SUPERPROX+™
Configuration Program
and
AC441 Handheld Configurator
Operating Instructions

Version 1.4
9/01/04

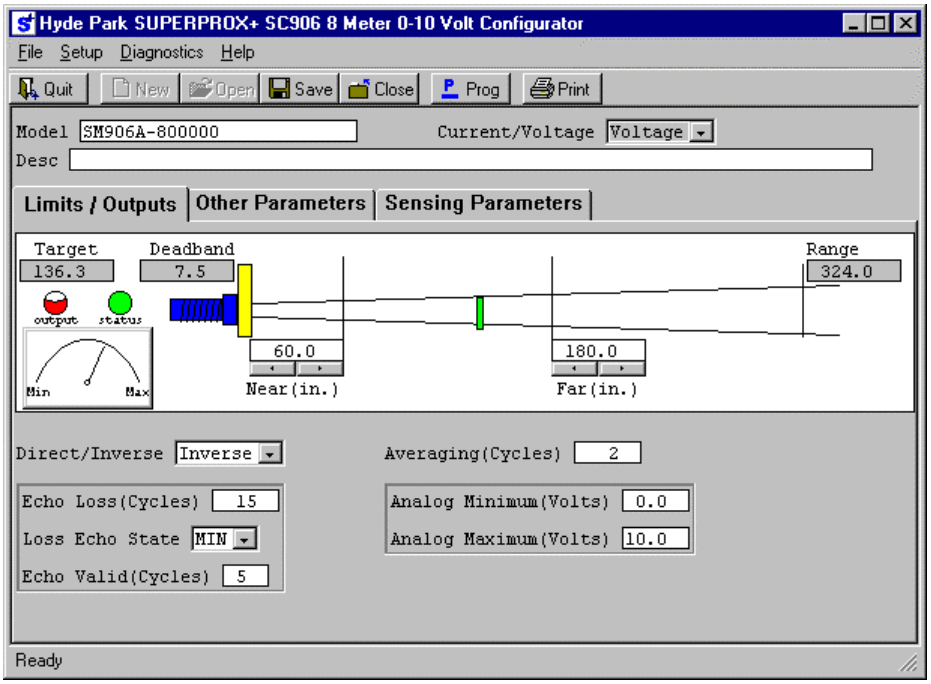

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Table of Contents

Introduction

Welcome to Hyde Park's SUPERPROX+ sensor configuration program. This configuration program is designed to configure all parameters used in the SC6 and SC9 series sensors. The SC series sensors are field configurable, while the SM series sensors are not field configurable. The SUPERPROX+ configuration program not only allows you to configure Hyde Park's world class ultrasonic sensors. In addition, it allows you to simulate the sensor's outputs and LEDs with a simulation target. This simulation lets you verify the configuration operation before programming the sensor.

With this program you can program sensors with s*tandard* configurations from Hyde Park or with *custom* configurations created by you. You can create and change custom configurations. You cannot delete or change the standard configurations from Hyde Park. However, you can open a Hyde Park standard configuration, modify it, and then save the modified configuration in your custom directory. When the program asks for a model to open or program, you can switch between the standard and custom configurations with the *standard* and *custom* selection buttons.

The program has on-line help plus a printable manual. Pausing the cursor over any configuration parameter, displays a popup window which explains that configuration parameter.

The distance units can be changed from inches to millimeters with the SETUP dropdown menu selection. In this manual, all distances are displayed in inches.

Requirements

This program requires Windows 95, 98, ME, or 2000. Also required is an AC441 Handheld Configurator and a reconfigurable sensor. Reconfigurable sensors have SC prefix instead of SM.

Installation

Installation from CD-ROM

1. Insert the SUPERPROX+ Configuration Program CD into CD-ROM drive. The setup program should autorun.
2. If the setup CD does not autorun, do the following:
   - Click on the **Start** menu icon.
   - Choose **Run** from the list
   - Type in **D:\Superprox+Setup.exe** (If your CD drive is not drive D, use the correct drive letter)
3. Follow the menus through the installation process. The setup program installs the SUPERPROX+ Configuration software onto your computer along with placing an optional icon on your desktop for easy access.

To upgrade the program to latest release, just run the setup installation program for the latest release. The previous version does not have to be uninstalled.

Removal of Software from Computer

1. Click on the **Start** menu icon.
2. Move the mouse pointer to **Programs**, then **Hyde Park SUPERPROX+**, and then click on **Uninstall SUPERPROX+**.
3. When asked to remove the programs, click **YES**.

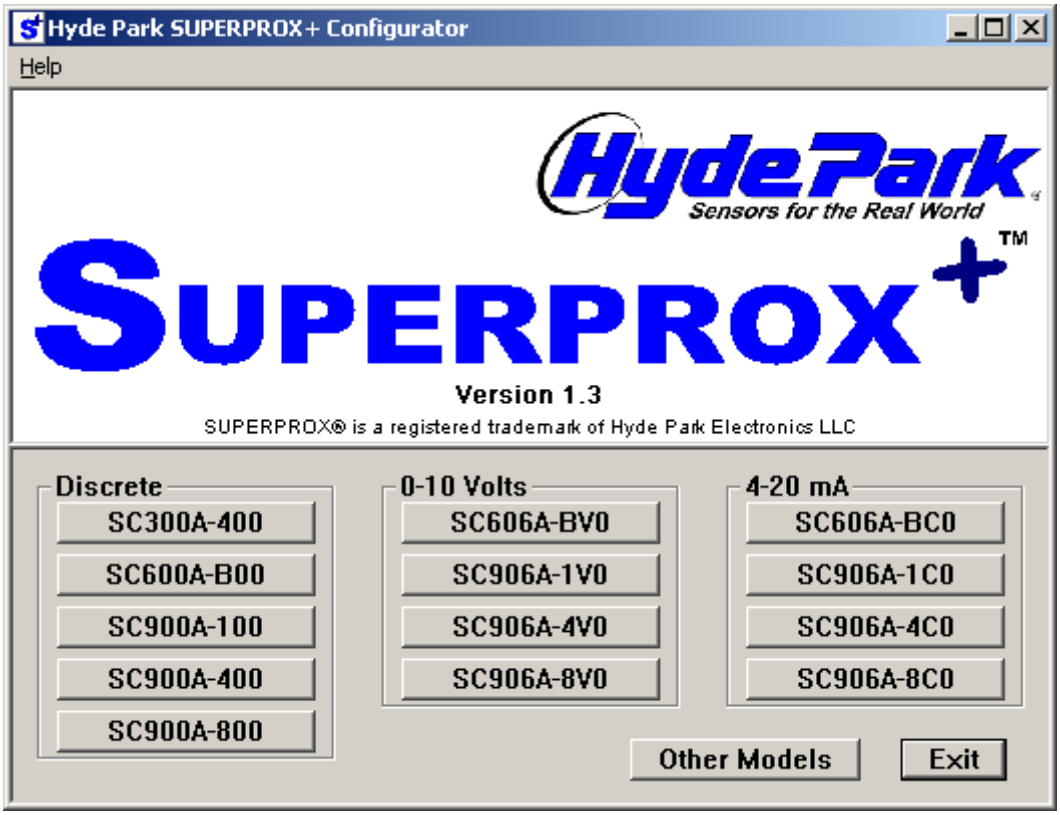
The uninstall program does not remove the directories created by the installation program or any configuration files you created.

Running the Software

The installation program optionally puts an icon on your desktop labeled *Hyde Park Superprox+*. Double click the **Hyde Park Superprox+** icon to run the SUPERPROX+ Configuration program. If you did not request a *Hyde Park Superprox+* desktop icon during installation, you can run the program by clicking the **Start** menu icon, then moving mouse pointer to **Programs**, then **Hyde Park SUPERPROX+,** and then click on **SUPERPROX+**.

Main Program Screen

When you start the SUPERPROX+ program, it presents a screen from which you can choose the sensor series that you are programming. Click the button for the series sensor you wish to program or edit. The sensor series can be read from the sensor's label.



Discrete Outputs Models:

SC300A-400	Discrete Output, 12 mm or Flat Profile, 101.6 mm (4 in.) max limit
SC600A-B00	Discrete Output, 18 mm or Flat Profile, 254 mm (10 in.) max limit
SC900A-100	Discrete Output, 30 mm, 1 meter (39 in.) range
SC900A-400	Discrete Output, 30 mm, 2 meter (79 in.) range
SC900A-800	Discrete Output, 30 mm, 8 meter (26 ft.) range

0-10 Volt Analog Output Models:

SC606A-BV0	0-10 Volts Analog Output, 18 mm or Flat Profile, 254 mm (10 in.) max limit
SC906A-1V0	0-10 Volts Analog Output, 30 mm, 1 meter (39 in.) range
SC906A-2V0	0-10 Volts Analog Output, 30 mm, 2 meter (79 in.)range
SC906A-8V0	0-10 Volts Analog Output, 30 mm, 8 meter (26 ft.) range

4-20 mA Analog Output Models

SC606A-BC0	4-20 mA Analog Output, 18 mm or Flat Profile, 254 mm (10 in.) max limit
SC906A-1C0	4-20 mA Analog Output, 30 mm, 1 meter (39 in.) range
SC906A-2C0	4-20 mA Analog Output, 30 mm, 2 meter (79 in.) range
SC906A-8C0	4-20 mA Analog Output, 30 mm, 8 meter (26 ft.) range

Other Models

When the Other Models button is clicked, the program pop ups a menu from which one of the following models can be chosen.

SC330A-400	SC300 with 3-pin pico connector – PNP output only
SC340A-400	SC300 with 3-pin pico connector – NPN output only
SC360A-400	SC300 with 4-pin pico connector – NPN and PNP outputs switched
SC380A-400	SC300 with 4-pin micro connector
SC390A-400	SC300 with 4-pin micro connector NPN and PNP outputs switched
SC606A-BC0AA	SC606-BC0 with remote limit setup (AA Option)
SC606A-BV0AA	SC606-BV0 with remote limit setup (AA Option)
SC660A-B00	SC600 with connector, NPN and PNP outputs switched
SC900A-100FS	Same as SC900A-100 with fluorosilicone transducer face
SC906A-1C0FS	Same as SC906A-1C0 with fluorosilicone transducer face
SC906A-1V0FS	Same as SC906A-1V0 with fluorosilicone transducer face
SC900A-700STS	Same as SC900A-100 except has 4.7 inch deadband and has stainless steel face and housing
SC906A-7C0STS	Same as SC906A-1C0 except has 4.7 inch deadband and has stainless steel face and housing
SC906A-7V0STS	Same as SC906A-1V0 except has 4.7 inch deadband and has stainless steel face and housing
SC909A-8R0	RS232 Output sensor, 30 mm, 8 meter (26 ft.) range

SUPERPROX+ Distance Units

The SUPERPROX+ program can display distances in either inches or millimeters. Select any sensor type from the main program screen. Next select the SETUP dropdown menu selection, select DISTANCE UNITS, and select the desired distance units. All distances in this manual are in inches.

SUPERPROX+ Program Control Bar

Located under the program title and dropdown menus is a control bar with buttons. These buttons allow easy access to the commonly used program operations. These buttons become enabled or disabled based upon the current operation.

Button	Description
Quit	Quits the program.
New	Creates a new model for editing. When clicked, the program presents a screen of model profiles as a starting point for the new model.
Open	Opens a model for either editing or programming. When clicked, the program presents a list of model numbers from the *Standard* models directory. From here you can either select a *standard* model or click the *custom* button to select a *custom* model created by you. Pausing the cursor on any model, displays a model summary description.
Save	Saves changes to the current model or creates a new model. To create a new model, change the model number to an unused model number, and then click this button. The program warns you if you are changing an existing model. Models you create are saved to the *Custom* models directory. You cannot save models to the *Standard* models directory, which are the models provided by Hyde Park.
Close	Closes the current model, which then presents a blank screen. If changes have been made to the model, the program warns you that the changes will be lost unless you click CANCEL to the program alert message box.
Prog	Programs a sensor. If a model is currently being displayed, that model is programmed into the sensor. If a model is not being displayed, the program presents a list of model numbers as in the OPEN button above. When a model is selected, that model is programmed into the sensor.
Print	Prints the current configuration to a printer.

SUPERPROX+ Program Dropdown Menus

Under the program title are four dropdown menu selections.

Menu	Item	Description
File		
	New Model	Same as NEW button.
	Open Model	Same as OPEN button.
	Save Model	Same as SAVE button.
	Close Model	Same as CLOSE button
	Delete Model	Presents a list of custom models from which can select a model to delete. You can only delete models you have created.
	Program Model	Same as PROG button
	Upload from Sensor	Uploads the configuration parameters from a sensor, and then displays the configuration parameters from that sensor.
	Print Model	Same as PRINT button.
	Exit	Same as QUIT button
Setup		
	Serial Port	Selects serial port to communicate with the sensor via the AC441.
	Distance Units	Selects distances to be displayed in either English Units (inches) or Metric units (millimeters). This does not affect the distance units in the SC900/SC906 Distance Display diagnostic.
Diagnostics		
	Diag Window	Opens a diagnostic window which might be useful if problems occur configuring a sensor.
	Test Com Port	Tests the communication and serial port connected from the PC to the AC441.
	Distance Display	SC900/SC906 only. Displays the target distance from the sensor, which is the same distance as displayed by AC441 LED display. The distance units are determined by the AC441. To change the distance units at the AC441, with the AC441 MODE button pressed, power up the AC441, and when the distance units are displayed; continue pressing the AC441 **MODE** button and press and release the AC441 ▲ button to toggle the distance units. If the AC441 does not display distance units, return the AC441 for an upgrade to latest firmware. The distance units are either "lnch" or "Eur".
Help		
	Help	Presents online help for this program.
	Manual	Opens this manual with Acrobat viewer.
	Terms and Conditions	Displays the Copyright, Disclaimer of Warranties, and Limitations of Liability.
	Website	Opens your web browser and then visits Hyde Park's website.
	About	Displays the program version and name.

Programming SC300 series Sensors

This procedure programs a model's configuration into an SC300 sensor. To determine the model, replace "SC330", "SC340, "SC350", "SC360", "SC380", "SC390" with "SC300", and drop the FP(flat profile) suffix. "SC300" specifies a cable model, SC330 specifies a 3-pin pico connector with PNP output, SC340 specifies a 3-pin pico connector with NPN output, "SC350" specifies a 4-pin pico connector model with standard outputs, "SC360" specifies a 4-pin pico connector model with NPN and PNP outputs switched, "SC380" specifies a micro connector model with standard outputs, and "SC390" specifies a micro connector model with NPN and PNP outputs switched. **SC330 and SC340 3-wire sensors require the AC441A version of the handheld configurator.**

1. Connect the sensor to the AC441 as indicated in drawing below. Connect your PC Serial Communication port to the AC441 DB9 connector with a DB9 serial extension cable. The PC Serial Communication port can be specified with the program SETUP dropdown menu.

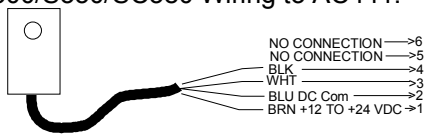
2. Plug the AC441 transformer into AC power and other end into the AC441 power connector.

3. For other than SC330 and SC340, press and release the AC441 ▲ button scrolling through models until 300 is displayed. If 300 does not show up in the display, then scroll through models until 600 is displayed. For SC330 scroll down until 300P is displayed, and for SC340 scroll down until 300n is displayed. 300P indicates 300 PNP and 300n indicates NPN.

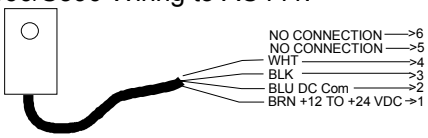
4. Double click the **Hyde Park Superprox+** desktop icon, and then click the button for the desired sensor type, which runs that sensor's type configuration program. The sensor type can be read from the sensor's label. Next click the **PROG** button on the control bar, which displays a screen of models. Double click the model to program into the sensor. The program displays a help box explaining how to power up the sensor. Hold the sensor so the sensor face is against the AC441 under the white bar located at the top-right of the AC441, and centered between the top and bottom of the AC441 box. With the other hand, press and release the AC441 **ENTER** button, which powers up the sensor. While the sensor is powered up, the AC441 illuminates the decimal points. If the help box does not disappear after you power up the sensor, try powering the sensor off and on again. Pressing and releasing the AC441 **ENTER** button toggles the sensor's power. If programming the sensor is unsuccessful, see the troubleshooting section (page 49). If still unable to program the sensor, verify that you have a field configurable sensor which has the SC prefix. While programming, the program displays the locations in the sensor being programmed on the program STATUS bar at the bottom of program screen.

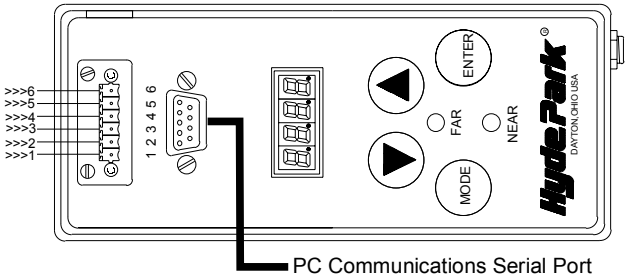
5. When finished programming, the program displays a message that the programming was either successful or unsuccessful. If successful, click the **OK** button to complete the programming and press the AC441 **ENTER** button to turn off power to the sensor. If unsuccessful, press the AC441 **ENTER** button to turn off power to the sensor, and try the process again.

SC300/S350/SC380 Wiring to AC441.

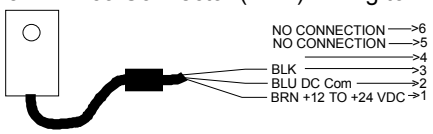


SC360/S390 Wiring to AC441.

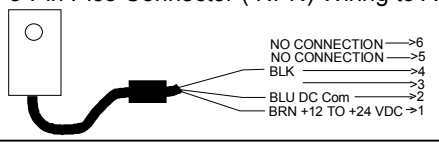


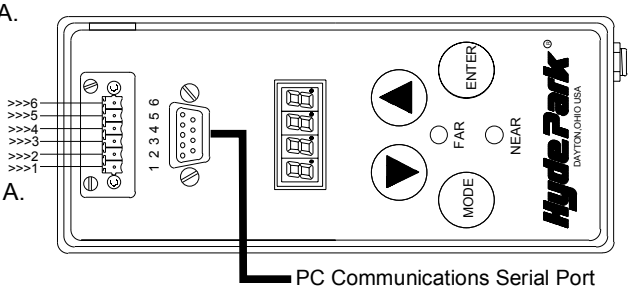


SC330 3-Pin Pico Connector (PNP) Wiring to AC441A.



SC340 3-Pin Pico Connector (NPN) Wiring to AC441A.





Programming SC600, SC660, or SC606 Sensors

This procedure programs a model's configuration into an SC600, SC660 or SC606 sensor, including AA option (remote limit setup) models. The same model configuration is used for similar 18 mm cable, 18 mm connector, flat-profile cable, and flat-profile connector models. To determine the model, replace "SC65" or "SC66" with "SC60", and drop the FP(flat profile) suffix. "SC60x" specifies a cable model, "SC65x" specifies a connector model with standard outputs, and "SC660" specifies a connector model with the NPN and PNP outputs switched.

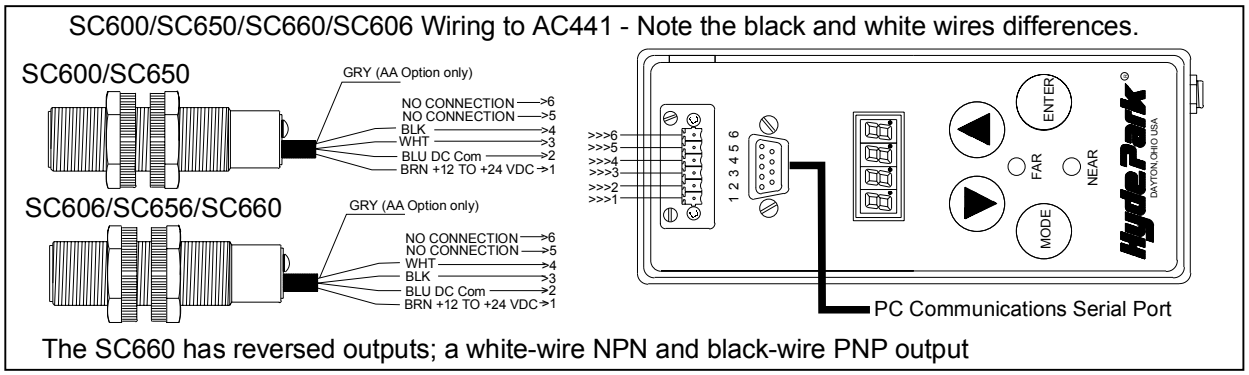
1. Connect the sensor to the AC441 as indicated in drawing below. Note the difference in the black- and white-wire connections between an SC600/SC650 and an SC660/SC606/SC656. Connect your PC Serial Communication port to the AC441 DB9 connector with a DB9 serial extension cable. The PC Serial Communication port can be specified with the program SETUP dropdown menu.

2. Plug the AC441 transformer into AC power and other end into the AC441 power connector.

3. Press and release the AC441 ▲ button scrolling through models until 600 or 606 is displayed.

4. Double click the **Hyde Park Superprox+** desktop icon, and then click the button for the desired sensor type, which runs that sensor's type configuration program. The sensor type can be read from the sensor's label. Next click the **PROG** button on the control bar, which displays a screen of models. Double click the model to program into the sensor. The program displays a help box explaining how to power up the sensor. Hold the sensor so the sensor face is against the AC441 under the white bar located at the top-right of the AC441, and centered between the top and bottom of the AC441 box. With the other hand, press and release the AC441 **ENTER** button, which powers up the sensor. While the sensor is powered up, the AC441 illuminates the decimal points. If the help box does not disappear after you power up the sensor, try powering the sensor off and on again. Pressing and releasing the AC441 **ENTER** button toggles the sensor's power. If programming the sensor is unsuccessful, see the troubleshooting section (page 49). If still unable to program the sensor, verify the sensor model series (SC600, SC660, or SC606) matches the configuration program (SC600/SC660/SC606), and that you have a field configurable sensor. While programming, the program displays the locations in the sensor being programmed on the program STATUS bar at the bottom of program screen.

5. When finished programming, the program displays a message that the programming was either successful or unsuccessful. If successful, click the **OK** button to complete the programming and press the AC441 **ENTER** button to turn off power to the sensor. If unsuccessful, press the AC441 **ENTER** button to turn off power to the sensor, and try the process again.



Programming SC900 or SC906 Sensors

This procedure programs a model's configuration into an SC900 or SC906 sensor. The same model configuration is used for both cable and connector models. To determine the model, replace "SC95" with "SC90". "SC90x" specifies a cable model, and "SC95x" specifies a connector model.

1. Connect the sensor to the AC441 as indicated in drawing below. Connect your PC Serial Communication port to the AC441 DB9 connector with a DB9 serial extension cable. The PC Serial communications port can be specified with the program SETUP dropdown menu.

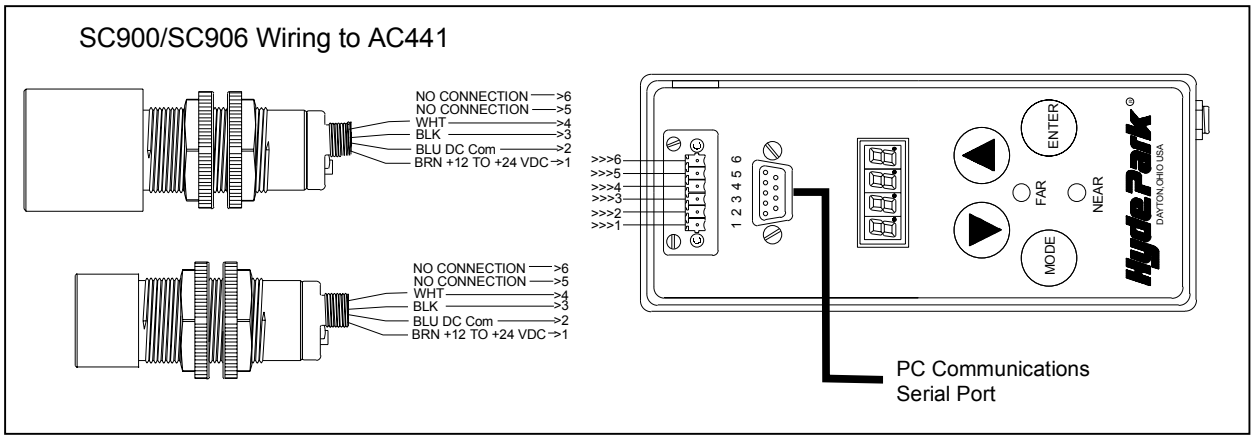
2. Plug the AC441 transformer into AC power and other end into AC441 power connector.

3. Press and release the AC441 ▲ button scrolling through models until 900 or 906 displayed.

4. Double click the **Hyde Park Superprox+** desktop icon, and then click the desired sensor type to program, which runs that sensor's type configuration program. The sensor type can be read from the sensor's label. Next click the **PROG** button on the control bar, which displays a screen of models. Double click on the models to program into the sensor. The program displays a help box that the program is attempting communication with the sensor. When the sensor is powered up, the AC441 illuminates the decimal points. While programming, the program displays status information. If programming the sensor is unsuccessful, see the troubleshooting section (page 49). If still unable to program the sensor, verify the sensor model series (SC900 or SC906) matches the configuration program (SC900 or SC906), and that you have a reconfigurable sensor.

5. While programming, the program displays status messages that indicate the current operation.

6. When finished programming, the program displays message that the programming was either successful or unsuccessful. If successful, click to **OK** button to complete. If unsuccessful, click to **OK** button to abort, and then try programming again.



Uploading Configurations from SC300 series Sensors

This procedure uploads a model's configuration from an SC300 sensor. To determine the model, replace "SC330", "SC340, "SC350", "SC360", "SC380", "SC390" with "SC300", and drop the FP(flat profile) suffix. "SC300" specifies a cable model, SC330 specifies a 3-pin pico connector with PNP output, SC340 specifies a 3-pin pico connector with NPN output, "SC350" specifies a 4-in pico connector model with standard outputs, "SC360" specifies a 4-pin pico connector model with NPN and PNP outputs switched, "SC380" specifies a micro connector model with standard outputs, and "SC390" specifies a micro connector model with NPN and PNP outputs switched. **SC330 and SC340 3-wire sensors require the AC441A version of the handheld configurator.**

1. Connect the sensor to the AC441 as indicated in drawing below. Connect your PC Serial Communication port to the AC441 DB9 connector with a DB9 serial extension cable. The PC Serial Communication port can be specified with the program SETUP dropdown menu.

2. Plug the AC441 transformer into AC power and other end into the AC441 power connector.

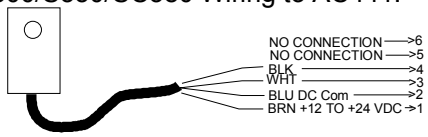
3. For other than SC330 and SC340, press and release the AC441 ▲ button scrolling through models until 300 is displayed. If 300 does not show up in the display, then scroll through models until 600 is displayed. For SC330 scroll down until 300P is displayed, and for SC340 scroll down until 300n is displayed. 300P indicates 300 PNP and 300n indicates NPN.

This procedure uploads the configuration from an SC300 sensor to the PC.

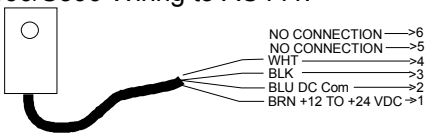
4. Double click the **Hyde Park Superprox+** desktop icon, and then click the desired sensor type from which to upload, which runs that sensor's type configuration program. The sensor type can be read from the sensor's label. Next click the program dropdown **File** selection and then **Upload from Sensor.** The program displays a help box explaining how to power up the sensor. Hold the sensor so the sensor face is against the AC441 under the white bar located at the top-right of the AC441, and centered between the top and bottom of the AC441 box. With the other hand, press and release the AC441 ENTER button, which powers up the sensor and loads the configuration data from the sensor. While the sensor is powered up, the AC441 illuminates the decimal points. If the help box does not disappear after you press the AC441 ENTER button, try powering the sensor off and on again. Pressing and releasing the AC441 ENTER button toggles the sensor power. If uploading from the sensor is unsuccessful, see the troubleshooting section (page 49). If still unable to program the sensor, verify and that you have a field configurable sensor, which has a SC prefix. While programming, the program displays the locations in the sensor being programmed on the program STATUS bar, which is at the bottom of program screen.

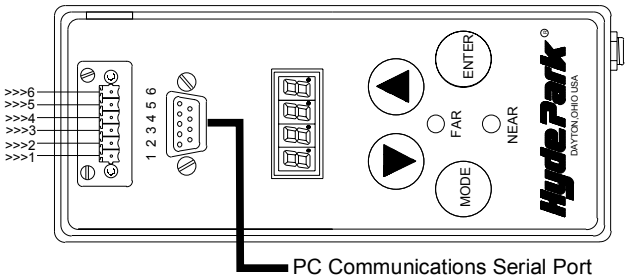
5. When finished uploading, if successful the program displays the configuration data from the sensor. Press the AC441 ENTER button to turn off power to the sensor. If unsuccessful, a failure message is displayed. Click the OK button to abort the uploading, press the AC441 ENTER button to turn off power to the sensor, and try the process again

SC300/S350/SC380 Wiring to AC441.



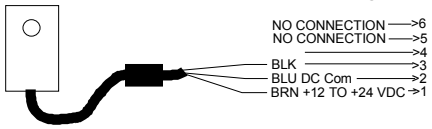
SC360/S390 Wiring to AC441.



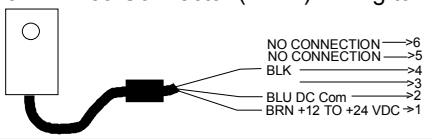


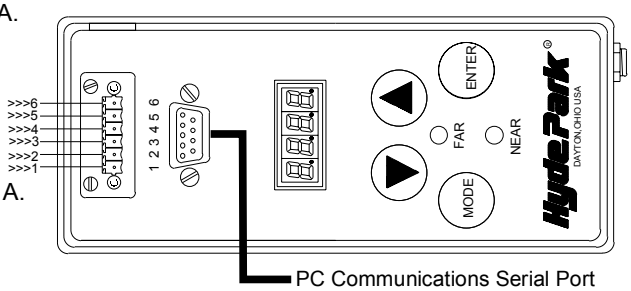
PC Communications Serial Port

SC330 3-Pin Pico Connector (PNP) Wiring to AC441A.



SC340 3-Pin Pico Connector (NPN) Wiring to AC441A.





PC Communications Serial Port

Uploading Configurations from SC600, SC660, or SC606 Sensors

This procedure uploads the configuration from an SC600, SC660 or SC606 sensor to the PC.

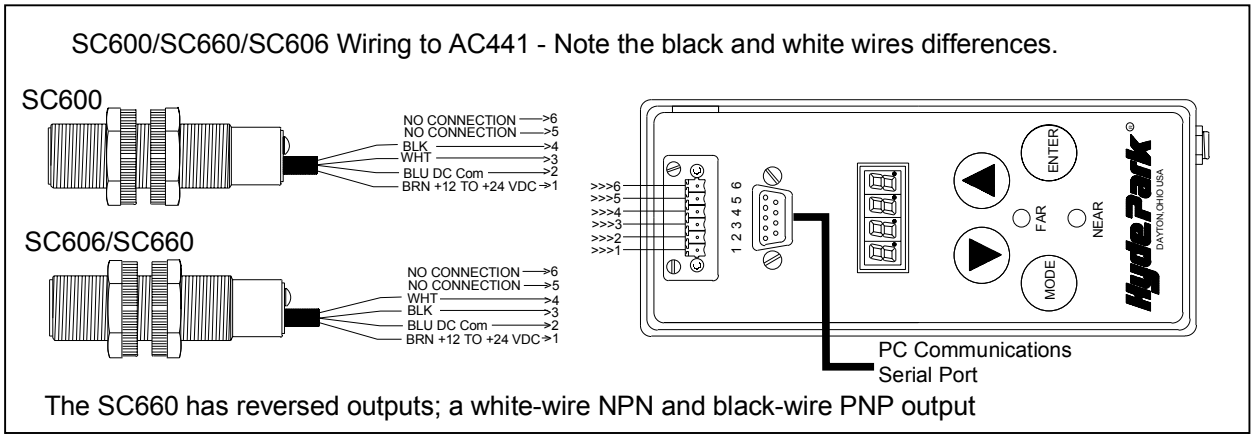
1. Connect the sensor to the AC441 as indicated in drawing below. Note the difference in the black- and white-wire connection between an SC600 and SC660/SC606. Connect your PC Serial Communication port to the AC441 DB9 connector with a DB9 serial extension cable. The

2. Plug the AC441 transformer into AC power and other end into the AC441 power connector.

3. Press and release the AC441 ▲ button scrolling through models until 600 or 606 is displayedf

4. Double click the **Hyde Park Superprox+** desktop icon, and then click the desired sensor type from which to upload, which runs that sensor's type configuration program. The sensor type can be read from the sensor's label. Next click the program dropdown **File** selection and then **Upload from Sensor.** The program displays a help box explaining how to power up the sensor. Hold the sensor so the sensor face is against the AC441 under the white bar located at the top-right of the AC441, and centered between the top and bottom of the AC441 box. With the other hand, press and release the AC441 **ENTER** button, which powers up the sensor and loads the configuration data from the sensor. While the sensor is powered up, the AC441 illuminates the decimal points. If the help box does not disappear after you press the AC441 **ENTER** button, try powering the sensor off and on again. Pressing and releasing the AC441 **ENTER** button toggles the sensor power. If uploading from the sensor is unsuccessful, see the troubleshooting section (page 49). If still unable to program the sensor verify the sensor model series (SC600, SC660, or SC606) matches the configuration program (SC600/SC660/SC606), and that you have a field configurable sensor. While programming, the program displays the locations in the sensor being programmed on the program STATUS bar, which is at the bottom of program screen.

5. When finished uploading, if successful the program displays the configuration data from the sensor. Press the AC441 **ENTER** button to turn off power to the sensor. If unsuccessful, a failure message is displayed. Click the **OK** button to abort the uploading, press the AC441 **ENTER** button to turn off power to the sensor, and try the process again



Uploading Configurations from SC900 or SC906 Sensors

This procedure uploads the configuration from an SC900 or SC906 sensor to the PC.

1. Connect the sensor to the AC441 as indicated in drawing below. Connect your PC Serial Communication port to AC441 DB9 connector with a DB9 serial extension cable. The PC Serial communications port can be specified with the program SETUP dropdown menu.

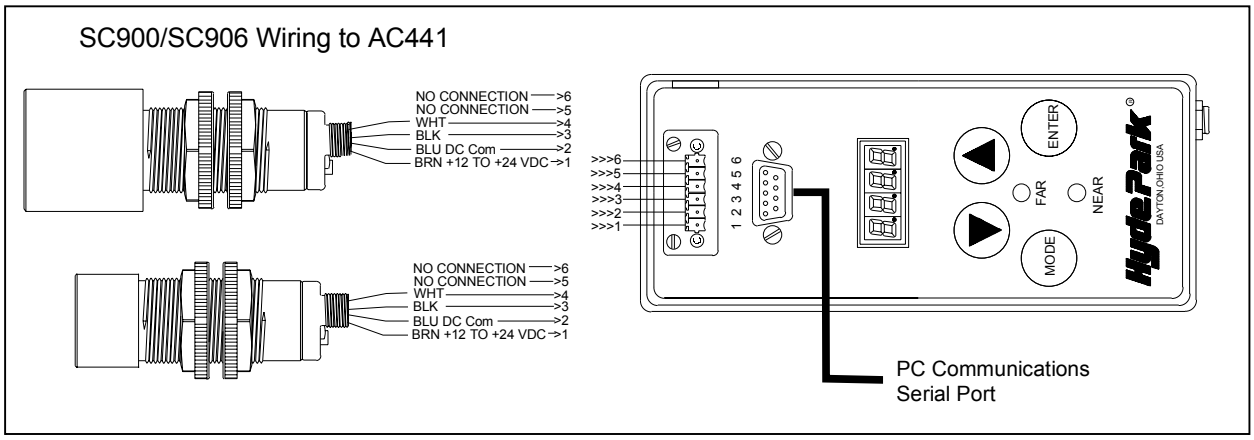
2. Plug the AC441 transformer into AC power and other end into the AC441 power connector.

3. Press and release the AC441 ▲ button scrolling through models until 900 or 906 displayed.

4. Double click the **Hyde Park Superprox+** desktop icon, and then click the desired sensor type from which to upload, which runs that sensor's type configuration program. The sensor type can be read from the sensor's label. Next click the program dropdown **File** selection and then **Upload from Sensor.** The program displays a help box that the program is attempting communication with the sensor. When the sensor is powered up, the AC441 illuminates the decimal points. If unable to upload from the sensor, see the troubleshooting section (page 49). If still unable to upload from the sensor, verify the sensor model series (SC900 or SC906) matches the configuration program (SC900 or SC906), and that you have a reconfigurable sensor.

5. While uploading, the program displays status messages that indicate the current operation.

6. When finish uploading, if successful, the program displays the configuration from the sensor. If unsuccessful, a failure message is displayed. Click the **OK** button to abort the uploading, and try again.



Editing a Sensor Configuration

Double click the **Hyde Park Superprox+** desktop icon and then click the desired sensor type to edit, which runs that sensor's type configuration program. The sensor type can be read from the sensor's label. Next click the **OPEN** button from the control bar, which displays a screen of models that are valid for that sensor type. Click the **CUSTOM** button to switch to configurations defined by you. Click the **STANDARD** button to switch to configuration supplied by Hyde Park. Double click the model you wish to edit. The program then displays the configuration parameters for that configuration. The SC600s/SC606s have 2 pages of parameters and the SC900s/SC906s have 3 pages of parameters. Click the page tabs under the model description to switch between the pages of parameters.

When a model is displayed, to change a parameter field either press the TAB or <ctrl>TAB key until the desired parameter is highlighted, or click the left mouse button on the parameter field. For text and numeric fields, type in the new value for the field. For dropdown list selections, click the arrow next to the parameter, and then select the desired option.

For help about any configuration parameter, pause the cursor pointer on the parameter field. A popup window appears which explains the configuration parameter.

<u>To make a new model</u>

1. Click the **OPEN** button. A screen of existing model configurations is displayed.
2. Double click a model similar to the new configuration desired.
3. Change the model number and make the desired changes to the configuration.
4. Click the **SAVE** button. The new model is saved to your custom directory.

or

1. Click the **NEW** button. A small window of sensor profiles is displayed.
2. Double click on the desired sensor profile.
3. Change the model number and make the desired changes to the configuration.
4. Click the **SAVE** button. The new model will be saved to your custom directory.

<u>To make permanent changes to an existing model</u>

The *Standard* models from Hyde Park cannot be changed. You can only change models that you created. The models you create are saved in the *Custom* directory of models. You can use the standard models from Hyde Park to create new models.

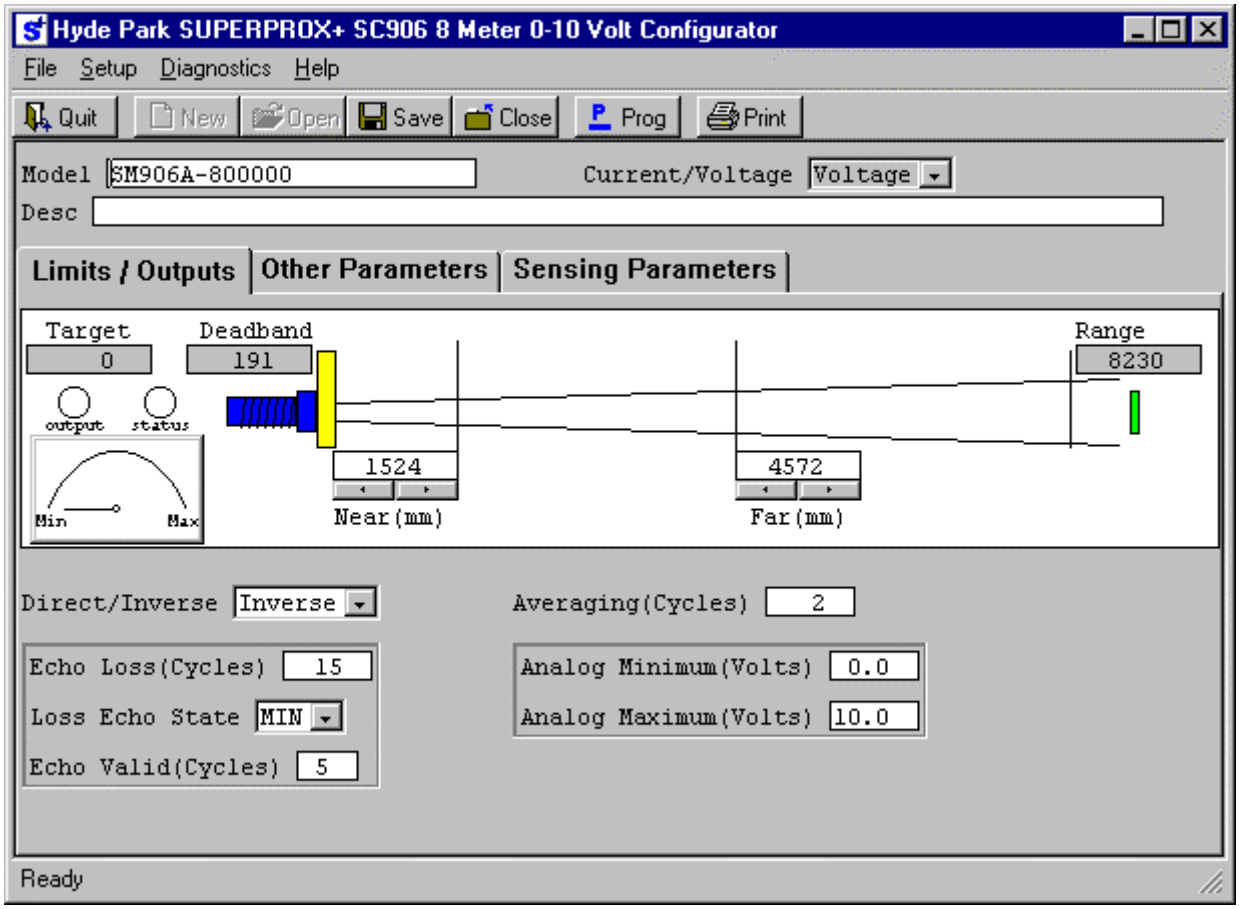
1. Click the **OPEN** button. A screen of all standard existing models is displayed.
2. Click the **CUSTOM** button to display the custom models. A screen of custom models is displayed.
3. Double click the model to change.
4. Make the desired changes to the model.
5. Click the **SAVE** button. Click **OK** to overwrite the current model.

<u>To make a one time change to a model</u>

1. Click the **OPEN** button. A screen of models is displayed.
2. Double click the model to program from either the *Standard* or *Custom* models.
4. Make the desired changes to the model.
5. Click the **PROG** button to program the changed model. (See programming Sensor above)

Sensor Simulation

The operation of the sensor can be simulated by dragging the target, which is currently between the two limits, with the mouse. To set the target to no echo, either move the target all the way to the right or move the target to the top of the simulation window.



Configuration - General Concepts

Cycles: The response time and delays are specified in cycles. See the next paragraph.

Cycle Time: The sensors operate in pulse echo mode, which means the sensor periodically sends a burst of ultrasonic energy and then listens for an echo return. This period between bursts is referred to as cycle time. All processing is done once every cycle. The cycle time must be large enough for the sound to travel to the maximum range and return. Also it must be large enough so that secondary echoes do not occur. See Speed-of-Sound below.

Response Time: Since processing is done once per cycle (see previous paragraph), all delays and response times are in multiples of the cycle time. The cycle time for the SC600s and SC606s is specified in the Advanced Parameters and for the SC900s and SC906s is specified in the Sensing Parameters. The actual response time may be a 1/2 cycle longer than the stated value, because if an object moves into the beam just after the ultrasonic energy passed, the object will not be detected until the next cycle.

Speed-of-Sound: Ultrasonic energy requires 150 microseconds to travel from the sensor face to a target at 1 inch (25.4 mm) and back to the sensor face. Therefore the minimum cycle time must be at least 150 usec times the maximum distance in inches (6 usec times the maximum distance in millimeters).

NPN is a type output that switches to ground when on. Normally the other end of the NPN load is connected to V+. NPN is often referred to as Sinking output.

PNP is a type output that switches to V+ when on. Normally the other end of the PNP load is connected to ground. PNP is often referred to as a Sourcing output.

SC300 Configuration Parameters

Introduction

The SC300/SC350 sensors have a black-wire NPN output and a white-wire PNP output. These two outputs are connected internally and are either both on or both off. The SC300 supports both Proximity and Dual Level processing. The sensors also have a bi-color LED that is either amber or orange. In Proximity mode, the bi-color LED is usually orange when a target is between the limits and amber when a target is not between limis. In Dual Level mode, the bi-color LED is usually orange when the outputs are on and amber when the outputs are off.

Some older model SC300's may not support Dual Level processing, long cycle times, and large delays. This program will not allow you to load these configurations into these older sensors. These configuration parameters can only be checked when the sensor is being configured.

The SC300 series sensor's parameters are separated under two tab controls: 1) Limits / Outputs and 2) Advanced Parameters. The tab controls appear just below the model description. To switch between tab controls, click the desired tab control. The parameters are explained under the tab control name under which the appear.

For help about any configuration parameter, pause the cursor pointer on the parameter field. A popup window appears which explains the configuration parameter.

The definitions of some of the fields are explained in more detail in "Sensing Terms" of the Hyde Park catalog.

Proximity Processing Used for proximity on/off processing delays. The outputs switch to one state when a target is between the limits and the opposite state when the target is not detected between the limits. The sensor LED is normally amber when an object is not detected within limits and is orange when an object is detected within limits (This color can be reversed with an advanced parameter.)

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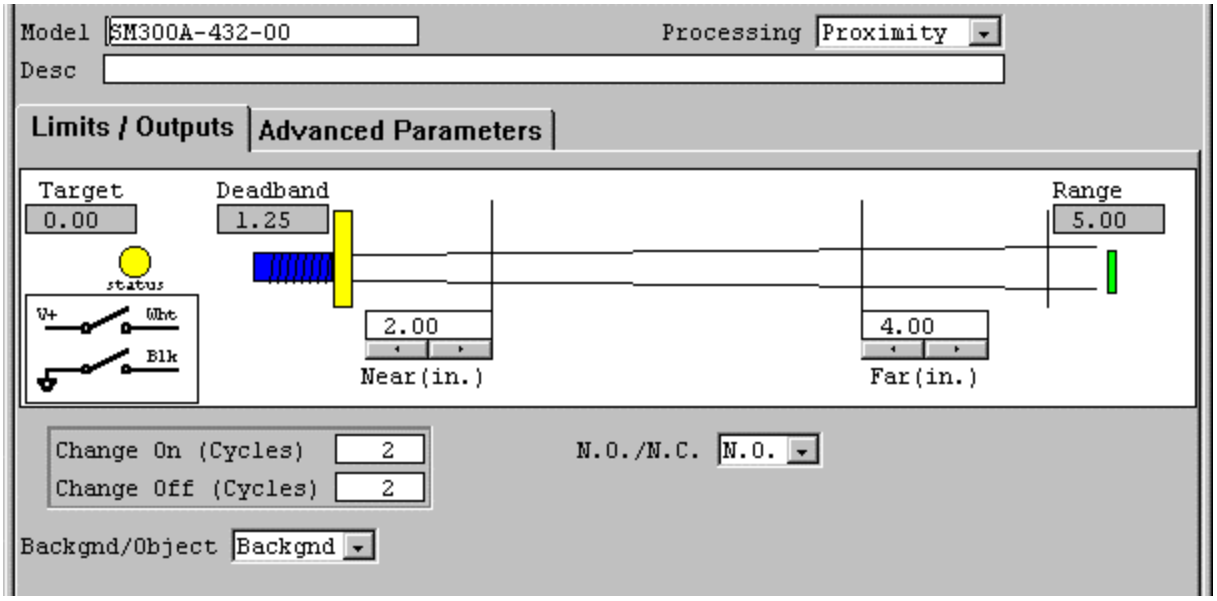
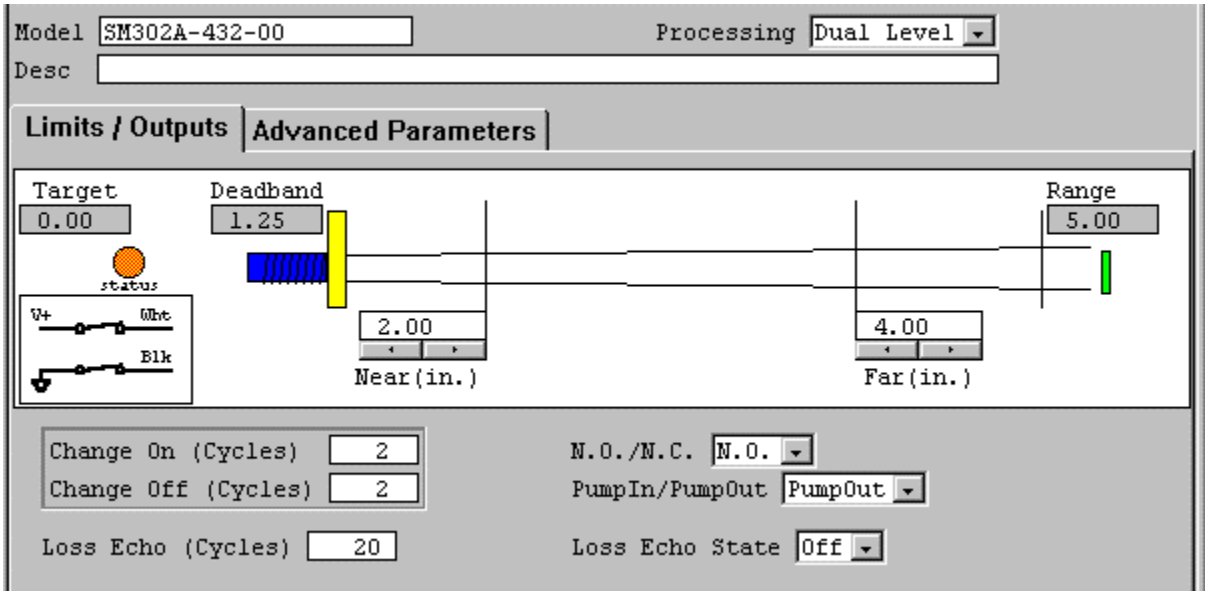


Dual-Level Processing Used for dual-level (Pump In and Pump Out) operation. In dual level, the sensor LED is normally amber when the outputs are off and orange when the outputs are on. (This color can be reversed with an advanced parameter.)



Non-Tab Control Parameters

Name	Description
Model	The number for the model, which is also the filename for this model. This number can be from 1 to 19 characters long.
Processing	Specifies the model processing. Select either Proximity or Dual Level. (Some older sensors do not support Dual Level)
Desc	A comment field that can be used to describe the model operation or any other useful information.

Simulation Window Parameters

Near Limit(in.)	Determines the near limit of the sensor. This parameter can be changed by either dragging the limit with the mouse or typing in a limit value. For fine adjustment of limit, click the arrows below the limit.
Far Limit(in.)	Determines the far limit of the sensor. This parameter can be changed by either dragging the limit with the mouse or typing in a limit value. For fine adjustment of limit, click the arrows below the limit.

Limits/Outputs Tab Parameters (Proximity

Change On (Cycles	The number of consecutive cycles the target has to be detected between the limits before the outputs change to the logical ON state.
Change Off (Cycles)	The number of consecutive cycles no target can be detected between the limits before the output change to the logical OFF state
N.O./N.C.	N.O. = Outputs are on when target detected between limits. N.C. = Outputs are off when target detected between limits.
Backgnd/Object	Selects either Backgnd or Object mode processing Backgnd - Sensor processes only first echo detected (standard). Object - Sensor processes multiple echoes, and assumes object is between the limits if any echo is detected between the limits.

Limits/Outputs Tab Parameters (Dual Level

Change On (Cycles	The number of consecutive cycles the target has to be detected between the limits before the outputs change to the logical ON state.
Change Off (Cycles)	The number of consecutive cycles no target can be detected between the limits before the output change to the logical OFF state
N.O./N.C.	N.O. = Outputs are on when target detected between limits. N.C. = Outputs are off when target detected between limits.
Pumpin/Pumpout	PumpIn = Outputs turn logically on when target farther than far limit and logically off when target closer than near limit. PumpOut = Outputs turn logically on when target closer than near limit and logically off when target farther than far limit.
Loss Echo (Cycles)	= 0 - On echo loss, outputs hold their last known state. > 0 - When a target is not detected for this many cycles, the outputs are set to the LOSS ECHO STATE.
Loss Echo State	Determines the power up state and the echo loss state.

Advanced Tab Parameters

The advanced parameters should normally not be changed.

Cycle Time(usec)	This sensor sends a burst of ultrasonic energy at regular intervals, and listens for the reflection of that ultrasonic energy. This parameter determines the time between bursts of ultrasonic energy. Ultrasonic energy requires 150 microseconds to travel from the sensor face to a target at 1 inch and back to the sensor face.
Ramp Deadband (in.)	Consult Hyde Park before changing this field. The Ramp is used to decrease the sensitivity of the sensor close to the sensor face where the receive transducer is still ringing from the transmitted energy. This allows a closer deadband value.
Range Dist(in.)	The farthest distance at which the sensor can detect an object. The sensor disables its receiver at this distance. The SC300A-400 has a maximum range of 5 inches (127 mm) with a maximum far limit of 4 inches (101.6 mm).
Xmit Power	Use this parameter to change the power or ultrasonic transmit energy.
Ramp Hyst (usec.)	Proximity mode only. Consult Hyde Park before changing this field. This hysteresis shifts the ramp closer to start of burst, which effectively lowers the echo detection threshold.
Near Limit Hyst(in.)	Proximity mode only. When an object is detected within the limits, the sensor moves the near limit this much closer to the sensor to prevent output oscillation at the near limit.
Far Limit Hyst(in.)	Proximity mode only: When an object is detected within the limits, the sensor moves the far limit this much farther from the sensor to prevent output oscillation at the far limit.
Reverse LED Color	Select Yes to reverse the operation of the bi-color LED as follows: Proximity - Amber when between limits, Orange when outside limits. Dual Level - Amber when outputs are on. Orange when outputs are off.

SC600 Configuration Parameters (Including AA Option)

Introduction

The LED configuration parameter affects only the LED in the 18 mm cable and the flat profile models. If an AC117 or AC127 connector cable is attached to an 18 mm SC650 connector model, the AC117 or AC127 connector LED shows the state of black-wire NPN output. This LED is on when the black-wire NPN output is sinking and off when the black-wire NPN output is non-sinking. There is no LED for the 18 mm SC660 connector models.

The SC600/SC650 sensors have a black-wire NPN output and a white-wire PNP output. The action of these outputs are independent of each other, and is specified with configuration parameters.

The SC660 models have reverse outputs; the black-wire is a PNP output and the white-wire is an NPN output. The action of these outputs are independent of each other, and is specified with configuration parameters. If the SC660 model was selected from the main configuration screen, the black-wire and white-wire outputs are switched in the configuration parameters and in the simulation window to reflect the SC660 outputs. All examples are shown for the SC600/SC650 model series.

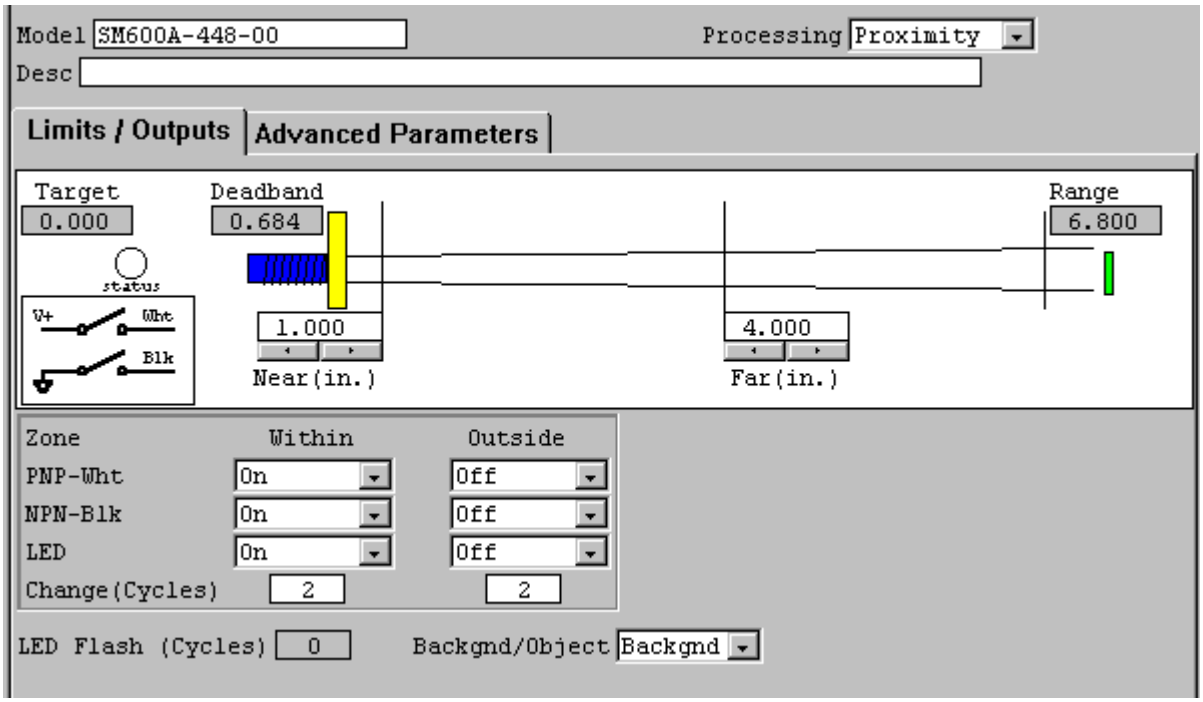
The SC600 series sensor's parameters are separated under two tab controls: 1) Limits / Outputs and 2) Advanced Parameters. The tab controls appear just below the model description. To switch between tab controls, click the desired tab control. The parameters are explained under the tab control name under which the appear.

For help about any configuration parameter, pause the cursor pointer on the parameter field. A popup window appears which explains the configuration parameter.

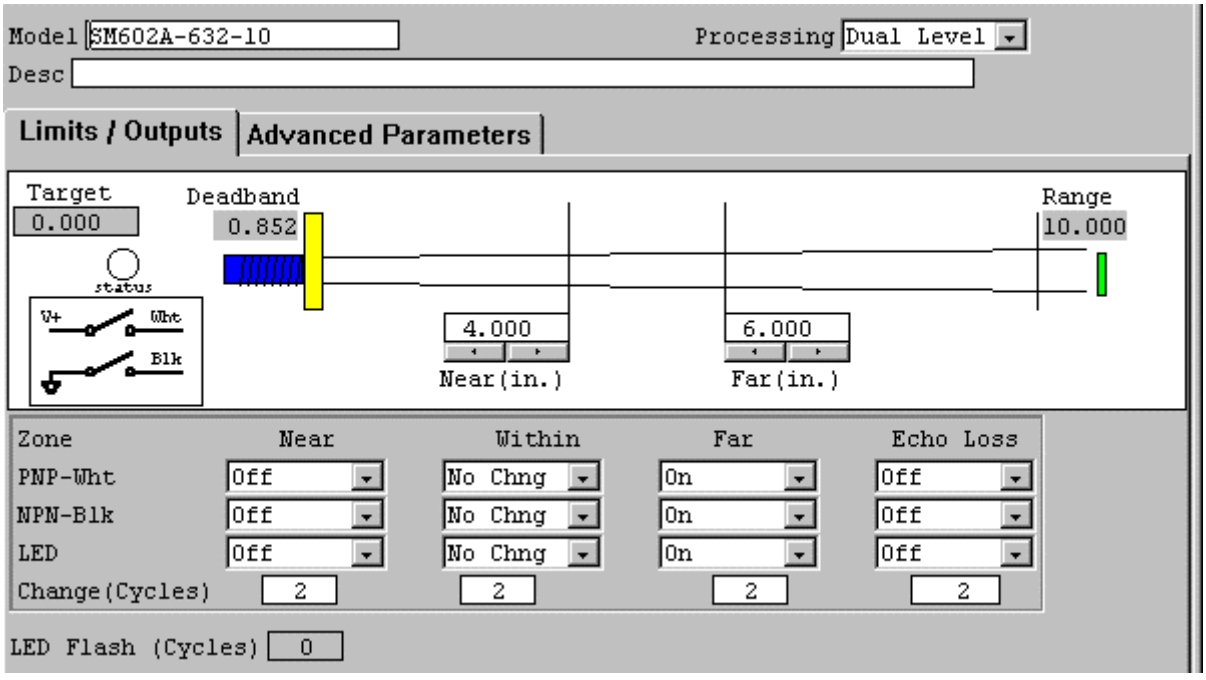
The definitions of some of the fields are explained in more detail in "Sensing Terms" of the Hyde Park catalog.

The SC600 supports both Proximity and Dual-Level processing. The parameters presented are determined by the selected processing mode.

Proximity Processing: Used for proximity on/off processing with delays. The outputs switch to one state when the target is between the limits and to the opposite state when the target is not between the limits.



Dual-Level Processing: Used for dual-level latch (Pump In and Pump Out) operation. Dual level processing has four zones, where the action for each output can be specified by zone. The four zones are: 1) between deadband near limit, 2) between near and far limit, 3) between far limit and far range, and 4) no echo.



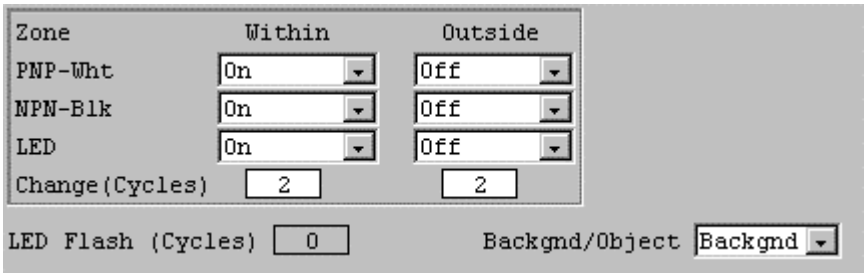
Non-Tab Control Parameters

Name	Description
Model	The number for the model, which is also the filename for this model. This number can be from 1 to 14 characters long.
Processing	Specifies the model processing. Select either Proximity or Dual Level.
Desc	A comment field that can be used to describe the model operation or any other useful information.

Simulation Window Parameters

Near Limit(in.)	Determines the near limit of the sensor. This parameter can be changed by either dragging the limit with the mouse or typing in a limit value. For fine adjustment of limit, click the arrows below the limit.
Far Limit(in.)	Determines the far limit of the sensor. This parameter can be changed by either dragging the limit with the mouse or typing in a limit value. For fine adjustment of limit, click the arrows below the limit.

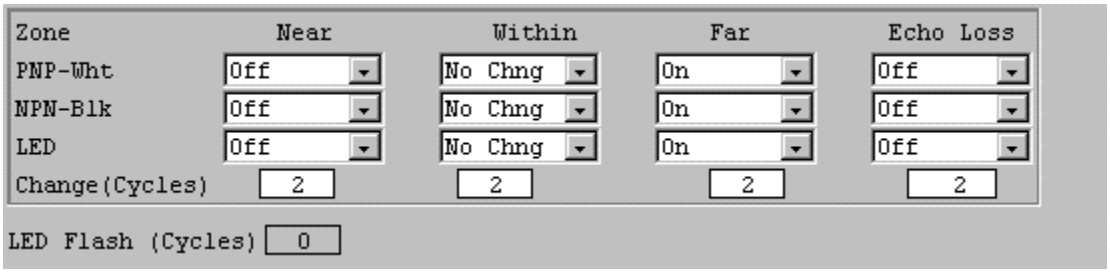
Limits and Outputs - Proximity



The proximity processing defines two zones: 1) Within - target is between the limits, and 2) Outside - no target is between the limits. The number of consecutive echoes required in a zone to switch to that zone is specified by the CHANGE(CYCLE) parameter for each zone. The action for the PNP output, the NPN output, and the LED can be independently set to OFF, ON, NO CHNG. The PNP output can also be set to generate a SQR WAVE, with the period and duty cycle settable with the advanced parameters. The LED can also be set to FLASHING, which is a state used for some Dual Level models.

LED flash (Cycles)	If flashing is specified for the LED, then this parameter is enabled and is the number of cycles the LED is on and then off when an object is in a flashing zone.
Backgnd/Object	Selects either Backgnd or Object mode processing Backgnd - Sensor processes only first echo detected (standard). Object - Sensor processes multiple echoes, and assumes object is between the limits if any echo is detected between the limits.

Limits and Outputs - Dual Level



The dual-level processing defines four zones: 1) Near - target is closer than near limit, 2) Within - target is between the limits, 3) Far - target between far limit and far range, 4) Echo Loss - no target detected (echo loss). The number of consecutive echo required to switch to a zone is specifies by the CHANGE(CYCLE) parameter for each zone. The action for the PNP output, NPN output, and the LED can be independently set to OFF, ON, or NO CHNG. The PNP output can also be set to SQR WAVE, with the period and duty cycle settable with the advanced parameters. The LED can also be set to FLASHING.

For Pump-In operation, set Near = OFF, Within = NO CHNG, and Far = ON.
For Pump-Out operation, set Near = ON, Within = NO CHNG, and Far = OFF.

LED flash (Cycles)	If flashing is specified for the LED, then this parameter is enabled and is the number of cycles the LED is on and then off when an object is in a flashing zone.

Advanced Parameters

The advanced parameters should normally not be changed.

Model Gain	Used to change the receiver sensitivity of the sensor. Increasing this value increases the distance that a target can be seen. Higher gains can be used to see smaller targets. Increasing the gain, however, increases the deadband and can require a longer cycle time. The standard gain is 100.
Cycle Time(usec)	This sensor sends a burst of ultrasonic energy at regular intervals, and listens for the reflection of that ultrasonic energy. This parameter determines the time between bursts of ultrasonic energy. Ultrasonic energy requires 150 microseconds to travel from the sensor face to a target at 1 inch and back to the sensor face.
Ramp Start(in.)	Consult Hyde Park before changing this field. The Ramp is used to decrease the sensitivity of the sensor close to the sensor face where the receive transducer is still ringing from the transmitted energy. This allows a closer deadband value.
Slow Ramp	This parameter must be enabled for high gain sensors. The slow ramp decreases the sensitivity of the sensor farther from the sensor face than the normal ramp. This decreased sensitivity is needed to ignore the increased ringing near the sensor face due to the higher gain. If the MODEL GAIN is set greater than 100, then this should be set to YES.

Deadband(in.)	The transmitted ultrasonic energy causes the receive transducer to ring. The deadband is the time for this ringing to diminish to the point where the transducer can receive its echo.
Range Dist(in.)	The farthest distance at which the sensor can detect an object. The sensor disables its receiver at this distance. The SC600A-B00 has a maximum range of 11 inches(279 mm) with a maximum far limit of 10 inches (254 mm).
Burst Width(usec)	Consult Hyde Park before changing this field. Standard value is 18. The ultrasonic transmit power can be lowered by decreasing this value.
Near Hyst(in.)	When an object is detected within the limits, the sensor moves the near limit this much closer to the sensor to prevent output oscillation at the near limit.
Far Hyst(in.)	When an object is detected within the limits, the sensor moves the far limit this much farther from the sensor to prevent output oscillation at the far limit.
Hardware Hyst	When an object is detected between the near and far limits, the sensor can optionally lower the threshold detection level. This lowering of the threshold can "lock" the sensor onto a small object which is barely detectable. This lowering of the threshold causes the object to appear closer, which can prevent output oscillation at the far limit; but can cause output oscillation at near limit (see next parameter). Possible values are NONE, SMALL, LARGE, and SPECIAL. The standard value is LARGE.
Hrdwr Hyst Off(in.)	As mentioned in the previous parameter, the lowering of the echo detection threshold causes the object to appear closer. At the near limit, this causes oscillation if the distance "shift" due to lowering the threshold causes the object to appear closer than the near limit. The hardware hysteresis is turned off when an object is detected within this distance of near limit.
Temp Comp	The speed of sound changes with temperature. The sensor can be configured to compensate the receive echo distance for temperature. Since the temperature sensor is internal to the sensor and affected by internal heating, the temperature compensation takes 20 minutes after the sensor is powered to be effective. The standard value is Off. The original SM600s did not support temperature compensation, therefore to be backwards compatible the new SM600s have temperature compensation disabled.
Square Wave Divider	The PNP output can be configured to generate a square wave output in any zone. This field determines the resolution of the internal square wave timer. The next field specifies the number of counts for the square wave. When this field is selected, the program displays the number of microsecond each value represents (1 = .25 usec/cnt, 2 =.2.0 usec/cnt, ..., 5 = 256 usec/cnt). The square wave on and off times are both equal to this parameter value times the SQUARE WAVE COUNTS.
Square Wave Counts	See previous field.

AA Option (Under Advanced Tab)

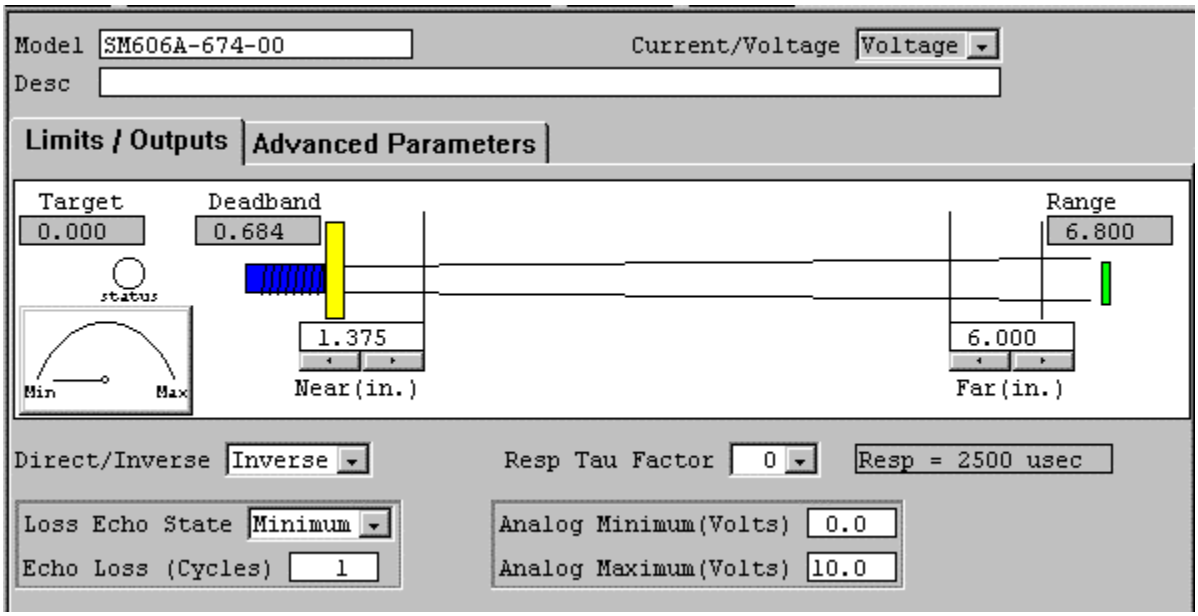
Setup Limit Offsets	If this parameter is zero, then two distinct limits are set, by placing the target at the first limit and grounding the limit setup wire, then placing the target at the second limit and grounding the limit setup wire. If this parameter is non-zero, then this is the +/- offset that the limit is set around the target. The default window is set with a single grounding of the limit setup wire. To set a 25.4 mm (1.00 in.) window, Set this parameter to 12.7 mm (0.50 in.).

SC606 Configuration Parameters (Including AA Option)

The SC606 series sensor's parameters are separated under two tab controls: 1) Limits / Outputs and 2) Advanced Parameters. The tab controls appear just below the model description. To switch between tab controls, click the desired tab control. The parameters are explained under the tab control name under which they appear. There are no extra parameters for the AA option (remote limit setup).

For help about any configuration parameter, pause the cursor pointer on the parameter field. A popup window appears which explains the configuration parameter.

The definitions of some of the following parameters are explained in more detail in "Sensing Terms" of the Hyde Park catalog.



Non-Tab Control Parameters

Name	Description
Model	The number for the model, which is also the filename for this model. The number can be from 1 to 14 characters long.
Current/Voltage	Documentation field that shows whether this configuration is for a CURRENT or VOLTAGE analog output sensor. This parameter must match the hardware capabilities of the sensor. Before downloading a configuration to a sensor, the program verifies that the sensor hardware matches the current or voltage value.
Desc	A comment field that can be used to describe the model operation or any other useful information.

Simulation Window Parameters

Near Limit(in.)	Determines the near limit of the sensor. This parameter can be changed by either dragging the limit with the mouse or typing in a limit value. For fine adjustment of limit, click the arrows below the limit.
Far Limit(in.)	Determines the far limit of the sensor. This parameter can be changed by either dragging the limit with the mouse or typing in a limit value. For fine adjustment of limit, click the arrows below the limit.

Limits and Outputs

Direct/Inverse	Direct - Analog output is at maximum when target closer than near limit. Inverse- Analog output is at maximum when target farther than far limit.
Resp TAU Factor	The sensor can do exponential averaging. The response time is specified as the time for the echo average to reach 95% of actual distance. The response time is 3 * RESP_TAU_FACTOR * CYCLE_TIME. The TAU factor is limited to powers of 2 (1, 2, 4, 8, 16, 32, 64, 128, and 256). See Exponential Averaging on page 48.
Loss Echo State	Determines if the analog output goes to either minimum or maximum value on echo loss. To specify hold on echo loss, set ECHO LOSS (CYCLES) to 0.
Echo Loss (Cycles)	=0 - On echo loss, the sensor holds the outputs for the last know distance. >0 - When a target is not detected for this many cycles, the sensor sets the output to its LOSS ECHO STATE.
Analog Minimum (Volts or mA)	Determines the minimum analog output value for the sensor. For voltage models this parameter is in volts, and for current models this parameter is in mA. Normally 0 for voltage sensors and 4 mA for current sensors.
Analog Maximum (Volts or mA)	Determines the maximum analog output value for the sensor. For voltage models this parameter is in volts, and for current models this parameter is in mA. Normally 10 volts for voltage sensors and 20 mA for current sensors.

Advanced Parameters

Model Gain	Used to change the sensitivity of the sensor. Increasing this value increases the distance that a target can be seen. Higher gains can be used to see smaller targets. Increasing the gain however, increases the deadband and can require a longer cycle time. The standard gain is 100.
Cycle Time(usec)	This sensor sends a burst of ultrasonic energy at regular intervals, and listens for the reflection of that ultrasonic energy. This parameter determines the time between bursts of ultrasonic energy. Ultrasonic energy requires 150 microseconds to travel from the sensor face to a target at 1 inch and back to the sensor face.
Ramp Start(in.)	Consult Hyde Park before changing this field. The ramp decreases the sensitivity of the sensor close to the sensor face where the receive transducer is still ringing from the transmitted energy. This ramp enables a closer deadband value.

Slow Ramp	This parameter must be enabled for high gain sensors. The slow ramp decreases the sensitivity of the sensor farther from the sensor face than the normal ramp. This decreased sensitivity is need to ignore the increase ringing near the sensor face due to the higher gain. If the MODEL GAIN is set greater than 100, then this should be set to YES.
Deadband(in.)	The transmitted ultrasonic energy causes the receive transducer to ring. The deadband is the time for this ringing to diminish to the point where the transducer can receive its echo.
Range Dist(in.)	The farthest distance at which the sensor can detect an object. The SC606A-BV0 and SC606A-BC0 sensors have a maximum range of 11 inches (279 mm) inches with a maximum far limit of 10 inches (254 mm).
Burst Width(usec)	Consult Hyde Park before changing this field. Standard value is 18. The ultrasonic transmit power can be lowered by decreasing this value.
Temp Comp	The speed of sound changes with temperature. The sensor can be configured to compensate the receive echo distance for temperature. Since the temperature sensor is internal to the sensor and affected by internal heating, the temperature compensation takes 20 minutes after the sensor is powered to be effective. The standard value is ON.

SC900 Configuration Parameters

In the operation of the sensor, the outputs are described as either logically ON or logically OFF. Each output for these sensors has a N.O./N.C. configuration parameter, which determines if logically ON is sinking/sourcing or non-sinking/non-sourcing. If the N.O./N.C. parameter for an output is set to N.O., then that output is sinking/sourcing when that output is logically ON. If the N.O./N.C. parameter for an output is set to N.C., then that output is non-sinking/non-sourcing when that output is logically ON.

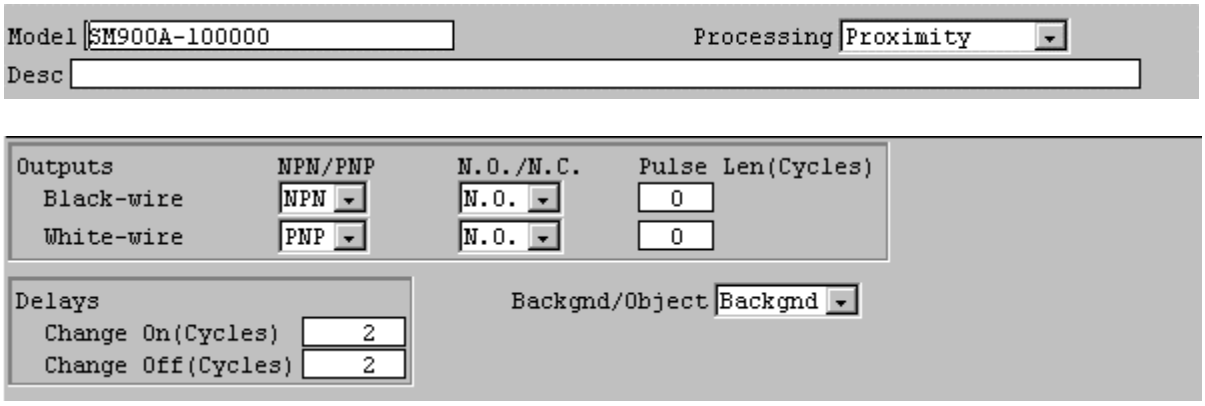
The SC900 series sensor's parameters are separated under three tab controls: 1) Limits / Outputs, 2) Other Parameters, and 3) Sensing Parameters. The tab controls appear just below the model description. To switch between tab controls, click the desired tab control. The parameters are explained under the tab control name under which the appear.

For help about any configuration parameter, pause the cursor pointer on the parameter field. A popup window appears which explains the configuration parameter.

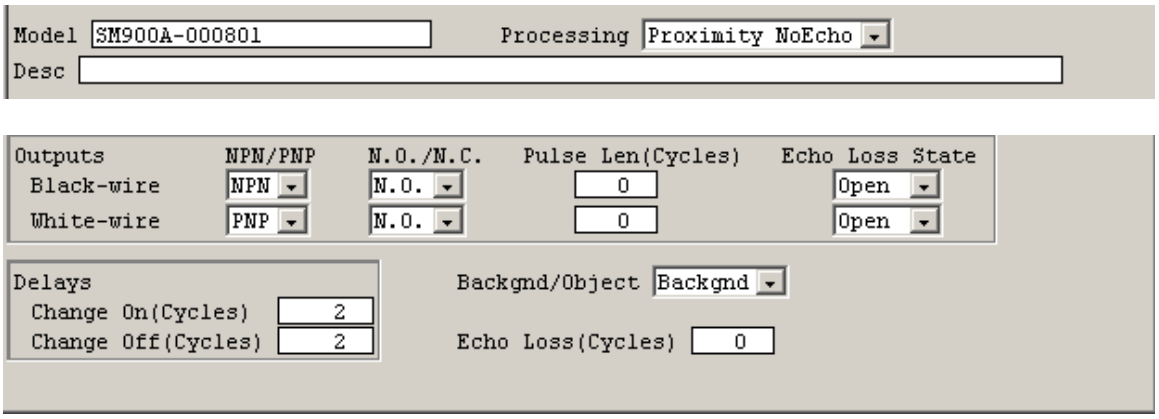
The definitions of some of the following parameters are explained in more detail in "Sensing Terms" of the Hyde Park catalog.

The parameters used by the Limits and Outputs section is dependent upon the processing type selected, and in the case of Dual Level processing the outputs are also dependent on the function selected for the outputs.

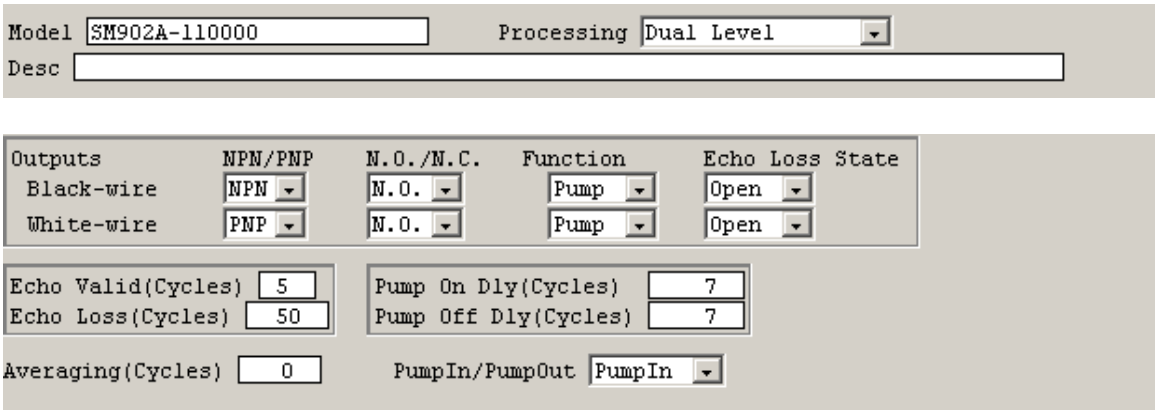
Proximity processing: Used for proximity on/off processing with delays. The outputs switch to one state when the target is between limits and to the opposite state when the target is not between limits.



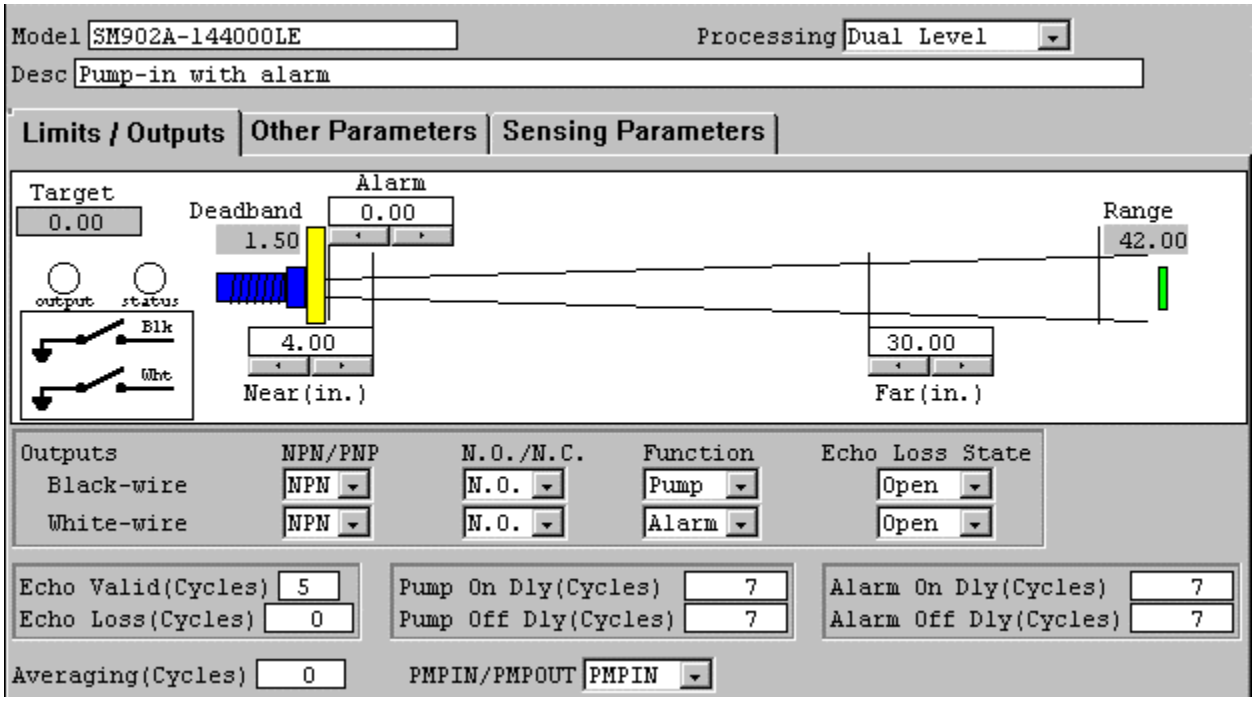
Proximity Noecho Processing: Used for proximity on/off with delays and no echo processing. This processing is intended fro proximity applications where the echo can momentarily be loss due to such things as gusts of air. With this processing mode, the outputs switch to the one state when the target is detected between limits and the opposite state when target is detected outside the limits. In addition, you can specify the outputs to hold or go to a specified state when echo is loss for Echo Loss (Cycles). With this processing mode, no echo do not reset the on or off delay counters. For example if you have a 1 second on delay, briefly losing the echo does the reset the on delay counter. If Echo Loss (Cycles) is 0, the outputs hold on echo loss, otherwise this is teh count of cycles with no echo before the sensor outputs go to the Echo Loss State.



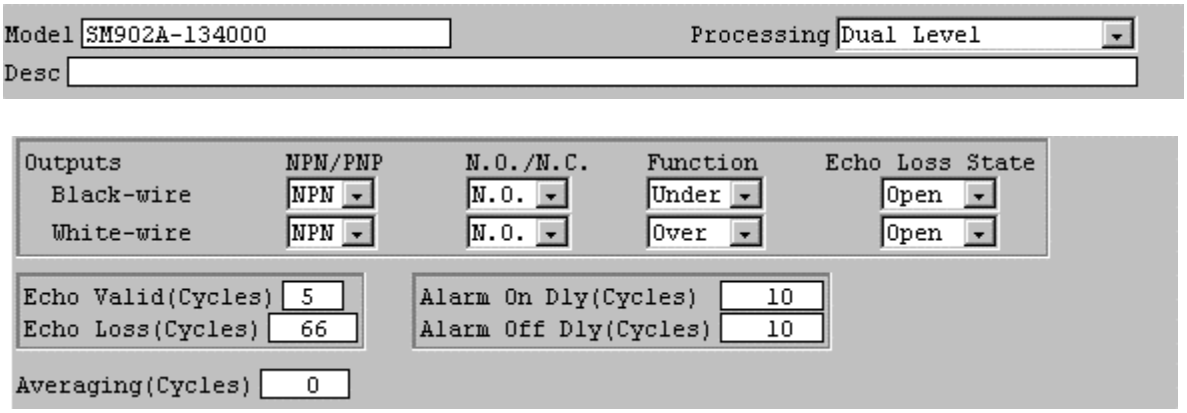
Dual Level without alarms: Used for either pump-in or pump-out control on both outputs. Specify this operation be setting the Processing to Dual Level and the both output functions to Pump.



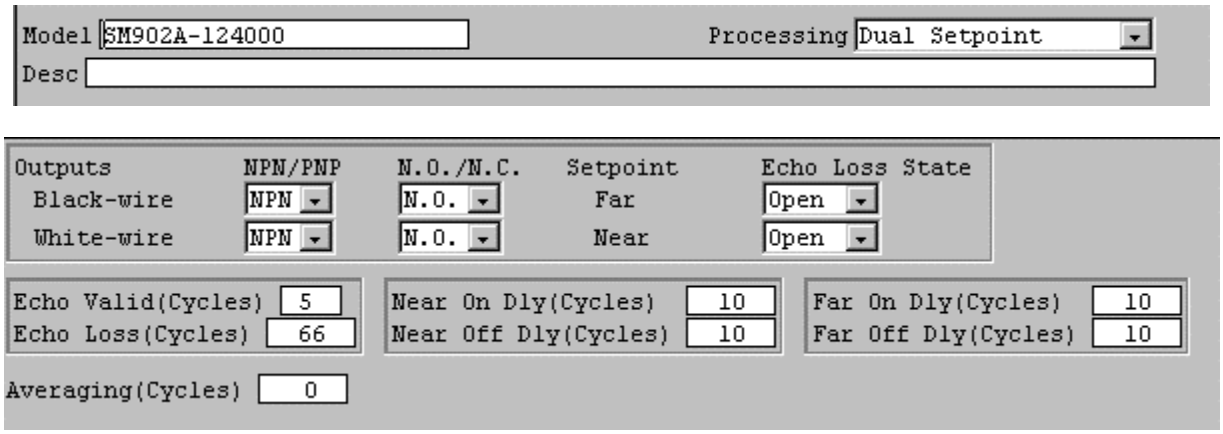
Dual Level with one alarm: Used when both a pump output and an alarm output is desired. Specify this operation by setting Processing to Dual Level, and then one output to Pump and the other to either Alarm, Under, or Over. An alarm output is logically ON when the target is not in alarm.



Dual Level with both alarms: Used for dual alarm operation. Specify this operation by setting Processing to Dual Level, and then one output function to Under and the other to Over. In dual alarm both outputs are logically ON when the target is not in alarm (between the near and far limits). When the target is closer than the near limit, the Over alarm output is logically OFF; and when the target is farther than the far limit, the Under alarm output is logically OFF.



Dual Setpoint processing: Used for dual setpoint operation. In dual setpoint operation, both the black-and white-wire outputs are logically OFF when target is farther than the far limit, the black-wire output is logically ON when the target is closer than the far limit, and both the black- and white-wire outputs are logically ON when the target is closer than near limit.



Non-Tab Control Parameters

Name	Description
Model	The number for the model, which is also the filename for this model. This number can be from 1 to 23 characters long.
Processing	Specifies the model processing. Proximity - Standard proximity processing. Dual Level - Dual Level Latch (PumpIn / PumpOut) no alarm output. - Dual Level Latch (PumpIn/ PumpOut) with alarm output. - Dual Alarms Dual Setpoint - Dual Setpoint operation.
Desc	Can be used to document the operation of the sensor.

Simulation Window Parameters

Near Limit	Determines the default near limit of the sensor. This parameter can be changed by either dragging this limit with the mouse or typing in a new value. For fine adjustment of limit, click the arrows below the limit. Setting the limits with the pushbutton changes this limit.
Far Limit	Determines the default far limit of the sensor. This parameter can be changed by either dragging this limit with the mouse or typing in a new value. For fine adjustment of limit, click the arrows below the limit. Setting the limits with the pushbutton changes this limit.
Alarm Limit	For Dual Level with Alarm only. Determines the default alarm limit of the sensor. This parameter can be changed by either dragging this limit with the mouse or typing in a new value. For fine adjustment of limit, click the arrows below the limit. Setting the limits with the pushbutton changes this limit (See "Setting Alarm Limit with Pushbutton" topic on page 47.

Limits and Outputs

Outputs	
NPN/PNP	Selects whether the output is NPN or PNP Select NPN for sinking output. Select PNP for sourcing output.
N.O./N.C.	Select whether output is normally open (N.O.) or normally closed (N.C.). Select N.O. for logical ON to be sinking or sourcing. Select N.C. for logical ON to be non-sinking or non-sourcing. Proximity - Output logically ON when target between limits and logically OFF when target not between limits. Dual Level (PumpIn) - Output turn logically ON when target beyond far limit and logically OFF when target closer than near limit. Dual Level (PumpOut) - Output turns logically ON when target closer than near limit and logically OFF when target beyond far limit. Dual Level Pump with 1 alarm. Alarm output logically ON when target not in alarm. Dual Level Alarm: Output logically ON when not in alarm. Over alarm output logically ON when target farther than near limit. Under alarm output logically ON when target closer than far limit Dual Level Setpoint: Black-wire output turns logically ON when target closer than far limit. White-wire output turns logically On when target closer than near limit.

Proximity Processing

Pulse Len(Cycles)	Set to zero for an output that is logically ON when target between limits and logically OFF when target not between limits. Set non-zero for a retriggerable logically ON output pulse of this many cycles when target moves to between the target. The output remains on this many cycles even if the target moves from between the limits. A retriggerable means the pulse timer is reset every time the target moves between the limits. See "Proximity Pulse Length" topic on page 49.
Delays	
Change On (Cycles)	The number of consecutive cycles the target has to be detected between limits before the outputs change to the logical ON state.
Change Off(Cycles)	The number of consecutive cycles no target can be detected between the limits before the outputs change to the logical OFF state.
Backgnd/Object	Select Backgnd or Object sensing mode: Backgnd - Sensor processes only first echo detected (standard setting) Object - Sensor processes multiple echoes and assumes target is between limits if any echo is detected between limits.

Proximity Noecho Processing

Pulse Len(Cycles)	Set to zero for an output that is logically ON when target between limits and logically OFF when target not between limits. Set non-zero for a retriggerable logically ON output pulse of this many cycles when target moves to between the target. The output remains on this many cycles even if the target moves from between the limits. A retriggerable means the pulse timer is reset every time the target moves between the limits. See "Proximity Pulse Length" topic on page 49.
Loss Echo State	If the sensor loses the target echo, the output can be selected to either open or close the output after ECHO LOSS (CYCLES). To specify hold on echo loss, set ECHO LOSS (CYCLES) parameter to 0. For normally open outputs, the loss echo state is usually open; and for normally closed outputs, the loss echo state is usually closed. Open - On echo loss, the output is non-sinking/non-sourcing. Close - On echo loss, the output is sinking/sourcing.
Delays	
Change On (Cycles)	The number of consecutive cycles the target has to be detected between limits before the outputs change to the logical ON state.
Change Off(Cycles)	The number of consecutive cycles the target is detected outside the limits before the outputs change to the logical OFF state.
Backgnd/Object	Select Backgnd or Object sensing mode: Backgnd - Sensor processes only first echo detected (standard setting) Object - Sensor processes multiple echoes and assumes target is between limits if any echo is detected between limits.
Echo Loss (Cycles)	=0 - On echo loss, the sensor holds the outputs for the last known distance >0 - When a target is not detected for this many cycles, the sensor sets the output to its LOSS ECHO STATE.

Dual Level (Pump, Alarm, and Setpoint)

Loss Echo State	If the sensor loses the target echo, the output can be selected to either open or close the output after ECHO LOSS (CYCLES). To specify hold on echo loss, set ECHO LOSS (CYCLES) parameter to 0. For normally open outputs, the loss echo state is usually open; and for normally closed outputs, the loss echo state is usually closed. Open - On echo loss, the output is non-sinking/non-sourcing. Close - On echo loss, the output is sinking/sourcing.
Echo Valid (Cycles)	After a echo loss condition, the sensor needs this many valid cycles to resume echo processing.
Echo Loss (Cycles)	=0 – On echo loss, sensor holds the outputs for the last known distance. >0 - When a target is not detected for this many cycles, the sensor sets the output to its LOSS ECHO STATE.
Averaging (Cycles)	Besides doing delays, the sensor can also do exponential averaging. The value in this field is the number of cycles for echo average distance to reach 95% of actual distance. See Exponential Averaging on page 48.

Dual Level (Pump only or Pump with Alarm)

Function	Selects the function for this output. Pump - The output is a pump control output. The operation depends upon the PumpIn/PumpOut parameter. Alarm - The output is an alarm output. If the alarm limit is closer than midpoint between near and far limits, the alarm output is an over alarm. If the alarm output is farther than midpoint between the near and far limits, the output is an under alarm. Over - The output is an over alarm output. The output is logically ON when the target is farther than the alarm limit. Under - The output is an under alarm output. The output is logically ON when the target is closer than the alarm limit
Pump On Dly(Cycles)	PumpIn - number of consecutive cycles target has to be detected farther than far limit to logically turn output ON. PumpOut - number of consecutive cycles target has to be detected closer than near limit to logically turn output ON.
Pump Off Dly(Cycles)	PumpIn - number of consecutive cycles target has to be detected closer than near limit to logically turn output OFF. PumpOut - number of consecutive cycles target has to be detected farther than far limit to logically turn output OFF.
Alarm On Dly(Cycles)	Over Alarm - number of consecutive cycles target has to be detected closer than near limit for output to logically turn OFF. Under Alarm - number of consecutive cycles target has to be detected farther than far limit for output to logically turn ON.
Alarm Off Dly(Cycles)	Over Alarm - number of consecutive cycles target has to be detected farther than near limit for output to logically turn ON. Under Alarm - number of consecutive cycles target has to be detected closer farther than far limit for output to logically turn OFF
PumpIn/PumpOut	PumpIn - Output turns logically ON when target farther than far limit and logically OFF when target closer than near limit. PumpOut - Output turns logically ON when target closer than near limit and logically OFF when target farther than far limit.

Dual Level - Both Alarms

Function	Selects the function for this output. Over - The output is an over alarm output. The output is logically ON when the target is farther than the alarm limit. Under - The output is an under alarm output. The output is logically ON when the target is closer than the alarm limit
Alarm On Dly(Cycles)	Over Alarm - number of consecutive cycles target has to be detected closer than near limit for output to logically turn OFF. Under Alarm - number of consecutive cycles target has to be detected farther than far limit for output to logically turn ON.
Alarm Off Dly(Cycles)	Over Alarm - number of consecutive cycles target has to be detected farther than near limit for output to logically turn ON. Under Alarm - number of consecutive cycles target has to be detected closer farther than far limit for output to logically turn OFF

Dual Setpoint

Near On (Cycles)	The number of consecutive cycles the target has to be detected closer than the near limit for the near output to turn logically ON.
Near Off (Cycles)	The number of consecutive cycles the target has to be detected farther than the near limit for the near output to turn logically OFF.
Far On (Cycles)	The number of consecutive cycles the target has to be detected closer than the far limit for the far output to turn logically ON.
Near On (Cycles)	The number of consecutive cycles the target has to be detected farther than the far limit for the far output to turn logically OFF.

Other Parameters

Pushbutton Limits Setup Offsets	
From One Target Distance	When the limits pushbutton is pressed twice on a single target, the near and far limits are offset from that single target distance by these distances.
From Two Target Distances	When the limits pushbutton is pressed once on one target and then on another target, the limits are offset from the two targets by these distances.

Echo Suppression	
Ignore Near ActionMode	Selects near echo suppression mode: Disabled - Near echoes are not ignored. Ignore Farther Echoes - If an echo is detected before the IGNORE NEAR LIMIT, then all farther echoes are ignored and echo processing is skipped this cycle. Process Farther Echoes - Ignores echoes before IGNORE NEAR LIMIT, but processes farther echoes. If echo detected closer than IGNORE NEAR LIMIT and no other echoes detected this cycle, then echo processing is skipped this cycle.
Ignore Near DistanceMode	Specifies how to interpret the IGNORE NEAR DISTANCE parameter. Relative is from the near limit and absolute is from the sensor face. Relative - IGNORE NEAR LIMIT = NEAR LIMIT - IGNORE NEAR DISTANCE Absolute - IGNORE NEAR LIMIT = IGNORE NEAR DISTANCE
Ignore Near Distance	See IGNORE NEAR DISTANCE MODE
Ignore Far Action Mode	Selects far echo suppression mode: Disabled - Far echoes are not ignored; No Echo - Echoes beyond IGNORE FAR LIMIT are processed as no echoes Ignore - Echoes beyond IGNORE FAR LIMIT are ignored, echo processing is skipped this cycle.
Ignore Far DistanceMode	Specifies how to interpret the ignore far distance parameter. Relative is from the far limit and absolute is from the sensor face. Relative - IGNORE FAR LIMIT = FAR LIMIT + IGNORE FAR DISTANCE Absolute - IGNORE FAR LIMIT = IGNORE FAR DISTANCE
Ignore Far Distance	See IGNORE FAR DISTANCE MODE
Limit Pushbutton Armed/Enable(Secs)	This parameter enables the 3 seconds that the limit pushbutton must be pressed to enable limit setting. Set to 0 to have the limit pushbutton always armed. Set to -1 to disable limit setting with the limit pushbutton.
Limit Setting Timeout(Secs)	After setting the first limit or arming limits, the next limit must be set within this time, or the limits revert back to the previous limit settings.
Hysteresis	Hysteresis is used to prevent the outputs from oscillating on and off when the target is at one of the limits.
Near Limit	Proximity: When target is detected farther that the near limit, the near limit is moved this distance closer to the sensor. Dual Level Pump: Outputs unaffected. After multicolor LED turns red, keeps multicolor LED red this distance beyond near limit. Dual Level Alarm: Holds alarm output this distance beyond near/alarm limit. Dual Setpoint: Holds near output state this distance beyond near limit.
Far Limit	Proximity: When target is detected closer than the far limit, the far limit is moved this distance farther from sensor, which prevents output oscillation. Dual Level Pump: Outputs unaffected. After multicolor LED turns amber, keeps multicolor LED amber this distance closer than far limit. Dual Level Alarm: Outputs unaffected. Keeps multicolor LED amber this distance closer than far/alarm limit. Dual Setpoint: Holds far output state this distance closer than far limit.

Hrwd Hyst	For Proximity processing only. This is used to "lock" the sensor onto a small target by lowering the echo detection threshold. If this parameter is set to enabled and the target is between the limits, the hardware hysteresis is applied.
Settable Delays	For Proximity processing only. The limit pushbutton can be used to change the delays. No: The delays cannot be changed with the Limit pushbutton. Period: The delay is determined by the interval of time the pushbutton is pressed Cycles: Each press of the pushbutton increases the delay by the number of cycles specified by the next parameter. See "Setting Delays with Pushbutton" topic on page 47 for instruction on how to set the delays with the pushbutton.
Delay Interval (Cycles)	For Proximity processing with Settable Delays set to Cycles. Specifies the number of cycles each press of pushbutton increases delay.

Sensing Parameters should normally not be changed unless specified by Hyde Park.

Cycle Time(msec)	This sensor sends a burst of ultrasonic energy at regular intervals, and listens for the reflection of that ultrasonic energy. This parameter determines the time between bursts of ultrasonic energy. 1-meter models standard value is 10.0 2-meter models standard value is 15.0 8-meter models standard value is 100.0
Far Range	Determines the far range of the sensor
Start Ramp	Consult Hyde Park before changing this field. The Ramp is used to decrease the sensitivity of the sensor close to the sensor face where the receive oscillator is still ringing from the transmitted energy. This allows a closer deadband value. The Start Ramp is set based upon Xmit Power
Rcvr Gain	Determines the transducer receiver gain. Set to 100 for 1- and 2-meters models and set to 200 for 8-meter models.
NormPwr Deadband	The transmitted ultrasonic energy causes the receive transducer to ring. The deadband is the time for this ringing to diminish to the point where the transducer can receive its echo. This is the normally used deadband.
LowPwr Deadband	Set to 0. (See dual power mode on page 48)
NormPwr Burst Cnt	The number of times the transmitter transducer is stimulated. Increasing this count increases the transmitter power. Do not increase this value over 16.
LowPwr Burst Cnt	Set to 0. (See dual power mode on page 48)
Hold LowPwr	Set to 0. (See dual power mode on page 48)
Snub On (Usec) (8 Meter Only)	Set to 250 usec
Xmit Power (1 & 2 Meter Only)	For Documentation only. Set to NORM for 1-meter models and set to HIGH for 2-meter models.
Min Echo Width	Sometimes noise can be ignored by accepting only echoes that are present for some duration. Accept first echo wider than this width. If early echo less than this width and later echo wider than this width, use later echo. If all echoes are less than this width, use the last echo.

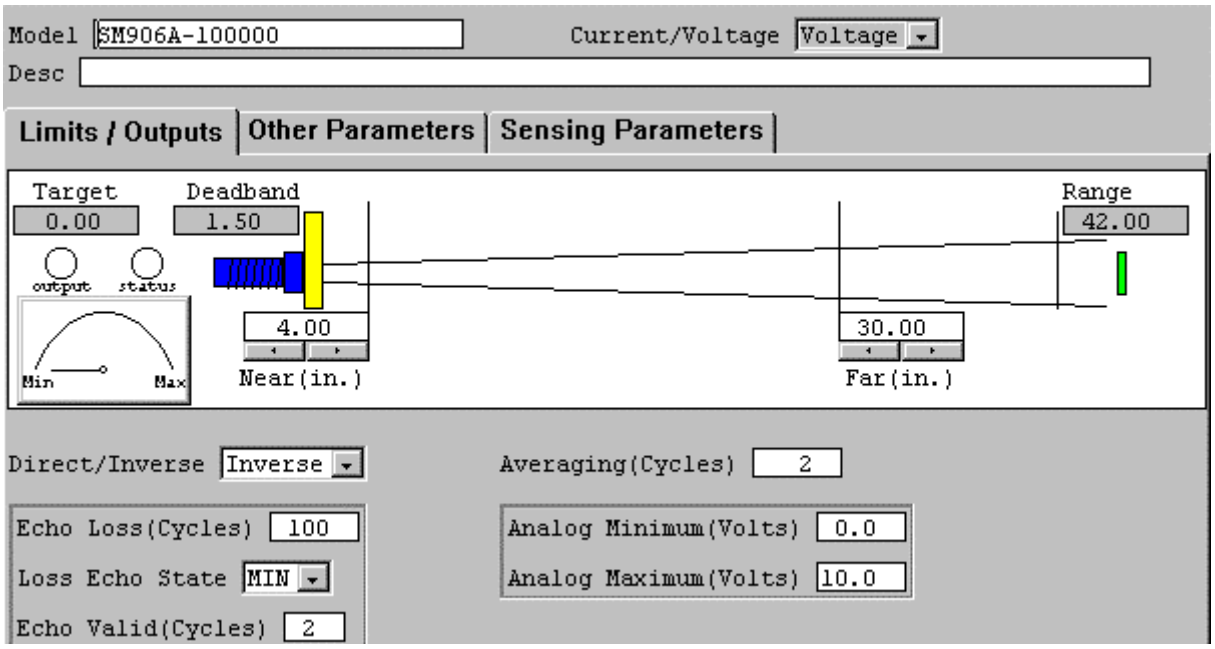
Gap Fill Width	This can be used concatenate two echoes into one.
Echo Duration Logic(Usec)	Set to 0. 0 to disable. Use first echo wider than this, else use widest echo.

SC906 Configuration Parameters

The SC906 series sensor's parameters are separated under three tab controls: 1) Limits / Outputs, 2) Other Parameters, and 3) Sensing Parameters. The tab controls appear just below the model description. To switch between tab controls, click the desired tab control. The parameters are explained under the tab control name under which the appear.

For help about any configuration parameter, pause the cursor pointer on the parameter field. A popup window appears which explains the configuration parameter.

The definitions of some of the following parameters are explained in more detail in "Sensing Terms" of the Hyde Park catalog.



Non-Tab Control Parameters

Name	Description
Model	The number for the model, which is also the filename for this model. This number can be from 1 to 23 characters long.
Current/Voltage	Documentation field that shows if this configuration is for CURRENT or VOLTAGE analog output. This parameter must match the hardware capabilities of the sensor. Before downloading a configuration to a sensor, the program verifies that the sensor hardware matches the current or voltage selection.
Desc	Can be used to document the operation of the sensor.

Simulation Window Parameters

Near Limit	Determines the default near limit of the sensor. This parameter can be changed by either dragging this limit with the mouse or typing in a new value. For fine adjustment of limit, click the arrows below the limit. Setting the limits with the pushbutton changes this limit.
Far Limit	Determines the default far limit of the sensor. This parameter can be changed by either dragging this limit with the mouse or typing in a new value. For fine adjustment of limit, click the arrows below the limit. Setting the limits with the pushbutton changes this limit.

Limits / Outputs Parameters

Direct/Inverse	Specifies DIRECT or INVERSE operation. DIRECT - The analog output is at maximum when target at or closer than near limit. INVERSE - The analog output is at maximum when target is at or farther than far limit. AUTO – The analog output is at minimum when target is at first limit set and at maximum when target at second limit set.
Averaging	Specifies the number of cycles for the echo average to reach 95 % of actual distance. 1 and 2 are special cases. If 1 is specified, the echo average is set to the last echo value. If 2 is specified, then the echo is the average of the last 2 cycles. Otherwise the program does exponential averaging of the distance. See Exponential Averaging on page 48.
Echo Loss (Cycles)	If echo not detected for this many cycles, output goes to state specified by LOSS ECHO STATE. Set to 0 to hold on echo loss.
Loss Echo State	Select either MIN or MAX. Specifies power-up and echo loss state for output. For hold on echo loss set ECHO LOSS (CYCLES) to 0.
Echo Valid (Cycles)	After a echo loss, the output is not updated until this many valid echoes are detected.
Analog Minimum	Specifies minimum current or voltage value.
Analog Maximum	Specifies maximum current or voltage value.

Other Parameters

Pushbutton Setup Limits Offsets	
From One Target Distance	When the limits pushbutton is pressed twice on a single target, the near and far limits are offset from that single target distance by these distances
From Two Target Distances	When the limits pushbutton is pressed once on one target and then on another target, the limits are offset from the two targets by these distances.

Echo Suppression	
Ignore Near ActionMode	Selects near echo suppression mode: Disabled - Near echoes are not ignored. Ignore Farther Echoes - If an echo is detected before the IGNORE NEAR LIMIT, then all farther echoes are ignored and echo processing is skipped this cycle. Process Farther Echoes - Ignores echoes before IGNORE NEAR LIMIT, but processes farther echoes. If echo is detected closer than IGNORE NEAR LIMIT and no other echoes detected this cycle, then echo processing is skipped this cycle.
Ignore Near: DistanceMode	Specifies how to interpret the IGNORE NEAR DISTANCE parameter. Relative is from the near limit and absolute is from the sensor face. Relative - IGNORE NEAR LIMIT = NEAR LIMIT - IGNORE NEAR DISTANCE Absolute - IGNORE NEAR LIMIT = IGNORE NEAR DISTANCE
Ignore Near: Distance	See IGNORE NEAR DISTANCE MODE
Ignore Far Action Mode	Selects far echo suppression mode: Disabled - Far echoes are not ignored; No Echo - Echoes beyond IGNORE FAR LIMIT are processed as no echoes Ignore - Echoes beyond IGNORE FAR LIMIT are ignored, echo processing is skipped this cycle.
Ignore Far DistanceMode	Specifies how to interpret the ignore far distance parameter. Relative is from the far limit and absolute is from the sensor face. Relative - IGNORE FAR LIMIT = FAR LIMIT + IGNORE FAR DISTANCE Absolute - IGNORE FAR LIMIT = IGNORE FAR DISTANCE
Ignore Far Distance	See IGNORE FAR DISTANCE MODE
Limit Pushbutton Armed/Enable(Secs)	This parameter sets the standard 3 seconds that the limit pushbutton must be pressed to enable limit setting. Set to 0 to have the limit pushbutton always armed. Set to -1 to disable limit setting with the limit pushbutton.
Limit Setting Timeout(Secs)	After setting the first limit or arming limits, the next limit must be set within this time, or the limits revert back to the previous limit settings.
M-LED Hysteresis	Multicolor LED hysteresis applies hysteresis of this distance to the multicolor LED to prevent the multicolor LED from oscillating at the limit boundaries.

Sensing Parameters should normally not be changed unless specified by Hyde Park.

Cycle Time(msec)	This sensor sends a burst of ultrasonic energy at regular intervals, and listens for the reflection of that ultrasonic energy. This parameter determines the time between bursts of ultrasonic energy. 1-meter models standard value is 10.0 2-meter models standard value is 15.0 8-meter models standard value is 100.0
Far Range	Determines the far range of the sensor

Start Ramp	Consult Hyde Park before changing this field. The Ramp is used to decrease the sensitivity of the sensor close to the sensor face where the receive oscillator is still ringing from the transmitted energy. This allows a closer deadband value. The Start Ramp is set based upon Xmit Power.
Rcvr Gain	Determines the transducer receiver gain. Set to 100 for 1- and 2-meters models and set to 200 for 8-meter models.
NormPwr Deadband	The transmitted ultrasonic energy causes the receive transducer to ring. The deadband is the time for this ringing to diminish to the point where the transducer can receive its echo. This is the deadband that is normally used.
LowPwr Deadband	Set to 0. (See dual power mode on page 48)
NormPwr Burst Cnt	The number of times the transmitter transducer is stimulated. Increasing this count increases the transmitter power. Do not increase this value over 16.
LowPwr Burst Cnt	Set to 0. (See dual power mode on page 48)
Hold LowPwr	Set to 0. (See dual power mode on page 48)
Snub On (Usec) (8 Meter Only)	Set to 250 usec
Xmit Power (1 & 2 Meter Only)	For documentation only. Set to NORM for 1-meter models and set to HIGH for 2-meter models.
Min Echo Width	Sometimes noise can be ignored by accepting only echoes that are present for some duration. Accept first echo wider than this width. If early echo less than this width and later echo wider than this width, use later echo. If all echoes are less than this width, use the last echo.
Gap Fill Width	This can be used combine two echoes into one.
Echo Duration Logic(Usec)	Set to 0. 0=disable. Use first echo wider than this, else use widest echo.
Plus Fault Hld Cnt	Set to 0. (See Sliding Valid Window below)
Plus Delta Dist(Cnts)	Set to 0. (See Sliding Valid Window below)
Plus Slack Dist(Cnts)	Set to 0. (See Sliding Valid Window below)
Plus Fault On Cnt	Set to 0. (See Sliding Valid Window below)

Sliding Valid Window

The SC906 sensor can ignore echoes that are not within a sliding window moving away from sensor. This may be useful if the main target becomes tilted and the echo bounces off this target off another object and then back to the sensor giving a false distance. The sliding window processing assumes the target cannot move faster away from the sensor than the PLUS DELTA DIST (CNTS) each cycle. Closer echoes are always processed. Each cycle that an echo is not present the sliding window distance is increased PLUS DELTA DIST. If an echo is not detected within this sliding window distance within PLUS FAULT ON CNT, the analog output goes to the LossEchoState value for PLUS FAULT HLD CNT cycles to indicate an error. The new echo distance is compared to the exponential average, which means the PLUS DELTA DIST must compensate for this change which is slower than the actual allowed distance change.

Parameter	Description
Plus Delta Dist (Cnts)	The additional distance to add to the sliding window each cycle. For 1 and 2 meter, 1 inch = 294 counts For 8 meter, 1 inch = 74 counts
Plus Slack Dist (Cnts)	An extra distance added to the sliding window that might help to process to work better. For 1 and 2 meter, 1 inch = 294 counts For 8 meter, 1 inch = 74 counts
Plus Fault On Cnt	If echo not detected within sliding window within this many cycles, then go to LossEchoStatet analog output.
Plus Fault Hld Cnt	The number of cycles to hold the analog output at LossEchoState.

PseudoCode:

```
Each Cycle:
    If Echo is present
        If ThisEchoDist < (SlidingWindowDist + PlusDeltaDist + PlusSlackDist)
            SlidingWindowDist = ThisEchoDist
            SlidingWindowCntr = 0
            Update analog output
        Else
            SlidingWindowDist = SlidingWindowDist + PlusDeltaDist
            SlidingWindowCntr = SlidingWindowCntr + 1
            If (SlidingWindowCntr > PlusFaultOnCnt
                Set analog output to LossEchoState for PlusFaultHldCnt
            Endif
        Endif
    Else
        Do loss-of-echo processing
    Endif
```

Other Topics

SM902 -Setting the Alarm Limit with the Pushbutton

To change either the control or alarm limits, all three limits must be set. Depress the SETUP pushbutton (the multicolor LED rapidly flashes amber to indicate the pushbutton is pressed) until the multicolor LED flashes green (about 3 seconds), and then release the SETUP pushbutton. The multicolor LED continues flashing green indicating the sensor is waiting for the first control limit. Align a flat object parallel to the sensor face at the desired distance position for either control limit, and press the SETUP pushbutton once. Upon release of the SETUP pushbutton, the multicolor LED flashes amber indicating the first control limit is set and the sensor is waiting for the second control limit. Align a flat object parallel to the sensor face at the desired position for the second control limit and press the SETUP pushbutton once. Upon release of the SETUP pushbutton, the multicolor LED flashes amber/green indicating the second control limit is set and the sensor is waiting for the alarm limit. Align a flat object parallel to the sensor face at the desired position for the alarm limit and press the SETUP pushbutton once. Upon release of the SETUP pushbutton, the multicolor LED turns to the color that indicates where the object is located.

SM903 - Setting Delays with the Pushbutton

Settable Delays = Period Enable setting the delays by pressing the SETUP pushbutton until the multicolor LED first flashes green and continue pressing until the multicolor LED flashes green and amber (about 7 seconds). After the multicolor LED flashes green and amber, release the SETUP pushbutton and the multicolor continues flashing green and amber indicating the sensor is waiting for the delay-on time. Press the SETUP pushbutton for the desired delay-on time and then release. The multicolor flashes green momentarily indicating a non-minimum delay-on time was accepted, and then multicolor LED flashes green and red indicating the sensor is waiting for the delay-off time. Press the SETUP pushbutton for the desired delay-off time and then release. The multicolor LED flashes green momentarily indicating a non-minimum delay-off time was accepted.

To set the delay-on or delay-off time to the minimum response time, press the SETUP pushbutton twice within one second. After the second release the multicolor LED flashes amber momentarily indicating the minimum delay time was accepted.

Settable Delays = Cycles Enable setting the delays by pressing the SETUP pushbutton until the multicolor LED first flashes green and continue pressing until the multicolor LED flashes green and amber (about 7 seconds). After the multicolor LED flashes green and amber, release the SETUP pushbutton and the multicolor continues flashing green and amber indicating the sensor is waiting for the delay-on time. Press and release the SETUP pushbutton for the desired number of DELAY INTERVAL (CYCLES) millisecond intervals for the delay-on time. After the SETUP pushbutton is not pressed for 5 seconds, the delay-on time is saved, and the multicolor flashes green momentarily indicating the delay-on time was saved. The multicolor LED next flashes green and red indicating the sensor is waiting for the delay-off time. Press and release the SETUP pushbutton for the desired number of DELAY INTERVAL (CYCLES) millisecond intervals for the delay-off time. After the SETUP pushbutton is not pressed for 5 seconds, the delay-off time is saved, and the multicolor flashes green momentarily indicating the delay-on time was saved.

SM900 / SM906 -Dual Power Mode

Dual Power Mode is an operational mode where the sensor alternates between the NormPwr Burst Count and Deadband, and LowPwr Burst Count and Deadband. This allows a closer deadband for high power models, but increases the response time and the accuracy to the target. Consult Hyde Park before using Dual power modes. If an object is detected within the HOLD LOWPWR distance, then the sensor remains in low power mode. Dual Power is enabled if LowPwr Burst Count is non-zero.

SM606 / SM900 / SM906 -Exponential Averaging

Exponential averaging is used to smooth the echo distance. For the SC606 the program uses TAU directly, which results in the distance average reaching 95 % of actual distance in 3 times the TAU factor. For the SC900 and SC906 the response time is given is cycles, and the program calculates a TAU so that the distance average is 95 % of actual distance in the requested number of cycles.

Each cycle the following calculation is made:

DistAvg = (DistAvg * (TAU-1) + DistNow) ÷TAU

This calculation can be expressed by the following equation.

DistAvg = DistNow * $(1 - e^{-n/N})$
(where N = Response Time in Cycles, and n = Current Cycle count)
Note: when n = 3*N

DistAvg = DistNow * $(1 - e^{-3})$ = DistNow * (1- 0.050) = DistNow * 0.95

SM900 / SM906 - Echo Suppression

Echo Suppression can be used to ignore unwanted objects.

Example 1 (Near Echo Suppression): Measure the contents in bottle, ignoring the echoes from the neck of the bottle.

Example 2 (Near Echo Suppression): Ignore side rails on a conveyor, but detect container in the conveyor.

Example 3 (Near Echo Suppression): Measure stock on a takeup or unwind reel, but ignore horizontal reinforcement bars reel.

Example 4 (Far Echo Suppression): Measure distance to intermittent passing objects, but ignore background surfaces.

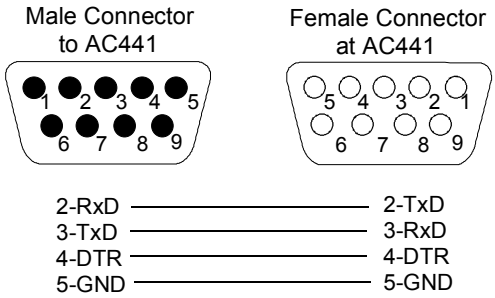
Example 5 (Far Echo Suppression): The main object for measuring sometimes becomes tilted and the echo reflects off this target, off a side wall, off the target again, and back to sensor causing a false distance reading. The far echo suppression can be used to ignore this false distance reading.

SM900 -Proximity Pulse Length

The SC900 proximity processing can generate a retriggerable pulse whenever the a target enters the sensing window. A possible use for this output is to verify objects are moving pass the sensor as some minimum rate.

Troubleshooting

The first troubleshooting step is to verify proper operation of the PC serial port with serial cable. To verify the serial port and serial cable, select TEST COM PORT from the DIAGNOSTIC dropdown menu. Follow the directions in the program which tests the serial port and cable by sending a test message to the serial port. Below is a picture of the DB9 pin numbers.

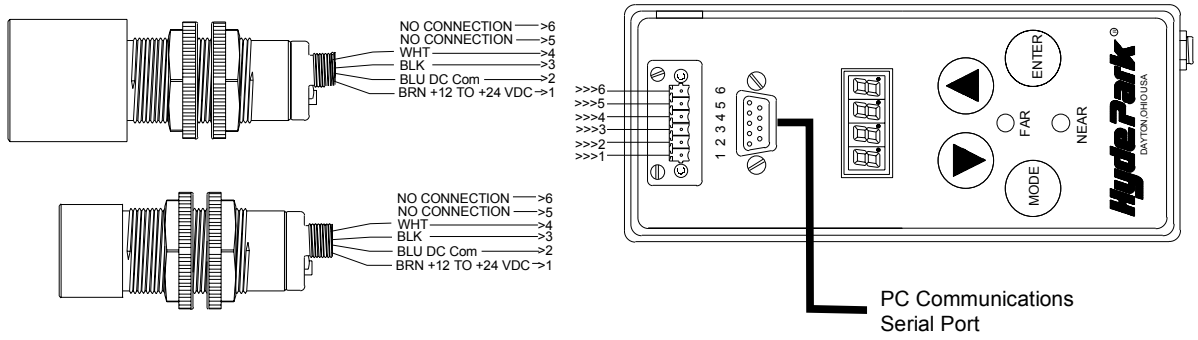


If the serial port passes its test, the next step is to check the DTR line. The DTR line is normal around -10 volts and changes to around +10 volts to power up the sensor. This signal can be checked with a voltmeter.

Appendix A - AC441 and AC441A Handheld Configurator

The AC441 can be used to set the window limits of the SC900/SC906 sensors, display distances from the SC900/SC906 sensors, and configure SC900/SC906, SC600/SC606, and SC300 sensors. The AC441A supports configuring NPN or PNP single output sensors.

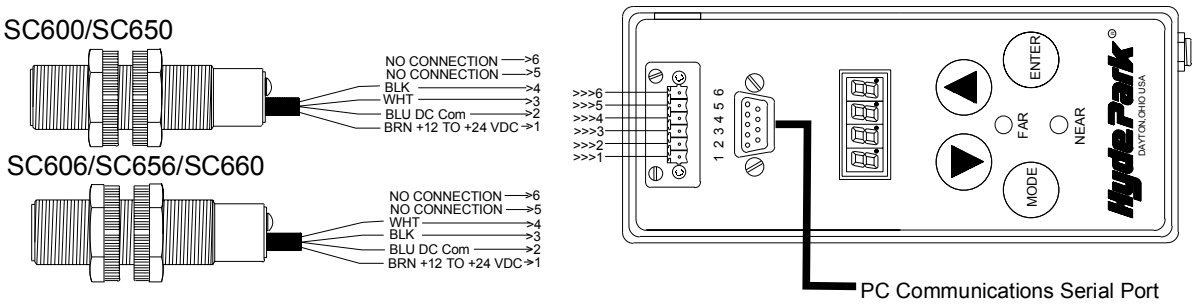
SC900/SC906 Wiring to AC441



SC600/SC650/SC660/SC606 Wiring to AC441 - Note the black and white wires differences.

SC600/SC650

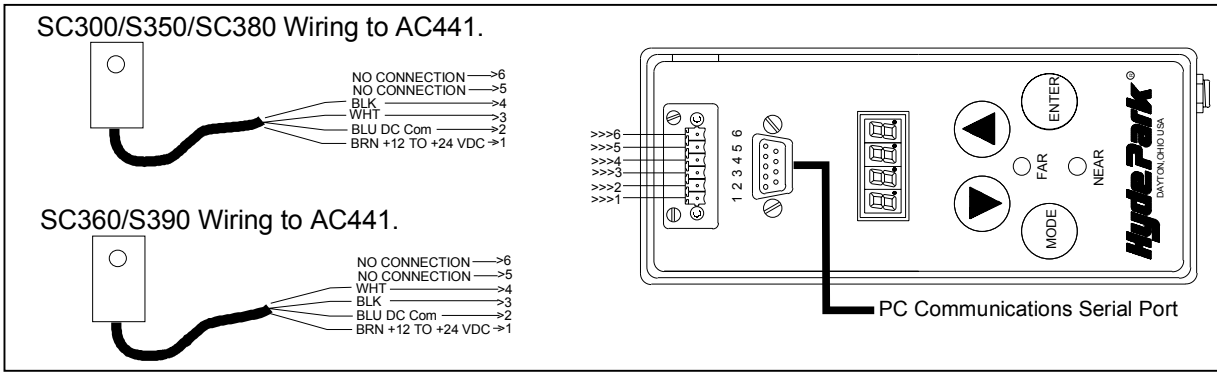
SC606/SC656/SC660

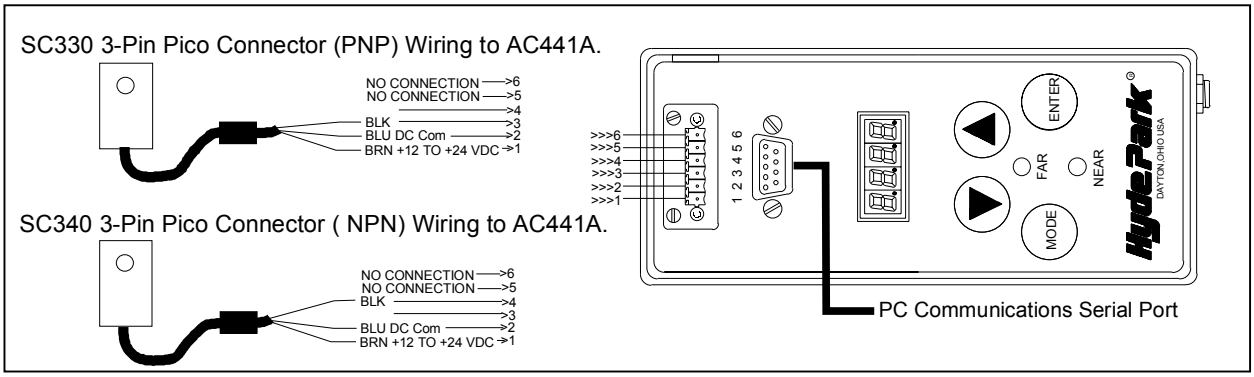


The SC660 has reversed outputs; a white-wire NPN and black-wire PNP output

SC300/S350/SC380 Wiring to AC441.

SC360/S390 Wiring to AC441.





To configure a SC300 PNP only output, connect sensor as above and select 300P with the ↑ or ↑ button. To configure a SC300 NPN only output, connect sensor as above and select 300n with the ↑ or ↓ button.

Installation

The AC441 is powered with an inline, universal input (85 VAC to 265 VAC, 50/60 Hz) power supply. The power supply is supplied with a country specific AC line/cord and DC output cord.

The AC441 can also be power with 24 VDC. It requires a 5.5 x 2.1 mm jack with a center negative. The AC441 with sensor requires a maximum of 220 mA.

The AC441 can be mounted to a back panel using the included mounting brackets and #8 screws.

Setup

On power up, the AC441 displays the distance units (1nch or Eur) and then the software version for a 1/2 second, and then displays the last selected model type. Press either the AC441 ▲ or ▼ button to change model.

Model	Display	Special
SC300 with both NPN and PNP outputs	300	
SC300 with NPN only output	300n	requires AC441A
SC300 with PNP only output	300P	requires AC441A
SC600	600	
SC900	900	
SC906	906	

Figure 1 - Available Models

If 900 or 906 is displayed, then press and release the **MODE** button to change modes. Each press and release of the **MODE** button advances to the next MODE (*Figure 2*). If 300, 600, or 606 is displayed, then only one mode is available (*Figure 3*).

Mode	7-Segment Display	Near LED	Far LED
Display Distance/Configure	[model] / 9.999, 99.99 or 999.9	on	on
Change Near Limit/Configure	[model] / 9.999, 99.99 or 999.9	on	off
Change Far Limit/Configure	[model] / 9.999, 99.99 or 999.9	off	on

Figure 2 - AC441 SC900/SC906 Modes

Mode	7-Segment Display	Near LED	Far LED
Configure SC300	300/300P/300n	off	off
Configure SC600/SC606	600/606	off	off
Configure SID-PC01	300P	off	off

Figure 3 - AC441 SC600/SC606 Configure Mode

Changing Distance Units: The AC441 can display the sensor distances and limits in either inches or meters. When the AC441 is powered on, the AC441 displays the current distance units (1nch for English, Eur for Metric). If the distance units do not display, call Hyde Park for assistance. To change the distance units, while pressing the MODE button apply power to the AC441. The AC441 displays the current distance units. Press and release the ▲ or ▼ button to change the distance units, and then release the MODE button. The distance units are saved in non-volatile memory.

English(inches) 1 & 2 meter models, the distances are displayed and limits entered in inches with 2 decimal places (99.99). 8 meter models, the distances are displayed and limits entered in inches with 1 decimal place (999.9).

Metric (meters) Distances are displayed and limits are entered in meters with 3 decimal places (9.999).

Configuring Sensors See the "Programming SC300 Sensors" on page **Error! Bookmark not defined.**, "Programming SC600, SC660, or SC606 Sensors" on page 7 or the "Programming "SC900 or SC906 Sensors" on page 10.

Display Distance Mode: When selected, the display shows the selected model number and both the far and near LEDs are on. Press the ENTER button to power up the sensor and request distances from the sensor. While powering up the sensor, the decimal points are illuminated as an indication power is applied to the sensor. When the sensor is powered up, the AC441 continuously displays the current distance. Press the ENTER button to power off the sensor.

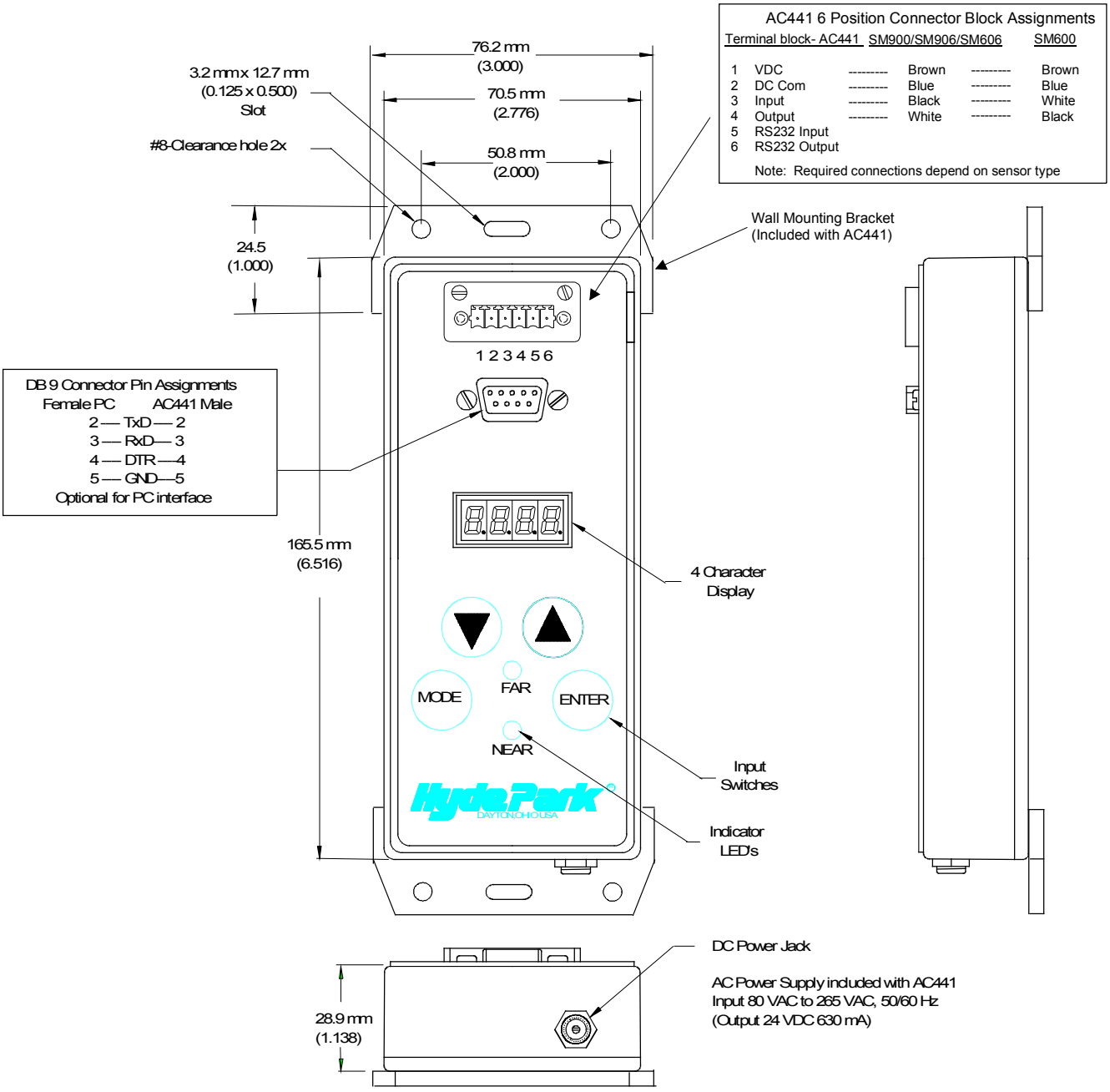
Change Near Limit: When selected, the display shows the selected model number, the near LED is on and the far LED is off. Press the ENTER button to request the current limits from the sensor. After the limits are received from the sensor, the display shows the near limit. Press the ▲ or ▼ button to change the near limit in the AC441 only. To change the near limit in the sensor, you must press the ENTER button. When the ENTER button is pressed, the AC441 sends the limits to the sensor, and then displays 'donE' when the near limit has been successfully saved by the sensor. If unsuccessful, the display shows 'Err'. Press the ENTER button to erase either the 'Err' or 'donE' display.

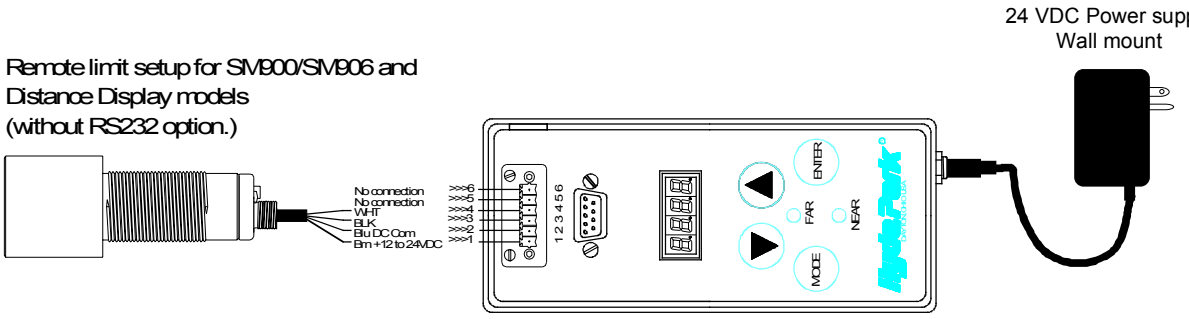
Change Far Limit:. When selected the display shows the selected model number, the near LED is off and the far LED is on. Press the ENTER button to request the current limits from the sensor. After the limits are received from the sensor, the display shows the far limit. Press the ▲ or ▼ button to change the far limit in the AC441 only. To change the far limit in the sensor, you must press the ENTER button. When the ENTER button is pressed, the AC441 sends the limits to the sensor, and then displays 'donE' when the near limit has been successfully saved by the sensor. If unsuccessful, the display shows 'Err'. Press the ENTER button to erase either the 'Err' or 'donE' display.

PC Get Distances from SC900 or SC906

When the AC441 is displaying distances. the distance is also being sent to the RS232 serial port. To remotely power up the sensor with the AC441, set the DTR signal high. When powered up, the AC441 uses the last selected model. To select the desired model, press the ▲ or ▼ button until the desired model is displayed. Then, press the ENTER button which saves the model number in non-volatile memory.

Wiring and Dimensions





General Specifications

Power Supply:	Inline, universal input: 85 VAC to 265 VAC, 50/60 Hz Output: 24 VDC, 630 mA Supplied with country specific AC line cord/plug and DC output cord. Both cords are 1.8 m (6 feet) in length The AC441 requires 220 mA at 24 volts connected to a 5.5 x 2.1 mm jack with center negative
Other Connections:	6-pin quick disconnect for sensor DB9 female connector for PC interface
Sensor Mounting Distance:	45.7 m (150 ft.) maximum
Display:	4-digit 7-segment 10 mm (0.4 in.) tall red LED with decimal point
Dimensions:	165.5 mm (6.52 in.) by 70.5 mm (2.78 in.) by 29.0 mm (1.14 in.)
Operating Temperature	0°C to 50°C (32°F to 122°F) @ 10-90% non-condensing humidity. Not suitable for permanent outdoor use.
Ratings and Certifications:	CE CE Mark Compliant