Configuration Tutorial

Onboard Interface (OBI) and PC Interface (PCI)

for the Models SC22-3 and SC22-3E Safety Controller

Contents

Important . . . read this before proceeding!

It is the responsibility of the machine designer, controls engineer, machine builder and/or maintenance electrician to apply and maintain this product in full compliance with all applicable regulations and standards. The product can provide the required safeguarding function only if it is properly installed, properly operated, and properly maintained. This manual attempts to provide complete installation, operational, and maintenance instruction. Reading the manual completely is highly recommended. Please direct any questions regarding the application or use of the product to the Banner Engineering Applications at the locations shown on the back cover.

For more information regarding U.S. and international institutions that provide safeguarding application and safeguarding product performance standards, see the list on the inside of the back cover.

Use of Warnings

Warnings are intended to remind the machine designer, control engineer, machine builder, maintenance electrician, or end user how to avoid misapplication of this product and effectively apply the Safety Controller to meet the various safeguarding application requirements. Reading and abiding by the warnings is highly recommended.

⚠️ **WARNING . . . User Responsibility**

It is the responsibility of the qualified person who configures, installs, or maintains the Safety Controller to:

• **Carefully read, understand and follow** the information in this manual.

• **Perform a risk assessment** of the specific machine guarding application.

• **Determine what safeguarding devices and methods** are appropriate per the requirements defined in ISO 13849-1 and other appropriate standards such as those that are referenced in this manual.

• **Create and confirm each configuration** and then verify that the entire safeguarding system (including input devices and output devices) is operational and working as intended.

• **Periodically re-verify** as needed, that the entire safeguarding system is working as intended.

Failure to follow any of these recommendations can potentially create a dangerous condition that may lead to serious injury or death.

PC Interface (PCI) Configuration Tutorial

The PC-based User Interface (PCI) is the primary tool for creating and managing configuration files for the Safety Controller. It's also used to retrieve, display and store both I/O and system status and fault information.

The following tutorial explains the steps needed to create a sample configuration, using the Safety Controller's PC Interface (PCI). The configuration is used to define the input devices to be connected to the Safety Controller and to establish relationships between those input devices and the Safety Controller outputs.

IMPORTANT: This tutorial is not intended to provide a comprehensive lesson about every feature the Safety Controller and PCI offer. Rather, it is designed to provide the basic skills and processes needed to explore the features on your own. It also is not intended to explain the operation of the Safety Controller. For complete operational instructions, read Sections 1–8 of this manual.

1 Install the PC Interface Software

• Insert the Banner Safety Controller CD.

• Select Install **PC Interface program**.

The menu choices identify where the software will be installed on your computer; in most cases, this location does not need to be changed and **Next** should be selected. To install the software in a different location, select **Browse** and choose the location to install the software. When the location is selected, click **Next**.

• Restart the PC for the PCI program installation to be complete.

2 Open the PC Interface Program

To open the PCI,

• Double-click on the ⚠️ icon created on your desktop

-or -

• Select the following series of menu options:
Start → Programs → Banner Engineering → Banner Safety Controller

• Read and understand the warning on the Start-up Page and click **OK**.

3 Interface Elements: Tool Bar, I/O Property Files and Documents

The Main screen will appear on the computer when the application launches. You will be using the functions in each section of the window during this tutorial.

4 Documents

The **Wiring Diagram** shown in the screen shows its numbered terminals:

S1 through **S22** for input devices (both safety and non-safety)

A1 for +24V dc and **A2** for 0V dc

O1 through **O10** for Controller and I/O status indication

SO1 (1A and **1B)**, **SO2 (2A** and **2B)** and **SO3 (3A** and **3B)** for connections to the Safety Outputs

SR, the Controller's system reset terminal (shown with a push button symbol)

• Click on the **Ladder Logic Diagram tab** just above the **Wiring Diagram**. No logic circuit elements are in place yet.

• Click on the **Configuration Summary tab** just next to the **Ladder Logic Diagram tab**. Only some default system settings are visible.

The diagrams and the configuration summary will take form as the configuration develops.
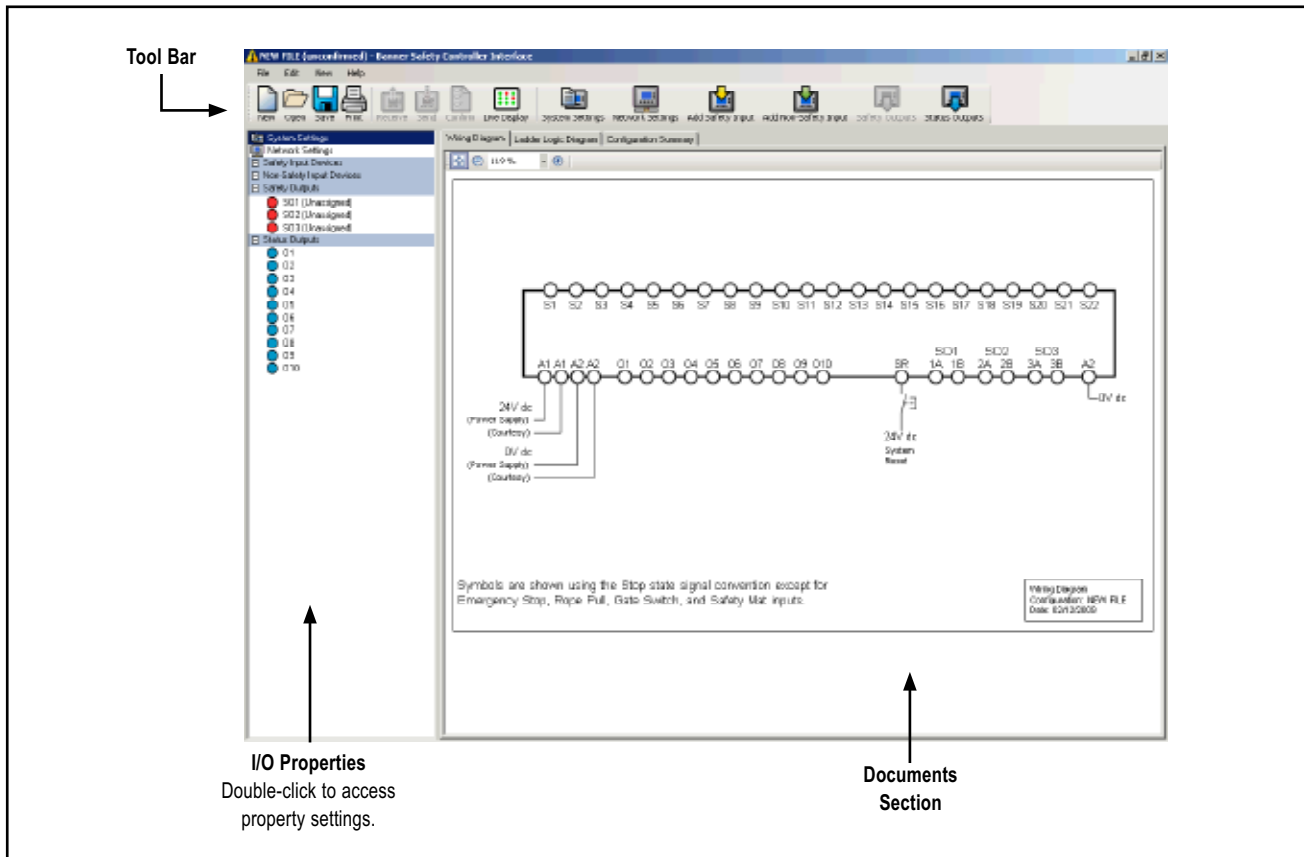
Figure 1. PCI main screen, ready for configuration

5 Create a Configuration

• Click on the **System Settings** icon [icon] on the right-hand side of the tool bar.

The pop-up System Settings menu will appear.
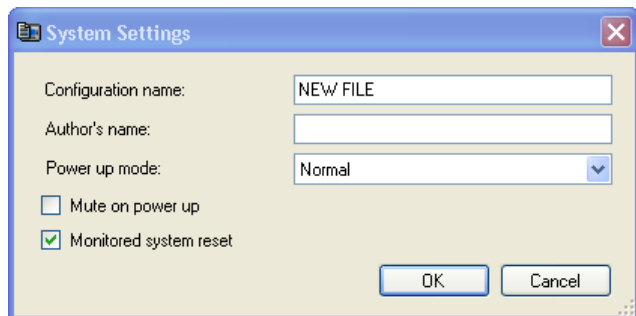
• Name the configuration file **CFG1**. (Up to 16 alphanumeric characters may be used.)

• Add your name in the Author's name box. (Up to 10 alphanumeric characters may be used; abbreviate as needed.)

• Keep the default settings listed below.

 Power up mode: Normal

 Mute on power up: No check mark

 Monitored system reset: Check mark (click on the checkbox to select or deselect it.)

Your System Settings menu should look like this:
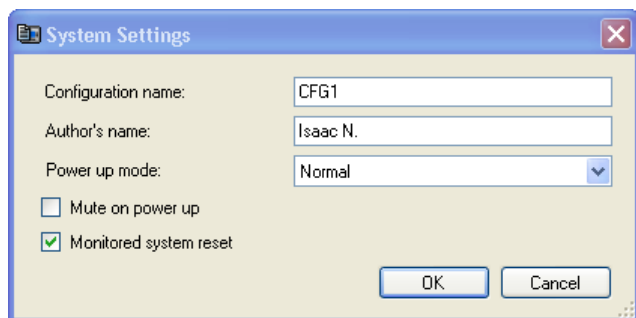
• Click **OK**.

Add an E-Stop Button Input
• Click on the **Wiring Diagram tab**, if the wiring diagram is not already displayed on the screen.

• Click on the **Add Safety Input** button in the center of the tool bar. The Add Safety Input Device pop-up menu will appear.

Select Emergency Stop Button Properties
• Double-click on the **Emergency Stop** icon [icon] in the **Add Safety Input** device menu. The **ES01 Properties** menu will appear. (Abbreviated, sequentially numbered device names are automatically assigned but can be changed.)
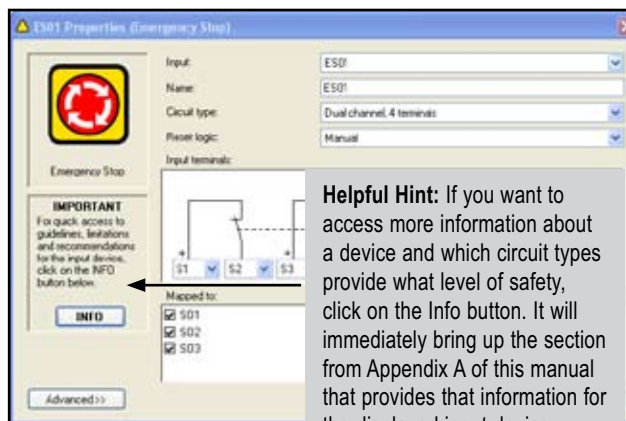

Helpful Hint: If you want to access more information about a device and which circuit types provide what level of safety, click on the Info button. It will immediately bring up the section from Appendix A of this manual that provides that information for the displayed input device.

• Name: Keep **ES01**.

• Circuit type: Keep the **Dual-channel, 4-terminal**. (Use the drop-down Circuit Type field to see other circuit options.)

• Reset logic: Keep the default **Manual**.

• Map to: Keep the ES01 mapped to all three Safety Outputs **(SO1, SO2, SO3)**.

• Click **OK**.

Because a manual reset signal was chosen for the E-stop button, when **OK** is selected and the ES01 Properties menu closes, the RS01 Properties Manual Reset screen will appear automatically.

## Manual Reset
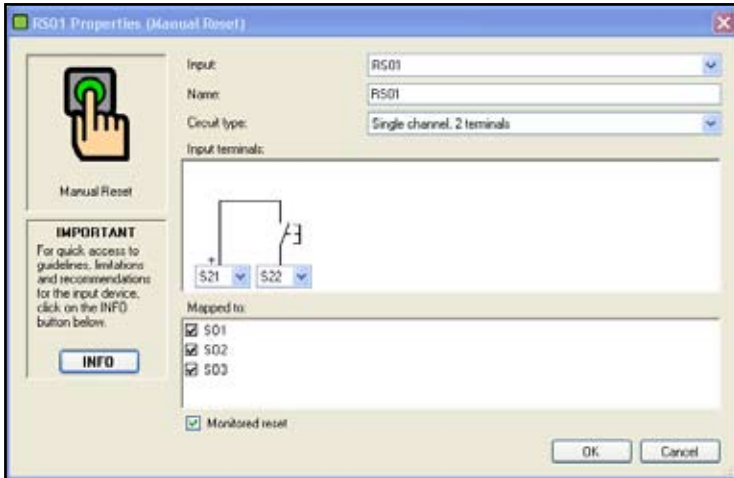
The **RS01 Properties menu** appears.

• Change the Circuit type to **Single-channel, 2-terminal**.

• Click **OK**.

This single "common" manual reset signal will reset all of the Safety Outputs. (For the purposes of this tutorial, one common manual reset signal is used to reset all of the Safety Outputs. In a real application, it is possible to assign a separate reset for each Safety Output, if needed. To do this, choose the **Circuit Type** from the Reset Properties menu, and then select the Safety Output that the reset device should reset. Individual Reset Properties menus will appear until all Safety Outputs that are controlled by an input device with manual reset have a reset assigned.)

Your **Wiring Diagram** should look like this:
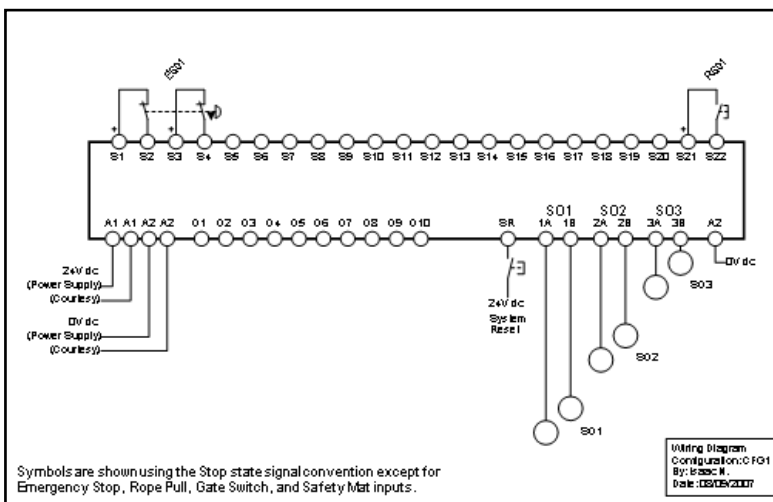
Your **Ladder Logic Diagram** should look like this:
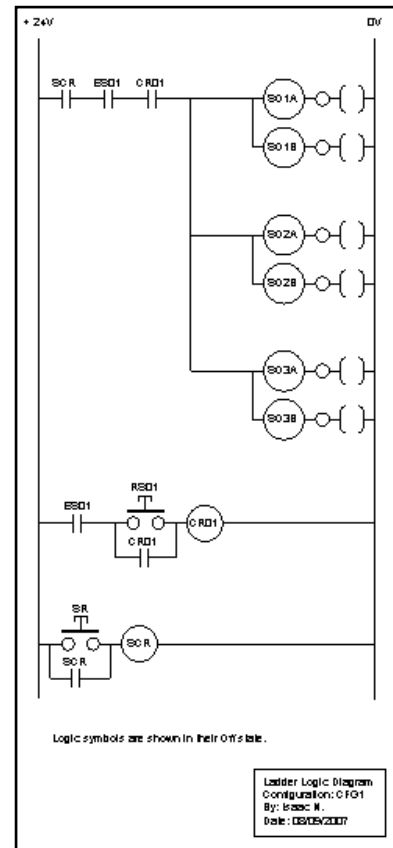
Add Other Safety Input Devices

The steps required to add other safety input devices are similar to those described above. Add a **Gate Switch** to the configuration:

• Click on the **Add Safety Input** button on the tool bar.

• Double-click on the **Gate Switch** icon.
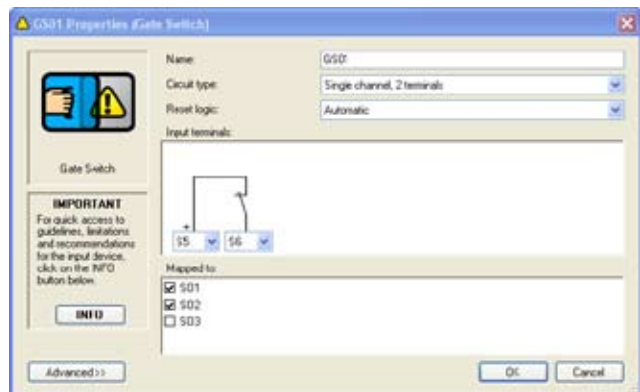
• Create a **Gate Switch** configuration with the properties listed below.

   Name: **GS01**

   Circuit: **Single-channel, 2 terminals**

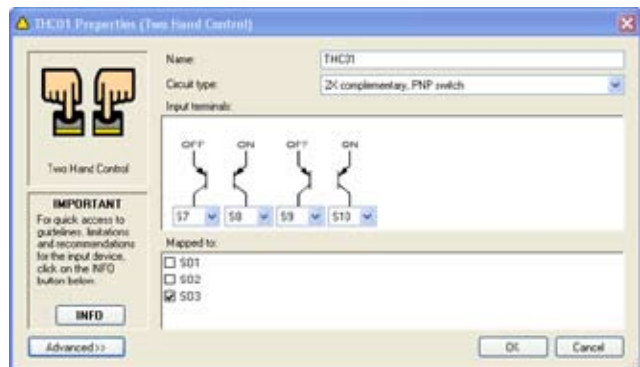   Reset: **Automatic**

   Terminals: **S5** and **S6**

   Map to: **SO1** and **SO2**
             (Click on a checkbox to select or deselect it.)

Your **Gate Switch** properties menu should match the one shown above.

• Click **OK**.

Add a Two-Hand Control Input Device

• Click on **Add Safety Input**.

• Double-click on the **Two-Hand Control** icon.

• Create a Two-Hand Control configuration with the properties listed below.

   Name: **THC01**

   Circuit: **2X complementary, PNP switch**

   Terminals: **S7, S8, S9** and **S10**

   Map to: **SO3**

• Click **OK**.

NOTE: The reset logic is set to Automatic for Two-Hand Control devices. There are no other reset options.

Add an Optical Sensor Input Device

• Click on **Add Safety Input**.

• Double-click on the **Optical Sensor** icon.
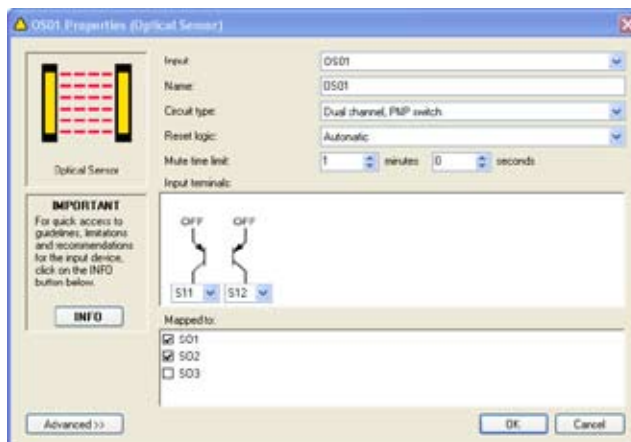
• Create an Optical Sensor configuration with the properties listed below.

   Name: **OS01**

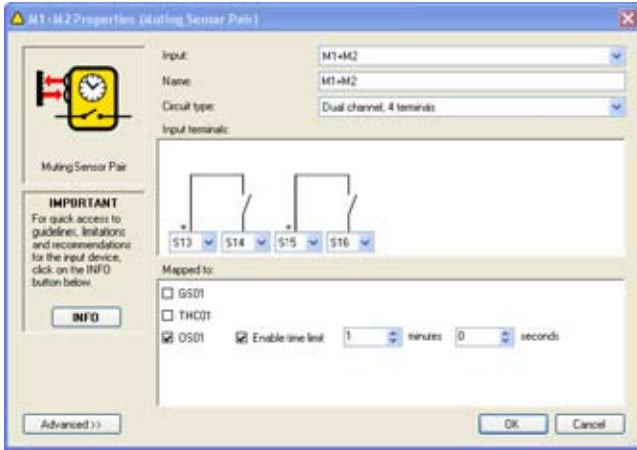   Circuit: **Dual Channel, PNP switch**

   Reset: **Automatic**

   Terminals: **S11** and **S12** (Use the drop-down terminal number fields to change the terminal assignment, if needed.)

   Map to: **SO1** and **SO2**

• Click **OK**.

Add a Mute Sensor Pair
• Click on **Add Safety Input**.

• Double-click the **Mute Sensor** icon.

• Create a Mute Sensor configuration with the properties listed below.

 Name: **M1+M2**

 Circuit: **Dual-Channel, 4 Terminal**

 Terminals: **S13, S14, S15,** and **S16**
 (Use the drop-down terminal number fields to change the terminal assignment, if needed.)
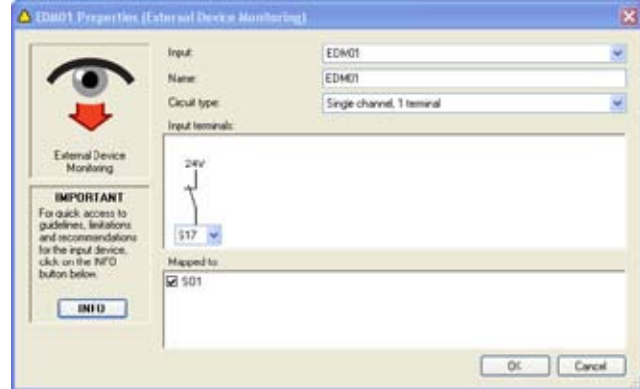
 Map to: **OS01**

 Time limit: **1 minute, 0 second**

• Click **OK**.

NOTE: Mute sensors are mapped to the safety input devices that they mute and not to the Safety Outputs.

Add an External Device Monitoring Input
• Click on **Add Safety Input**.

• Double-click the **External Device Monitoring** icon.

• Create an External Device Monitoring configuration with the properties listed below.

 Name: **EDM01**

 Circuit: **Single Channel, 1 terminal**

 Reset: **Automatic**

 Terminals: **S17** (Use the drop-down terminal number field to change the terminal assignment, if needed.)

 Map to: **SO1**

• Click **OK**.

Add More External Device Monitoring Inputs
Add two more **External Device Monitoring** inputs, one for each Safety Output.

• Name them **EDM02** and **EDM03**.

• Use **Single-Channel, 1-terminal** circuit types for each.

• Assign terminal **S18** to **EDM02** and terminal **S19** to **EDM03**.

• Map **EDM02** to **SO2** and **EDM03** to **SO3**.

Add a Status Output

• Click on the **Status Output** button [icon] in the tool bar (or

double-left click on the **O1** icon in the properties field of the screen).

The O1 Properties pop-up menu will appear.

O1 Properties	
Status output:	O1
Name:	O1
Function:	Unassigned
	OK Cancel
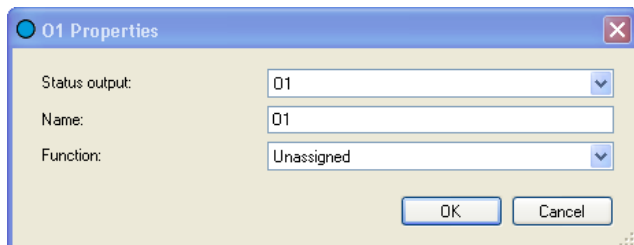
Name: **ES01**

Function: **Track input**

A drop-down Source field will now appear.

O1 Properties	
Status output:	O1
Name:	ES01
Function:	Track input
Source:	ES01
Signal convention:	24V dc = Run
	OK Cancel
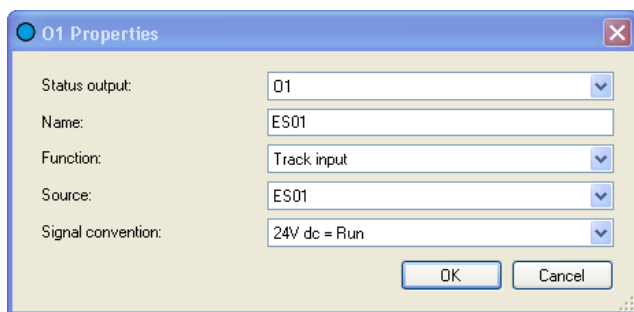
Source: **ES01**

Signal Convention: **24V dc = Run**

(When ES01 is in the Run state, O1 will be at 24V dc. When ES01 is in the Stop state, O1 will be at 0V dc.)

• Click **OK**.

Add Another Status Output

• Select Status Output **O2**

• Configure Status Output O2 with the properties listed below.

Name: **Need Reset**

Function: **Output waiting for Reset**

Source: **SO1**

Signal Convention: **24V dc = Reset needed**

• Click **OK**.

The **Wiring Diagram** should now look like this:
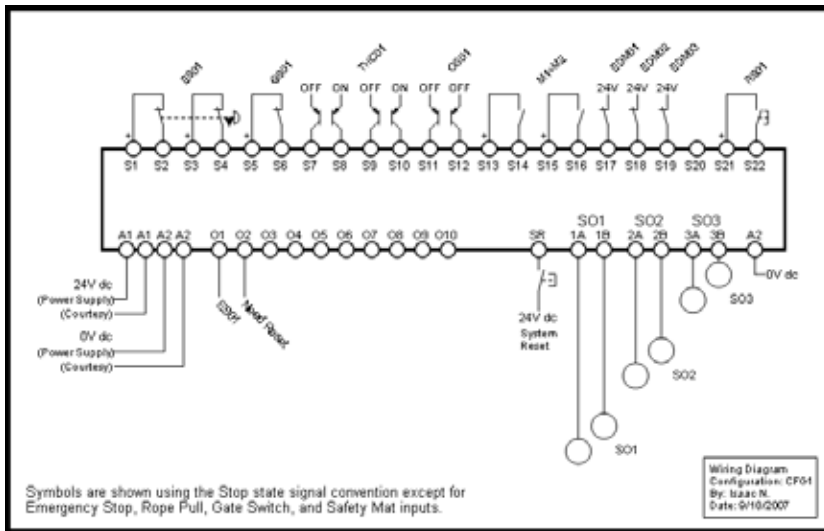
The **Ladder Logic Diagram** should now look like this:
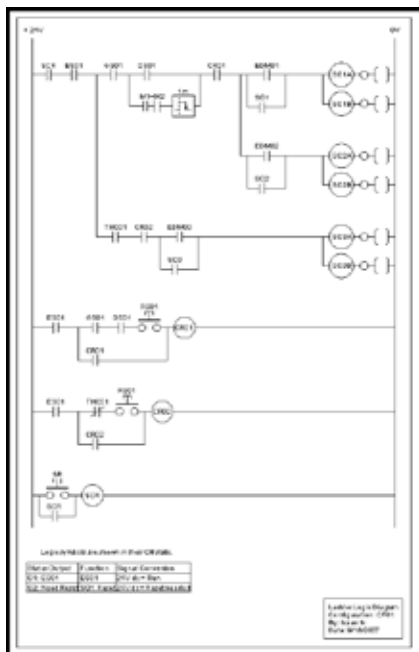
6 Configuration Confirmation

You will need to confirm this new configuration before it can be used in a safeguarding application. To do this you will need to connect the Safety Controller to your computer, using the USB cable. The confirmation process has two parts:

1. The Safety Controller microcontrollers receive and check a copy of the configuration to be sure that all safety critical settings are appropriate (configuration validation).

2. The Controller sends a copy of the configuration back to the PC Interface for the final, manual confirmation check process (configuration verification).

To confirm **CFG1**, follow the steps below.

• Save **CFG1**

• Connect the Safety Controller to the PC using the USB cable (refer to Section 1.3.1.)

• Apply 24V dc power to the Controller.

When the powered Controller is connected, the Receive, Send and Confirm buttons in the PCI tool bar become active and turn from gray scale to full color.

• Click on the **Confirm** button.

A message will appear, asking if you want to save a copy of the Controller's existing configuration.

NOTE: The Controller used during the confirmation process may have an existing (either factory default or user-defined) configuration. Any configuration already loaded in the Controller will be overwritten (and therefore lost) during this confirmation process. **It is the user's responsibility to save existing configurations, as needed.**

• Select **Yes** to save the configuration or **No** to proceed to overwrite the Controller's existing Configuration.

• Enter the password (the factory default is **0000**) on the Confirm Configuration pop-up menu.

• Click **OK**.

• A pop-up warning message will ask if you want to continue; select **Yes**.

The configuration validation process takes a few seconds and when complete, the verification window appears.

• Review the properties in the right column to be sure that they match the properties in the left column.

  If any device properties need to be changed, see **Edit the Configuration** at the end of this section (page 110).

  If both columns match, select **Confirm** for each device.

The confirmation screen shows the summary that is created when you have completed verifying each property.

As each device is confirmed, the Device Properties window for that device will compress, eventually showing only a checklist.
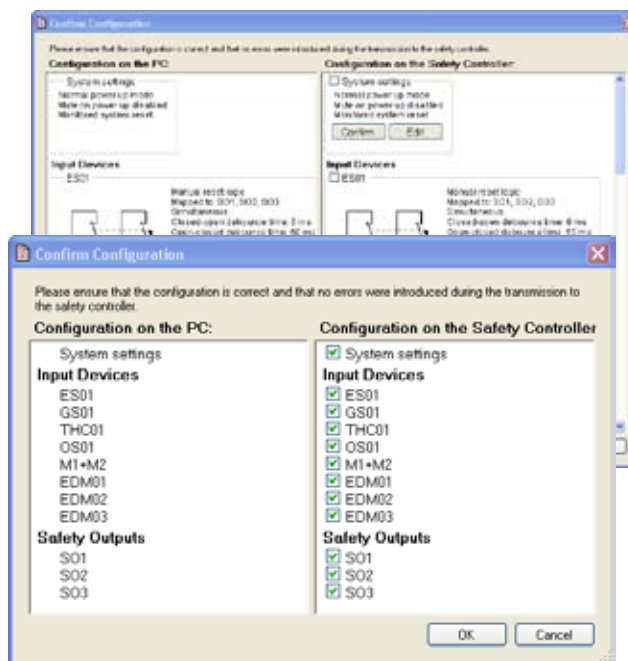
• To review a confirmed device property, click on the checkbox and the Device Properties window for that device will expand.

• When the manual verification is complete, click **OK**.

• The Controller requires a system reset (or cycle power) to enter Run mode.

• Because the two-hand control (THC) inputs are not connected, the Controller will enter Lockout mode (the Controller's Status indicator will be flashing red and the front panel display will indicate "*ES01: Stop*" and then "*THC01: Fault*", on line 5 for SO3.

Edit the Configuration

• If there is a need to edit one of the properties during the confirmation process, select **Edit**.

• Selecting the **Edit** button will open up the Properties menu for the device. Make the change and then select **OK**.

If you change one or more device properties during the manual verification stage of the confirmation, the Controller will need to re-validate the code.

• When you complete the edit and select **OK**, a message will appear asking whether you want to proceed to edit any other devices or if you want to restart the confirmation process.

When the configuration is successfully confirmed, the Controller will switch to Run mode, as described earlier, and wait for a system reset.

7 Other Functions

Receive a Configuration from the Controller (see Section 4.5.1)

To receive (upload) a configuration from a Controller and display it in the PCI:

• Connect the Safety Controller to the PC using the USB cable (see Section 1.3.1.).

• Apply 24V dc power to the Controller.

• Click on the **Receive** button in the tool bar.

Send a Configuration to the Controller (see Section 4.5.2)

To send (download) a configuration from the PCI to a Controller:

• Connect the Safety Controller to the PC using the USB cable (see Section 1.3.1.).

• Apply 24V dc power to the Controller.

• Click on the **Open** button in the tool bar and open the intended configuration file.

• Click on the **Send** button in the tool bar.

NOTE: *Confirming* a configuration also *sends* the configuration to the Controller.

Open a Configuration from the XM Card (see Section 4.5.3)

To open a copy of a configuration from the XM card and display it in the PCI:

• Connect the SC-XMP programming tool to the PC using the USB cable (see Section 1.3.1).

• Insert the XM card into the programming tool.

• Open the **File** menu in the upper left of the PCI tool bar.

• Select **Open From XM Card**.

A message will appear when the operation is complete.

NOTE: Both confirmed and unconfirmed configurations can be sent to or received from the XM card.

Send a Configuration to the XM Card (see Section 4.5.4)

To send a copy of a configuration from the PCI to the XM card:

• Connect the SC-XMP programming tool to the PC using the USB cable (see Section 1.3.1).

• Insert the XM card into the programming tool.

• Click on the **Open** button in the PCI tool bar and open the intended configuration file.

• Open the **File** menu in the upper left of the PCI tool bar.

• Select **Send To XM Card**.

A message will appear when the operation is complete.

NOTE: Both confirmed and unconfirmed configurations can be sent to or received from the XM card.

Lock the XM Card (see Section 4.5.5)

To Lock the XM card so that the stored configuration cannot be changed **(this operation cannot be undone)**:

• Insert the XM card into the programming tool.

• Click on the **Open** button in the PCI tool bar and open the intended configuration file.

• Verify that the correct file is stored on the XM card.

• Open the **File** menu in the upper left of the PCI tool bar.

• Select **Lock XM Card**.

A message will appear when the operation is complete.

Change the Controller Password (see Section 4.5.6)

To change a Controller password from the PCI:

• Connect the Controller to the PC, using the USB cable.

• Apply 24V dc power to the Controller.

• Open the **File** menu in the upper left of the PCI tool bar.

• Select **Change Safety Controller Password**.

• Fill in the menu that will appear as needed.

• Record the new password and click **OK**.

Export Documents (see Section 4.5.7)

The configuration wiring diagram, ladder logic diagram and configuration summary documents can be saved as either .pdf or .dxf files. The additional network tabs can be saved as .pdf, .dxf, or .csv files.
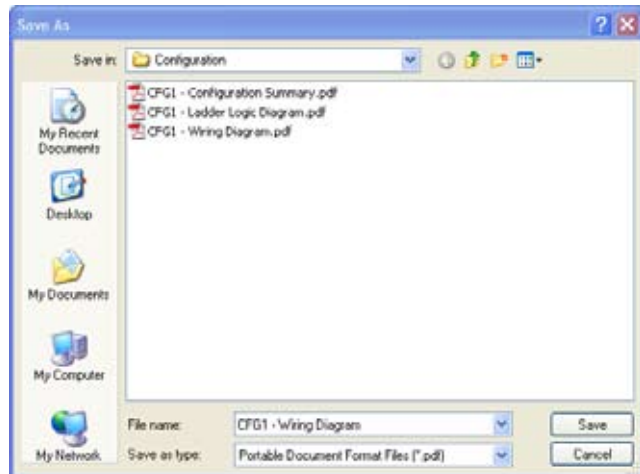

To export a configuration file:

• Open the configuration file that you want to save.

• Open the **File** menu in the upper left of the PCI tool bar.

• Select **Export**.

• Select the configuration document to export.

• Verify that the file name is correct and select the appropriate **Save as type** file option from the drop-down field (either **.pdf** or **.dxf** file format).

• Click **<Done>**.

Print Options (see Section 4.5.8)

To print a configuration file:

• Open the configuration file that you want to print

• Open the **File** menu in the upper left of the PCI tool bar.

• Select **Print**.

• Select the configuration document you want to print. A page setup menu will appear.

• Make the page and printer choices and click **OK.**

Fault Log

To access the Controller's internal Fault Log using the PCI:

• Connect the Safety Controller to the PC using the USB cable.
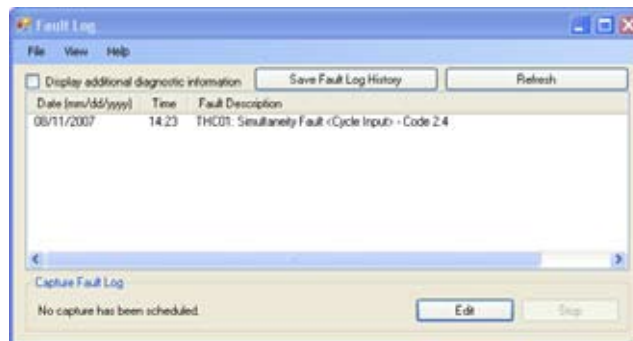
• Apply 24V dc power to the Controller.

• Open the **View** menu in the PCI tool bar.

• Select **Fault Log**.

The Fault Log screen will appear and will display any I/O or system faults detected by the Safety Controller.

Scheduled Fault Log Capture

Controller I/O and system fault information can be recorded to a computer file. To set up a recording period to capture fault data from a Controller, access the Fault Log menu.

• Connect the Safety Controller to the PC using the USB cable.

• Apply 24V dc power to the Controller.

• Open the **View** menu in the tool bar.
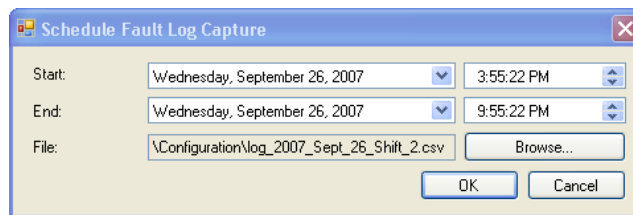
• Select **Fault Log**.

• Select the **Edit** button.

• Set the **Start** and **End** times, using the drop-down fields.

• Browse for the **File** location.

• Click **OK**.

The fault data will be stored to this file location as an Excel file.

Live Display

To access live Controller information from the PCI:

• Connect the Safety Controller to the PC using the USB cable.

• Apply 24V dc power to the Controller.

• Click on the **Live Display** button ⬚ in the tool bar or open

   View > Live Display.

The Live Display screen will appear.
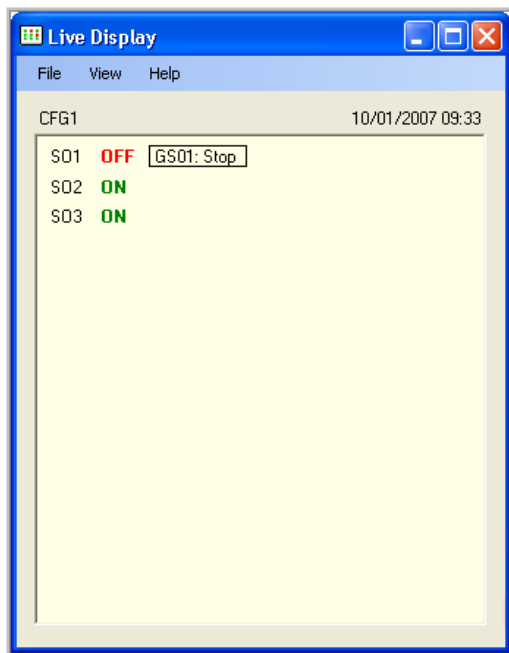
Onboard Interface (OBI) Configuration Tutorial

The Safety Controller Onboard User Interface (OBI) is a tool for creating and managing configuration files for the Safety Controller, using the built-in features of the Controller itself. The OBI is also used to retrieve, display and store both I/O and system status and fault information. Ethernet configuration can be viewed using the OBI, but cannot be configured using this interface.

The following tutorial explains the steps needed to create a sample configuration, using the Safety Controller's Onboard Interface (OBI). The configuration is used to define the input devices to be connected to the Safety Controller and to establish relationships between those input devices and the Safety Controller outputs.

Important: This tutorial is not intended to provide a comprehensive lesson about every feature the Safety Controller and OBI offer. Rather, it is designed to provide the basic skills and processes needed to explore the features on your own. It also is not intended to cover the operational requirements of the Safety Controller. For complete operational instructions, read Sections 1–8 of this manual.

Enter Configuration Mode
The first step in creating a configuration is entering Configuration mode. To enter Configuration mode from the Run mode display, press **OK** to display the main System Menu. At the System Menu, press the **Down** arrow button until *Configuration Mode* is highlighted on the display, then press **OK**.
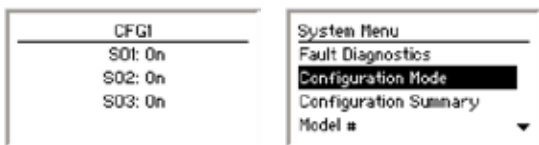
Enter Password
The default password is **0000**. Use the left/right arrow keys to select the password digit to change. Use the up/down arrow buttons to change the selected password digit.

When the password is entered, press **OK** to enter Configuration mode.

Read the caution that the Safety Outputs will turn OFF when Configuration mode is entered, and press **OK**.

Edit Configuration
To edit the configuration from the Configuration Mode menu, select **Configuration File** and press **OK**.
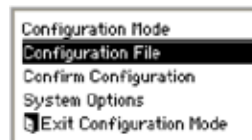
When the Configuration File menu is displayed, select **Edit Configuration** and press **OK**.
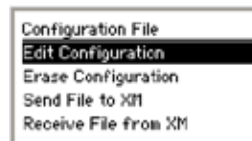
The first property of the configuration that can be changed is its name.

Use the left/right arrow keys to select the character to be changed (up to 16 characters).

Use the up/down arrow keys to change the character (choices A-Z, 0-9, -, +, or space), and press **OK**.
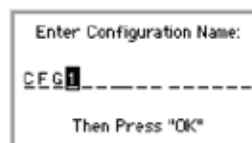
Add Input Devices
In this tutorial we will add the following input devices:

- Emergency stop (E-stop) input
- Gate switch input
- Two-hand control input
- Reset input
- Optical sensor input
- External device monitoring inputs
- Mute sensor pair input

NOTE: Safety mat, protective stop, rope pull, enabling device, and bypass switch devces are not covered in this tutorial.

Add E-Stop Input
To add the E-stop input, select **Inputs** in the following menu and press **OK**.
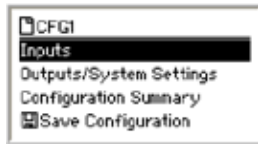
Select Add Input and press OK.
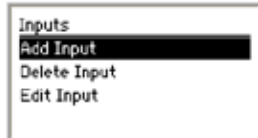
NOTE: The other options in this menu, **Delete Input** and **Edit Input**, are not covered in this tutorial. These selections allow you to make changes to an existing configuration.

Input devices are categorized as either safety inputs or non-safety inputs. The E-stop button is categorized as a safety input. Select **Safety Input** and press **OK**.
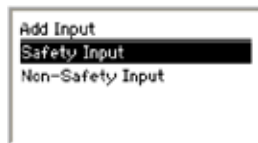
The next menu is used to select the type of input device to add. Icons for the input types are used to make the selection easier. Use the left/right arrow keys to select the type of input to add, in this case use the E-Stop icon, and press **OK**.

Configuring Input Device Properties
The following parameters must be configured for each E-stop input device:

• Name

• Circuit type

• Terminal assignments

• Advanced settings

• Reset logic

• Output mapping

Enter Input Device Name
After selecting to add an E-Stop Input device the next menu displayed is the Enter Name menu.

Use the left/right arrow keys to select the character to be changed, up to 10 characters.

Use the up/down arrow keys to change the character (choices A-Z, 0-9, -, +, or space).

In this case, the name of the E-Stop Input was set to the default value of ES01. Do not change the name of the device at this time; just press **OK**.
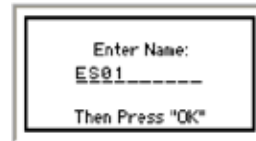
Input Properties Menu
The next menu displayed is the Input Properties menu.

Set the Circuit Type of the Input
From the Input Properties menu select **Select Circuit Type** and press **OK**.
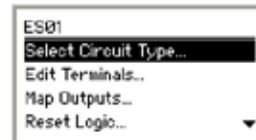
The display will show the Select Circuit Type menu.

The left/right arrow keys select the circuit type of the input device. Select the circuit type **Dual Ch., 4 terminal** and press **OK**.
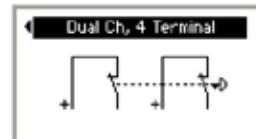
When the circuit type is selected, the display returns to the Input Properties menu.

Edit the Terminal Assignments
When the input circuit type was selected, the Safety Controller automatically assigns terminals for the input device. These terminal assignments can be viewed and changed by selecting **Edit Terminals** and pressing **OK**.
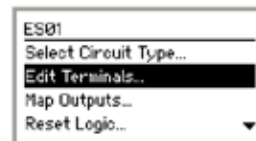
Use the left/right arrow keys to select the terminal assignment to be changed.

Use the up/down arrow keys to change the terminal assignments.

Set the terminal assignments to **S1, S2, S3,** and **S4**, and press **OK**.
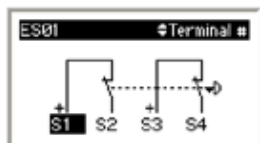
Map Outputs
Choose which of the Safety Output(s) the input will control. Select **Map Outputs** in the Input Properties menu and press **OK**.
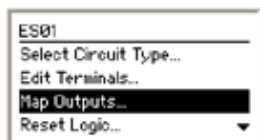
To map the input to an output, select the output using the up/down arrow keys and press **OK**. A filled-in circle next to an output indicates the input is mapped to that output. To remove the input mapping, select the output and press **OK**. An open circle indicates the input is not mapped to that output.

Map the E-stop to all three Safety Outputs, select **Save** and press **OK**.
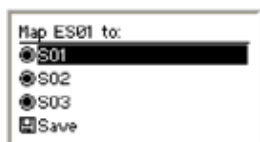
After mapping the input to the Safety Outputs, the display returns to the Input Properties menu.

Set Reset Logic
To set the reset logic, select **Reset Logic** and press **OK**.
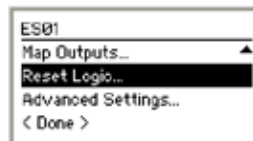
Use the left/right arrow keys to select the **Set Reset Logic** parameter. Select **Manual** and press **OK**.
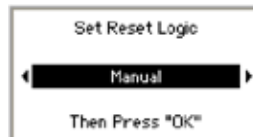
After the Reset Logic parameter is set, the display returns to the Input Properties menu.

Saving the Input Device Parameters
All of the E-Stop's parameters have been set. To save the parameters, select **< Done >** and press **OK**.

The display now indicates the input parameters were saved.

Press **OK** to continue.

The display returns to the Inputs menu.
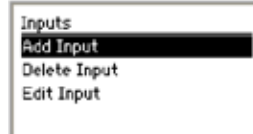
Adding Other Input Devices

The steps required to add other input devices are similar to those you've just completed.

Now create the following input devices, with properties as provided in the steps below:

- Gate Switch, GS01
- Two Hand Control, THC01
- Reset Input, RS01
- Optical Sensor, OS01
- External Device Monitors; EDM01, EDM02, and EDM03
- Mute Sensor Pair, M1+M2

Safety Input: Gate Switch – GS01

Circuit Type:
Single-Channel,
2-Terminal Contact Switch

Terminals: S5 and S6

Mapped to: SO1, SO2

Automatic Reset Logic
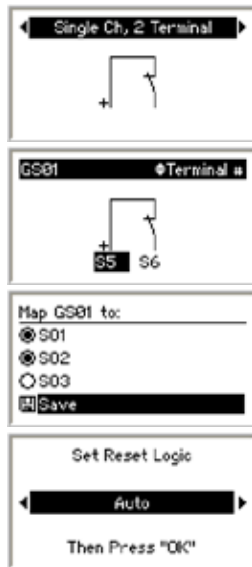
Safety Input: Two-Hand Control – THC01

Circuit Type:
2X complementary,
PNP switch

Terminals:
S7, S8, S9, and S10

Mapped to: SO3
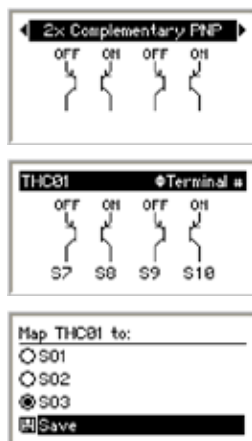
Non-Safety Input: Reset Input – RS01

Circuit Type:
Single Channel,
2-Terminal Contact Switch

Terminals: S21 and S22

Mapped to:
SO1, SO2, and SO3
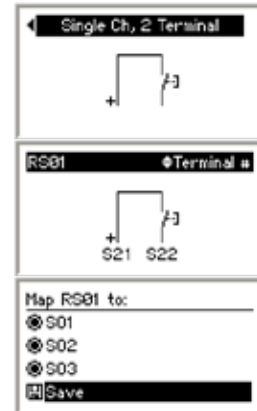
Safety Input: Optical Sensor – OS01

Circuit Type:
Dual-Channel, PNP

Terminals: S11 and S12

Mapped to: SO1 and SO2

Automatic Reset Logic
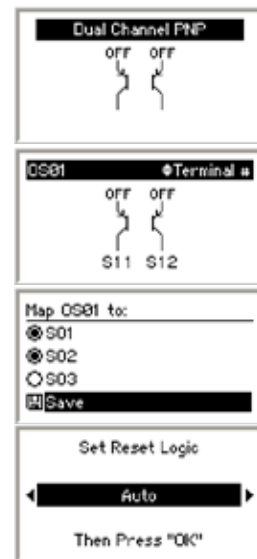
Safety Input: Mute Sensor – M1 + M2

The next input is a little different than the previous inputs added. So, we'll discuss this one in a little more detail.

After selecting to add a mute sensor and entering its name, set the circuit type and the terminal assignments as follows:

Circuit Type:
Dual-Channel Contact Switch

Terminals: 13, 14, 15 and 16
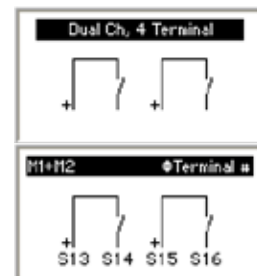
Instead of mapping to an output, mute sensor inputs are mapped to the inputs they will mute. Only certain types of input devices can be muted. The Safety Controller creates a list of the

inputs in the current configuration that can be muted. Select **Map Inputs** from the Mute Sensor Properties menu and press **OK**.

Using the up/down arrow buttons, select **OS01** from the list of inputs and press **OK**. The circle to the left of the *OS01* fills in to indicate that mute senor pair M1+M2 is mapped to OS01.
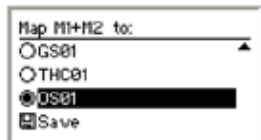
NOTE: In this case, the mute sensor pair is being mapped to only OS01, but the mute sensor pair can be mapped to more than one input.

Select **Save** and press **OK** to complete the input mapping process.

Set the Mute Time Limit

The mute time limit defines the maximum amount of time an input can be muted. From the Mute Sensor Properties menu, select **Set Mute Limit Timers** and press **OK**.
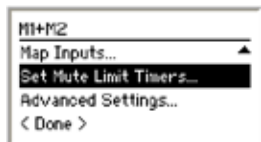
When the next menu is displayed, press **OK** to display the Mute Time Limit Enable menu.

Using the up/down arrow buttons, select **Change Time…** and press **OK**.
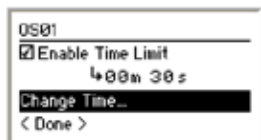
NOTE: If the box in front of *Enable Time Limit* is not checked, select **Enable Time Limit** and press **OK** to enable the time limit.

Change the mute time limit to 1 minute. Use the left/right arrows to select the digit to be changed and the up/down arrows to change the digit (0-9) and press **OK**.
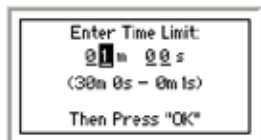
At the Mute Time Limit Enable menu, select **<Done>** and press **OK**.

At the Mute Sensor properties menu, select **<Done>** and press **OK** to complete adding the mute sensor.

Safety Input: External Device Monitor – EDM01

Circuit Type:
Single-Channel, 1 Terminal
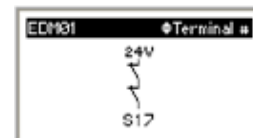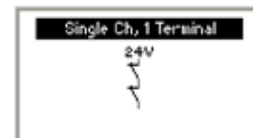
Terminal: S17
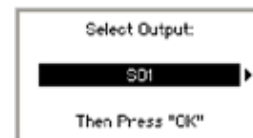
Mapped to: SO1

Safety Input: External Device Monitor – EDM02

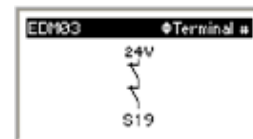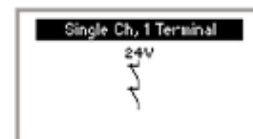**Circuit Type:**
Single-Channel, 1 Terminal
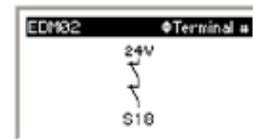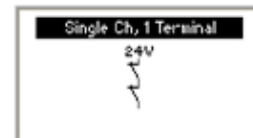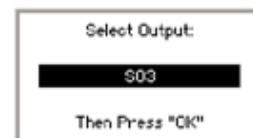
Terminal: S18
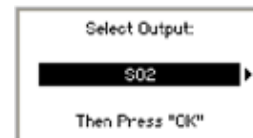
Mapped to: SO2

Safety Input: External Device Monitor – EDM03
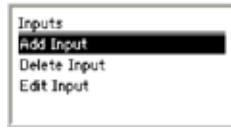
Circuit Type:
Single-Channel, 1 Terminal

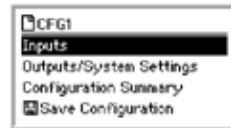**Terminal:** S19

Mapped to: SO3

All inputs have been added; press **OK**. When the Inputs menu is displayed, press **ESC** to display the Edit Configuration menu (see next page).
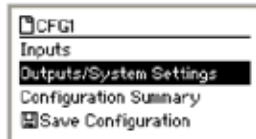
Edit Inputs menu

Inputs
Add Input
Delete Input
Edit Input

ESC→

Edit Configuration menu

CFG1
Inputs
Outputs/System Settings
Configuration Summary
Save Configuration
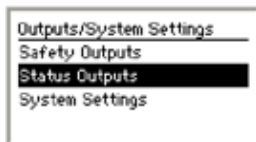
Configure the Status Outputs

To configure the Status Outputs, select **Outputs/System Settings** and press **OK**.

CFG1
Inputs
Outputs/System Settings
Configuration Summary
Save Configuration

Select **Status Outputs** and press **OK**.

Outputs/System Settings
Safety Outputs
Status Outputs
System Settings

Use the left/right arrow keys to select the Status Output to configure. In this case, select **Status Output 01** and press **OK**.

Select Status Output

01

Then Press "OK"
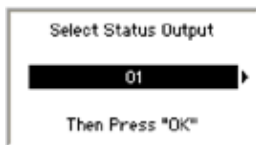
The next menu displayed is the Status Output Properties menu. From this menu you can configure the Status Output(s). Configure:

• Status Output 01 to track the state of ES01

• Status Output 02 to signal when a reset operation is needed for Safety Output SO1

Configure Status Output 01

Change the name of 01 by selecting **Change Name** and pressing **OK**.

01
Change Name...
Select Function...
Select Source...
Signal Convention...

Use the left/right arrow keys to select the character to be changed (up to 10 characters).

Use the up/down arrow keys to change the character (choices A-Z, 0-9, -, +, or space).
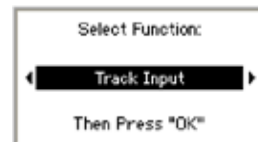
Set the name to **ES01** and press **OK**.

Enter Name:
ES01_____
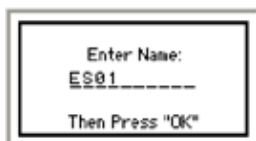
Then Press "OK"

The display returns to the Status Output Properties menu. The top line of the display now displays the name assigned to the Status Output.

01
Change Name...
Select Function...
Select Source...
Signal Convention...
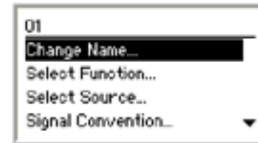
Configure the Status Output to track an input. Select **Select Function** and press **OK**.

01
Change Name...
Select Function...
Select Source...
Signal Convention...
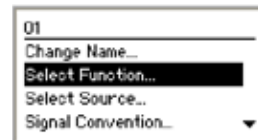
Using the left/right arrow keys, select **Track Input** and press **OK**.

Select Function:

Track Input

Then Press "OK"

The display returns to the Status Output Properties menu.

Configure the Status Output to track the E-stop input, ES01. Select **Select Source** and press **OK**.
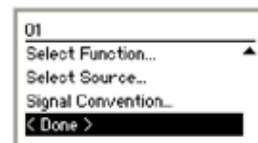
01
Change Name...
Select Function...
Select Source...
Signal Convention...
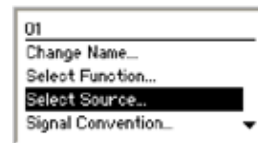
Using the left/right arrow keys, select **ES01** and press **OK**.
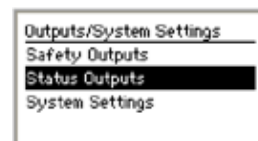
Select Source:

ES01

Then Press "OK"

The display returns to the Status Output Properties menu.

Status Output 01 is now configured. To save the settings, select **<Done>** and press **OK**.

01
Select Function...
Select Source...
Signal Convention...
< Done >

The display returns to Outputs/System Settings menu.

Outputs/System Settings
Safety Outputs
Status Outputs
System Settings

To configure additional Status Outputs, select **Status Outputs**, select the Status Output to configure and repeat the steps that were performed for Status Output 01.
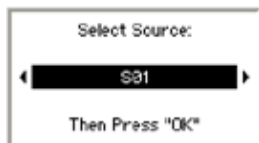
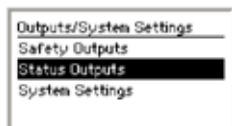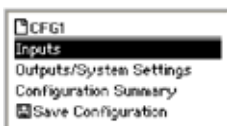**Configure Status Output 02**

Name: NEED RESET

Function:

Source:

When the last Status Output has been configured, return to the Edit Configuration menu by pressing **ESC**.
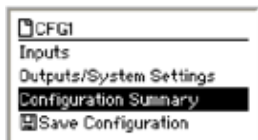
Edit Inputs menu   **Edit Configuration menu**

     ESC→

Review the Configuration
Prior to saving the newly created configuration, review it by selecting **Configuration Summary** and pressing **OK**.


The Configuration Summary menu allows you to:

  • Review the input circuit and terminal assignments for each input

  • Review the mapping assignments of each input

  • Review the configuration of each Status Output

Review Terminal Assignments
Select **Terminal Assignments** and press **OK**.
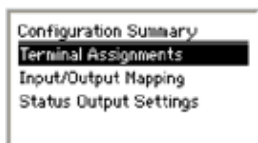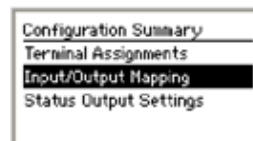

The display shows the terminal assignments for the first input. Use the left/right arrow keys to view the terminal assignments for the other inputs.
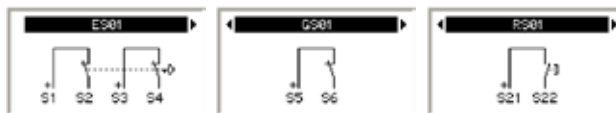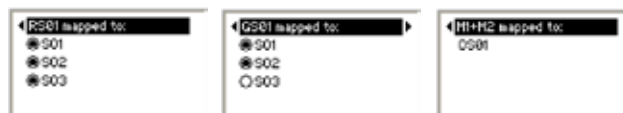

When finished, press either **OK** or **ESC**.

Review Input/Output Mapping
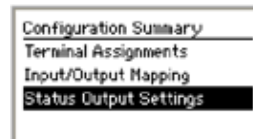Select **Input/Output Mapping** and press **OK**.

The display shows the input/output mapping for the first input. Use the left/right arrow keys to view the other inputs.
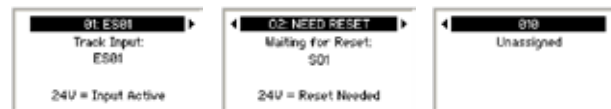

When finished, press either **OK** or **ESC**.

Review Status Output Settings
Select **Status Output Settings** and press **OK**.

The display shows the first Status Output. Use the left/right arrow keys to view the other Status Outputs.


When finished, press either **OK** or **ESC**.

When finished reviewing the configuration summary, return to the Edit Configuration menu by pressing **ESC**.

Saving the Configuration

Up until now, the configuration changes have been stored in a temporary memory location. To make the configuration changes permanent, select **Save Configuration** and press **OK**.

NOTE: If you do not want to save the changes while at the Edit Configuration menu, press **ESC** and select **Yes** when asked if you want to exit without saving changes.

```
CFG1
Inputs
Outputs/System Settings
Configuration Summary
Save Configuration
```
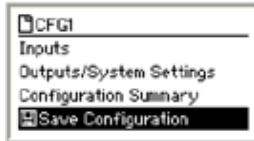
Once the configuration is saved, the display will return to the Configuration Mode menu.

Confirming the Configuration

You will need to confirm the changes to the configuration before it can be used in a safeguarding application. To confirm the configuration, select **Confirm Configuration** and press **OK**.

```
Configuration Mode
Configuration File
Confirm Configuration
System Options
Exit Configuration Mode
```
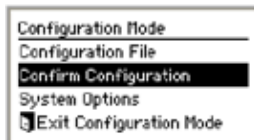
The Confirm Configuration menu will appear.

To confirm you'll need to review the safety-critical configurations for the inputs, Safety Outputs, and the system settings. An unchecked box in the Confirm Configuration menu indicates the safety-critical settings have not yet been confirmed.
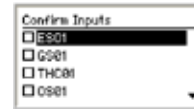
```
Confirm Configuration
□ Inputs
□ Safety Outputs
□ System Settings
< Done >
```
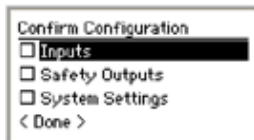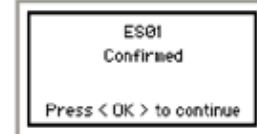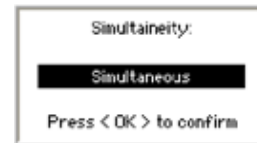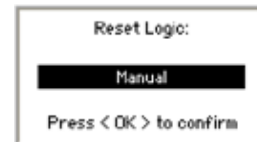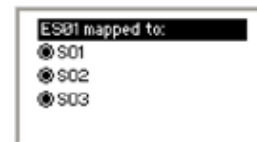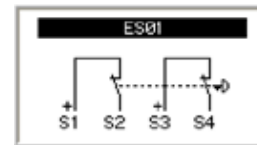
Confirm Configurations of Inputs

From the Confirm Configuration menu, select **Inputs** and press **OK**.

The next menu lists all of the safety inputs in the configuration.

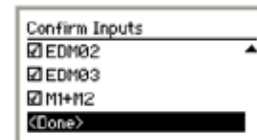To confirm E-Stop ES01, select it and press **OK**.

```
Confirm Inputs
□ ES01
□ GS01
□ THC01
□ OS01
```

The next series of menus lists the safety-critical configurations for this input. Press **OK** after reviewing each setting.

```
ES01
S1  S2  S3  S4
```

```
ES01 mapped to:
S01
S02
S03
```

```
Reset Logic:
Manual
Press < OK > to confirm
```

```
Simultaineity:
Simultaneous
Press < OK > to confirm
```

```
ES01
Confirmed
Press < OK > to continue
```

Repeat the confirmation process for each of the inputs.

When all inputs have been confirmed, the display looks like this:

```
Confirm Inputs
☑ EDM02
☑ EDM03
☑ M1+M2
<Done>
```

To continue confirming the configuration, select **<Done>** and press **OK**.

Confirm Safety Output Configuration
Select **Safety Outputs** and press **OK**.

Confirm Configuration
☑ Inputs
☐ Safety Outputs
☐ System Settings
< Done >
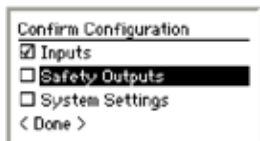
To confirm Safety Output SO1's configuration, select **SO1** and press **OK**.

Confirm Outputs
☐ SO1
☐ SO2
☐ SO3
<Done>

The next series of menus lists the safety-critical configurations for SO1. Press **OK** after reviewing each setting.
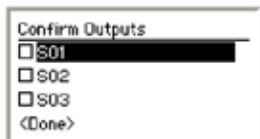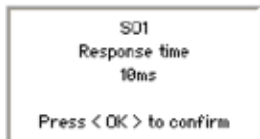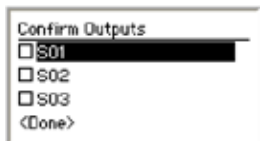
Delay Type:
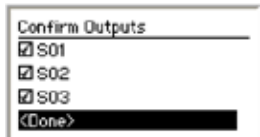No Delay

Press < OK > to confirm

SO1
Response time
10ms

Press < OK > to confirm

SO1
Confirmed

Press < OK > to continue

When SO1 is confirmed, the box in front of SO1 will be checked.

Confirm Outputs
☐ SO1
☐ SO2
☐ SO3
<Done>

Repeat the confirmation process for SO2 and SO3.

When finished, the Confirm Outputs screen should look like this:

Confirm Outputs
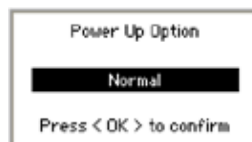☑ SO1
☑ SO2
☑ SO3
<Done>

Select **< Done >** and press **OK**.

The Confirm Configuration menu now indicates the Inputs and Safety Outputs are confirmed.

The last step is to confirm the System Settings. Select **System Settings** and press **OK**.
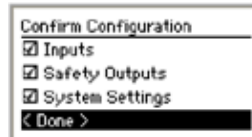
Confirm Configuration
☑ Inputs
☑ Safety Outputs
☐ System Settings
< Done >
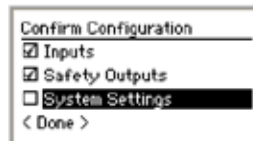
The next series of menus lists the safety-critical system settings. Press **OK** after reviewing each setting.

System Reset
Monitored

Press < OK > to confirm

Power Up Option
Normal

Press < OK > to confirm

Mute on Power Up
Off

Press < OK > to confirm

Final Confirmation Step
All of the safety-critical configurations settings have been confirmed and the configuration can be used in a safeguarding application. If any changes are made to the configuration, the confirmation process will need to be repeated.

Exit the Confirm Configuration menu by selecting **< Done >** and pressing **OK**.
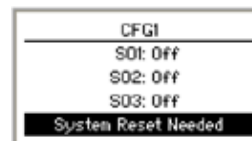
Confirm Configuration
☑ Inputs
☑ Safety Outputs
☑ System Settings
< Done >

Exit Configuration Mode
Select **Exit Configuration Mode** and press **OK** to exit Configuration mode and return to the Run mode display.

Configuration Mode
Configuration File
Confirm Configuration
System Options
Exit Configuration Mode
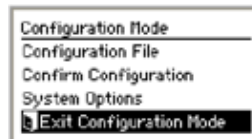
The Safety Controller has now been configured. The display screen should be similar to the one below, if the inputs have been connected.

CFG1
SO1: Off
SO2: Off
SO3: Off
System Reset Needed

NOTE: If the inputs have not been connected, the Controller will indicate a lockout.

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