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Configuration Tutorial

Onboard Interface (OBI) and PC Interface (PCI)

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

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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.

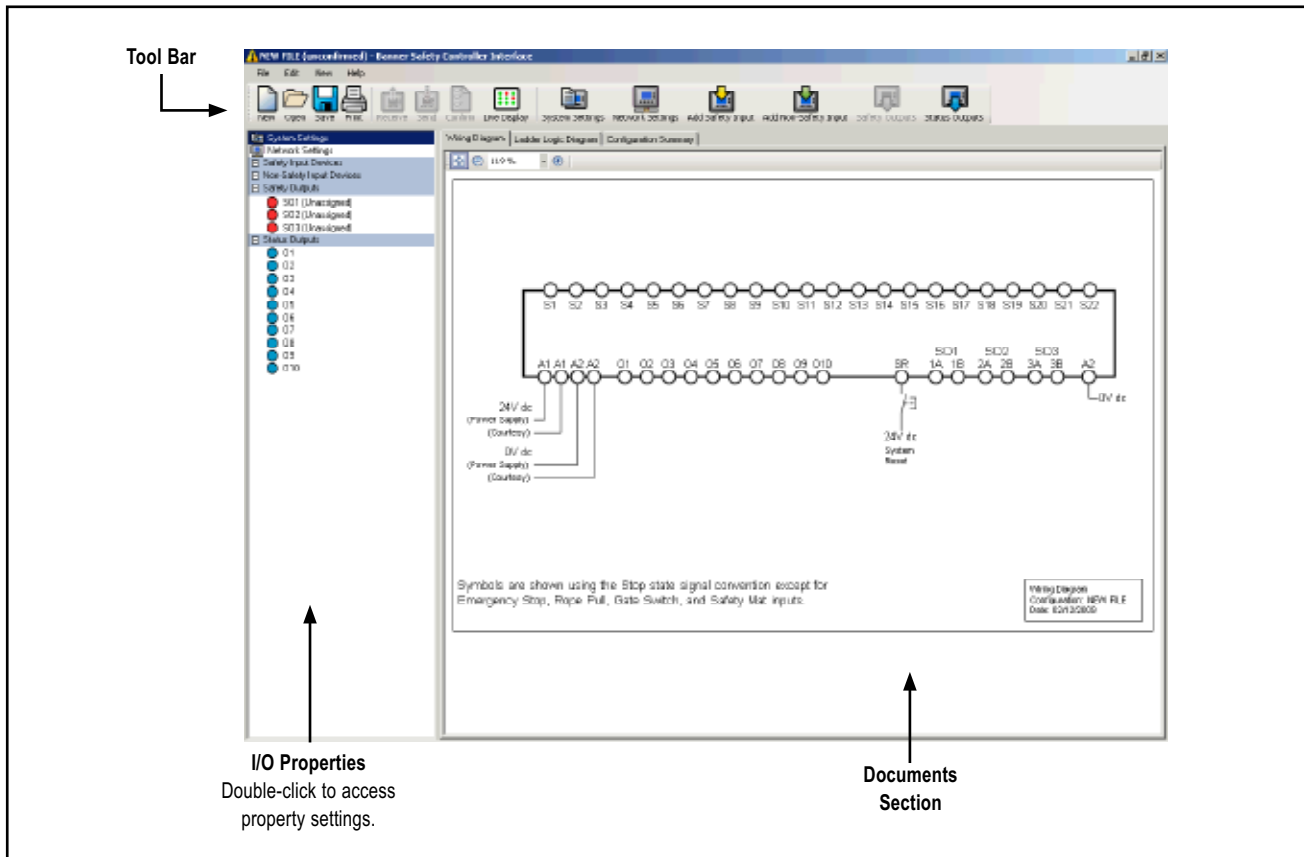

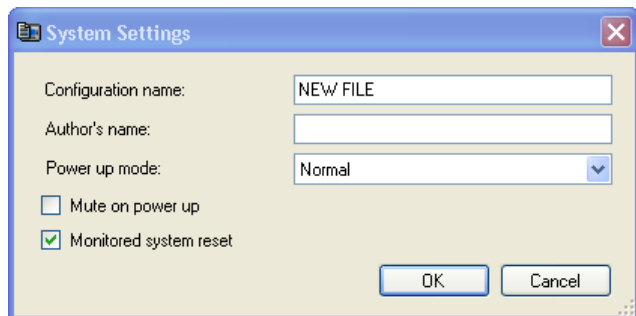


Figure 1. PCI main screen, ready for configuration

5 Create a Configuration

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

The pop-up System Settings menu will appear.



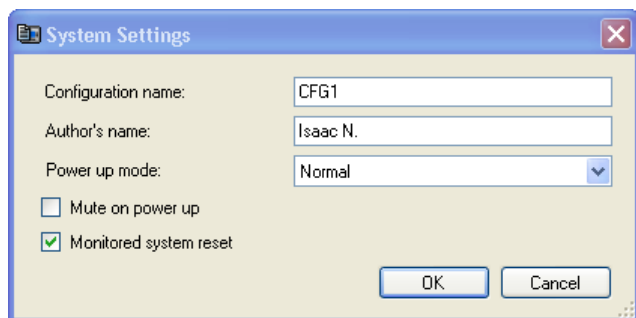
- Name the configuration file **CFG1**. (Up to 16 alphanumeric characters may be used.)
- Add your name in the Author's name box. (Up to 10 alphanumeric characters may be used; abbreviate as needed.)
- Keep the default settings listed below.

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**.

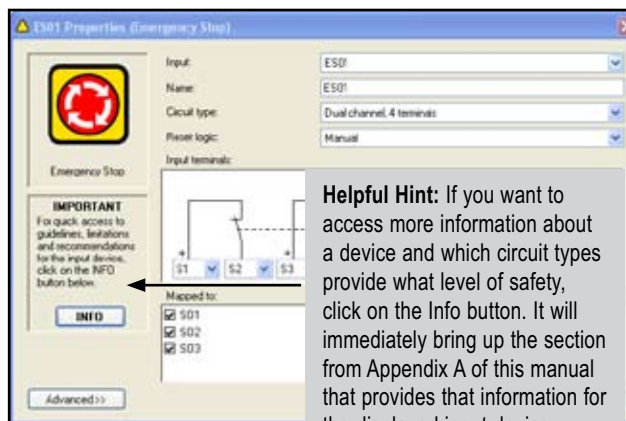
Add an E-Stop Button Input

- 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  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.)

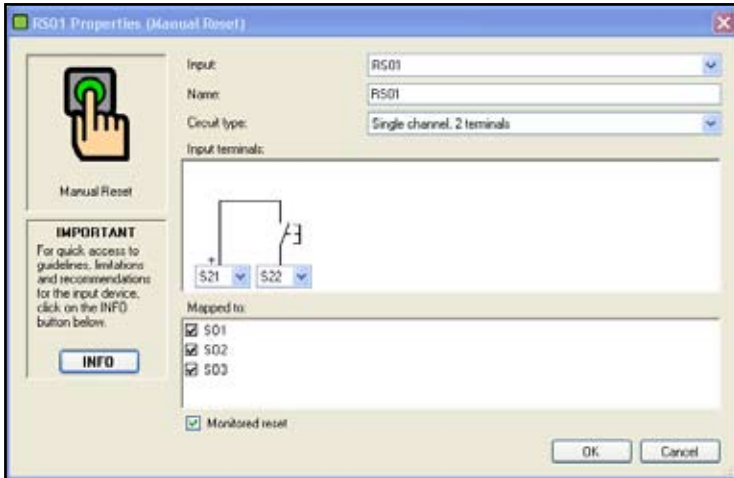


Helpful Hint: If you want to access more information about a device and which circuit types provide what level of safety, click on the Info button. It will immediately bring up the section from Appendix A of this manual that provides that information for the displayed input device.

- 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

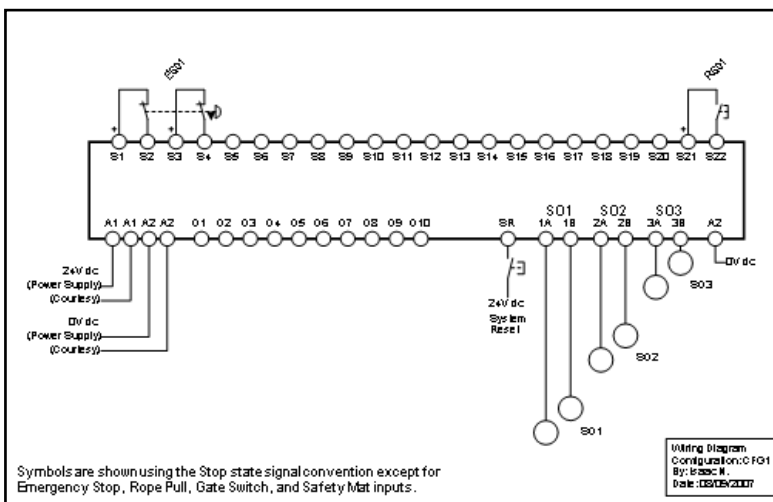


The **RS01 Properties** menu appears.

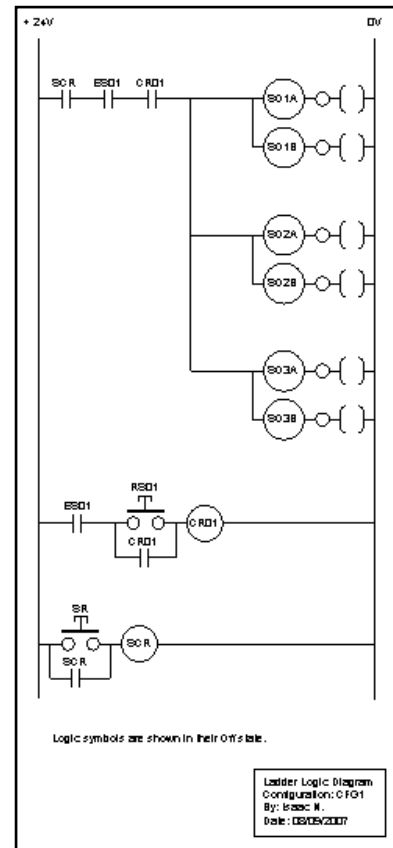
- Change the Circuit type to **Single-channel, 2-terminal**.
- Click **OK**.

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:



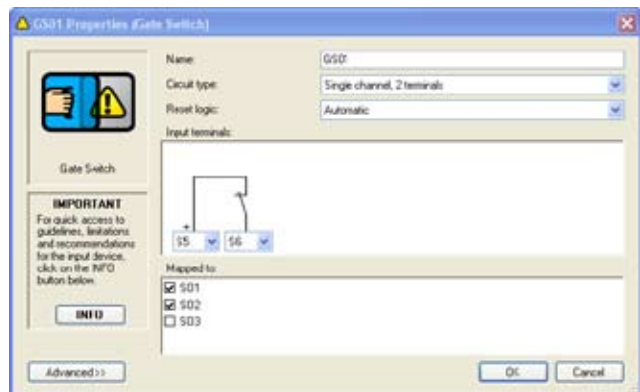
Your **Ladder Logic Diagram** should look like this:



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: **S01 and S02**

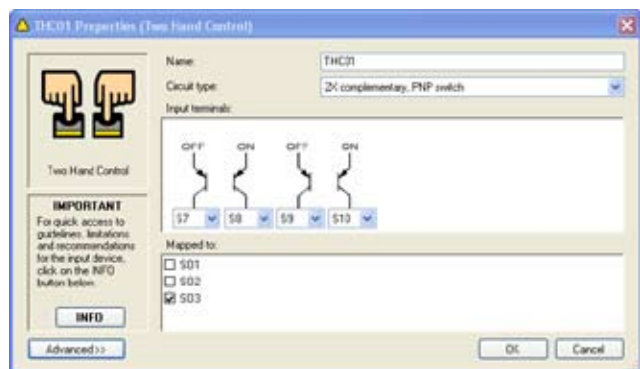
(Click on a checkbox to select or deselect it.)

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**

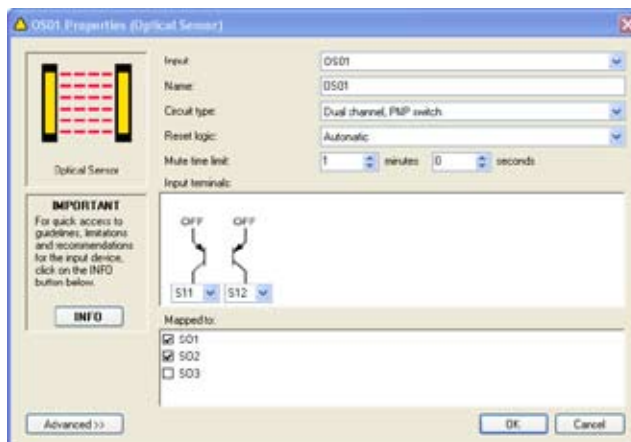
Map to: **S03**

- 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**

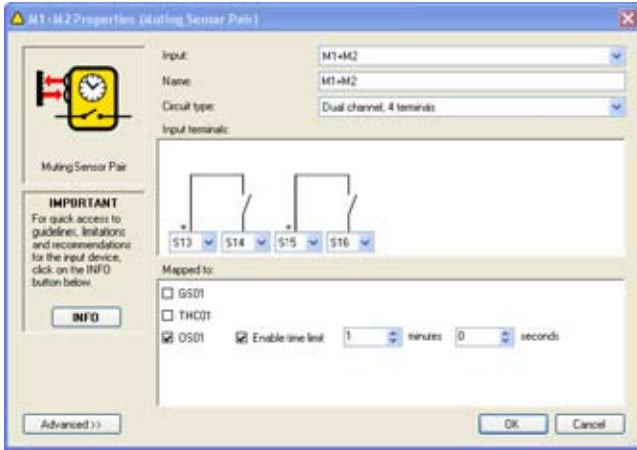
Terminals: **S11 and S12** (Use the drop-down terminal number fields to change the terminal assignment, if needed.)

Map to: **S01 and S02**

- 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**

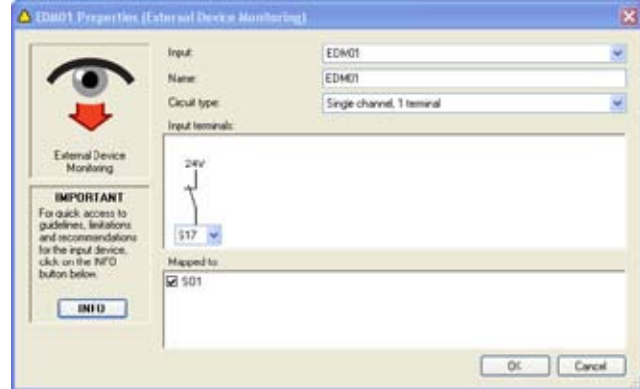
Time limit: **1 minute, 0 second**

- 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

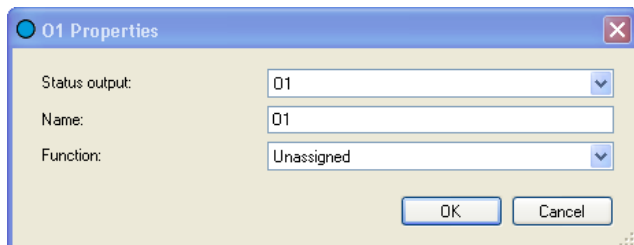
Add two more **External Device Monitoring** inputs, one for each Safety Output.

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

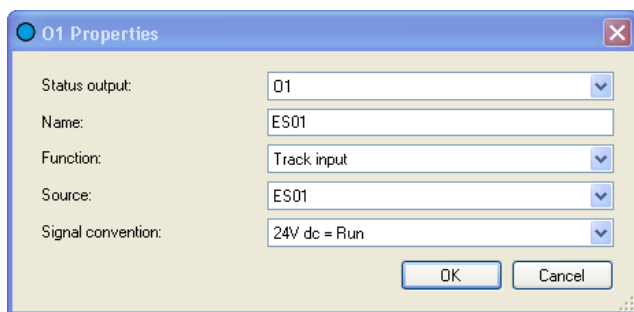
The O1 Properties pop-up menu will appear.



Name: **ES01**

Function: **Track input**

A drop-down Source field will now appear.



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**

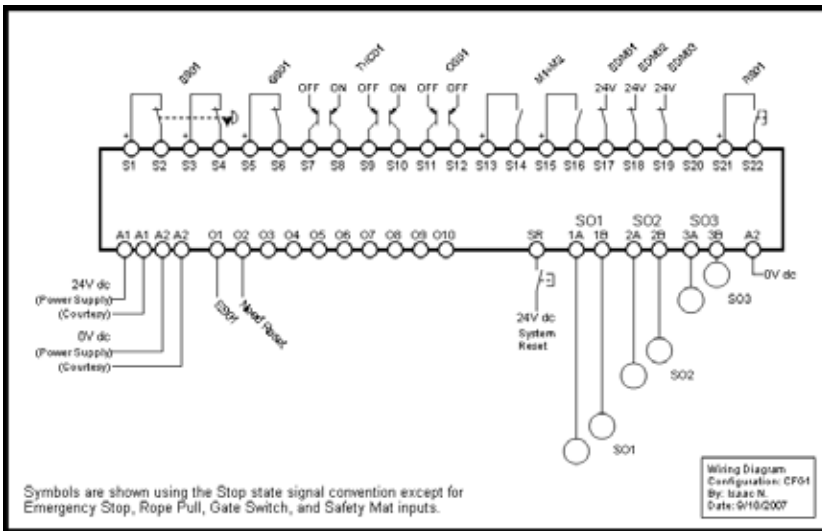
Function: **Output waiting for Reset**

Source: **SO1**

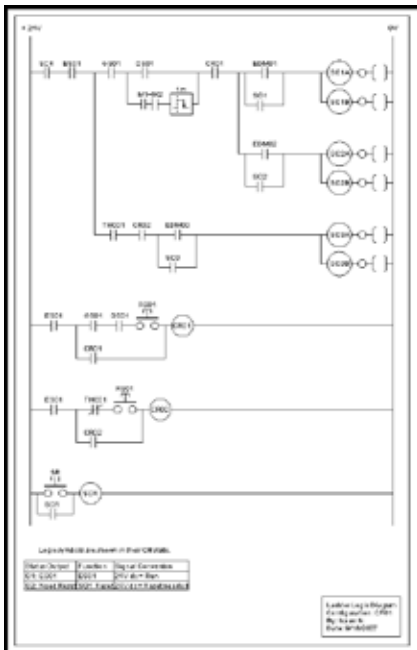
Signal Convention: **24V dc = Reset needed**

- 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.

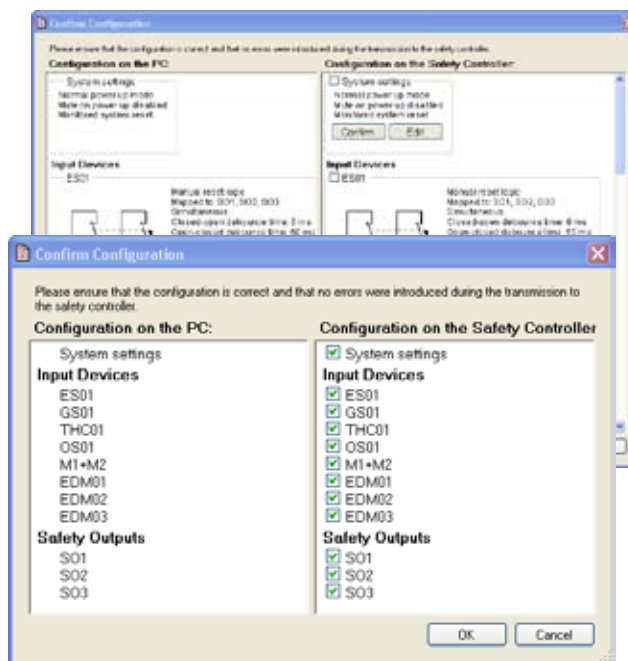
- Review the properties in the right column to be sure that they match the properties in the left column.

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.

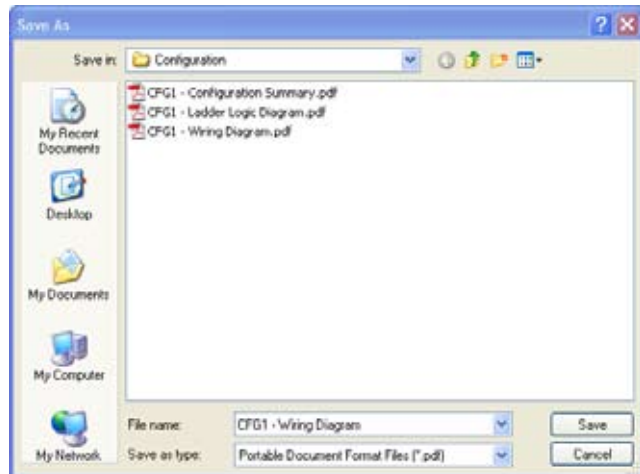
Change the Controller Password (see Section 4.5.6)

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)

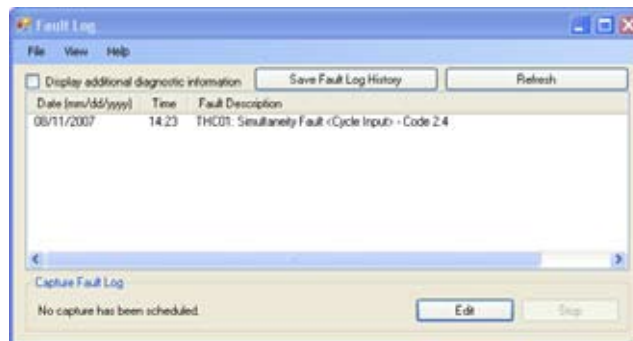
To print a configuration file:

- 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.



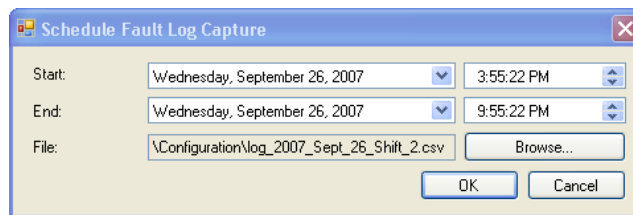
- Apply 24V dc power to the Controller.
- Open the **View** menu in the PCI tool bar.
- Select **Fault Log**.

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.

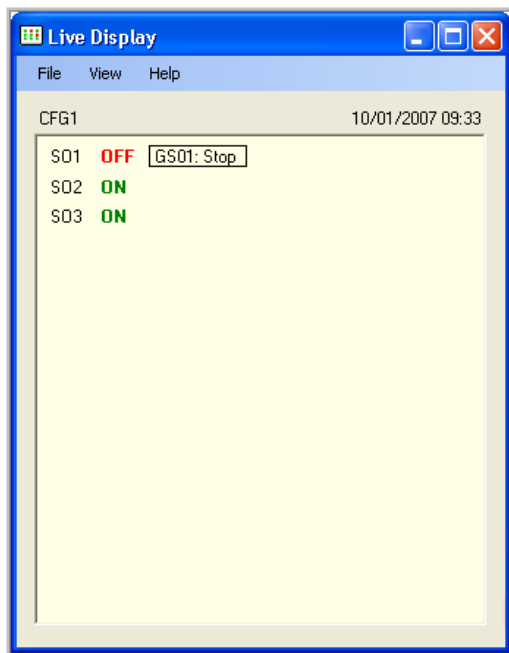
Live Display

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

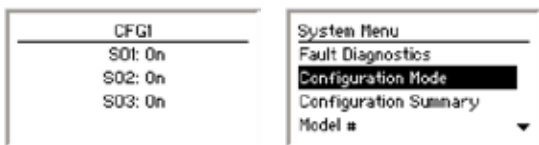
The Safety Controller Onboard User Interface (OBI) is a tool for creating and managing configuration files for the Safety Controller, using the built-in features of the Controller itself. The OBI is also used to retrieve, display and store both I/O and system status and fault information. Ethernet configuration 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.

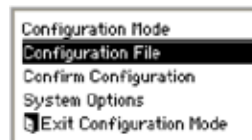
When the password is entered, press **OK** to enter Configuration mode.



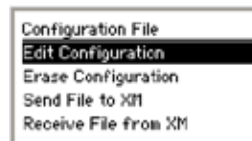
Read the caution that the Safety Outputs will turn OFF when Configuration mode is entered, and press **OK**.

Edit Configuration

To edit the configuration from the Configuration Mode menu, select **Configuration File** and press **OK**.



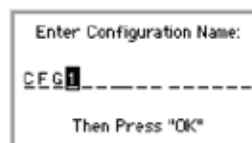
When the Configuration File menu is displayed, select **Edit Configuration** and press **OK**.



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

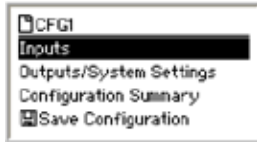
In this tutorial we will add the following input devices:

- 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

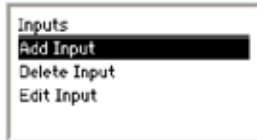
NOTE: Safety mat, protective stop, rope pull, enabling device, and bypass switch devices are not covered in this tutorial.

Add E-Stop Input

To add the E-stop input, select **Inputs** in the following menu and press **OK**.

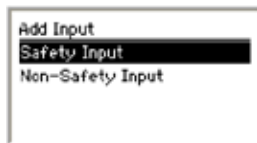


Select **Add Input** and press **OK**.



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

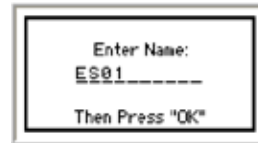
Enter Input Device Name

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.

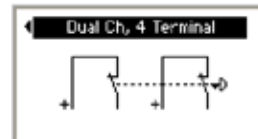
Set the Circuit Type of the Input

From the Input Properties menu select **Select Circuit Type** and press **OK**.



The display will show the Select Circuit Type menu.

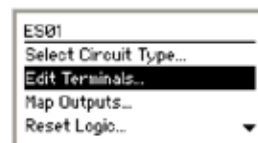
The left/right arrow keys select the circuit type of the input device. Select the circuit type **Dual Ch., 4 terminal** and press **OK**.



When the circuit type is selected, the display returns to the Input Properties menu.

Edit the Terminal Assignments

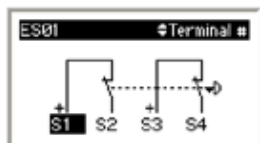
When the input circuit type was selected, the Safety Controller automatically assigns terminals for the input device. These terminal assignments can be viewed and changed by selecting **Edit Terminals** and pressing **OK**.



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.

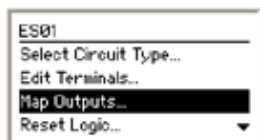
Set the terminal assignments to **S1**, **S2**, **S3**, and **S4**, and press **OK**.



After the terminal assignments are edited, the display returns to the Input Properties menu.

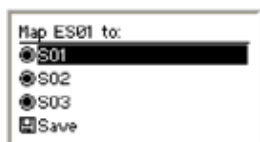
Map Outputs

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.

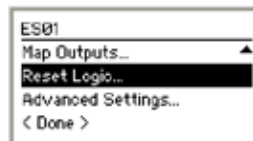
Map the E-stop to all three Safety Outputs, select **Save** and press **OK**.



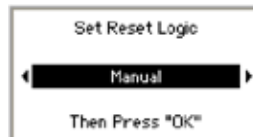
After mapping the input to the Safety Outputs, the display returns to the Input Properties menu.

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**.

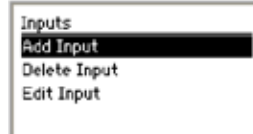


The display now indicates the input parameters were saved.

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

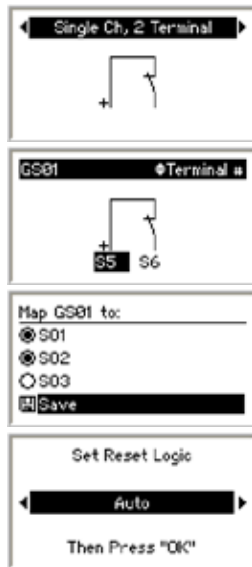
Safety Input: Gate Switch – GS01

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

Terminals: S5 and S6

Mapped to: S01, S02

Automatic Reset Logic

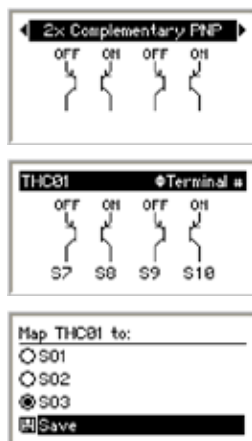


Safety Input: Two-Hand Control – THC01

Circuit Type:
2X complementary,
PNP switch

Terminals:
S7, S8, S9, and S10

Mapped to: S03

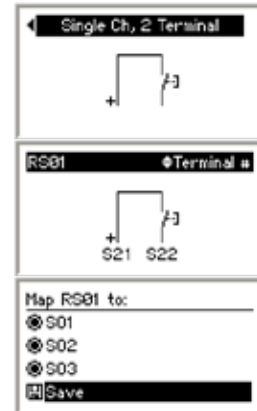


Non-Safety Input: Reset Input – RS01

Circuit Type:
Single Channel,
2-Terminal Contact Switch

Terminals: S21 and S22

Mapped to:
S01, S02, and S03



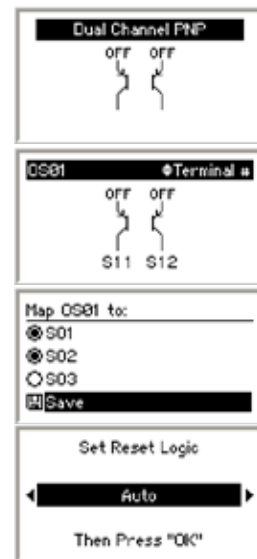
Safety Input: Optical Sensor – OS01

Circuit Type:
Dual-Channel, PNP

Terminals: S11 and S12

Mapped to: S01 and S02

Automatic Reset Logic



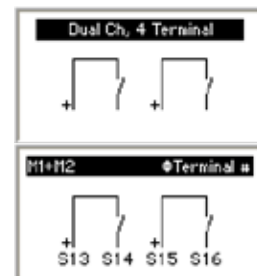
Safety Input: Mute Sensor – M1 + M2

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

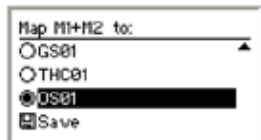
Terminals: 13, 14, 15 and
16



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 sensor 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.

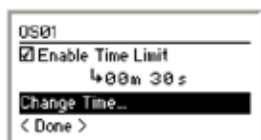
Set the Mute Time Limit

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**.



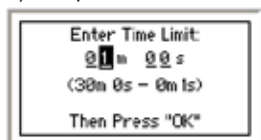
When the next menu is displayed, press **OK** to display the Mute Time Limit Enable menu.

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**.

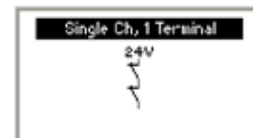


At the Mute Time Limit Enable menu, select **<Done>** and press **OK**.

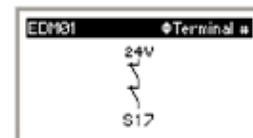
At the Mute Sensor properties menu, select **<Done>** and press **OK** to complete adding the mute sensor.

Safety Input: External Device Monitor – EDM01

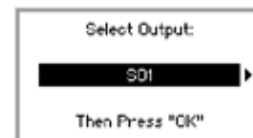
Circuit Type:
Single-Channel, 1 Terminal



Terminal: S17

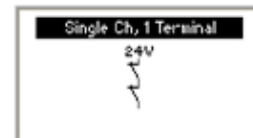


Mapped to: SO1

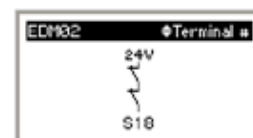


Safety Input: External Device Monitor – EDM02

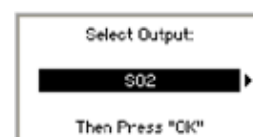
Circuit Type:
Single-Channel, 1 Terminal



Terminal: S18

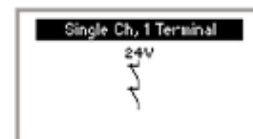


Mapped to: SO2

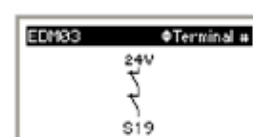


Safety Input: External Device Monitor – EDM03

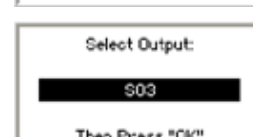
Circuit Type:
Single-Channel, 1 Terminal



Terminal: S19

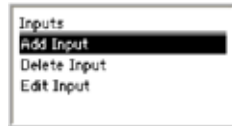


Mapped to: SO3



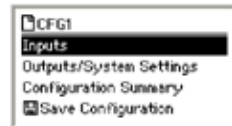
All inputs have been added; press **OK**. When the Inputs menu is displayed, press **ESC** to display the Edit Configuration menu (see next page).

Edit Inputs menu



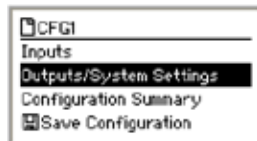
ESC →

Edit Configuration menu

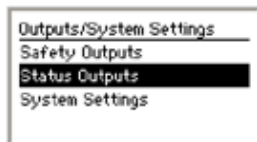


Configure the Status Outputs

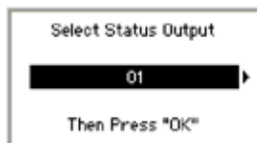
To configure the Status Outputs, select **Outputs/System Settings** and press **OK**.



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



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

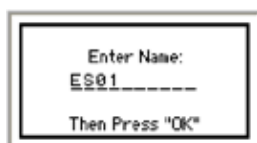
Change the name of 01 by selecting **Change Name** and pressing **OK**.



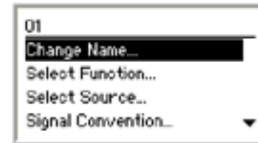
Use the left/right arrow keys to select the character to be changed (up to 10 characters).

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

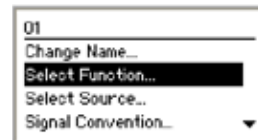
Set the name to **ES01** and press **OK**.



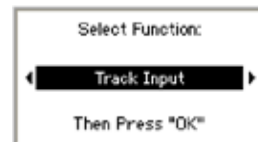
The display returns to the Status Output Properties menu. The top line of the display now displays the name assigned to the Status Output.



Configure the Status Output to track an input. Select **Select Function** and press **OK**.

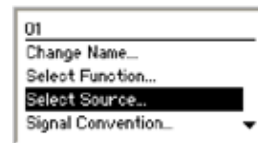


Using the left/right arrow keys, select **Track Input** and press **OK**.

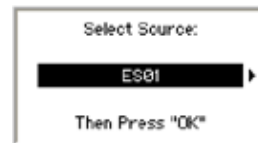


The display returns to the Status Output Properties menu.

Configure the Status Output to track the E-stop input, ES01. Select **Select Source** and press **OK**.

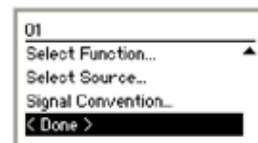


Using the left/right arrow keys, select **ES01** and press **OK**.

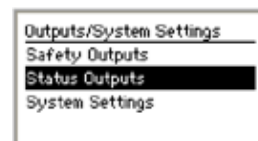


The display returns to the Status Output Properties menu.

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



The display returns to Outputs/System Settings menu.



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.

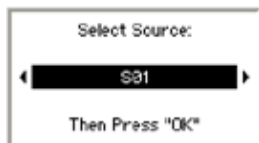
Configure Status Output 02

Name: NEED RESET

Function:

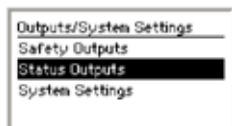


Source:



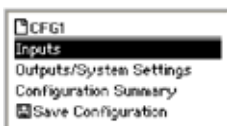
When the last Status Output has been configured, return to the Edit Configuration menu by pressing **ESC**.

Edit Inputs menu



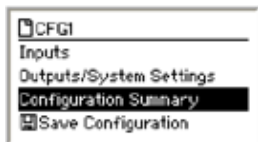
ESC →

Edit Configuration menu



Review the Configuration

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

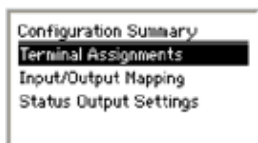


The Configuration Summary menu allows you to:

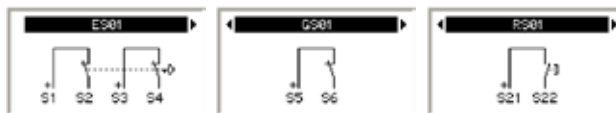
- Review the input circuit and terminal assignments for each input
- Review the mapping assignments of each input
- Review the configuration of each Status Output

Review Terminal Assignments

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



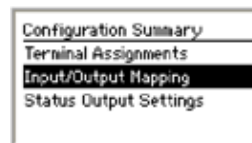
The display shows the terminal assignments for the first input. Use the left/right arrow keys to view the terminal assignments for the other inputs.



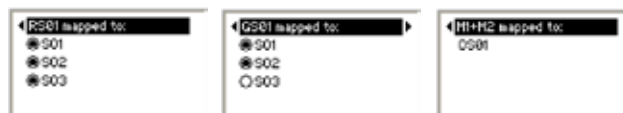
When finished, press either **OK** or **ESC**.

Review Input/Output Mapping

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



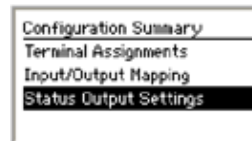
The display shows the input/output mapping for the first input. Use the left/right arrow keys to view the other inputs.



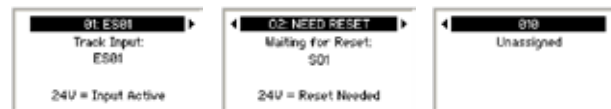
When finished, press either **OK** or **ESC**.

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.



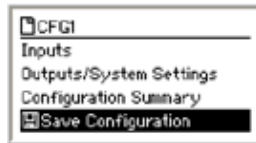
When finished, press either **OK** or **ESC**.

When finished reviewing the configuration summary, return to the Edit Configuration Mapping 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**.

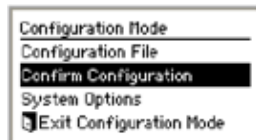
NOTE: If you do not want to save the changes while at the Edit Configuration menu, press **ESC** and select **Yes** when asked if you want to exit without saving changes.



Once the configuration is saved, the display will return to the Configuration Mode menu.

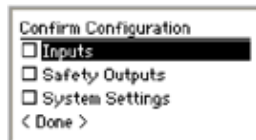
Confirming the Configuration

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**.



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.

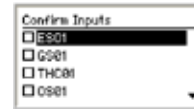


Confirm Configurations of Inputs

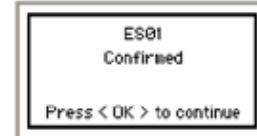
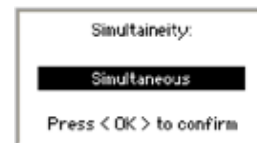
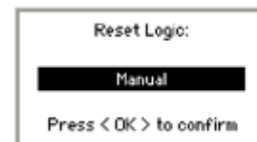
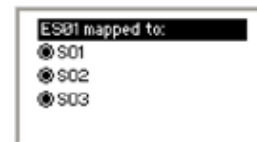
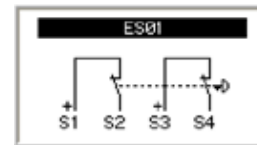
From the Confirm Configuration menu, select **Inputs** and press **OK**.

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

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

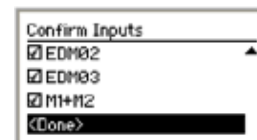


The next series of menus lists the safety-critical configurations for this input. Press **OK** after reviewing each setting.



Repeat the confirmation process for each of the inputs.

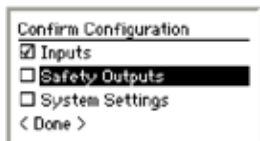
When all inputs have been confirmed, the display looks like this:



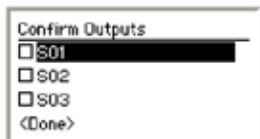
To continue confirming the configuration, select **<Done>** and press **OK**.

Confirm Safety Output Configuration

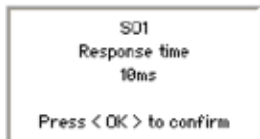
Select **Safety Outputs** and press **OK**.



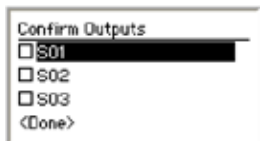
To confirm Safety Output SO1's configuration, select **SO1** and press **OK**.



The next series of menus lists the safety-critical configurations for SO1. Press **OK** after reviewing each setting.

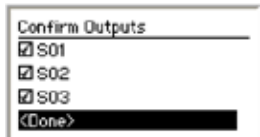


When SO1 is confirmed, the box in front of SO1 will be checked.



Repeat the confirmation process for SO2 and SO3.

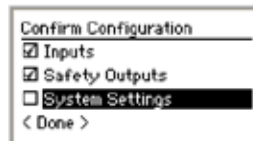
When finished, the Confirm Outputs screen should look like this:



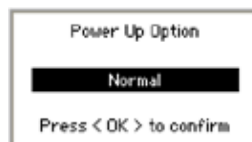
Select **< Done >** and press **OK**.

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**.



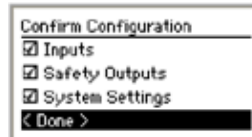
The next series of menus lists the safety-critical system settings. Press **OK** after reviewing each setting.



Final Confirmation Step

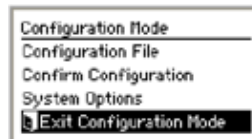
All of the safety-critical configurations settings have been confirmed and the configuration can be used in a safeguarding application. If any changes are made to the configuration, the confirmation process will need to be repeated.

Exit the Confirm Configuration menu by selecting **< Done >** and pressing **OK**.

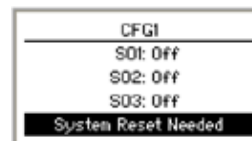


Exit Configuration Mode

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



The Safety Controller has now been configured. The display screen should be similar to the one below, if the inputs have been connected.



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



| | | | |
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