JR CLANCY

SceneControl® 5100 P
Console User Guide

SC5100 P User Guide

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TABLE OF CONTENTS

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<u>**INTRODUCTION**</u>

The **SC5100 P** (PENDANT) Operator Pendant is a handheld operator interface controller that is available in four models; **5100 P-1**, **5100 P-4** and **5100 P-8**. The last digit in each of the part numbers signifies the quantity of axes that the controller is able to control. All models of the **SC5100 P** address one axis at time via separate function modes for SETUP, JOG, LIMIT CONFIG and TARGET. These modes are explained within this manual.

To use the **SC5100 P**, connect the ETHERCON and Emergency Stop Connector of the supplied 30' cable to a system control connection point. It is very important to choose a location that allows the operator to view the load that they will be controlling (moving). Once connected, turn the keyswitch to the right to power up the device. Even without power, the **SC5100**'s E-Stop Button is linked to the system and can stop all motion on all axes at any time.

When the **SC5100 P** is turned on and communicating with the system, it is ready to send GO commands. Other Operator Control Devices (IF INSTALLED) connected to the system can also control machinery, so it is advisable to set up various rules and protocols for the use of your installation. Consult your **RAYNOK ADMINISTRATOR** or the **RAYNOK SOFTWARE MANUAL** to discuss control options and functional safety.

Once properly connected and turned on, the **SC5100 P** can control one hoist at a time using the JOG function or CUE function. The **SC5100 P** communicates with each of the possible 8 **RAYNOK CONTROLLERS** directly via the local area network. All axes configured to be controlled by the device will respond directly to the GO Button on the **SC5100 P**. Once a target has been selected the operator must press and hold the GO button to move the currently displayed axis. Releasing the button will stop the moving axis immediately. A moving axis will also stop should an error or system fault be detected by the controller; these are put in place to prevent accidents and to ensure safe operation in all conditions.

This document explains the **SC5100 P** features, functions, buttons, and operations. Please read the document carefully and practice safe operating procedures.
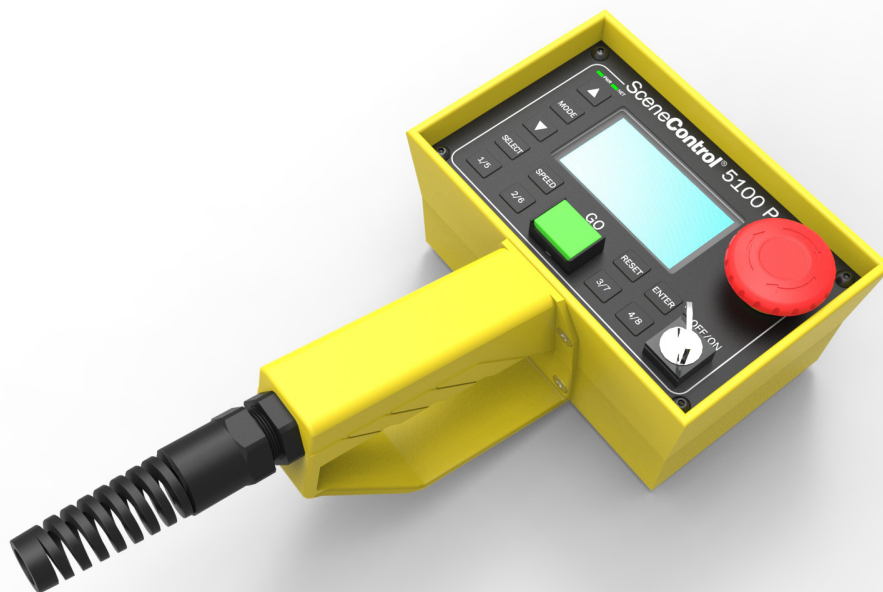
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Suggested Safety Procedures

There is no safety device more important to any machinery control system than an alert and properly trained operator. All personnel that use this motion control system must be properly trained in its safe operation prior to moving any equipment or machinery via the remote control system.

To ensure that the operator is properly prepared to engage in the operation of the machinery and equipment that this control system operates, consider these simple guidelines and safety checks. The list of notes below is just a set of guidelines and should never be taken as the only safety notices to be met. Use this list in conjunction with any performance and safety guidelines provided by the owners of the control system.

Before Operating the System

- Enable the Emergency Stop System

- Observe that all axes are ready by scrolling through the axis list on the **SC5100 P** or observing the E-Stop indicator on the front of the drive panel

- Depress the Emergency Stop Button on the **SC5100 P**

- Observe that ALL axes are in E-Stop by scrolling through the axis list on the **SC5100 P** or observing the E-Stop indicator on the front of the drive panel

- Repeat this test for ALL E-Stop buttons connected to your system

- Reset the system and test any other Emergency Stop buttons that have been identified by your company or management as integral to the safe operation of the system

- Follow any other guidelines that have been outlined by your company management

To safely move a machine or equipment connected to the system

- **DO NOT WORK ALONE,** controlling this equipment from a remote location can be dangerous, always work with another individual when moving machinery and equipment

- With the assistance of another person, properly trained in the operation of the equipment, stationed in the vicinity of the machinery or equipment to be moved ensure that all equipment and personnel are clear and that there are no collision obstructions

- Understand the limitations of the equipment attached to the machinery

- Do not attempt to run a machine that has the potential to injure personnel who are working on it

- If there are personnel working directly on a machine or it's attached equipment, disable the axis in the control software and turn off the power to the motor drive

- If your system does not have audible or visual warnings that machinery is in motion, warn all personnel working in the vicinity of equipment being moved that it is about to move via a method approved by your management personnel (i.e. Verbally call out via a loud clear voice or radio communications *"Lineset number 22 standing by to move!!"*)

- Once the "GO" button has been depressed and the machinery is set in motion again warn all personnel working in the vicinity of the equipment that has been set in motion (i.e. Verbally call out via a loud clear voice or radio communications "Lineset number 22 moving!!")

- Maintain your hand in close vicinity to the STOP button

- Stay alert and stay in visual contact with the equipment in motion

- Your attention should only be diverted from the equipment in motion to check the computer screens to verify data pertaining to the current move

- When the equipment has come to a complete stop confirm with the personnel working in the vicinity that motion has stopped

LIST OF PARTS

The following diagram below is intended to familiarize the operator with all the **SC1200 P** operator buttons and physical features. Before the unit can be used to control machinery, it must be set up properly using the **SC5100 Utility**, explained in the next section.
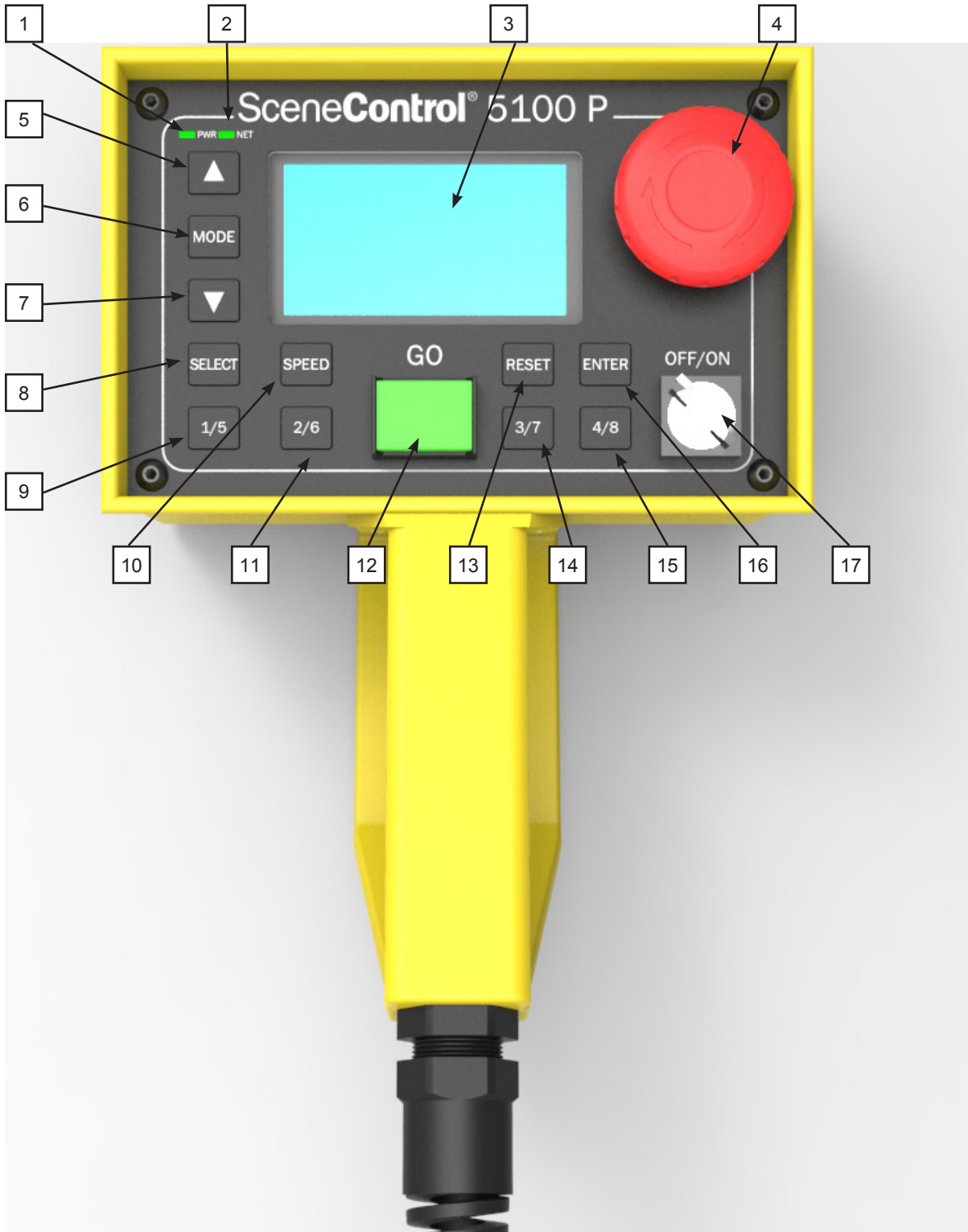
1. PWR LED: Turns BLUE when the **SC5100 P** is powered ON

2. NET LED: Turns GREEN when there is communication between the **SC5100 P** and any of the 8 set up controllers on the device.

3. LCD Screen: 240x128 LCD Display. Shows various menus, modes, and settings of the controller and the axes. All available screen are explained in full detail later in the manual.

4. E-Stop Button: Stops all motion and disables the main Emergency Stop System.

5. UP Button: Used to set the direction of the cursor to UP.

6. MODE Button: Used to select the active mode: Start, Target, Jog, or Limit Config.

7. DOWN Button: Used to set the direction of the cursor to DOWN.

8. SELECT Button: Toggles between various settings when UP and DOWN are being used to adjust values.

9. 1/5 Button: Toggles between axis 1 and axis 5 in JOG and TARGET modes.

10. SPEED Button: Pressing this button in JOG or TARGET mode will move the cursor to the SPEED ADJUST section, allowing the user to adjust speed, accel, and decel values on a variable speed controller.

11. 2/6 Button: Toggles between axis 2 and axis 6 in JOG and TARGET modes.

12. GO Button: Functions as a momentary switch and must be held to move the currently selected axis; releasing this button will stop all motion.

13. RESET Button: Used to send a RESET command to the currently selected faulted axis. Press and hold to initiate setting of current position.

14. 3/7 Button: Toggles between axis 3 and axis 7 in JOG and TARGET modes.

15. 4/8 Button: Toggles between axis 4 and axis 8 in JOG and TARGET modes.

16. ENTER Button: Used to confirm various settings/adjustments in the various modes. Cycles between Speed, Accel, and Decel during speed select. Also, hold this down in the START Mode to initiate IP Address setup.

17. OFF/ON Key: Turns the unit ON and OFF. The key can be removed when in the OFF position.

SETUP

Your **SC5100 P** installation should be installed by a factory trained and authorized technician. Information on the SETUP process has been included in this manual attached as APPENDIX A. Please refer to the APPENDIX and contact J.R. Clancy Technical Support or your Installer for additional information and/or training before attempting to perform ANY of the described setup functions. Failure to perform SETUP tasks correctly may result in undesirable activity of the control system that could bring harm to personnel, public or property. Be alert, be informed and stay safe.

To begin operating the **SC5100 Pendant**, plug both the Emergency Stop connector and the NETWORK ETHERCON (tails coming out of the pendant) into the System Connection Point. The LED marked 'PWR' should light up BLUE and the LED marked 'NET' should also light up GREEN when there is network communication established between the pendant controller and a controller on the system network.

START MODE

The following message will be displayed on the screen when the pendant starts up:

```
            JRCLANCY
                  SINCE 1885

        SC5100-SOFT v1.01A
        IP: 192.168.1.70
```
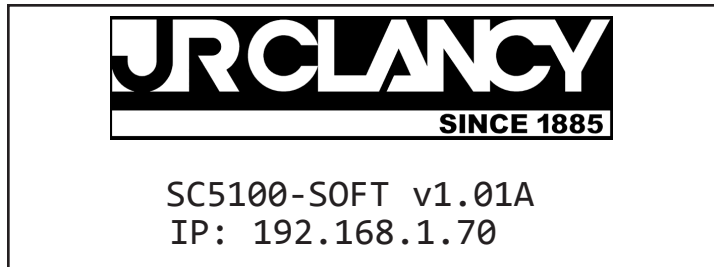
The first line indicates the installed controller software and the revision number, while the second line displays the IP address of the controller.. Press the 'MODE' button to view the 'Mode Selection' screen. The following is displayed when in the Mode Selection screen:
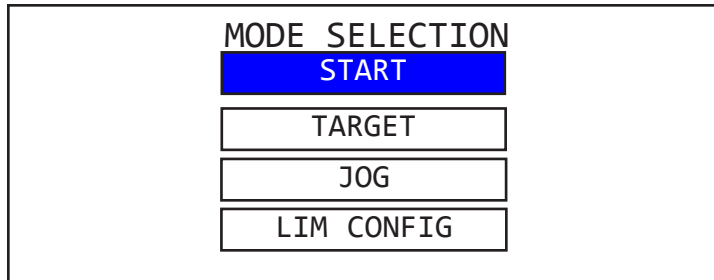
```
        MODE SELECTION
            START
            TARGET
             JOG
          LIM CONFIG
```

Use the UP and DOWN arrow keys to change the position of the cursor, and press ENTER to select the highlighted option. Selecting the 'START' option will bring the user back to the main startup screen. Target and Jog modes will be explained in further detail, and what should be displayed while running the system.

JOG MODE

Jog Mode allows the user to run an axis Forward/UP/Retract/ON-stage/OUT/Clockwise or Reverse/DOWN/Extend/OFF-stage/IN/Counter-Clockwise at a set speed. From the MODE SELECTION screen press the UP or DOWN arrow keys to highlight the JOG MODE and press ENTER.

```
JOG MODE: Ax[1] Hoist #1
CurPos          5.65
Target         10.00         JOG UP
Fault           None
State          Ready         JOG DWN
Load          150.00
                      JOG SPEED  11.75
```
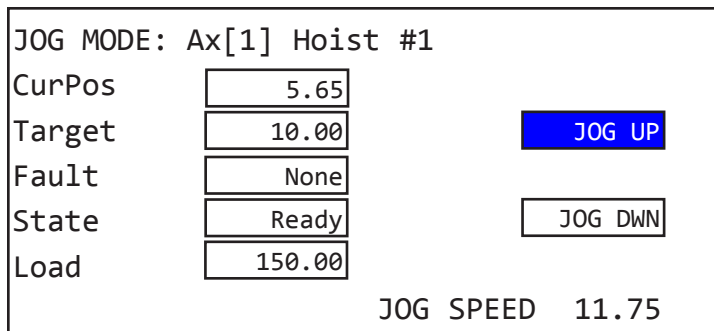
If the axis is a SERVO axis (SN102 - Servo), there is also an option to adjust the SPEED of the axis. Press the SPEED button to bring the selection cursor to the "JOG SPEED" value in the bottom-right corner of the screen, and use the UP and DOWN arrow buttons to adjust the value. Press the SPEED button again to exit the speed adjustment mini-menu. The speed will only go as high as the 'JOG PARAMETER' set up in the **SC5100 Utility**.

Press the UP button to select 'JOG UP' and the DOWN button to select 'JOG DWN'.If the axis is showing the READY state, it is ready to move. Pressing the **SC5100 P**'s GO button will execute the selected motion. The axis will move in the selected direction at the speed selected until it hits a limit (soft or hard), or the GO button is released. While the GO button is held down, the pendant will IGNORE all other button presses.

If READY is not displayed, attempt to reset the fault by pressing the RESET button. A list of possible error codes is listed and explained in the next section of this manual.

TARGET MODE

Target Mode allows the user to run an axis to a selected target. Use the 'SELECT' key to cycle between all available targets. When the intended target is highlighted, press the ENTER key to load the target value the 'Target' box on the left.

```
TARGET MODE: Ax[1] Hoist #1
                            TARGETS

CurPos        5.65      T1:      10.00
Target       10.00      T2:      20.00
                        T3:      30.00
Fault       CommTO      T4:      40.00
                        T5:      50.00
State      No Resp      T6:      60.00
                        T7:      70.00
Load          0.00      T8:      80.00

                        SPEED   11.75
                        ACCEL    8.00
                        DECEL    8.00
```

If the axis is a SERVO axis (SN102 - Servo), there is also an option to adjust the SPEED, DECEL, and ACCEL of the axis. Press the SPEED button to bring the selection cursor to the bottom-right corner of the screen, and use the ENTER button to cycle between SPEED, ACCEL, and DECEL and the UP and DOWN arrow buttons to adjust the values. Press the SPEED button again to exit the speed adjustment mini-menu.

```
TARGET MODE: Ax[1] Hoist #1
                            TARGETS

CurPos        5.65      T1:      10.00
Target       10.00      T2:      20.00
                        T3:      30.00
Fault         None      T4:      40.00
                        T5:      50.00
State        Ready      T6:      60.00
                        T7:      70.00
Load        151.25      T8:      80.00

                        SPEED   11.75
                        ACCEL    8.00
                        DECEL    8.00
```

If the axis is showing the READY state, it is ready to move. Press and hold the GO button down to move an axis. The axis will move to the target until it reaches it, hits a limit, or the GO button is released. When the GO button is held down, the pendant will IGNORE all other button presses.

If READY is not displayed, attempt to reset the fault by pressing the RESET button. A list of possible error codes is listed and explained in the next section of this manual.

TARGET ASSIGNING

Besides the **SC5100 Utility**, it is also possible to assign targets from the pendant itself. In Jog Mode, jog an axis to a desired target location and press the SELECT button. The following screen will appear:

```
Select a target to which you would
like to assign the current position:
                          TARGETS
CurPos      55.00      T1:     10.00
                       T2:     20.00
                       T3:     30.00
                       T4:     40.00
                       T5:     50.00
                       T6:     60.00
                       T7:     70.00
                       T8:     80.00
```

Use the UP and DOWN arrow buttons to select targets T1 through T8, and press ENTER to overwrite the existing target value with what is currently in the CurPos field. A screen will ask to confirm the target assignment. Press ENTER to confirm or MODE to exit.

```
Assign CurPos to Target 4?:
       CurPos      55.00
          T4:      40.00

OK = ENTER    CANCEL = MODE
```

LIMIT CONFIG MODE

Select the axis that you wish to configure the limit switch on by pressing the associated axis selection button **(1/5, 2/6, 3/7, or 4/8)**. To set the operational soft limits for any axis under the control the SC5100 Pendant, choose the LIM CONFIG MODE within the MODE SELECT screen to see the following screen:
Use the SELECT button to cycle between Max, Min, and Scenery Offset.

```
LIMITS SET: Ax[1]  Hoist#1
   Max Position      180.00
   Min Position       40.00
   Scenery Off.       40.00
OK = ENTER    CANCEL = MODE
```

Once the desired values have been set, press the ENTER button to be presented by the following

screen:

```
LIMITS SET: Ax[1] Hoist#1
Please confirm new limits:
   Max Position       180.00
   Min Position        40.00
   Scenery Off.        40.00
                  CANCEL = MODE
```

To save the values to the SC5100 Pendant, press the following BUTTON COMBINATION:

SELECT + ENTER

These values should ONLY be altered or setup by an authorized and trained technician or the System Administrator. Unauthorized users should not attempt to change these values. Erroneous use of this feature may cause undesirable consequences, damaging property or causing injury.

CURRENT POSITION UPDATE

In the event that an axis has lost its current position or a mechanical alteration has physically moved the location of the load carrying device from where the controller has been calibrated, the current position may need to be updated.

From the MODE SCREEN select TARGET MODE. Press and HOLD the RESET button to initiate the process. The screen will display the following:

```
        Update Current Position:

CurPos        5.65

OK = ENTER      CANCEL = MODE
```

The value that appears is preprogrammed into the controller via the SC5100 UTILITY (explained previously). Press 'ENTER' to confirm setting the current position, or any other button to cancel.

Using a tape measure, measure the distance from the stage floor to the underside of the load carrying device and record that value in INCHES.

Use the UP and DOWN arrow buttons to update the current position to the measured value. Press ENTER to confirm.

<u>**Appendix A - SETUP**</u>

The **SC1200 P** must be properly set up before it can be used with any machinery in the system. In Windows 7 (or above), double click on the SC5100Utility.exe ICON to start the setup utility.


Enter the JOB NUMBER and TECHNICIAN INITIALS after reading the warning, and click the Checkbox to accept, before clicking the ENTER button. The values entered in the fields are stored on the PC and can be retrieved by **RAYNOK ADMINISTRATORS** when a situation arises where they are required.

CAUTION: This software utility allows the user to change the system parameters. Incorrect settings could result in a serious injury or accident; extreme caution should be exercised when using the **SC5100** Configuration Utility. Only qualified personnel should have access to this administrative tool.

FILE MENU
Once ENTER has been clicked, the screen will automatically switch to the 'Axis Settings' Tab. All the fields will be empty at first, because the default values are stored on the **SC5100 Pendant** itself.

Click on the File Menu to display the options as shown on the image to the right.
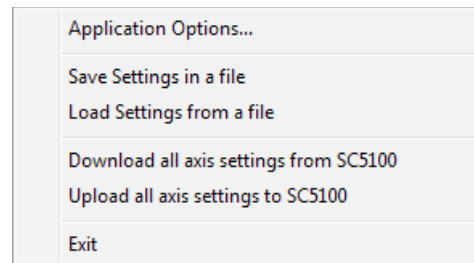
APPLICATION OPTIONS
In Application Options, the IP Address of the **SC5100 Pendant** can be changed, as well as a Backup File location set. It is good practice to always save a file with all the machine parameters in case they are lost or erased off the device for whatever reason. Under normal operating conditions it is not necessary to change the Port; leave it at 7002.
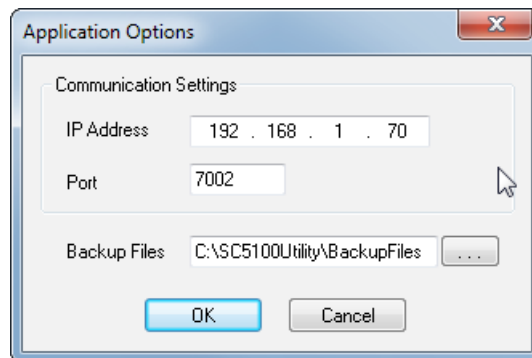
SAVING AND LOADING SETTINGS
To save and load the settings, use commands 'Save Settings in a file' and 'Load Settings from a file'. File configurations are saved with extension ".scs" (i.e. System63535.scs).

DOWNLOADING/UPLOADING ALL SETTINGS
It is always recommended to 'Download all axis settings from SC5100' before editing any fields in the 8 different axis pages. Not only does this speed up the process of setting up the system, it also assures the user that current values and settings are being edited.

Likewise, once all pages are edited, 'Upload all axis settings to SC5100' will save them on the FLASH memory of the unit itself. All settings must be uploaded before the **SC5100** will treat them as current values.

AXIS USER SETTINGS

Use the Axis pulldown pick box to select an axis to set up. To view the current settings of the selected axis press the 'Download axis settings from SC5100' button. Each area in the Axis Settings Tab is explained below. To change any of the values within a selected axis, the axis settings must be uploaded to the controller by pressing 'Upload axis settings to controller'. Once the Axis settings have been uploaded verify the new values by downloading the axis setting from the controller again.

NAME

Enter a useful name that will appear in Target and Jog Mode of the **SC5100**. Take note that only 11 characters will be displayed on the actual pendant screen due to screen real estate limitations.
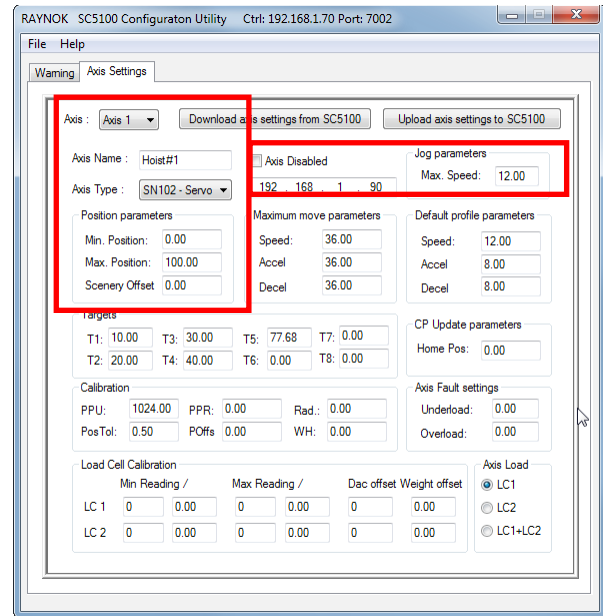
IP ADDRESS

This is the IP Address of the controller that is controlling the hoists. This is a coordinated value that permits the **SC5100 P** to communicate with the hoist controller. It should NOT be changed unless advised by your System Administrator.

AXIS DISABLED

Check this box if you wish to disable the axis.

JOG PARAMETERS

Max. Speed: This is the MAXIMUM jog speed of the axis as determined by the System Administrator. Measured in INCHES PER SECOND this value is recommended to be less than the SPEED value under Maximum Move Parameters. As a guideline "rule of thumb" this value is often set at 50% of the SPEED value under Maximum Move Parameters.

POSITION PARAMETERS

The values entered into this section constrain the motion of the axis during programed TARGET mode.

> **Min. Position:** The lowest (INTRIM/OFFSTAGE/REVERSE) safe limit of travel for the axis. Measured in INCHES, referenced from the STAGE FLOOR.

> **Max. Position:** The highest (OUTTRIM/ONSTAGE/FORWARD) safe limit of travel for the axis. Measured in INCHES, referenced from the STAGE FLOOR.

> **Scenery Offset:** Alters the Min Position value by shifting it to accommodate an attached load and prevent it from colliding with a fixed element such as the floor. This value is checked as the minimum position allowed for the axis, so it should always be set higher or the same as the minimum position. Measured in INCHES, referenced from the STAGE FLOOR.

MAXIMUM MOVE PARAMETERS

Speed: This is the MAXIMUM rated speed of the axis. Measured in INCHES PER SECOND

Accel (Stop Distance):

This is the MAXIMUM rated acceleration of a VARIABLE SPEED AXIS. Measured in INCHES PER SECOND PER SECOND (in/sec^2). This value represents the STOP DISTANCE variable for a FIXED SPEED axis and is used to anticipate the freewheel distance the motor will travel when the brake is de-energized and the mechanical spring of the motor/load brake stops and parks the load. This value is affected by load on fixed speed axes and is measured in INCHES. To determine this value initially set it to 0 and send the axis to a pre-determined target. Subtract the value of the ACTUAL position (as measured with a measuring tool to the fixed reference point) from the TARGET position and enter that differential here. Retest to confirm. It may take a couple of tries to get this correct depending on the speed of your axis and the repeatable timing of the brake de-energizing.
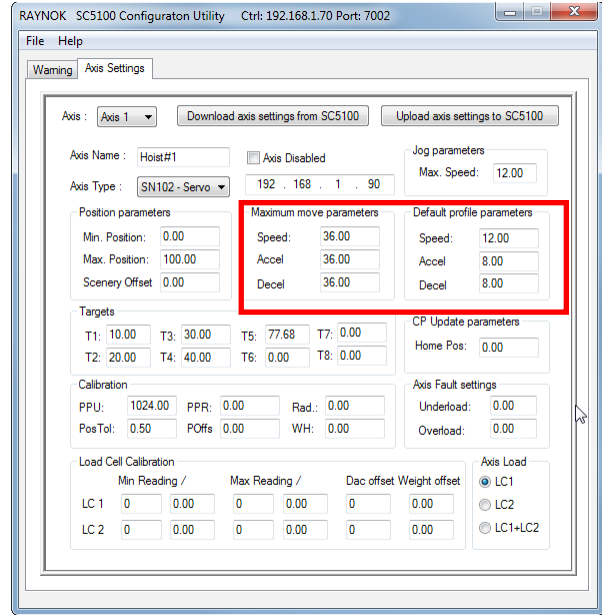
Decel (Position Tolerance):

This is the MAXIMUM rated deceleration of a VARIABLE SPEED AXIS. Measured in INCHES PER SECOND PER SECOND (in/sec^2). This value represents the POSITION TOLERANCE variable for a FIXED SPEED axis. Enter a tolerance value here so that the **SC5100 P** will assume that the axis has reached its target based on being within the tolerance window.

DEFAULT PROFILE PARAMETERS

Speed: This is the default speed that will be entered into the SPEED value when using TARGET MODE. This value is measured in inches.

Accel (Stop Distance):

This is the default ACCELERATION (STOP DISTANCE) that will be entered into the ACCEL value when using TARGET MODE. This value is measured in in/sec^2 for VARIABLE SPEED AXES and inches for FIXED SPEED.

Decel (Position Tolerance):

This is the default DECELERATION (POSITION TOLERANCE) that will be entered into the DECEL value when using TARGET MODE. This value is measured in in/sec^2 for VARIABLE SPEED AXES and inches for FIXED SPEED.

TARGETS

These eight (8) fields represent values specific to the venue or performance. When these targets are set and uploaded, they will immediately show on the **SC5100 P** screen if in Jog or Target mode.

CALIBRATION - PPU IN INCHES

This value is the value determined by the PPU calculation.

LOAD CELL CALIBRATION

Do not change these settings unless advised by your System Administrator. Each load cell has been specifically configured to work with its corresponding Load Cell unit, and if these values are changed the loads read could either be offset or scaled incorrectly. Should you require additional assistance, contact JR Clancy Technical Support for instructions on how to set this up.
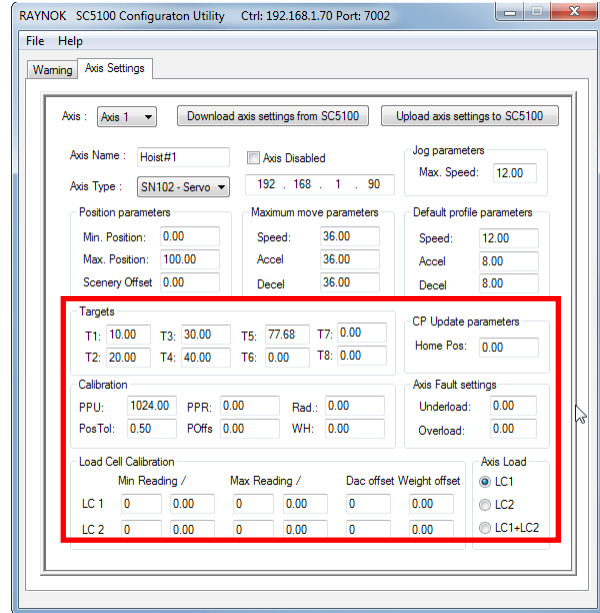
AXIS FAULT SETTINGS

These are the individual overload and underload values for the axis. If these values are exceeded in any way, the axis will trip a fault and stop. Set these both to 0 (zero) if it is desired to bypass these faults completely.

AXIS LOAD SETTINGS

Depending on which option is chosen here, the **SC5100** will display the option in the Load Field. Depending on the arrangement of your axis either; Load Cell 1, Load Cell 2, or both (added together) will be displayed.

APPENDIX B - Status Code List

These are the possible status and error codes the **SC5100 Pendant** can display. Consult this list when troubleshooting the pendant, and refer to it when in contact with a **RAYNOK ADMINISTRATOR** regarding an issue.

Fault	Explanation
Ready	The system is ready to be moved
NoResp	The pendant is not communicating with the selected axis. Ensure that the controller is plugged into the junction box and that it is ON, and that the network is functioning.
ESTOPPED	The system is in an estopped state. Locate the Emergency stop button that is pressed and pull it out to reset the system.
Local	The controller for the selected axis is in a 'LOCAL' mode. Check the LOCAL/REMOTE function switch on the front of the controller and switch it to REMOTE or disconnect the **HC-100B** local control pendant from the controller.
NeedHome	The controller's current position needs to be set. Contact your System Administrator for instructions on resetting the controller's Current Position.
FwdLim	The axis has hit its HARD struck forward limit. Reset the error and move the axis in reverse using the local controller to clear this fault.
RevLim	The axis has hit its HARD struck reverse limit. Reset the error and move the axis forward using the local controller to clear this fault.
AmpFault	The axis motor DRIVE (variable speed) has a fault or the axis motor OVERLOAD (fixed speed)has tripped. Attempt to move the axis locally before continuing. Consult J.R.Clancy Tech support if the error cannot be cleared.
FolErr	The motor encoder is not following the motor movement as intended. Consult J.R.Clancy Tech support if the error cannot be cleared.
CommTo:	Communications timeout. The pendant has lost communication with the selected controller; ensure the network is running and that all network cables are plugged in. (NET LED should be GREEN)

The following faults are flagged on the pendant.

LfUndrLd	Local Fault: Underload. The axis has too little weight on its hoist.
LfOverLd	Local Fault: Overload. The axis has too much weight on its hoist.
LfFwdLim	Local Fault: Forward Limit. The forward SOFT limit of the axis has been reached. This can be adjusted from the pendant (Lim Config Mode)
LfRevLim	Local Fault: Reverse Limit. The reverse SOFT limit of the axis has been reached. This can be adjusted from the pendant (Lim Config Mode)

Should more than one fault be detected during an incident, they must all be cleared before the READY status will be displayed. Continue pressing the 'RESET' button and rectifying faults as they appear until the system is returned to a 'READY' state..

APPENDIX C - CHANGING AND SETTING IP ADDRESSES

The IP Addresses of the **SC5100 Pendant** and the various **RAYNOK CONTROLLERS** that the pendant is communicating with can be changed within the controller itself.

SELECT PENDANT IP (START MODE)

The first type of IP change that can be done is changing the IP Address of the Pendant itself. To initiate this option,

PRESS AND HOLD THE ENTER BUTTON IN START MODE

The following screen will appear:

```
Select pendant IP:    70


OK = ENTER    CANCEL = MODE
```

Use the UP and DOWN arrow buttons to scroll between 50 and 100. Pressing ENTER will change the IP address of the **SC5100 Pendant**. Pressing MODE will exit back to the start screen without changing the IP address..

SELECT NODE IP (TARGET AND JOG MODES)

The second type of IP change is changing the IP of an axis. To initiate this option,

PRESS AND HOLD THE ENTER BUTTON IN JOG OR TARGET MODE

The following screen will appear:

```
Select node IP:    90


OK = ENTER    CANCEL = MODE
```

Use the UP and DOWN arrow buttons to scroll between 50 and 200. Pressing ENTER will change the IP address of the Axis Node (Controller). Pressing MODE will exit back to the start screen. Note that this will actually send a command to the axis to change its address.

NOTES