



SCSFP
BY FINNA GROUP

MC PRO 2400
Installation Guide

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INTRODUCTION

Welcome to the MC Pro 2400 and 1500NC installation guide. The purpose of this manual is to assist in the correct installation of the MC Pro 2400 and 1500NC system hardware, electrical components and software.

The MC Pro 2400 1500NC Moisture Measurement System consists of 4 main components:

1. **Sensor Heads** - (Varies from 1-5 heads depending on the quantity purchased.) - These are the sensors that measure moisture content and are installed in the lumber line. Included with each sensor is all hardware, junction boxes, and cables required to connect to the MCU.
2. **MCU (Main Control Unit) Cabinet** — This cabinet houses the components that are responsible for all IO and communication within the 2400 and 1500NC devices as well as the users PLC or grading system.
3. **SCS Interface PC** — The PC runs the Tally software used to connect to the MCU which allows the user to adjust system settings, monitor the system, and maintain and view historical reports. If a PC is purchased with the system, all required software will be pre installed. If the customer is providing a PC, it must meet the requirements listed in the software installation section and software will be installed during system installation.
4. **Wiring** — The wiring of the system is responsible for all power and communication aspects of field devices in the system as well as user communication and IO.

HARDWARE INSTALLATION

There are 5 drawings that should be used for reference when installing the MC Pro 2400 system. There are three drawings found in this document:

- Block Diagram. (This drawing is used to illustrate how the system is connected)
- Beam and Base plate. (This drawing is used to show the heights and placement of the beam and the sensor base plates.)
- MCU Serial Wiring Diagram.
- MCU Power and IO Wiring Diagram.

The fifth drawing is a Sensor Location Diagram and is unique to your installation. Consult this drawing for the location of each sensor in your system. Attention should be paid to the 0 end of the system as well as the orientation of the sensor base plates. If you do not have the Sensor Location Drawing, please contact SCS Forest Products.

Installation

- Install a 4" tubing mounting frame under chain runs as shown in the installation drawings. **Top of tubing should be installed 8" below lumber. If there is doubt over the beam height, please contact SCS.**
- Mount sensor base plates as shown in Sensor Location Drawing. (This drawing is not included in this manual as it has to be customized for each installation based on line measurements and chain spacing.)
- Weld in sensor base plates along the mounting frame using distance indicated in Sensor location Diagram. **Ensure that the zero end of the plate faces the right way. See Sensor Location Diagram and Beam and Baseplate Drawing.**
- Mount the MCU on a wall near the 0 end of the system within 25' of the first sensor.
- Mount Junction boxes to sensor base plates using the provided hardware.



- Mount Temperature sensor and Board Present Photocell junction box in a convenient location on the beam.
- Mount the temperature sensor on the beam, near the first sensor, with the temperature infrared lens aligned with the center of the sensors, and with a clear view of the lumber.
- Mount the Board Present Photocell using the provided bracket **two lugs** before the center of the sensors. **If a full lug bit from the PLC can be provided, this step is unnecessary.**
- Run suitable conduit (flex or rigid) from the MCU to the first junction box, then conduit between each junction box and pull provided cat5e cables from the MCU to each sensor, running cables through each junction box. Pull an additional cat5e cable for the Temperature sensor and Board Present Photocell junction box.
- Mount sensors onto sensor base plates using supplied 1" adjustment bolts and hardware. Sensor face should run parallel to, and 1" below the lumber line.

ELECTRICAL INSTALLATION

- Run 120VAC power to MCU cabinet.
- Run Ethernet cable from MCU to the computer (Or Network) that the 2400 or 1500NC software will be installed. (Not supplied)
- Run a 20 conductor cable between MCU and user PLC if Moisture hand-off is required or a 12 conductor if exact MC is not needed. (Not supplied) **Work with an SCS Forest Products installation technician to determine the number of conductors required. This can vary depending on the configuration of your system.**
- Terminate Cat5e cable at both ends using a standard 568B pinout. This is the same as a standard Ethernet patch cable, and is a 1:1 pinout.

SOFTWARE INSTALLATION

- The computer that will run the 2400 Tally software must meet the following requirements:
 - Windows 7 (recommended) or
 - Windows XP with SP2 and .net Framework 3.5 SP1
 - 1GB RAM
 - Network capability

- Open the installation disk. (Located on either the desktop of the supplied computer or the supplied install disk.)
 - Extract publish.zip
 - Run setup.exe
 - Follow on screen instructions.

- Provide a DC lug pulse input to the MCU box via 20 Conductor. This Lug Pulse should come 1" past the center of the 2400 sensors and should have duration of approximately 1/8 of the lug. The duration is flexible and it should be noted that the MC output will be delayed until the next lug pulse occurs.

- Program a board present bit that will send a high pulse if there is a board present 2 lugs preceding the sensors.

- Program PLC to receive moisture content as specified in the IO specification guide or serial moisture content to the specifications shown in the serial communication specification guide.

2400 IO Hand-off Specification

This describes the IO interface between the SCS Transverse System and the PLC. The IO lines are defined as follows (on the main OPTO IO board):

Terminal #	I/O	Description	Notes	Cable #
1	I	Sensor 1 Photocell		
3	I	Remote Enter Input		
5	I	Sensor 2 Photocell		
6	I	Sensor 3 Photocell		
7	I	Sensor 4 Photocell		
8	I	Sensor 5 Photocell		
9	O	Alarm 1 Output	Configurable Alarm	
10	O	Alarm 2 Output	Configurable Alarm	
11	O	NC		
12	O	NC		
13	O	Overdry Output		
14	O	Dry Output		
15	O	Medium Output		
16	O	Wet Output		

Terminal #	I/O	Port C Input Setting	Port C Output Setting	Cable #
17	I/O	Thickness 0	Stock Bit 0	
18	I/O	Thickness 1	Stock Bit 1	
19	I/O	Width 0	Stock Bit 2	
20	I/O	Width 1	Stock Bit 3	
21	I/O	Width 2	Stock Bit 4	
22	O	NC	Stock Bit 5	
23	O	NC	Stock Bit 6	
24	O	NC	Lug Toggle/ Heartbeat	

Isolated Relays:

There are 2 separate red isolated relays inside the cabinet. These are meant for the board present, and lug pulse signal coming from the PLC. They are 4-28VDC inputs and will also require PLC common. Please see page 13, power and IO diagram.

Serial Spec for Transverse Planer Moisture Sensor

This specification will describe the serial specification for the Transverse planer program in order that the PLC can receive the board by board data from the planer sensor via a serial channel. The serial connection will be a three wire connection with GND, TX and RX. For the Transverse sensor there is only one mode that is implemented at this time. All modes that were in the inline system have been removed and there is no settings that are needed in the windows program. This mode will always operate and does not need to be enabled. The PLC can send data to the moisture sensor. The specification for this is at the end of the document.

The sensor will send packets to the grader which are framed by start Tx (02H) and End Tx (03H) bytes. When a lug pulse occurs sensor will transmit a package to the grader with the following format:

Byte	Description
0	02H (Start Transmit)
1	Status Byte
2-6	ASCII string (5 char) with the Overall reading
7-11	ASCII string (5 char) with the Peak reading
12-14	ASCII string (3 char) with Sensor 1 Reading (if valid)
15-17	ASCII string (3 char) with Sensor 2 Reading (if valid)
18-20	ASCII string (3 char) with Sensor 3 Reading (if valid)
21-23	ASCII string (3 char) with Sensor 4 Reading (if valid)
24-26	ASCII string (3 char) with Sensor 5 Reading (if valid)
27	03H (End Transmit)

The status byte will indicate if a sensor has taken a valid reading (0 -not valid, 1 - valid). Bit 0 is sensor 1, bit 1 is Sensor 2, etc. Bit 7 of the Status byte will indicate if the lug was empty or full (0 – Empty, 1 – Full). On empty lugs all other data should be ignored and will not be valid.

All ASCII strings will use the null character (00H) to mark the end of the string. The Overall and Peak readings will be sent with a decimal in the string (ex. 28.5).

The serial communication will be 19200, 8 bit, 1 stop, no parity.

The board data takes approx. 15 ms to transmit and will be transmitted as soon as the board leaves the sensor. It is up to the PLC program to match this data to the board.

PLC Communication Protocol

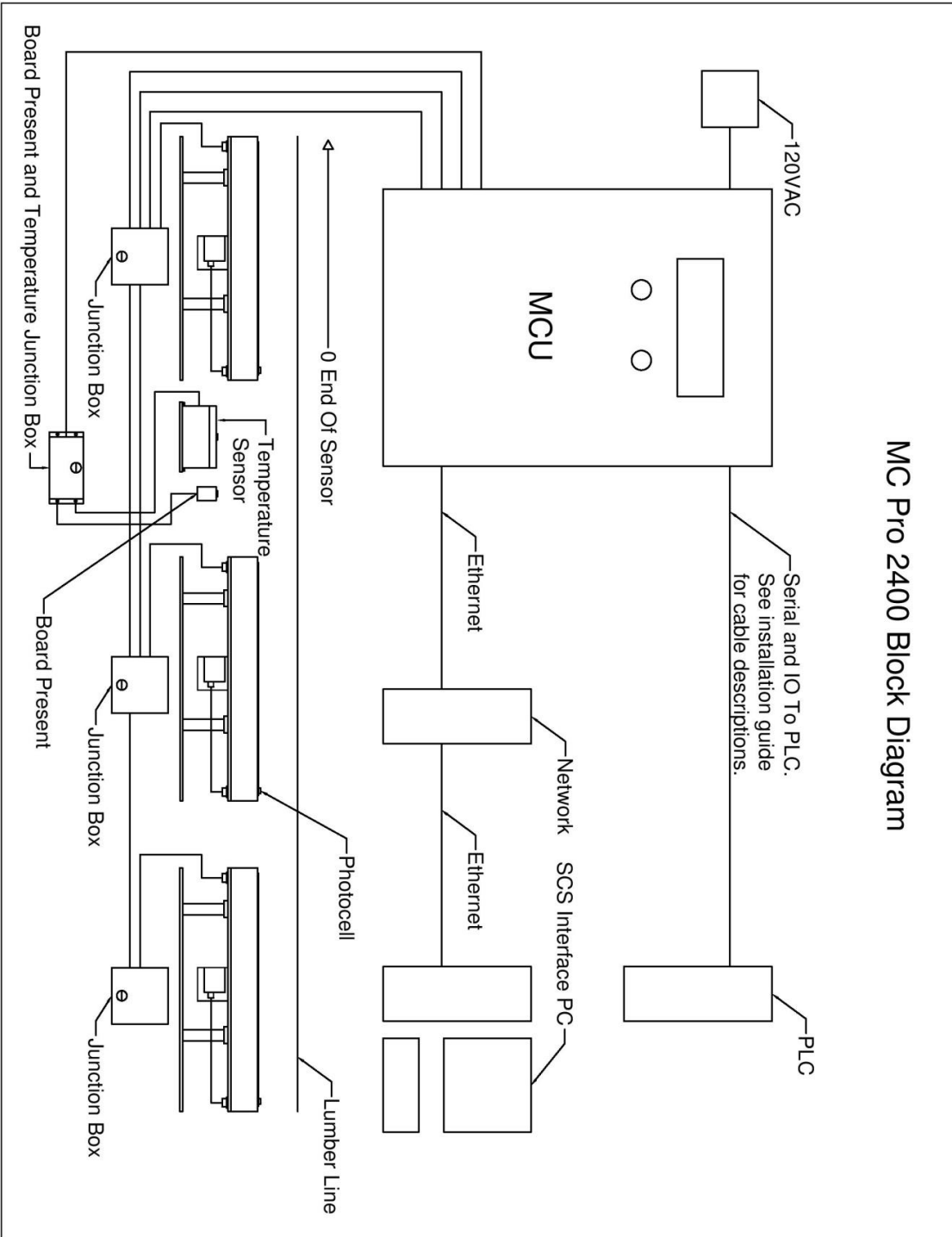
The following is the protocol for communication from the PLC to the moisture sensor. The serial communication will be 19200 (9600 for Peak/Avg/Bundle mode), 8 bit, 1 stop, no parity.

Presence Detect command

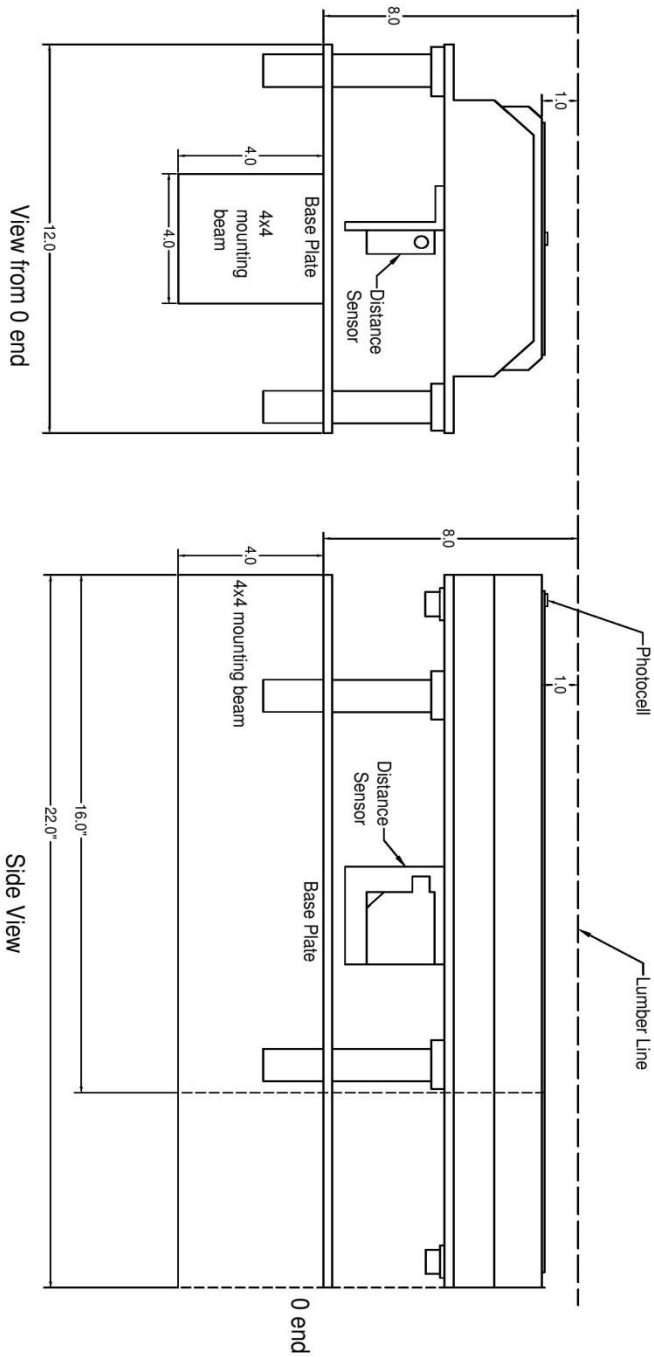
Byte	Description
0	30H (Presence detect command)

The Moisture sensor will respond with a package of the following format:

Byte	Description
0	02H (Start Transmit)
1	32H (Presence detect response)
2-6	ASCII string (5 char) with the sensor version number
7	03H (End Transmit)



MC Pro 2400 Beam and Baseplate Diagram



*Note the size of your sensors (16" vs 22" and ensure that the 0 end is placed correctly)

