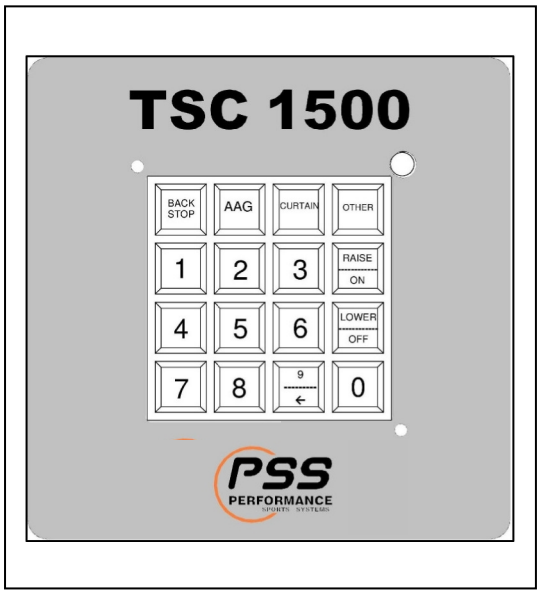
# TSC

## Models: 1500




## Installation Instructions

**Please read all instructions before attempting installation or operation of these units**

## SAVE THESE INSTRUCTIONS FOR FUTURE USE

PUBLICATION NO.
8 5 1 7 5 4 5 3 1
F E B U R A R Y 1 4 , 2 0 1 4

# *Table of Contents*

## Introduction

The TSC 1500 system is comprised of two components, a touch pad unit that provides the interface for the operator and one relay box that provides the control for the devices.

The TSC 1500 was developed to provide the operator ease of control without the need for keys that can be lost, misplaced or broken. By creating a touch pad control station the operator can conveniently operate all equipment in the gymnasium easily and efficiently. Controls for backstops, curtains, mats, batting cages, scoreboards and even lights are available at the touch of a button.

TSC 1500 was designed with the capability to control each device independently or control multiple devices. Group configurations can be added or manipulated at any time in the field. All programming will be done in the field by the electrician or the dealer.

The TSC 1500 has an override, the tsc-mc that can be used for troubleshooting by hooking it directly into one of the relay boards inside the relay box.

## ⚠ CAUTION

ONLY TRAINED AND AUTHORIZED PERSONNEL SHOULD OPERATE THIS EQUIPMENT. OPERATION BY UNTRAINED OR UNAUTHORIZED PERSONNEL MAY RESULT IN DAMAGE TO THE EQUIPMENT OR STRUCTURE AND/OR INJURY TO ANYONE NEAR THE EQUIPMENT.

OPERATION OF MORE THAN ONE DEVICE AT A TIME REQUIRES SPECIAL ATTENTION BY THE OPERATOR. THE OPERATOR SHOULD BE TRAINED IN OBSERVING MULTIPLE DEVICES IN MOTION AND FAMILIAR WITH THE TSC1500 KEYPAD OPERATION.

ALWAYS MAKE SURE AREA AROUND AND BELOW THE EQUIPMENT IS CLEAR OF PERSONNEL AND OBSTACLES BEFORE OPERATING THE DEVICES.

## ⚠ CAUTION

THIS EQUIPMENT IS TO BE INSTALLED BY A QUALIFIED ELECTRICIAN IN COMPLIANCE WITH ALL LOCAL, STATE AN NATIONAL ELECTRIC CODES

FOLLOW INSTALLATION SEQUENCE TO PREVENT DAMAGE OR INJURY FROM ELECTRICAL SHOCK.

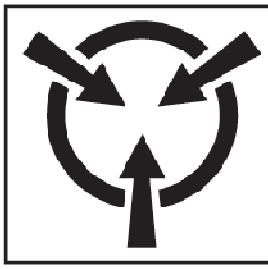
KEYPAD MUST BE MOUNTED IN A CLEAR VIEW OF THE BACKSTOPS TO BE OPERATED BY THE SYSTEM.

KEYPAD SHOULD BE MOUNTED IN A STANDARD 4" X 4" X 2 $\frac{1}{2}$" JUNCTION BOX. TAB ORIENTATION IS IMPORTANT.

## ⚠ CAUTION

DO NOT ATTACH THE COMMON OR 12V WIRE TO THE "IN", "L" OR "N" TERMINAL OR THE MOTOR TERMINALS IN THE RELAY BOX.

THE SYSTEM WILL NOT FUNCTION PROPERLY AND DAMAGE COULD RESULT TO THE CONTROL SYSTEM IF THE COMMON OR 12V WIRE ARE NOT CONNECTED TO APPROVED BOARD TERMINALS.



## ⚠ CAUTION

**Electrostatic sensitive devices.**

**To prevent equipment damage, use proper grounding techniques.**

## ⚠ WARNING

Do not drill relay box. Sensitive equipment contained inside are susceptible to damage from metal shavings.

## ⚠ WARNING

DC COMMUNICATION LINES SHOULD NEVER CROSS ANY AC LINES. THEY MUST BE IN THEIR OWN CONDUIT AND RUN SEPARATE FROM ANY AC CONDUIT.

## ⚠ WARNING

DO NOT MOUNT RELAY BOX UPSIDE DOWN IN CEILING. SYSTEM IS NOT DESIGNED TO BE INSTALLED IN THIS MANNER. SYSTEM FAILURE WILL OCCUR.

# TSC 1500

## INSTALLATION INSTRUCTIONS

Tools Required:
Drill
Phillips screwdriver
1/8" Straight edge screwdriver
Ratchet with sockets

### Installation Procedure

System consists of one (1) relay box and one (1) keypad assembly supplied by Performance Sports Systems.

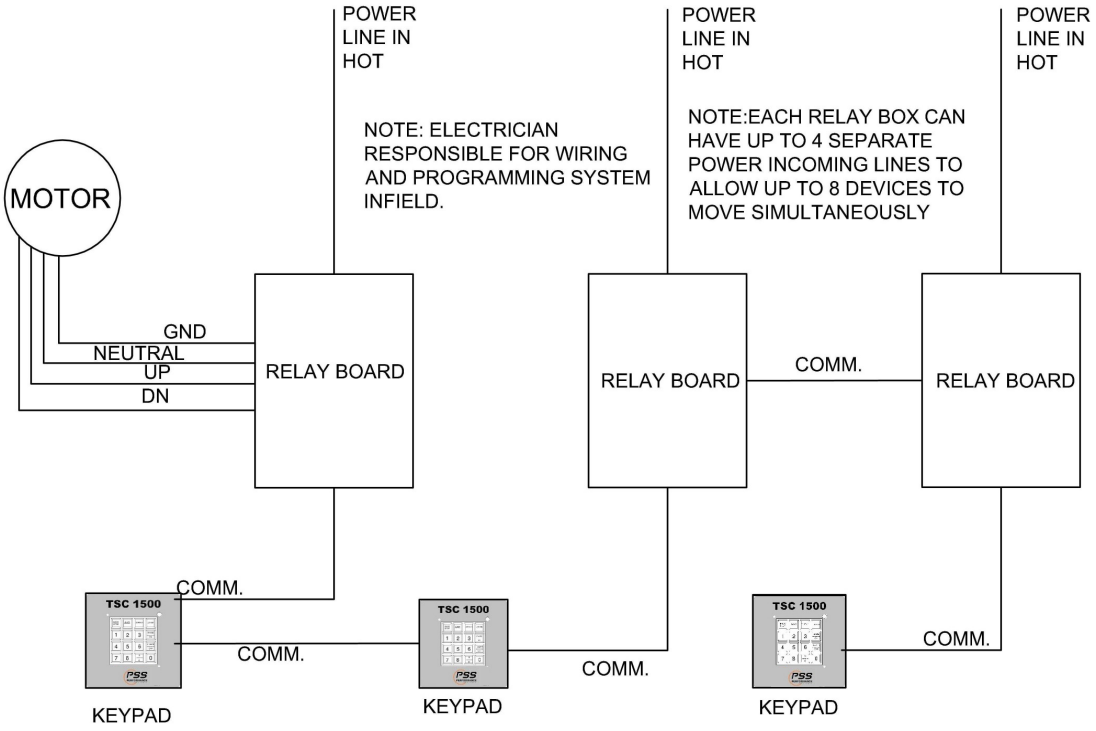
**Determine location for relay box. Relay box should be securely mounted in a location as near as possible to the center of all backstops and/or curtains being controlled in order to minimize wiring.**

**Determine location for keypad. Keypad should be located at a convenient height for authorized users. Keypad must be located such that the authorized user has full view of gymnasium equipment at all times when operating controls. Keypad is designed to fit a standard 4 by 4 by 2 1/2" deep box.**

**Once the relay box and keypad have been located and properly mounted, wiring of the system can be accomplished.**

**Refer to System Wiring Configuration drawing (Page 5+6) from Performance Sports Systems, Model TSC 1500 Total System Control.**

# TSC 1500




COMMUNICATIONS WIRE ALL
2:18AWG DUAL TWISTED PAIR 12V
SHIELDED CABLE

ALL WIRE PROVIDED BY ELECTRICIAN

IMPORTANT: THE VOLTAGE PROVIDED MUST BE STABLE. IF UNSTABLE CAN CAUSE PROBLEMS WITH SYSTEM.

NOTE: COMMUNICATION WIRE CAN ALL BE DAISY CHAINED ON SYSTEM TO PROVIDE A REDUCTION IN REQUIRED WIRE. HOWEVER A SLAVE RELAY CANNOT HAVE THE +12V CONNECTED TO THE CIRCUIT. ALL POWER FOR THE KEYPADS MUST COME FROM THE MASTER RELAY BOARD TO AVOID BACKFEEDING +12V POWER.

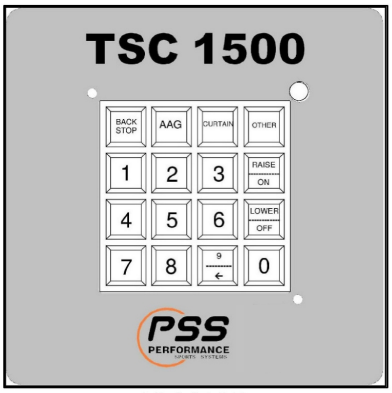
MOTOR ELECTRICAL REQUIREMENTS

MINIMUM CIRCUIT REQUIREMENTS
-DEDICATED 120VAC, 1PH, 60HZ,
30 AMP SERVICE
-MAX OF FOUR POWER LINES PER BOX

ALL TERMINALS ACCEPT ONLY 10GA MAX

# TSC 1500

IMPORTANT: THE VOLTAGE PROVIDED MUST BE STABLE. IF UNSTABLE CAN CAUSE PROBLEMS WITH SYSTEM.



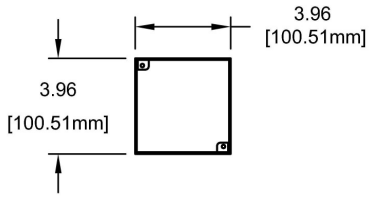

KEYPAD

IMPORTANT: THE SHIELD OF THE COMMUNICATION WIRE BETWEEN THE RELAY BOX AND THE INTERFACE MUST BE GROUNDED

2:18AWG DUAL TWISTED PAIR 24V SHIELDED CABLE

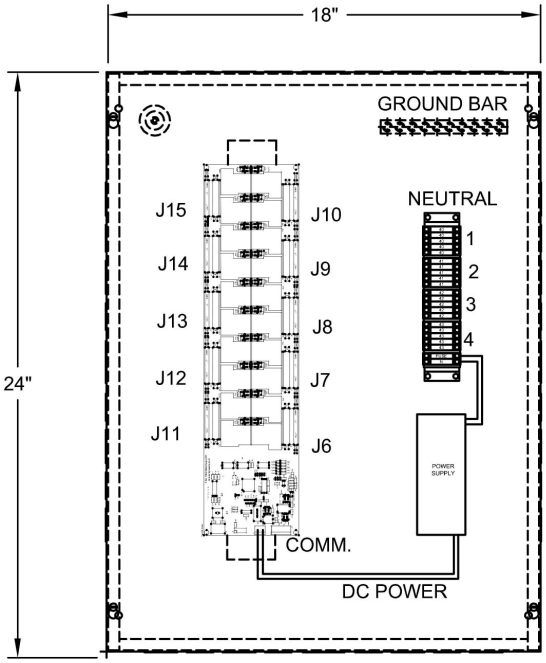
NOTE:
WIRE MOTOR ON TERMINALS PER DEVICE ASSIGNMENT SHEET

NOTE:
J6 = INCOMING LINE 1
J10 = INCOMING LINE 2
J11 = INCOMING LINE 3
J15 = INCOMING LINE 4
IF USING MAX INCOMING POWER.
OTHERWISE ONE LINE TO J6 AND THEN CHAINED TO ALL OTHER INPUTS.




NOTE: JUNCTION MOUNTING TABS MUST BE ORIENTED AS SHOWN FOR PROPER MOUNTING OF TOUCH PAD

STANDARD 4" x 4" x 2½" DEEP JUNCTION BOX. REQUIRED AT EACH KEYPAD LOCATION. (SUPPLY BY OTHERS)




RELAY BOX

MOTOR ELECTRICAL REQUIREMENTS

MINIMUM CIRCUIT REQUIREMENTS
-DEDICATED 120VAC, 1PH, 60HZ,
30 AMP SERVICE
-MAX OF FOUR POWER LINES PER BOX

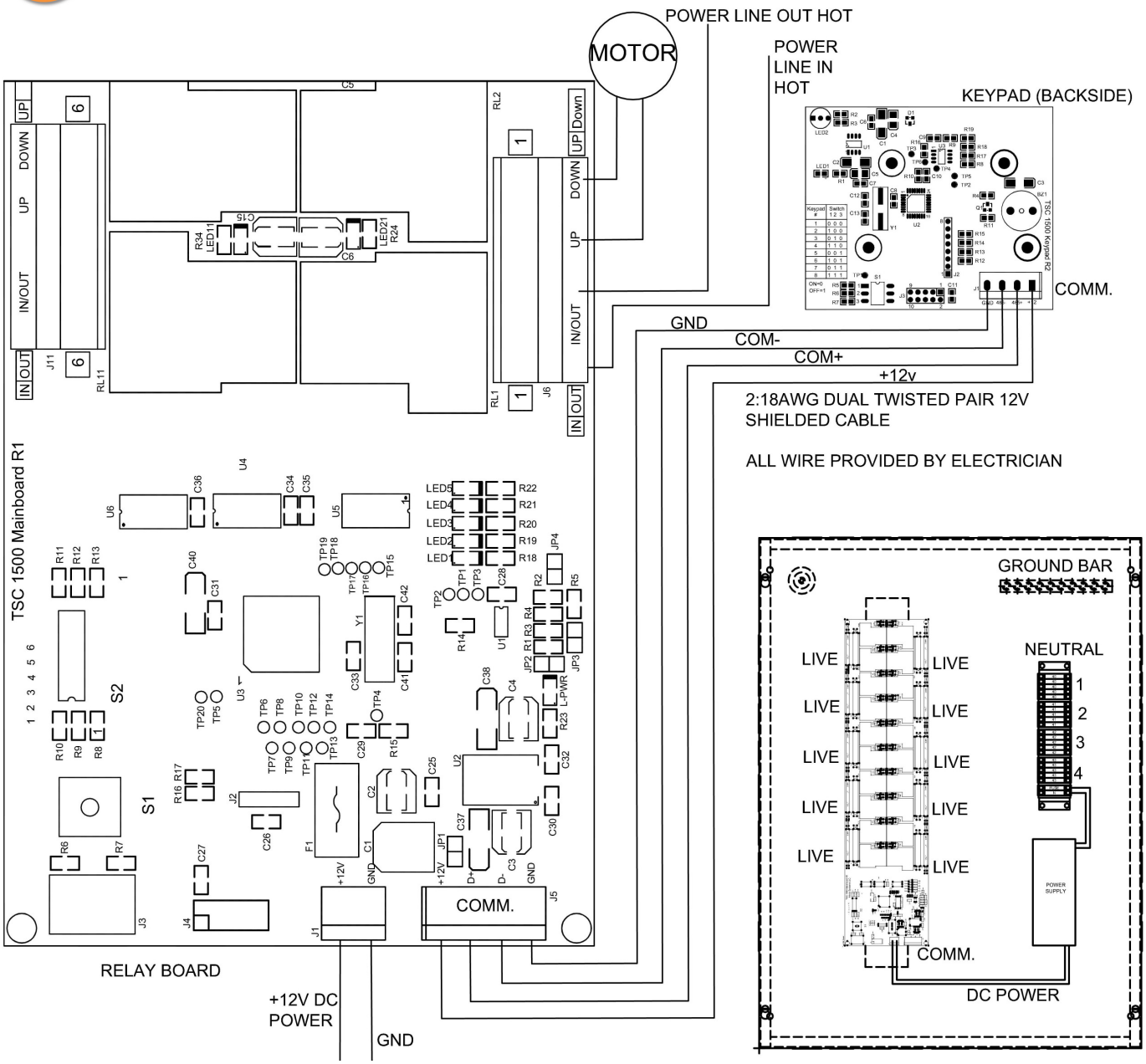
ALL TERMINALS ACCEPT ONLY 10GA MAX

NOTE: LOCATE KEYPAD ON WALL AT A CONVENIENT HEIGHT FOR AUTHORIZED USERS.

AUTHORIZED USER MUST HAVE FULL VIEW OF GYMNASIUM EQUIPMENT AT ALL TIMES WHEN OPERATING.

ALL OTHER ELECTRICAL, JUNCTIONS AND SYNCHRONIZER BOXES ARE TO BE INSTALLED BY A CERTIFIED ELECTRICAL CONTRACTOR. FOLLOW ALL LOCAL CODES AND MANUFACTURER'S INSTRUCTIONS.

# TSC 1500




**NOTE:** Master board shown. Slave board will not have +12V hooked to keypad. All +12V power is to be fed off of the master board to keep from back feeding power in the system when daisy chained.

**Sequence 1 - Connect keypad and relay box control wiring as follows:**

**Communication wiring and Power wiring**

Communication wiring and power wiring must be twisted pair 18 gauge wire or twisted pair multi-conductor cable of 22 gauge or larger. Shielded wire must be used when running nearby fluorescent lighting loads or Variable Speed Drives (air handling units).
Belden 5302FE is recommended. You may substitute, but the cable must be:

A) Stranded
B) 18 gauge
C) Shielded
D) Twisted Pair

1. When connecting wire, a pair shall be landed on + com and – com. The other pair shall be landed on +12v and -12v.
2. Then note the color and terminal terminations on the display box. Repeat the connections on the relay box. Do not put DC wire in the same conduit as any AC wire. Do not route DC wires across AC if at all possible. If necessary, the DC wire must cross perpendicular to the AC wire

NOTE: When adding a slave board, remove all jumpers on the slave board.

**Proper Grounding and Shielding**

Proper grounding and shielding is essential for reliable system operation. Low voltage DC and communication wiring must be protected from electrical noise introduced by 110v AC wiring, other voltages and signals which may be present in the building infrastructure.

1. The main 110v power feeds from the breaker panel to the RB should have a separately pulled Green ground wire. This should be bonded to both the breaker panel source, and to the ground bar in the bottom of the RB.
2. The display boxes should be grounded to the RB. Make sure gnd in the RB operator terminal connections have a Green wire in the RB going to the RB ground bar and a green wire going from them to terminal gnd in the display box.
3. Cable shields on any shielded cables should ONLY be grounded at the RB end. The shields should be folded back and taped/insulated so that the shields and drain wire are NOT connected at the display box end.
4. Cable shields MUST be connected via their drain wires at the RB end only. Cut back enough of the cable shield so that the drain wire can be connected to terminal gnd in the RB. Make sure these non insulated drain wires cannot touch any other AC or DC voltages.
5. Shields are used on the 12vDC signal wires, fold back the shield and drain wire, cut off short, and tape/insulate the display box end so that the shield in the display box is not connected to anything. At the RB end extend enough drain wire to land the shield drain to.

Note: Shields of wires should only be grounded in the relay box. Not both places.

Note: Supplied voltage must be constant. If not constant errors can occur.

**Sequence 2 - Connect device motors to relay box as follows:**

Requires a 4 wire line sized appropriately for the length of run (refer to specification of device for run sizes):

1. Connect the motor wires from the Backstops and/or 115V Curtains to the relay box. Take note of the location landed on the device assignment sheet for later programming.
    a. Neutral wires are connected depending on which power line they are located on.
    b. Terminal L1 is the location for all device neutrals on the first incoming line.
    c. Terminal L2 is the location for all device neutrals on the second incoming line.
    d. Terminal L3 is the location for all device neutrals on the third incoming line.
    e. Terminal L4 is the location for all device neutrals on the forth incoming line.

Note: Ground connections can be made to any open GND terminal on the Ground strip.

**Sequence 3 - Connect power to relay box as follows:**

Electrical Service Requirements - 120V, 30A, 1PH service per line, Each Box capable of taking 4 power lines.

Power can be run directly to the relay box. Feed line should be sized appropriately for the length of run to meet the electrical service requirements. Terminals internal to the TSC do not take any wire size larger than 10ga.

1. Connect the power wires to the relay box as follows:
    - Live or Load wire to terminal J6
    - Second Live or Load wire to terminal J10
    - Third Live or Load wire to terminal J11
    - Forth Live or Load wire to terminal J15
    - Neutral wire to terminal L1
    - Second Neutral wire to terminal L2
    - Third Neutral wire to terminal L3
    - Forth Neutral wire to terminal L4
    - Ground wire to Ground Bar

Note: AC wires should not be near the DC terminal blocks. This can cause communication interruption.

**Sequence 4 – Plug all open holes.**

1) After installation of conduit and wire, all open holes must be plugged by electrician.

**Wiring Practices:**

All AC wiring should be routed away from DC wiring and should never intersect or cross. Failure to do so can cause communication issues with an installed system. All device wiring should go to the top side of the box. Wiring can also go out through the sides of the box. Input AC should always come in the upper left corner.

Ideally locate the Relay Box somewhere easily accessible such as in an electronics room or cat walk. The reason for this is so the manual override option is still intact. Do not install the box on the ceiling. It is not designed to be installed in this manner and doing so will cause operation problems.

**Contact Performance Sports Systems at 800-848-8034 for questions or additional information concerning the TSC 1500 Total System Control installation.**

## System Setup:

**Din Settings:**

Once the system is wired then it can be set up. The din switches must be set on all relay boards and key pads. Each unit comes as a default of master or keypad one. See the following page for din settings. While setting dins in relay boards fill out the assignment sheet to make programming easier in the following stages.

**Wiring:**

The power wiring is very important for programming info. The power must be appropriately spread out on the relay board to allow up to 8 devices to operate at once. If this is not properly done the breaker will trip. This needs to be kept in mind when programming. Each device relay terminal has a line in and line out along with the up and down. The key part is the line in and line out. This allows someone to patch in to the line out and bring it to another line in to power that relay as well. Each power line brought in will allow up to 2 devices to operate on that power line. It is assumed 15 amps max per device. A single incoming line has 30 amps which allows two devices to operate. There should always be at least one line landed at J6 terminal if the relay box only has one power line incoming.

**Jumper Setting:**

The relay board has jumpers on it that must be removed if the board being installed is a slave.

## Din Assignment:

### Relay Board

| S1 | S2 | S3 | S4 | S5 | S6 | |
|---|---|---|---|---|---|---|
| On | On | On | On | On | On | Board is Mater is in Standard Operating Mode (1) |
| On | On | On | On | On | Off | Password Reset Mode (2) |
| On | On | On | On | Off | On | Reset all settings (Except password) (3) |
| On | On | On | On | Off | Off | Programming enable mode (4) |
| Off | On | On | On | On | On | Slave Mode Address #1 |
| On | Off | On | On | On | On | Slave Mode Address #2 |
| Off | Off | On | On | On | On | Slave Mode Address #3 |
| On | On | Off | On | On | On | Slave Mode Address #4 |
| Off | On | Off | On | On | On | Slave Mode Address #5 |
| On | Off | Off | On | On | On | Slave Mode Address #6 |
| Off | Off | Off | On | On | On | Slave Mode Address #7 |
| On | On | On | Off | On | On | Slave Mode Address #8 |
| Off | On | On | Off | On | On | Slave Mode Address #9 |
| On | Off | On | Off | On | On | Slave Mode Address #10 |
| Off | Off | On | Off | On | On | Slave Mode Address #11 |
| On | On | Off | Off | On | On | Slave Mode Address #12 |
| Off | On | Off | Off | On | On | Slave Mode Address #13 |
| On | Off | Off | Off | On | On | Slave Mode Address #14 |
| Off | Off | Off | Off | On | On | Slave Mode Address #15 |

Notes:

(1)- Normal Operating Mode- Options 1,3,4,5,6,7,8 (programming modes see pg11-13) on the keypad are inactive.

(2)- Password reset- To reset the password you have to set the dip switch, remove power, press and hold switch (S1), Apply power. After about 5 seconds when LED's start blinking the settings reset is complete.

(3)- Reset all settings- To reset all the settings, set dip switches, remove power, press and hold switch S1, apply power. After about 5 seconds when the LED's start blinking the settings reset is complete.

(4)- Programming enable mode- Enables Options 1,3,4,5,6,7,8 (pg 11-13) on the keypads. Note that the power to the board has to be cycled after the dip switch setting has been made to enable this mode.

### Keypad

| S1 | S2 | S3 | Keypad |
|---|---|---|---|
| On | On | On | 1 |
| OFF | On | On | 2 |
| On | Off | On | 3 |
| Off | Off | On | 4 |
| On | On | Off | 5 |
| Off | On | Off | 6 |
| On | Off | Off | 7 |
| Off | Off | Off | 8 |

# Programming Guide

After assignment sheets have been filed out then devices can be assigned to the different device types.

**Individual Assignment:**

Example no. 1
1) Enter 3 to activate device assignment.
2) Enter device type (backstop)
3) enter two digit code (01-99) This is device number ex. Backstop 01
4) Enter three digit device relay code (001-160)
5) 4 beeps to confirm assignment
6) Keypad returns to command mode

Backstop 01 has now been assigned

**Operations:**

START->
LED flashing RED (Keypad is waiting for Main Board to talk to it)->
LED Solid RED (Keypad is waiting for user Code)->
Enter 4 digit Code, After the first key LED will turn Solid Yellow, after correct code is entered you will hear two beeps and LED will turn Solid Green (Command Mode). If code is incorrect you will hear a long error beep and LED will turn Solid Red.

(Backstop)- Activate Backstop
Press "Backstop" (LED will turn Solid Yellow) then enter two digit code(01-99)(LED will flash green). Press and hold raise or lower to activate UP/DOWN Relay. Press "9" to go back to command mode.

(Height Adjusters)- Activate Height Adjusters
Press "HGT ADJ" (LED will turn Solid Yellow) then enter two digit code(01-99)(LED will flash green). Press and hold raise or lower to activate UP/DOWN Relay. Press "9" to go back to command mode.

(Curtain)- Activate Curtain
Press "Curtain" (LED will turn Solid Yellow) then enter two digit code(01-99)(LED will flash green). Press and hold raise or lower to activate UP/DOWN Relay. Press "9" to go back to command mode.

(Other)-Activate Other
Press "Other" (LED will turn Solid Yellow) then enter two digit code(01-99)(LED will flash green). Press and hold raise or lower to activate UP/DOWN Relay or to activate ON/OFF relay.

Press "9" to go back to command mode. Note that the Devices from 01-49 are up and down devices and Devices from 50-99 are on/off devices.

**Command Mode:**

**How to activate a device**

(1)-Press "1" (LED will turn Solid Yellow), then enter three digit device code (001 through 160)(LED will flash green). Press and hold to Raise or Lower to activate UP/DOWN relay. Press "9" to go back to command mode.

**How to activate a group**

(2)-Press "2" (LED will turn Solid Yellow), then enter two digit group code (01-75)(LED will Flash Green). Press and hold raise or lower to activate UP/DOWN relay of included Groups. Press"9" to go back to Command Mode. Note that groups from 01-75 are up/down groups and 76-98 are static "aux" devices.

**How to assign a device to a device type**

(3)-Press "3" (LED will turn Solid Yellow), then enter Device Type (Backstop/HGT ADJ/Curtain/Other) (LED will flash yellow), Enter two digit code (01-99)(LED Flashes Green and two beeps). Enter three digit device code (001 through 160) (4 Beeps for confirmation) Keypad will go back to command mode.

**How to remove a device from a device type**

(4)-Press "4" (LED will turn Solid Yellow), then enter Device Type (Backstop/HGT ADJ/Curtain/Other) (LED will flash yellow), Enter the two digit code (01-99)(4 Beeps for confirmation). Keypad will go back to command mode

**How to add a device to a group**

(5)-Press "5" (LED will turn Solid Yellow), then enter two digit code (01-75for Regular groups, 76-98 for Aux groups) (LED will flash yellow and two beeps) Enter three digit device code to add device to group selected (001 through 160)(4 Beeps for confirmation). Keypad will go back to command mode

**How to delete device from group**

(6)-Press "6" (LED will turn Solid Yellow), then enter two digit code (01-75for Regular groups, 76-98 for Aux groups) (LED will flash yellow and two beeps) Enter three digit device code to delete from group selected (001 through 160)(4 Beeps for confirmation). Keypad will go back to command mode.

**How to assign Aux devices**:

(7)-Auxiliary device is defined as an on or off feature. The 1500 is capable of having 50 Aux devices total. Any Device relay can be turned into an Aux relay. The power being used for this relay must be landed in the (IN) section of the device relay terminal block. This incoming power can be anything from 5vdc to 250v AC. It is the same process as above but other as type device and a number in the range of 50 to 99.

**How to assign Aux Groups**:

(8)-This ability allows multiple auxiliary devices to operate as one group. If a user wishes to group two scoreboards together they would use this. Follow the same instructions for adding a device to a group. The only difference is aux groups are 76-98

**How to change pass code:**

Press "8" (LED will turn Solid Yellow) then existing 4 digit code (double beep and LED will flash yellow). Then enter new 4 digit code (4 beeps for confirmation). Keypad will go back to locked state, enter new code to go to command mode.

**Timer Note**: In any mode if no key is pressed for 30 seconds the keypad will reset and go into the locked state.

## Manual Control Override

This system has a built in over ride back up. To use this ability you must have the TSC-MC option. This is used when plugging in the TSC-MC into the relay board at J3 and then activating it with S1 on page 6. This will cycle through the relays that can be activated.

| LED 1 | LED 2 | LED 3 | LED 4 | Device |
|---|---|---|---|---|
| ON | Off | Off | Off | 1 |
| Off | On | Off | Off | 2 |
| On | On | Off | Off | 3 |
| Off | Off | On | Off | 4 |
| On | Off | On | Off | 5 |
| Off | On | On | Off | 6 |
| On | On | On | Off | 7 |
| Off | Off | Off | On | 8 |
| On | Off | Off | On | 9 |
| Off | On | Off | On | 10 |

Press S1 and watch the LED's for selection and then use the remote to manually raise or lower. To go back to normal operation go past 10 and once you see the LED blinking you are back to normal mode.

**Passcode :** 4321

# Notes:


**Performance Sports Systems**
**9200 E. 146th Street**
**Noblesville, IN 46060**

**800-848-8034**
**www.perfsports.com**