



CE850(2020)

Service Manual

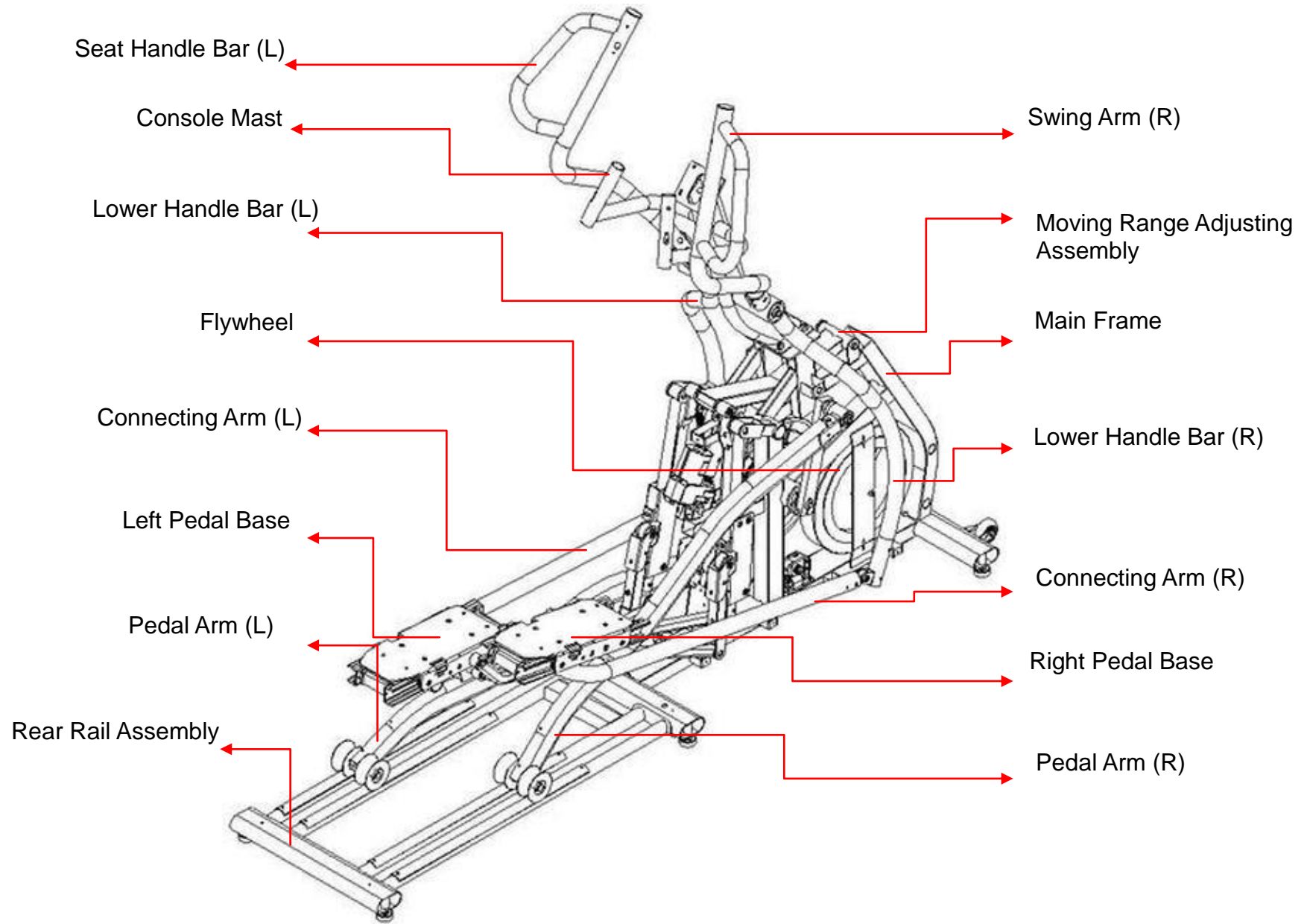
DYACO
Dyaco International Inc.

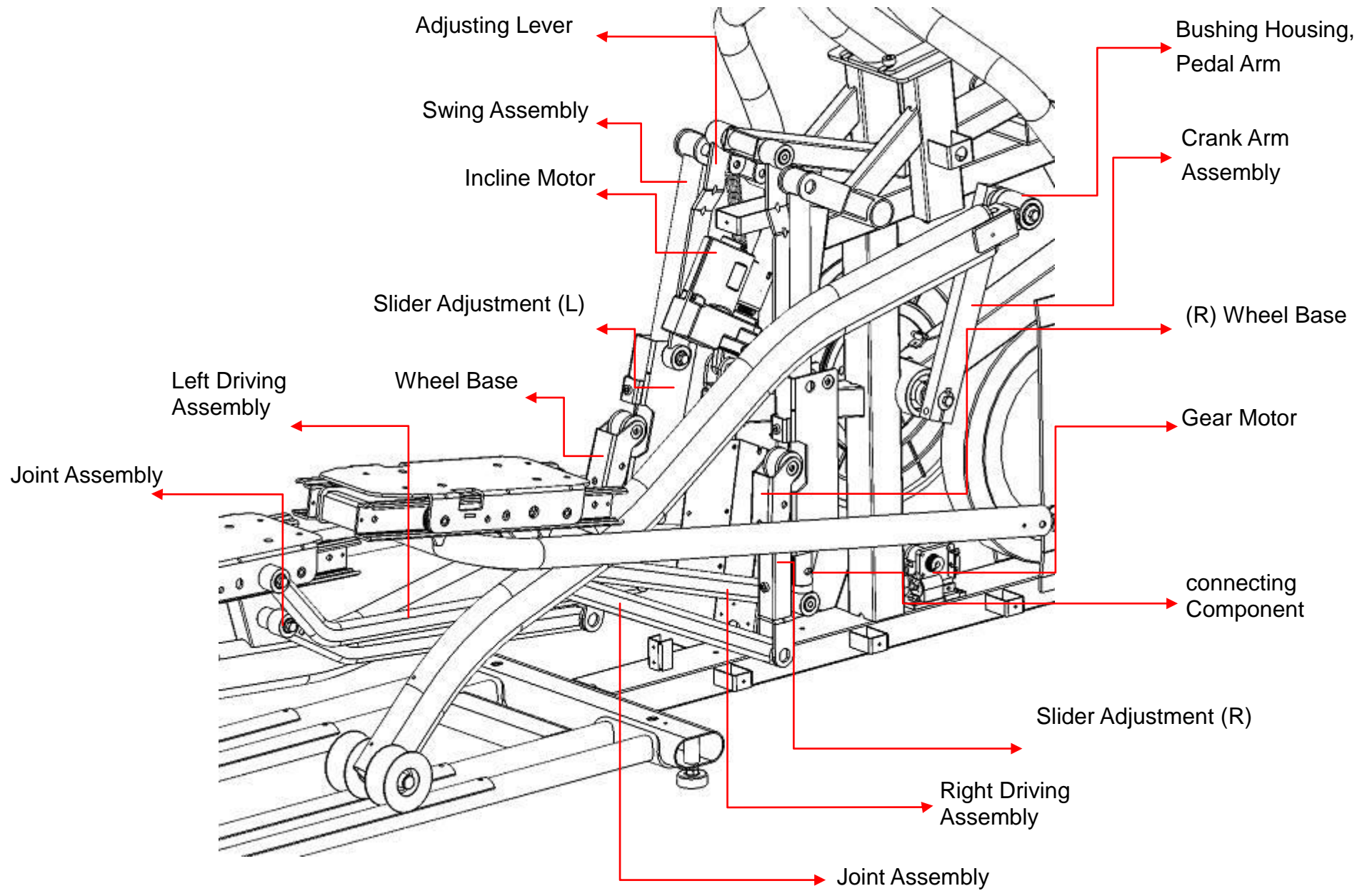
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1. CE850(2020) Outlines





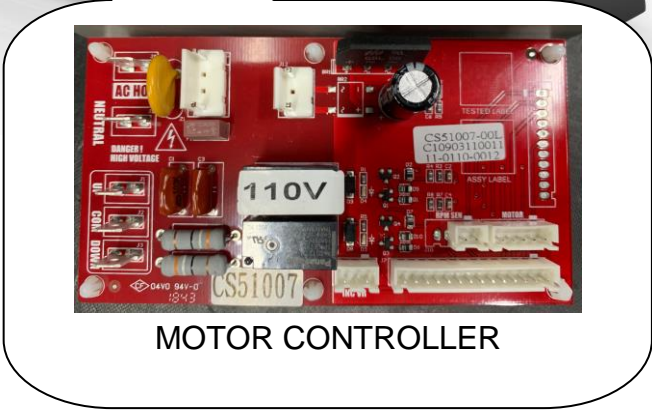
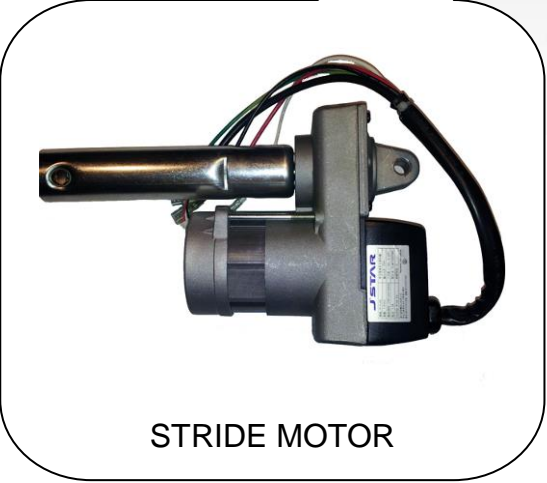


2. Electronic Parts

2-1 Upper Controllers



2-2 Lower Controller and Driver



3. Electrical Configurations

CONSOLE:

Interface that controls all functions of the Elliptical.

MAIN CONTROLLER:

The circuit board consist of the DC power supply for console 、 stride driver and tension motor driver, link the console to output appropriate voltages for tension motor that control the elliptical functions.

TENSION MOTOR (GEAR MOTOR):

It can change to increase or decrease resistance level of brake.

STRIDE MOTOR:

This is an ac motor. User can to control variable elevation by console within main controller.

GENERAL INFORMATION

CONSOLE

Contain Keys control and LED Display.

Main controller Include power supply 、 motor driver control circuit and stride control circuit.

TENSION MOTOR

Work voltage: DC 4.0~6.0V

Control resistance increases and decreases.

STRIDE MOTOR

This is a 115 volt (or 220 volt) AC motor.

Have four wires, red, black, white and green.

Has one 3 pins cable of position sensor.

If there is AC voltage on the Red wire (UP) the stride motor will increase the stride.

If there is AC voltage on the Black wire (DOWN) the stride motor will decrease the stride.

The White wire (COM) is neutral.

The green wire is grounding.

4. CE850(2020) Product Operation

Display Windows



Operation

POWER

When initially powered on the console will perform an internal self-test. The odometer will remain displayed for only a few seconds then the console will go to the startup display. The Dot Matrix Message Center will be scrolling through the different profiles of the programs and will be scrolling the start up message. You may now begin to use the console.

QUICK START

This is the quickest way to start a workout. After the console powers up you just press the Start key to begin. This will initiate the Quick Start mode. In Quick Start the Time will count up from zero, all workout data will start to accrue and the workload may be adjusted manually by pressing the Up and Down buttons. The Dot Matrix Message Center will show a ¼ mile (0.4km) track display or just the bottom row lit at first, depending on how the display button has been set (see Basic information below). As you increase the workload, more rows will light indicating a harder workout. The elliptical will get harder to pedal as the rows increase. The Dot Matrix Message Center has 24 columns of lights and each column represents 1 minute. At the end of the 24th column (or 24 minutes of work) the display will wrap around and start at the first column again.

There are 20 levels of resistance – displayed as 10 rows of lights - available for plenty of variety. The first 5 levels are very easy workloads, and the changes between levels are set to a good progression. For deconditioned users. Levels 5-10 are more challenging but the increases from one level to the next remain small. Levels 10-15 start getting tough as the levels jump more dramatically. Levels 15-20 are extremely hard and are good for short interval peaks and elite athletic training.

BASIC INFORMATION

The Dot Matrix Message Center, or Profile Window, will display the workout Profile. The LED Data Display Windows displays pertinent exercise data. There is a Stride window for pedal speed and a Level window indicating machine resistance.

The LED Data Display Window will initially be displaying Distance, Calories, Pulse and Time Elapsed information. When the Up/Down Scan key is pressed the next set of information will appear: Speed, Watts, METs, Time Remaining. Pressing the Up/Down Scan button, the Scan mode is activated and the LED Data Display Window will show each set of data for four seconds then switch to the next set of data in a continuous loop. Pressing the Up/Down Scan button again will bring you back to the beginning.

The Stop key button actually has several functions. Pressing the Stop key once during a program will pause the program for 5 minutes. If you need to get a drink, answer the phone, or any of the many things that could interrupt your workout, this is a great feature. To resume your workout during Pause just press the Start key. If the Stop key is pressed twice during a workout, the program will end and the console will return to the start-up screen. If the Stop key button is held down for 3 seconds, the console will perform a complete Reset. During data entry for a program the Stop key performs a Previous Screen

function. This allows you to go back one step in the programming each time you press the Stop key button.

The Program Key is used to preview each program. When you first turn the console on, you may press Program key to preview what the program profile looks like. If you decide that you want to try a program, press the Enter key to select the program and enter into the data set-up mode.

PROGRAMMABLE FEATURES

Each of the programs can be customized with your personal information and changed to suit your needs. Some of the information asked for is necessary to ensure the readouts are correct. You will be asked for your Age and Weight. Entering your Age ensures that the Heart Rate bar graph shows the correct number. Your Age is also necessary during the Heart Rate control program to ensure the correct settings are in the program for your Age. Otherwise the workout settings could be too high or low for you; entering your Weight aides in calculating a more correct calorie reading. Although we cannot provide an exact calorie count we do want to be as close as possible.

HEART RATE WINDOW

The Pulse (Heart Rate) window will display your current heart rate in beats per minute during the workout. You must use both left and right stainless steel sensors to pick up your pulse. Pulse values are displayed anytime the computer is receiving a Grip Pulse signal.

STRIDE LENGTH ADJSUTMENT

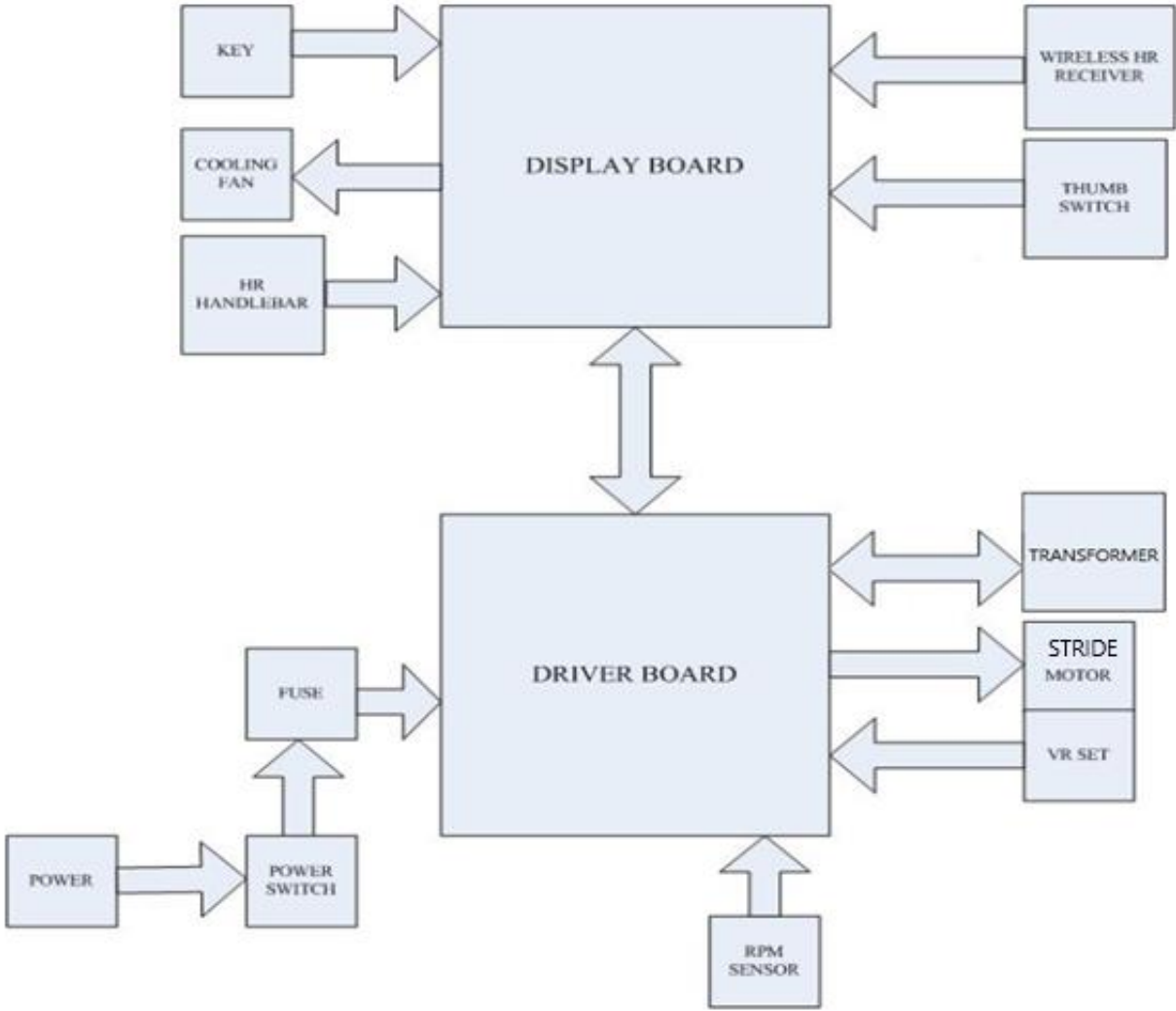
The elliptical has a unique adjustable stride length feature that will further increase the variety of your workouts. When the stride setting is at its lowest (shortest) position the stride length will be 18 inches. This setting is used when pedaling slowly, during quick bursts at very high resistance, and to closely simulate a walking motion. The highest (longest) setting is 24 inches and closely simulates the longer stride of a running motion. The stride adjustment can also be used to select a stride length that is comfortable for you. The stride length can also be computer controlled in some programs. The stride length can be controlled by buttons on the left swing arm and also can be automatically adjusted during the built-in workout programs.

C-SAFE FEATURE

Your console is equipped with a C-SAFE feature. The Power (POWER) port can be used for powering a remote controlled audio-visual system by connecting a cable from the remote to the Power port at the back of the console. The Communication port (COMM) can be used to interact with fitness software applications.

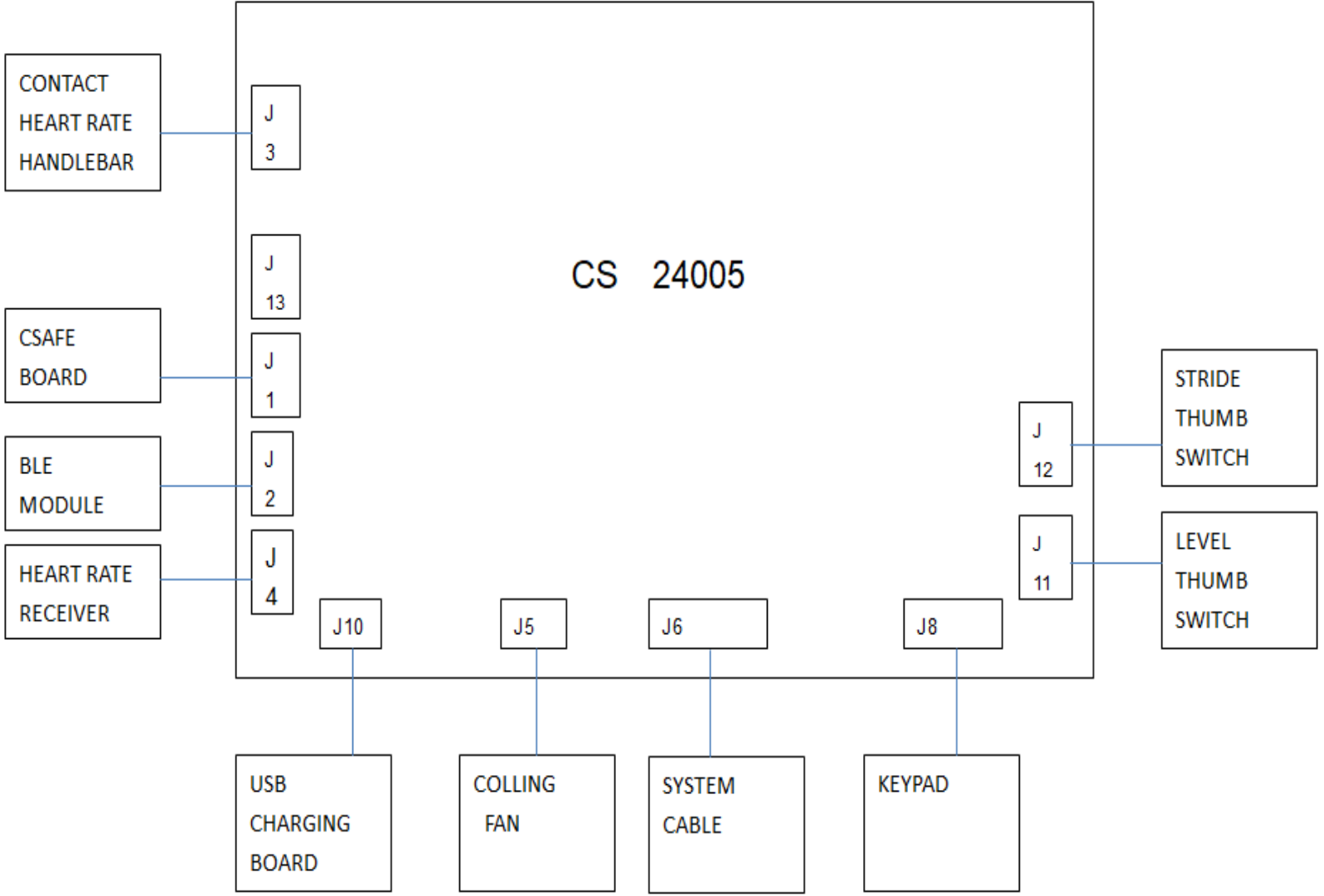
5. CE850(2020) Unit Block Diagrams

Elliptical Configuration



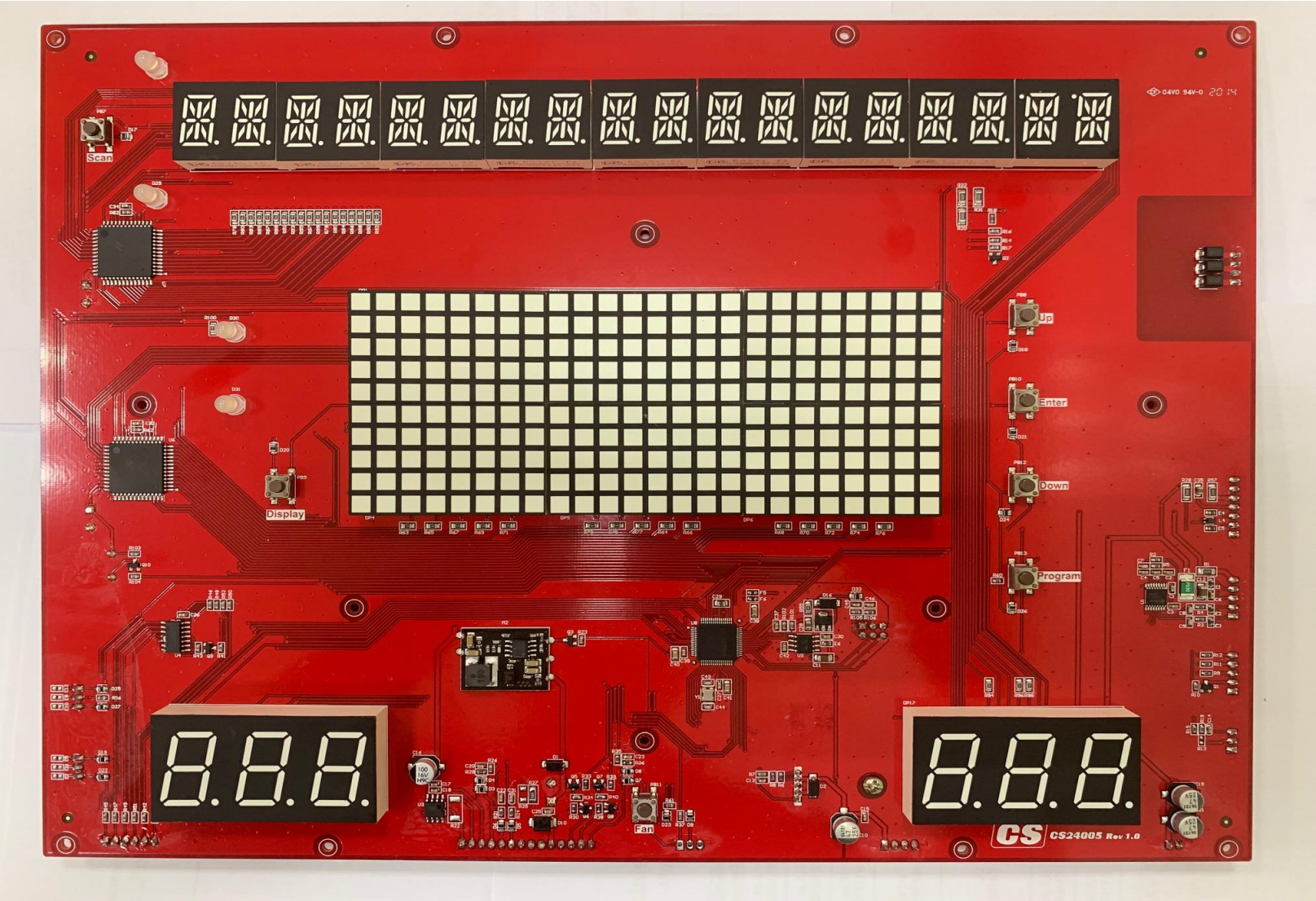
6. CE850(2020) Basic Connections and Wiring

6-1 Display Board wire Connections

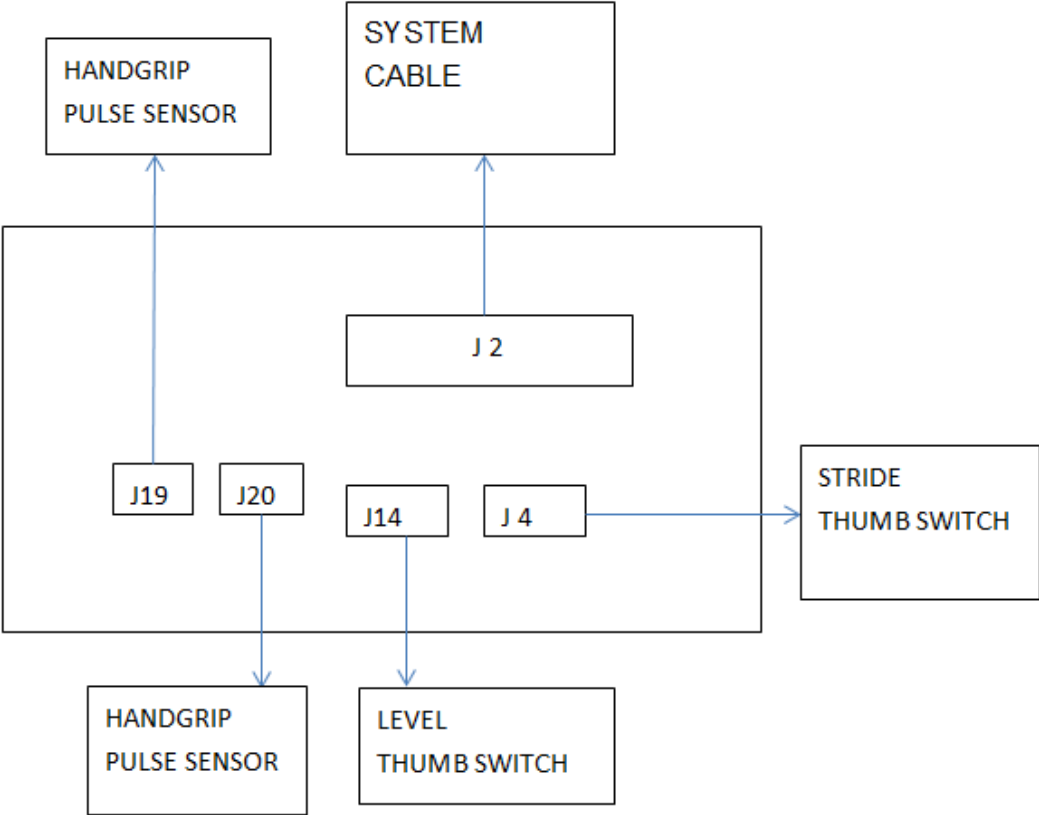


6-2 Display Board PCB Component Locations

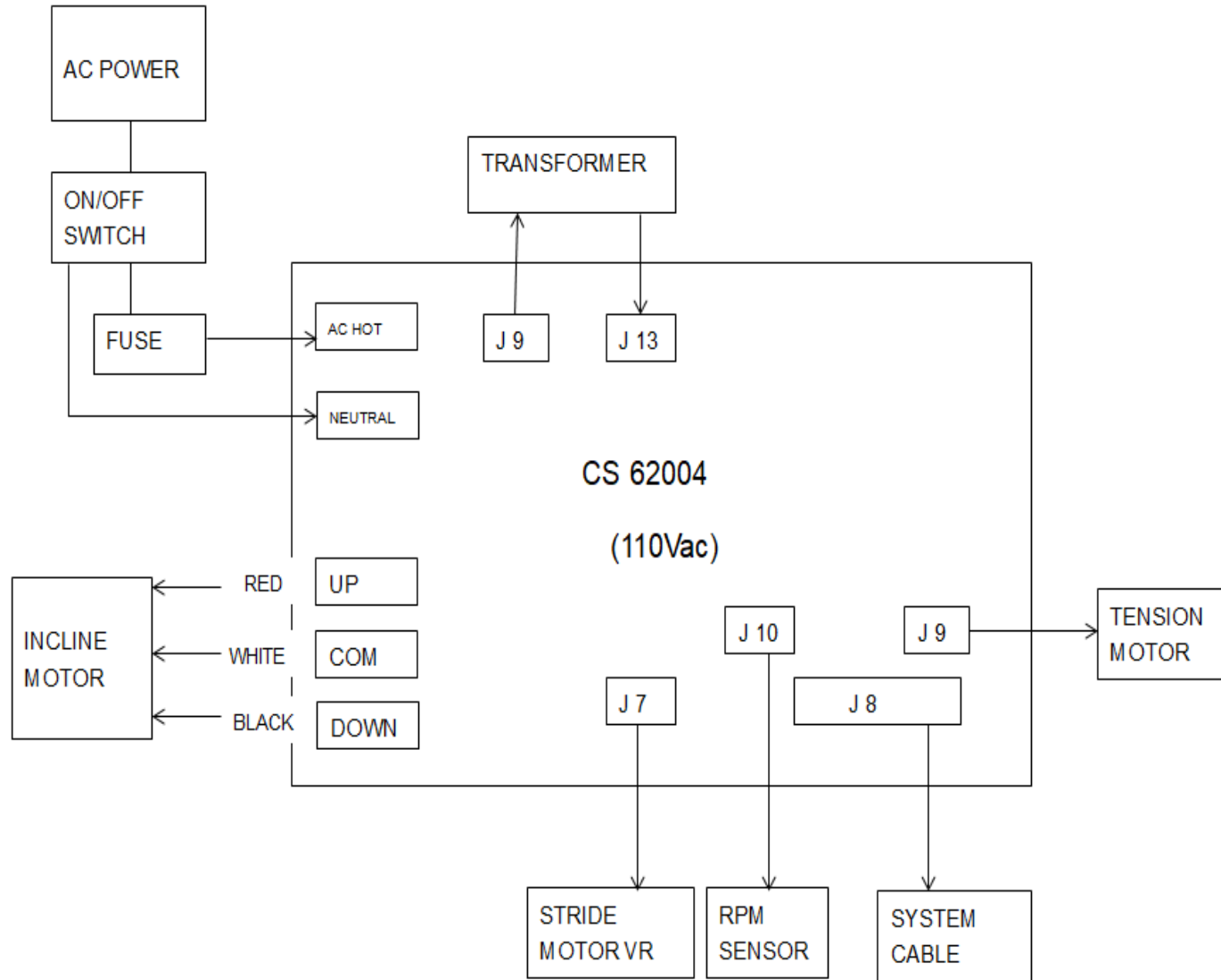
PCB Board Top

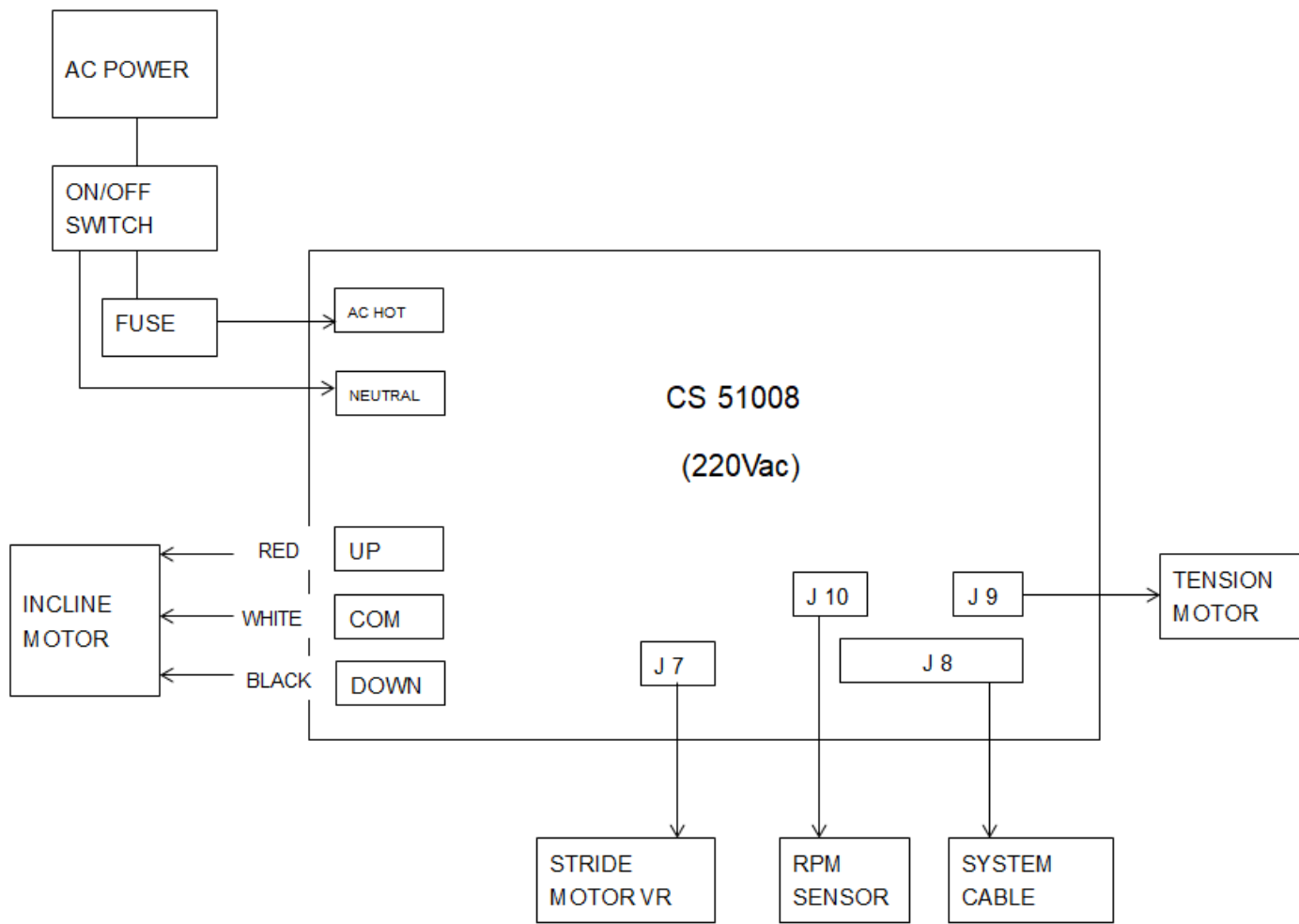


The console Interface Board wire Connections

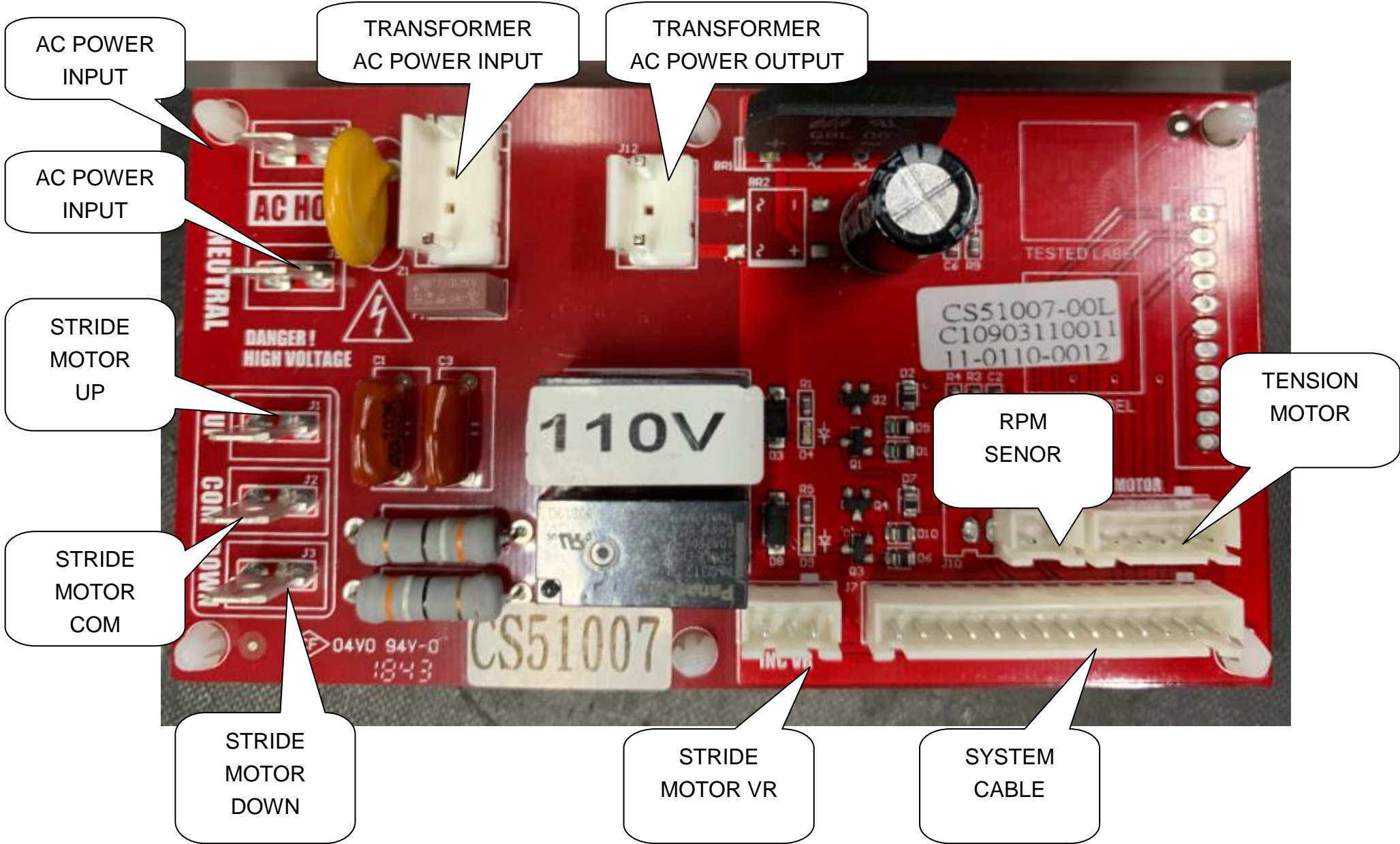


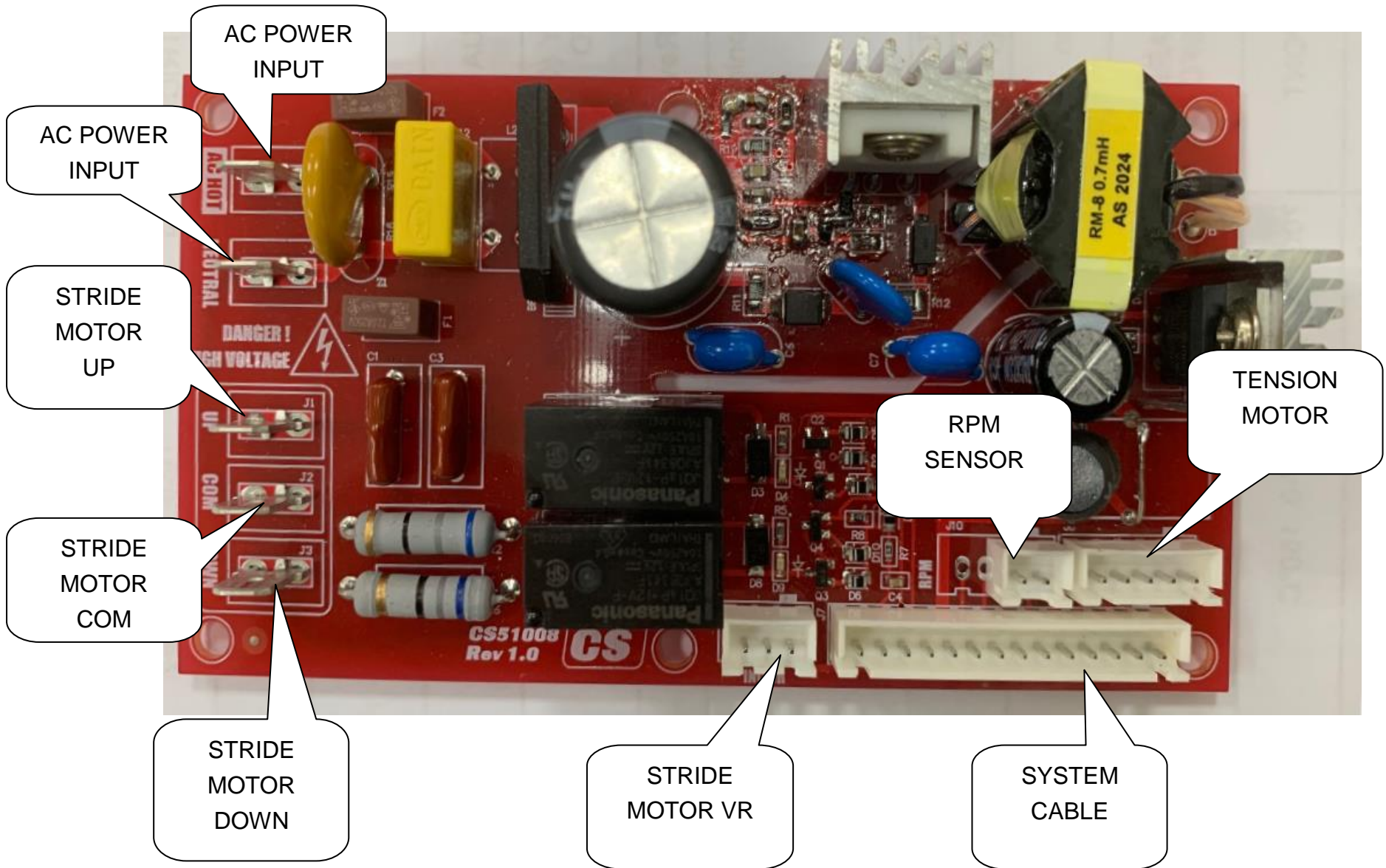
Driver Board Wire Connections





Driver Board PCB Component Locations and Function

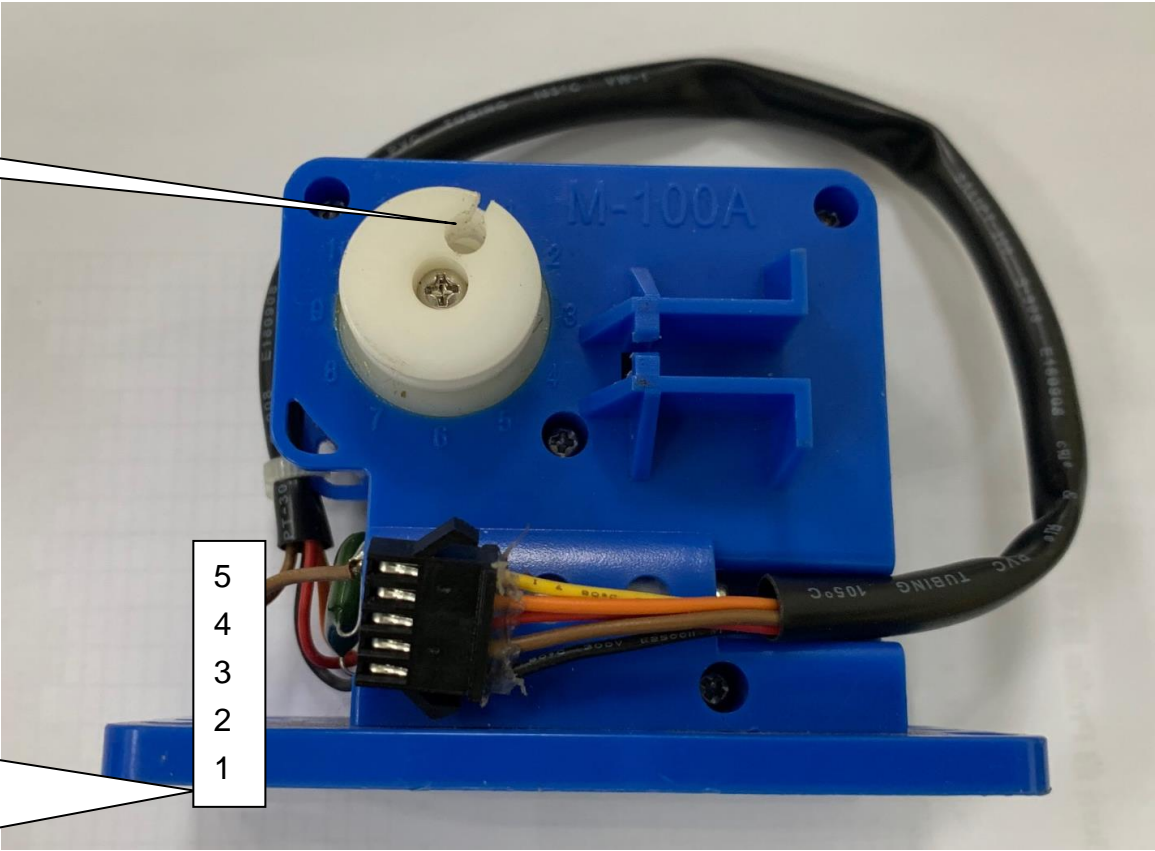




Tension Motor connector definition function

STEEL ROPE

MAIN CONTROL
1. M+
2. M-
3. +5V
4. VR
5. GND



- 5
- 4
- 3
- 2
- 1

7. Product Safety Instructions

7-1 Important Safety Instructions

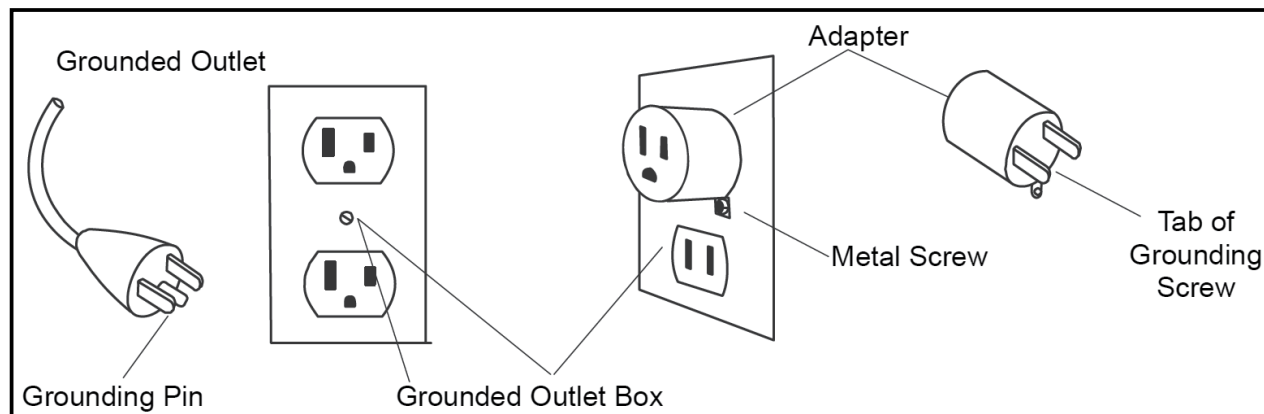
- To reduce the risk of electric shock disconnect your Elliptical from the electrical outlet prior to cleaning and/or service work.
- To reduce the risk of burns, fire, electric shock, or injury to persons, install the Elliptical on a flat level surface with access to a 115-volt, 15-amp grounded outlet with only the Elliptical plugged into the circuit.
- Do not use an extension cord unless it is a 16 AWG or better with only one outlet on the end. Do not attempt to disable the grounded plug by using improper adapters or in any way modify the cord outlet.

7/2 Important Electrical Instructions

- Never use a ground fault circuit interrupt (GFCI) wall outlet with this Elliptical. As with any appliance with a large motor, the GFCI will trip often. Route the power cord away from any moving part of the Elliptical including the elevation mechanism and transport wheels..
- **Circuit Breakers:** Some circuit breakers used in homes are not rated for high inrush currents that can occur when a Elliptical is first turned on or even during use. If your Elliptical is tripping the house circuit breaker (even though it is the proper current rating) but the circuit breaker on the Elliptical itself does not trip, you will need to replace the home breaker with a high inrush type. This is not a warranty defect. This is a condition we as a manufacture have no ability to control. This part is available through most electrical supply stores. Examples: Grainger part # 1D237, or available online at www.squared.com part # QO120HM.

7-3 Important Grounding Instructions

- **This product must be grounded.** If the Elliptical should malfunction or breakdown, grounding provides a path of least resistance for electric current, reducing the risk of electric shock. This product is equipped with a cord having an equipment-grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.
- **DANGER - Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the product is properly grounded. Do not modify the plug provided with the product if it will not fit the outlet; have a proper outlet installed by a qualified electrician.** This product is for use on a nominal 115-volt circuit (or 220-volt circuit), and has a grounding plug that looks like the plug illustrated below. A temporary adapter that looks like the adapter illustrated below may be used to connect this plug to a 2-pole receptacle as shown below if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet, (shown below) can be installed by a qualified electrician. The green colored rigid earlug, or the like, extending from the adapter, must be connected to a permanent ground such as a grounded outlet box cover. Whenever the properly adapter is screw.




8. CE850(2020) Error Messages / Troubleshooting

- Error code items :

Error Message	Explain
EEPROM ERROR	EEPROM failure
ERR	Tension motor is failure
---	Stride motor is failure

- Prepare :

Picture	Tool name
	<p>Multi-meter</p>

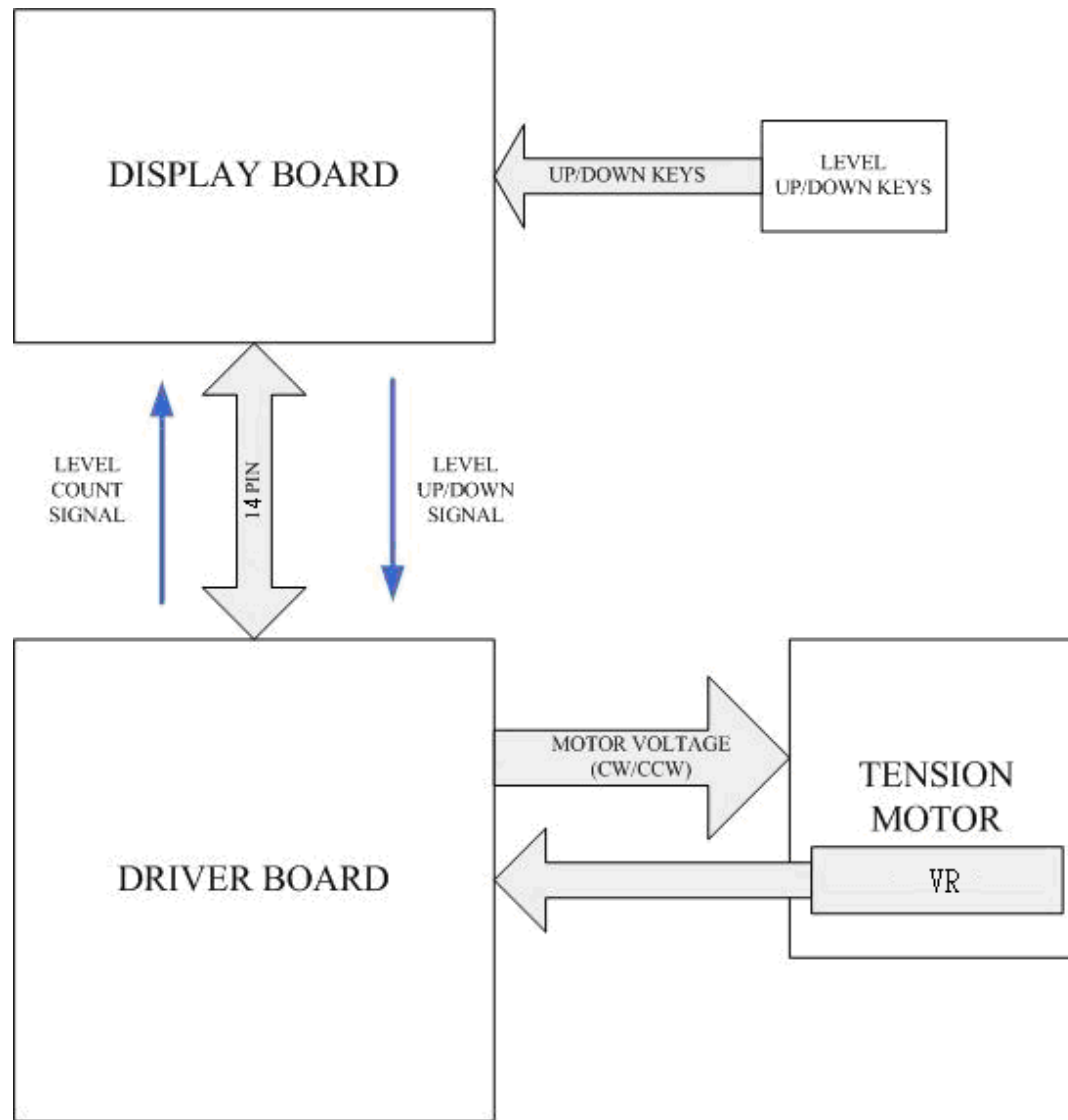
- **8-1 Error Message : EEPROM ERROR**

- **Definition: All screens are off, and outputs are stop when EEPROM damaged or malfunction. Display message will show “EEPROM ERROR”.**
- **Troubleshooting: Replace upper controller.**

- **8-2 Error Message : Err**

- Definition : When you press the Level Up or Down key, the motor does not move.” Err” appears on the display.

- Configuration :



● Tension Motor Operation

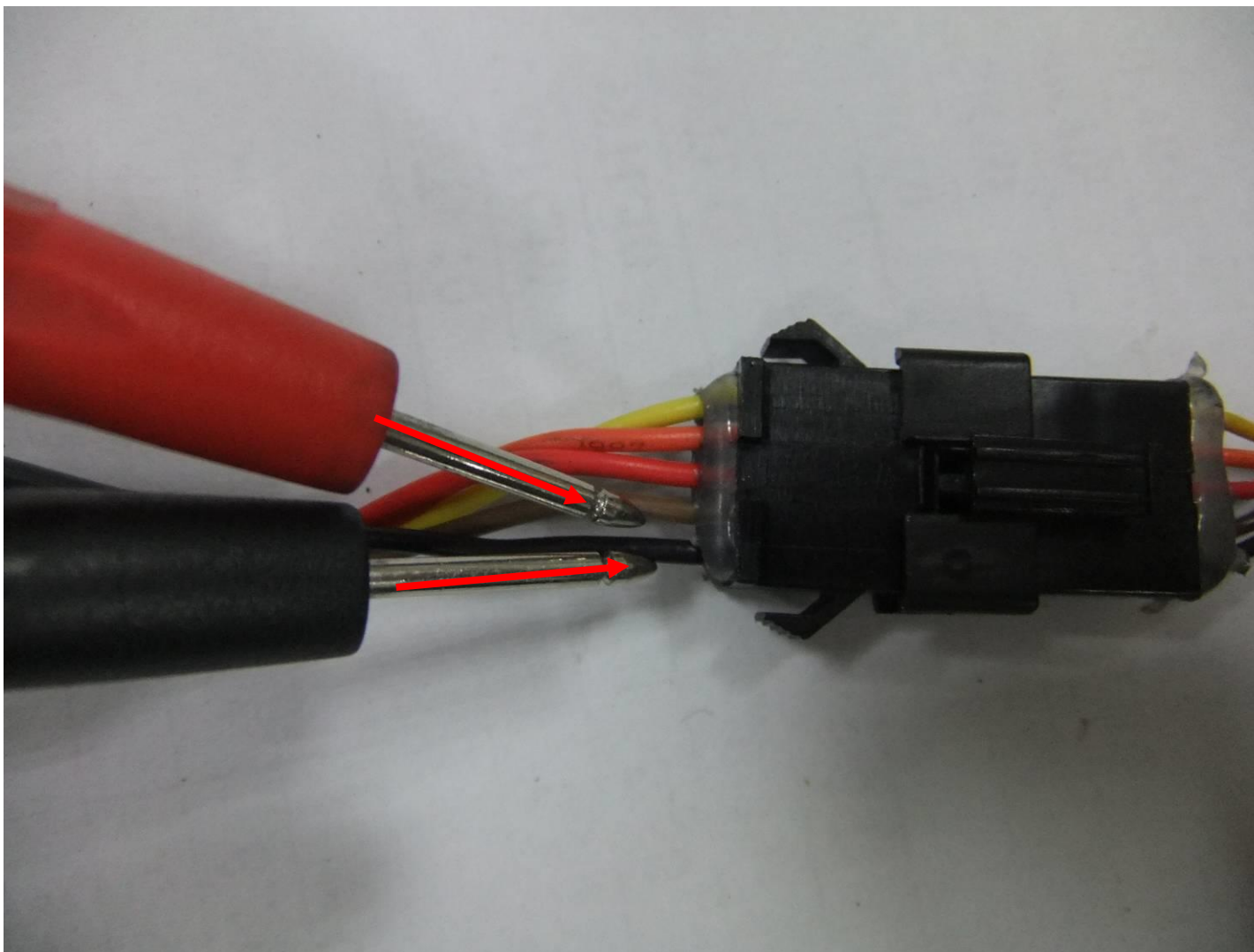
Part	Description
Display	Key signal travels to the display. The main program IC then sends a command signal to the drive board.
Drive Board	Drive board receives the signal and responds by putting out power to the motor. Level UP:+5VDC;Level DOWN:-5VDC

● Tension Motor Troubleshooting

Part	Description
Display	If the key beeps when pressed, assume that the signal was sent.
Data cable	Inspect the cable and connections.
Drive Board	Inspect drive board power output to the motor. Press the Level Up is +5VDC; Level DOWN is -5VDC.If there is power to the motor, but the motor does not operate, replace it. If there is no power output, inspect whether the drive board has power.

● Tension Motor Voltage Test Procedure

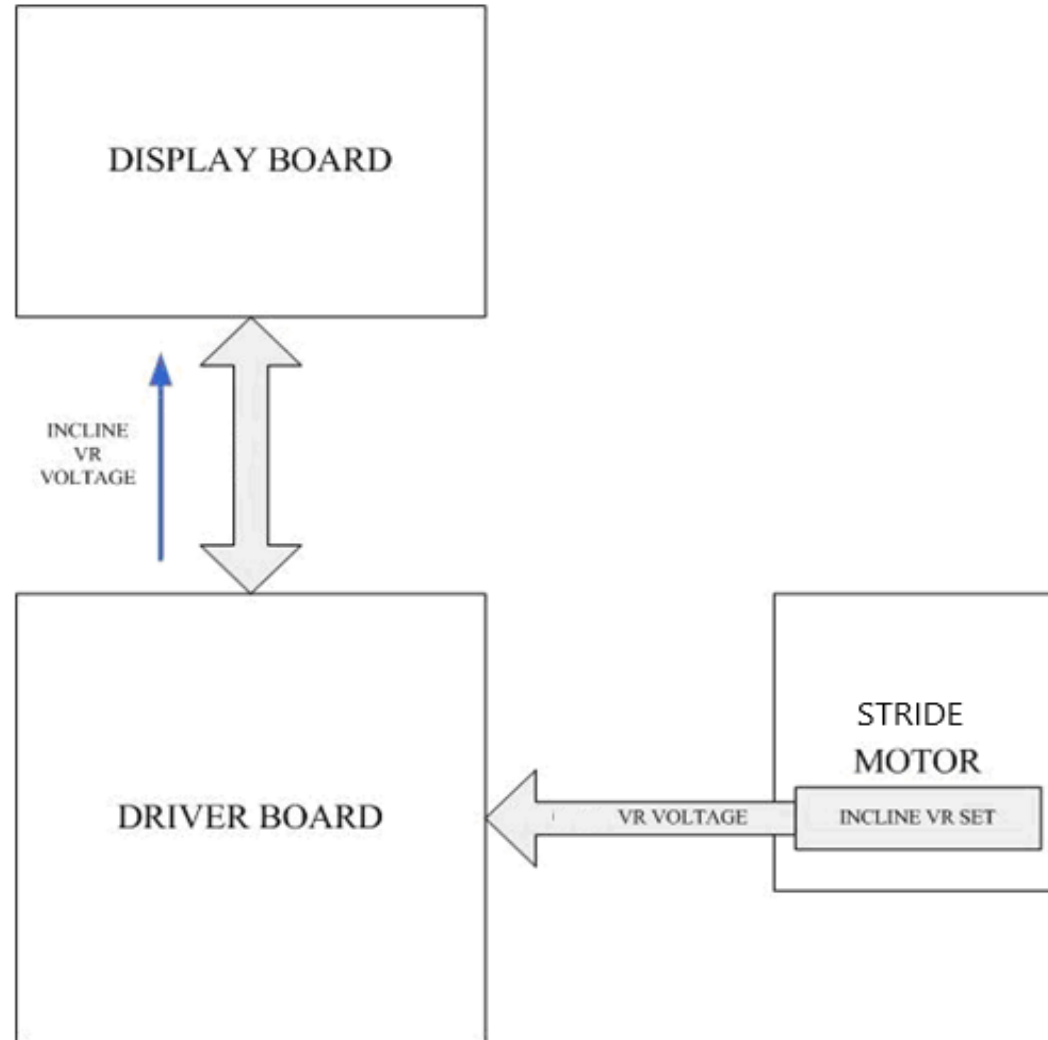
1. Put multi-meter to the 20VDC setting. Place probes on the motor control wire (Red probe in blue wire, Black probe in green wire) on the drive board.
2. Turn on unit power. The display lights up.
3. Press LEVEL UP. Normal reading: +5~6.0VDC.Motor operates. Resistance increases.
4. Press LEVEL DOWN. Normal reading: -5~6.0VDC.Motor operates. Resistance decreases.
5. If there is no voltage, inspect power socket the holder FUSE. If broke replace it.
6. Inspect the drive board POWER LED whether lit. If no lit the drive board is bad. Replace it.



Place probes on the motor control wire (Red probe in palm wire, Black probe in black wire)

8-3 Error Message : - - -

- Definition : The console board is not detecting the VR voltage value, or the voltage value has exceeded the range.”- - -” appears on the STRIDE WINDOW.
- Configuration :



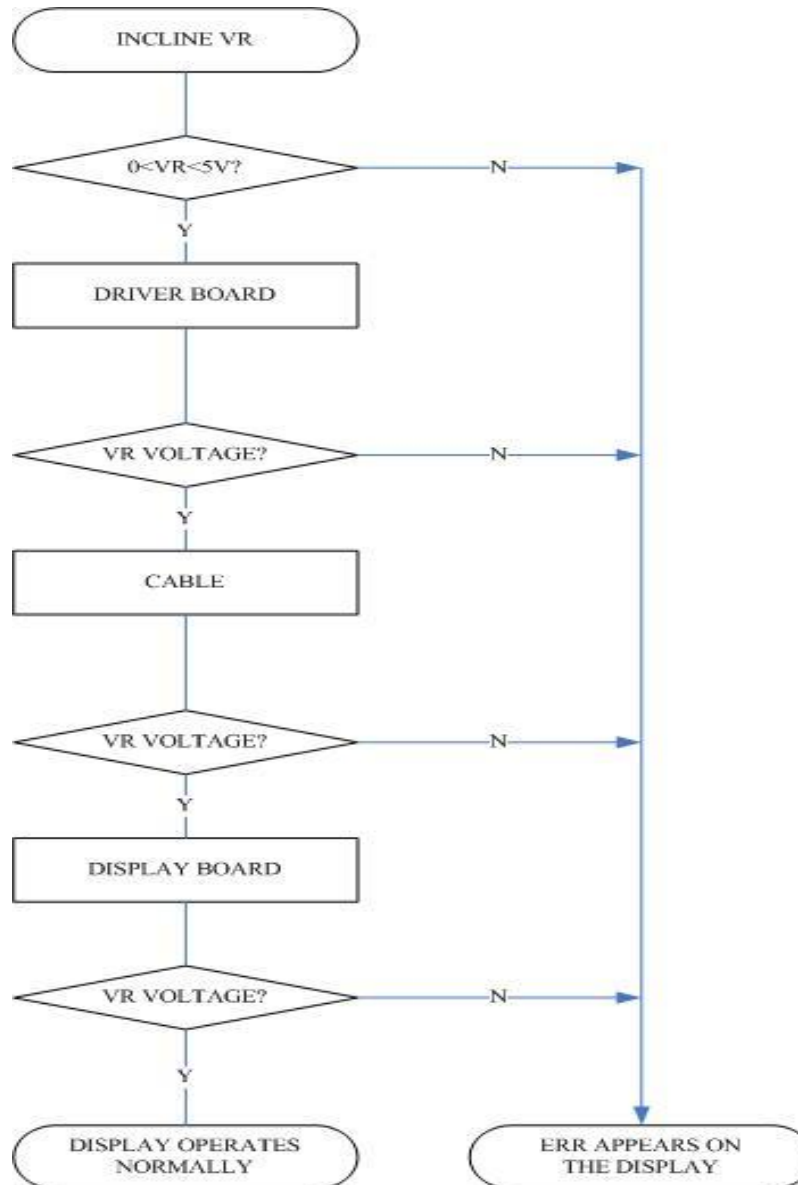
- Case of STRIDE ERROR

- Stride VR value exceeds the range. --- appears on the display.

- ◆ Stride motor isn't operation up or down, making the VR value exceed the range.

- ◆ After turning on the unit, the display board detects that the stride VR voltage exceeds the range, so --- appears.

- ◆ Action Flow Chart

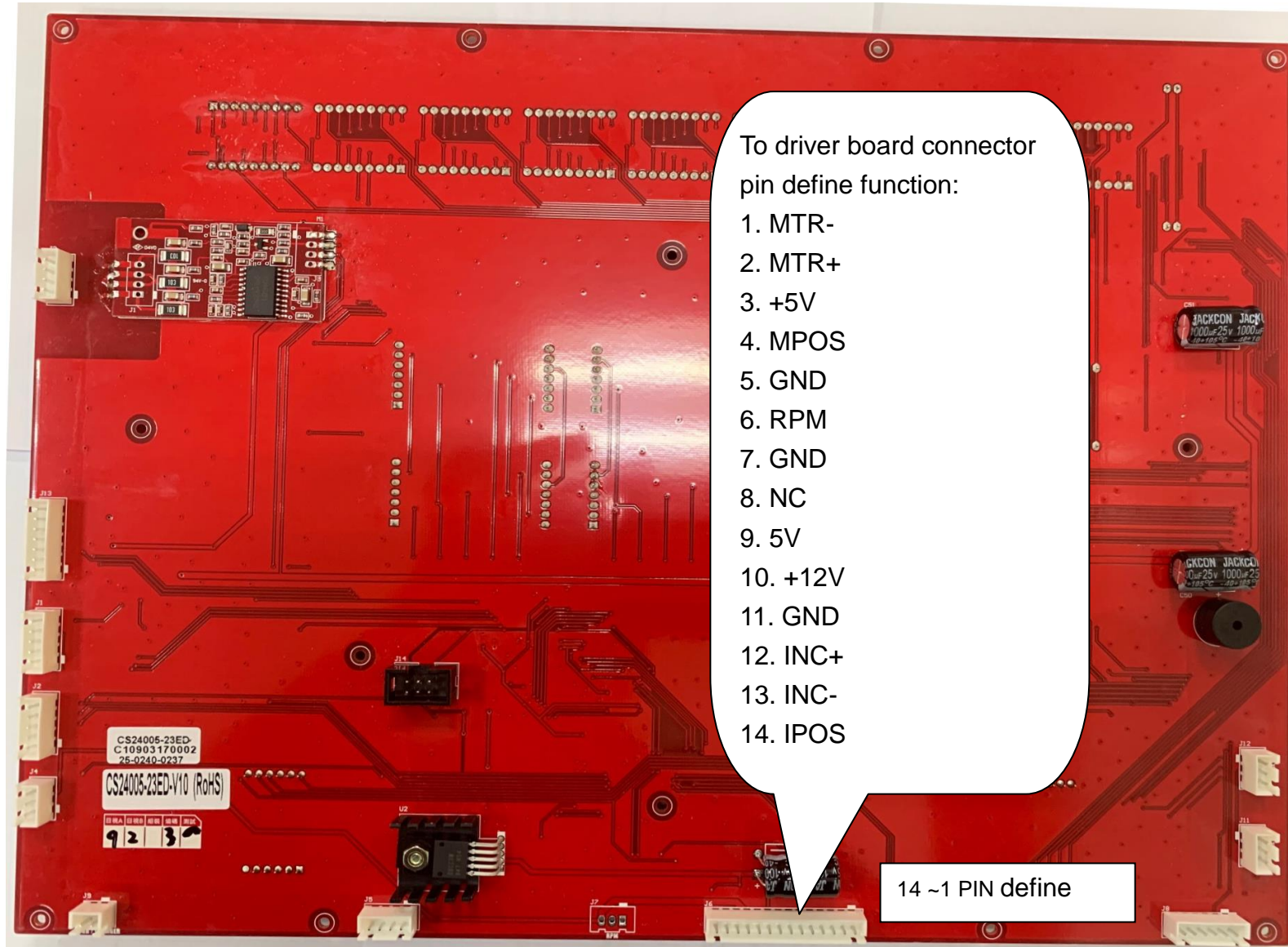


● Troubleshooting

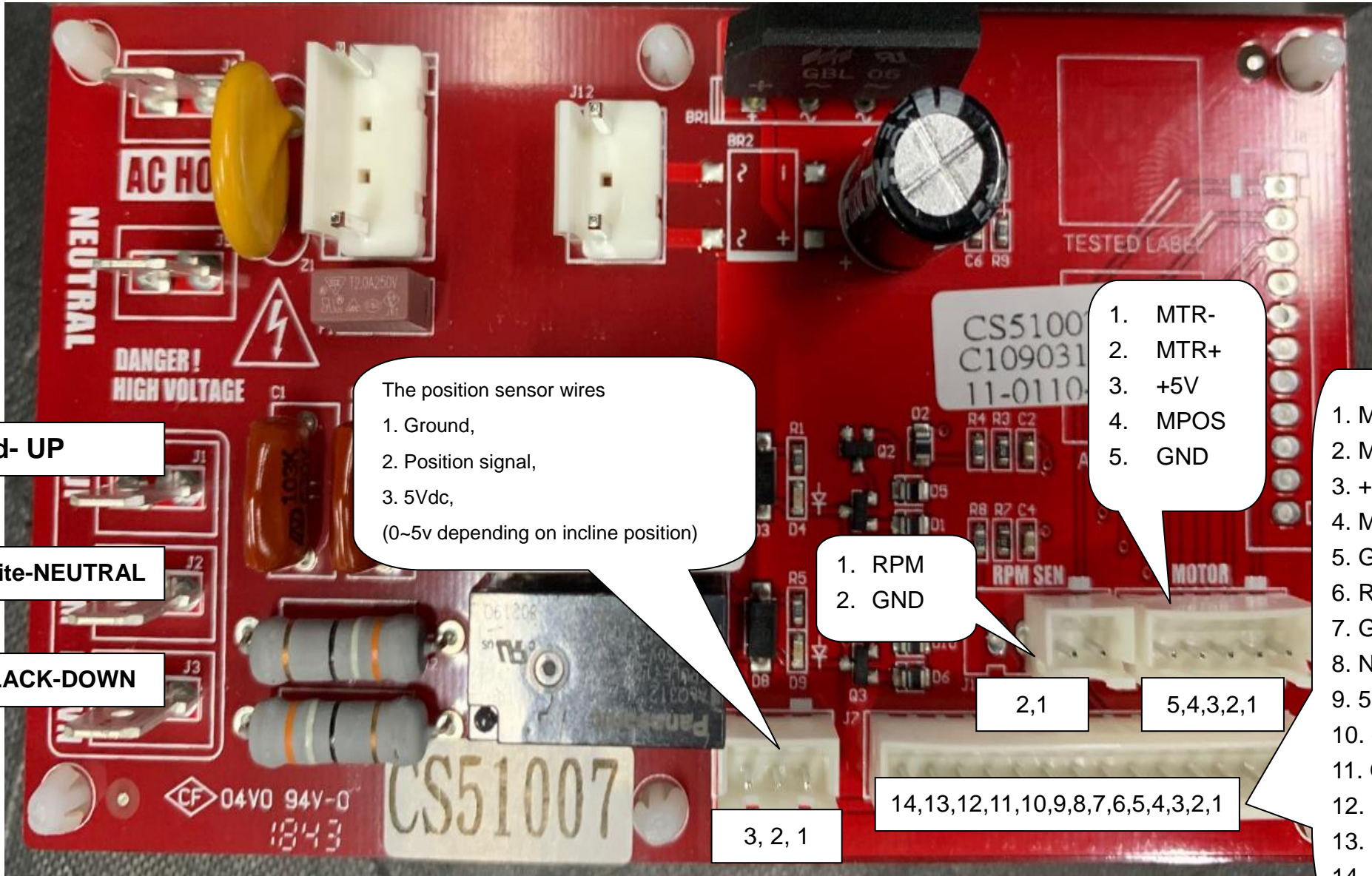
Part	Troubleshooting
Stride VR	<ol style="list-style-type: none">1. Reconnect VR wires.2. Inspect whether the stride wires are broken or disconnected.
Display board	<ol style="list-style-type: none">1. Inspect the stride wire and 14-pin cable connections.2. Test whether the VR voltage varies at the stride wire terminal.
14-pin cable	<ol style="list-style-type: none">1. Inspect the wire connections.2. Inspect whether wires are broken or crimped.3. Replace the wires and test again.
Driver board	Inspect the display board 14-pin connections.

- Test configuration.

The console to driver board connector pin define function



Stride motor control function relate parts location



Red- UP

White-NEUTRAL

BLACK-DOWN

The position sensor wires
 1. Ground,
 2. Position signal,
 3. 5Vdc,
 (0-5v depending on incline position)

1. RPM
 2. GND

1. MTR-
 2. MTR+
 3. +5V
 4. MPOS
 5. GND

1. MTR-
 2. MTR+
 3. +5V
 4. MPOS
 5. GND
 6. RPM
 7. GND
 8. NC
 9. 5V
 10. +12V
 11. GND
 12. INC+
 13. INC-
 14. IPOS

3, 2, 1

14,13,12,11,10,9,8,7,6,5,4,3,2,1

2,1

5,4,3,2,1

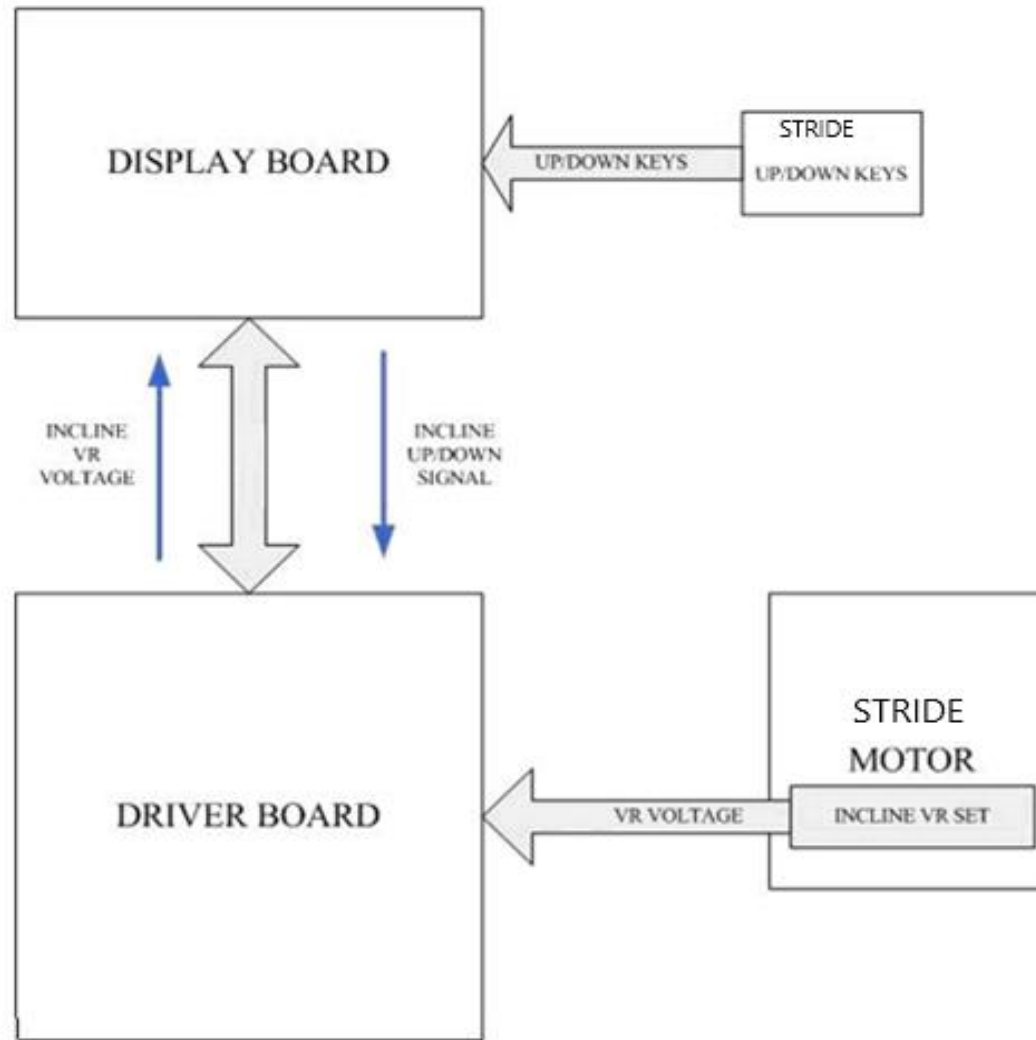
Test Procedure :

1. Run calibration again.
2. Does the stride motor move at all?
3. If no, do the Up/down lights on the stride board light?
4. If they light, do the relays click on?
 - ◆ If the relay clicks on but the motor doesn't move: with the stride light and relay activated check the voltage between the neutral (white) wire and the Up (red) or down (black) wire, depending on which direction the motor is supposed to travel according to Up/Down lights on the board. It should be about the same as the mains voltage ~ 115VAC. If the voltage is present but the motor doesn't move, then the motor is bad.
 - ◆ If the light is on, but the relay does not click on then the stride board needs to be replaced (Bad relay most likely).
5. If the motor moves, is there a sensor reading on console?
 - ◆ The STRIDE window will display the computer stride setting (after speed cal. ends); 20 for max stride, 0 for lowest stride. The Stride window is a counter that is showing the actual position sensor output. If the motor is moving and there is no count occurring in the Stride window then there is a problem in the position sensor wiring or circuitry.
 - ◆ If there is a count, but the calibration fails then the position sensor (Potentiometer) could be loose, creating false readings (should not be able to rotate). Remove the cover from the rear of the motor and grab the potentiometer and see if it is loose. Check the two Phillips screws holding it to the motor casting. If it still feels loose the nut holding the potentiometer to its black mounting bracket could be loose. If everything is tight then the potentiometer could be bad.
 - ◆ If there is no count then check the voltage at the potentiometer. There should be 5vdc between the black and red wire and there should be a voltage between the red and white wire. This voltage will be about 4.5~4.7 Vdc when the motor is at the lowest position (the number isn't too critical, as long as it's somewhere in this neighborhood). If there is a voltage at the white wire, and the voltage changes as the motor moves, but the counter still does not register then there may be a bad wire connection between the potentiometer and the console.
6. Check the voltage from the potentiometer at the 3-pin connector on the stride board. If there is no voltage then the wire from the motor to the connector is faulty.
7. If there is a voltage, check at the output connector to the console at the bottom of the stride board. If no voltage present then there is a problem on the stride board. There are no electronic components on the board for this signal; there are just circuit connections from the potentiometer connector to the console connector. The only problems that are possible are a bad solder joint or broken circuit on the board.
 - ◆ Console connector wiring, these connections are the same on the stride board and at the console.
 - Pin 3 = 5vdc
 - Pin 2 = position signal 0~5vdc
 - Pin 1 = ground
8. If there is voltage at the output connector to the console then check the voltage at the console. If there is no voltage there, but is there at the stride board then check the entire cable from stride board to console for cuts or bad connection at the inline connectors.
9. If there is voltage at the console connector, but no count in Stride window when motor is moving then there is a problem with the console.

Error Message : ---

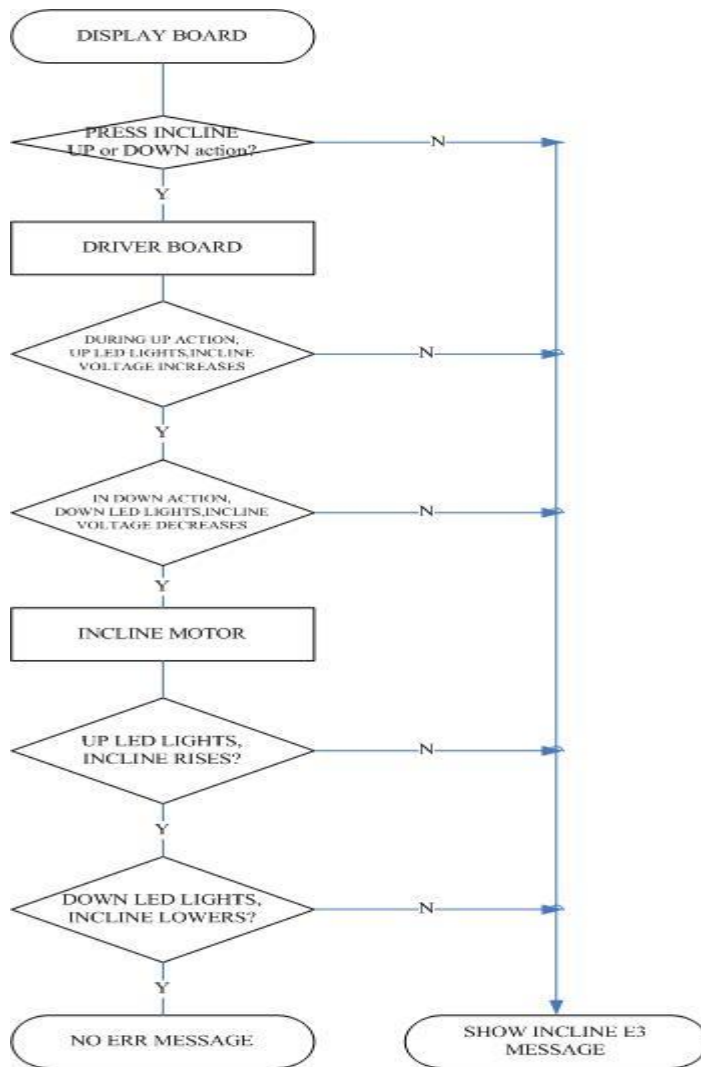
Definition : During stride action, the display board CPU cannot read the VR value, so - - - appears on STRIDE window.

Configuration :



Cause of “- -“on STRIDE window

- Press the stride UP/DOWN key. The stride doesn't operate. --- appears on the display.
 - ◆ Explanation
 - Press the stride UP and DOWN key. The stride operates, moving the VR, which changes the VR value.
 - The display board CPU reads the stride VR value. If there is no VR value change, to the CPU, the stride is not operating when it should be --- appears on the display.
 - ◆ Action Flow Chart

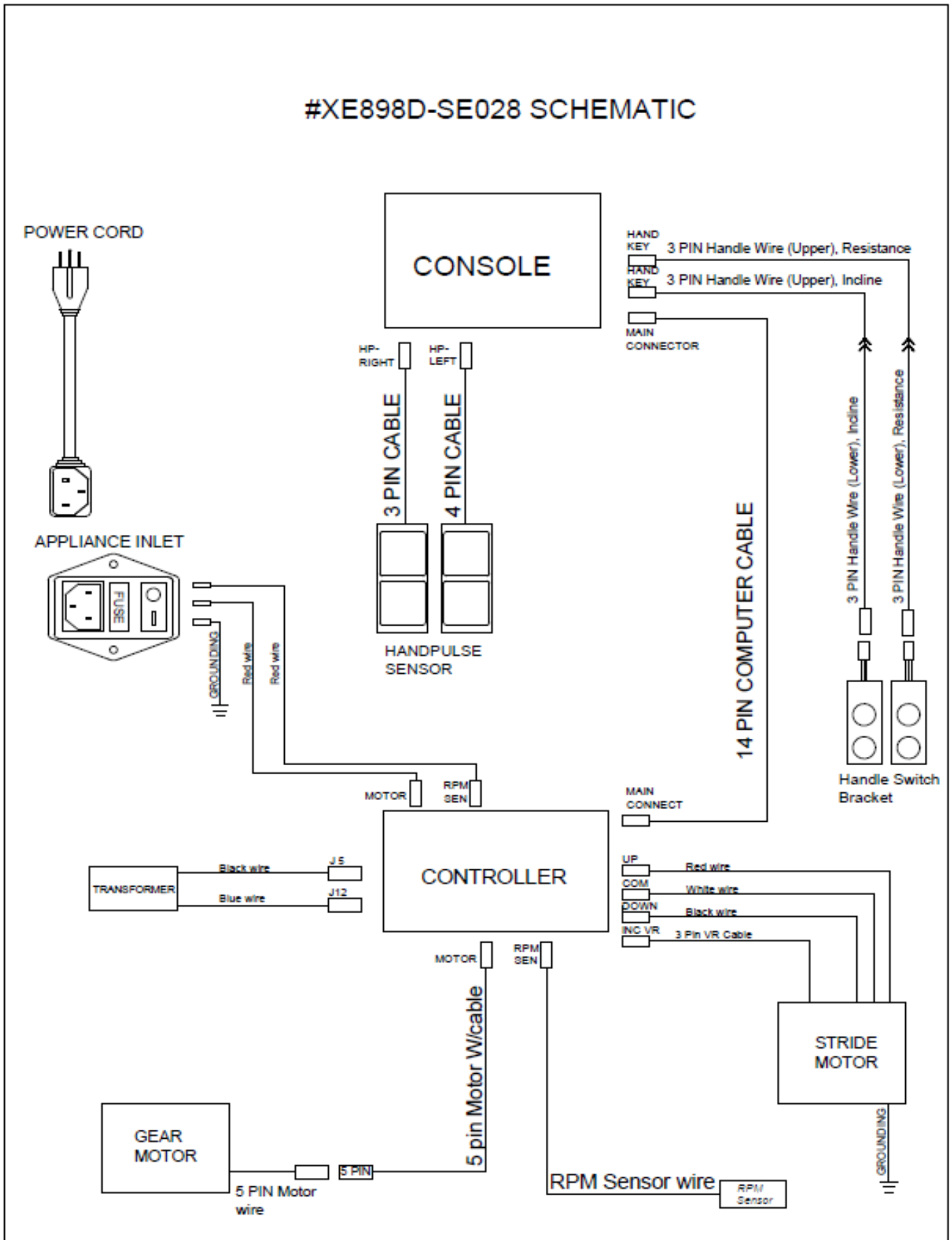


Troubleshooting

Part	Troubleshooting
Display board	1. Inspect the cable and connections.
14-pin cable	1. Inspect whether the 14-PIN cable is connected well. 2. Test by replacing the cable with a good one.
Driver board	1. Press stride UP or DOWN key again, making the stride motor return to its position. 2. If --- still appears, re-calibrate the stride set.
Stride motor	1. Inspect whether the stride motor is stuck. 2. Inspect whether the stride gears are cracked. 3. Test whether the stride motor has a broken circuit. 4. Re-calibrate the stride set.

8.4 CIRCUIT DIAGRAM

#XE898D-SE028 SCHEMATIC



8.5 CALIBRATION PROCEDURE

Stride Calibration:

If there is a problem with the stride function, try running the calibration. Press the STRIDE up key and the START key at the same time. Hold them down for 5 seconds and the Stride calibration will start and run automatically. If the problem persists contact service department.

MAINTENANCE MENU IN CONSOLE SOFTWARE

The console has built in maintenance/diagnostic software. The software will allow you to change the console settings from English to Metric and turn off the beeping of the speaker when a key is pressed for example. To enter the Maintenance Menu (may be called Engineering Mode, depending on version) press and hold down the **Start**, **Stop** and **Enter** keys keep holding the keys down for about 5 seconds and the **Message Window** will display "Engineering Mode". Press the **Enter** button to access the menu below. Press the **Level** ▲/▼ keys to navigate the menu.

- a. Key Test- Will allow you to test all the keys to make sure they are functioning.
- b. Display Test-Tests all the display functions.
- c. Functions -Press Enter to access settings and Up arrow to scroll.
 - I. Unit (Press enter to select ENGLISH or METRIC).
 - II. Pause Mode (Turn on allow 5 minutes of pause, turn off to have the console pause indefinitely).
 - III. ODO Reset (Resets the odometer).
 - IV. Beep (Turns off the speaker so no beeping sound is heard).
 - V. Use CSAFE protocol (Reservation)
 - i. Use CAB protocol (Reservation)
- d. Service- (Factory test)
 - I. Motor Test
 - II. Stride Test
 - III. Sensor Test
 - IV. CSAFE Test
- e. Exit

8-6 Fuse replacement



If your elliptical loses power or will not start, check the fuse located on the motor controller.

DANGER: Turn the power switch off and unplug the elliptical to reduce the risk of an electric shock

Remove FUSE holder.

Remove and replace the fuse on the holder

8-7 Troubleshooting procedure matrix

Condition	Reason	Solve
LED not bright, incomplete or imperfect.	<ol style="list-style-type: none"> 1. LED light is broken. 2. Power to console too low. 	<ol style="list-style-type: none"> 1. Replace with new LED or console. 2. Check AC power is 110-120V. 3. Check power to console. 4. Replace lower controller.
LED displays not bright, incomplete or imperfect.	<ol style="list-style-type: none"> 1. LED displays are broken. 	<ol style="list-style-type: none"> 1. Replace with new console.
The stride position doesn't match console	<ol style="list-style-type: none"> 1 Console is not calibrated. 	<ol style="list-style-type: none"> 1 Calibrate the console.
STRIDE ERR, STRIDE window displays "--".	<ol style="list-style-type: none"> 1 Position sensor value of stride motor is wrong. 	<ol style="list-style-type: none"> 1 Turn off the AC switch and turn on power again. 2. Calibrate the monitor.
Erratic pulse display.	<ol style="list-style-type: none"> 1. Another chest belt in use around Ellipitcal. 2. Other magnetic field disturbance. 3. Receiver is broken. 	<ol style="list-style-type: none"> 1. Check for other chest belt use around elliptical. 2. Change the position or direction of elliptical. 3. Replace with new receiver.
<p>UP/DOWN button of STRIDE ADJUSTMENT SWITCH can't be used.</p> <p>Stride button just can press UP, can't press DOWN.</p> <p>Stride button just can press DOWN, can't press UP.</p>	<ol style="list-style-type: none"> 1 The connector of STRIDE CABLE and CONSOLE not connected properly. 2. The connector of STRIDE CABLE and STRIDE ADJUSTMENT SWITCH W/CABLE not connected properly. 3 The connector of STRIDE CABLE or STRIDE ADJUSTMENT SWITCH CABLE got damage. 4. Button of STRIDE ADJUSTMENT SWITCH is broken. 5. The connector of STRIDE CABLE or STRIDE ADJUSTMENT SWITCH CABLE got damage. 6. The connector of STRIDE CABLE or STRIDE ADJUSTMENT SWITCH CABLE damaged. 	<ol style="list-style-type: none"> 1 Connect the wires again. 2. Connect the wires again. 3. Replace the cable. 4. Replace buttons. 5. Replace the cable. 6. Replace the cable.
Hand pulse lost its function. (No pulse displayed on monitor)	<ol style="list-style-type: none"> 1. Hands not on the hand pulse sensors or only one hand on sensor. 	<ol style="list-style-type: none"> 1. Two hands hold the hand pulse.

	<ol style="list-style-type: none"> 2. The connector of HANDPULSE W/WIRE and Console not connected properly. 3. The wires got damaged when connecting the HANDPULSE W/WIRE and Console. 4. Hand pulse board is broken. 	<ol style="list-style-type: none"> 2. Connect the cable again. 3. Replace with new cable. 4. Replace console or Hand pulse board.
Wireless lost its function. (No pulse displayed on monitor)	<ol style="list-style-type: none"> 1. Chest belt not worn properly. 2. Distance is too far and exceeds range of receiver. 3. Chest belt battery is weak or dead. 	<ol style="list-style-type: none"> 1. Check chest belt has proper contact with skin and is oriented correctly. 2. User chest belt in front of console within 3 feet. 3. Replace with new lithium battery type is <u>CR2032</u>.
Chest belt too close to the Ellipitcal.	Weak battery.	Replace with new lithium battery with type <u>CR2032</u> .