CS800(2020)

Service Manual

dyaco

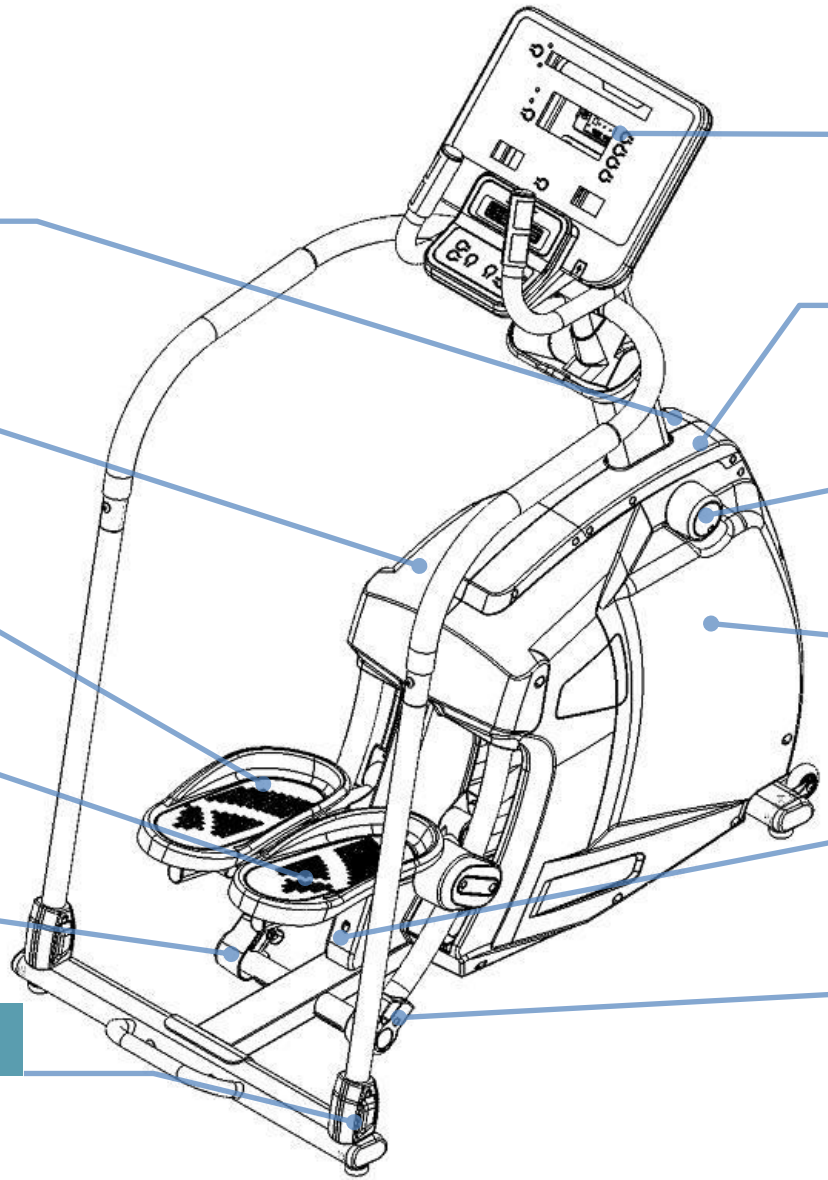
Service Manual

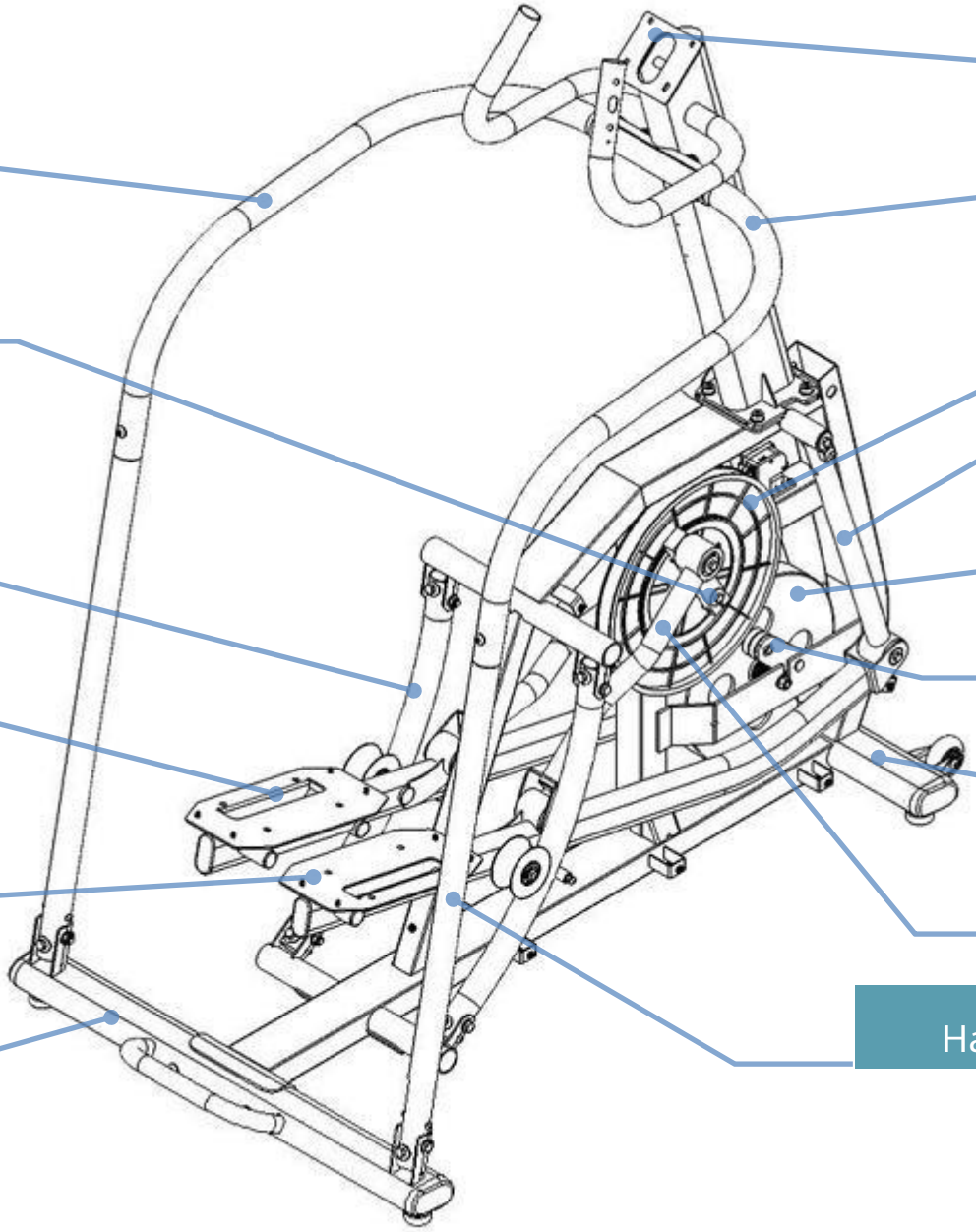
Table of Contents

1. CS800(2020) Outlines 3
2. CS800(2020) Electronic Parts 6
    2-1 Upper Controllers 7
    2-2 Lower Controller and Driver 8
3. Electrical Configurations 9
4. CS800(2020) Product Operation 11
    4-1 Display Windows 12
    4-2 Operation 13
        4-2-1 POWER 13
        4-2-2 QUICK START 13
        4-2-3 BASIC INFORMATION 13
        4-2-4 1/4 MILE TRACK 14
        4-2-5 HEART RATE WINDOW 14
        4-2-6 PROGRAMMABLE FEATURES 14
        4-2-7 CSAFE FEATURE 14
5. CS800(2020) Unit Block Diagrams 16
6. CS800(2020) Basic Connections and Wiring 18
    6-1 Display Board PCB Component Locations 19
        6-1-1 DISPLAY BOARD WIRE CONNECTIONS 19
        6-1-2 PCB BOARD TOP 20
        6-1-3 PCB BOARD BOTTOM 21
        6-1-4 THE CONSOLE INTERFACE BOARD WIRE CONNECTIONS 22
        6-1-5 GENERATOR FLYWHEEL DEFINITION FUNCTION 23
7. CS800(2020) Error Messages / Troubleshooting 24
    7-1 Error Codes 25
    7-2 Prepare tools 25
    7-3 Error Message：EEPROM ERROR 26

7-4 Error Message：Err 26
7-4-1 TENSION MOTOR OPERATION 27
7-4-2 TENSION MOTOR TROUBLESHOOTING 28
7-4-3 TENSION MOTOR VOLTAGE TEST PROCEDURE 29
7-5 Test configuration and the console to driver board connector pin define function 30
7-6 MAINTENANCE MENU IN CONSOLE SOFTWARE 31
7-7 Troubleshooting procedure matrix 32
8. Circuit diagram(CS800(2020)) 33
9. Troubleshooting(CS800(2020)) 35
9-1 Troubleshooting for the console 36
9-2 Troubleshooting for the Flywheel 37
9-3 Troubleshooting for Drive Belt 38
9-4 Troubleshooting for Swing Assembly 39
9-5 Troubleshooting for Connecting Arm 40
10. Parts Replacement Guide 41
10-1 Console Replacement 42
10-2 Chain Cover Replacement 43
10-3 Swing Assembly Replacement 46
10-4 Linked Assembly Replacement 48
10-5 Connecting Arm Replacement 49
10-6 Console Mast Replacement 50
10-7 Rail Tube Replacement 51
10-8 Crank Arm Assembly Replacement 52
10-9 Idle Wheel Assembly Replacement 53
10-10 Flywheel and Drive Belt Replacement 55

1. CS800(2020) Outlines


Console
Console Mast Cover (R)
Chain Cover (L)
Handle Bar Cover (R)
Pedal (L)
Chain Cover (R)
Pedal (R)
Rear Side Case
Left Slider Cover
Right Slider Cover
Handgrip CapCover (L) & (R)


Left Handgrip
Crank Arm Assembly
Rail Tube
Connecting Arm (L)
Connecting Arm (R)
Rear Stabilizer
Console Mast
Right Handgrip
Drive Pulley
Swing Assembly
Flywheel
Idler Wheel Assembly
Main Frame
Linked Assembly (R)
Handgrip Connecting Tube

2. CS800(2020) Electronic Parts

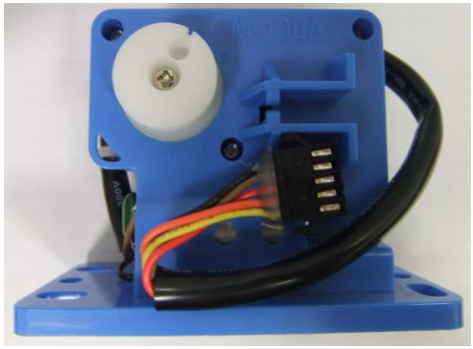
2-1 Upper Controllers

Console

Cooling Fan

2-2 Lower Controller and Driver

Tension Motor



Speed Sensor

3. Electrical Configurations

Part Name	Part Description
Console	Interface that controls all functions of the Stepper.
MAIN CONTROLLER	The circuit board consist of the DC power supply for console.
ECB BRAKE	It can change to increase or decrease resistance level of brake.

GENERAL INFORMATION	
CONSOLE	Contains Key controls and LED Display. Main controller include power supply、ECB driver control circuit.

4. CS800(2020) Product Operation

4-1 Display Windows

4-2 Operation

4-2-1 POWER

When the AC power cord is connected to the Stepper, the console will automatically power up. When initially powered on the console will perform an internal self-test. During this time all the lights will turn on. When the lights go off, the Message Center will show the software version (i.e.: VER 1.0). The message window shows the total hours of use and total ksteps. The odometer will remain displayed for only a few seconds then the console will go to the start up display. The dot matrix display will be scrolling through the different profiles of the programs and the Message Center will be scrolling the start up message. You may now begin to use the console.

4-2-2 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 Level Up and Down buttons. The dot matrix display will show just the bottom row lit. As you increase the workload more rows will light indicating a harder workout. The Stepper will get harder to pedal as the rows increase. The dot matrix 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 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 de-conditioned users. Levels 6-10 are more challenging, but the increases in resistance from one level to the next remain small. Levels 11-15 start getting tough as the levels jump more dramatically. Levels 16-20 are extremely difficult and are good for short interval peaks and elite athletic training.

4-2-3 BASIC INFORMATION

The Dot Matrix, or Profile Window, will display the workout Profile. The Message window displays pertinent exercise data. There is a Strides Per Minute window for pedal speed and a Level window indicating machine resistance.
The Message Window will initially be displaying Steps ,Calories ,Pulse and Time Elapsed information. When the Scan key (△▽) is pressed the next set of information will appear: Vertical Distance ,Watts ,METs and Time Remaining. Pressing the Scan button, the Scan mode is activated and the Message Window will show each set of data for four seconds then switch to the next set of data in a continuous loop. Pressing the 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.

4-2-4 1/4 MILE TRACK

The 1/4-mile track (0.4 km) will be displayed around the dot matrix window. The flashing dot indicates your progress. In the center of the track there is a lap counter for reference.

4-2-5 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. You may use the Grip Pulse feature while in Heart Rate Control. The CS800 will also pick up wireless heart rate transmitters that are Polar compatible, including coded transmissions.

4-2-6 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. 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 work 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.

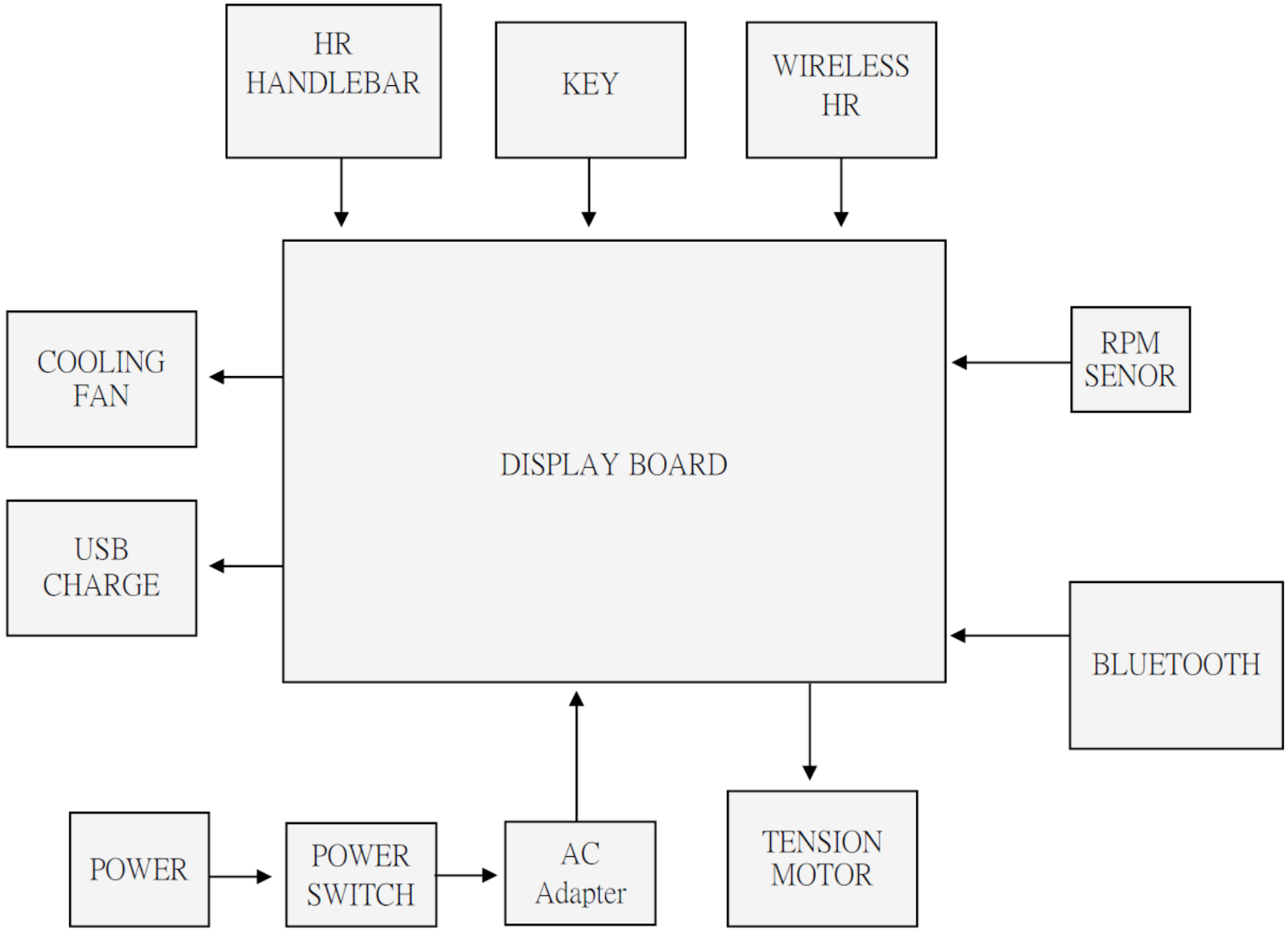
4-2-7 CSAFE FEATURE

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.

4-2-8 TO TURN STEPPER OFF

The display will automatically turn off (go to sleep) after 30 minutes of inactivity. This function is called sleep mode. In sleep mode, the stepper will power down most everything except for a minimum of circuitry for detecting button presses and the safety button so it will start up again if these are activated. There is only a tiny amount of current used in sleep mode (about the same as your TV when it is turned off) and it is perfectly fine to leave the main power switch on in sleep mode. Of course you may also remove the safety
button or turn off the main power switch to power down the stepper.

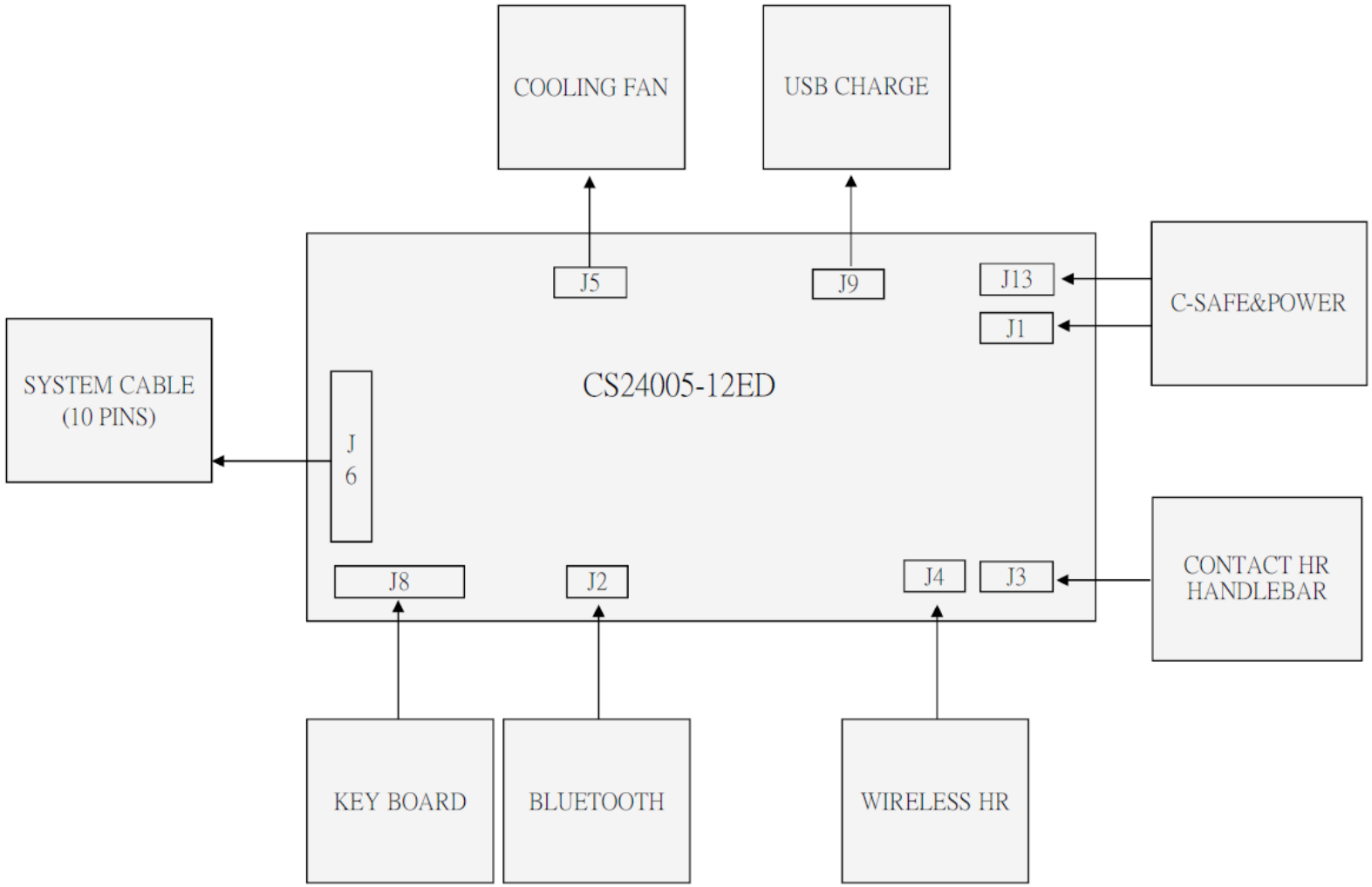
5. CS800(2020) Unit Block Diagrams


HR
HANDLEBAR
KEY
WIRELESS
HR
COOLING
FAN
DISPLAY BOARD
RPM
SENOR
USB
CHARGE
BLUETOOTH
POWER
POWER
SWITCH
AC
Adapter
TENSION
MOTOR

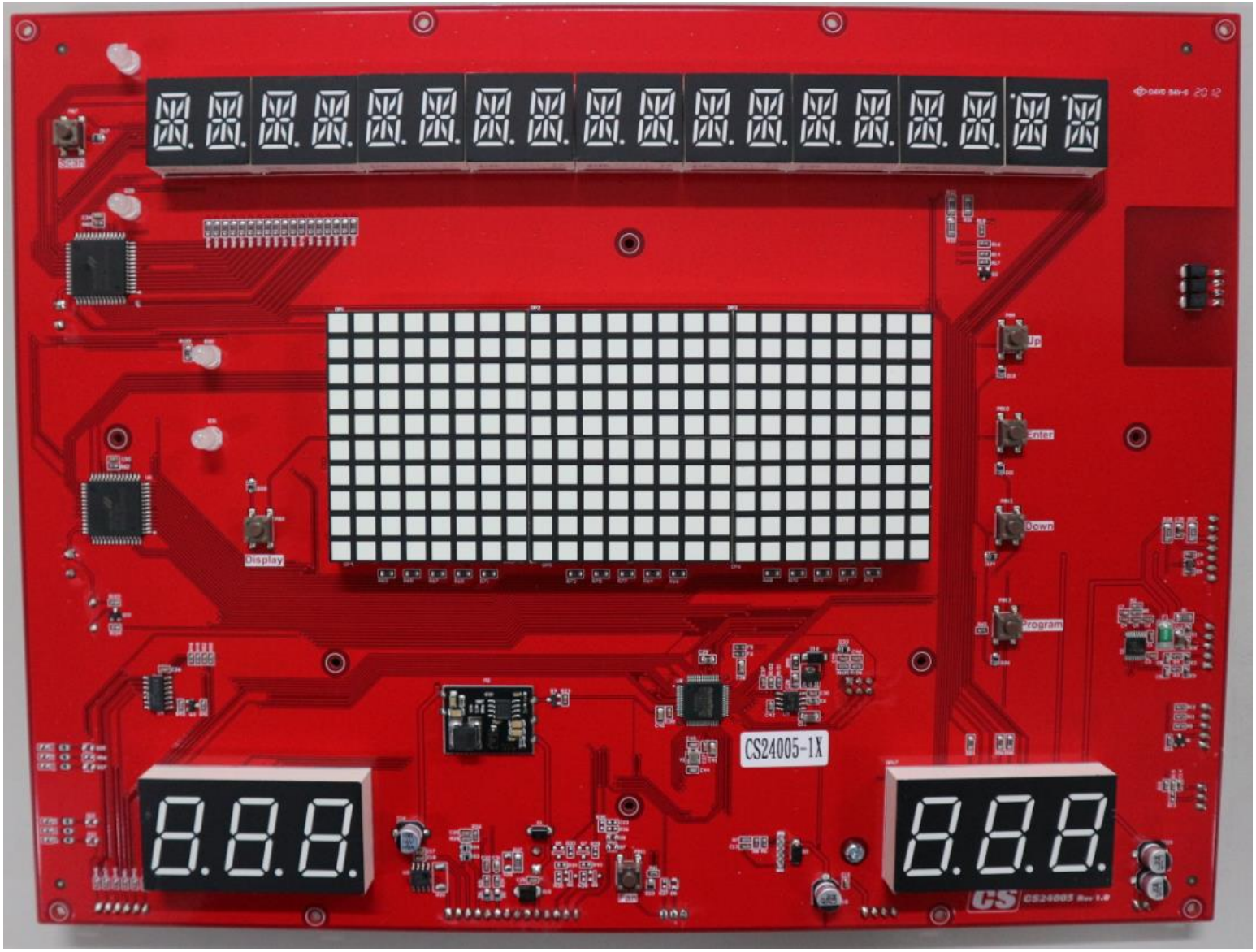
6. CS800(2020) Basic Connections and Wiring

6-1 Display Board PCB Component Locations

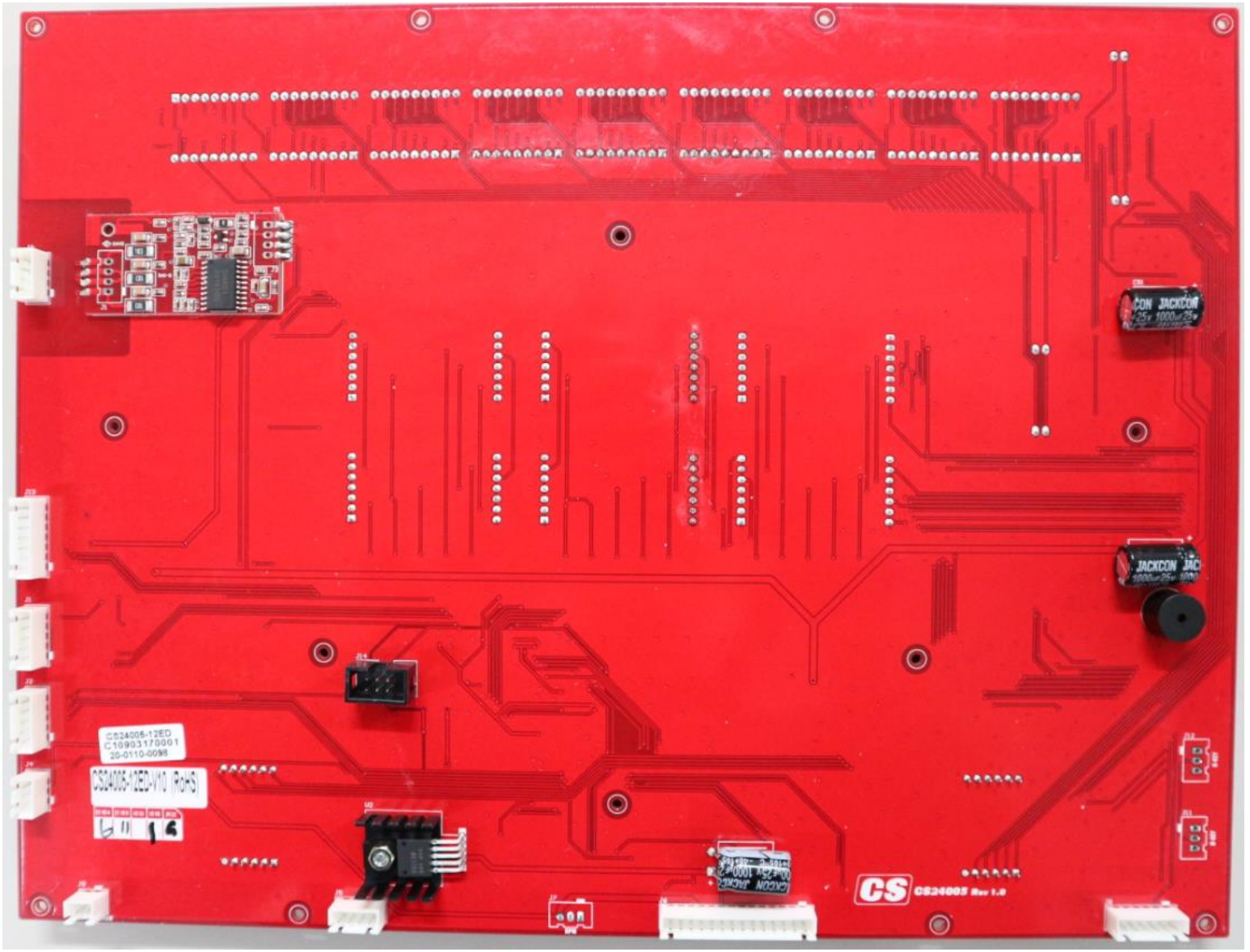
6-1-1 DISPLAY BOARD WIRE CONNECTIONS



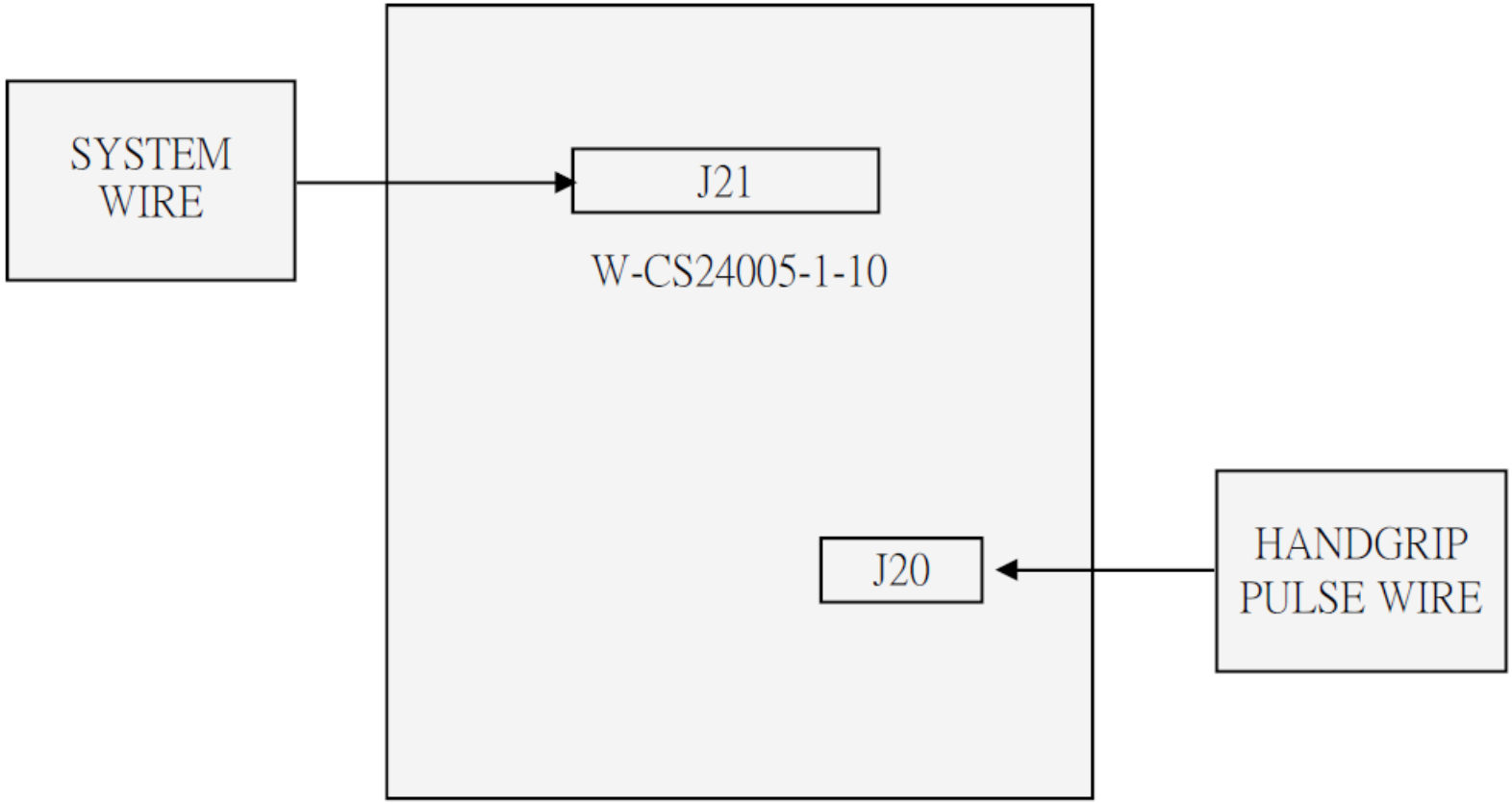
6-1-2 PCB BOARD TOP



6-1-3 PCB BOARD BOTTOM

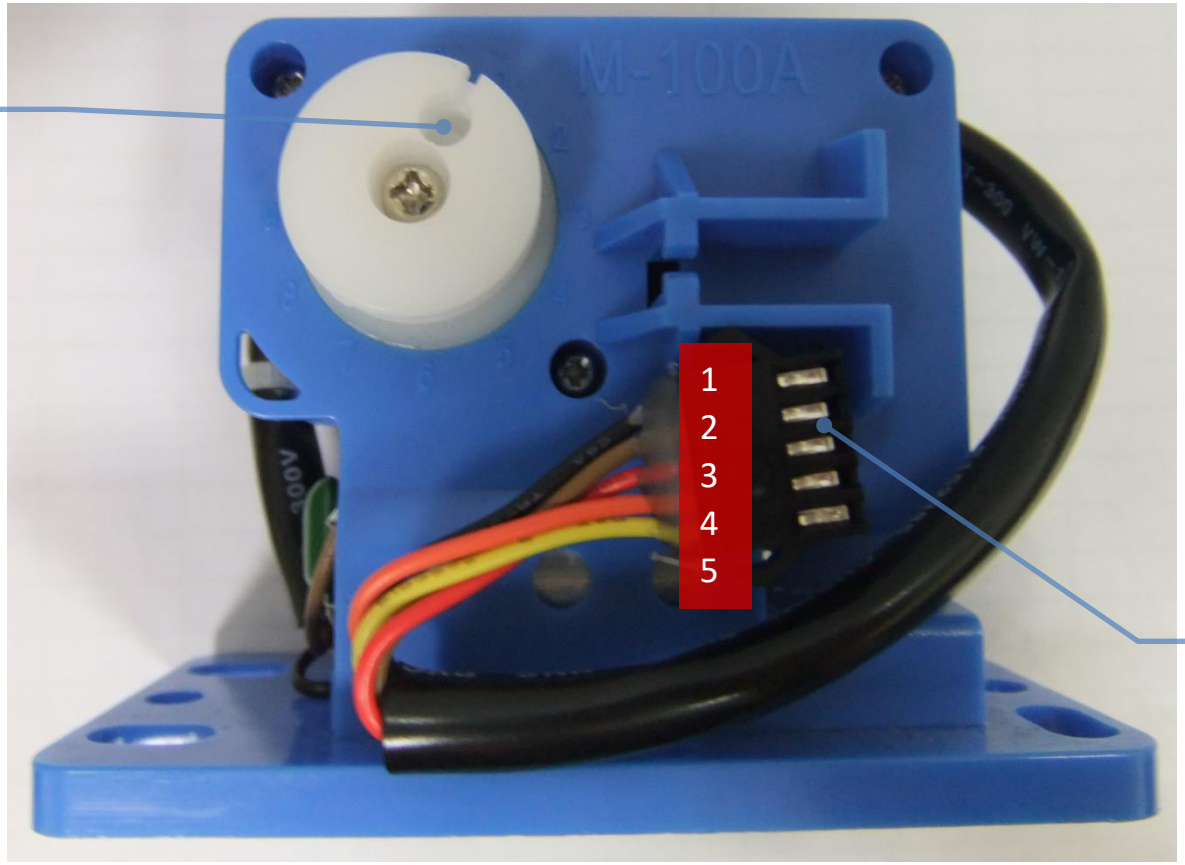


6-1-4 THE CONSOLE INTERFACE BOARD WIRE CONNECTIONS



6-1-5 GENERATOR FLYWHEEL DEFINITION FUNCTION

STEEL ROPE



MAIN CONTROL

1. M-
2. M+
3. +5
4. VR
5. GND

7. CS800(2020) Error Messages / Troubleshooting

7-1 Error Codes

Error Code	CAUSE
EEPROM ERROR	EEPROM failure
Err	Tension Motor failure

7-2 Prepare tools

Multi-meter

7-3 Error Message：EEPROM ERROR

Definition

When EEPROM is defective or has memory access problems, the console will shut all display windows off and stop all the outputs. The Main Window will show “EEPROM ERROR”.

Troubleshooting

The console requires replacement.

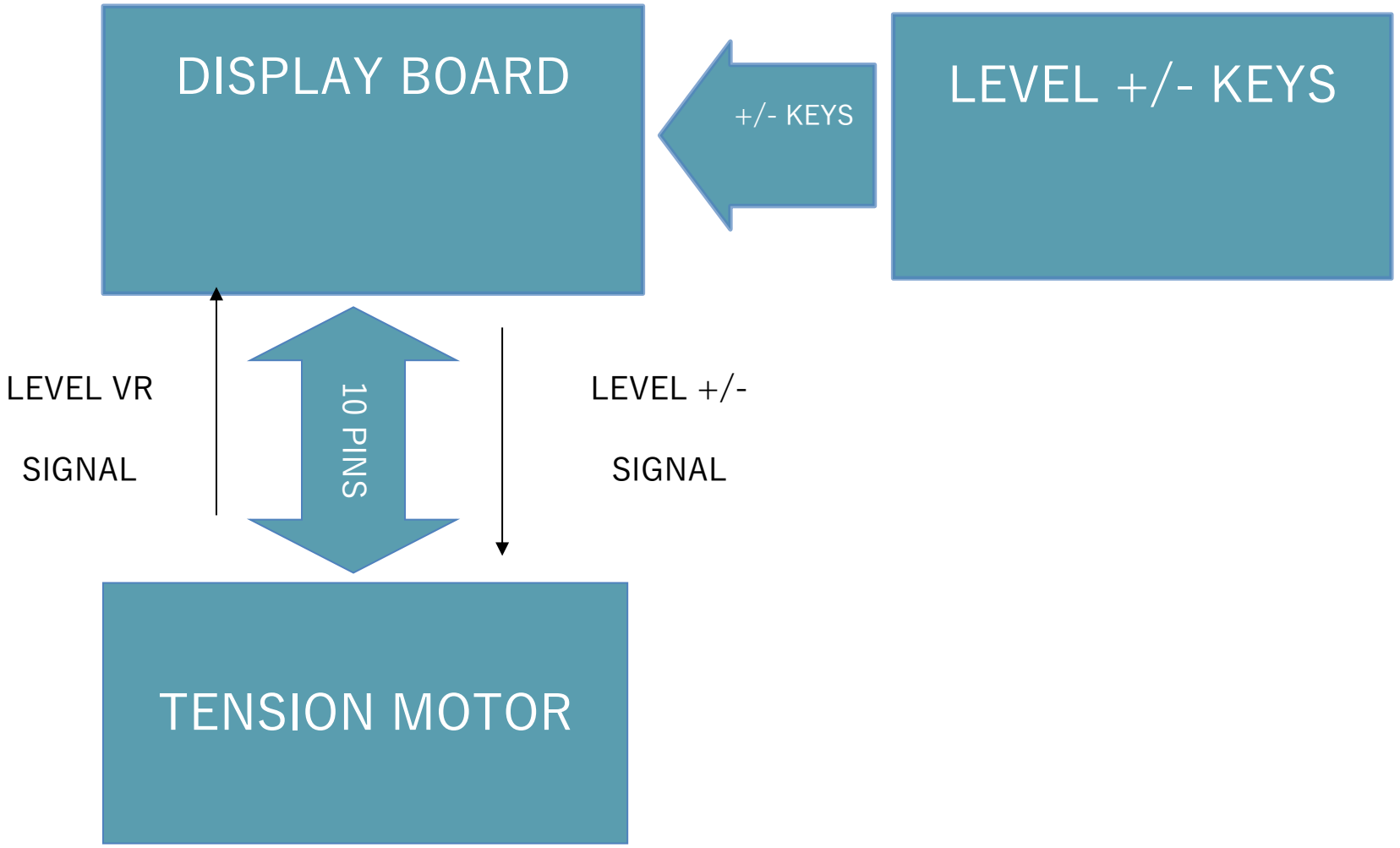
7-4 Error Message：Err

Definition

When the tension motor feedback signal is abnormal or no feedback to the console, all the outputs will stop and all the display windows are blank but the LEVEL window will show “Err”.

Troubleshooting

1. Check the control cable and replug it.
2. Check the tension motor.


DISPLAY BOARD
+/- KEYS
LEVEL +/- KEYS
LEVEL VR
SIGNAL
10 PINS
LEVEL +/-
SIGNAL
TENSION MOTOR

7-4-1 TENSION MOTOR OPERATION

Console

1. Key signal travels to the display. The main program IC then sends a command signal to the drive board.
2. Console directly controls the motor. Level UP:+4~5VDC;Level DOWN:- 4~5VDC

7-4-2 TENSION MOTOR TROUBLESHOOTING

Console

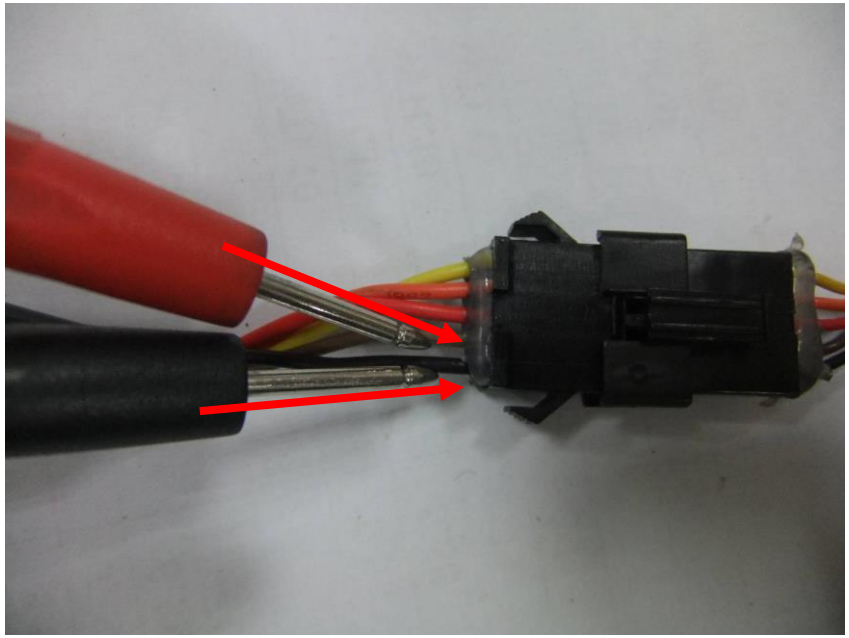
1. If the key beeps when pressed, assume that the signal was sent.
2. Inspect console power output to the motor. Press the Level Up is +4~5VDC;Level DOWN is -4~5VDC.If there is power to the motor, but the motor does not operate, replace it. If there is no power output, inspect whether the transformer has power.

Data cable

Inspect the cable and connections.

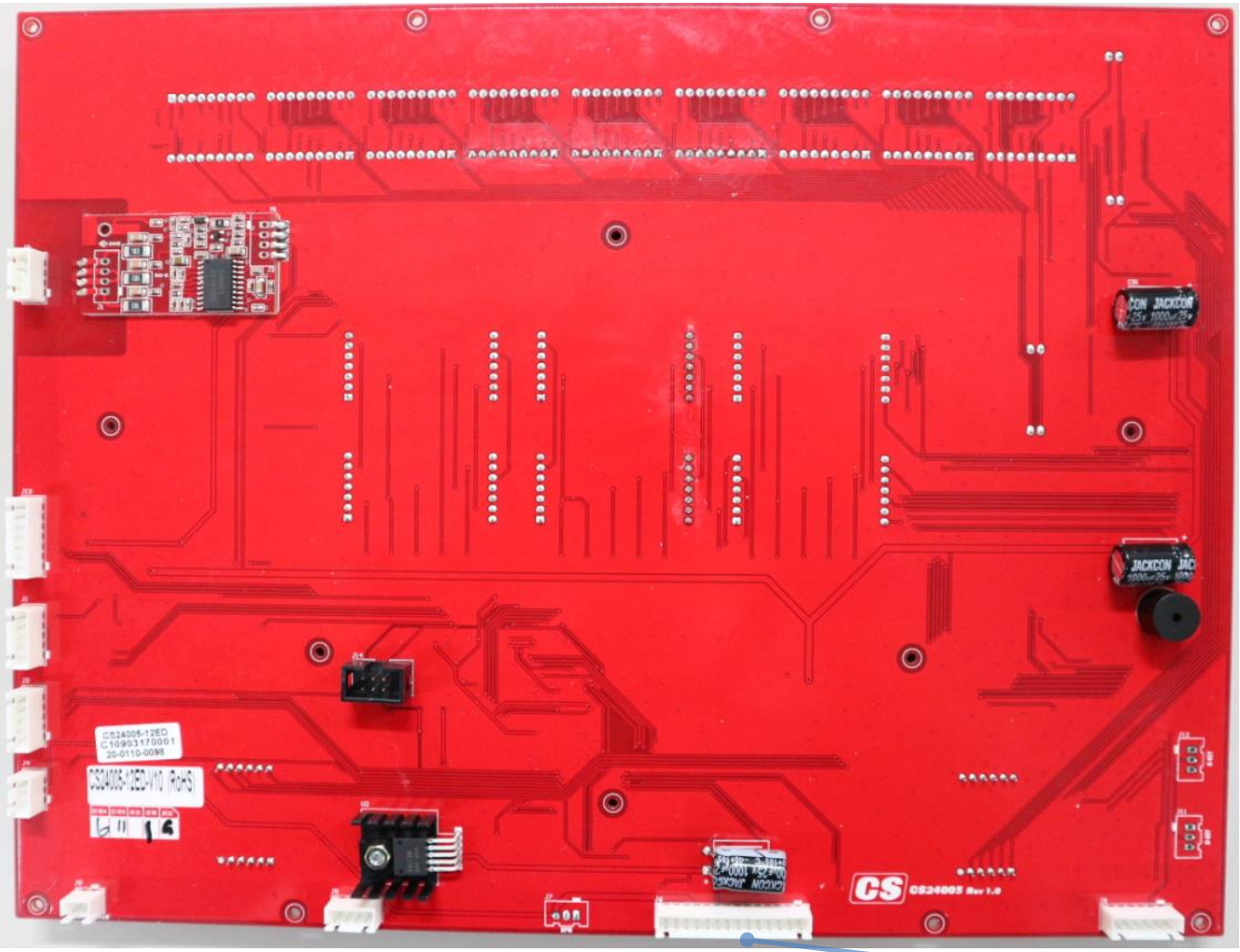
7-4-3 TENSION MOTOR VOLTAGE TEST PROCEDURE

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: +4~5VDC.Motor operates. Resistance increases.
4. Press LEVEL DOWN. Normal reading: -4~5VDC.Motor operates. Resistance decreases.
5. If there is no voltage, check the transformer, if there is no output, replace it.



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

7-5 Test configuration and the console to driver board connector pin define function



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

The console to driver board connector pin define function:

1. MTR-
2. MTR+
3. 5V
4. MTR_AD
5. GND
6. RPM
7. GND
8. N/A
9. GND
10. 12V
11. N/A
12. N/A
13. N/A
14. N/A

7-6 MAINTENANCE MENU IN CONSOLE SOFTWARE

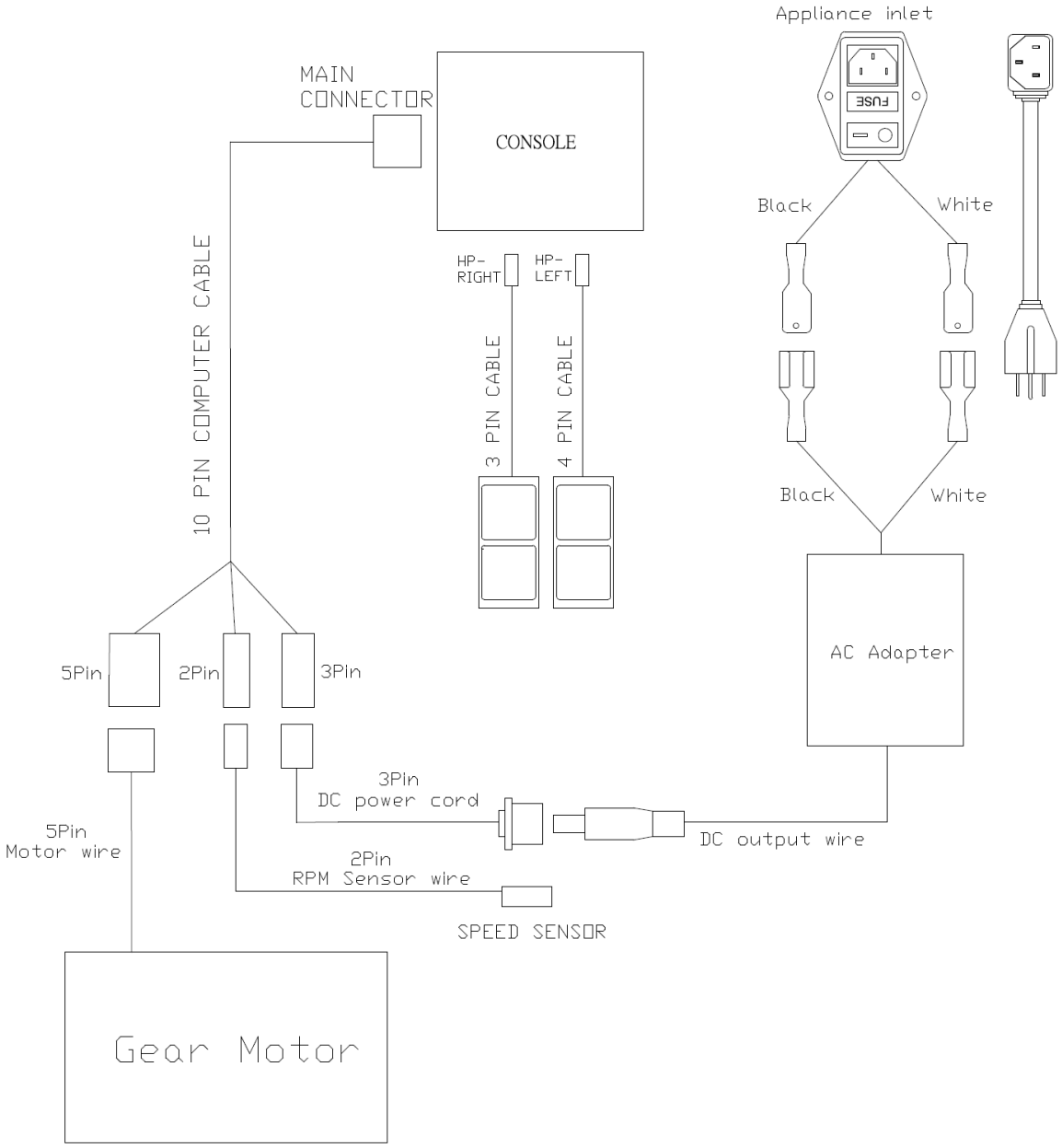
To enter the Maintenance Mode, pedal the elliptical and press and hold down the Start, Stop and Enter keys. Keep holding the keys down for about 5 seconds and the Message Center will display Maintenance Mode. Press the Enter key to access the menu below:

1. Key Test (Will allow you to test all the keys to make sure they are functioning)
2. Display Test (Tests all the display functions)
3. Function
   -Units (Sets the display to read out in English or Metric display measurements)
   -Pause mode (have five minutes)
   -Odometer Reset (Resets the odometer)
   -Sleep mode
   -Beep sound(Control Beep)
   -CAB Protocol or CSAFE Protocol
4. Service
   -Motor test
   -Csafe test
   -Sensor test(Test the speed sensor function)
5. Exit

7-7 Troubleshooting procedure matrix

Condition	Reason	Solve
LEDs not bright, incomplete or imperfect.	1. LED light is broken. 2. Power to console too low.	1. Replace with new LED or console. 2. Check AC power is 220-240V or 110-120V. 3. Check power to console. 4. Replace lower controller.
LED displays not bright, incomplete or imperfect.	1. LED displays are broken.	1. Replace with new console.
Erratic pulse display.	1. Another chest belt in use around Stepper. 2. Other magnetic field disturbance. 3. Receiver is broken.	1. Check for other chest belt use around Stepper. 2. Change the position or direction of Stepper. 3. Replace with new receiver.
Hand pulse lost its function. (No pulse displayed on monitor)	1. Hands not on the hand pulse sensors or only one hand on sensor. 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.	1. Two hands hold the hand pulse. 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)	1. Chest belt not worn properly. 2. Distance is too far and exceeds range of receiver. 3. Chest belt battery is weak or dead.	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 CR2032.
Chest belt too close to the Stepper.	Weak battery.	Replace with new lithium battery with type CR2032.

8. Circuit diagram(CS800(2020))


Appliance inlet
MAIN
CONNECTOR
CONSOLE
FUSE
Black
White
HP-
RIGHT
HP-
LEFT
10 PIN COMPUTER CABLE
3 PIN CABLE
4 PIN CABLE
Black
White
AC Adapter
5Pin
2Pin
3Pin
3Pin
DC power cord
DC output wire
5Pin
Motor wire
2Pin
RPM Sensor wire
SPEED SENSOR
Gear Motor

9. Troubleshooting(CS800(2020))

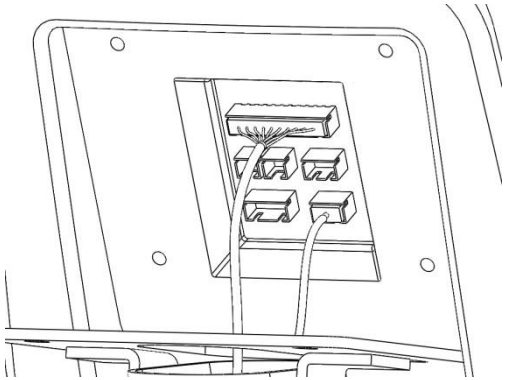
9-1 Troubleshooting for the console

Situation:

No display on monitor.

Solve:

1. Check the power supply or test with a new one.
2. Check all computer cables are plug well.



3. Check all wires inside the console and the chain cover are plug well. And check there are no pinched wires.

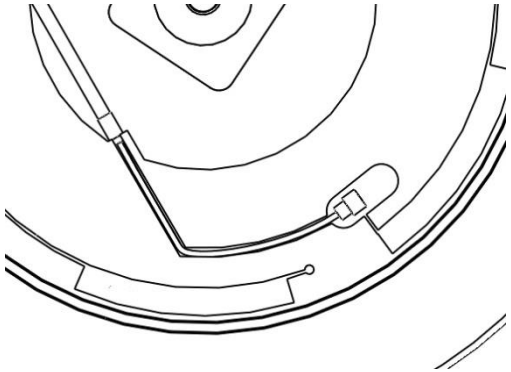
9-2 Troubleshooting for the Flywheel

Situation:

The console can adjust the resistance level and gear motor operates normally, but the resistance doesn't change.

Solve:

Check the steel cable is mounted on the flywheel.



Situation:

There is a noise when the flywheel is spinning.

Solve:

Check the noise is from the flywheel friction drive pulley or idle wheel. If so follow the replacement steps to reinstall those parts.

If the noise comes from flywheel, please do the replacement.

9-3 Troubleshooting for Drive Belt

Situation:

Drive Belt drops from drive pulley.

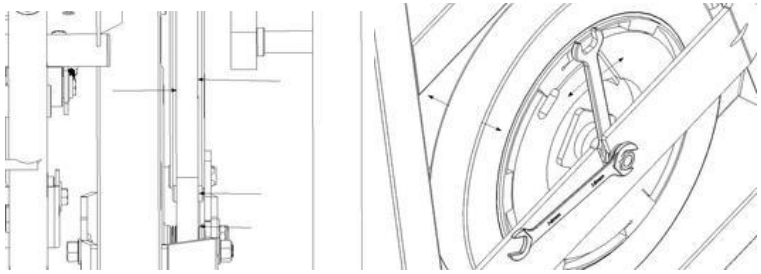
Solve:

Follow the Chain cover replacement to take off right Chain cover and loose the idle wheel assembly then mount Drive Belt back.

Spin the drive pulley slowly to see if the drive pulley swings too much or the drive pulley, idle wheel, and flywheel are not aligned to cause Drive Belt to fall off.

Then spin the drive pulley in high speed (100~120RPM) to test again.

If the drive pulley, flywheel pulley, and idle wheel assembly are not aligned, to adjust the flywheel to appropriate locate can fix it.

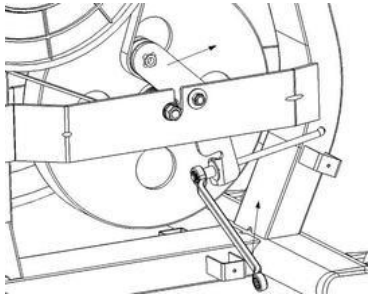


Situation:

Drive Belt is Skidding.

Solve:

To use a 13mm open-end wrench to adjust the nut of J-Bolt can fix it.



If Drive Belt is worn please do the replacement.

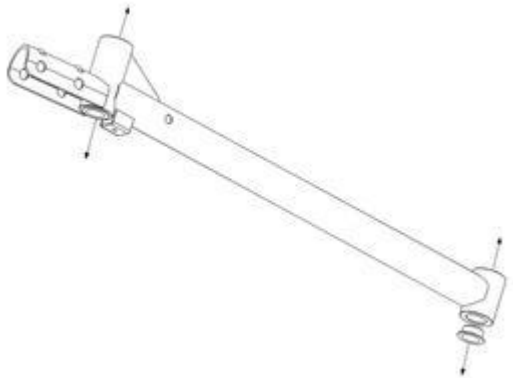
9-4 Troubleshooting for Swing Assembly

Situation:

There is a clearance between bushing and axle.

Solve:

The bushing may be worn after a long time of usage requires replacement.



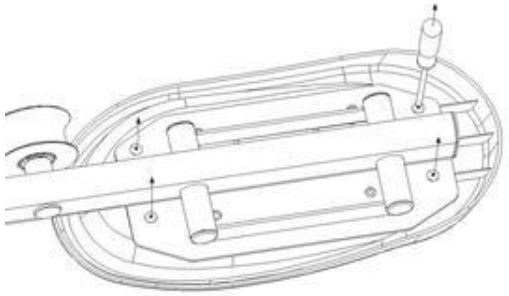
9-5 Troubleshooting for Connecting Arm

Situation:

The broken pedal.

Solve:

To do the pedal replacement.

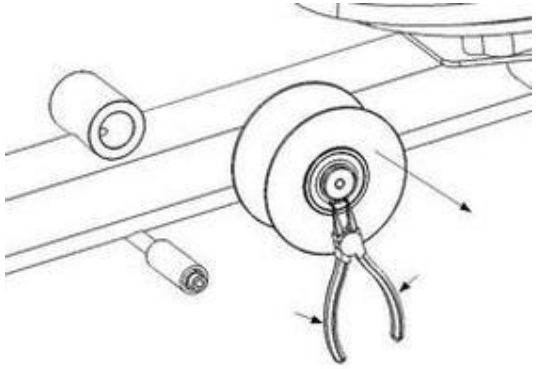


Situation:

There is a vibration feeling from feet when pedaling.

Solve:

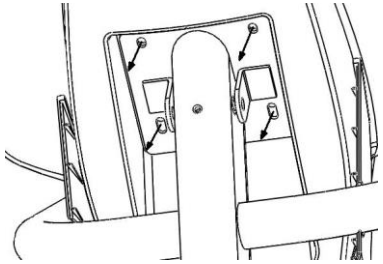
It’s maybe the bearing of Slide wheel is defective require replacement.



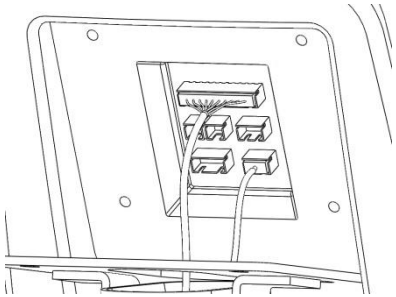
10. Parts Replacement Guide

10-1 Console Replacement

Step 1: Use a screwdriver to remove 4 screws (5*10mm) which locking console on console mast.



Step 2: Unplug wires then take off the console.

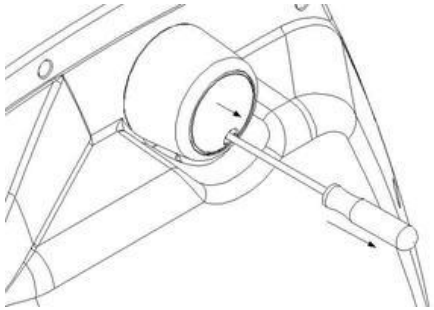


Step 3: Plug wires back before install the console then tighten 4 screws back.

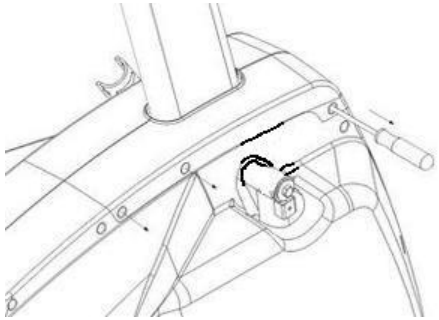
Note: Do not pitch the wires.

10-2 Chain Cover Replacement

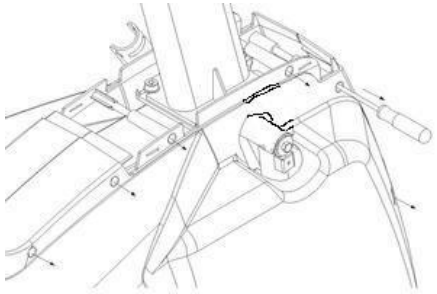
Step 1 : Use a screwdriver to remove both side handle bar cover.



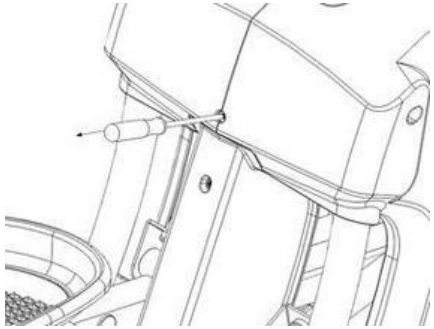
Step 2: Use a screwdriver to remove 3 screws(ψ4*15mm) then take off console mast covers.



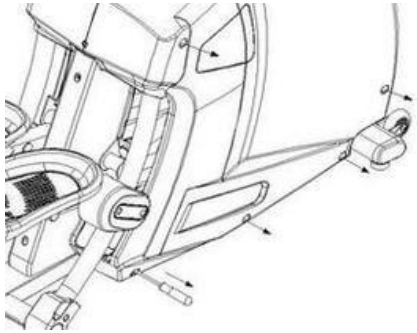
Step 3: Use a screwdriver to remove 7 screws(ψ4*15mm).



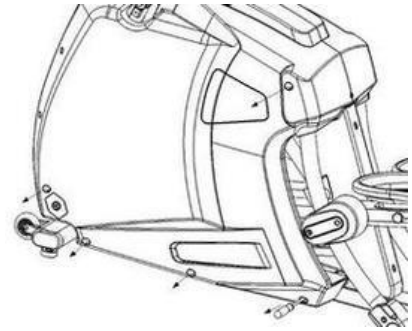
Step 4: Remove a screw which locking both left and right chain covers.



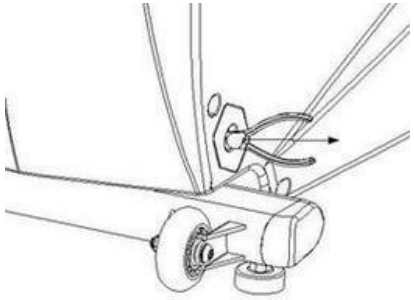
Step 5: Remove 5 screws(ψ5*19mm) of right side chain cover then take off it.



Step 6: Remove 5 screws(ψ5*19mm) of left side chain cover then take off it.



Step 7: Use a Needle nose plier to remove DC socket nut, then unmount DC power wire from chain cover.

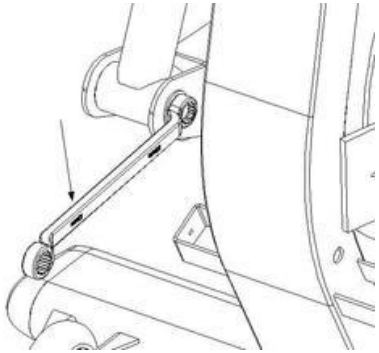


Step 8: To do the reverse of above steps to install both side chain cover back.

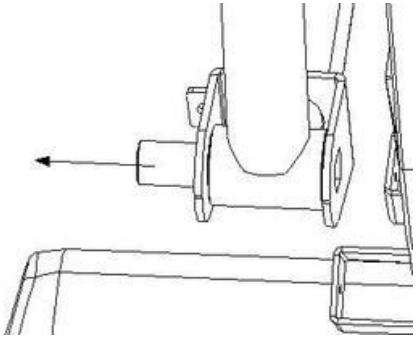
10-3 Swing Assembly Replacement

Step 1: Follow the steps of Chain Cover Replacement to take off both chain covers.

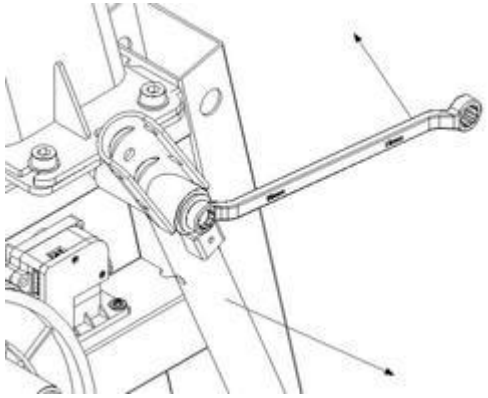
Step 2: Use a 12mm open-end wrench to remove inside bolt and washer of swing assembly axle.



Step 3: Unmount axle and separate the swing assembly and connecting arm.

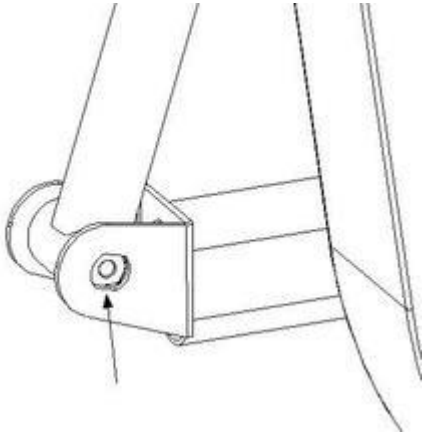


Step 4: Use a 12mm open-end wrench to remove bolt and washer which locking swing assembly with mainframe, then take off swing assembly.



Step 5: To do the reverse of above steps to install swing assembly back.

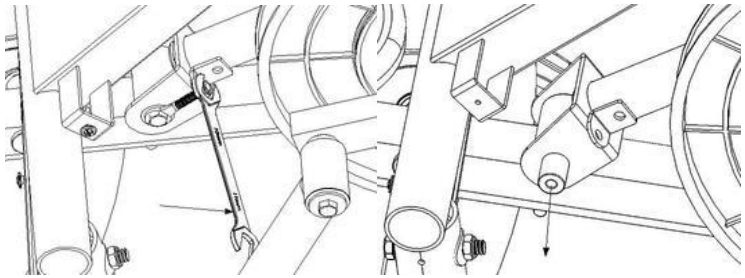
Note: Make sure axle and U-plate alignment before tighten the bolt.



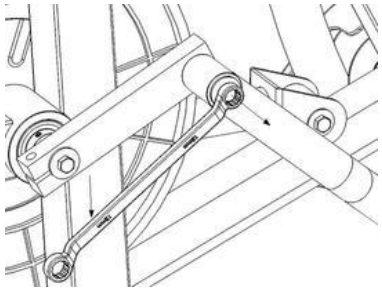
10-4 Linked Assembly Replacement

Step 1: Follow Chain Cover Replacement to take off both left and right Chain Cover.

Step 2: Remove outside hex head bolt and washer which locking the axle then removes the axle.

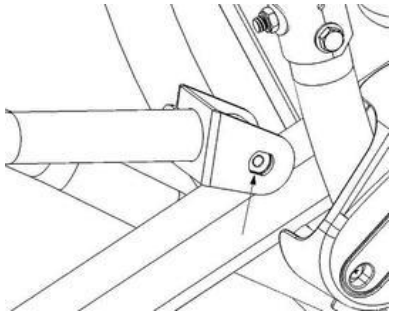


Step 3: Remove the bolt which locking the linked assembly with the crank, then take off the linked assembly.



Step 4: To do the reverse of above steps to install back.

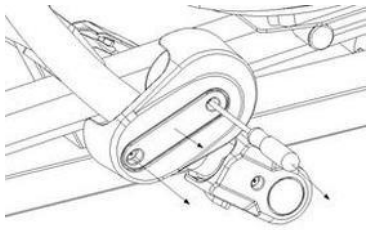
Note : Make sure axle and U bracket alignment before tightening the bolts.



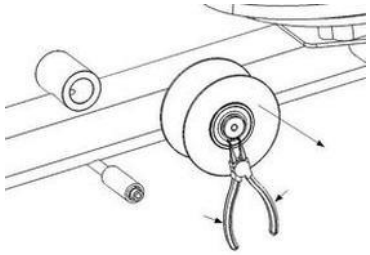
10-5 Connecting Arm Replacement

Step 1: Follow the steps of Swing Assembly Replacement and Linked Assembly Replacement to remove the axles of Connecting Arm.

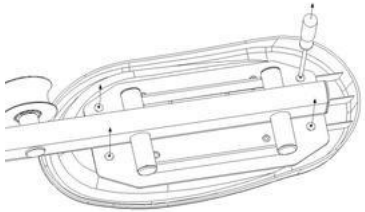
Step 2: Use a screwdriver to remove 2 screws which locking the Slide Wheel Cover then take off the cover and Connecting Arm.



Step 3: Use a circlip plier to remove the circlip Ø17 then remove the slide wheel.



Step 4: Use a screwdriver to remove 4 screws(M5*10mm) then take off pedal.

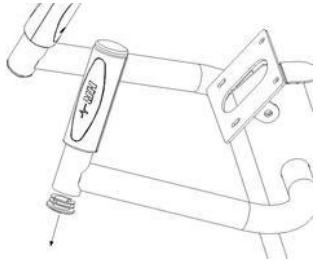


Step 5: To do the reverse of above steps to install back.

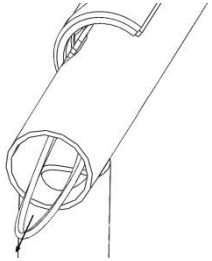
10-6 Console Mast Replacement

Step 1: Follow the User Manual to take off the console mast.

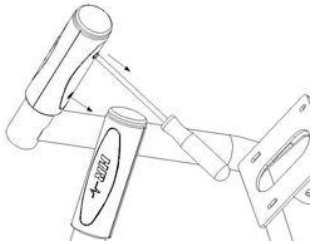
Step 2: Remove the end caps of handle pulses.



Step 3: Put out the Handle pulse wires from under the tube.



Step 4: Use a screwdriver to remove 2 screws(ψ3x20mm) then remove the handle pulse with wire.



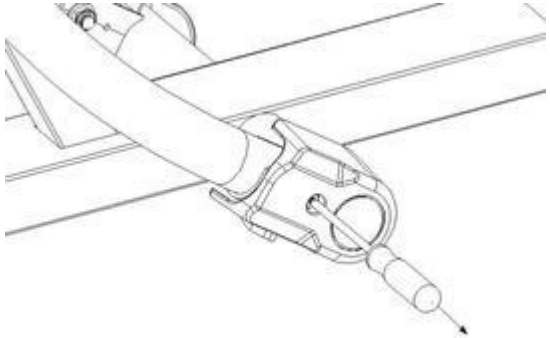
Step 5: To do the reverse of above steps to install back.

Note : Do not pinch the wires.

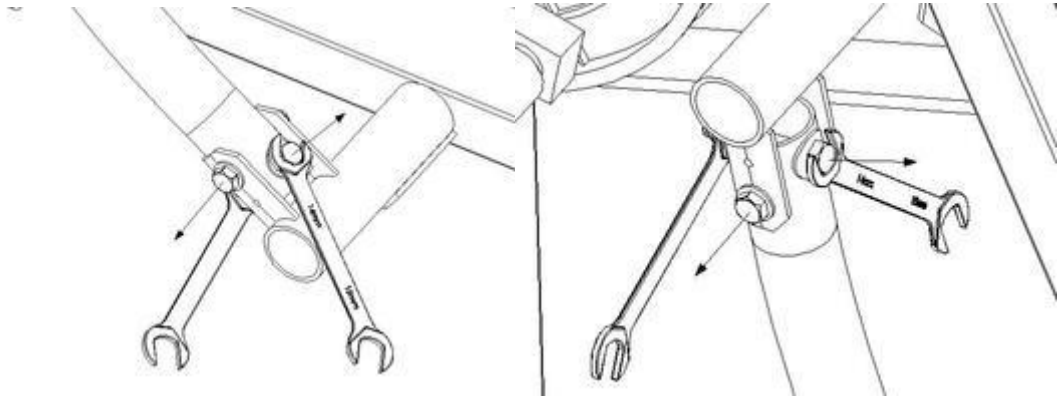
10-7 Rail Tube Replacement

Step 1: Follow the Connecting Arm Replacement to take off the connecting arm.

Step 2: Use a screwdriver to remove a screw(M5*10mm) of Slider Cover then take off it.



Step 3: Use 2 14mm open-end wrenches to remove the bolts and nuts which locking the Rail tube then take off it.

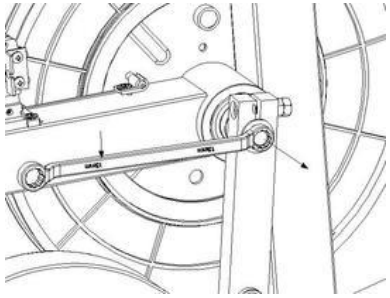


Step 4: To do the reverse of above steps to install back.

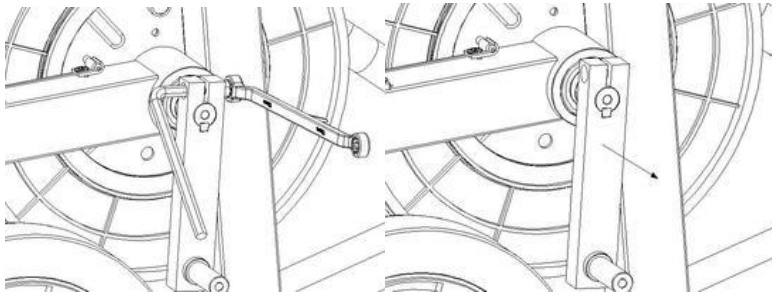
10-8 Crank Arm Assembly Replacement

Step 1: Follow the Linked Assembly Replacement to take off Linked Assembly.

Step 2: Use a 12mm wrench to remove a hex head bolt and a flat washer which locking the crank.

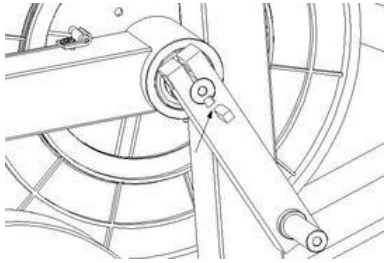


Step 3: Use a M6 L-Allen wrench and a 13mm wrench to loose the bolt(M8*35L) then take off the Crank Arm Assembly.



Step 4: To do the reverse of above steps to install back.

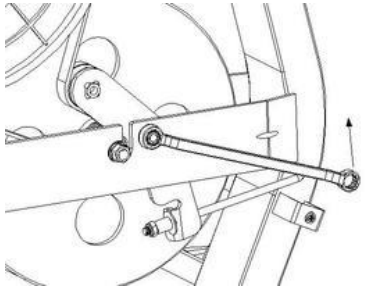
Note: The direction of the woodruff key, the round head direct to the axle.



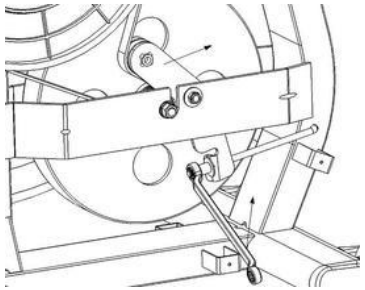
10-9 Idle Wheel Assembly Replacement

Step 1: Follow the Linked Assembly Replacement to take off left Linked Assembly.

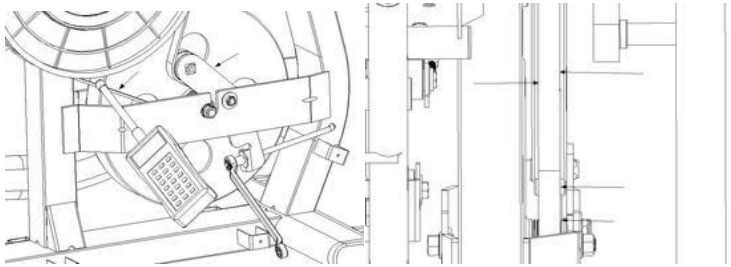
Step 2: Use a 13mm open-end wrench to loose the nut(M8*7T) which locking Idle Wheel Assembly on the Main Frame.



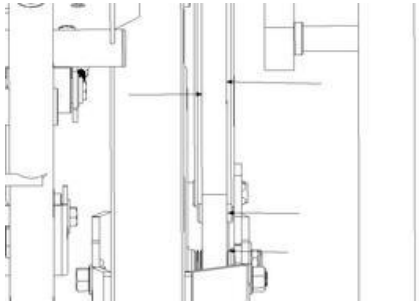
Step 3: Use a 13mm open-end wrench to remove the nut which locking on the J-bolt then unmount the drive belt from drive pulley.



Step 4: To do the reverse of above steps to install back. Use the nut of J-bolt to adjust drive belt tension then use Sonic belt tension meter to measuring belt tension.



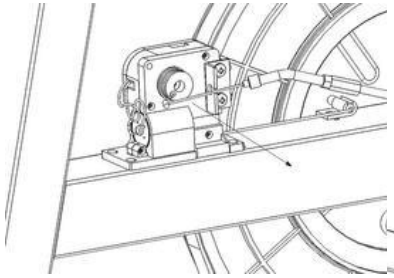
Step 5: Operate the crank to make sure the belt is aligned with drive pulley, flywheel pulley, and idle wheel, and then install back all other parts.

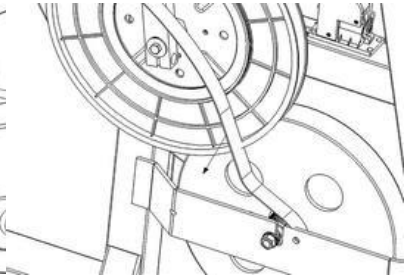


10-10 Flywheel and Drive Belt Replacement

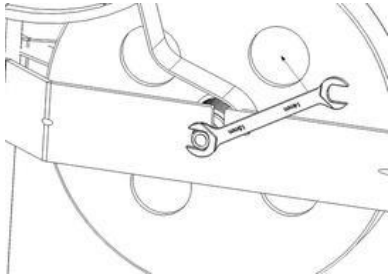
Step 1: First, use the console to set the resistance level to MAX, and then turn off power. Follow the Idle Wheel Assembly Replacement to take off the idle wheel assembly.

Step 2: Unmount the steel cable from flywheel, then unmount drive belt from drive pulley.

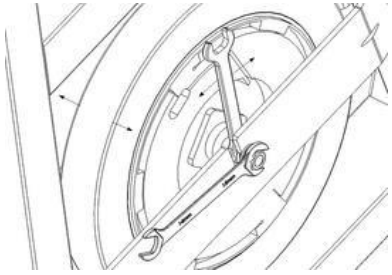




Step 3: Use 15mm open-end wrench to loose 2 nuts which locking on flywheel, then take off flywheel and drive belt.



Step 4: To do the reverse of above steps to install back. Then use crank assembly to operating the drive pulley to make sure drive belt is aligned with flywheel pulley, idle wheel, and drive pulley. If not, use a 17mm open-end wrench to adjust the nuts of flywheel to center the belt on the drive pulley.



Step 5: Adjust the drive belt tension with the idle wheel assembly, and then install back all other parts.