

T615 Repair Manual (Electronics)



#### 1-1.Product Illustration





1-2.Dispaly-







#### 1-3. Component Placement- T615 Display



#### 1-3. Component Placement- T615 Bridge board







#### 1-3. Component Placement - T615 lower frame





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#### 1-4. Connection-T615





#### 1-4. Connection-T615 Display



#### 1-5. Cable Connections - T615 Display







#### 1-5. Cable Connections - T615 Drive board



#### 1-6.Indicator LEDs - T615 Display











# 1-7. Troubleshooting chart T615

Malfunction	Circumstance	Inspection and test points	Components to replace
Safety key malfunction	Put safety key in place.	1. Inspect the cable connections on the lower	Safety key board
	Display has no reaction.	part of the display and safety key.	
	"Safety key" appears on	2. Inspect the safety key magnet.	
	the display.	3. Inspect the safety key board.	
No start up	Power on indicator does	1. Inspect the power cord connection.	1. Fuse, fuse holder
	not light.	2. Inspect all cable connections.	2. Drive board
		3. Inspect the fuse, the fuse holder, and the	
		power switch.	
		4. Drive board components have an electrical	
		short. Replace the drive board.	
No start up	Power on indicator lights	1. Inspect all cable connections, including	1. Transformer
	but the display does not	connector cables.	2. Drive board
	light.	2. Inspect whether drive board LED2 lights:	3. Display board
		a. If LED2 lights, inspect and test the	program IC
		transformer fuse.	
		3. Inspect whether LED1 on the display	
		lights.	
		a. If LED1 does not light, inspect the data	
		cable from the display to the drive board.	
		b. If LED1 does light, inspect the display	
		program IC. Re-install the display IC.	
Telemetry heart rate	Telemetry heart rate	1. Inspect the heart rate transmitter strap and	1. Heart rate transmitter
malfunction	malfunction	its batteries. Replace batteries if they have	2. Heart rate receiver
		not been replaced recently.	board
		2. Inspect the receiver board cables.	
		3. Test or replace the receiver board.	
		4. Inspect for environmental interference, for	
		example, from speakers and lights.	

Key malfunction	Key does not operate or operates continually. (number key & lower key)	<ol> <li>Inspect the soft key connection.</li> <li>Replace the soft key.</li> </ol>	1. Soft keys	
ERR 1 Motor does not rotate, ERR 1 appears.		<ol> <li>There is no power to the motor; the motor cannot operate.</li> <li>Inspect the motor brushes.</li> <li>Measure voltage from the drive board to the motor. If there is no voltage, replace the drive board. If there is voltage, inspect the following:         <ul> <li>a. transformer voltage.</li> <li>b. whether the EMG indicator lights.</li> <li>c. whether IGBTs have an electrical short. Replace the drive board.</li> </ul> </li> <li>Inspect motor brushes or the commutator.</li> </ol>	<ol> <li>Drive board</li> <li>Motor brushes, motor</li> </ol>	
ERR 1	Motor operates, ERR 1 appears.	<ol> <li>The program did not detect the optic sensor signal.</li> <li>Inspect the CLK indicator on the drive board.         <ul> <li>a. If the CLK indicator is not lit, clean or replace the optic sensor.</li> <li>b. If the CLK indicator lights normally, inspect the data cable from the display to the drive board. Re-install the display IC.</li> </ul> </li> </ol>	1. Optic sensor	
ERR 3	Display speed differs from actual speed.	<ol> <li>Inspect KPH/MPH setting.</li> <li>Inspect the optic wheel teeth.</li> <li>Replace the optic sensor.</li> <li>Replace the drive board.</li> </ol>	<ol> <li>Optic sensor</li> <li>Drive board</li> </ol>	
ERR 7	ERR7 appears at startup.	<ol> <li>Inspect the incline VR cable connection.</li> <li>Usually ERR7 indicates the display is stuck at either the highest or lowest position.</li> <li>Inspect whether LED5 and LED6 light on the drive board. If lit, the display or cable malfunction may be causing a malfunction.</li> <li>Inspect whether the drive board emits voltage to the incline motor. If not, replace the drive board.</li> <li>Recalibrate the incline set or replace the incline set as a test.</li> </ol>	1.VR 2. Drive board	

	Press <change> key 3 seconds; it will display English/matrix_aparay saying setting</change>
Product settings	program timer, total distance, total time as
	well as control board/drive board software
	versions



Model: T615 Malfunction: Safety

Safety key malfunction

Circumstance: Put the safety key in place; the display shows no reaction; "Safety key" error message appears.

Possible causes: Safety key board malfunction

Troubleshooting: 1. Inspect the safety key magnet.

2. Inspect the bridge board wire connections.

3. Test or replace the safety key board..





Cable connection

Program board

# Troubleshooting

Model:T615Malfunction:Unit will not start operating.Circumstance:Turn POWER ON; the display does not light.Possible cause:Incoming power issue; component failure.Troubleshooting:1. Inspect the main fuse, power switch, & transformer<br/>2. Inspect all cable connections.

- 3. Inspect drive board power LED. Or replace the drive board as a test.
- 4. Inspect the display power LED and main IC.
- 5. Replace the SDC drive board.





T615 Model: Malfunction: keypad malfunction Circumstance: Press display board keys. There is no reaction, or keys operate continuously. keypad is bad Possible causes: 1. Inspect the keypad connection.

Troubleshooting:

2. Replace the keypad.





22000



1 2 3 4 5 6

7 8 9

0.00

QUICK

TO START

SportsArt ........................

00

Π

30:00

ENTER

## Troubleshooting







Model: T615
Malfunction: Key malfunction – display keys
Circumstance: Press display keys; there is no reaction; Or keys operate continuously.
Possible causes: 1. Display key switch malfunction: 2. Key cushions are out of place.
Troubleshooting: 1. Inspect key cushions. 2. Replace display key switches.









- Model:T615Malfunction:Telemetry heart rate malfunctionCircumstance:Telemetry heart rate reading does<br/>not appear or the value is incorrect.
- Possible cause: 1. Telemetry heart rate batteries
  - 2. Heart rate receiver
  - 3. Environmental interference, for example, lights and speakers
- Troubleshooting: 1. Replace telemetry heart rate transmitter or its batteries
  - 2. Inspect telemetry receiver board cable connections
  - 3. Replace the telemetry receiver board as a test.









Model:T615Malfunction: Incline will not operate upward or downward.Circumstance: Press incline keys; there is no incline action.Possible causes: 1. Incline VR or drive board has malfunctioned.

- 2. Cables are not connected well.
- 3. Incline motor is not operating.
- Troubleshooting: 1. Inspect drive board cable connections.
  - 2. Inspect transformer voltage.
  - 3. Inspect incline signal indicators on the drive board and measure incline output voltage.
  - 4.. Listen for the sound of incline gear grinding. the drive board could be malfunctioning.
  - 5. Replace the drive board.











Model: T615
Malfunction: incline level is not correct.
Circumstance: Incline readout on the console is not exactly the same as the actual incline
Possible causes: 1.Incline VR has malfunctioned.
Troubleshooting: 1.Inspect the incline VR cable on drive board.
2. Measuring VR voltage on the drive board red-green 0% → 1.20Vdc 15% → 3.57Vdc
If not correct, please do the incline unit calibration calibration 3.Replace VR unit.









Model:T615Malfunction:The fuse has burnt.Circumstance:Turn on the unit. The fuse breaks.Possible causes:1. Components have an electrical short.<br/>2. Drive board component malfunction.Troubleshooting:1. Inspect cable insulation for tears.<br/>2. Remove the power cable and take continuity<br/>readings: There should be no continuity between

AC1 and frame. There should be no continuity between AC2 and frame.

- 3. Check components for signs of electrical shorts. Replace the drive board as a test.
- 4. Replace the filter as a test.





Model: T615 Malfunction: The fuse has burnt. Circumstance: Press the SPEED key; the fuse breaks. Possible causes: 1. The motor has an electrical short. 2. Drive board malfunction Troubleshooting: 1. Replace the drive board.

2. Replace the motor as a test.

3. Replace the speed sensor as a test.











Model:T615Malfunction: The fuse has burnt.Circumstance: While in operation, the fuse breaks.Possible causes: 1. Fuse holder connection2. Walk deck or walk belt is worn.

- 3. EAC drive board malfunction
- Troubleshooting: 1. Inspect the fuse and fuse holder installation.
  - 2. Inspect mechanical parts:
    - A. walk belt lubrication and wear
    - B. walk belt tightness
  - 3. Replace the drive board as a test.
  - 4. Replace the carbon brush







Model: Malfunction: Circumstance: Possible cause: Troubleshooting: T615 Err 1

Press Speed key. Motor rotates. Err1 appears.

- 1. Motor rotates  $\rightarrow$  optic sensor malfunctions
- 1. Inspect all cable connections.
  - 2. Inspect program IC on the control board.
  - 3. Inspect the motor Carbon brush
  - 4. Replace the drive board.
  - 5. Replace the motor.
  - 6. Replace the transformer











Model:T615Malfunction:Err 3Circumstance:Display speed and actual speed differ.Possible cause:1. Optic wheel teeth or optic sensor malfunction<br/>2. Drive board malfunctionTroubleshooting:1. Inspect whether optic wheel teeth are missing.

2. Replace the optic sensor as a test.

3. Replace the drive board.





Model: T615 Malfunction: Err 7

Circumstance: Display shows ERR 7.

Possible cause: 1. Drive board or VR malfunction made the incline

stick at highest or lowest level.

Troubleshooting: 1. Inspect incline VR wire.

2. Replace the VR set.

3. Replace drive board.







Model: T616

Item: KPH/MPH switch and total distance, time, control board/drive board software version display

Method: 1.Press <CHANGE DISPLAY> key for 3 seconds to enter user preference & settings.

A. English and Metric setting

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The display will show "UNIT-MPH (for English) " or "UNIT-KPH (for Metric) "; press INCLINE < \Delta > < \nabla > key to select MPH/KPH;
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then **<**ENTER> key to confirm after selection.

B. User ID setting

The display will show "USER ID - ON" or "USER ID – OFF"

Press INCLINE  $< \blacktriangle > < \forall >$  key to set ON/OFF; press < ENTER> to confirm.

C. Total distance display

The display will show "DIST-XXXXXX KM" or "DIST-XXXXXX MI" for total distance; press <ENTER> to exit.

F. Total time display

The display shows "TIME-XXXXXHOUR" for total time; press <ENTER> to exit.

G. Control board software version display

The display shows "CTL BT615-XX" for software version; press <ENTER> to exit.

H. Drive board software version display

The display shows "DRV TR21DRV-1B" for software version display; press <ENTER> to exit.



Model: T615 Item: Error Code Table

- E-1 : Display board main program has not received the optic sensor signal.
- E-3 : Display setting and actual speed differ.
- E-7 : The display detected that the incline VR voltage is too high or too low, indicating that incline is stuck in the wrong position.



Model: T645

Item: Self-lubrication system operation

System: The system is consisting of control board, lubrication motor VR, speed sensor and lubricant bottle Operation process:

- 1. When the treadmill is in motion, the lubrication control board will track the mileage. When it reaches 200 Km, the program will perform lubrication procedure.
- 2. When it enters self-lubrication procedure, the motor will start and drip of lubricant; total of 2cc.
- 3. The bottle holds 400cc of lubricant; it lasts 200 times of self-lubrication procedures and about 40000Km distance. The distance display will reset to 0 each time the self-lubrication is performed.
- 4. Lubrication display -

Press <RESET> key to display total distance in mile & km; total time

Press <UP> key to display total exercise distance, speed and software version

- 5. When the lubrication procedure performs exceed 20 times, the display will show "CH O'L" and beeping sound; that means it is time to replace the lubricant bottle.
- 6. Untighten the screws shown on below figure and push the metal plate to remove the lubricant bottle when replacing lubricant bottle. Swap the bottles out with the existing cap.
- 7. The self-lubrication system is an independent system from the main console; it is operating under its own programming and detecting system.
- 8. The speed sensor signals of the new version self-lubrication system is from DSP on the drive board.







Model:T615Item:Self-lubrication system wiring and block diagram

























Model: T645 Item: Self-lubrication system wiring





#### Other descriptions::

Model: T615 Item: Lubrication error messages and troubleshooting Troubleshooting:





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## **Other descriptions:**

Model: T615 Item: Lubricant bottle replacement

Step1.Untighten the screws shown here



Step2. Push the metal plate and take the bottle out









Model : T615

Inspection point: T611 transformer

Inspection method: 1. Inspect whether the transformer fuse has blown.

2. Measure transformer voltage.

3. Set the multi-meter to the AC setting. Place probes as follows:





Model :T615Inspection point:motor brushesInspection method:1. Inspect motor brushes.

A. Inspect brush length. If brushes are shorter than 0.7mm, replace the brushes.

- B. Inspect the brush surface. It should be smooth. If there are grooves, the commutator might be faulty.
- C. Inspect whether brush copper wires have changed color. If so, replace the brushes.



Brush length should exceed 0.7 mm. This image shows brushes that are too short.



Brush ends shown here have scratches, a sign of irregular wear. Replace brushes like these.



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Inspection point: T615 optic wheel, optic sensor

Inspection method: 1. Inspect the optic wheel placement. The optic wheel should rotate in the center of the optic sensor.

- It should not touch the optic sensor.
- 2. Inspect whether optic wheel teeth have broken.
- 3. Pull the walk belt to allow the optic wheel to move. Inspect whether LED6 on the drive board flashes. When a tooth of the optic wheel is in the center of the optic sensor, LED6 on the drive board does not light. When a tooth of the optic wheel is not in the center of the optic sensor, LED6 on the drive board lights.
- 4. The optic sensor includes an infrared transmitter and a receiver. Inspect whether the optic sensor is dirty.







Model: T615

Inspection point: Motor voltage test at the drive board

Inspection method: 1. Select the VDC setting on the multi-meter. Place probes on M+M- connectors on the drive board. 2. Press the SPEED< $\blacktriangle$  > key. The motor should operate, allowing you to measure motor voltage.





Model: T615

Testing item: Motor temperature switch test

- Method: 1. When the temperature is normal, there is no abnormality on the display. Unplug the motor temperature switch wiring, drive board led4 will lights. the display will show the message of "SERVICE REQUIRED..."
  - 2. If the display shows a message of "SERVICE REQUIRED..." after using for a while and the motor temperature is hot, the ends of the yellow wire will be shorted.





Model : T615

Inspection point: incline voltage measurement at the drive board

Inspection method: 1. Do not press any key. Incline indicators do not light.

The drive board does not emit voltage to the incline motor. The incline motor does not operate.

2. Select the VDC setting on the multi-meter and test as follows.

Incline key	Indicator on drive	Drive board	Incline set
	board	incline voltage	
Incline <>	LED5 lights (DOWN)	green-white +40V or-40V	Incline operates down
Incline < >	LED6 lights (UP)	Green-white +40V or -40V	Incline operates up



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#### Model : T615

Inspection point: Measuring VR voltage on the drive board

Inspection method: 1. Select the VDC setting on the multi-meter. Place probes on the VR set red-green wires.

Incline key	Drive board VR voltage	Incline position
0%	Red-green 1.20V	At red line (calibration point)
15%	Red-green 3.57V	Longest position

4-6-1

2. If the VR voltage fluctuates widely, the VR is bad. Replace it.





Inspection point: Incline motor and VR calibration Inspection method:

I. Calibration goals : Adjust the incline set tube to the red calibration line. Adjust the VR voltage across red and green wires to 1.20V.

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II. Calibration steps:

Step 1. Adjust the incline tube to the red calibration line as follows:

A. Remove VR set screws. Remove the VR cap.

B. Rotate the VR to set voltage across red and green wires to 2.5V.

C. Press the INCLINE  $\langle \blacktriangle \rangle / \langle \nabla \rangle$  keys to operate the incline up or down, making the incline tube return to the red calibration line.

Step 2. Adjust the VR voltage across red and green wires to 1.20V.

A. Rotate the VR to set voltage across red and green wires to 1.20V.

B. Use screws to secure the VR cap back into place.

Step 3. When calibration is complete, test incline operation as follows.

A. Press the Incline  $\langle \blacktriangle \rangle$  key. The incline should operate to 15%. Measure incline VR voltage. It should be 3.57V.

B. Press the Incline  $\langle \nabla \rangle$  key. The incline should operate to 0%. Measure incline VR voltage.

	Incline position	Incline set	Incline VR	Treadmill position	
	0%	At red calibration line	1.20V	Level position	
	15%	At longest point	3.57V	Highest position	
VR voltage adjustment				Incline Red line	

