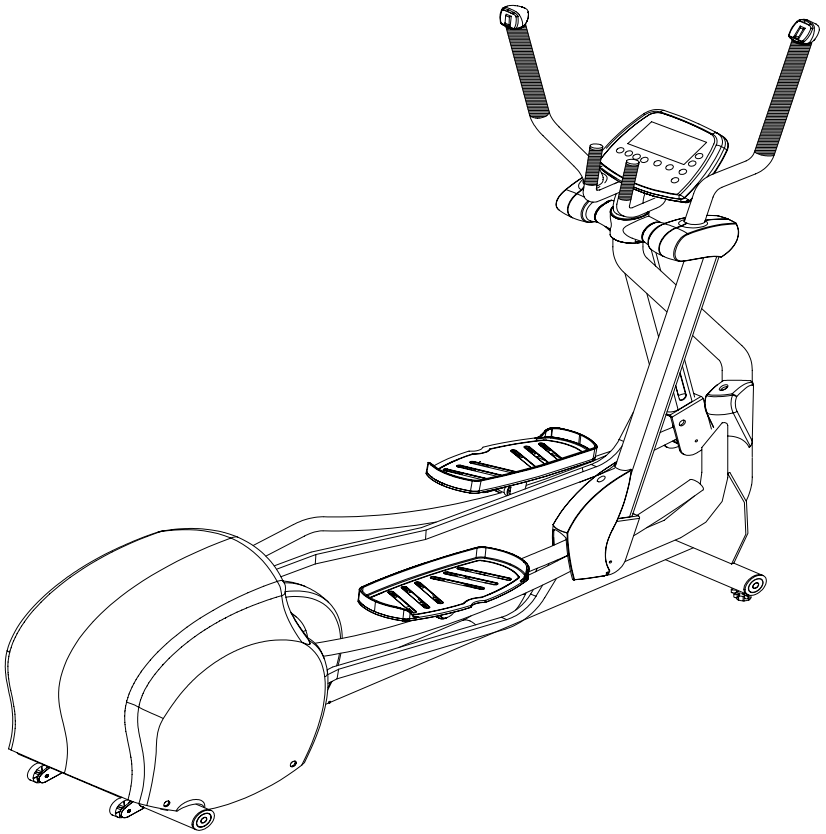
SPORTSART

805P and 807P Elliptical Trainer Repair Manual



USA Version 2
Update: 09-01-04

805P and 807P Elliptical Trainer Repair Manual

This manual was made through the cooperation of SportsArt personnel in Taiwan and the USA. In making repair manuals, our goal is to present an accurate, easy-to-use guide for technicians in the field. We welcome your suggestions and comments.

To make suggestions or comments, please contact Bob Baumgartner. Thank you!

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805P and 807P Elliptical Trainer Repair Manual
USA Version 2
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Introduction

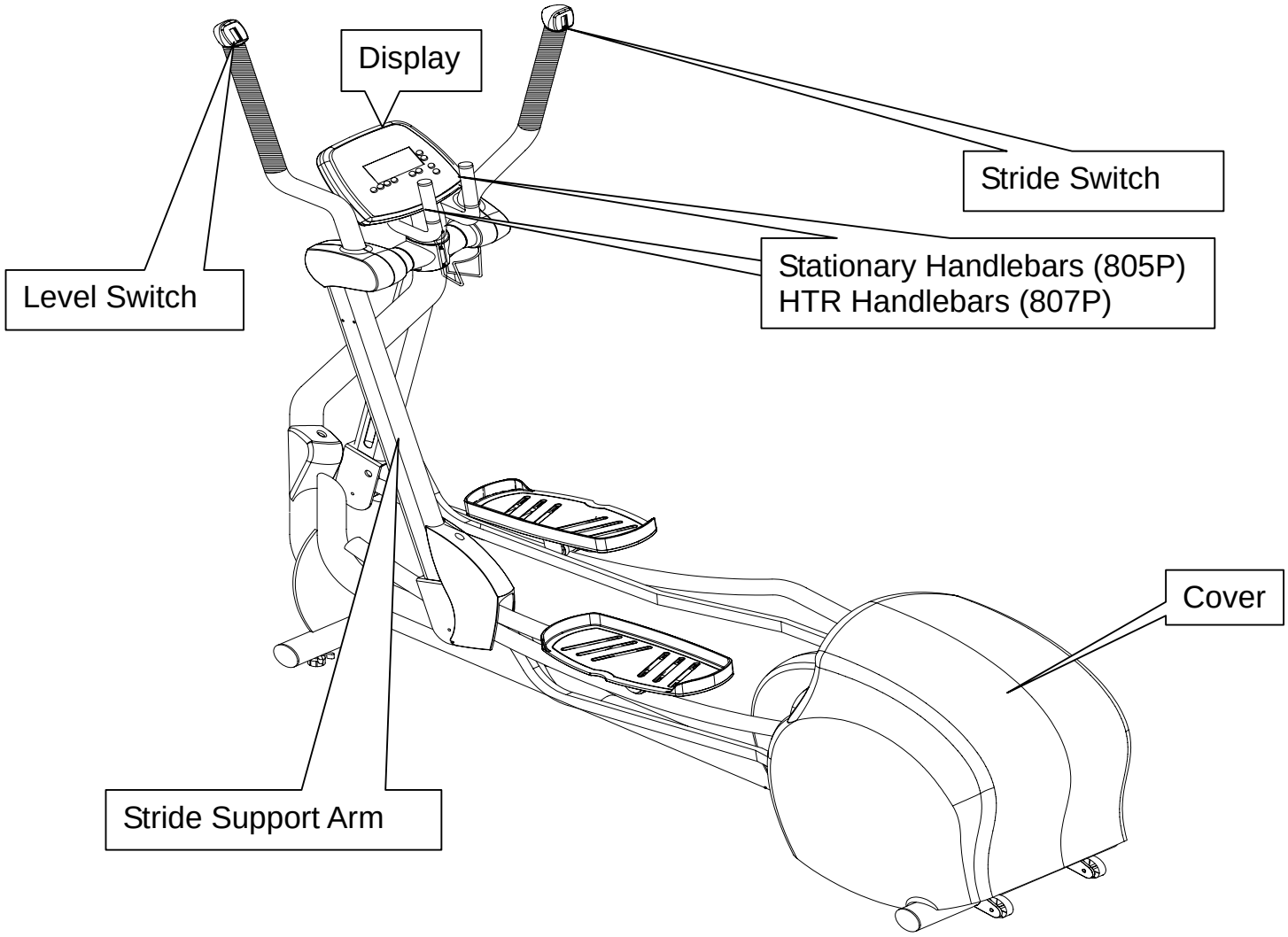
Introduction to the 805P and 807P Elliptical Trainers

Some of the first elliptical trainers with automatic stride adjustment, the 805P and 807P provide a gentle, full-body workout. 805P offers user convenience – automated stride and resistance adjustment on the display and handlebars – and a full array of possibilities, including heart rate control, three programs, intervals and manual operation, plus Polar heart rate feedback, step count, calorie expenditure, and steps per minute. 807P offers all this, plus heart touch rate (HTR) handlebars and a dot matrix feedback display screen.

805P and 807P Specifications

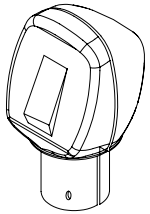
Item	Range	Notes
Power	Plug in type	N. America: 110 VAC
Fuse	1 Amp slow blow	Size: 6mm x 32mm
Display	805P: Liquid Crystal Display; 807P: Dot Matrix	See INTRO.12 for test mode.
Resistance (LEVEL)	LEVEL 1-14; Control on handle switch and display key	
Stride	450-650 mm; 17.0-26.0 inch; Display and handle control	Units: Metric or US. See INTRO.12
INTV	Interval program	For operation, see INTRO.08.
PROGRAM	Program 1, 2, 3	For operation, see INTRO.07.
Heart Rate (HR)	805P: Polar + HRC; 807P: Polar + HRC + HTR	For operation, see INTRO.09.
Weight Limit	300 pounds	
Dimensions	L: 77”, W: 22”; H: 72”	
Net Weight	172 pounds	
Home Warranty	2 year parts, 1 year labor	
Com. Warranty	1 year parts and labor	Limited use: 4 hours per day

805P and 807P Elliptical Trainers

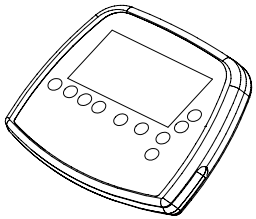


Electronic Components in Front

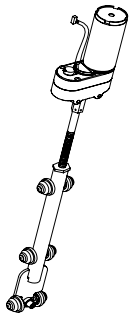
Level Switch

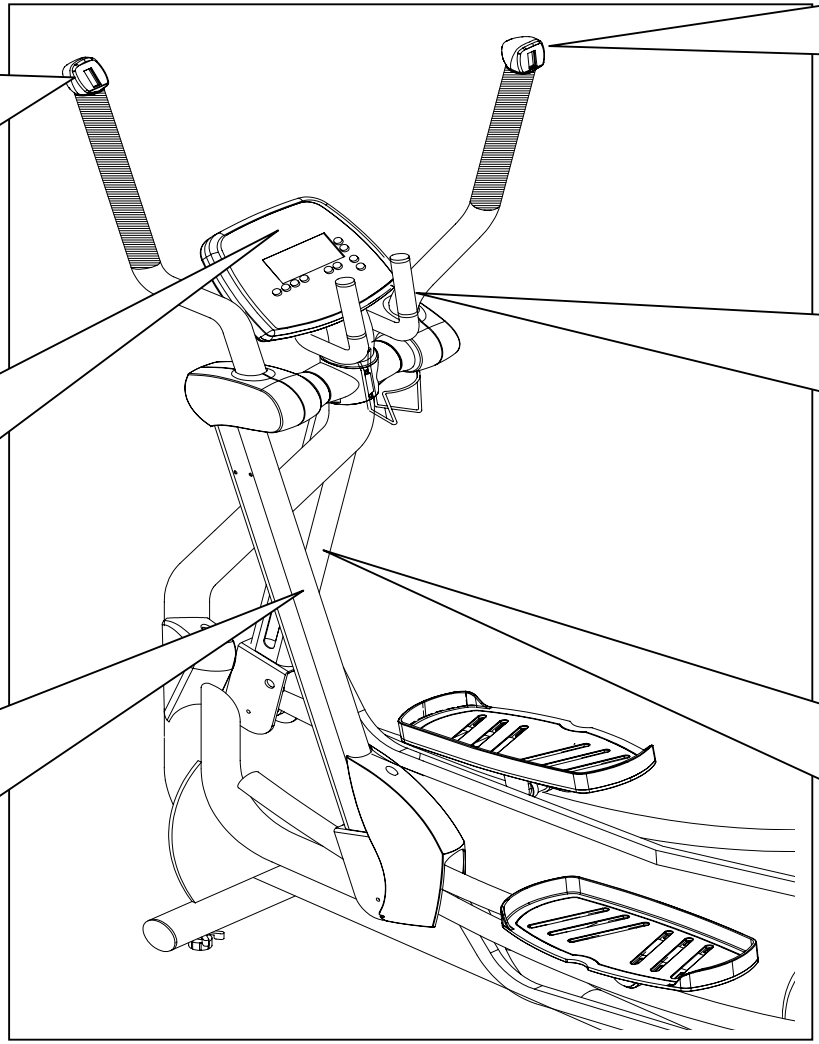


Display

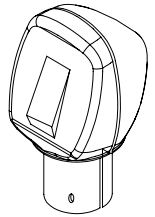


Stride Motor (Left)

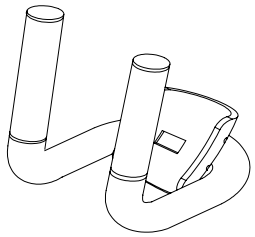




Stride Switch

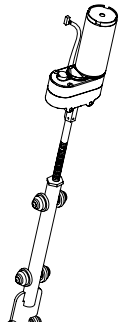


Stationary Handlebars



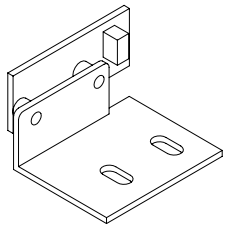
HTR – 807P only

Stride Motor (Right)

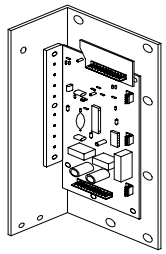


805P and 807P Elliptical Trainers - Components in Back

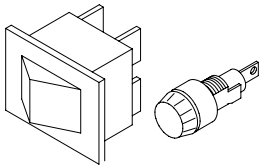
Optic Sensor



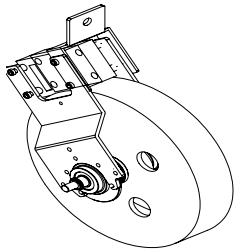
Drive Board



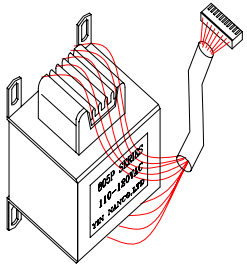
On/Off Switch & Fuse Holder

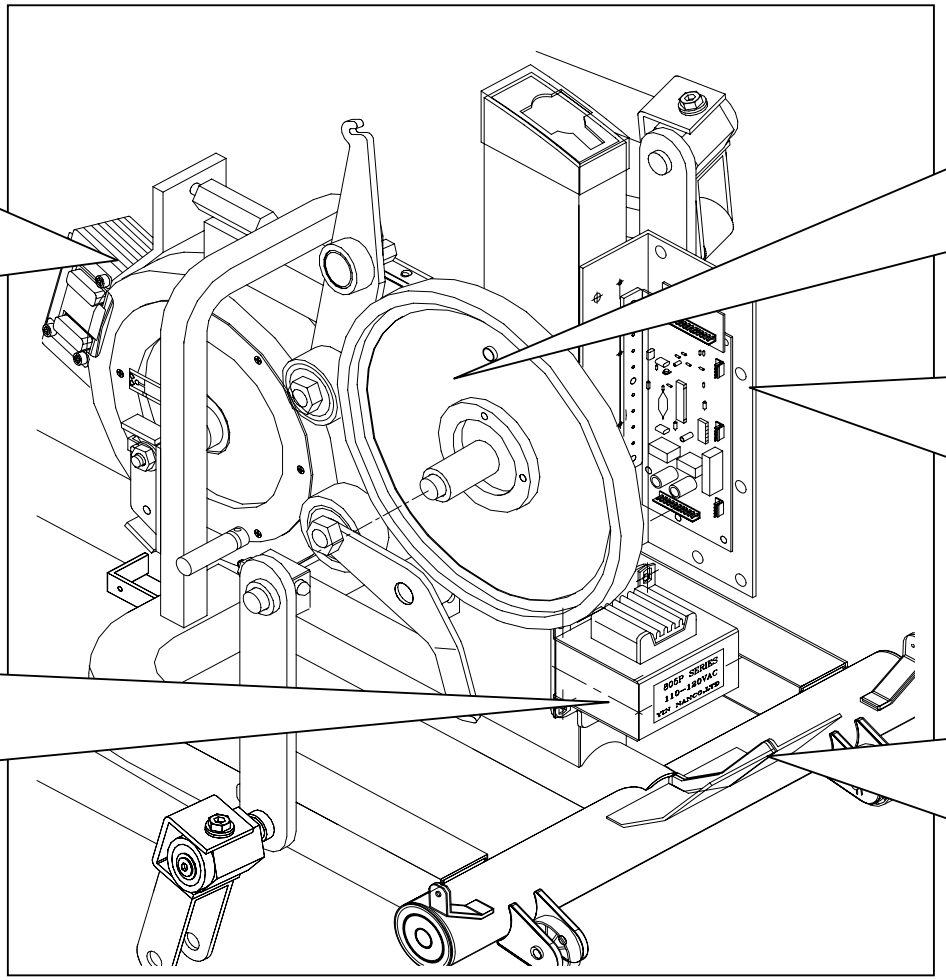


Magnet & Flywheel

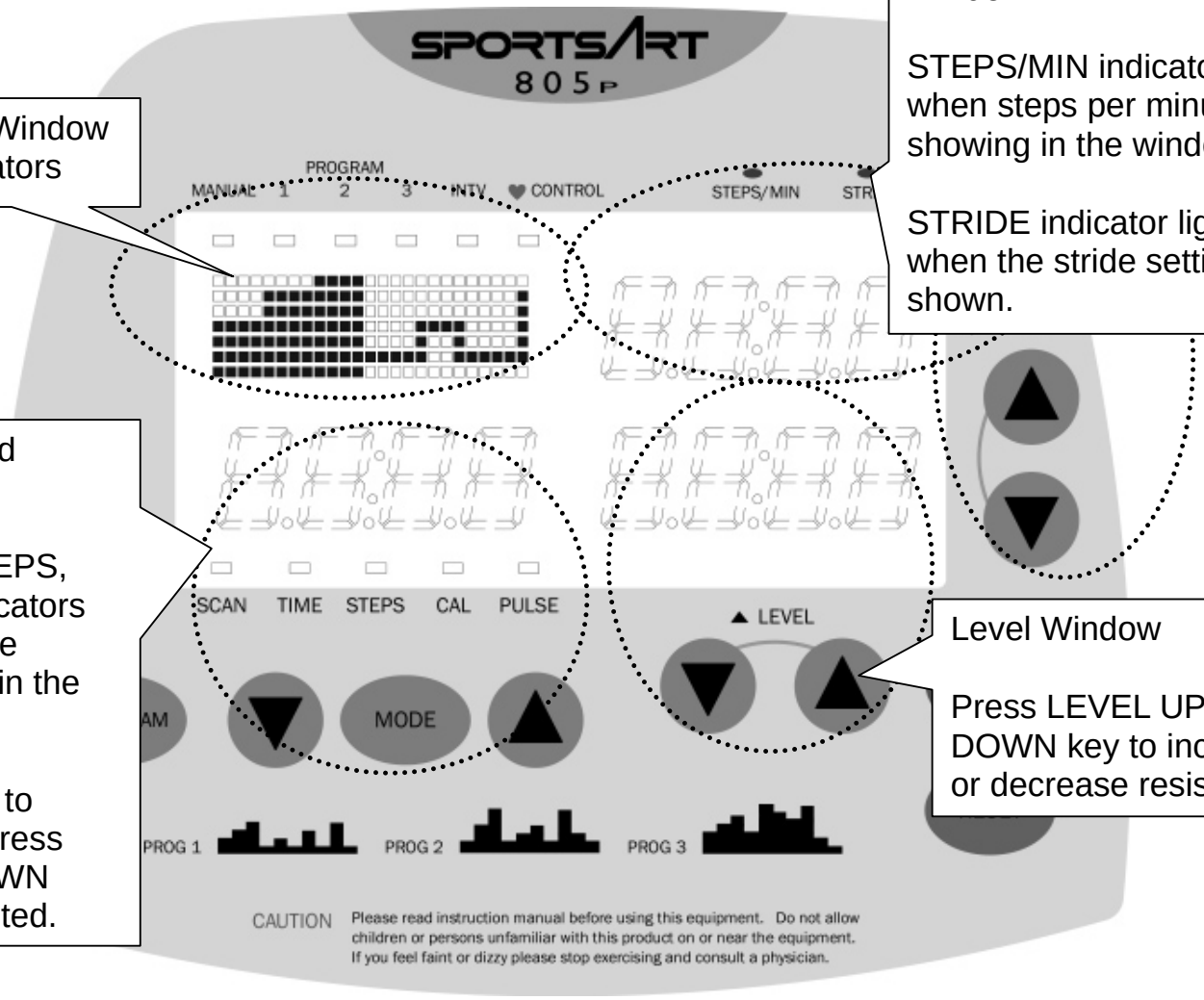


Transformer





Display Functions and Windows



Program Window and Indicators

STEPS/MIN & STRIDE Window

STEPS/MIN indicator lights when steps per minute are showing in the window.

STRIDE indicator lights when the stride setting is shown.

Mode Window and Indicators

SCAN, TIME, STEPS, CAL, PULSE indicators light to indicate the function showing in the window.

Press MODE key to change modes. Press MODE UP or DOWN keys when prompted.

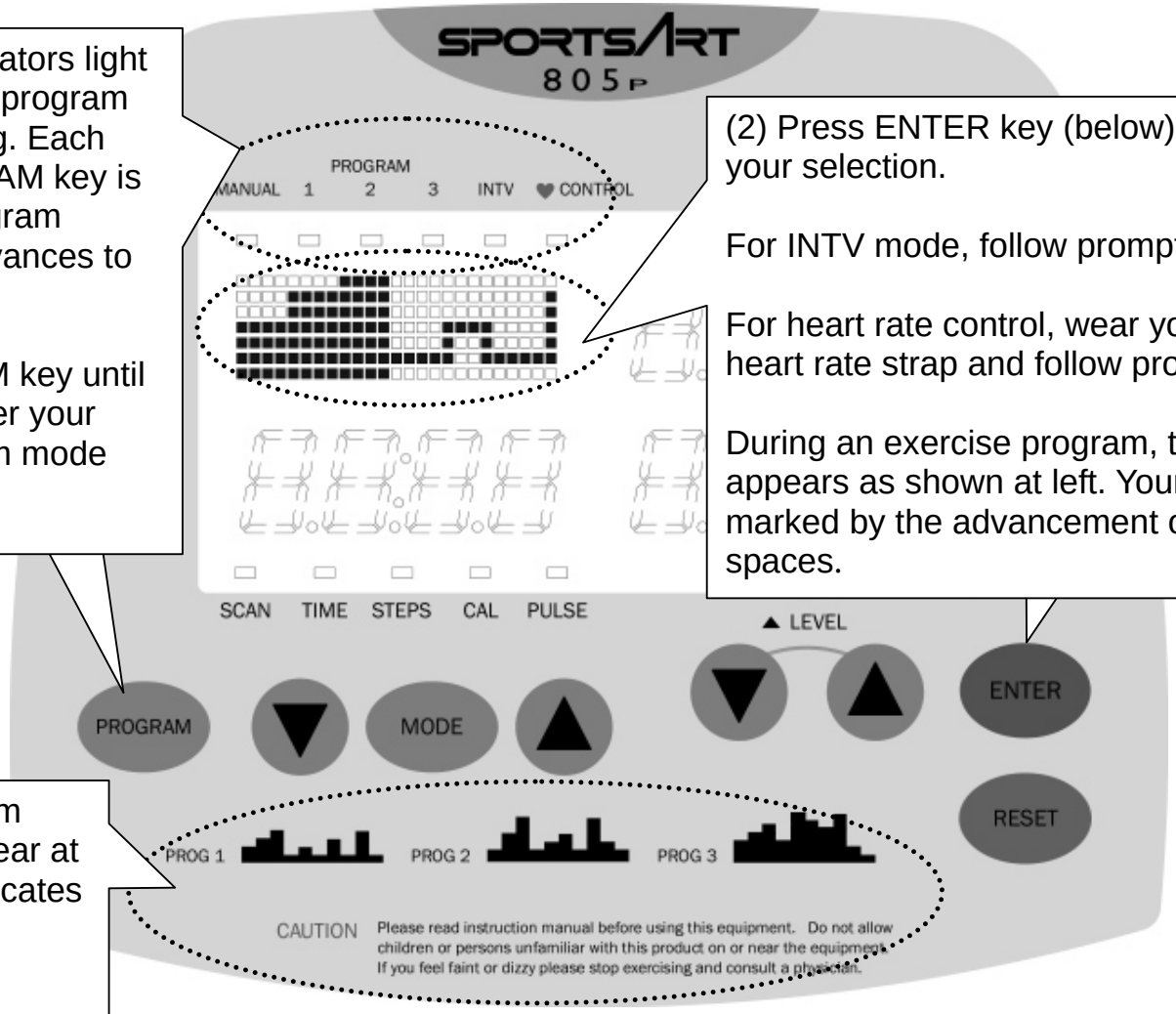
Level Window

Press LEVEL UP or DOWN key to increase or decrease resistance.

Programs

(1) Program indicators light to express which program mode is operating. Each time the PROGRAM key is pressed, the program indicator light advances to the right.

Press PROGRAM key until the indicator under your preferred program mode lights.



(2) Press ENTER key (below) to confirm your selection.

For INTV mode, follow prompts.

For heart rate control, wear your Polar heart rate strap and follow prompts.

During an exercise program, the screen appears as shown at left. Your progress is marked by the advancement of colored spaces.

Exercise program illustrations appear at right. Height indicates resistance: The higher, the more resistance.

Program Introduction and Operation

1. Manual Mode

Manual mode allows direct control of resistance and stride settings.
Operation: (a) Press the PROGRAM key until the MANUAL indicator lights.
(b) Press the ENTER key to confirm your choice. The main window will show “MAN’L”.
(c) Press LEVEL and STRIDE keys to set resistance and stride settings.

2. Program Mode

Built-in exercise programs provide the following workout routines.

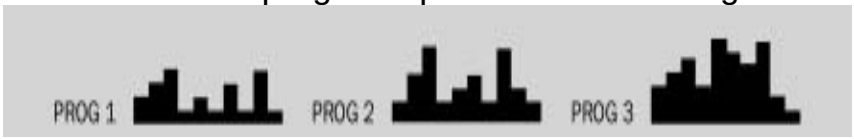
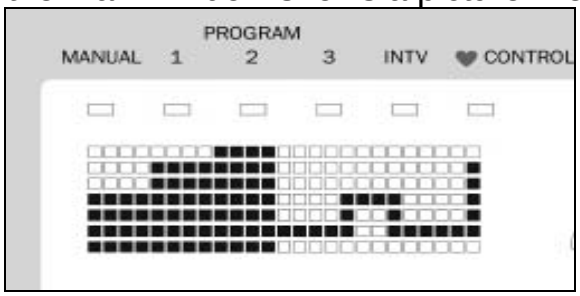


Illustration height represents resistance: the higher the column, the more resistance. (One dot (below) represents two resistance levels.) Horizontal length represents time. Once in exercise program mode, the main window shows a picture like the one below.



The illustration represents an exercise course. The user’s progress is tracked by the coloring of columns: Solid color columns mark an area already traveled; Uncolored columns represent an area not yet traveled.

Operation

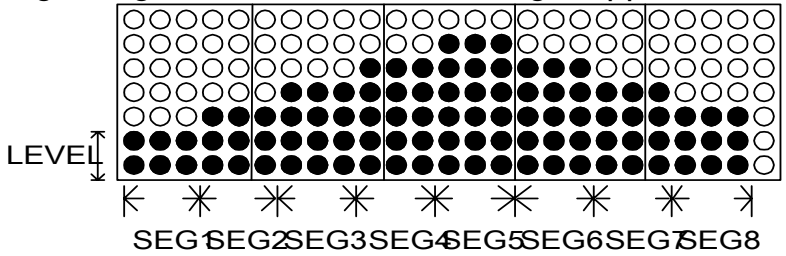
(a) Press the PROGRAM key until your preferred program appears in the main window. Program 1 appears as “PRO:1”; Program 2: “PRO:2”; Program 3: “PRO:3”.

(b) Press the ENTER key to confirm your selection. Press MODE<▲> or <▼> key to select a time length.

(c) Press the ENTER key to confirm your selection. The PROGRAM pattern appears and the program begins operating. Start exercising.

3.INTV Mode

Interval mode allows the user to create a unique exercise program -- all under microcomputer control. One interval includes eight segments, SEG1~SEG8. The user establishes LEVEL and TIME values. An eight-segment interval session might appear on the display like the following example.



Operation: (a) Press the PROGRAM key until the INTV indicator lights. “INTV” appears in the main window.

(b) Press the ENTER key to confirm your selection. The main window will show “SEG1”. The MODE window TIME indicator will light.

(c) Press the MODE UP or DOWN key to select a time length. Press the ENTER key to confirm your choice.

(d) Press the LEVEL UP or DOWN key to select a resistance level. Press the ENTER key to confirm your choice.

(e) Set all other segment resistance levels and time periods by following steps c-d again.

(f) The interval program will operate after all segments are programmed.

4. Heart Rate Control (HRC) Mode

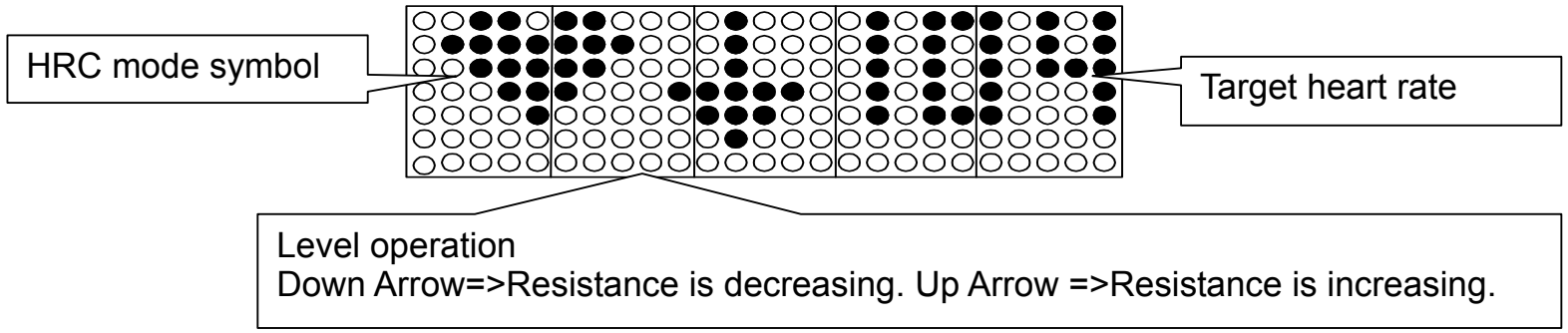
HRC mode allows users to exercise at an optimal heart rate for either cardio conditioning or fat loss. In heart rate control mode, the unit automatically adjusts the resistance level to keep the user's heart rate at a pre-set target. The pre-set target is based on a formula for optimum fat burn and cardio conditioning rates.

220 – (your age) = x
x * 65% = (your fat burn target heart rate)
x * 80% = (your cardio conditioning target heart rate)

So, for a 37 year old person, the formula works out as follows: 220 – 37 = 183.
Optimal fat burn heart rate: 183 * .65 = 119.
Optimal cardio conditioning heart rate: 183 * .80 = 146. The 805P figures this out for you.

Operation: (a) Press the PROGRAM key until the Heart Rate CONTROL indicator lights. The main window shows "HRC".
(b) Press the ENTER key. The program window shows "FAT" or "CARDIO".
(c) Press MODE<▲> or <▼> key until your preferred mode, FAT or CARDIO, appears. Press ENTER key to confirm your choice.
(d) "AGE35" appears in the mode window. Press MODE<▲> or <▼> keys until your age appears. Press ENTER key to confirm your choice.
(e) "MODIFY" appears in the program window and the PULSE indicator lights; MODE window shows the heart rate value. Press MODE<▲> or <▼> key to modify your target heart rate. When the display shows your preferred target heart rate, press <ENTER> to confirm your choice.
(f) "MODIFY" appears in the program window and the TIME indicator lights. "5:00" appears in the mode window.
Press MODE <▲> or <▼> key until your preferred workout period appears. Press ENTER to confirm your choice. (Continued on following page.)

(g) The main window will show the HRC pattern below and the unit will start operating in HRC mode.



Note:
HRC mode works only if the user is wearing a Polar heart rate strap. If the Polar strap loses contact, the display will show “NO ♥,” beep once, and return to MANUAL mode.

5. MODE Function

Mode provides two functions: (1) in operation, press the MODE key to toggle between TIME, STEPS, CAL, PULSE functions. (2) Mode also allows a time or step countdown. For example, in MANUAL mode, press the MODE key until the TIME indicator lights. Press the MODE up key to 10:00, for ten minutes. Then press the MODE down key. The display time reading will count down from 10:00, to 9:59, 9:58, 9:57.... At 0, the display beeps and begins counting up, 1,2,3….

6. STEP Function

The step function shows unit speed measured as steps per minute. It operates automatically. Exercise on the unit. The STEPS/MIN indicator lights, and the STEPS/MIN window shows the STEPS/MIN value. STEPS/MIN and STRIDE indicators toggle every six seconds.

7. STRIDE Function

The stride function shows the stride length setting and allows for stride adjustment. When the display STRIDE window lights, the STRIDE window shows the stride value. Stride range: 450-650 mm (17.0-26.0 inches); Stride and step indicators toggle every six seconds.

Operation: (a) Press STRIDE UP key on the display or handlebar until the STRIDE window shows 450 mm (17.0 inches). The STRIDE indicator lights. The stride linkage moves to the highest position on the stride support arm. (b) Press STRIDE DOWN key on the display or handlebar until the STRIDE window shows 650 mm (26.0 inches). The stride indicator lights. The stride linkage moves to the lowest position on the stride support arm.

8. LEVEL Function

The level function shows and sets the resistance value.

Operation: (a) Press LEVEL DOWN key until the LEVEL window shows 1. Exercise on the unit. Resistance is at the lowest level. (b) Press LEVEL UP key until the LEVEL window shows 14. Exercise on the unit. Resistance is at the highest level.

9. RESET Function

Reset clears all functions except STRIDE to 0.

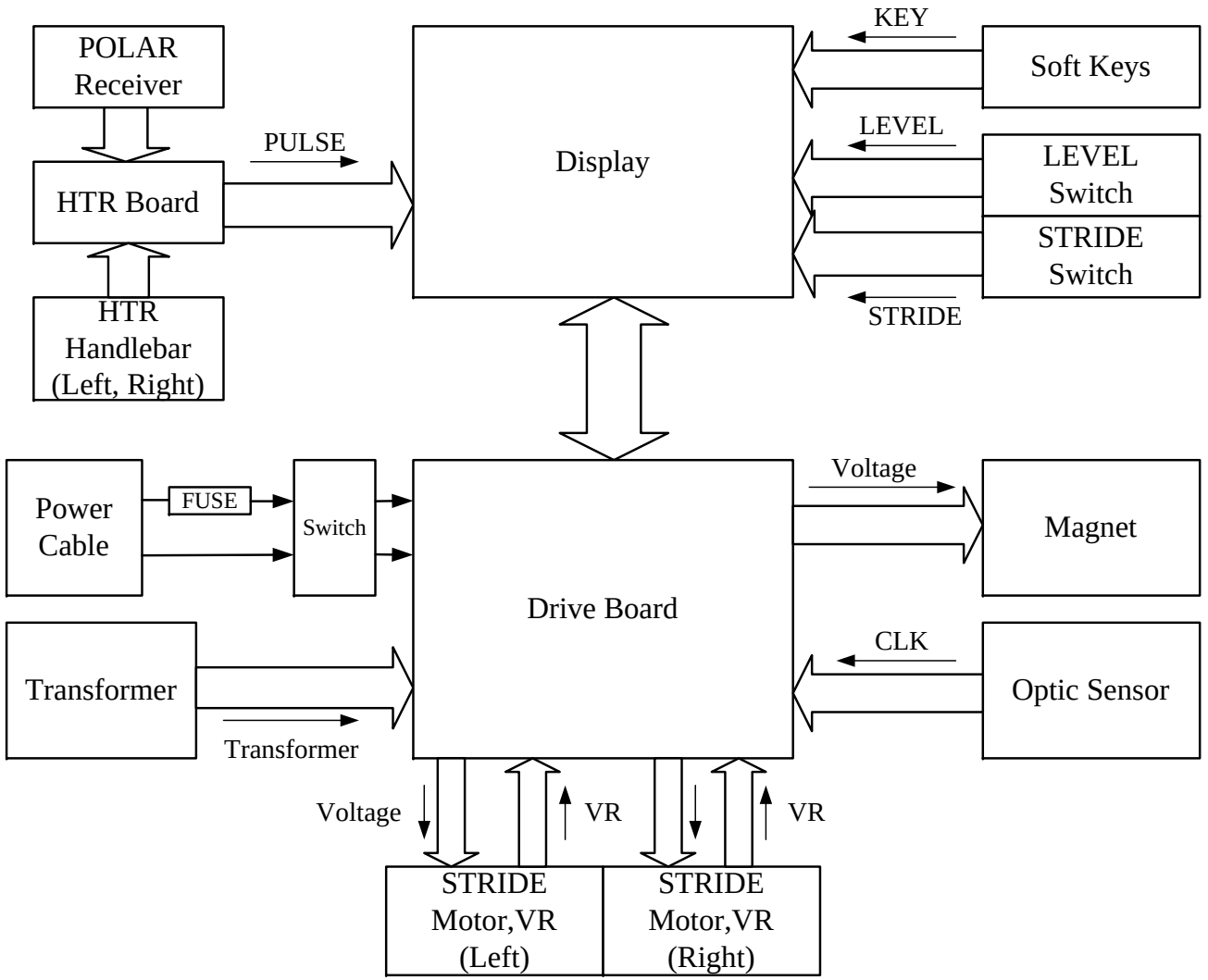
Operation: Press the RESET key. The display beeps once, and all functions except stride show 0.

How to Switch from Metric (KPH) to American (MPH) Standard; Also, How to Input User Weight
Operation: (a) Press the MODE key for three seconds. The program window shows “SET”.
(b) Press the ENTER key. The program window will show “KG” or “LB”.
(c) Press MODE DOWN or UP key to toggle between KG and LB.
(d) When your preferred unit of measurement appears, press the ENTER key to confirm your choice.
(e) The program window shows a weight, for example, 150 LB. Press MODE UP or DOWN key to find your weight. Press the ENTER key to confirm your choice.

How to Operate Display LCD Test
The display test allows easy inspection of all display marks.
(a) Turn on the unit and don’t press any other keys.
(b) Simultaneously press the STRIDE DOWN and ENTER keys.
(c) Display LEDs light in a sequential order, then a prompt appears: “KEY 1”.
(d) When “KEY 1” appears, press the PROGRAM key.
(e) When “KEY 2” appears, press the MODE DOWN key.
(f) Press the following keys when prompted. “KEY 3” = MODE key; “KEY 4” = MODE UP key; “KEY 5” = LEVEL DOWN key; “KEY 6” = LEVEL key; “KEY 7” = LEVEL UP key; KEY 8 = STRIDE UP key; “KEY 9” = STRIDE key; “KEY 10” = STRIDE DOWN key; “KEY 11” = ENTER key; “KEY 12” = RESET key. (g) The display will show “OK.”

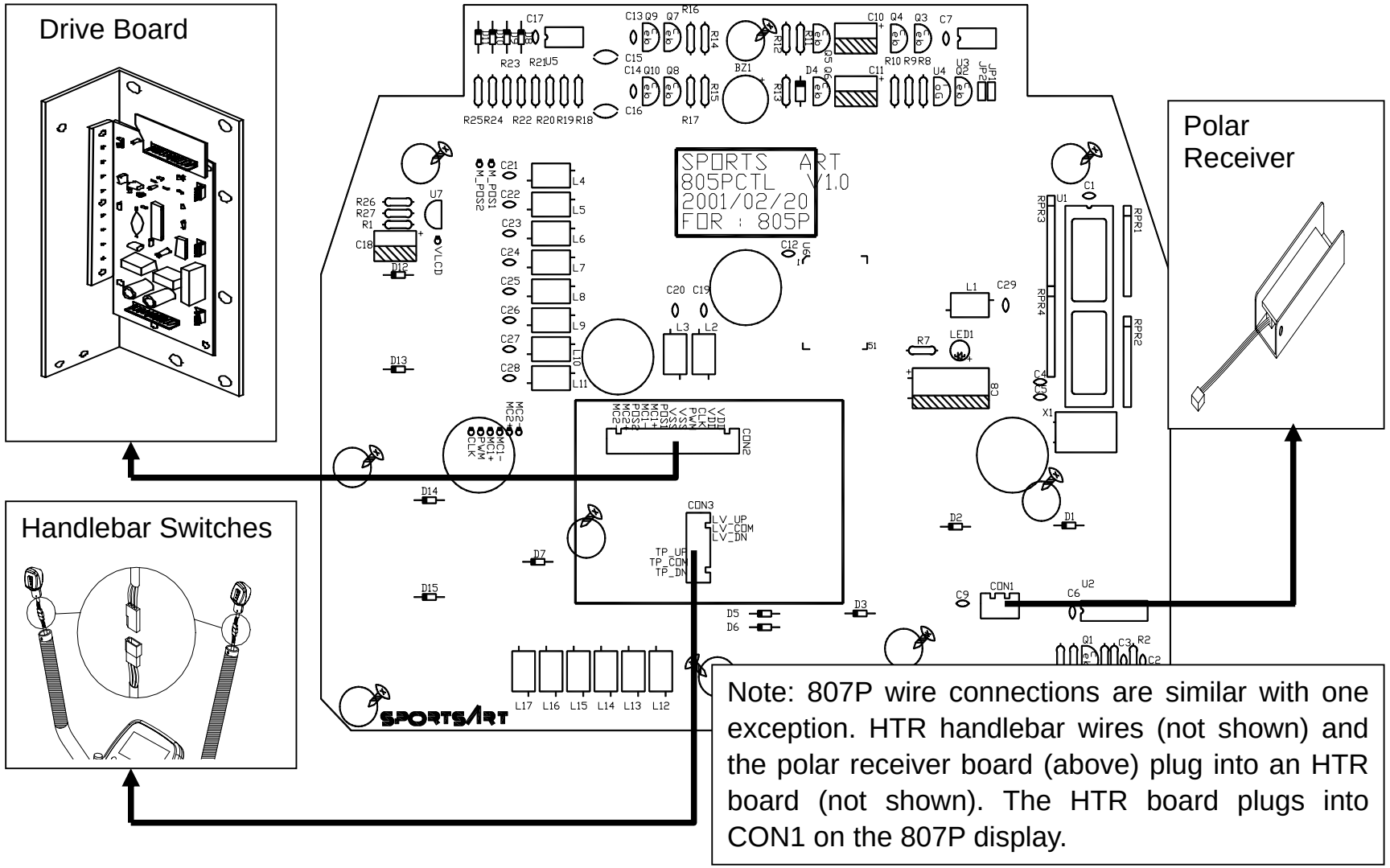
How to View Mileage In Memory; How to Erase Mileage Memory
(a) Turn on the unit and don’t press any other keys.
(b) Simultaneously press LEVEL DOWN+ENTER keys. Mileage value will appear on the display.
(c) Simultaneously press LEVEL UP+ENTER keys. “OK” appears to indicate that mileage memory has been erased.

805P and 807P Operation Diagram

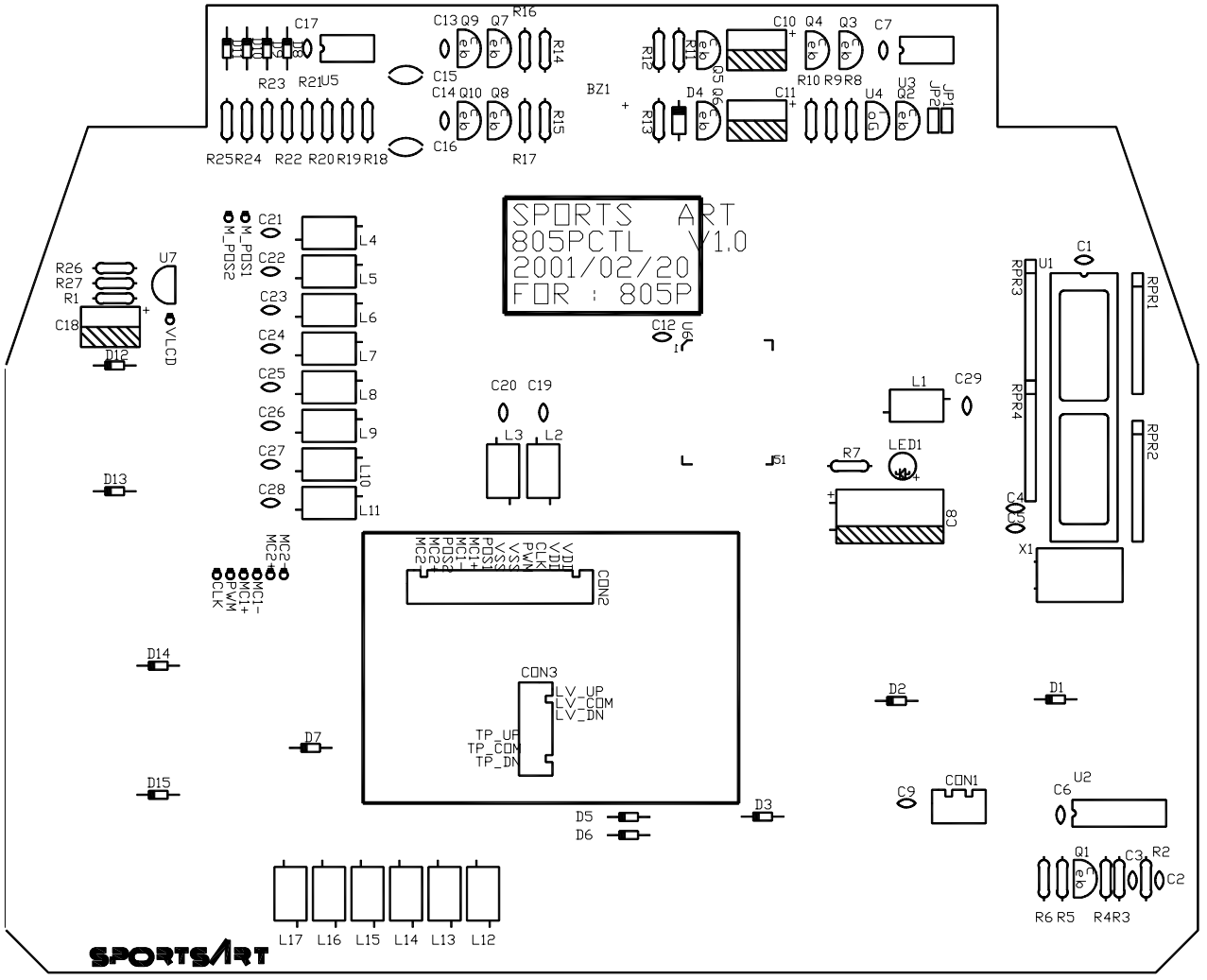


Display

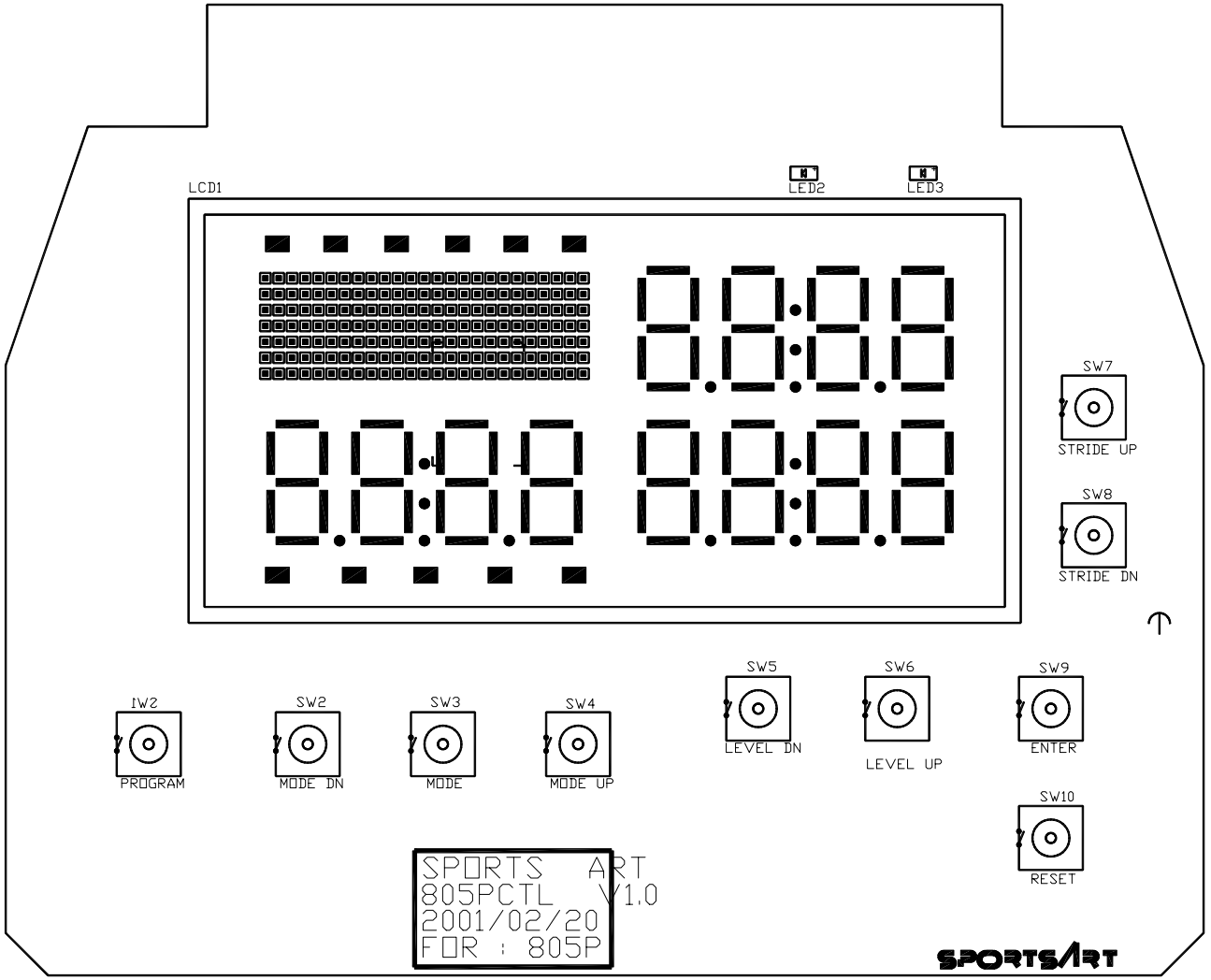
805P Display Board Wire Connections



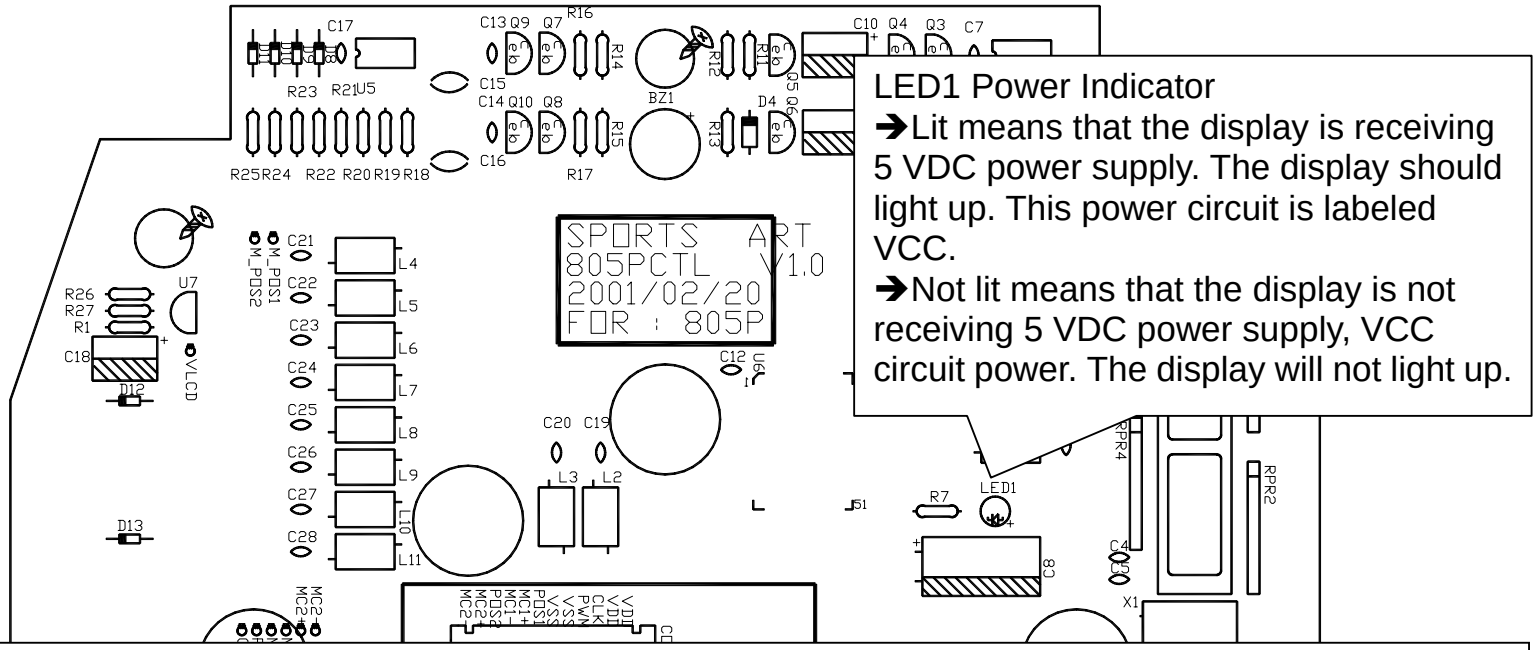
805P Display Board Component Locations – Back Side



805P Display Board Component Locations – Front Side



805P Display Board Indicator Definitions



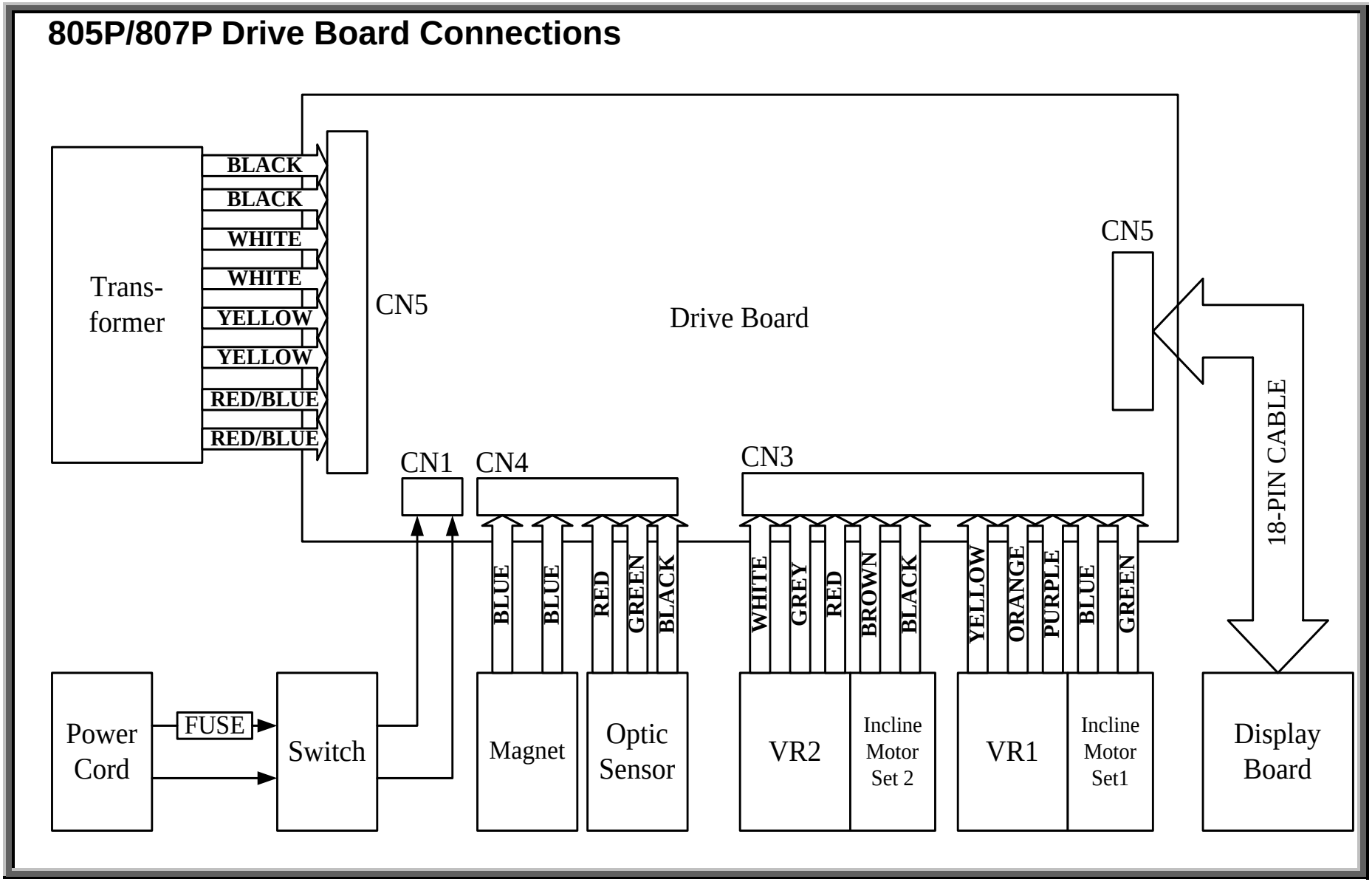
LED1 Power Indicator
➔Lit means that the display is receiving 5 VDC power supply. The display should light up. This power circuit is labeled VCC.
➔Not lit means that the display is not receiving 5 VDC power supply, VCC circuit power. The display will not light up.

807P Display Board Indicator Definitions

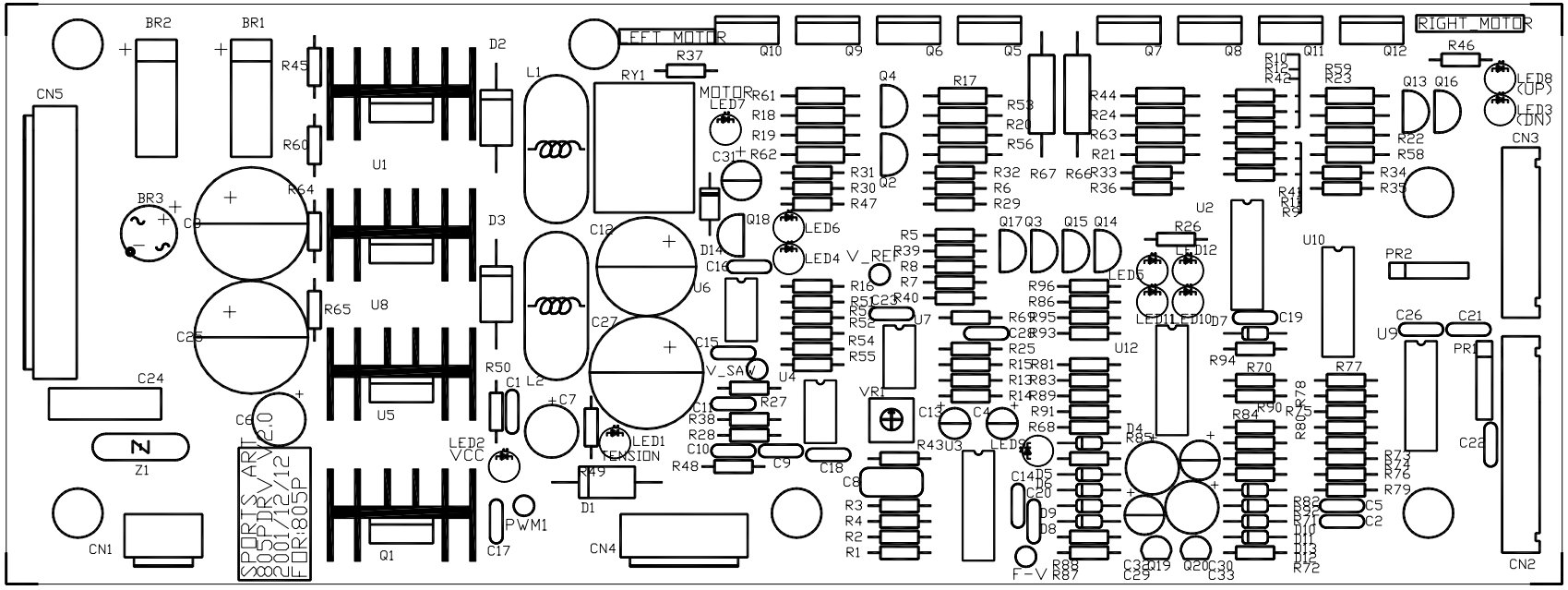
Led13 Power Indicator (top center, not shown)
➔Lit means that the display is receiving 5 VDC power supply. The display should light up. This power circuit is labeled VCC.
➔Not lit means that the display is not receiving 5 VDC, VCC circuit power. The display will not light up.

Led14 CLK (optic sensor) Indicator (right side, not shown)
Flashes when optic sensor signal enters display at low speed. Appears to remain lit when signal enters at high speed.

Drive Board


805P/807P Drive Board Connections
Trans-
former
BLACK
BLACK
WHITE
WHITE
YELLOW
YELLOW
RED/BLUE
RED/BLUE
CN5
Drive Board
CN5
18-PIN CABLE
CN1
CN4
CN3
BLUE
BLUE
RED
GREEN
BLACK
WHITE
GREY
RED
BROWN
BLACK
YELLOW
ORANGE
PURPLE
BLUE
GREEN
Power
Cord
FUSE
Switch
Magnet
Optic
Sensor
VR2
Incline
Motor
Set 2
VR1
Incline
Motor
Set1
Display
Board

805P/807P Drive Board Component Illustration

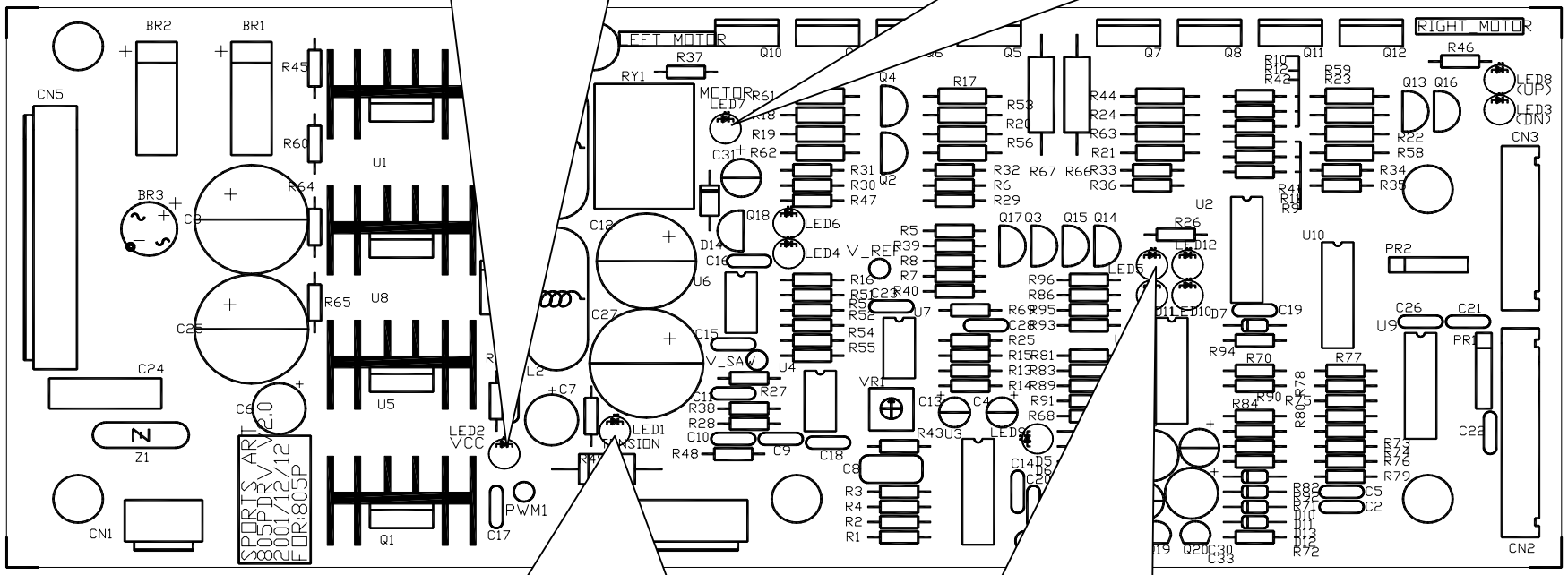


Note: Subsequent revisions have changed the appearance of the drive board, which now has two layers.

805P/807P Drive Board Indicator Locations and Definitions – LED 1, 2, 5,7

LED2 5 VDC (VCC circuit) Power Indicator
Lit➔Sending power to the display board

LED7 24 VDC
Lit➔Sending power to the stride motors



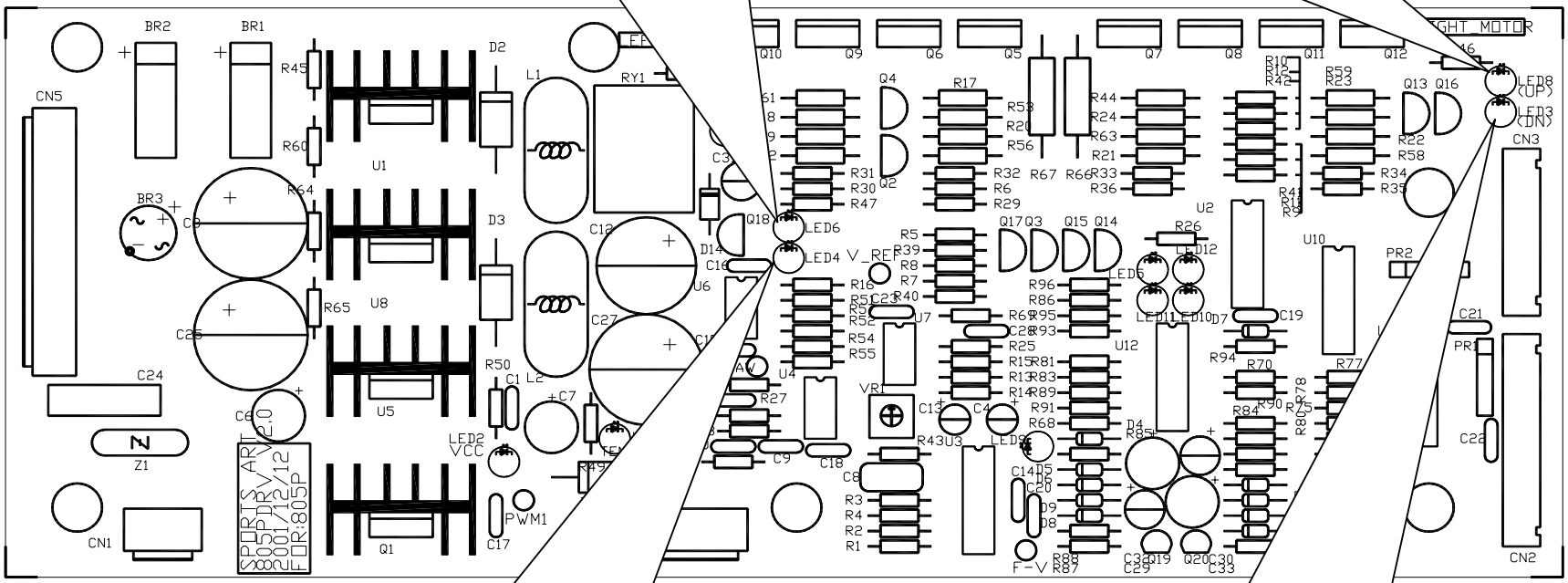
LED1 VDD (Electro-magnet circuit)
Lit➔Sending power to the electro-magnet for resistance

LED5 CLK
Flashing➔Receiving the optic sensor signal

805P/807P Drive Board Indicator Locations and Definitions – LED 3, 4, 6, 8

LED6 UP (STRIDE 1)
Lit➔ STRIDE 1 Motor is operating up.

LED8 UP (STRIDE 2)
Lit➔STRIDE 2 motor is operating up.



LED4 DN (STRIDE 1)
Lit➔ STRIDE 1 motor is operating down.

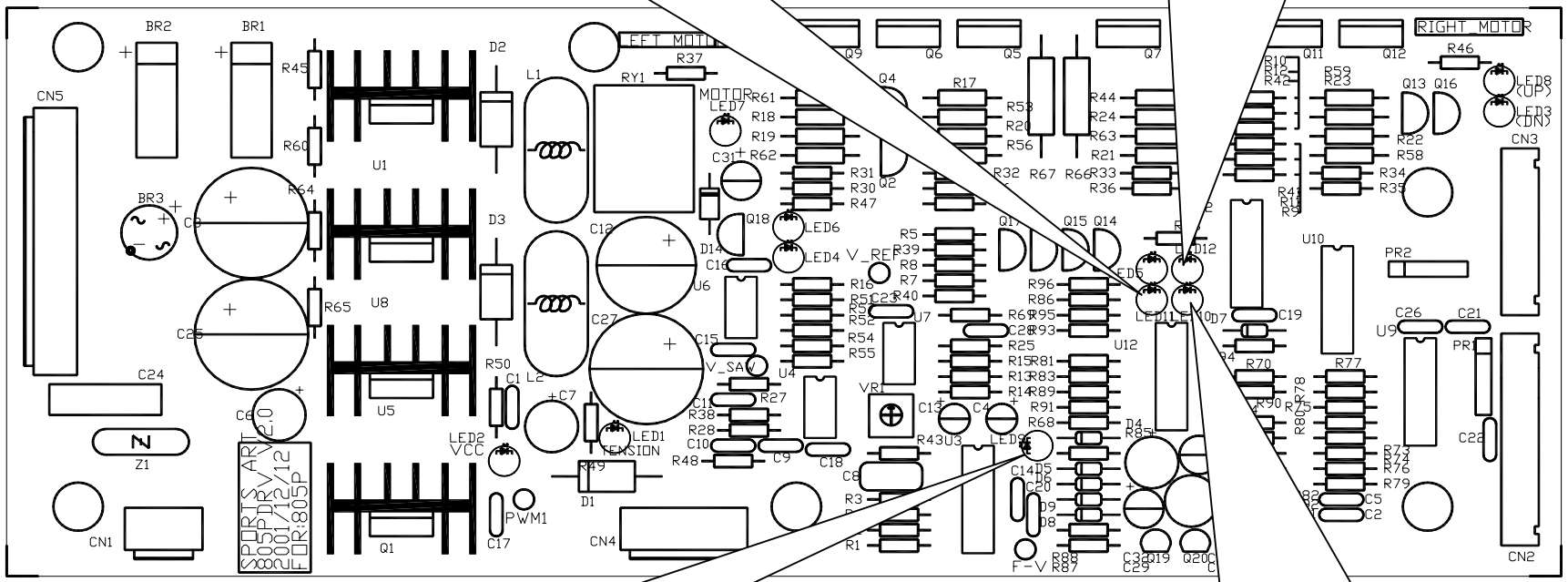
LED3 DN (STRIDE 2)
Lit➔ STRIDE 2 motor is operating down.

Note: A subsequent revision (addition of a second layer) to the drive board has partially obscured LEDs.

805P/807P Drive Board Indicator Locations and Definitions – LED 9, 10, 11, 12

LED11 POWER_DN_R
Not lit➔ STRIDE motor protection feature is activated on left side.

LED12 POWER_DN_L
Not lit➔STRIDE motor protection function is activated on right side.

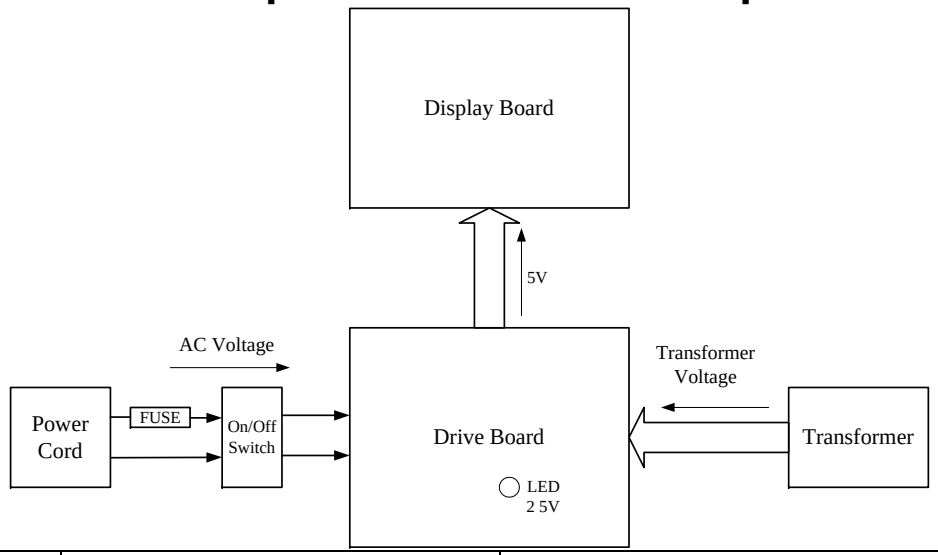


LED9 OVER_R
Not lit➔Right side STRIDE incline motor current draw is too high.

LED10 OVER_L
Not lit➔ Left side STRIDE incline motor current draw is too high.

Power

805P/807P Elliptical Trainer Power Up



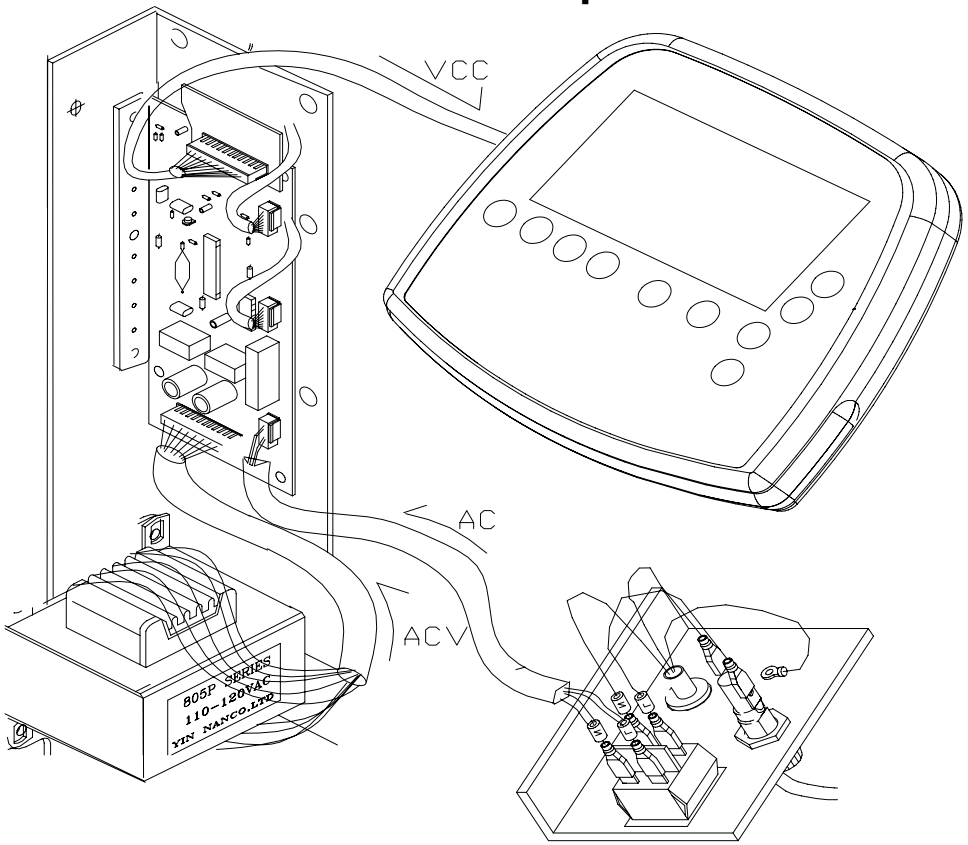
What Happens

Plug the power cord into the wall outlet and flip "ON" the power switch. Here's what happens inside the unit.

Left: Power Up Diagram
Below: Explanation

Order	Part	Operation
1	Cord, Fuse, On/Off Switch	1. Power cord supplies alternating current (AC) voltage to the drive board.
2	Transformer	1. Transformer reduces the AC voltage for various circuits and sends it back to the drive board.
3	Drive Board	1. The drive board processes the transformer voltage, converting it into direct current (DC) voltage. 2. Drive board sends 5 VDC power to the display (labeled "VCC" power). LED2 VCC indicator lights.
4	Data Cable	1. VCC power conducts across the cable to the display board.
5	Display Board	1.Upon receiving voltage, the display board "beeps" once and lights up; the power LED inside the display also lights up.

Illustration of the Power Up Process



Troubleshooting

If the unit doesn't power up, inspect the following:

Drive Board VCC – POWER.03

Display Board – POWER.05

Transformer – POWER.07

(Illustrations follow)

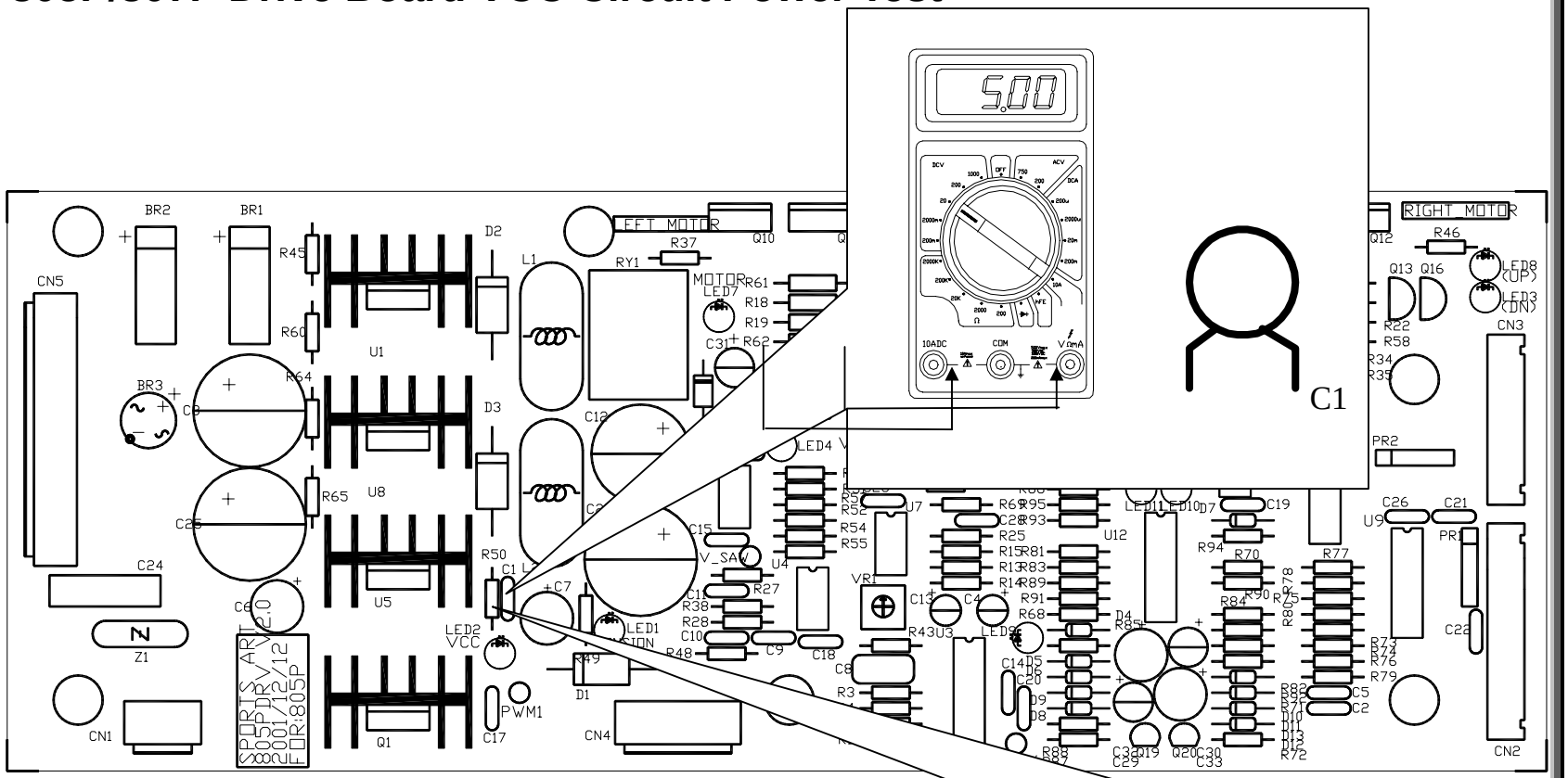
Other Places to Inspect (not shown):

Power cord – Should be in tact.

Fuse – 15A should have continuity.

On/Off Switch – Indicator should light.

805P/807P Drive Board VCC Circuit Power Test



LED2 VCC
Lit = There is 5 VDC (VCC circuit power) at the drive board.

Drive Board VCC Power Test Procedure

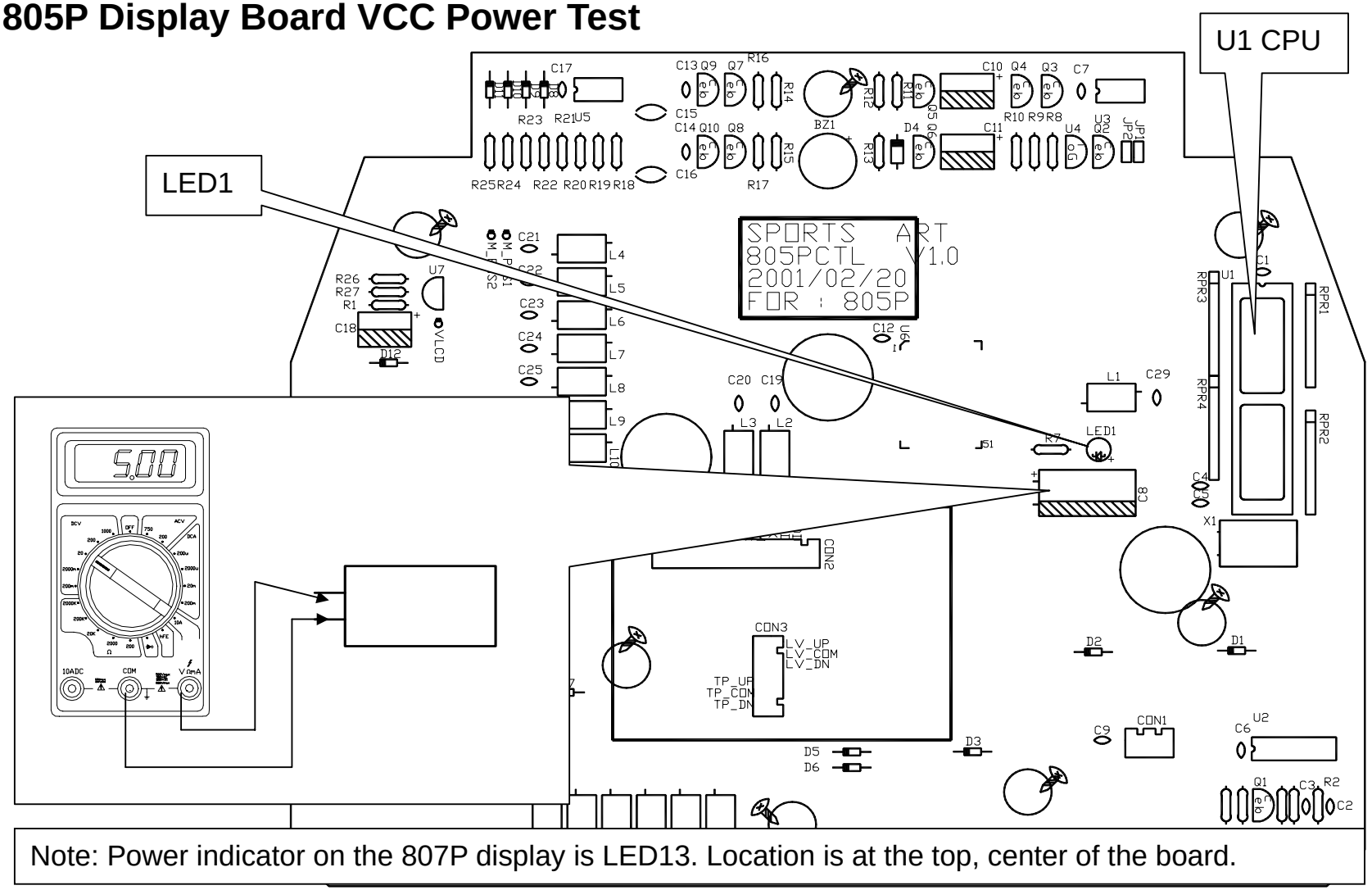
1. Turn on the power switch. The power switch should light. If it doesn't light, inspect the unit fuse.
2. The drive board LED2 VCC power indicator should light. See illustration in POWER.03.
3. There should be voltage across capacitor C1. To test the capacitor, place one multimeter probe on each pin of capacitor C1 on the drive board. See illustration in POWER.03. Set multimeter to VDC. Normal reading: 4.8-5.2 VDC. (LED2 and this test shows the same thing, VCC circuit power.)
4. If the reading is not as above, test the transformer voltage. See POWER.07.

Drive Board VCC Power Output Test

To see whether the drive board is putting out power to the display, take readings at the CN3 cable connector on the drive board.

1. Put the black multimeter probe on the first pin from the left (this pin connects to the black wire on the cable).
2. Put the red probe on the third pin from the right. Take a reading. Then put the red probe on the fourth pin from the right. Normal reading in both locations: 4.8-5.2 VDC.

805P Display Board VCC Power Test

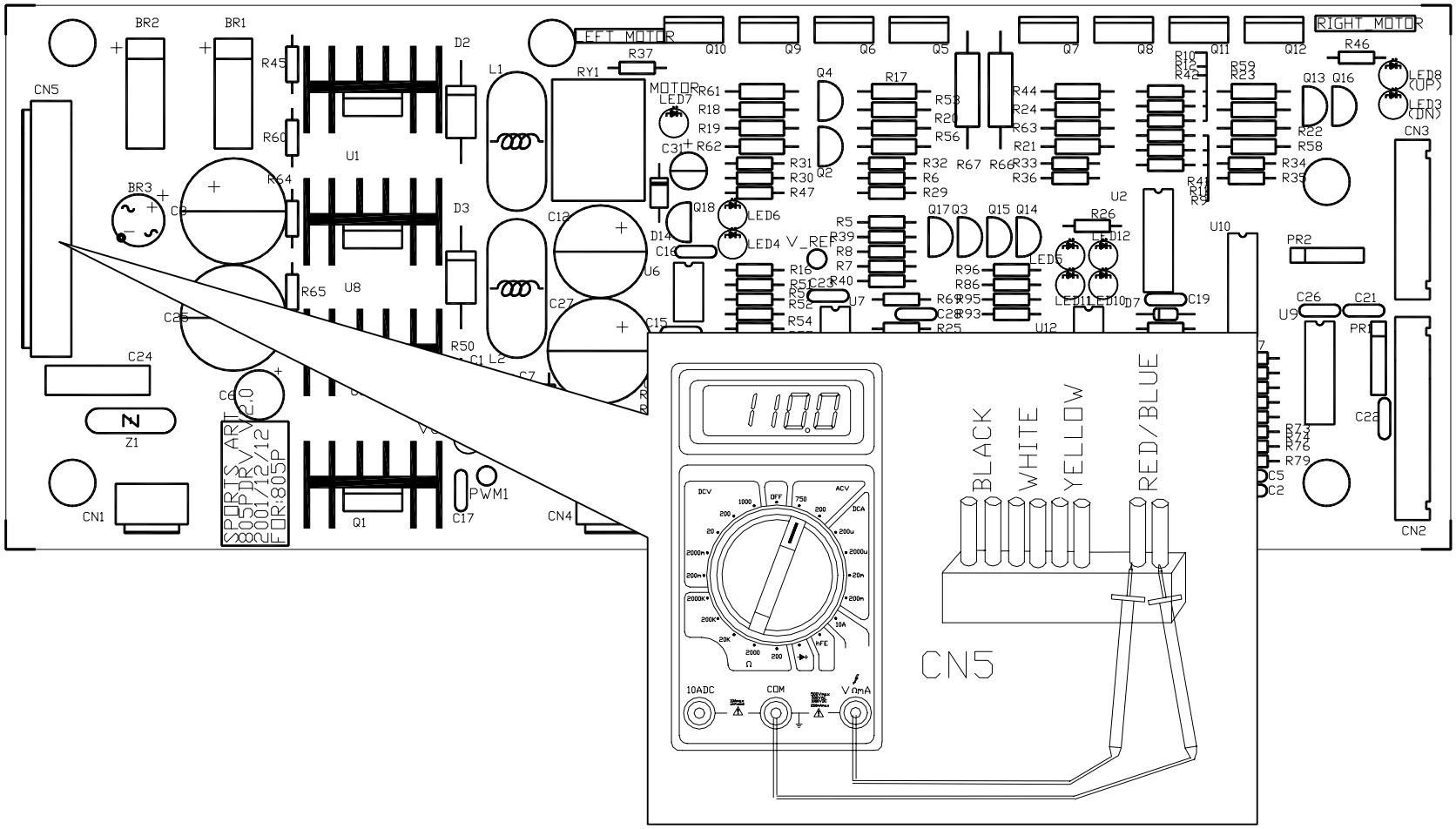


Note: Power indicator on the 807P display is LED13. Location is at the top, center of the board.

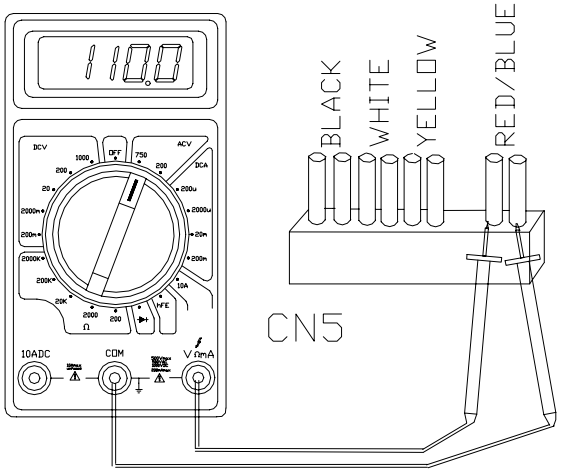
Display Board VCC Power Test Procedure

1. Turn on power. Power switch indicator should light up.
2. Drive board LED2 VCC power LED should light up.
3. Display board LED1 (on 807P, LED13) should light up. This indicates 5 VDC across the pins of capacitor C8 on the 805P display board (see Power.05). See illustration.
4. If the display board LED1 lights but the display doesn't light up, reinstall display board U1 CPU to ensure proper contact.

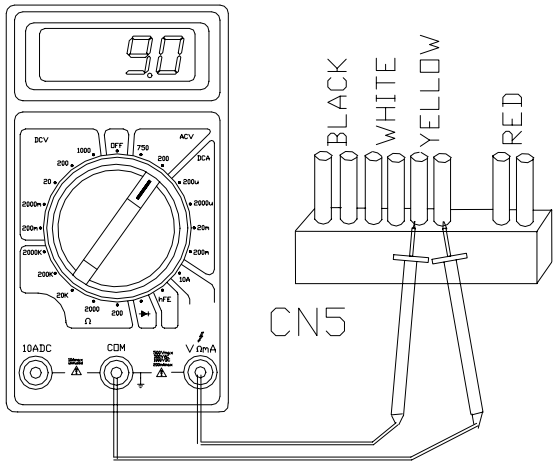
Transformer Primary Voltage Test



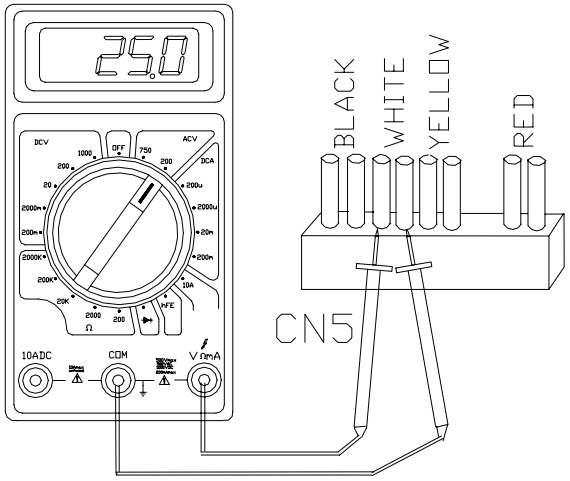
1. Transformer Primary Test (red-red or blue-blue)



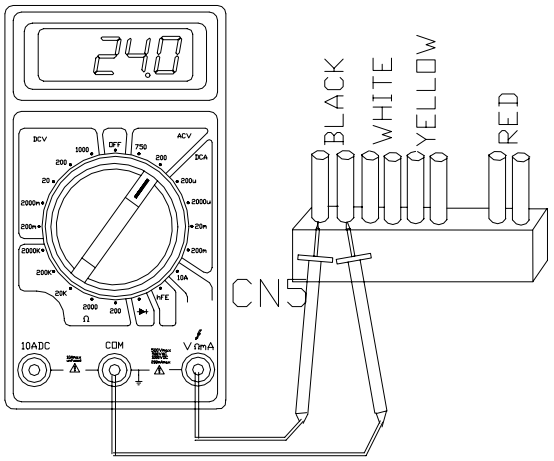
2. Transformer Secondary Test (yellow-yellow)



3. Transformer Secondary Test (white-white)



4. Transformer Secondary Test (black-black)



Transformer Primary Test Procedure

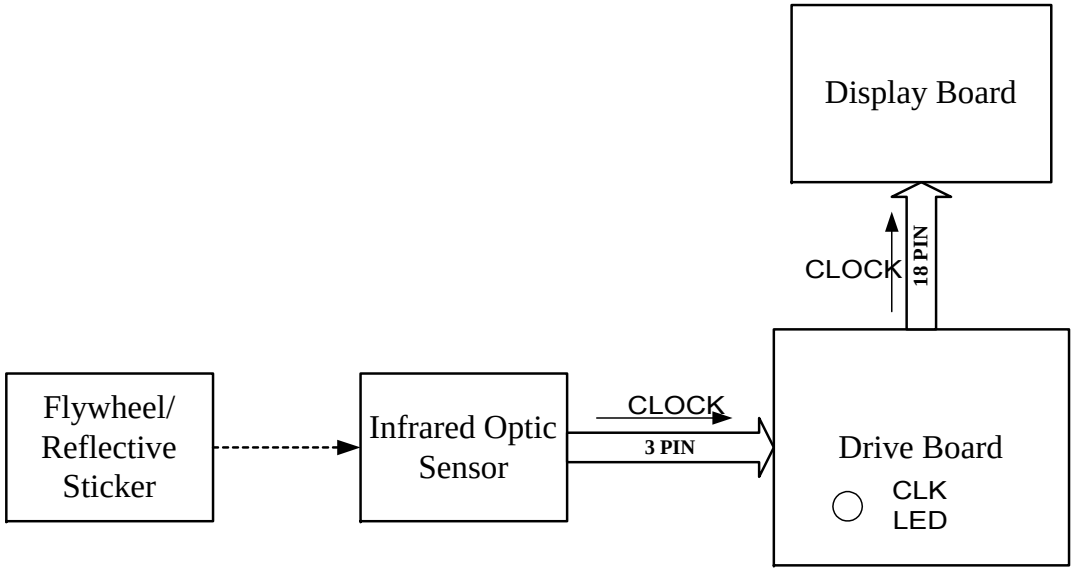
1. Do not disconnect wires from the drive board.
2. Turn on unit power. The power switch should light up.
3. Place probes as shown in Figure 1, POWER.08. Normal reading: 110 VAC (USA, Canada).
4. If there is no voltage, inspect the transformer cable and its connections. Other possible points to inspect include the power switch, fuse, wall power socket.

Transformer Secondary Test Procedure

1. Do not disconnect wires from the drive board.
2. Turn on unit power. The power switch should light up.
3. Place probes as shown in Figure 2, POWER.08, on the two yellow wire connectors. Normal reading: 9.0 VAC.
4. Place probes as shown in Figure 3, POWER.08, on the two white wire connectors. Normal reading: 25.0 VAC.
5. Place probes as shown in Figure 4, POWER.08, on the two black wire connectors. Normal reading: 24.0 VAC.
6. If the primary test is normal, but the secondary test is not normal, inspect the transformer cable connections. Replace the transformer.

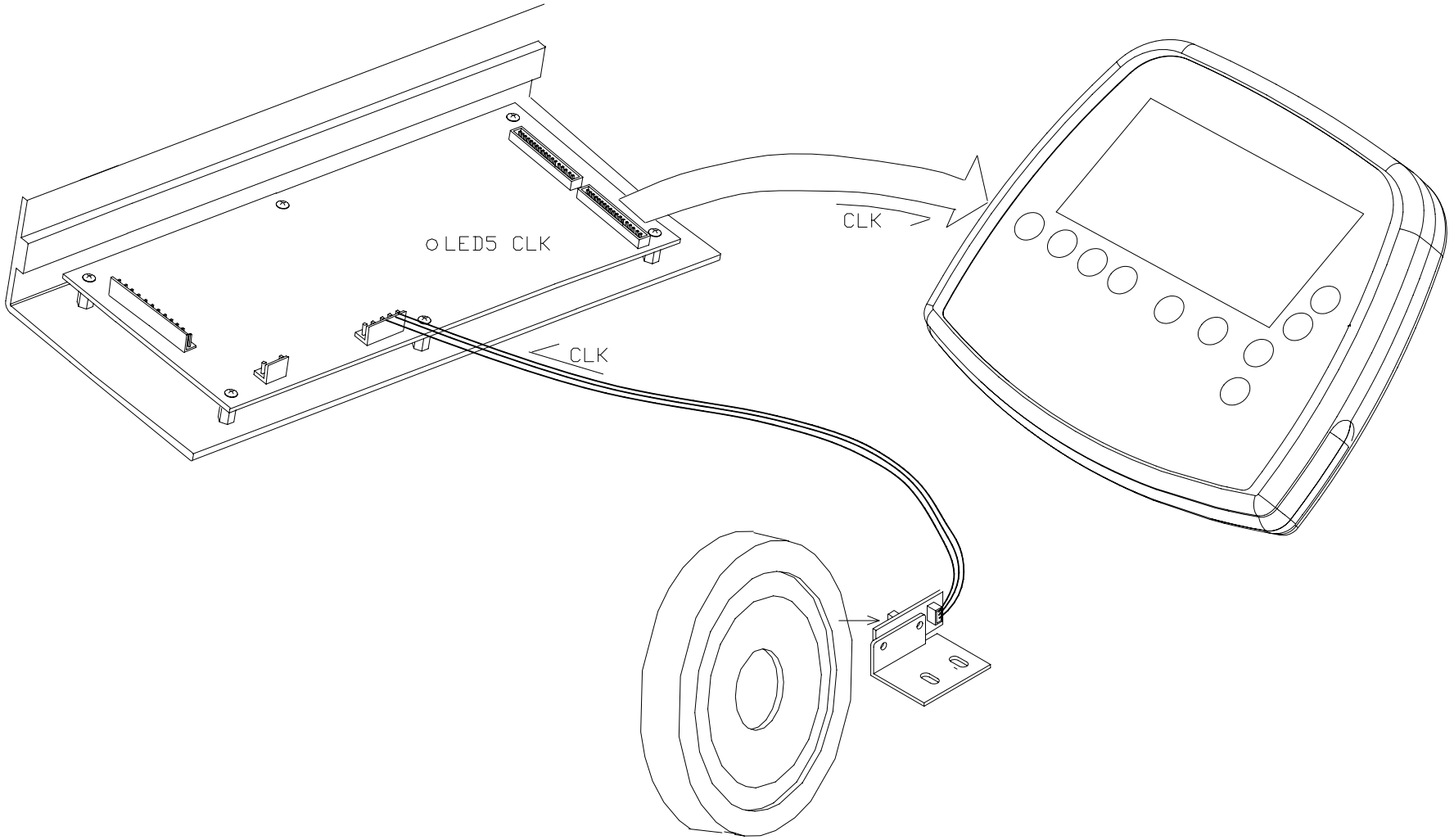
Optic Sensor

Optic Sensor Operation



Order	Part	Operation
1	Flywheel	1. Exercising on the unit makes the flywheel rotate.
2	Optic Sensor	1.The optic sensor detects movement of the reflective sticker on the flywheel.
3	Sensor Cable	1. The optic sensor signal travels the sensor cable to the drive board.
4	Drive Board	1. Drive board LED5, marked CLK (the optic sensor LED), lights after the drive board receives the optic sensor signal. 2. Drive board LED5 flashes or remains lit, depending on flywheel rotation speed.
5	Data Cable	1. The optic sensor signal is transmitted to the display.
6	Display Board	1. The CPU (the main integrated circuit chip) reads the optic sensor signal. 2. The display STEPS/MIN window lights. STEPS/MIN window shows the speed.

Optic Sensor Signal Illustration



Optic Sensor Malfunction

Symptom: No step count; no step count per minute. “STEP” flashes on the display, even though someone is exercising on the unit. All these symptoms indicate no optic sensor signal to the display.

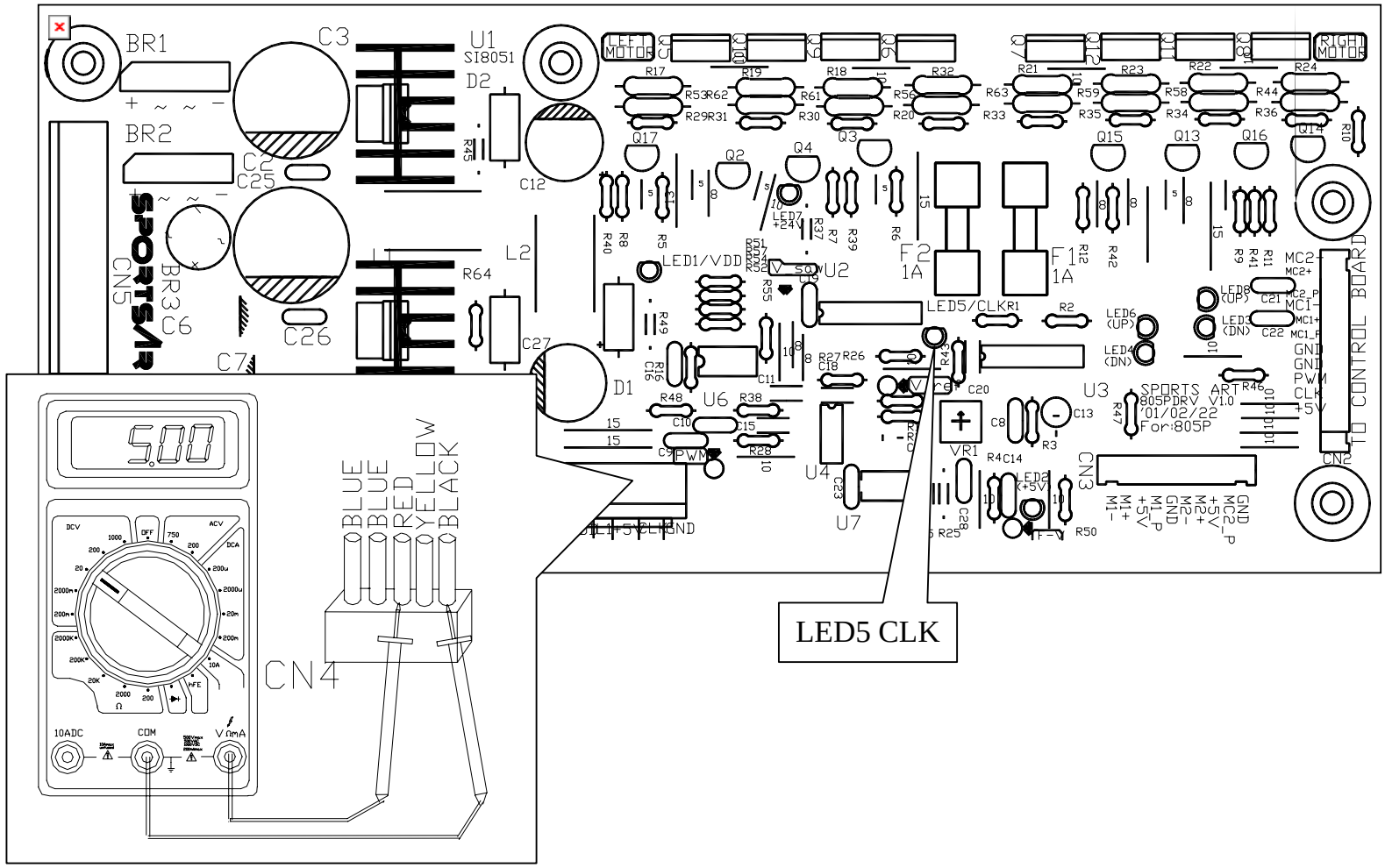
Troubleshooting

1. LED5, the CLK optic sensor signal indicator, on the drive board should flash when the flywheel rotates. A flashing CLK LED indicates that the optic sensor signal arrives at the drive board. See illustration, OPTIC.04.

If the CLK LED does not light, do the following.
(a) Inspect the optic sensor and reflective sticker distance. See Fig. 1, OPTIC.05.
Normal distance: 1/8 to 1/4 inch; 3-7 mm.
(b) Inspect the optic sensor wires to the drive board.
(c) Take readings of the optic sensor power supply and signal output at the drive board CN4 connector. See illustration, OPTIC.06.

Test	Probe Positions	Normal Voltage	Abnormal	If Abnormal:
Power Supply	Red probe on red wire connector– Black probe on black wire connector	5 VDC	Under 4.5 VDC	Inspect wires, drive board VCC power; See LED2 VCC 5 VDC on DRIVE.03.
Signal Output	Red probe on yellow wire connector – Black probe on black wire connector	1.5-3.5 VDC	5 or 0 VDC while flywheel moves	Replace optic sensor if power supply is OK.

Optic Sensor Signal LED and Test Location



Optic Sensor Tests

Fig. 1: Optic Sensor & Reflective Sticker Distance

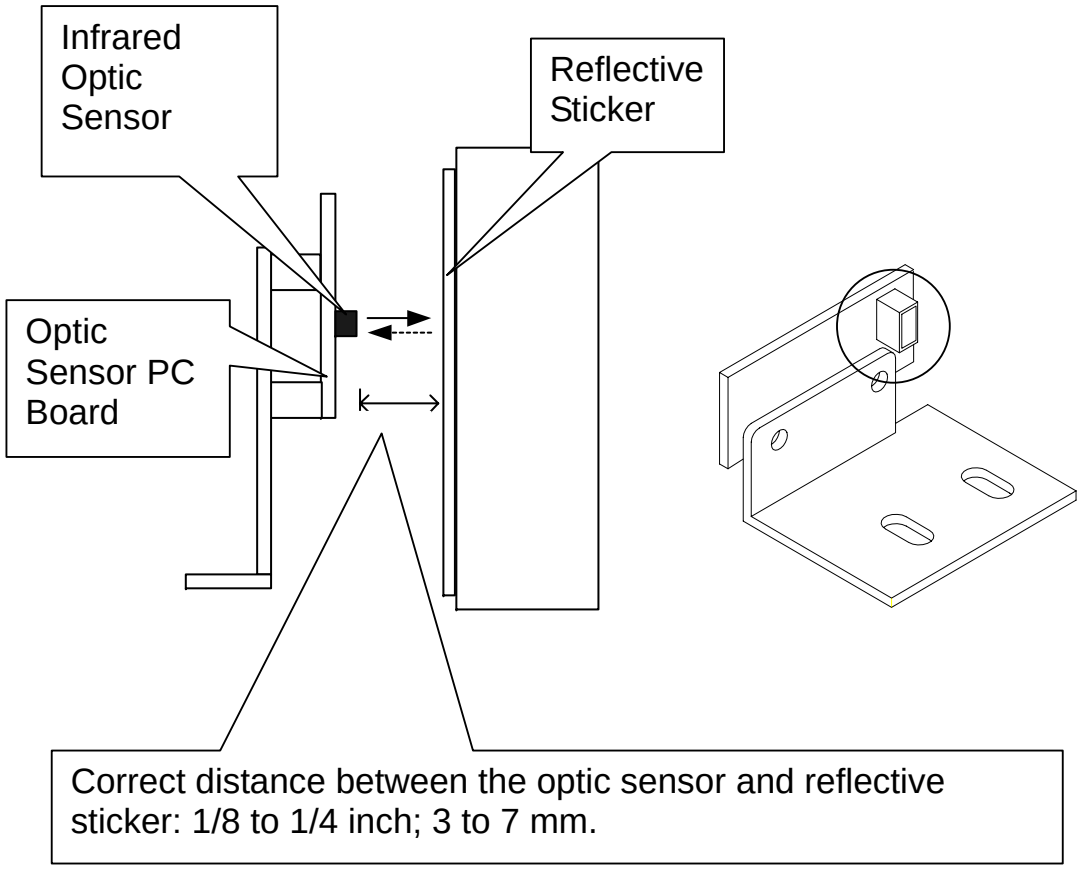
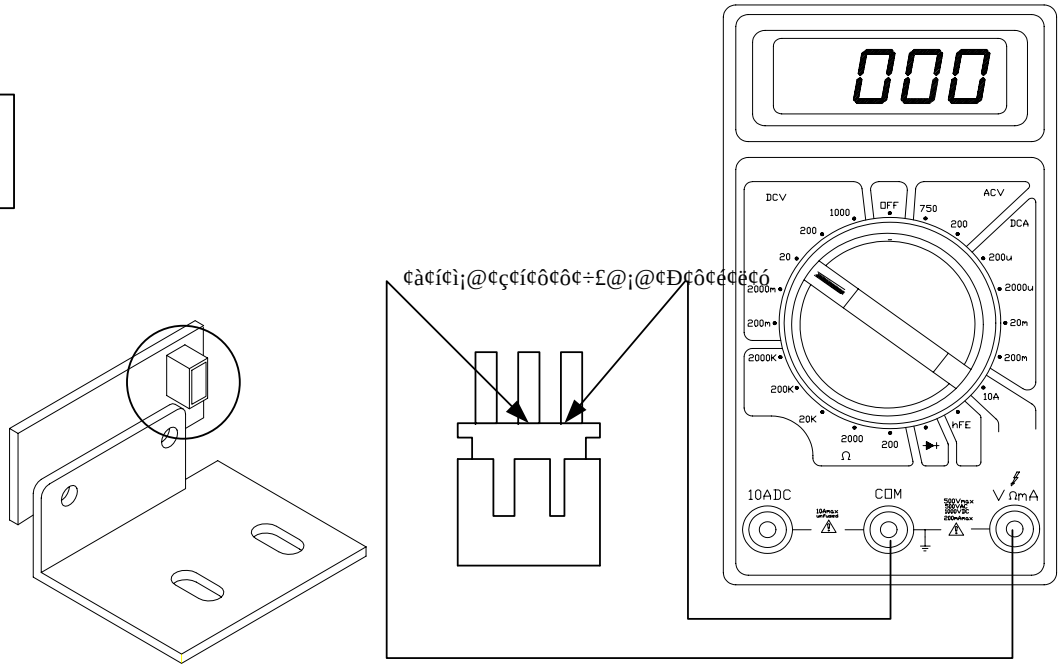
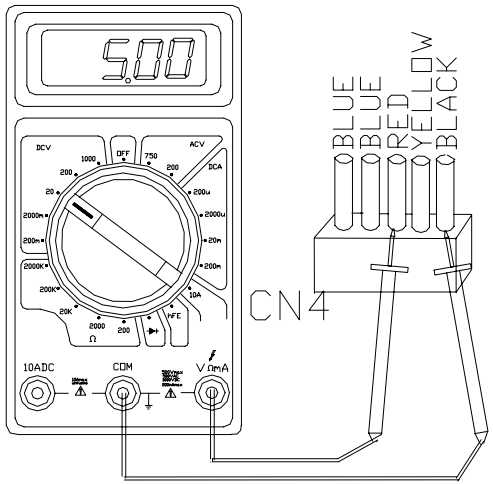


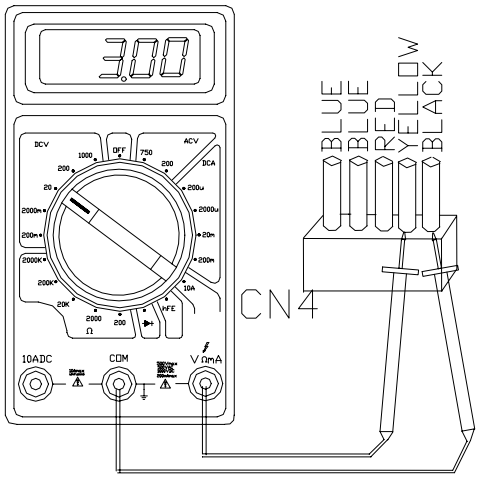
Fig. 2: Optic Sensor Signal Output Test



Optic Sensor Power (VCC) Test



Optic Sensor Signal (CLK) Output Test



Optic Sensor Power (VCC) Voltage Test

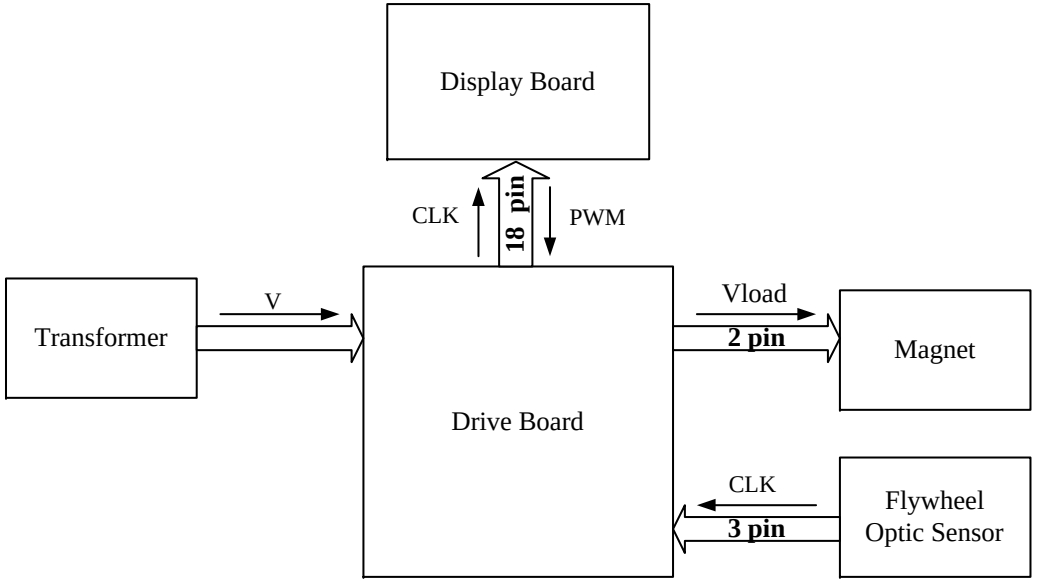
(1) Don't detach any wires from the drive board. Turn on unit power.
(2) Put multimeter to the 20VDC setting. Place probes as shown above (left). Exercise on the unit. Normal reading: 5V.
(3) If not as above, inspect drive board VCC power supply (LED2, VCC indicator, DRIVE.03).

Optic Sensor Signal (CLK) Output Test

(1) Put multimeter to the 20 VDC setting. Place probes as shown above (right). Exercise on the unit.
(2) LED5 (CLK) indicator should flash at low speeds and appear to remain lit at high speeds. Normal reading: 1.5-3.5 VDC.
(3) If not as above, inspect the cable, connections. If there is power into the optic sensor board but no signal out, replace the optic sensor board.

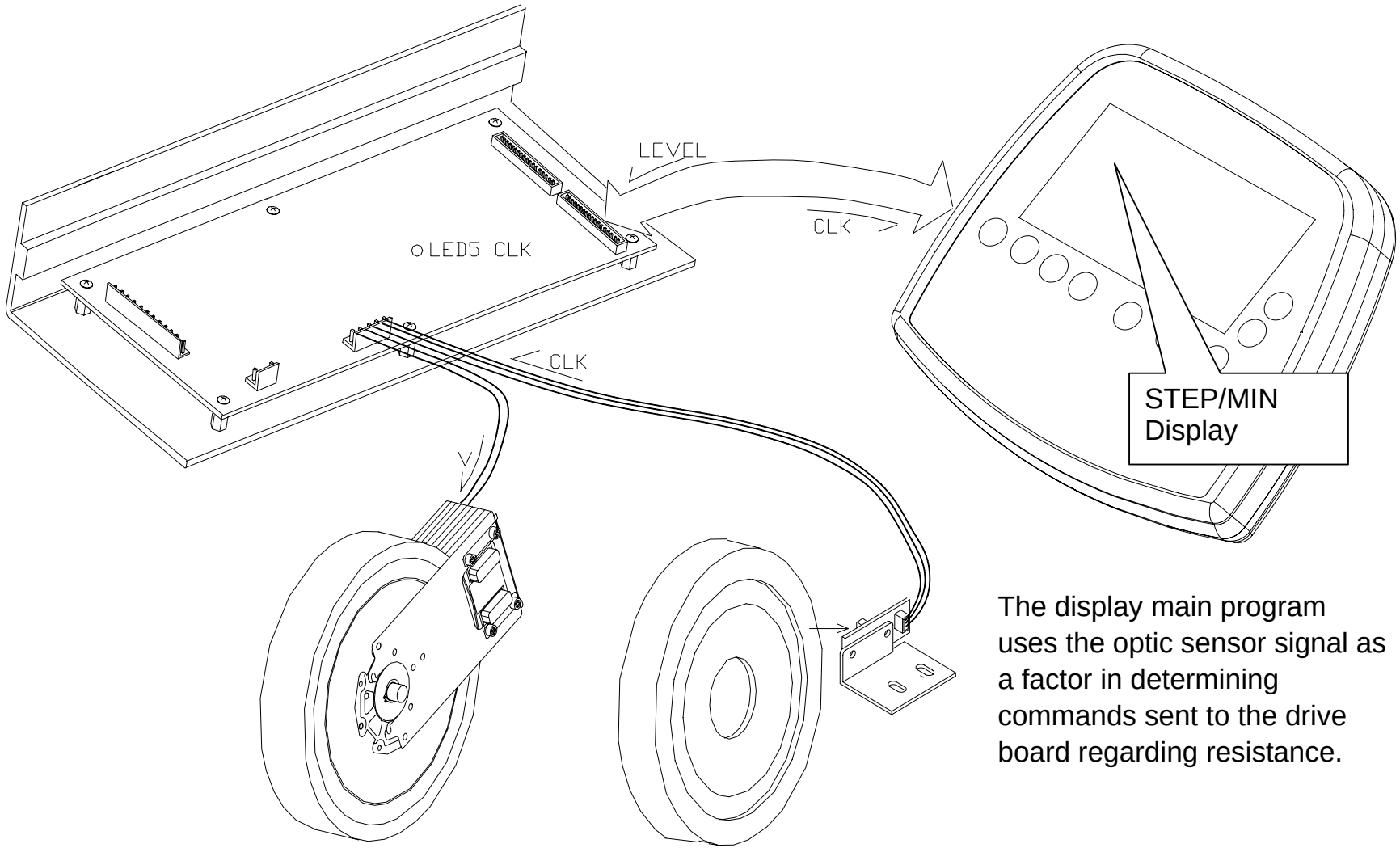
Resistance

Resistance Operation - Diagram and Explanation



Order	Part	Operation
1	Transformer	1.The transformer reduces incoming alternating current (AC) voltage for various circuits. The drive board converts AC voltage to direct current (DC) voltage. The VDD circuit supplies voltage for resistance.
2	Optic Sensor	1.The infrared sensor detects movement of the reflective sticker on the flywheel and sends its signal to the drive board. The signal travels the optic sensor wire, to the drive board, up the data cable, to the display.
3	Display Board	1. The CPU detects the optic sensor signal and calculates STEPS/MIN. STEPS/MIN window shows the speed. 2. When someone presses the LEVEL up or down key, the CPU uses speed as a factor in determining and sending the resistance (PWM) signal to the drive board to control resistance.
4	Cable	1. The PWM signal travels the cable to the drive board.
5	Drive Board	1. The drive board converts the PWM signal into resistance voltage sent to the magnet.
6	Magnet	1. The magnet attracts the flywheel according to the voltage from the drive board. 2. On LEVEL 1, the resistance voltage is smallest. The magnet attraction is lowest. Resistance is lightest. 3. On LEVEL 14, the resistance voltage is greatest. The magnet attraction is highest. Resistance is heaviest.

Optic Sensor Operation in Resistance



The display main program uses the optic sensor signal as a factor in determining commands sent to the drive board regarding resistance.

Resistance Malfunction

Symptom Type 1: Press LEVEL keys; there is no resistance; display shows no STEP/MIN value or "STEP" flashes on the display.

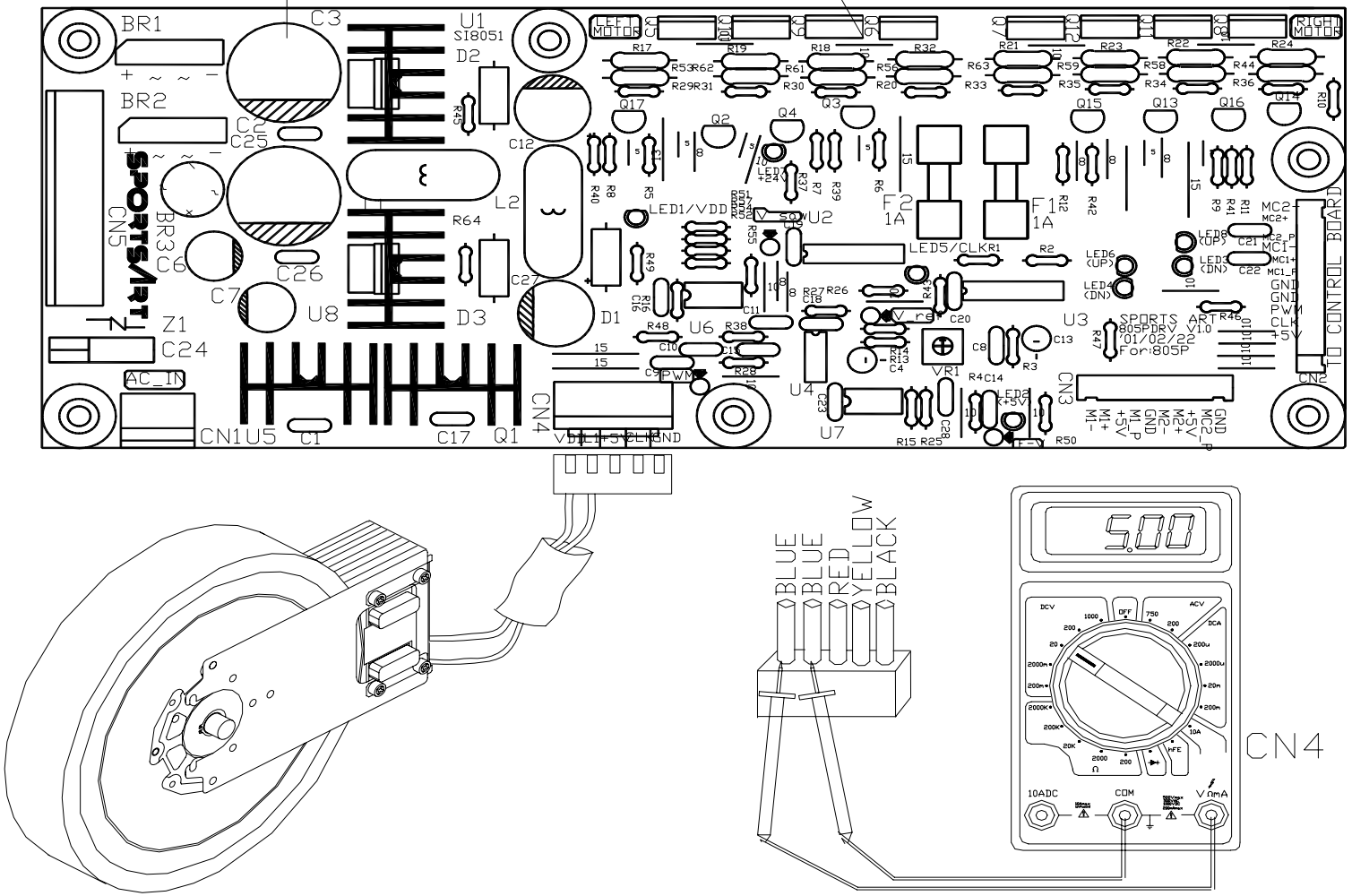
Symptom 1 Troubleshooting: Since resistance operation requires an optic sensor signal, see optic sensor troubleshooting, OPTIC.03.

Symptom Type 2: Press LEVEL keys; there is either no resistance or full resistance at all levels; STEP/MIN value appears on the display.

Symptom 2 Troubleshooting:

1. Inspect power to the magnet. See Drive Board Resistance Voltage Test, LEVEL.04.
2. If there is power to the magnet but no resistance, check magnet OHMs. See Magnet OHM Test, LEVEL.06.
3. If there is no power to the magnet, inspect drive board VDD circuit. See Drive Board VDD Voltage Test, LEVEL.08.
4. If the VDD LED doesn't light, inspect the transformer primary and secondary voltages. See POWER.08.

Resistance Voltage Test at the Drive Board



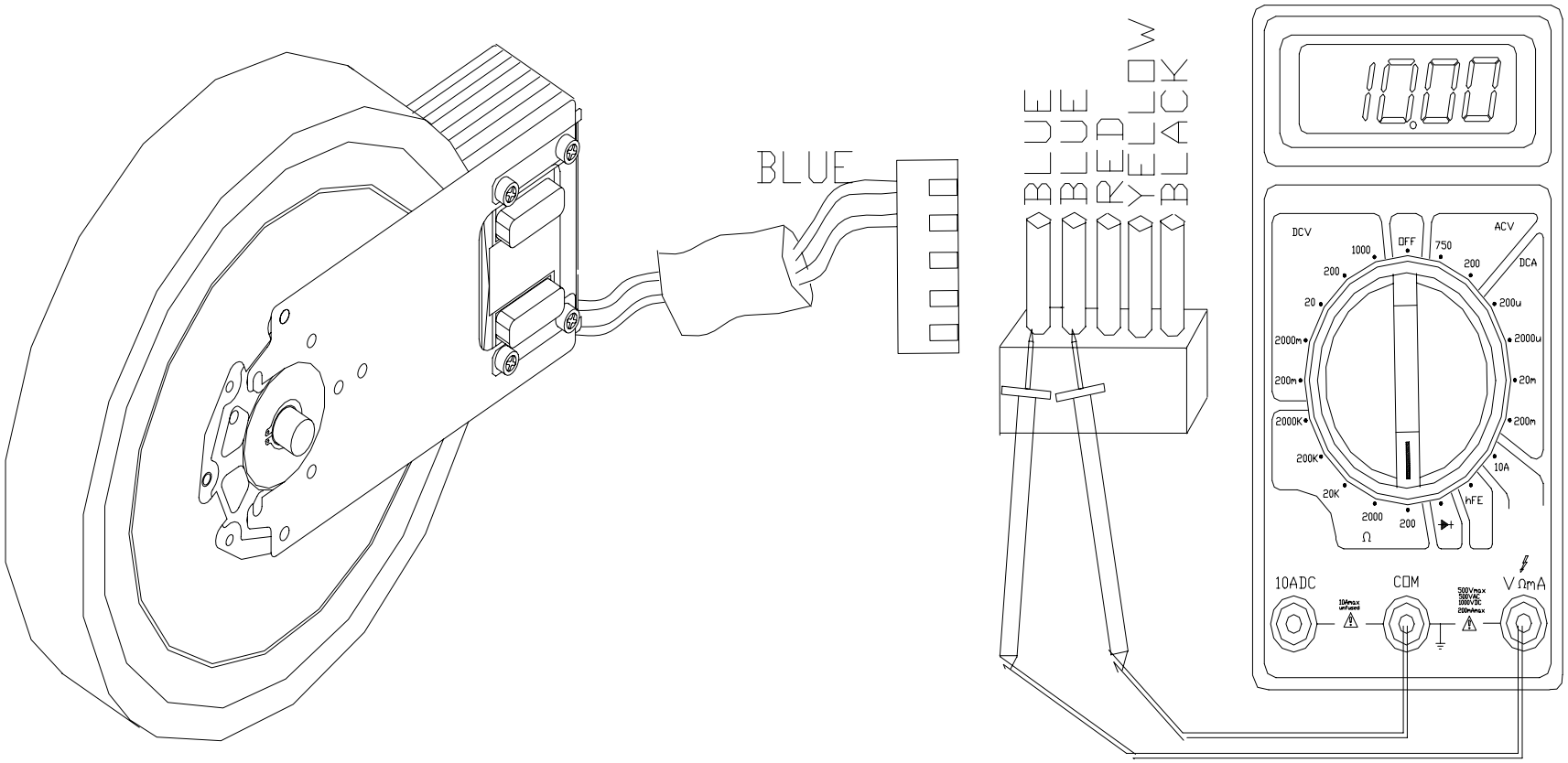
Drive Board Resistance Voltage Test Procedure

(1) Do not detach any wires from the drive board.
(2) Turn on unit power.
(3) Place probes on the CN4 blue wire connector points as shown.
(4) Exercise on the unit. Press LEVEL up key. Normal reading varies depending on resistance level. Please see the chart below for a Level/Voltage reference figure.
(5) If there is no resistance voltage, inspect the following:
- (a) Drive board. Look for burnt components, VDD LED not lighting (LEVEL.08)
- (b) Display. Do LEVEL display values change? If not, inspect the overlay and keys.
- (c) Ribbon cable. Is it connected well and in good condition?

(6) If there is voltage, inspect the magnet. See Magnet OHM Test, LEVEL.06.

Level/Voltage Reference Readings at 30 Steps Per Minute	
Resistance Level	VDC
1	0.1
5	5
10	10
14	21

Magnet OHM Test



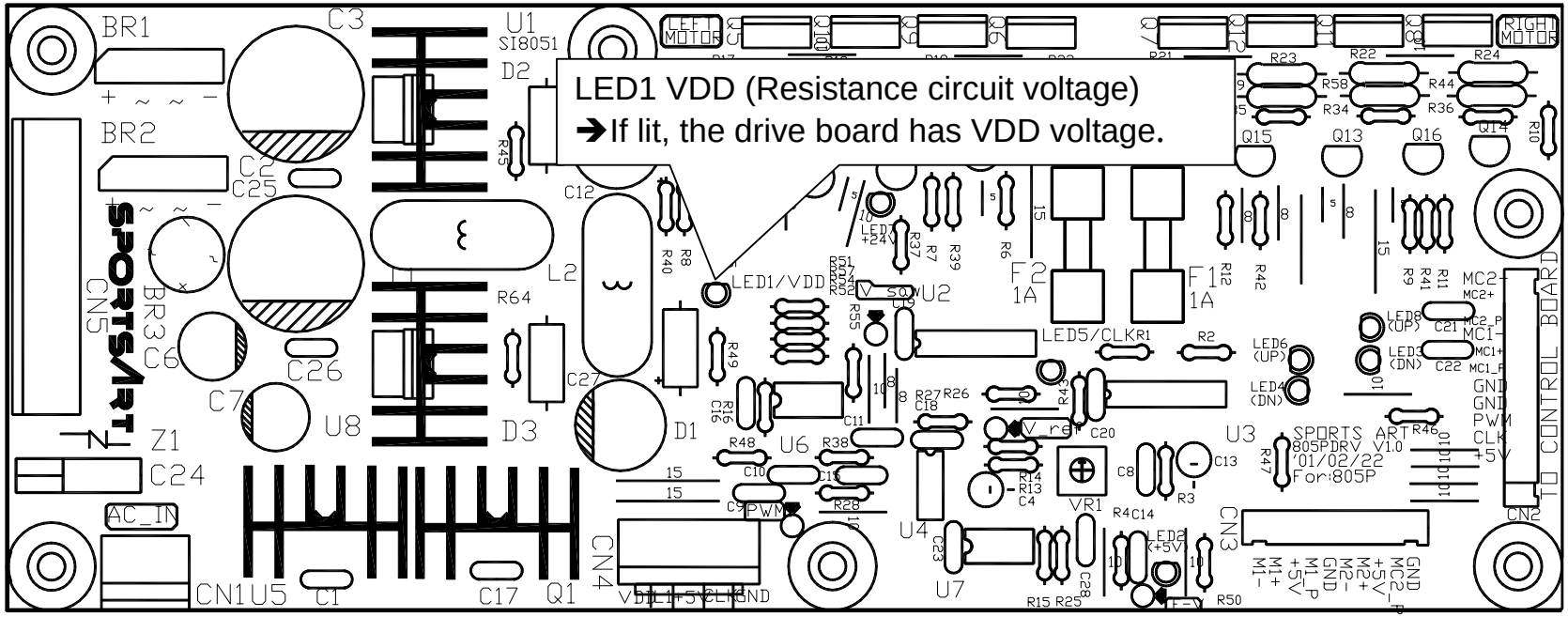
Magnet OHM Test Procedure

(1) Put multimeter to the 200 Ohm setting. Remove the CON1 cable connector from the drive board.
(2) Place meter probes separately on the two blue wire connectors. Normal reading: 10 Ohms.
(3) If the reading is not between 8 and 12 Ohms, replace the magnet.

Magnet Current Leakage Test

(1) Put multimeter to the 200 Ohm setting. Place the red probe on the CN1 blue wire. Place the black probe on a unit screw or metal part of the frame.
(2) If the multimeter reading doesn't change whatsoever, there is no short between the magnet and the unit frame.
(3) If the multimeter shows a reading, like 0.4, for example, there is a short between the magnet (probably a magnet wire) and the frame on the unit. Inspect whether the wire to the magnet touches some metal part of the unit. If possible, just isolate the wire that creates the short. If not, replace the magnet or the entire flywheel.

Drive Board VDD Voltage Test

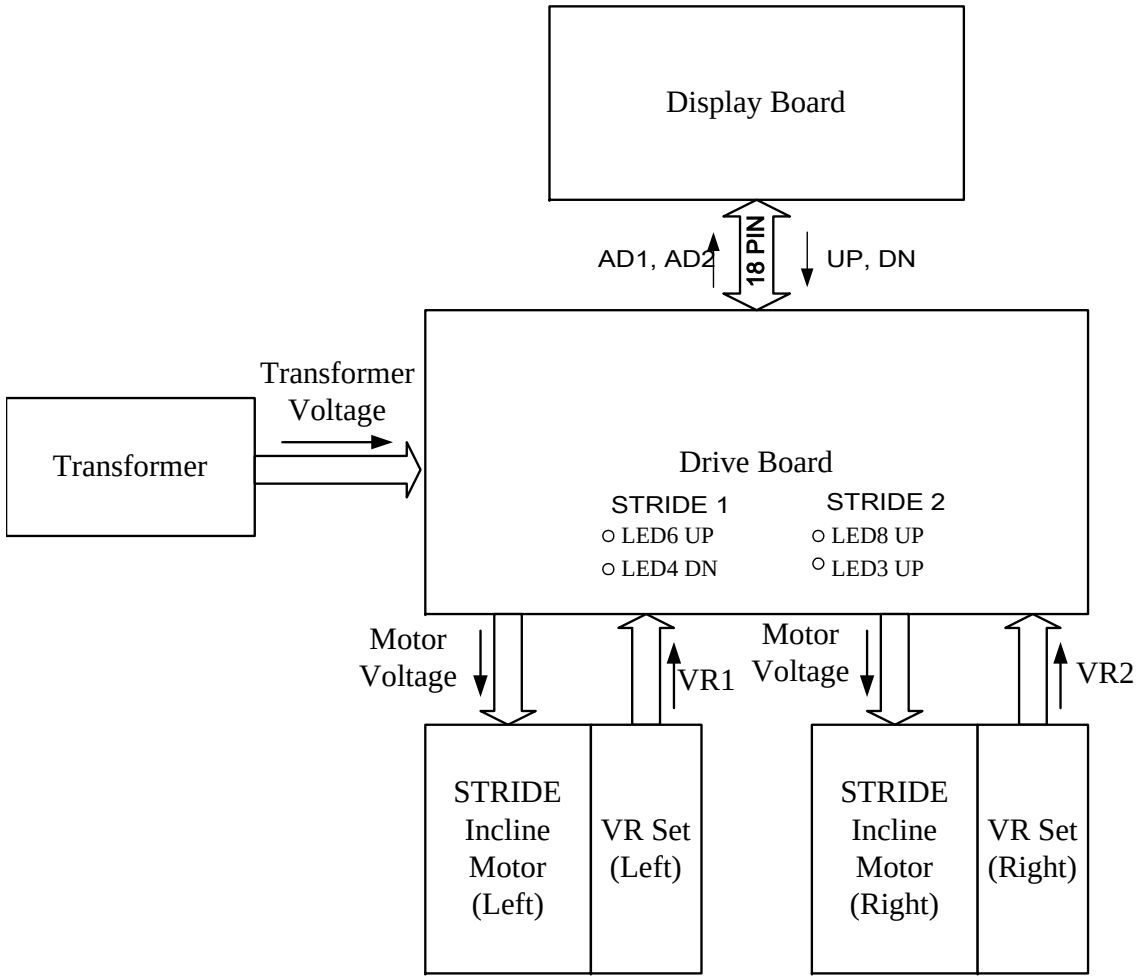


Test Procedure

(1) Do not disconnect any wires from the drive board.
(2) Turn on unit power. Power switch should light. Display should show “MAN’L”.
(3) Drive board LED1 VDD indicator should light, showing that the drive board has resistance circuit voltage.
(4) If not as above, inspect the transformer. See POWER.08.

Stride

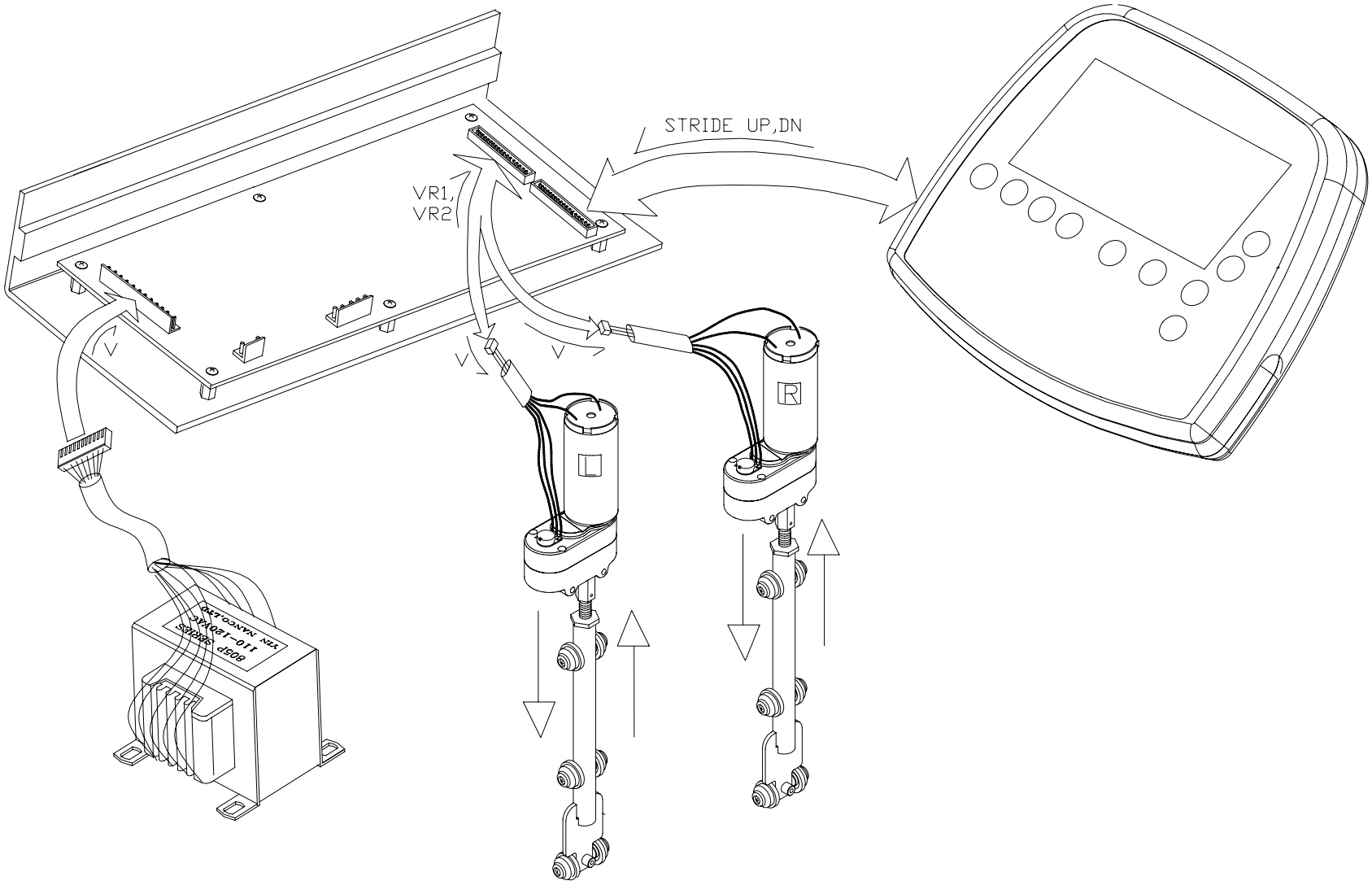
Stride Operation Diagram



Stride Operation Explanation

Order	Part	Operation
1	Display	1. When the STRIDE <▲> key is pressed, the CPU emits the STRIDE_UP signal. 2. When the STRIDE <▼> key is pressed, the CPU emits the STRIDE_DN signal.
2	Transformer	2. The transformer provides power for STRIDE motor operation. LED7 lights up. See STRIDE.04.
3	Data Cable	1. The STRIDE_UP or STRIDE_DN signal travels the main cable from the display to the drive board.
4	Drive Board	1. When the drive board receives the STRIDE_UP signal, drive board LED6 and LED8 UP indicators light. See illustration, STRIDE.04. Voltage travels CN3 (M1+ and M1-, M2+ and M2-) wires to the STRIDE motors. 2. When the drive board receives the STRIDE_DN signal, drive board LED4, LED3 DN indicators light. See illustration, STRIDE.04. Voltage travels CN3 (M1+ and M1-, M2+ and M2-) wires to the STRIDE motors.
5	Stride Cable	1. The STRIDE signal travels the STRIDE cable to the stride motors.
6	Stride Motors	1. If there is negative voltage across M1+ and M1-, M2+ and M2-, STRIDE operates down. 2. If there is positive voltage across M1+ and M1-, M2+ and M2-, STRIDE operates up.
7	Stride Variable Resistors	1. When the STRIDE motor operates upward, it drives the variable resistor (VR) gear, increasing VR voltage. 2. When the STRIDE motor operates downward, it drives the VR gear, decreasing VR voltage. 3. The VR voltage is relayed through the ribbon cable to the display board, where it is used to calculate the incline motor position. See illustration, STRIDE.03. 4. When the VR voltage values match the stride setting, the display CPU stops emitting the stride up or down signal to the drive board. The drive board, in turn, stops putting out power to the stride motors, and stride motors stop operating.

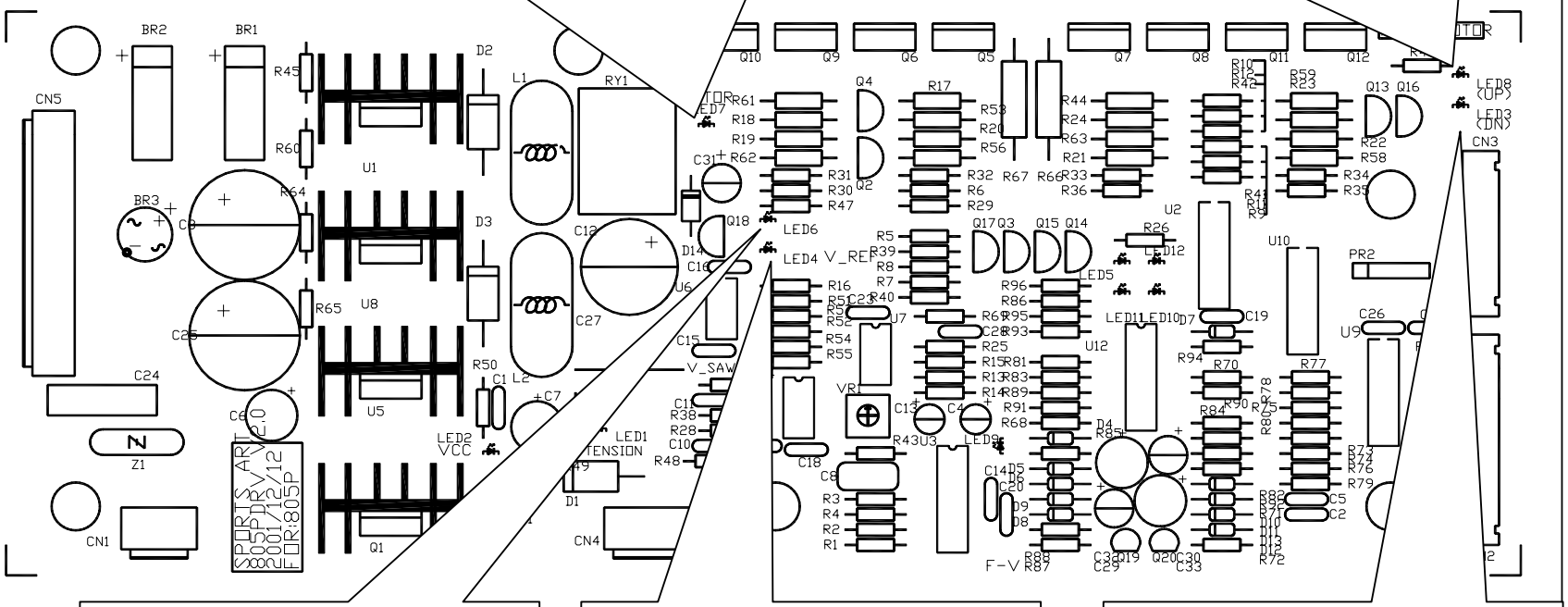
Stride Operation Illustration



Stride LED Indicators on the Drive Board

LED7 22 VDC
Lights when drive board sends voltage to STRIDE incline motors.

LED8 UP (STRIDE Motor 2)
Lights when stride motor 2 is operating up.



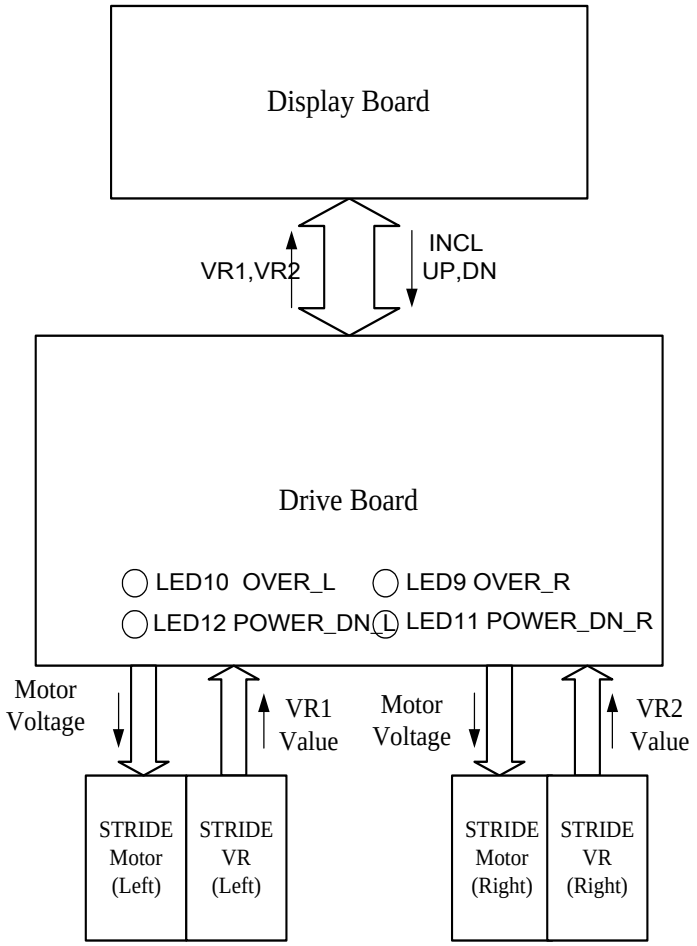
LED6 UP (STRIDE Motor 1)
Lights when stride motor 1 is operating up.

LED4 DN (STRIDE Motor 1)
Lights when stride motor 1 is operating up.

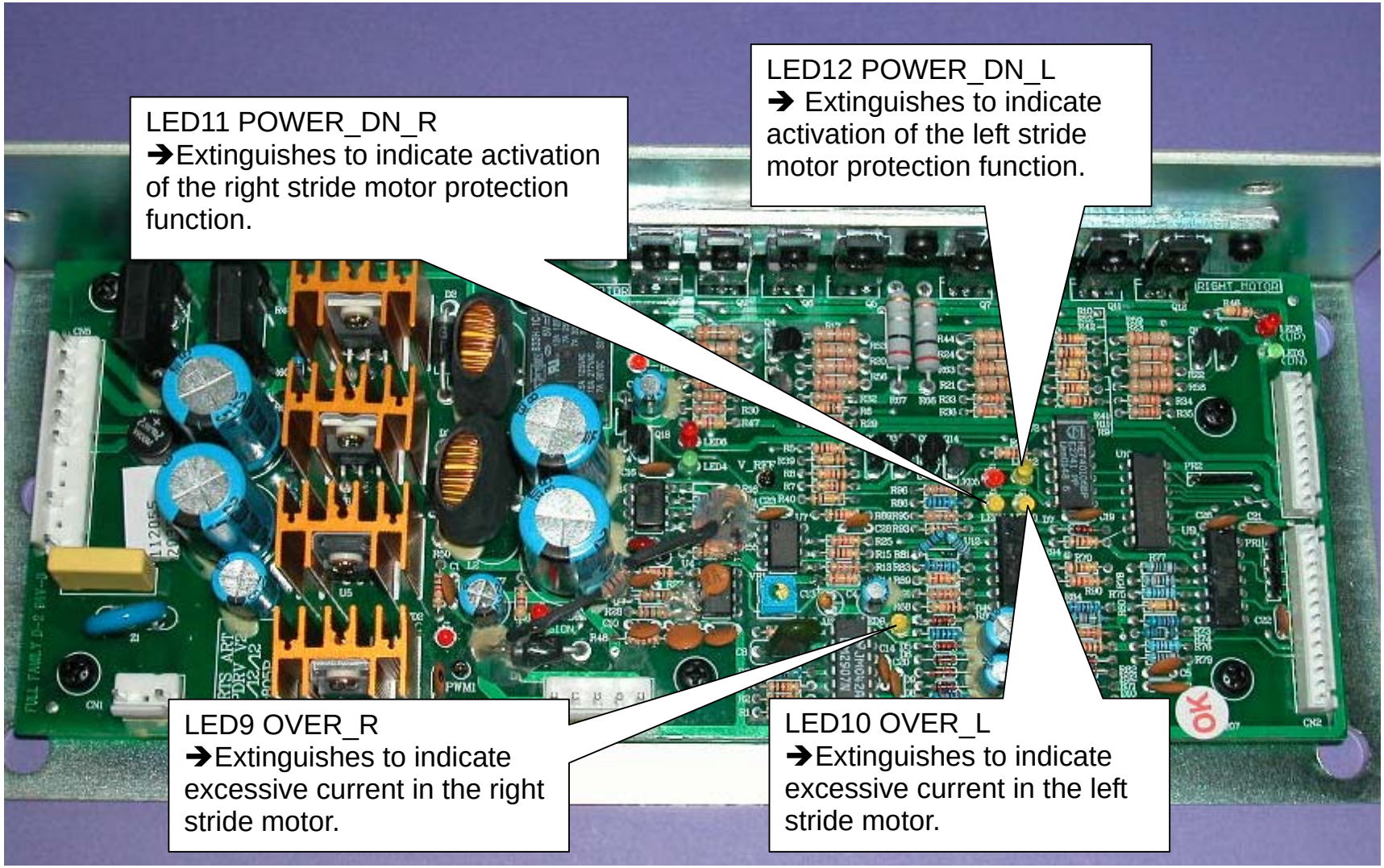
LED3 DN (STRIDE Motor 2)
Lights when stride motor 2 is operating down.

Stride Motor Protective Function

Order	Part	Operation
1	Display Board	1. The diplay emits the STRIDE ▲or▼ signal. The signal travels the data cable to the drive board.
2	Drive Board	1. The ▲or▼ LEDs light. See STRIDE.04.The drive board emits voltage for stride motor operation.
3	Stride Motor	1. Stride motor operates. 2. Stride length increases or decreases.
4	Drive Board	1.The drive board protection circuit detects stride motor current. 2.If the current is too high (the motor is stuck), drive board OVER_L and/or OVER_R LED extinguish. See STRIDE.06. 3.After 30 seconds, PWR_ON_L and/or PWR_ON_R LED extinguish. See STRIDE.03. 4. Simultaneously, when the VR voltage exceeds the range of 0.5 to 4.5 VDC, up (LED 3,8) or down (LED 4,6) indicators extinguish. See STRIDE.04. 5.The drive board shuts off power to the stride motor.



Stride Motor Protection OVR LEDs



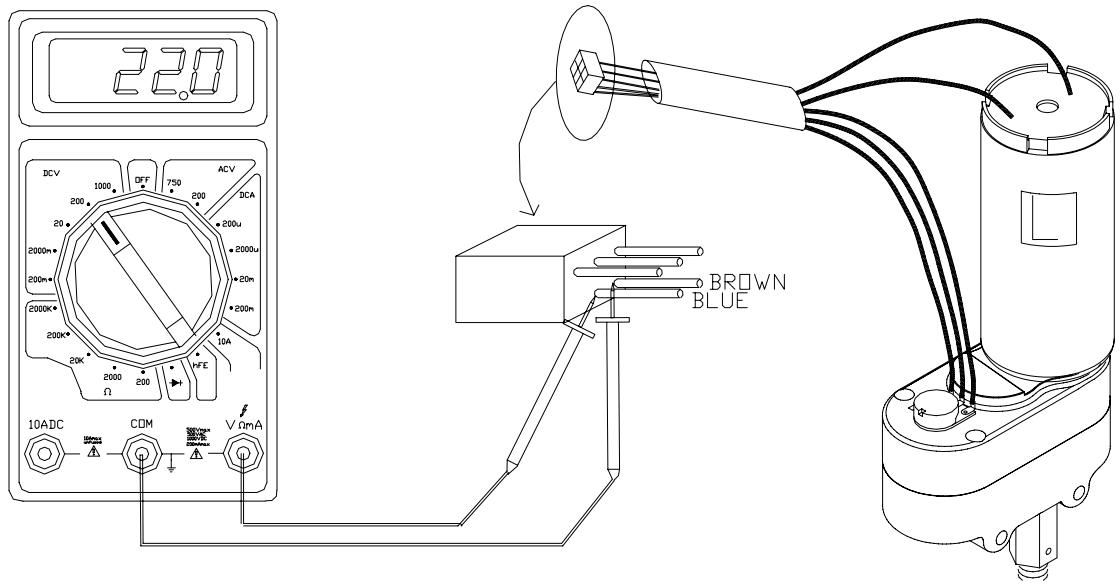
Stride System Troubleshooting

An ERR7 message on the display is the most common indication of a stride system malfunction. ERR7 appears if (1) the CPU can not read the stride VR value or (2) the VR value far exceeds the range of 0.8 to 4.15 VDC. Possible reasons for such problems include a bad VR, a stuck motor, bad wire connections, and lack of power to the VR or motor.

To resolve ERR7, inspect:
(1) Inspect stride LEDs on the drive board (STRIDE.04 and STRIDE.06). If OVR LEDs are lit, inspect stride set voltages (STRIDE.10) and recalibrate the stride set (STRIDE.11).
(2) Inspect wire connections. A loose wire or bad connection can cause ERR7. Carefully inspect wire connections, in particular those in the unit's shoulder.
(3) If the stride power indicator, LED7, on the drive board does not light, suspect a power issue. Inspect the drive board for damaged components and the transformer input and output (POWER.08).

The following pages show stride voltage test procedures (STRIDE.08 through STRIDE.10) and calibration (STRIDE.11 through STRIDE.14).

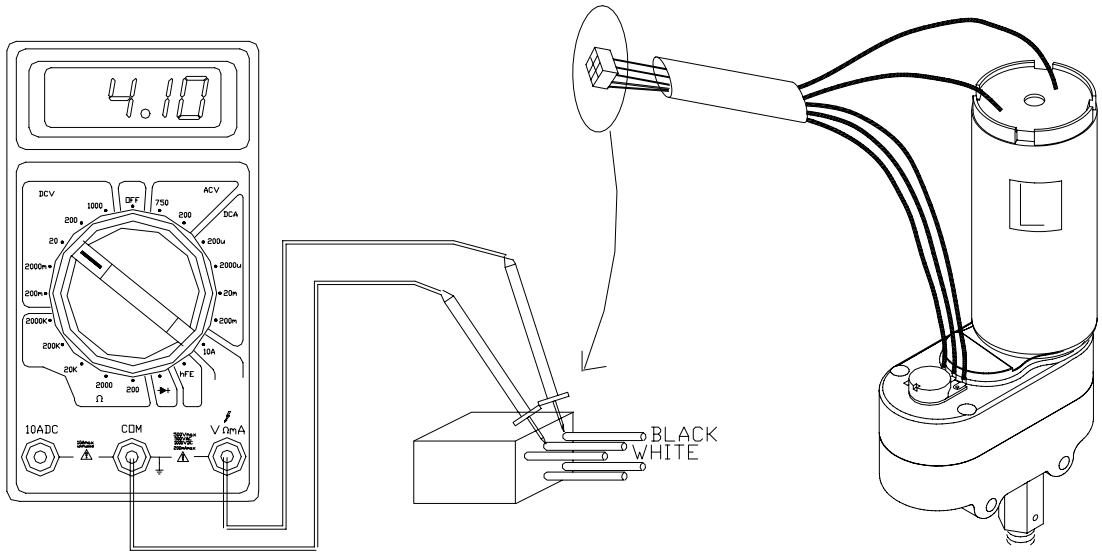
Stride Motor Voltage Test



Motor Voltage Test Procedure

This test answers the question: Does the stride motor have power to operate?
(1) Do not disconnect any wires. Place multimeter probes as shown.
(2) Exercise on the unit. Press STRIDE up or down key. The value in the STRIDE window should increase or decrease.
(3) The drive board UP or DN indicator should light. See STRIDE.04.
(4) Normal reading: +22 (up) or –22 (down). Stride should operate up or down.
(5) If there is voltage but the stride motor doesn't operate, try to get it unstuck and recalibrate it. If not possible, replace the motor.

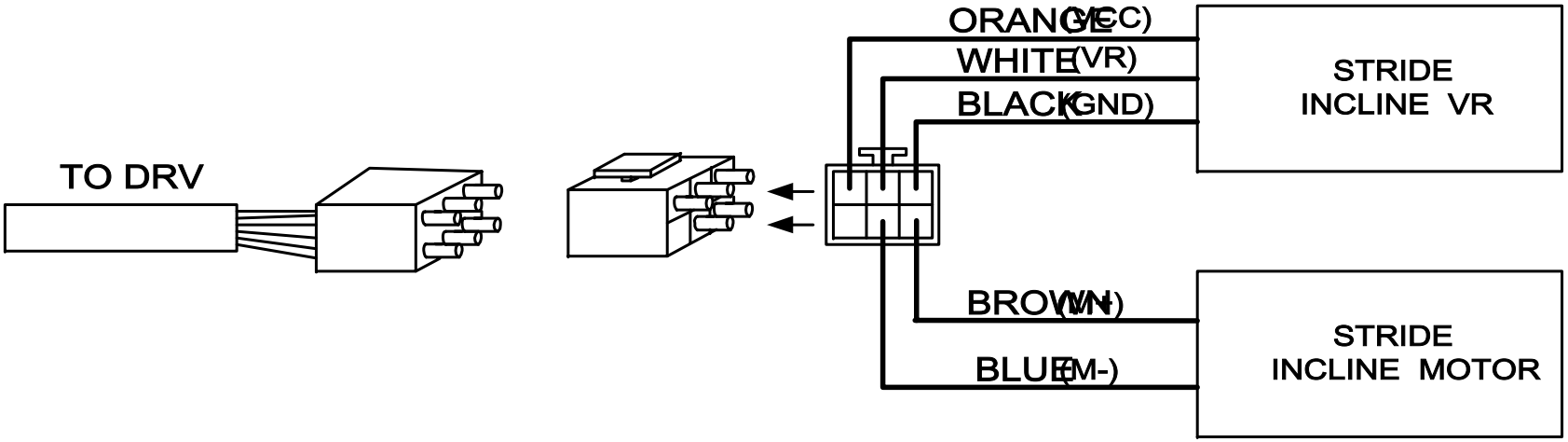
Stride VR Voltage Test



Stride VR Voltage Test Procedure

This test answers the questions: Does the VR have power supply? What voltage does the VR put out?
(1) Do not disconnect any wires. Exercise on the unit. The display should light.
(2) Place probes on the VR power supply wire connectors, which are orange and black.
Normal reading: 5 VDC. If there is no voltage, inspect wire connections and drive board power LEDs (STRIDE.04). If LEDs are not lit, see POWER.01
(3) Place probes on the VR voltage output wire connectors, which are white and black.
Normal reading: 0.8-4.5 VDC. Recalibrate if the voltage reading exceeds this range.

Stride Motor and VR Voltage Test Summary



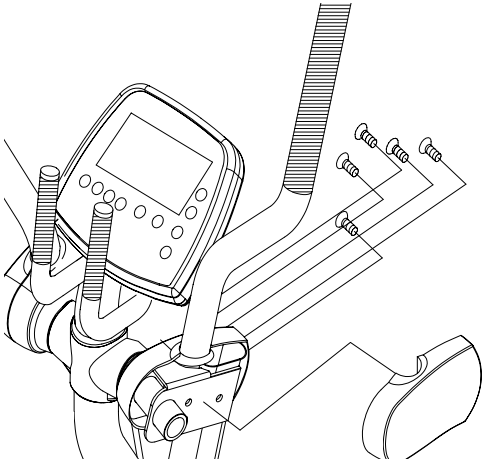
Test Procedure

Do not detach wire connections. Probe into wire connectors as indicated. Exercise on the unit.
For motor voltage test, operate stride function.

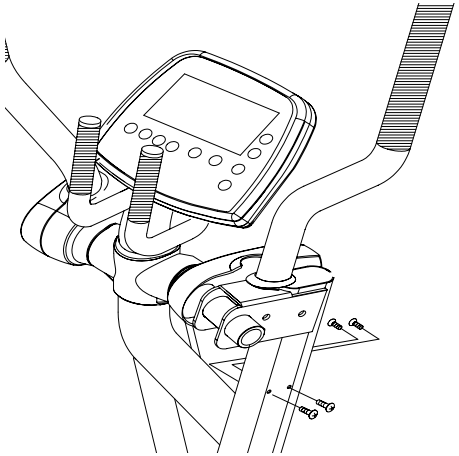
Significance	Wire Colors	Normal Voltage	If Not Normal, Inspect
VR power supply	Orange and Black	5 VDC	Wires and connections, drive board voltage output to VR
VR output voltage	White and Black	0.8-4.5 VDC	Wires and connections, input voltage, recalibrate
Stride motor power supply	Brown and Blue	Up: +22 VDC; Down: -22 VDC	Wires and connections, drive board voltage output to stride

Stride Motor and VR Calibration

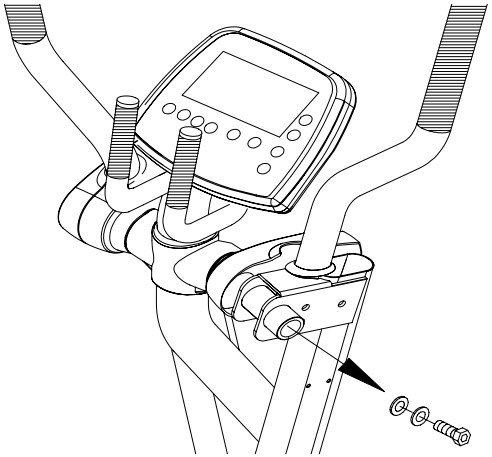
1. Remove screws and covers as shown in Figures 1 through 3 below.



(Fig. 1)

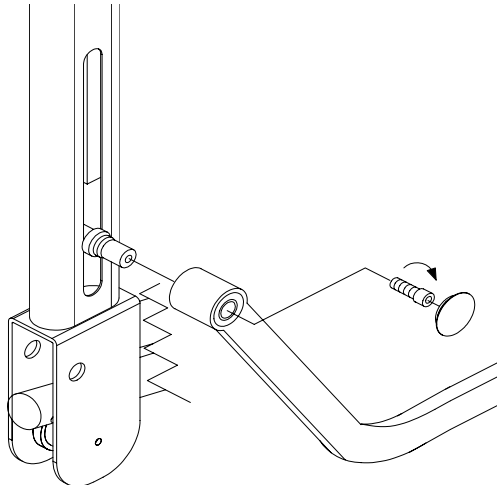


(Fig. 2)



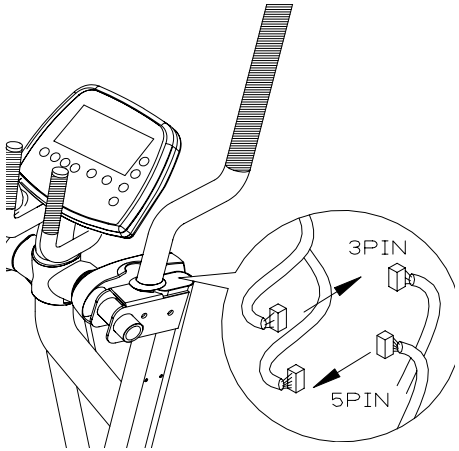
(Fig. 3)

2. Remove the stride linkage as shown in Fig. 4.

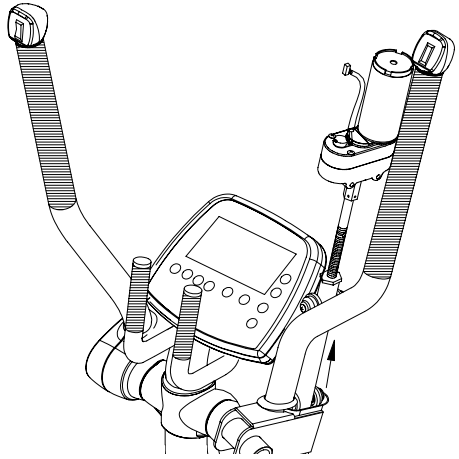


(Fig. 4)

3. Disconnect stride wires and remove the stride motor assembly as shown in Fig. 5 and 6.

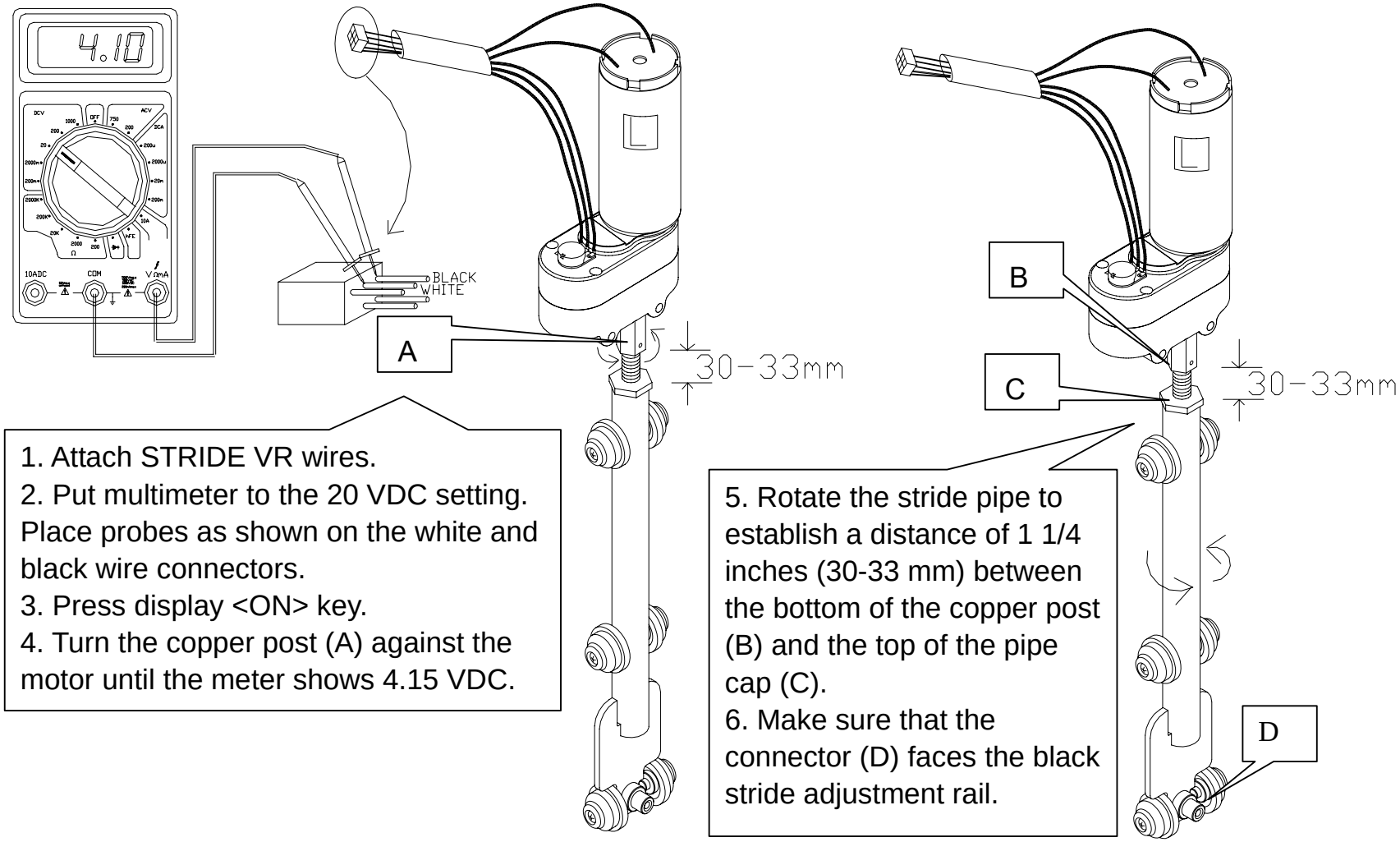


(Fig. 5)



(Fig. 6)

4. Stride Calibration



1. Attach STRIDE VR wires.
2. Put multimeter to the 20 VDC setting. Place probes as shown on the white and black wire connectors.
3. Press display <ON> key.
4. Turn the copper post (A) against the motor until the meter shows 4.15 VDC.

5. Rotate the stride pipe to establish a distance of 1 1/4 inches (30-33 mm) between the bottom of the copper post (B) and the top of the pipe cap (C).
6. Make sure that the connector (D) faces the black stride adjustment rail.

5. Put the stride motor assembly back in place.

6. Test

(a) Exercise on the unit. Press STRIDE<▼> key until the display shows 17 inches (450 mm).

The stride motor operates, bringing the stride linkage to the lowest position on the stride support arm. Normal stride VR reading: 0.8VDC.

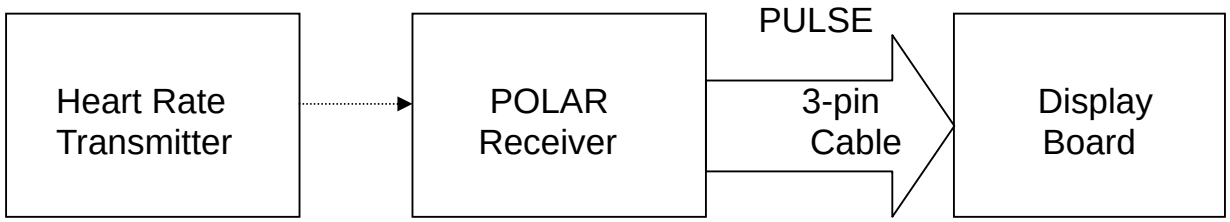
(b) Exercise on the unit. Press STRIDE<▲> key until the display shows 26 inches (650 mm).

The stride motor operates, bringing the stride linkage to the highest position on the stride support arm. Normal VR reading: 4.15VDC.

7. If the STRIDE VR voltage measures as indicated, the calibration process has been completed successfully.

Polar

805P Elliptical Trainer Polar Heart Rate Function



User Action

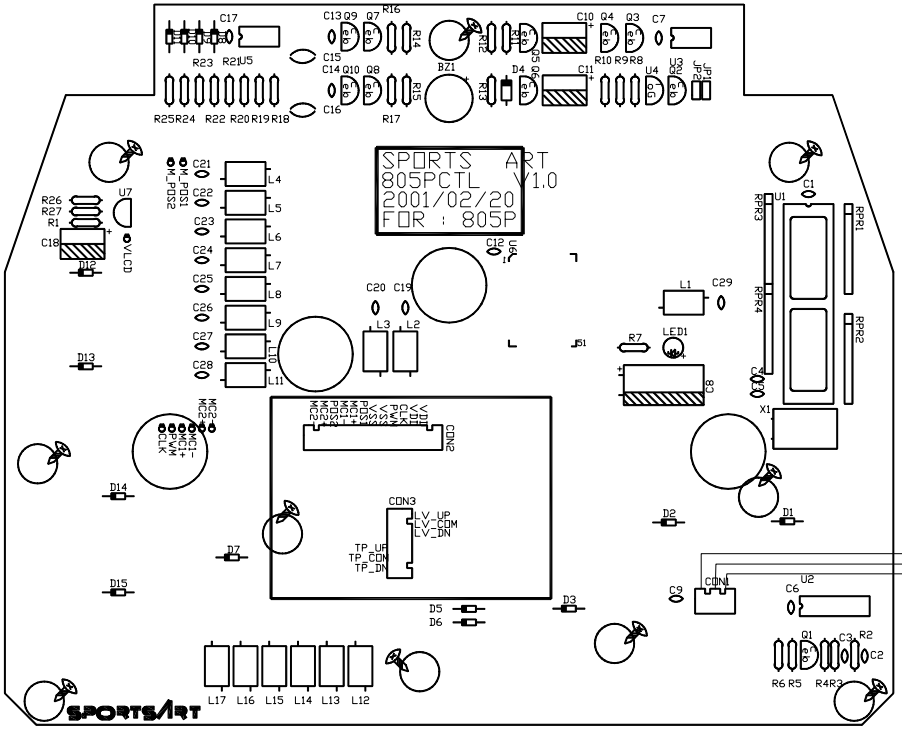
Step	Operation
1	Strap on POLAR transmitter. Stand on the unit. Do not hold onto heart touch rate handles (807P).
2	Press the display “ON” key. Display beeps once and lights up.
3	Within ten seconds, the PULSE window should show the heart rate value.

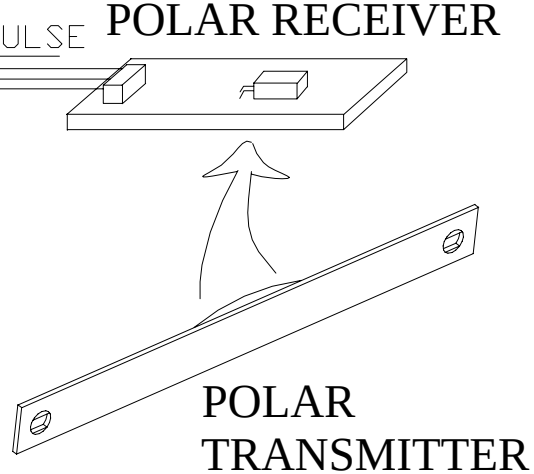
Unit Operation

Order	Part	Operation
1	POLAR Transmitter	1. POLAR transmitter detects pulse. 2. The transmitter transmits the pulse signal to the receiver.
2	POLAR Receiver	1. The POLAR receiver receives the signal. 2. After processing the signal, the receiver transmits the signal to the display board.
3	3-pin Cable	1. The signal travels the 3-pin cable to the display board.
4	Display	1. The CPU reads the heart rate value. 2. The display shows the heart rate value in the PULSE window.

Note that the 807P POLAR function operates similarly, but the wiring routes through the HTR board before going to the display.

Polar Receiver Wire Connections, Transmitter Signal Transmission





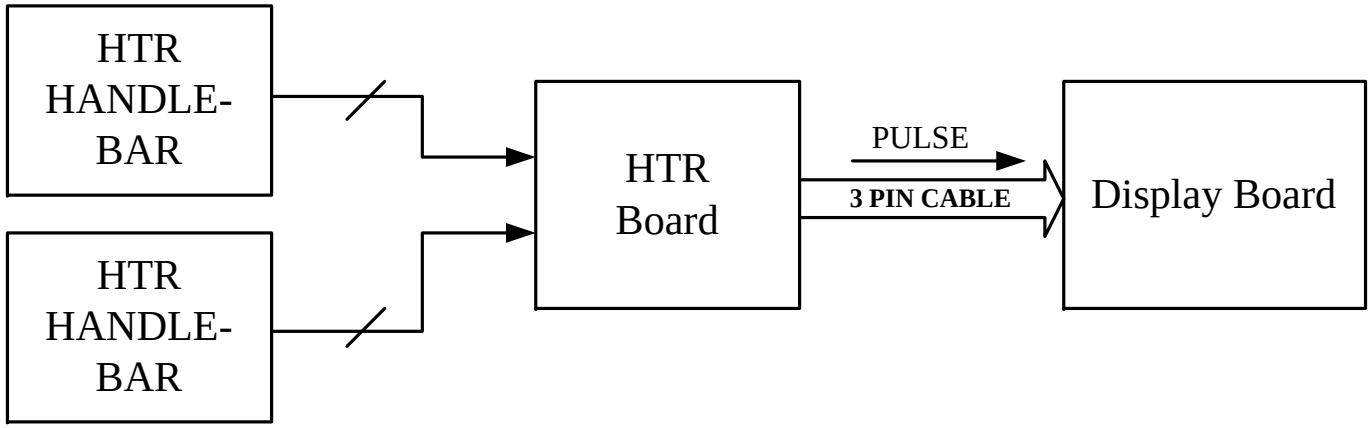
Polar Heart Rate Test Procedure

(1) Strap on the Polar transmitter.
(2) Turn on unit power. Press <MODE> until the “PULSE” indicator lights.
(3) The MODE window should show the heart rate value within ten seconds.
(4) If not, inspect the following:
(a) Polar receiver board wire and its connections;
(b) Polar receiver board soldering; attachment of the blue box (the antenna) on the Polar receiver board; Make sure that nothing metal, including the serial number sticker, covers this antenna.
(c) Inspect whether the Polar transmitter works on another product. If so, replace the transmitter. Polar transmitter batteries wear out and can be replaced by the manufacturer.

HTR Function

(HTR applies only to 807P; The Polar receiver is on both 805P and 807P.)

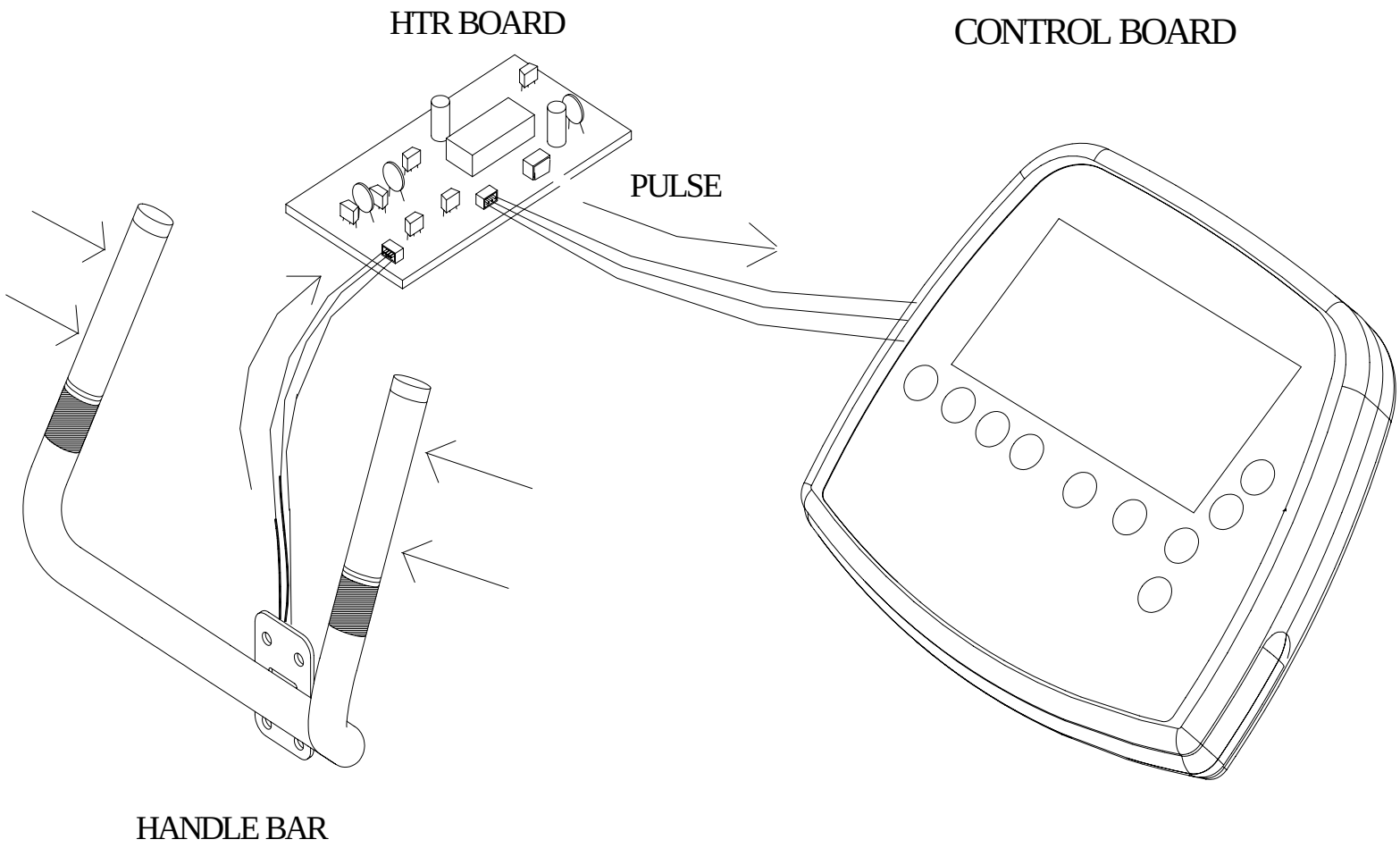
807P Elliptical Trainer Heart Touch Rate (HTR) Function



HTR Operation

Order	Part	Operation
1	HTR Handlebar	1. Place both hands on the HTR handlebars. 2. LED2 and LED4 on the HTR board light up when the user holds onto the handlebars. 3. The user's pulse signal travels from the handlebars, via wiring, to the HTR board.
2	HTR Board	1. The HTR board receives, processes, and transmits pulse signals. 2. LED3 flashes each time an incoming pulse signal is received. 3. LED4 flashes each time an outgoing pulse signal is sent to the display board.
3	3-pin Cable	1. The heart rate signal travels the 3-pin cable from the HTR board to the display board.
4	Display	1. The display board main program IC receives the heart rate signal and determines the heart rate value. 2. The display PULSE window shows the heart rate value.

HTR Wire Connections



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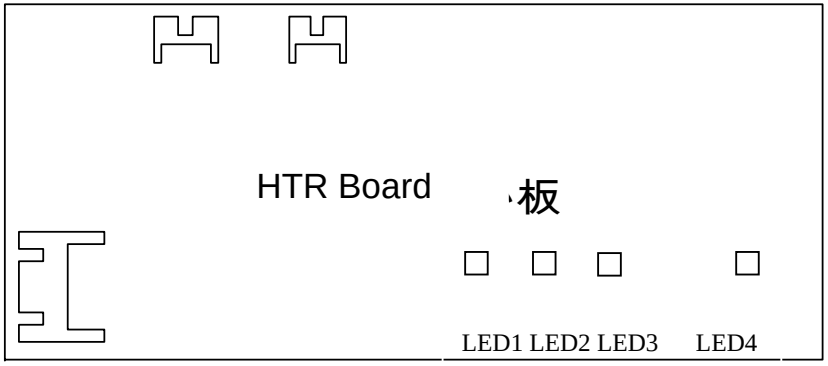
Heart Touch Rate Board Diagram



Heart Touch Rate Board LED Indicator Definitions

HTR Board	LED1	LED2	LED3	LED4
HTR	X - Not lit in HTR mode.	Lights when user holds onto HTR handlebars.	Flashes to indicate incoming HTR signal.	Lights when HTR handlebars are held; Flashes when HTR signal is sent to display.
Polar	Flashes to indicate incoming POLAR signal.	X - Doesn't light in POLAR mode.	X - Doesn't light in POLAR mode.	Flashes when POLAR signal is sent to display.

Possible Problems with HTR and Polar

Possible problems include the following:

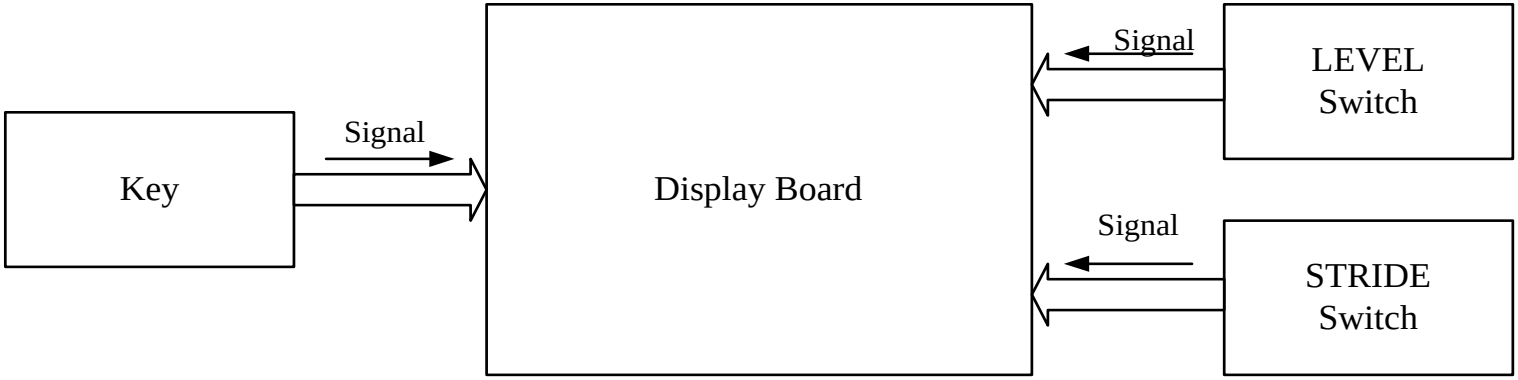
- Hold onto the HTR handlebar or strap on a Polar heart rate transmitter. The display PULSE window shows no heart rate value.
- PULSE window shows the heart rate value inappropriately -- when the unit is first turned on or when no one touches the HTR handlebar or no one wears the Polar strap.
- Heart rate value appears during exercise when no one touches the HTR handlebar or no one is wearing a Polar strap.
- Place hands on the HTR handlebar or wear the Polar strap. The display PULSE window value differs too much from the user's actual heart rate.

Troubleshooting Chart

Malfunction	Cause	Part in Question
LED1 (POLAR) not flashing	POLAR receiver is not detecting a heart rate or the signal is not getting to the HR board.	POLAR transmitter, POLAR receiver board, wires
LED2 (HTR) not lighting	HTR handlebar is not being held or there is no detection of a signal at the HR board.	HTR handlebar, wire from HTR board to handlebar
LED3 (HTR) not flashing	Signal is not arriving from HTR handlebars.	HTR handlebar, cable, HR board
LED4 (HTR+POLAR) not flashing	POLAR receiver or HTR is not emitting a heart rate signal to the display.	If all other HR board LEDs are normal, replace the HR board.
Display Shows No HR Value	If HR board LEDs are normal, inspect the 3-pin cable, its connections, and the display board	3-pin cable, connections, display board

Key

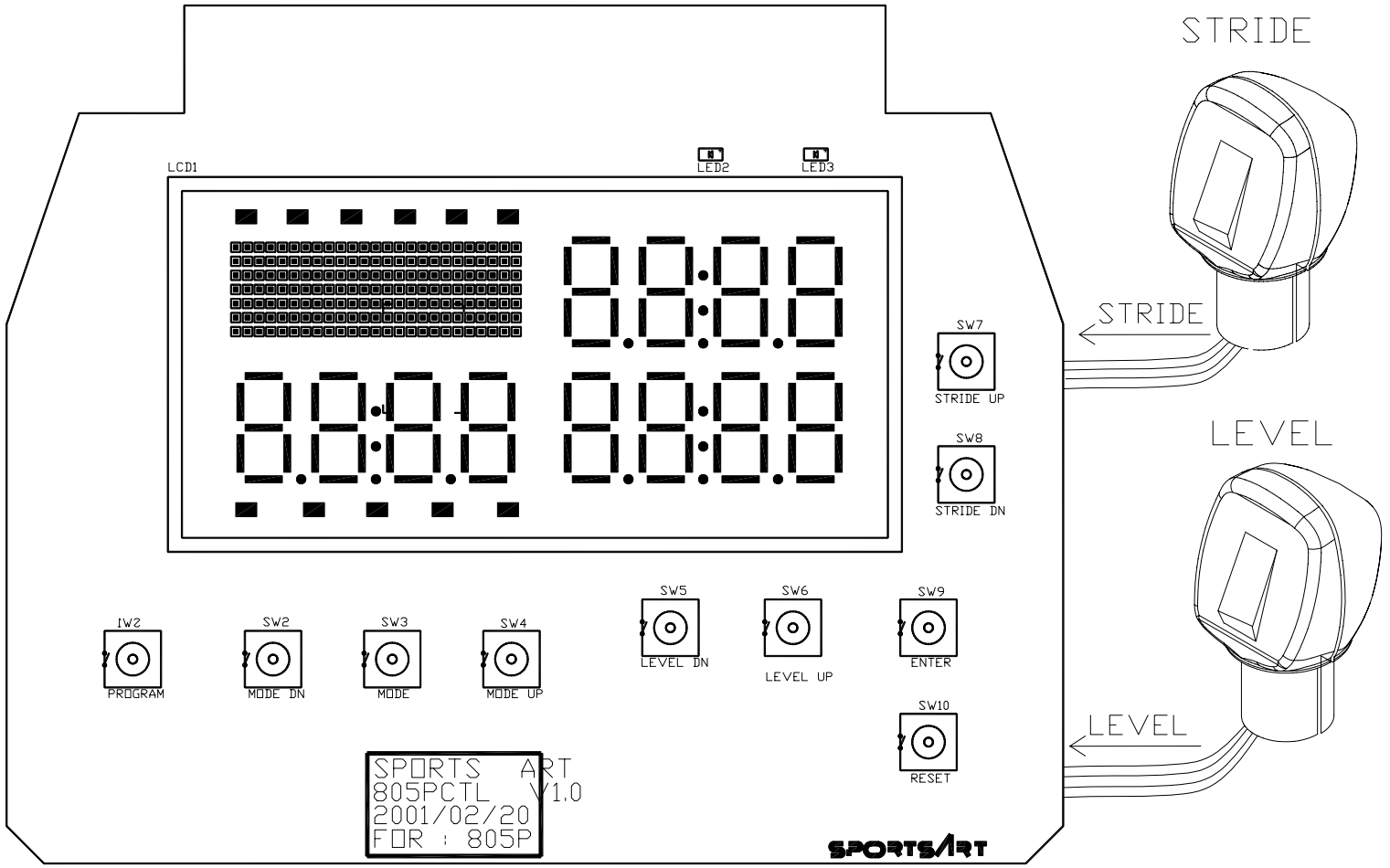
Key and Switch Operation - Diagram



Key and Switch Operation - Explanation

Order	Part	Operation
1	Soft Keys	1. Press the display keys. 2. The key signal is transmitted to the display board.
2	LEVEL Switch	1. Press LEVEL switch on the handle. 2. The signal goes to the display board.
3	STRIDE Switch	1. Press STRIDE switch on the handle. 2. The signal goes to the display board.
4	Display Board	1. The CPU reads the key or switch signal. 2. The CPU sends signals to execute the command.

Switch Operation Illustration



Key and Switch Malfunctions

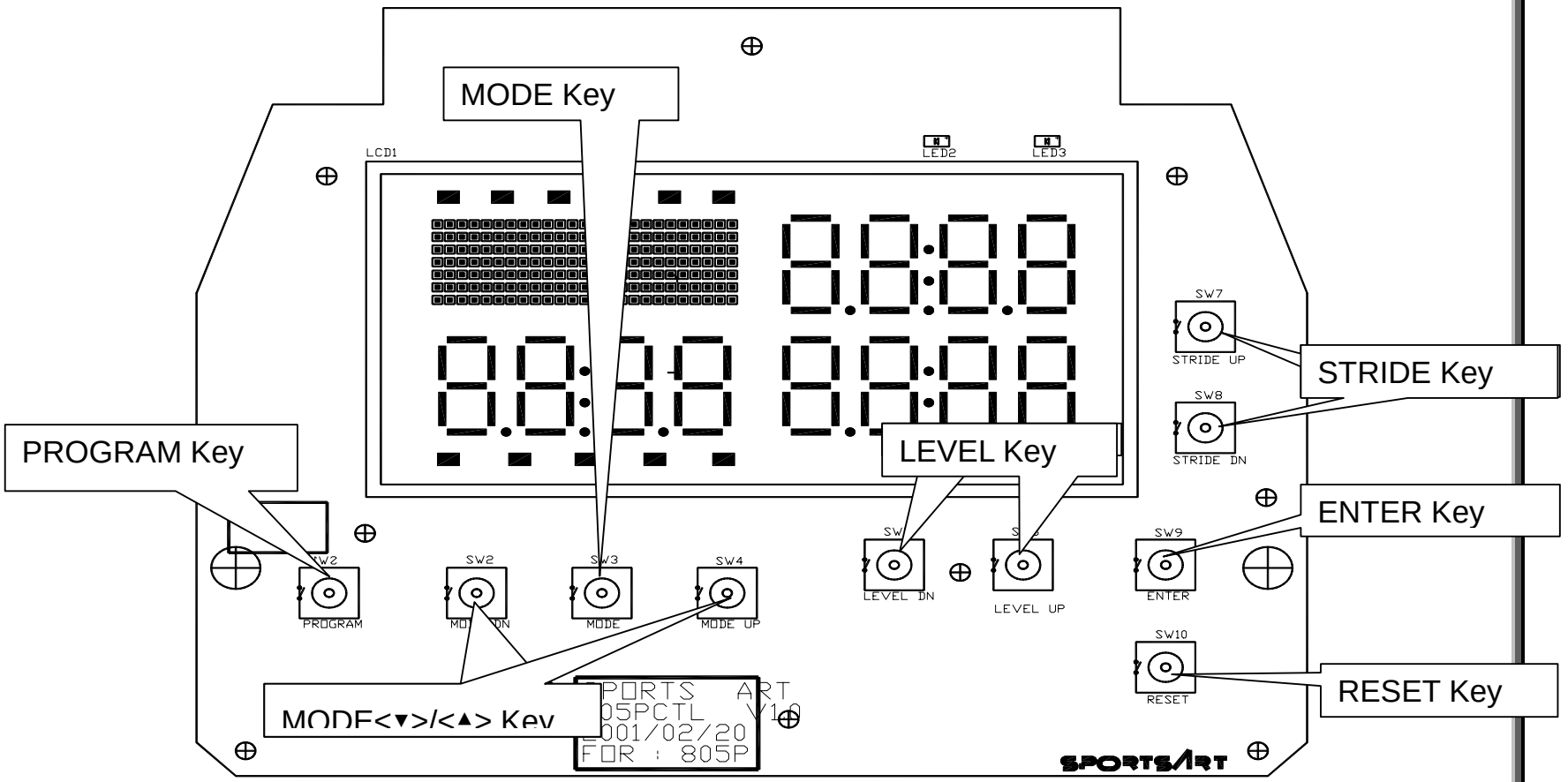
Symptoms of a display key issue follow.
Visual indication: Display overlay is cracked, usually on most often used keys.
Performance: Display does not beep after keys are pressed. Display doesn't change, and unit doesn't respond.
(No signal is getting through to the display.)

Symptoms of a handlebar switch issue follow.
Performance: Display does not beep after keys are pressed. Display doesn't change, and unit doesn't respond. (No signal is getting through to the display.)

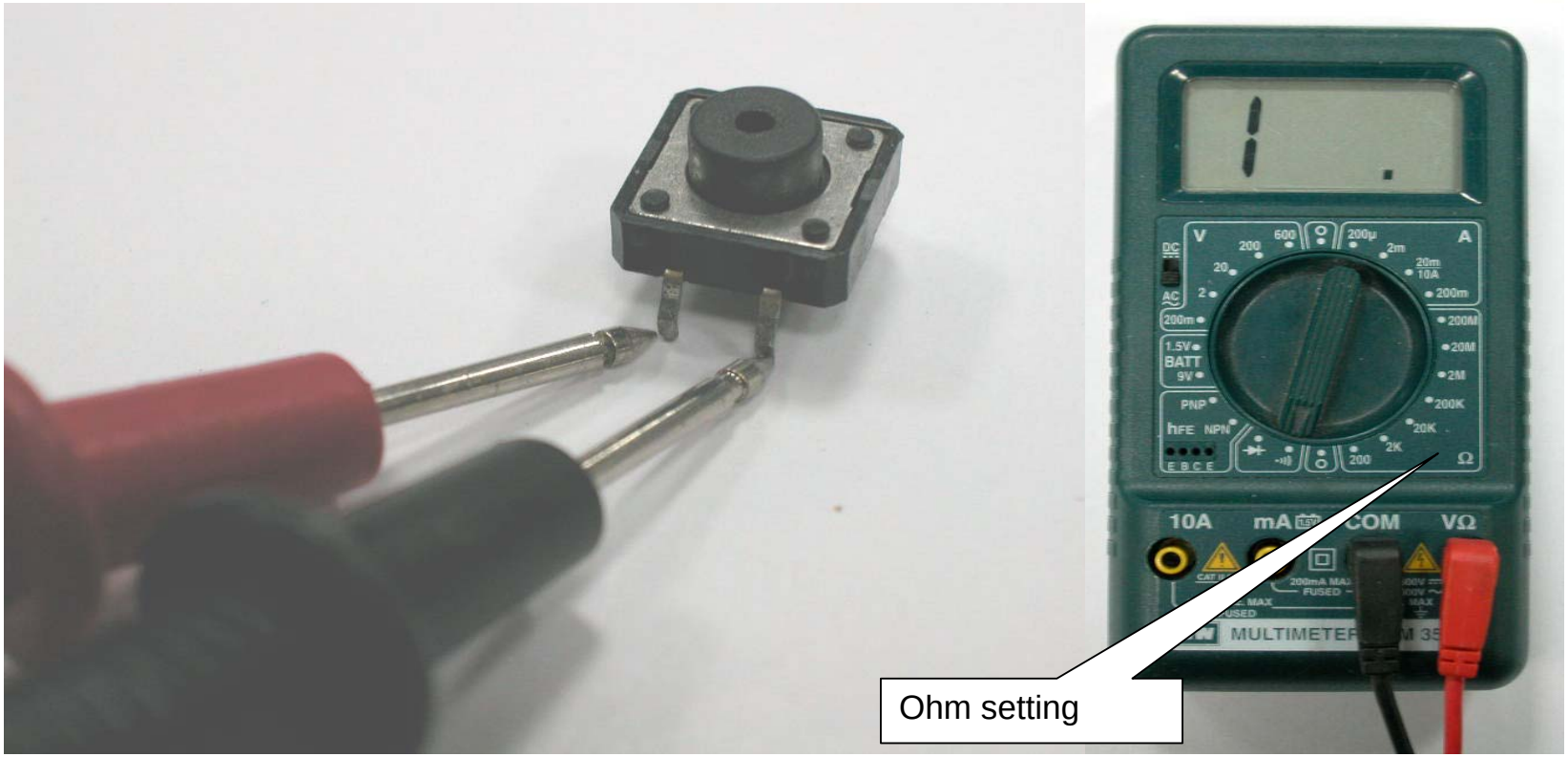
Key and Switch Troubleshooting

Keys - If the display overlay is cracked, replace it. Check keys as shown in KEY.04 through KEY.05.
Switches - Inspect all the wires involved. Be especially careful in checking switch wiring in the shoulders.

Display Key Illustration



Key Test Illustration



Key Test Procedure

(1) Put multimeter to the audible setting. Place probes as shown in KEY.05.
(2) Do not press the key. Normal reading: No sound.
(3) If the multimeter beeps when the key is not pressed, the key has a short. Replace it.
(4) Press the key switch “ON”. Normal reading: multimeter beeps.
If not as above, the key is broken. The picture below shows a reading taken on a key with a short.

Troubleshooting

Error Codes

Error codes are provided as a diagnostic aid. 805P and 807P have the following error messages:

STEP – "STEP" flashes on the display when the main program IC does not receive an optic sensor signal. This message appears for two reasons:
(1) User issue - the user isn't exercising on the unit so the flywheel doesn't rotate, and the optic sensor cannot detect any movement. In this case, the STEP message prompts the user to start moving. Once the flywheel rotates, the CPU should receive the optic sensor signal. Resolution in this case is simple: Exercise on the unit.
(2) Mechanical issue - the optic sensor signal is not arriving at the CPU. The optic sensor might be broken, the distance between the sensor and the reflective sticker might be too great, or the optic sensor or ribbon cable wires might be damaged or disconnected. Resolution: inspect the optic sensor, reflective sticker, wires and their connections. See OPTIC.01.

ERR6 – A STRIDE system error, ERR6 was removed from 805P models produced after July 2, 2001. It was never included on 807P products. Causes for ERR6 and their troubleshooting methods were similar to those of ERR7. The main exception was that ERR6 was broader in range than ERR7. ERR6 includes power issues, like a transformer malfunction, for example, as it related to stride operation. Since ERR6 is similar to ERR7 and so few units included ERR6, ERR6 is not dealt with in depth in this manual. Please refer to ERR7.

ERR7 – Causes of ERR7 include (1) the VR signal exceeds its proper range; (2) the CPU cannot read the VR signal. ERR7 always relates to stride operation. For ERR7 or other stride issues, please refer to STRIDE.07.

Electronic Malfunctions

If the following symptoms appear, refer to the page indicated.

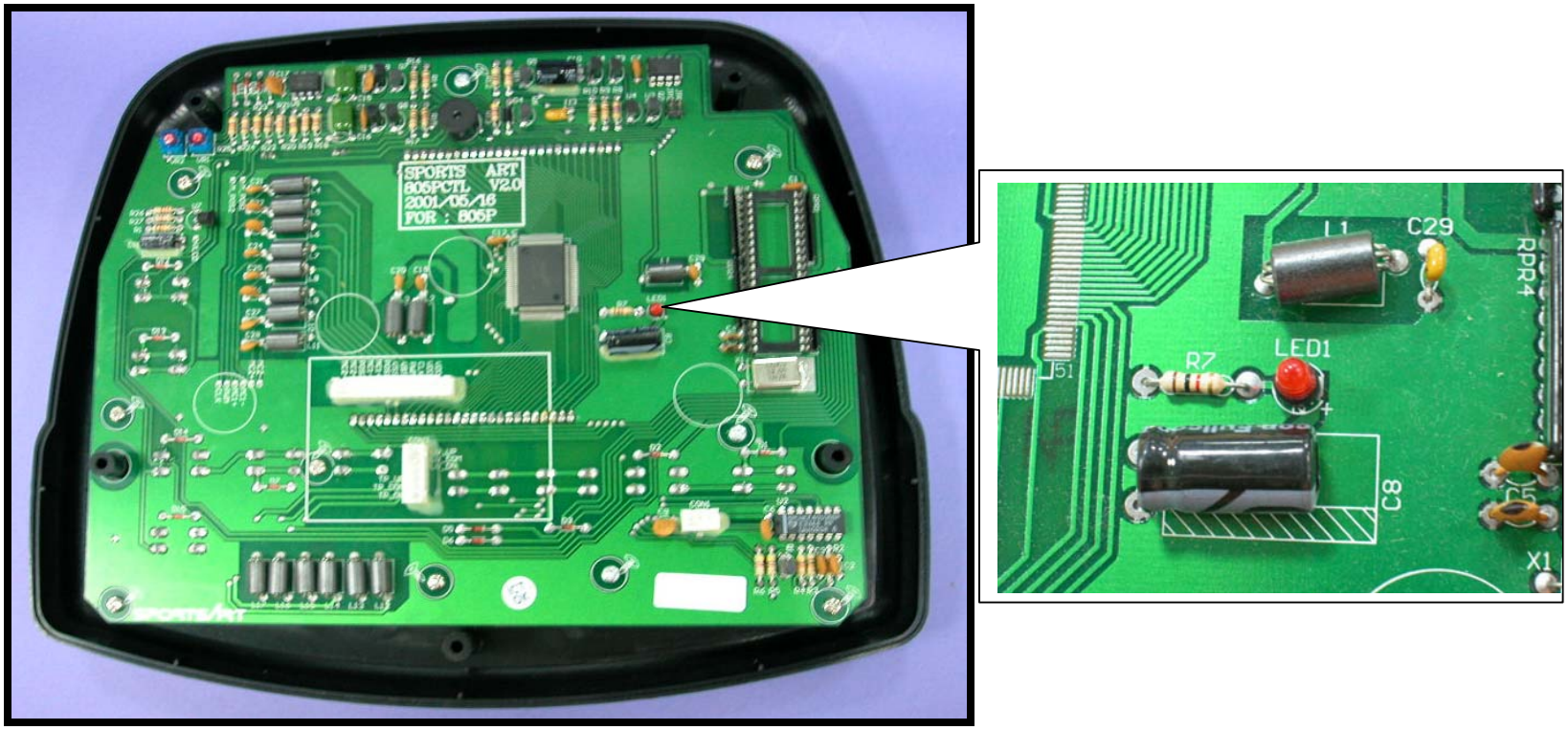
- Display doesn't light up. Refer to TROUBLESHOOTING.03.
- No response to display keys. Refer to KEY.01.
- No response to handle switches. Refer to KEY.01.
- No Polar heart rate reading appears. Refer to POLAR.01.
- No HTR (807P only) reading appears. Refer to HTR.01.

Display Does Not Light Up

Malfunction: Turn on unit; Display does not light up.

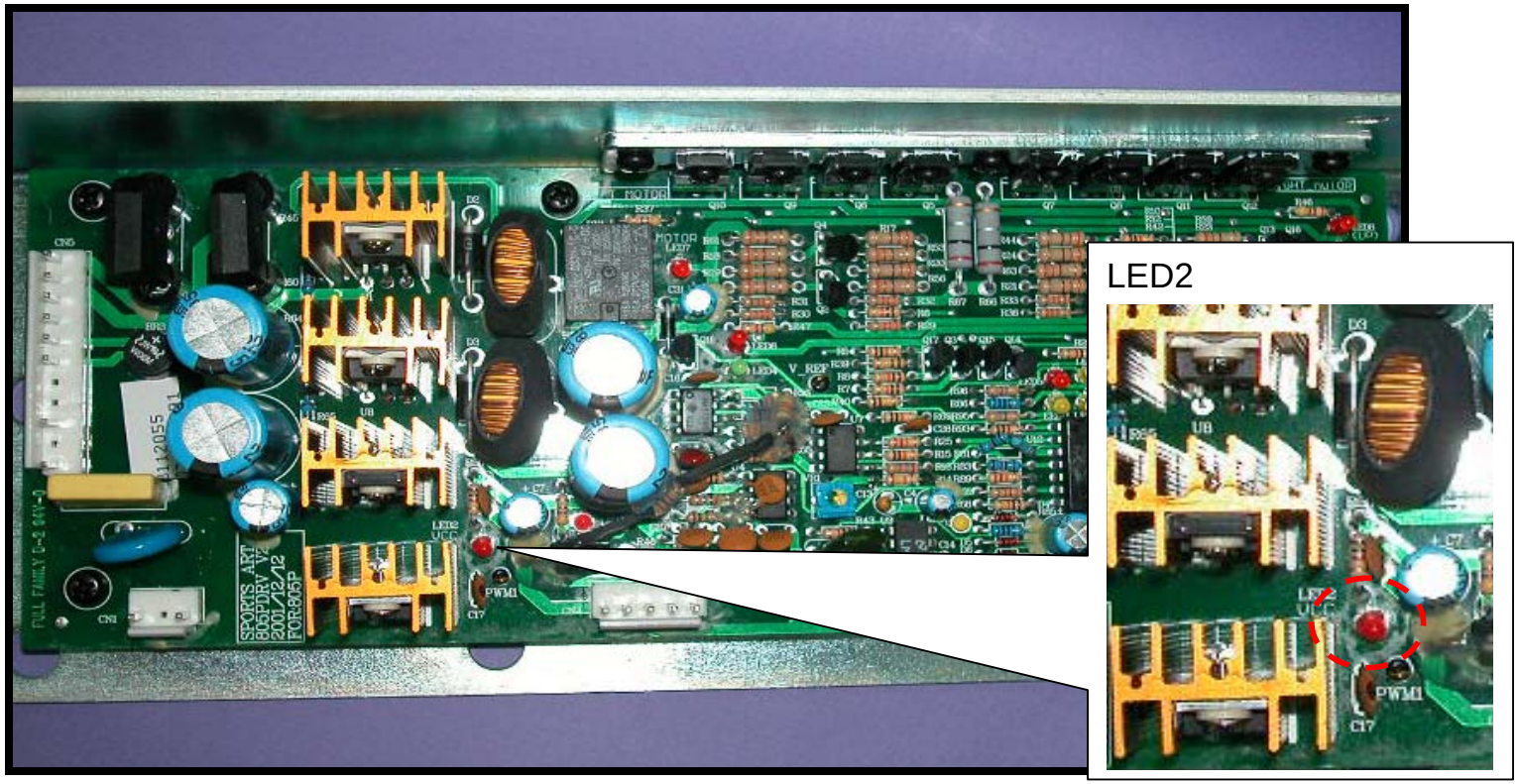
Inspect the following:
(1) LED1 on the display – LED1 on the display should light up when the unit is turned on. See TROUBLESHOOTING.04. If it does not light up, inspect the drive board power indicator, LED2. See TROUBLESHOOTING.05.
If LED1 (805P) or LED13 (807P) on the display does light up but the display does not light, replace the display.
(2) Drive board LED2 – LED2 on the drive board should light up when the unit is turned on. See TROUBLESHOOTING.05 and POWER.03 through POWER.04. If there's no power to the drive board, inspect the on/off switch, fuse, fuse-holder, and transformer (POWER.07 through POWER.09). If it does light, inspect the drive-to-display cable and its connections. Inspect wire connections. See POWER.01 for general reference.

Display Board VCC Test



If the display board has power, display VCC LED1 (805p) OR LED13 (807P) indicator (shown above) should light; capacitor C8 (shown above, 805P) should also have power. To test voltage at the capacitor, put a multimeter probe on each pin of capacitor C8. Normal reading: 5 VDC.
If there is power at the display but it doesn't light or beep once when turned on, replace the display.
If there is no power at the display, make sure the ribbon cable is connected well and inspect the drive board.

Drive Board VCC Voltage Test



If there is power to the drive board, the drive board VCC LED2 should light. If not, inspect the transformer input and output voltages, fuse, fuse holder, and on/off switch.