

Vision T9800HRT

Service Manual



| | |
|----------------------|---|
| Belt Area | 63" x 22" (160 X 59 cm) |
| Elevation | 0 to 15% Cambridge Motor Works™ |
| Speed | 5 to 12 MPH/ 0.8 to 20 KPH |
| Motor | 3.0hp Continuous Duty Cambridge Motor Works™Internal Fan Cooled |
| Motor Control | Club-Rated PWM with Fuseless |
| Deck | 1" Low Maintenance Prewaxed Phenolic Reversible |
| Cushioning | 8 Variable-Durometer Elastomer Cushions |
| Belt | Siegling Cool-Wave 2 - ply Urethane High Conductivity |
| Rollers | 3.0" Crowned with Large O.D. Bearings |
| Frame | Extra Heavy Duty Steel Welded Frame |
| Weight | 157 kgs |

TABLE OF CONTENTS

| | |
|--|---------------|
| SECTION 1: MAINTENANCE PROCEDURE | 3 |
| 1. MAINTENANCE CHECK LIST..... | 4 |
| 2. TENSIONING THE BELT PROCEDURE..... | 5-6 |
| 3. DECK RE-WAXING PROCEDURE..... | 7 |
| 4. CLEAN THE GROOVES PROCEDURE..... | 8 |
| SECTION 2: WIRING DIAGRAM INSTRUCTION..... | 9 |
| 1. T9800(TM87) MCB WIRING(FOR 110V / 220V)..... | 10 |
| 2. T9800(TM87) MCB WIRING DEFINITION OF PIN..... | 11-12 |
| 3. T9800(TM87) CONSOLE WIRING..... | 13 |
| 4. T9800(TM87) CONSOLE WIRING DEFINITION OF PIN..... | 14-15 |
| 5. T9800(TM87) ELECTRICAL BLOCK DIAGRAM FOR 110V..... | 16 |
| 6. T9800(TM87) WIRING DIAGRAM INSTRUCTION for 110V..... | 17 |
| 7. T9800(TM87) ELECTRICAL BLOCK DIAGRAM FOR 220V..... | 18 |
| 8. T9800(TM87) WIRING DIAGRAM INSTRUCTION for 220V..... | 19 |
| SECTION 3: CONSOLE FUNCTIONAL FLOW DIAGRAM..... | 20 |
| 1. OPERATION T9800 MANUAL..... | 21 |
| 2. OPERATION T9800 MANUAL- Engineer mode..... | 22-26 |
| SECTION 4: MCB LED INSTRUCTIONS..... | 27 |
| 1. T9800 MCB LED PLACE AND DEFINITION..... | 28-29 |
| SECTION 5: <i>TROUBLESHOOTINGS</i>..... | 30 |
| 1. T9800 Console Error code | 31 |
| 2. E1 - Reverse Elevation Pot | 32 |
| 3. E2 – Elevation Out Of Range | 33 |
| 4. E3 – Elevation Stall | 34 |
| 5. E5 – Over-speed Error | 35 |
| 6. E6 – Runaway Belt Error | 36 |
| 7. E7 – Speed Stall Error..... | 37 |
| 8. E9 – Speed Range Error | 38-39 |
| 9. Speed Issues | 40 |
| 10. Belt Drive Issues..... | 41 |
| 11. Speed Control Issues..... | 42 |
| 12. Speed Calibration Issue..... | 43 |
| 13. OPERATION ERRORS..... | 44 |

SECTION 1
MAINTENANCE PROCEDURE

MAINTENANCE CHECK LIST

| <u>PREVENTIVE MAINTENANCE SCHEDULE</u> | | | | | | |
|---|--------------|---------------|------------------------|------------------|-------------------|---------------|
| <i>Vision T9800 TREADMILL</i> | | | | | | |
| <i>Item</i> | <i>Daily</i> | <i>Weekly</i> | <i>Monthly</i> | <i>Quarterly</i> | <i>Biannual</i> | <i>Annual</i> |
| <i>Console Mounting Bolts</i> | | | | | Inspect | |
| <i>Frame</i> | Clean | | | | Inspect | |
| <i>Power Cord</i> | | | Inspect | | | |
| <i>Display Console</i> | Clean | | Inspect | | | |
| <i>Handrail & Handlebar</i> | Clean | | | Inspect | | |
| <i>Front Roller</i> | | | | Clean | Inspect | |
| <i>Rear Roller</i> | | | | Clean | Inspect | |
| <i>Emergency Button</i> | Test | | | | | |
| <i>Running belt Tension</i> | | | Inspect | | | |
| <i>V Belt</i> | | | | Clean | Inspect | |
| <i>Deck Re-waxing</i> | | | Inspect & Re-waxing | | | |
| <i>Running Belt</i> | | | | | Inspect | |
| <i>Control Board</i> | | | | | Clean (Vacuum) | |
| <i>Motor</i> | | | | Clean | | |

TENSIONING THE BELT PROCEDURE

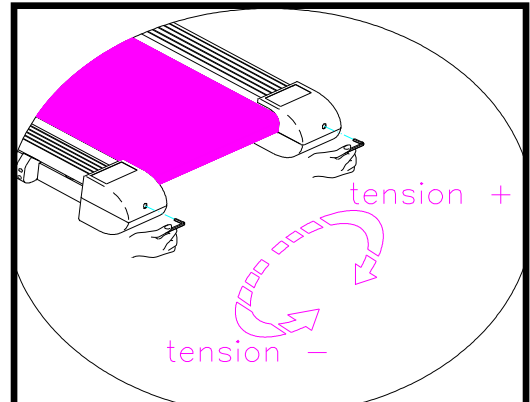
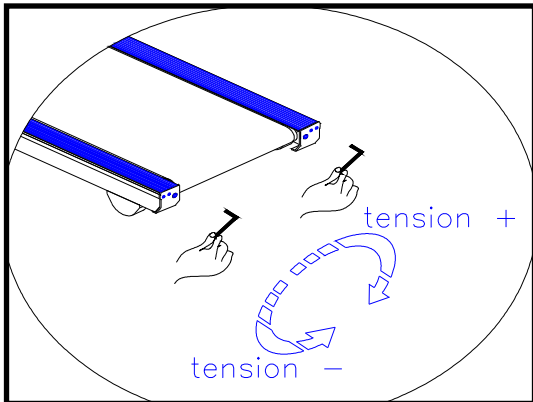
Caution:

Over-tightening of the roller will severely shorten the life of the belt and may cause further damage to other components.

Frequency: Every 1 months

Running Belt:

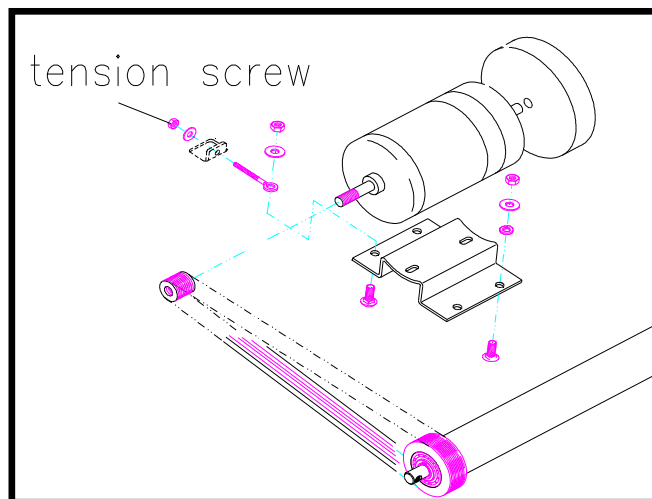
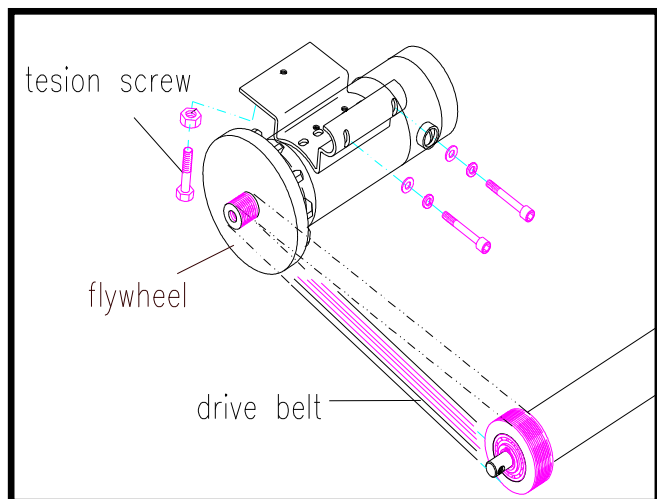
If when you plant your foot on the belt, you can feel a slipping sensation then the belt has stretched and is slipping across the rollers. This is a normal and common adjustment on a new treadmill. To eliminate this slipping, tension both the rear rollers Allen bolts **1/4 TURN** as shown above. Try the treadmill again to check for slipping. Repeat if necessary, but **NEVER TURN the roller bolts more than 1/4 turn at a time.**



Perfect Tension of Running Belt: 0.9~1.1 lbs

Drive Belt:

If you have tensioned the running belt and are still experiencing a slipping, adjust the tension screw. Then try the treadmill again to check for slipping.



DECK RE-WAXING PROCEDURE

Caution:

If deck is not to periodical add the waxing, between the deck and running belt will produce great friction make the deck and running belt to burn up and cut down the motor life .

Frequency: Every 1 month



Parts name: Silicon oil set
Parts number: SZTM74SOS
Price (USD): 0.6
Use time : 1

Procedure:

1. Loosen the tension bolts at both ends.
2. Pull the belt with your left hand and apply the silicon in the deck with your right hand. *(The volume of silicon applied is about 40ml)*
3. Tighten the tension bolts.
4. Start the treadmill. Step on the treadmill belt to walk the silicon in. Adjust the belt tension if necessary.
5. With the clamp-on meter, measure the current draw of the motor. *(Clamp on either the red or the black wire.)* The current should be less than 15Amps for 110V model. *(less than 7.5Amps for 220V model.)*

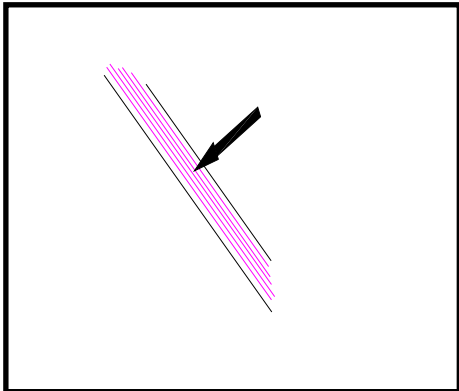
CLEAN THE GROOVES PROCEDURE

Caution:

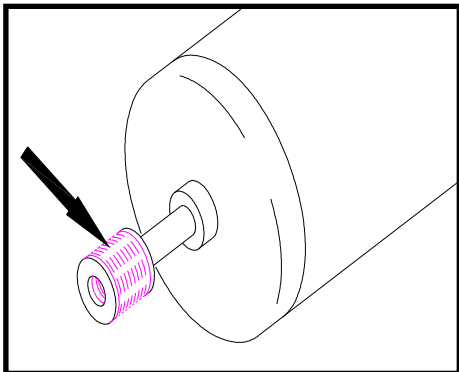
If dirty grooves in the drive belt, motor and roller pulley, there will be noises while running.

Frequency: Every 3 months

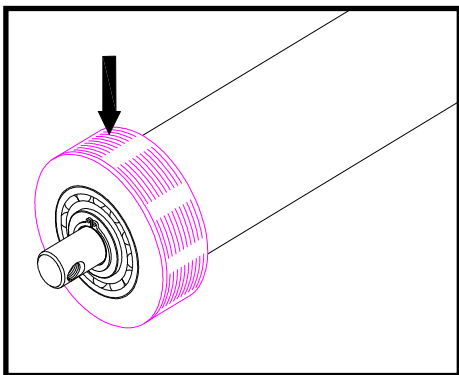
Procedure:



1.Remove the drive belt and check the grooves in belt for dirt or dust and clean it.



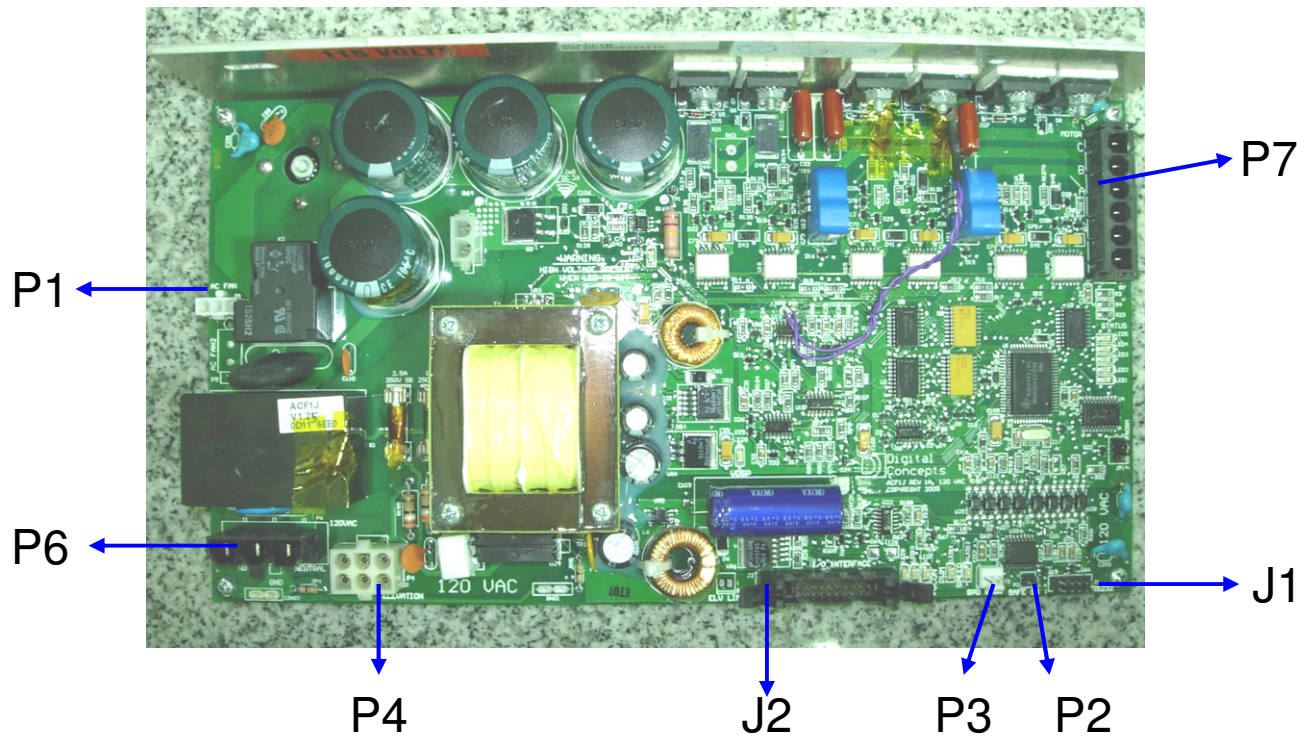
2.Check the grooves in motor pulley for dirt or dust and clean it



3.Check the grooves in roller pulley for dirt or dust and clean it.

SECTION 2
WIRING DIAGRAM INSTRUCTION

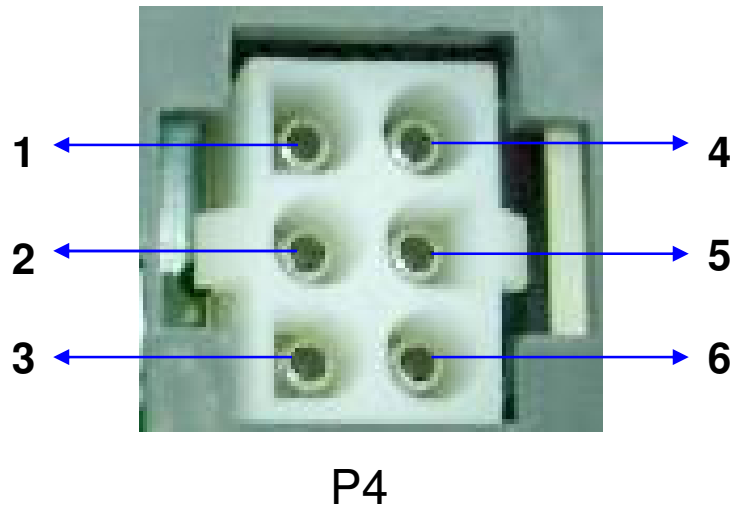
T9800(TM87) MCB WIRING(FOR 110V / 220V)



- P7-----Motor wire
- P6----- on/off switch (power)
- J2-----Console cable
- P1-----Fan power
- P2-----SAFE SW (install software)
- J1-----RS232 (install software)
- P4-----Elevation cable
- P3-----Speed sensor (RPM)

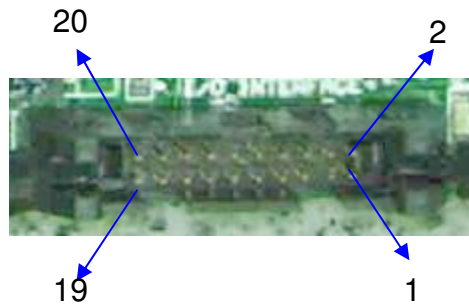
T9800(TM87) MCB WIRING DEFINITION OF PIN

JP1:Elevation cable(6pin/AMP-350762-4)



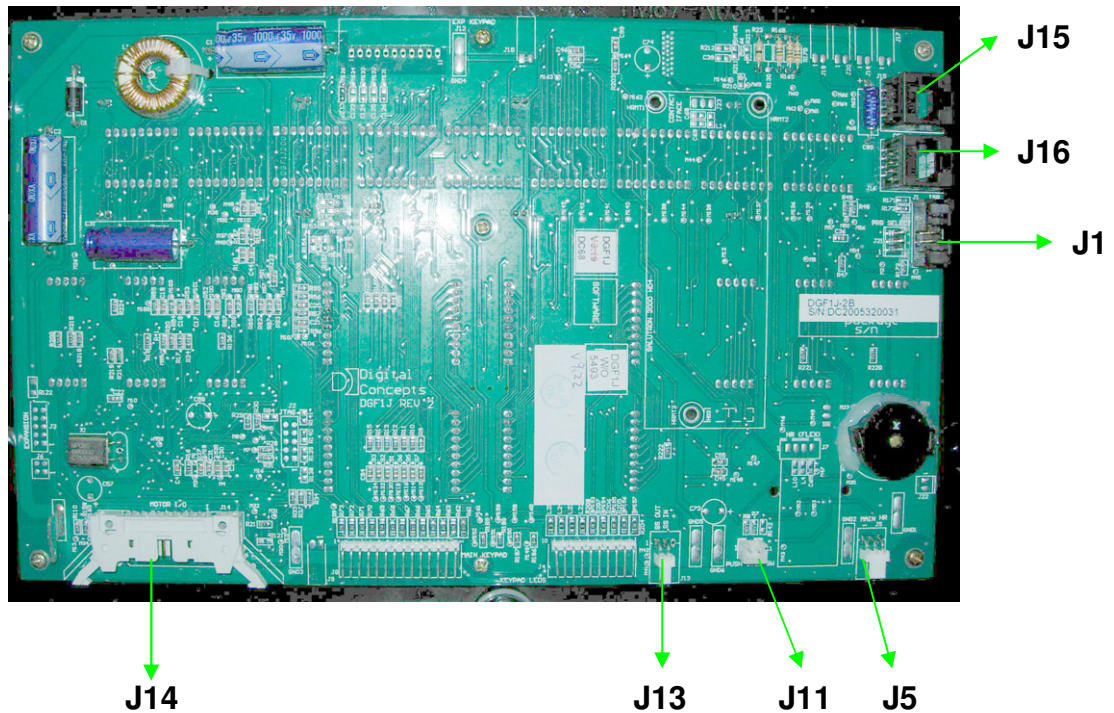
| Pin | Name | Definition |
|-----|----------|----------------------------------|
| 1 | ELVR_+5V | Incline place signal test power |
| 2 | ELVR_POT | Incline place signal |
| 3 | ELVR_GND | Incline place signal test ground |
| 4 | UP | Incline motor does move to up |
| 5 | DOWN | Incline motor does move to down |
| 6 | COM | Incline motor does turn on power |

J2: console cable



| Pin | Definition |
|-----|---|
| 1 | Console ground |
| 2 | Motor Current |
| 3 | ELV REF GND |
| 4 | POT Wiper of ELV(0-5V) |
| 5 | ELV REF VOL.+5V |
| 6 | Speed. signal. (0-5V PULSE) |
| 7 | Console ground |
| 8 | Console ground |
| 9 | Console for MCB of the PWM signal |
| 10 | Console power |
| 11 | Console power |
| 12 | Console power |
| 13 | Console provide for incline motor UP signal |
| 14 | Console provide for incline motor DOWN signal |
| 15 | E_STOP |
| 16 | TX OUT(RESERVE) |
| 17 | RESERVE |
| 18 | RX IN(RESERVE) |
| 19 | ERR. SIG. |
| 20 | Console ground |

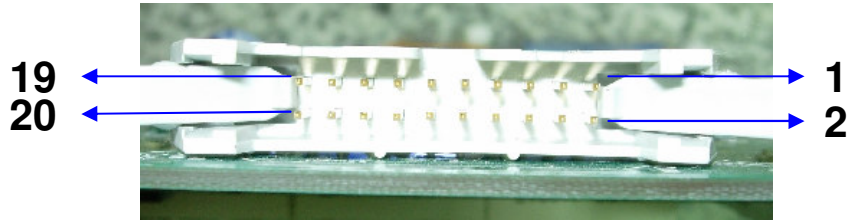
T9800(TM87) CONSOLE WIRING



- J13-----Safety Pull Switch
- J11-----Safety Push Switch
- J5-----Main HR Interface
- J14-----Console cable
- J15-----CSAFE 1
(Full csafe function)
- J16-----CSAFE 2
(Power only port)
- J1-----RS232
(install software)

T8900(TM87) CONSOLE WIRING DEFINITION OF PIN

J14:20-pin console cable

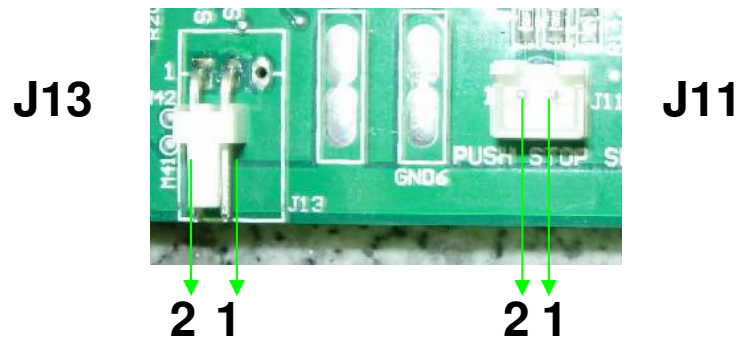


J14

| Pin | Definition |
|-----|---|
| 1 | Console ground |
| 2 | Motor Current |
| 3 | ELV REF GND |
| 4 | POT Wiper of ELV(0-5V) |
| 5 | ELV REF VOL.+5V |
| 6 | Speed. signal. (0-5V PULSE) |
| 7 | Console ground |
| 8 | Console ground |
| 9 | Console for MCB of the PWM signal |
| 10 | Console power |
| 11 | Console power |
| 12 | Console power |
| 13 | Console provide for incline motor UP signal |
| 14 | Console provide for incline motor DOWN signal |
| 15 | E_STOP |
| 16 | TX OUT(RESERVE) |
| 17 | RESERVE |
| 18 | RX IN(RESERVE) |
| 19 | ERR. SIG. |
| 20 | Console ground |

J13: Safety Pull Switch

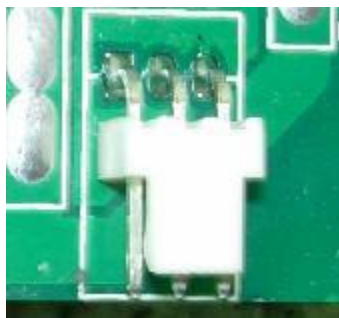
J11: Safety Push Switch



| Pin | Name | Definition |
|-----|--------|----------------|
| 1 | SS OUT | Safe key |
| 2 | SS IN | Console ground |

| Pin | Name | Definition |
|-----|--------|----------------|
| 1 | SS OUT | Safe key |
| 2 | SS IN | Console ground |

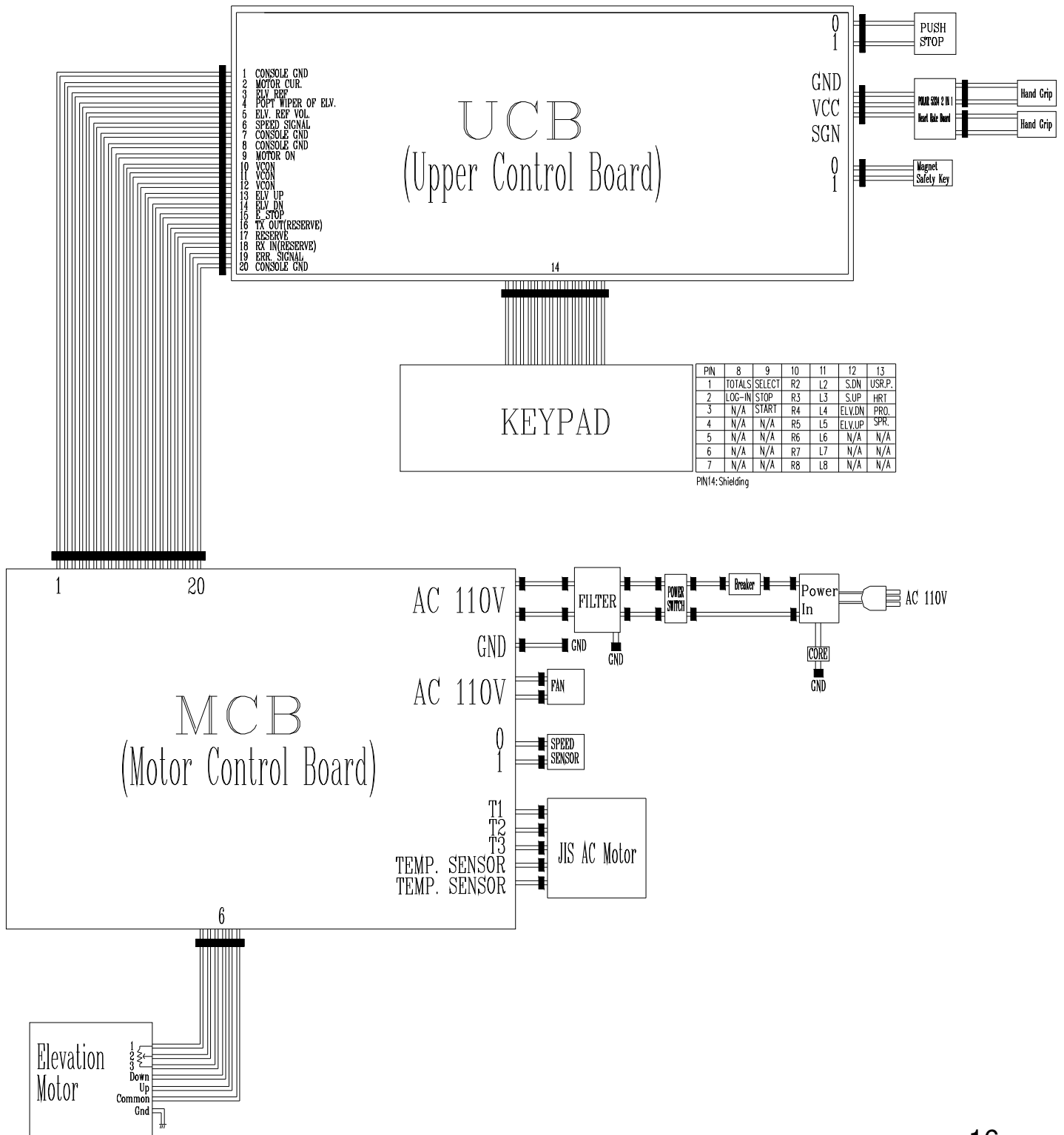
J5: Main HR Interface



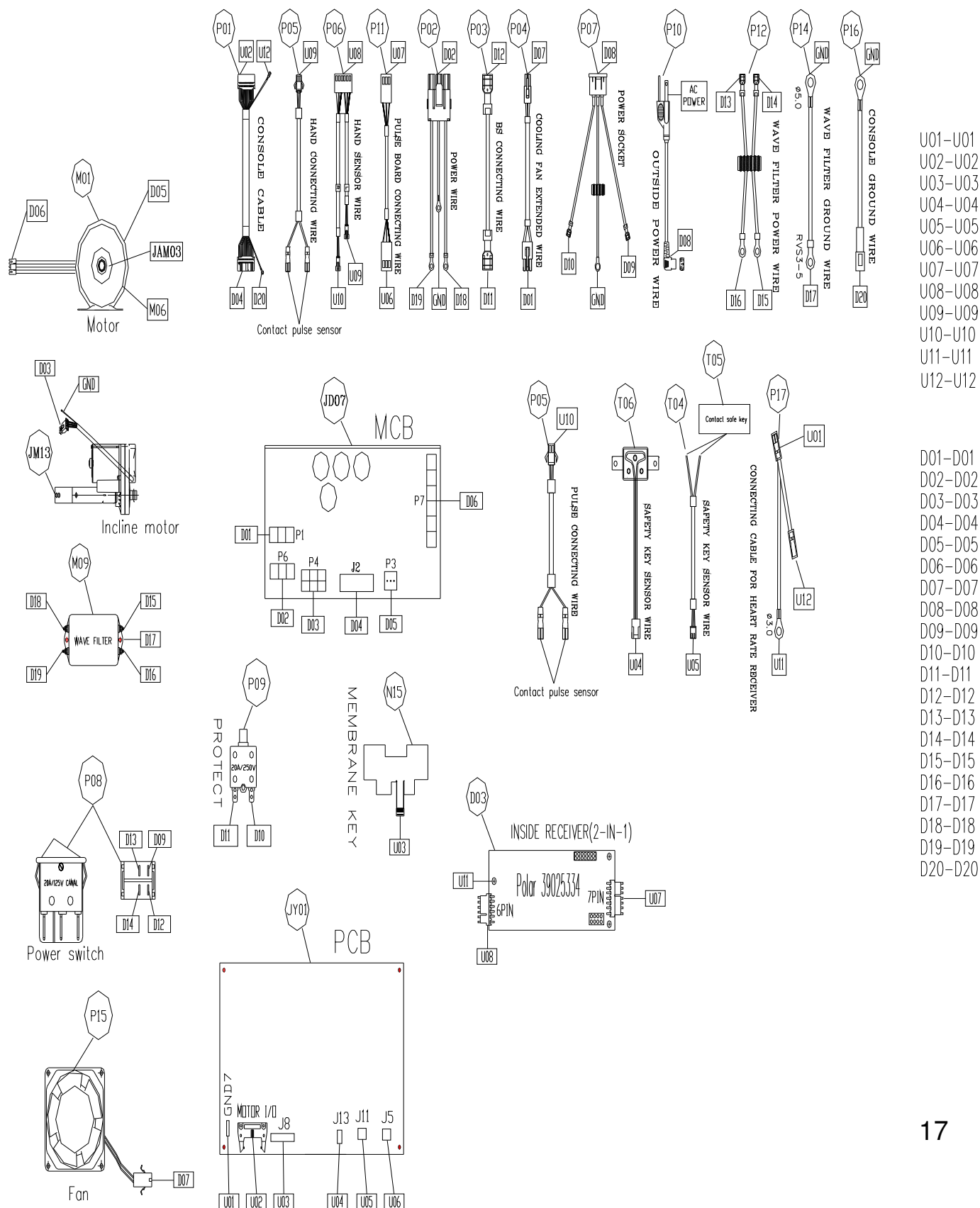
3 2 1

| Pin | Name | Definition |
|-----|------|---------------------|
| 1 | HR2 | Pulse Board signal |
| 2 | VCC | Console power (+5V) |
| 3 | GND | Console ground |

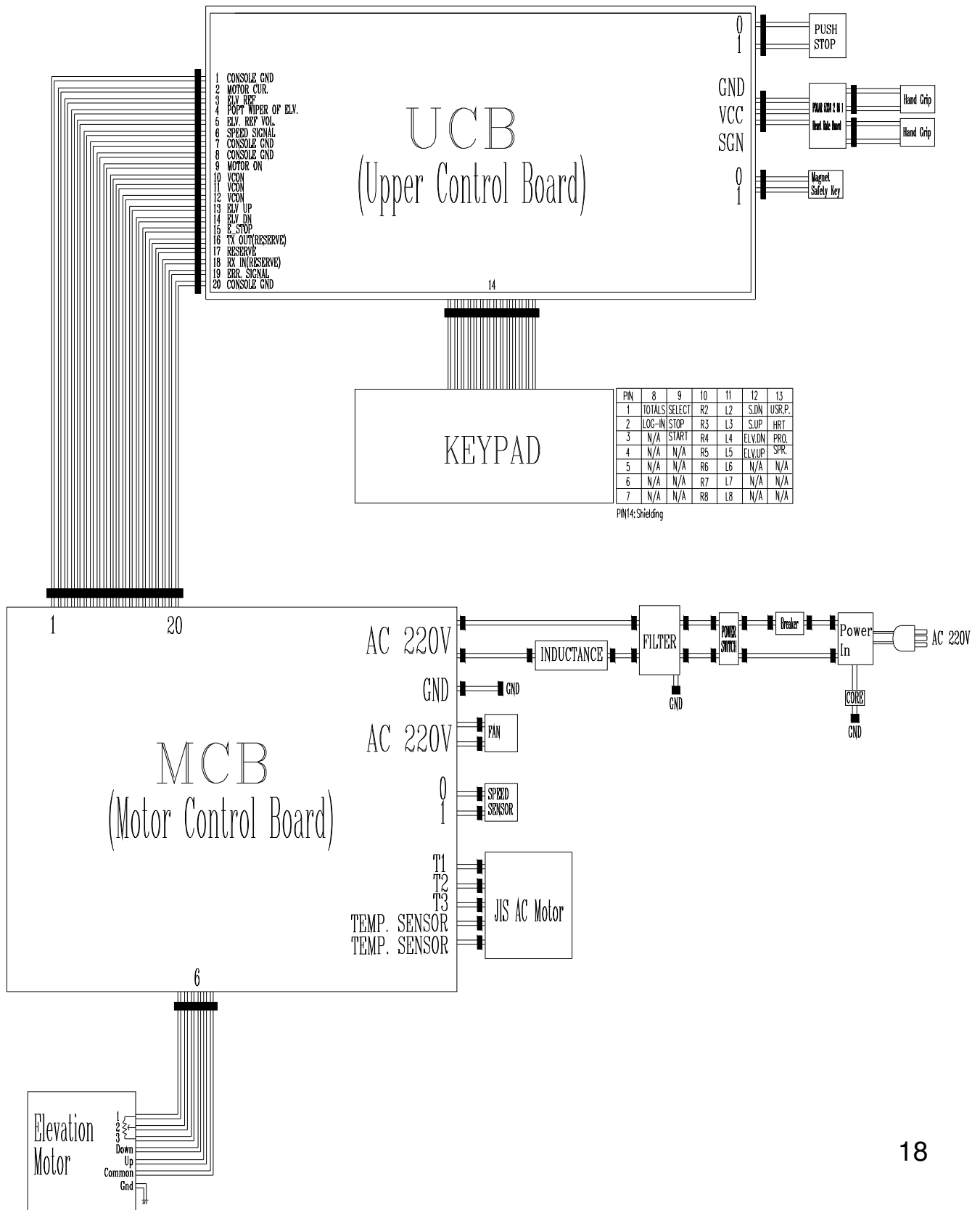
T9800(TM87) Electrical block diagram for 110V



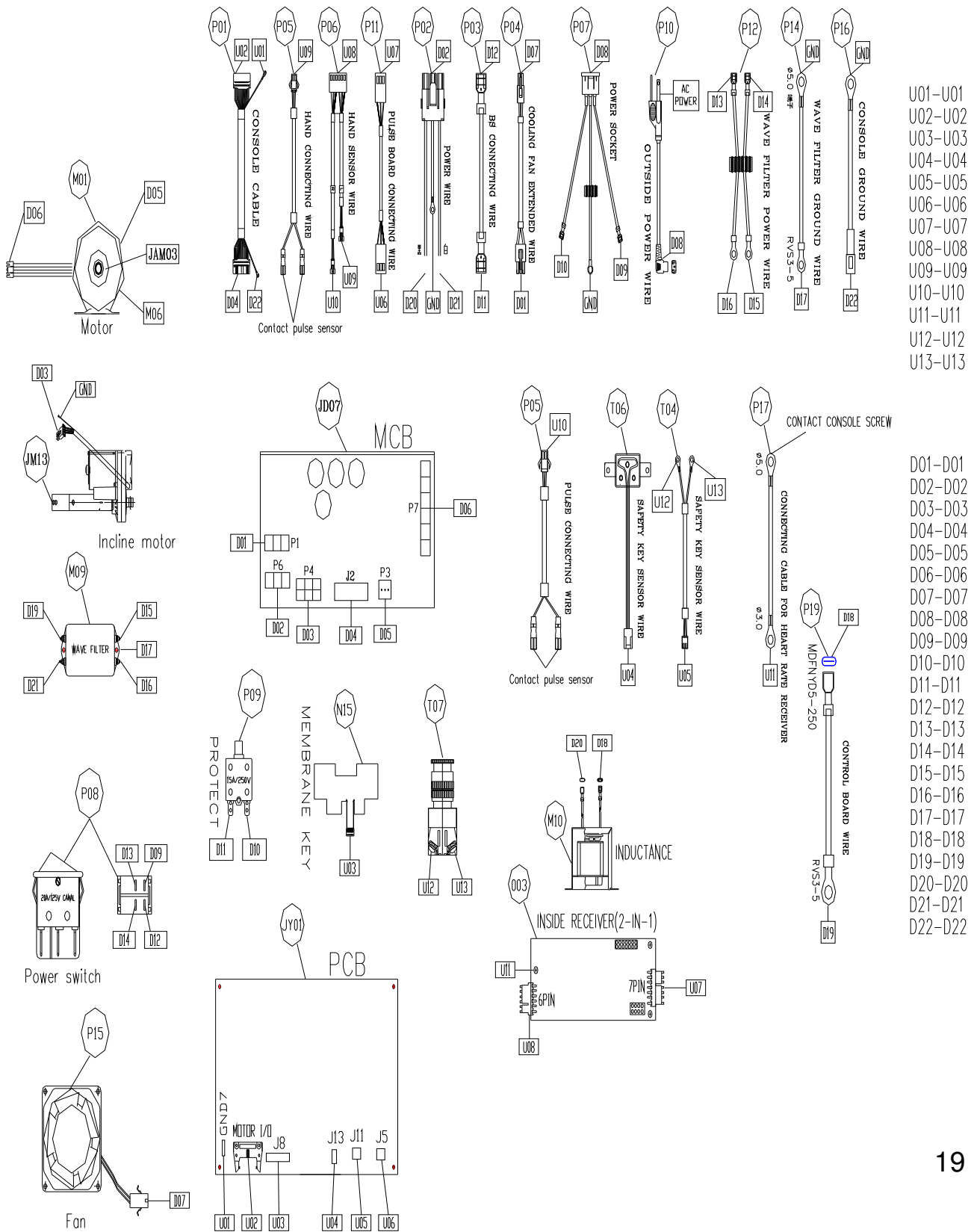
T9800(TM87) WIRING DIAGRAM INSTRUCTION for 110V



T9800(TM87) Electrical block diagram for 220V



T9800(TM87) WIRING DIAGRAM INSTRUCTION for 220V



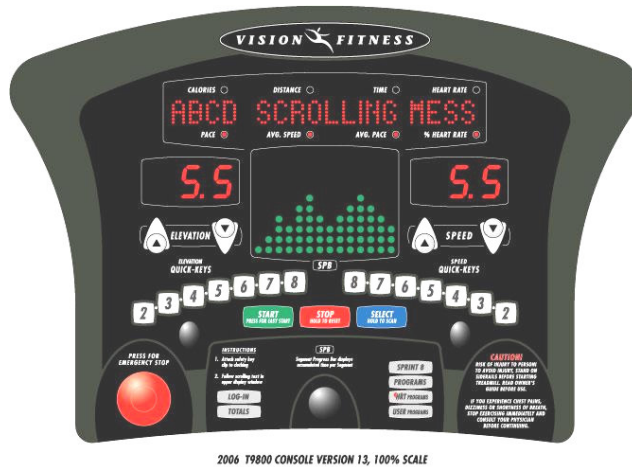
SECTION 3
CONSOLE FUNCTIONAL FLOW DIAGRAM

OPERATING T9800



One 10 x 14 Dot Matrix, Two LED Display, W/ CONTACT & TELEMETRIC HEART RATE,
One - Touch Program Keys, Unique User Log-In Spint8, Manual, Muscle Toner, Speed Interval, 5K, Fat Burner, Pacer, HRT Weight Loss, HRT Cardio, HRT Endurance, HRT Interval and 1 User program.

T9800 OPERATION MANUAL- Engineer mode



1. Press & Hold both “ELEVATION ▲” and “SPEED ▼” at the same time for 5 sec. Then, the display will show “Engineering Mode”.

2. Press the "ELEVATION UP or DOWN" to select you want and press the “SELECT” key enter.

| KEY BEHALE FUNCTION | |
|---------------------|---------------------------------------|
| UP | To scroll through the list of setting |
| DOWN | To scroll through the list of setting |
| FAST | Add this show parameter of speed |
| SLOW | Decrease this show parameter of speed |
| SELECT | To Store up the parameter |

Set the data/function Step.

Use the elevation arrow keys to scroll through the available functions press “SELECT” key enter, press the “SPEED” key to choose the data press “SELECT” key to save the data/function.

To exit, press “STOP” key

| |
|------------------------------|
| Engineering Mode Menu |
| CONFIGURATION |
| SYSTEM TESTS |
| AUTO-CALIBRATION |
| MANUAL CALIBRATION |
| MAINTENANCE |
| SOFTWARE VERSION |
| EXIT |

| CONFIGURATION | | | | |
|-------------------------------|---|----------------------|----------------------|----------------------|
| Address | Description | Default Value | Minimum Value | Maximum Value |
| P6 T9800HRT | English,0.5-12 Mph,15% Incline for USA | | | |
| P6 T9800HRT INT | Metric,0.8-20 Kph,15% Incline for ID English,0.5-12 Mph,15% Incline for ID | | | |
| P6 T9800S | English,0.5-12mph,15% Incline for USA | | | |
| P24 UNITS | English/Metric | | | |
| P7 MAXIMUM TIME | | 99 | 5 | 99 |
| P22 DEFAULT TIME | | 30 | 5 | 99 |
| P23 PAUSE TIME | | 0:20 | 0:05 | 10:00 |
| P27 DEFAULT AGE | | 40 | 15 | 99 |
| P8 DEFAULT WEIGHT | English Metric | 150 68 | 80 36 | 400 181 |
| P15 SCROLL SPEED | | 3 | 1 | 5 |
| P30 Maximum Speed | English Metric | 12.0 20.0 | | |
| P14 ELEVATION ERRS—OFF | | ON | | |
| Reset Novram | | | | |
| EXIT | Exits mode | | | |

MANUAL CALIBRATION

| Address | Description | Default Value | Minimum Value | Maximum Value |
|--------------------------|---|---------------|---------------|---------------|
| P0 PWM MIN SPD | PWM value at min speed (0.5 mph/0.8kph) | 34 | 1 | 111 |
| P1 PWM 1/2 MAX | PWM value at 1/2 max speed (6.0 mph/10.0kph) | 176 | 110 | 251 |
| P2 PWM MAX SPD | PWM value at max speed (12.0 mph/20.0kph) | 341 | 249 | 486 |
| P4 ELEVATION MIN | Value at zero or minimum elevation | 40 | 27 | 71 |
| P5 ELEVATION MAX | Value at maximum elevation | 218 | 71 | 228 |
| P13 ELV DIRECTION | | YES | | |
| P19 MAGNET COUNT | | 26 | 1 | 48 |
| P20 EFF DIAMETER | | 67.8 | | |
| P21 PWM START SPD | | 30 | 1 | ~ |
| P29 RAMP TIME | | 30 | 12 | 40 |
| EXIT | Exits mode | | | |

Remarks:

Do not change the product below parameter , or it may cause malfunction.

| Address | Default Value |
|--------------------------|---------------|
| P13 ELV DIRECTION | YES |
| P19 MAGNET COUNT | 26 |
| P20 EFF DIAMETER | 67.8 |
| P29 RAMP TIME | 30 |

| |
|-------------------------------|
| SYSTEM TESTS |
| HARDWARE TEST |
| DISPLAY TEST |
| KEYBOARD TEST |
| SAFETY SWITCH TEST |
| IO TEST |
| BURN-IN TEST |
| ELEVATION BURN-IN TEST |
| EXIT |

| MANUAL CALIBRATION | | | | |
|---------------------------|---|----------------------|----------------------|----------------------|
| Address | Description | Default Value | Minimum Value | Maximum Value |
| P0 PWM MIN SPD | PWM value at min speed (0.5 mph/0.8kph) | 34 | 1 | 111 |
| P1 PWM 1/2 MAX | PWM value at 1/2 max speed (6.0 mph/10.0kph) | 176 | 110 | 251 |
| P2 PWM MAX SPD | PWM value at max speed (12.0 mph/20.0kph) | 341 | 249 | 486 |
| P4 ELEVATION MIN | Value at zero or minimum elevation | 40 | 27 | 71 |
| P5 ELEVATION MAX | Value at maximum elevation | 218 | 71 | 228 |
| P13 ELV DIRECTION | | YES | | |
| P19 MAGNET COUNT | | 26 | 1 | 48 |
| P20 EFF DIAMETER | | 67.8 341 | | |
| P21 PWM START SPD | | 30 | 1 | ~ |
| P29 RAMP TIME | | 30 | 12 | 40 |
| EXIT | Exits mode | | | |

| MAINTENANCE | | | | |
|-------------------------------|--------------------|----------------------|----------------------|----------------------|
| Address | Description | Default Value | Minimum Value | Maximum Value |
| P9 Total HOURS | | 0 | 0 | 6533.5 |
| P10 TOTAL DISTANCE | | 0 | 0 | 65335 |
| P25 BELT/MOTOR HOURS | | 0 | | |
| P26 LIFT MOTOR HOURS | | 0 | | |
| P16 LUBRICATE DECK MSG | | OFF | | |
| P17 CLEAN | | 0 | | |
| TREADMILL MSG | | 0 | | |
| ERROR LOG | | 0 | | |
| EXIT | Exits mode | | | |

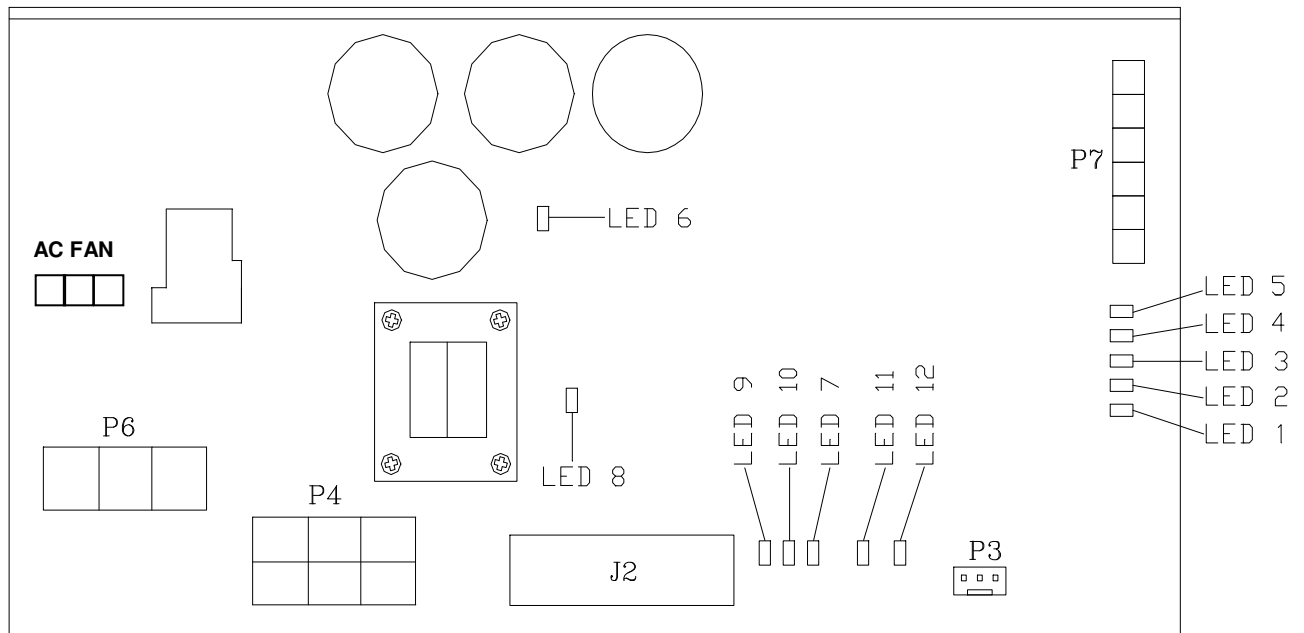
Remarks:

If you want to the clean below parameter, please enter engineering mode select “below place” enter, hold “START” key for 3 sec.

| |
|-----------------------------------|
| P9 Total HOURS |
| P10 Total DISTANCE |
| P25 Belt/Motor HOURS |
| P26 Lift (Elevation) HOURS |
| P16 LUBRICATE DECK MSG |
| P17 CLEAN MSG |
| TREAMILL MSG |
| Error Log |

SECTION 4
MCB LED INSTRUCTIONS

MCB



| LED | Reference Designator | Description |
|---------------|-----------------------------|---|
| STATUS | LED 1 | Auxiliary Status LED |
| | LED 2 | Auxiliary Status LED |
| | LED 3 | Auxiliary Status LED |
| | LED 4 | Auxiliary Status LED/Digital to Analog Output. |
| | LED 5 | Main Status/Error LED. |
| AC | LED 6 | Indicates if the DC Buss is Energized (Voltage Present). |
| +VCON | LED 7 | Indicates if Console Voltage Supply is present. |
| VDSP | LED 8 | Indicates if the DSP Power Supply is present. |
| DOWN | LED 9 | Indicates if the upper console is commanding Elevation DOWN. |
| UP | LED 10 | Indicates if the upper console is commanding Elevation UP. |
| PWM | LED 11 | Indicates if Console is commanding speed. |
| SPEED | LED 12 | Indicates the motor is moving via the encoder's feedback by blinking. |

NORMAL OPERATION

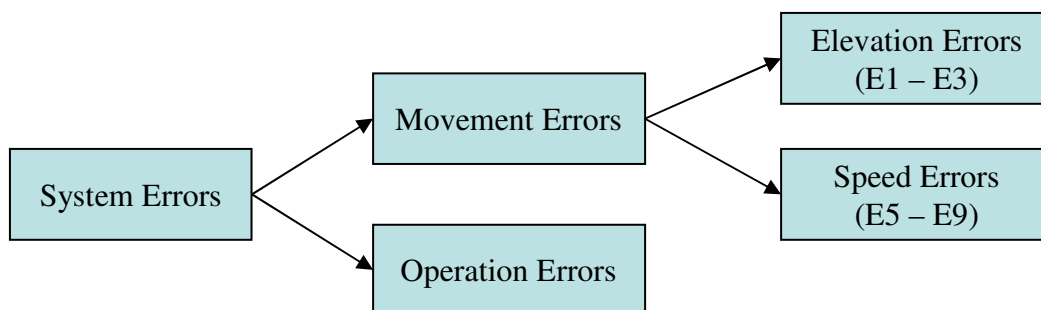
1. LEDs 1, 2 and 3 Sequence back and forth to indicate the processor is on-line and operational.
2. LED 4 is used as a discrete/analog signal to the upper console.
3. LED 5 indicates system status/mode. Currently 3 modes are defined safe mode, stand-by mode and run mode. They are defined as follows:
 - a) **Safe Mode** - When the controllers safety relay is not energized and no error exists, LED 5 remains off.
 - b) **Stand-by Mode** - When the safety relay is engaged but the system is not outputting an active PWM to the motor and no error exists, LED 5 blinks off and on at a fast rate.
 - c) **Run Mode** - When the system outputs an active PWM Control signal to the motor and no error exists, LED 5 remains ON.

SECTION 5
TROUBLESHOOTINGS

T9800 Console Error code

| CODE | DESCRIPTION |
|------|---|
| E1 | Reverse elevation pot |
| E2 | Elevation out of range |
| E3 | Elevation movement stall |
| E5 | Over-speed |
| E6 | Runaway belt |
| E7 | Speed stall (could be missing speed sensor) |
| E9 | Speed Range (usually caused by calibration) |
| E16 | Stuck key error |
| E18 | Safety Switch Test Failure |
| E19 | NOVRAM failure |

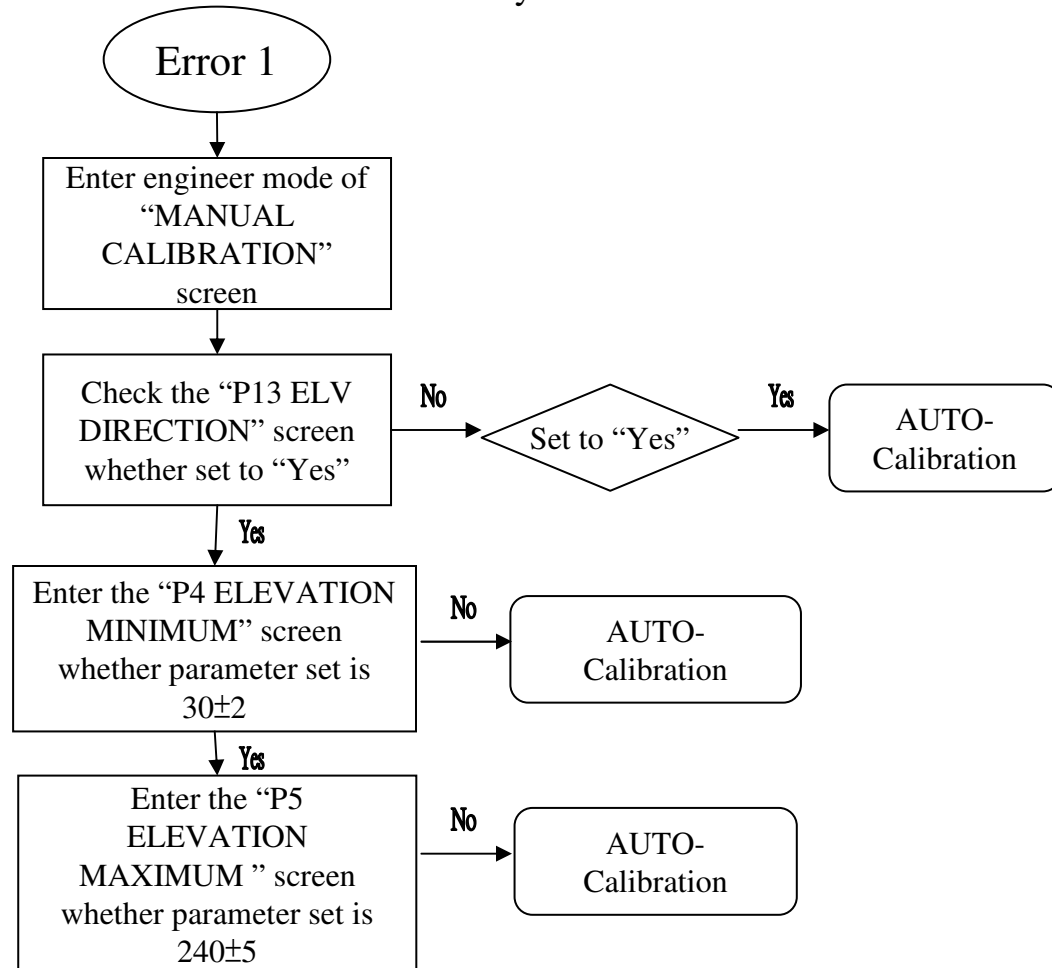
Movement related errors can be divided in elevation related errors (E1 – E3) or speed related errors (E5 – E9).



E1 - Reverse Elevation Pot

Step 1. Calibrate Elevation

Calibrate the elevation as outlined in the System Calibration Procedure in below step.



Step 2. CORRECTIVE ACTION

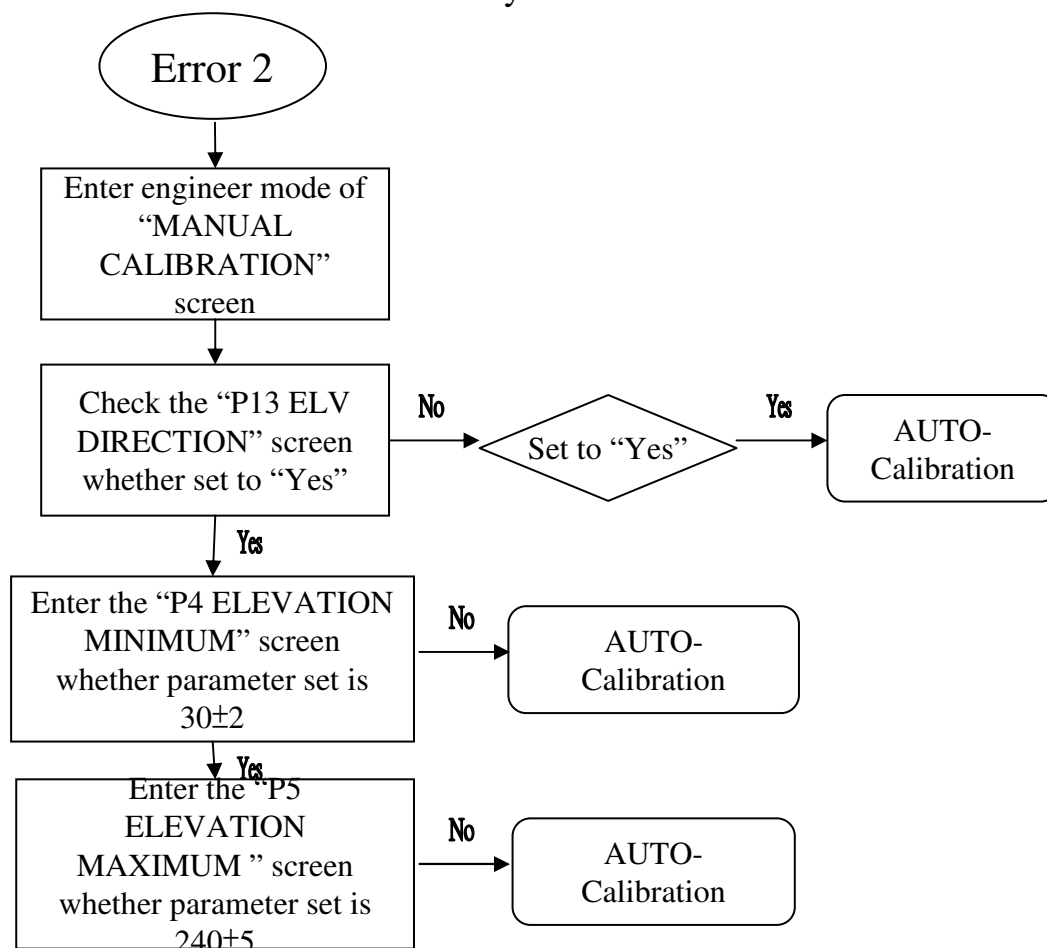
1.Ensure correct signal is being sent to interface board (MCB) by pressing elevation up/down keys by observing elevation LED's correctly corresponding to correct elevation keys pressed (please refer the 29 page) . If failure occurs for this step check console cable and then the interface board (MCB).

2.Check failed elevation motor, interface board, console cable with a known good console.

E2 – Elevation Out Of Range

Step 1. Calibrate Elevation

Calibrate the elevation as outlined in the System Calibration Procedure in below step.

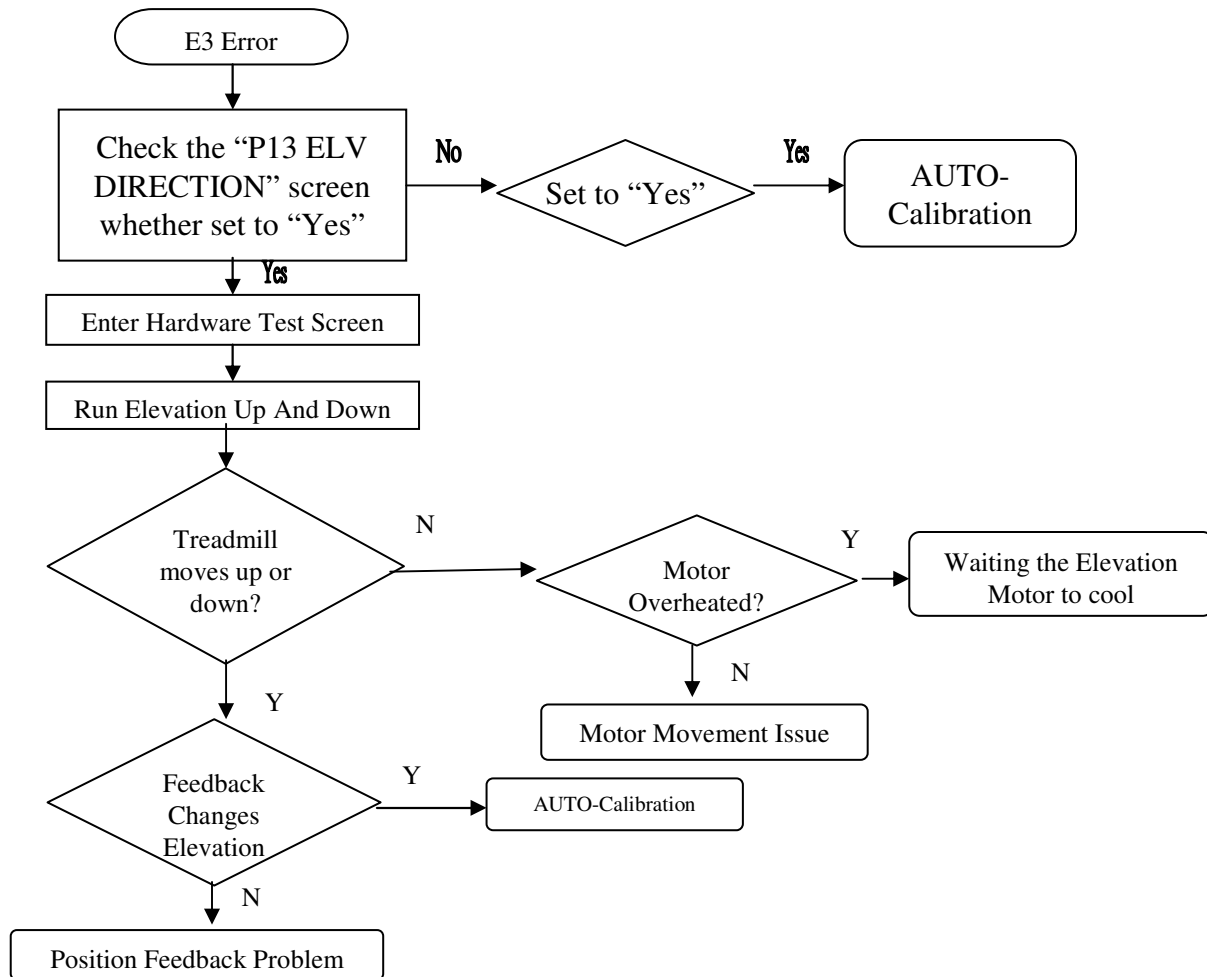


Step 2. CORRECTIVE ACTION

1. Check the failed system with a known good console cable. If fixed then repair/replace the console cable.
2. Check the failed system with a known good elevation motor. If problem fixed then repair/replace the elevation motor.
3. Check the failed system with a known good interface board. If problem fixed then repair/replace the interface board (MCB).
4. Check the failed system with a known good console board with current software. If the problem is fixed then repair/replace the console.

E3 – Elevation Stall

Step 1. Please refer the below PROBLEM IDENTIFICATION Step.



Step 2. CORRECTIVE ACTION

1.Allow elevation motor to cool.

2.Check the failed system with a known good console cable. If fixed then repair/replace the console cables.

3.Check the failed system with a known good elevation motor. If problem fixed then repair/replace the elevation motor.

4.Check the failed system with a known good interface board (MCB). If problem fixed then repair/replace the interface board (MCB).

5.Check the failed system with a known good console board with current software. If the problem is fixed then repair/replace the console.

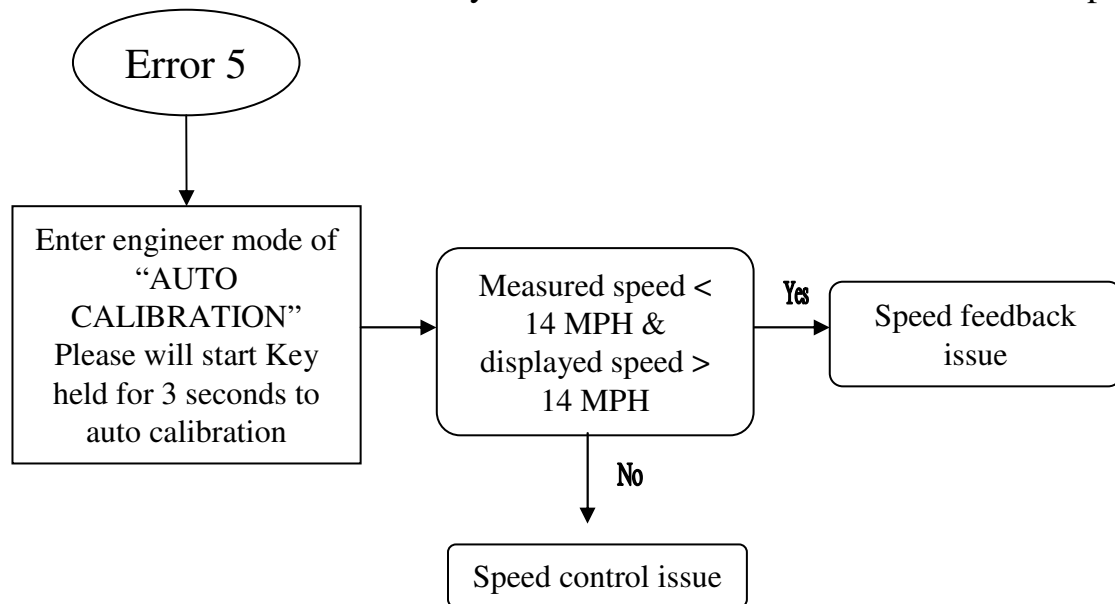
E5 – Over-speed Error

OVERVIEW

If the actual speed from the speed sensor exceeds the system maximum speed by a limit (currently 2 MPH) an over-speed error occurs (E5).

Step 1. AUTO CALIBRATION

AUTO-Calibration the as outlined in the System Calibration Procedure in below step.



Speed Feedback Issues – See speed feedback issue trouble shooting guide in *the CORRECTIVE ACTION PROCEDURES – Speed Issues* section of this document.

Speed Control Issues – See speed control issue trouble shooting guide in the *CORRECTIVE ACTION PROCEDURES – Speed Issues* section of this document.

Step 2 :

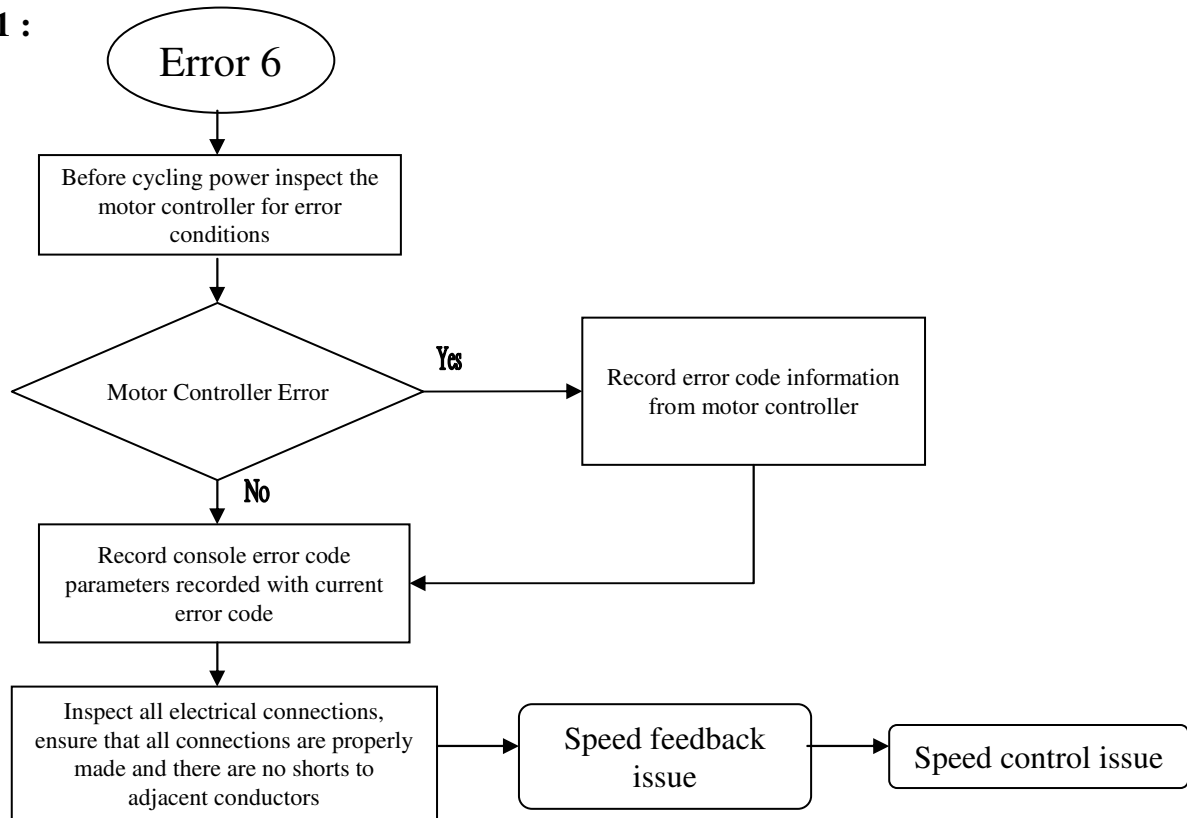
1. Record when parameter information with error (please refer the 25 page of P1 / P2 / P3 place) .
2. Remove Power!!! Carefully check all connections.
3. Check interface board (MCB) with the speed sensor ensure contact are correct and fix.
4. If AUTO CALIBRATION can't finish, please take speed sensor to be close to magnet and AUTO CALIBRATION again.
5. If repeat over speed errors occur remove the treadmill from service.

E6 – Runaway Belt Error

OVERVIEW

If the actual belt speed is greater than the target speed by a limit and increasing then an E6 error is called. E6 errors flag errors that will result in the belt “running away” or not responding to input.

Step 1 :



Speed Feedback Issues – See speed feedback issue trouble shooting guide in the *CORRECTIVE ACTION PROCEDURES – Speed Issues* section of this document.

Speed Control Issues – See speed control issue trouble shooting guide in the *CORRECTIVE ACTION PROCEDURES – Speed Issues* section of this document.

Step 2 :

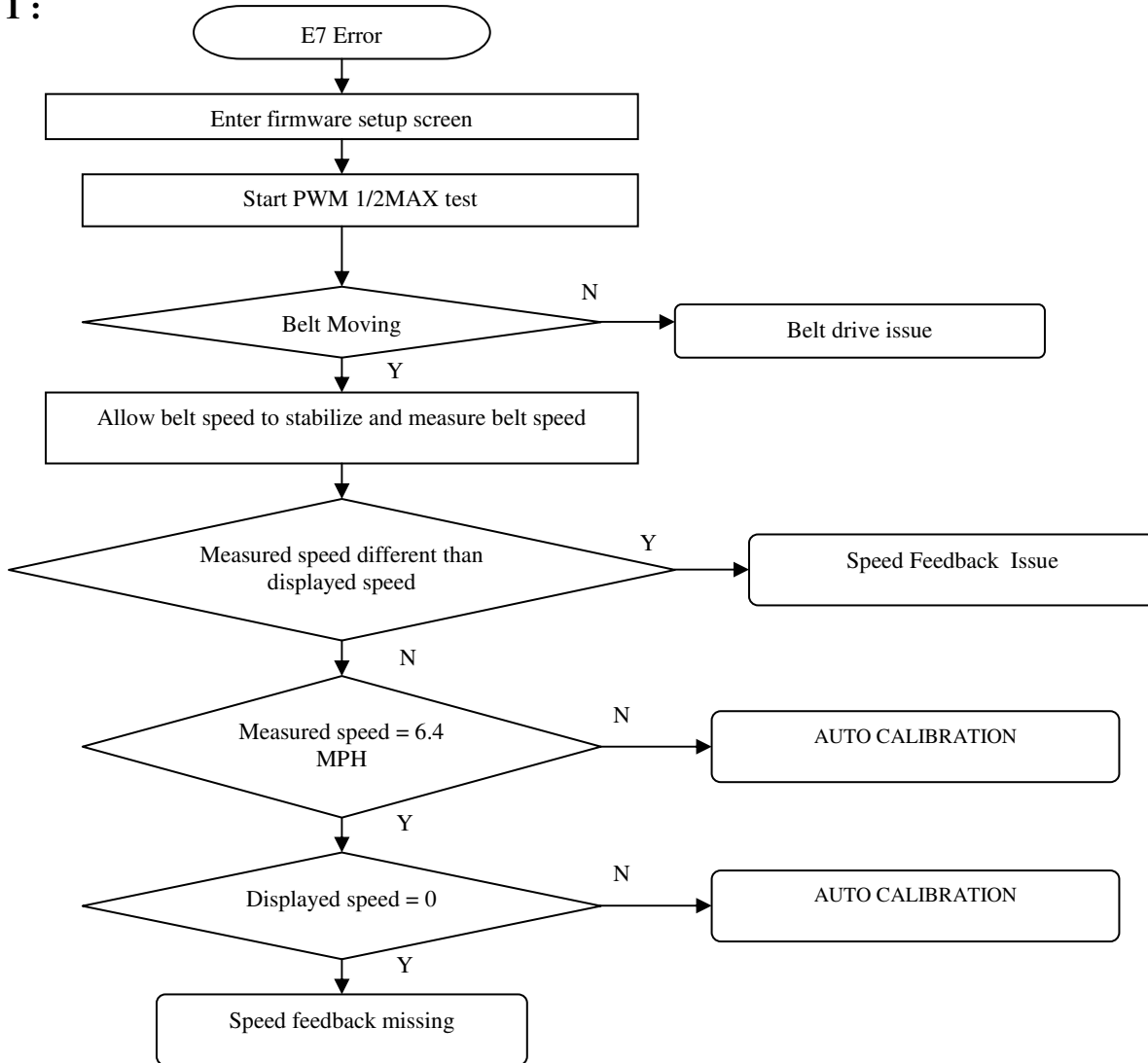
1. Remove Power!!! Carefully check all connections, interface board and the Reliance Motor controller setting to ensure all settings are correct.
2. Enter the engineer mode to SERVICE 5, press "START" key to clean "ERROR LOG" and refer the T5x Engineer mod parameter set SOP to confirm the machine parameter whether is correct.
3. AUTO CALIBRATION again.
4. If AUTO CALIBRATION can't finish, please take the speed sensor to be close to magnet and AUTO CALIBRATION again.

E7 – Speed Stall Error

OVERVIEW

If no belt movement is detected several seconds after commanding belt movement a speed stall error (E7) is called.

Step 1 :



Step 2 :

Belt Drive Issues – See belt drive issue trouble shooting section in *the CORRECTIVE ACTION PROCEDURES – Speed Issues* section of this document.

Speed Feedback Issues – See speed feedback issue trouble shooting section in *the CORRECTIVE ACTION PROCEDURES – Speed issues* section of this document.

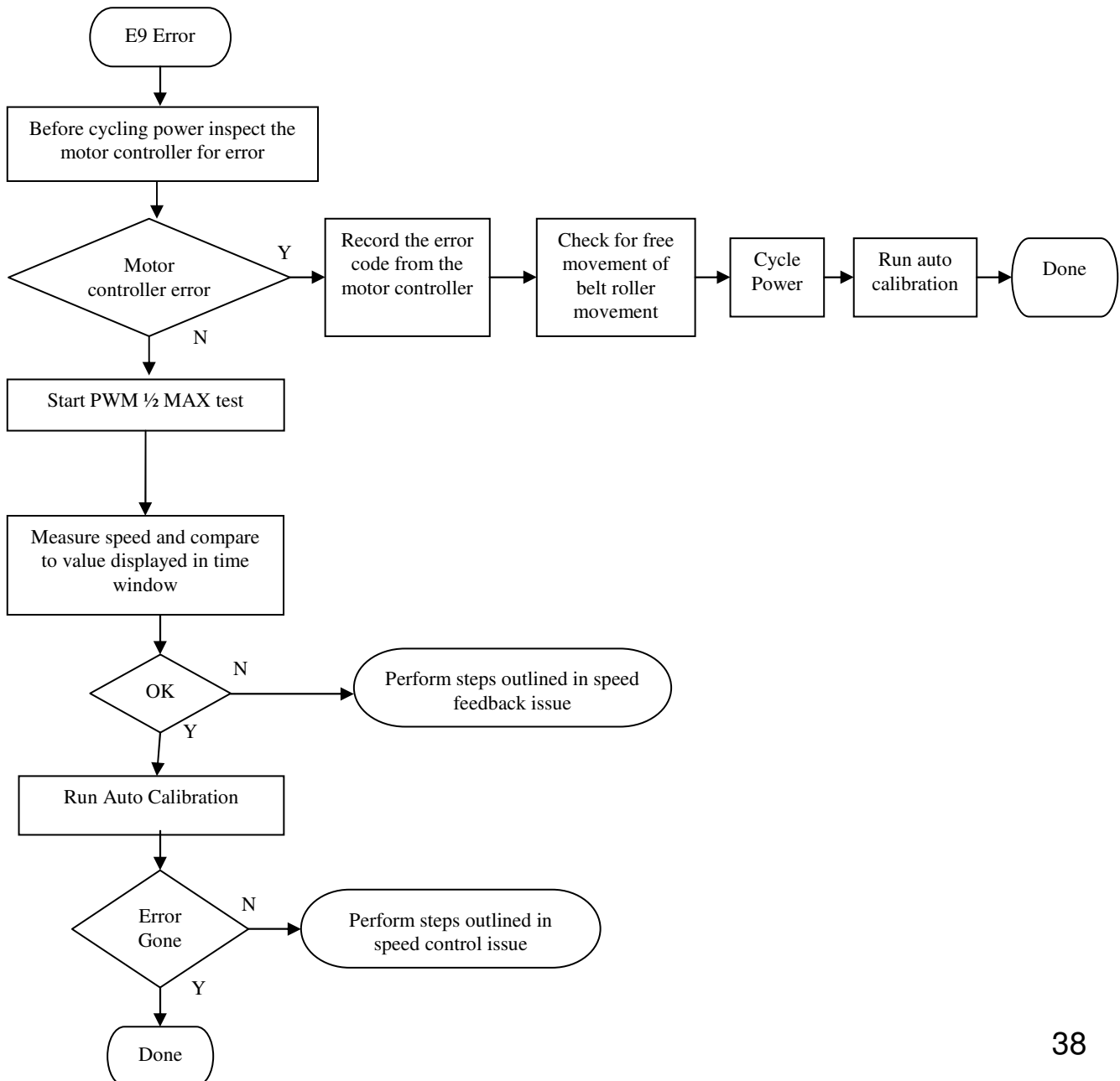
Speed Feedback Missing Issues – See speed feedback issue trouble shooting section in *the CORRECTIVE ACTION PROCEDURES – Speed Issues* section of this document.

Calibration Issues – See speed calibration issue trouble shooting section in the *CORRECTIVE ACTION PROCEDURES – Speed Issues* section of this document

E9 – Speed Range Error

OVERVIEW

During normal run time operation the value stored during auto calibration is used to initially set the speed (e.g. target speed = 12 MPH, PWM ticks = Maximum PWM = 363). Once the speed stabilized the actual speed is monitored and if different than the target speed the PWM value is adjusted until the actual speed matches the target speed. If the PWM value is changed by more than the amount of ticks required to change 0.8 MPH and the actual speed does not match the target speed then an E9 error is flagged. This error indicates the motor controller system is unable to maintain the target speed.

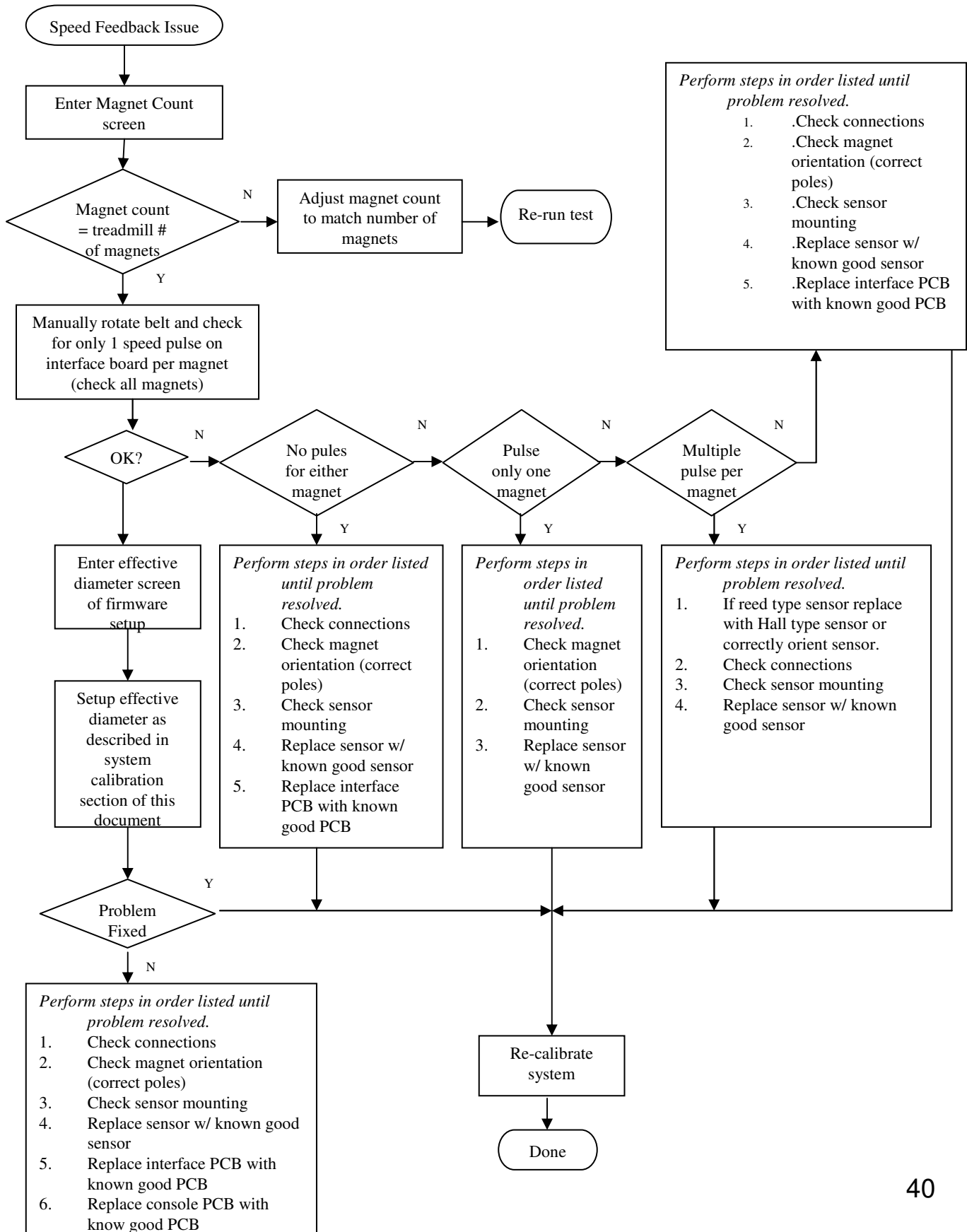


Speed Feedback Issues – See speed feedback issue trouble shooting section in *the CORRECTIVE ACTION PROCEDURES – Speed Issues* section of this document.

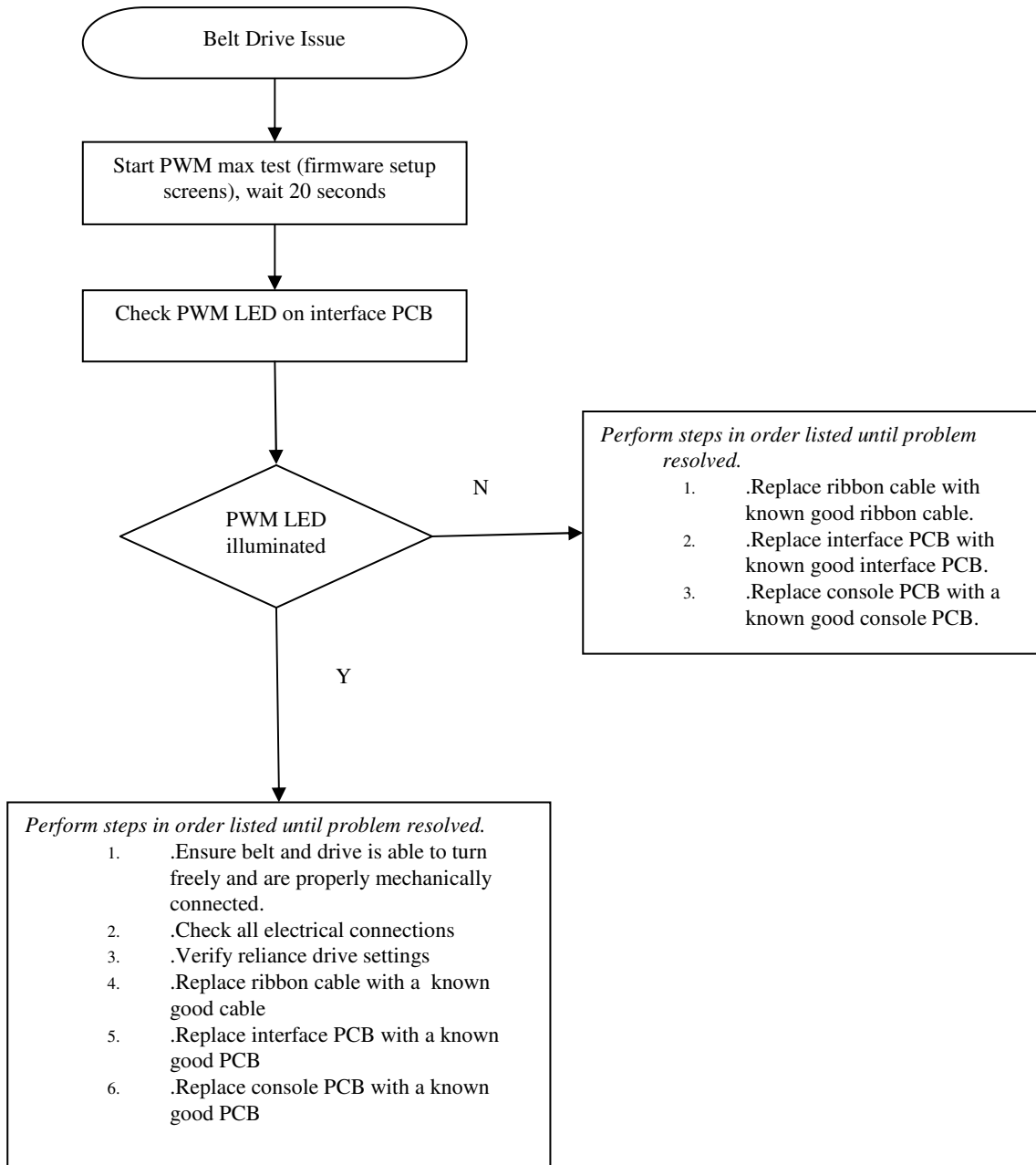
Speed Control Issues – See speed control issue trouble shooting guide in the *CORRECTIVE ACTION PROCEDURES – Speed Issues* section of this document.

Calibration Issues – See speed calibration issue trouble shooting section in the *CORRECTIVE ACTION PROCEDURES – Speed Issues* section of this document.

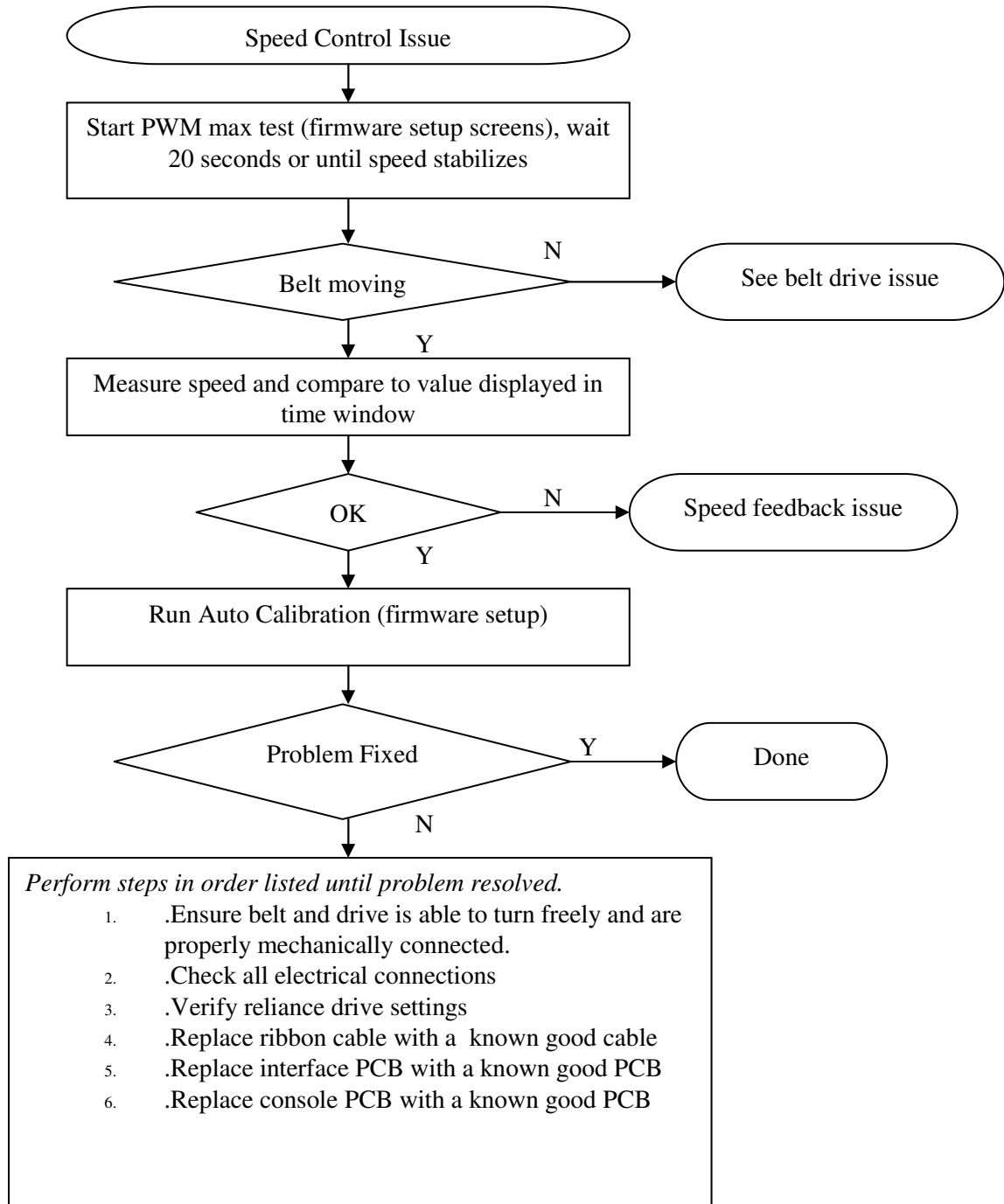
CORRECTIVE ACTION PROCEDURES – Speed Issues



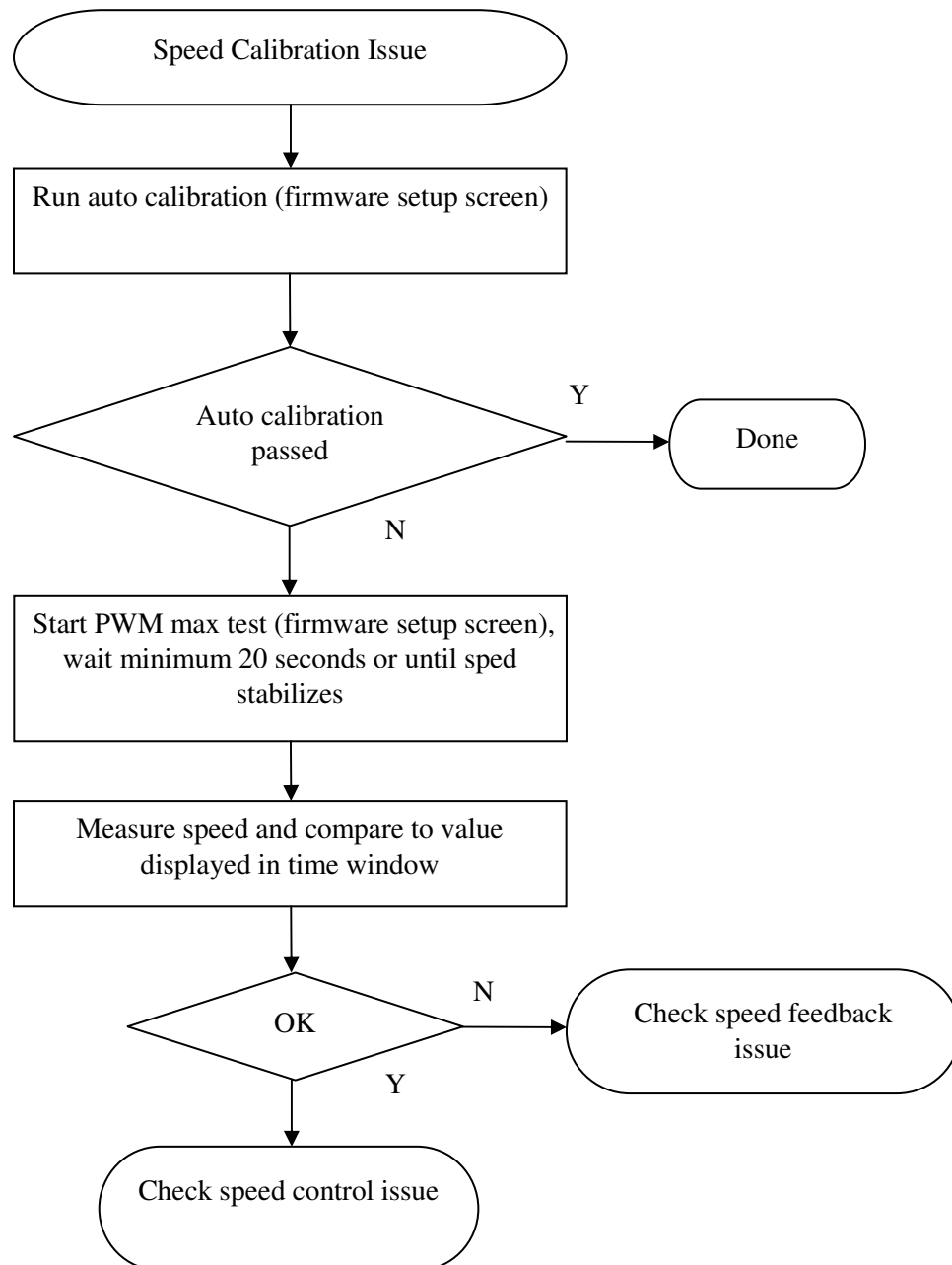
CORRECTIVE ACTION PROCEDURES – Belt Drive Issues



CORRECTIVE ACTION PROCEDURES – Speed Control Issues



CORRECTIVE ACTION PROCEDURES – Speed Calibration Issue



OPERATION ERRORS

E16 – Stuck key error

OVERVIEW

If a key press is detected for more than 45 seconds a stuck key error is flagged. This error is primarily caused by a faulty keypad but could be caused by other issues (object on the keypad).

CORRECTIVE ACTION

Reset system power. If error re-occurs replace the keypad with a known good keypad. If error still occurs replace console PCB with known good console PCB.

E18 – Safety switch test failure

OVERVIEW

If the actual speed exceeds limit set for safety switch test a safety switch test failure error occurs..

CORRECTIVE ACTION

Re-calibrate system as listed in system calibration section of this document and re-run safety switch test. If system still fails safety switch test run speed feedback issue and speed control issue tests in the corrective action procedures section of this document.

E19 – NOVRAM Failure

OVERVIEW

If the values stored in non-volatile memory are out of limits or do not match the safety check value stored in non-volatile memory a NOVRAM failure occurs. The system attempts to re-initialize the non-volatile memory three times and if the NOVRAM check fails all three attempts a NOVRAM failure error (E19) is called.

CORRECTIVE ACTION

An E-19 error indicates the NOVRAM has critically failed and needs to be replaced. If an E19 error occurs the console should be reprogrammed with the current software version and the power should be toggled. If this does not clear the E-19 error the console PCB will need to be returned to DCI for repair.