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

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SECTION 1
MAINTENANCE PROCEDURE

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MAINTENANCE CHECK LIST

PREVENTIVE MAINTENANCE SCHEDULE

Vision T9800 TREADMILL

Item	*Daily*	*Weekly*	*Monthly*	*Quarterly*	*Biannual*	*Annual*
Console Mounting Bolts					Inspect	
Frame	Clean				Inspect	
Power Cord			Inspect			
Display Console	Clean		Inspect			
Handrail & Handlebar	Clean			Inspect		
Front Roller				Clean	Inspect	
Rear Roller				Clean	Inspect	
Emergency Button	Test					
Running belt Tension			Inspect			
V Belt				Clean	Inspect	
Deck Re-waxing			Inspect & Re-waxing			
Running Belt					Inspect	
Control Board					Clean (Vacuum)	
Motor				Clean		

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TENSIONING THE BELT PROCEDURE

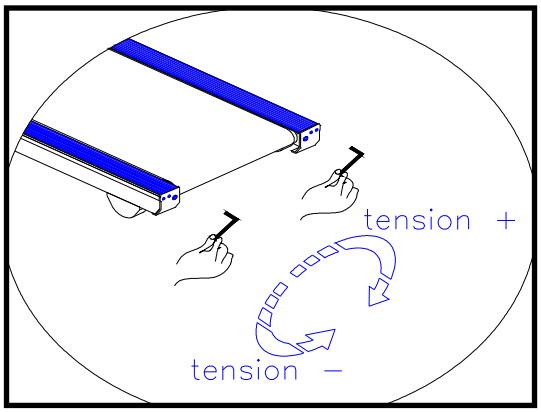
Caution:

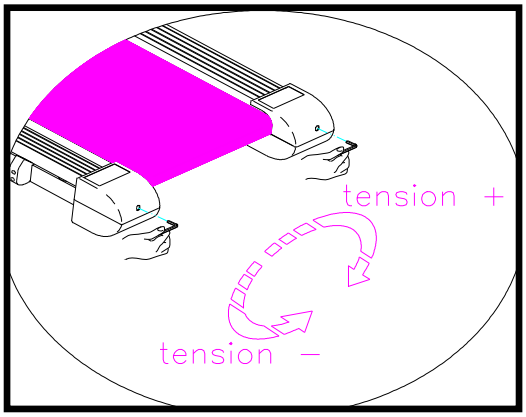
Over-tightening of the roller will severely shorten the life of the belt and may cause further damage to other components.

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: ***<u>0.9~1.1 lbs</u>***

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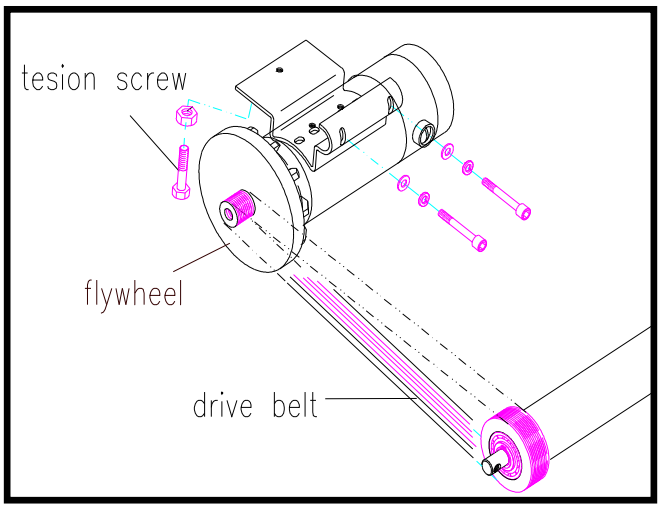
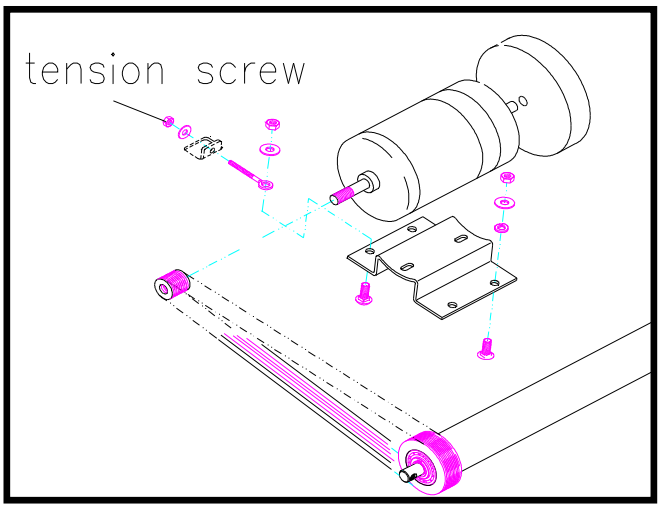
Drive Belt:

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.





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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.)***

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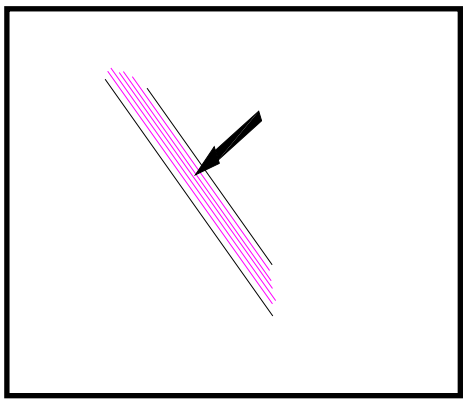
CLEAN THE GROOVES PROCEDURE

Caution:

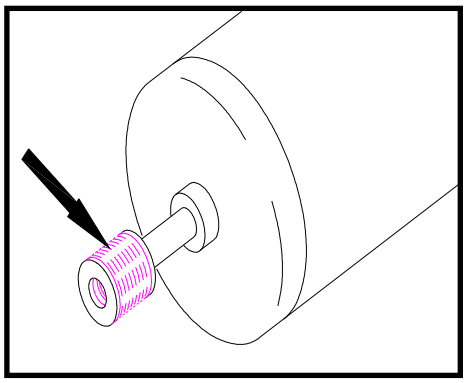
If dirty grooves in the drive belt, motor and roller pulley, there will be noises while running.

Frequency: Every 3 months

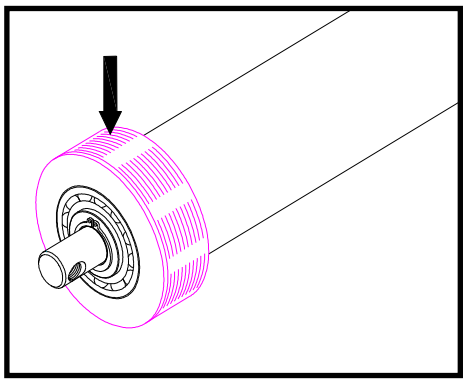
Procedure:



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.

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SECTION 2
WIRING DIAGRAM INSTRUCTION

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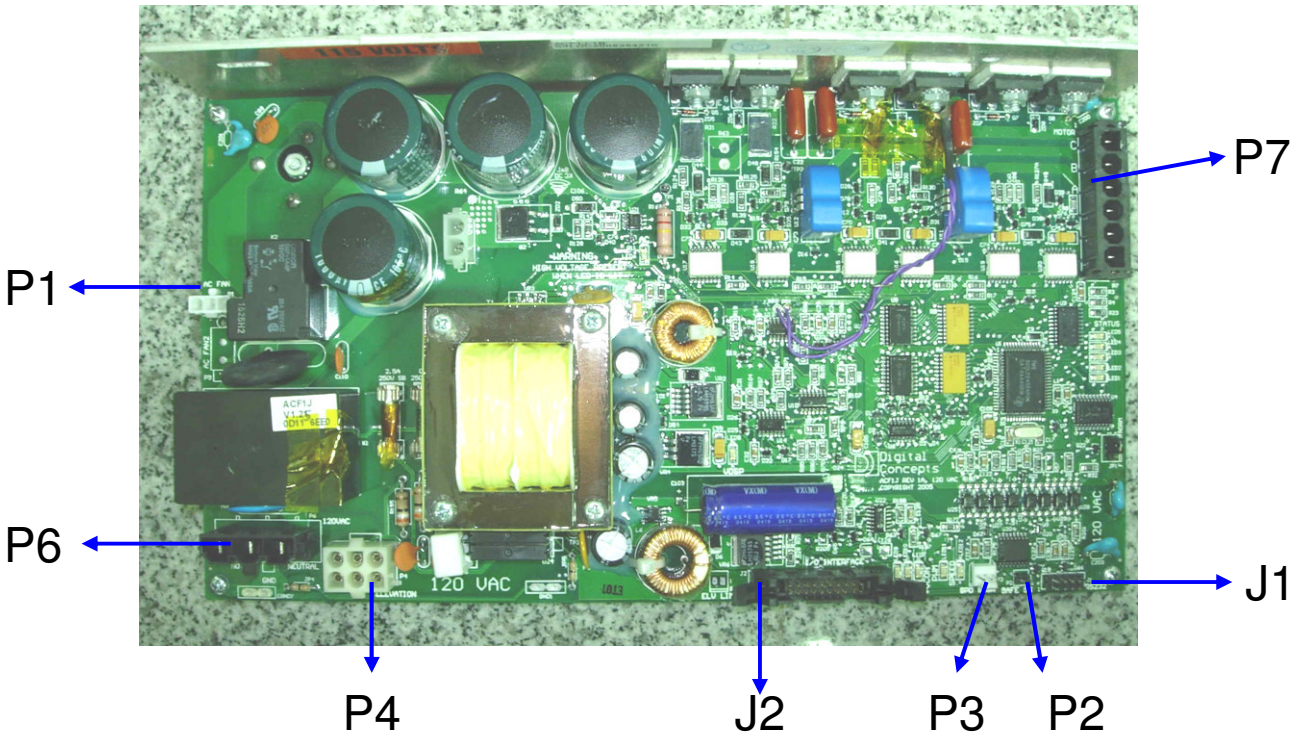
T9800(TM87) MCB WIRING(FOR 110V / 220V)



- **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)**

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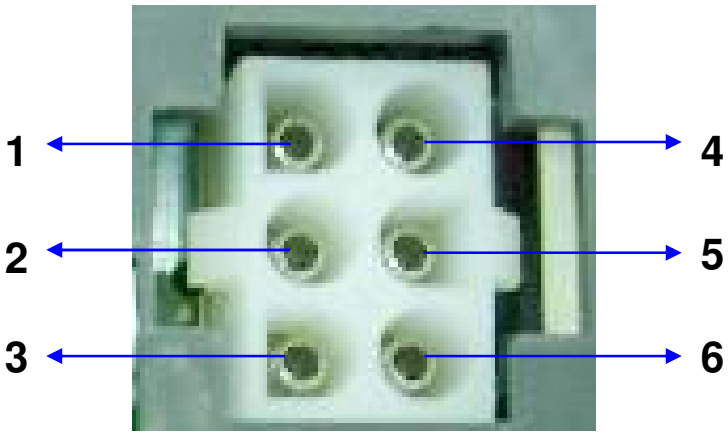
T9800(TM87) MCB WIRING DEFINITION OF PIN

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



P4

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

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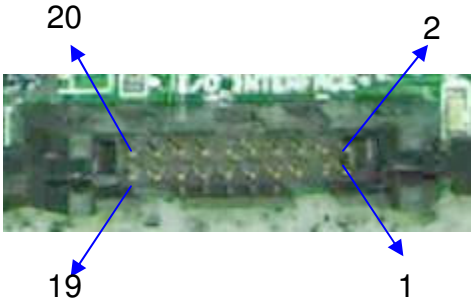
J2: console cable



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

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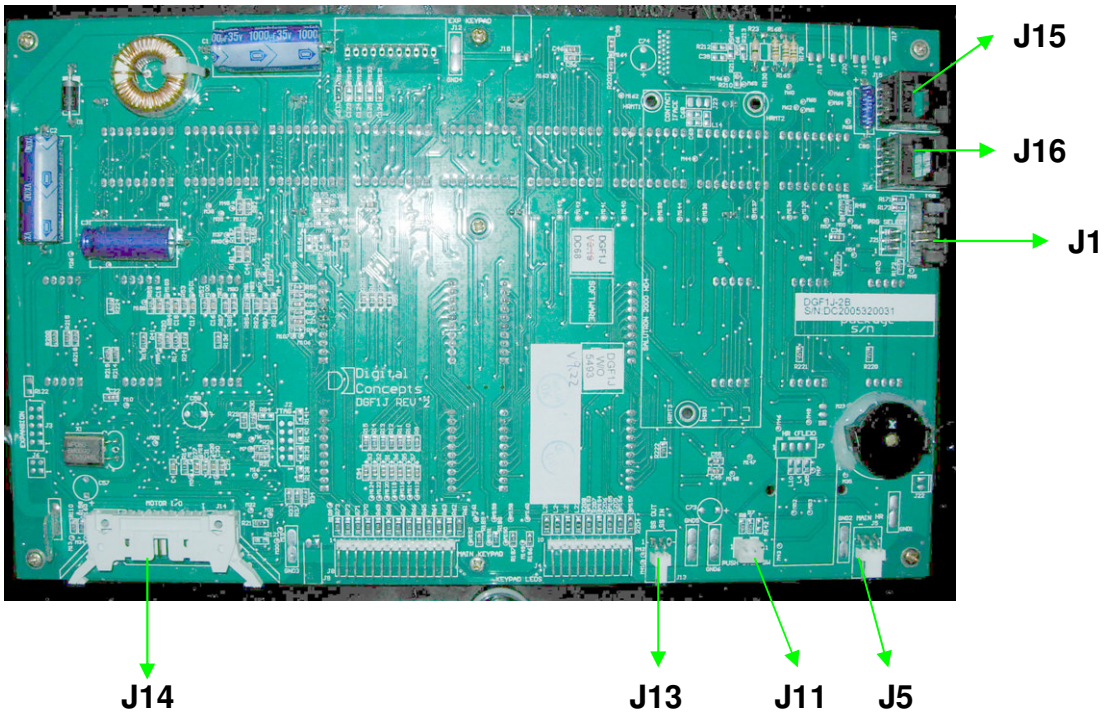
T9800(TM87) CONSOLE WIRING



- **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)**

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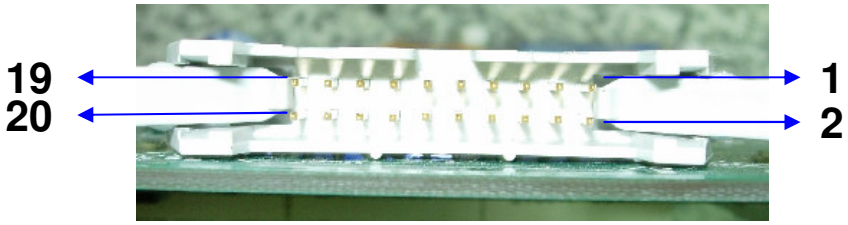
T8900(TM87) CONSOLE WIRING DEFINITION OF PIN

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

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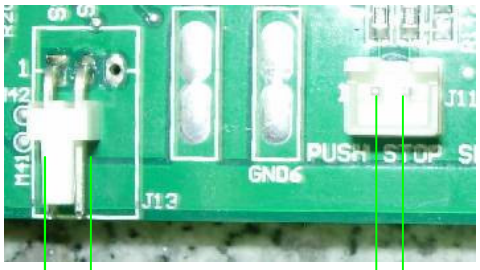
J13: Safety Pull Switch

J11: Safety Push Switch

J13



J11

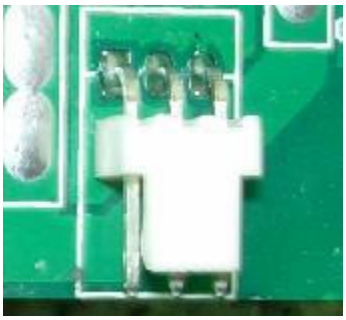
2 1

2 1

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

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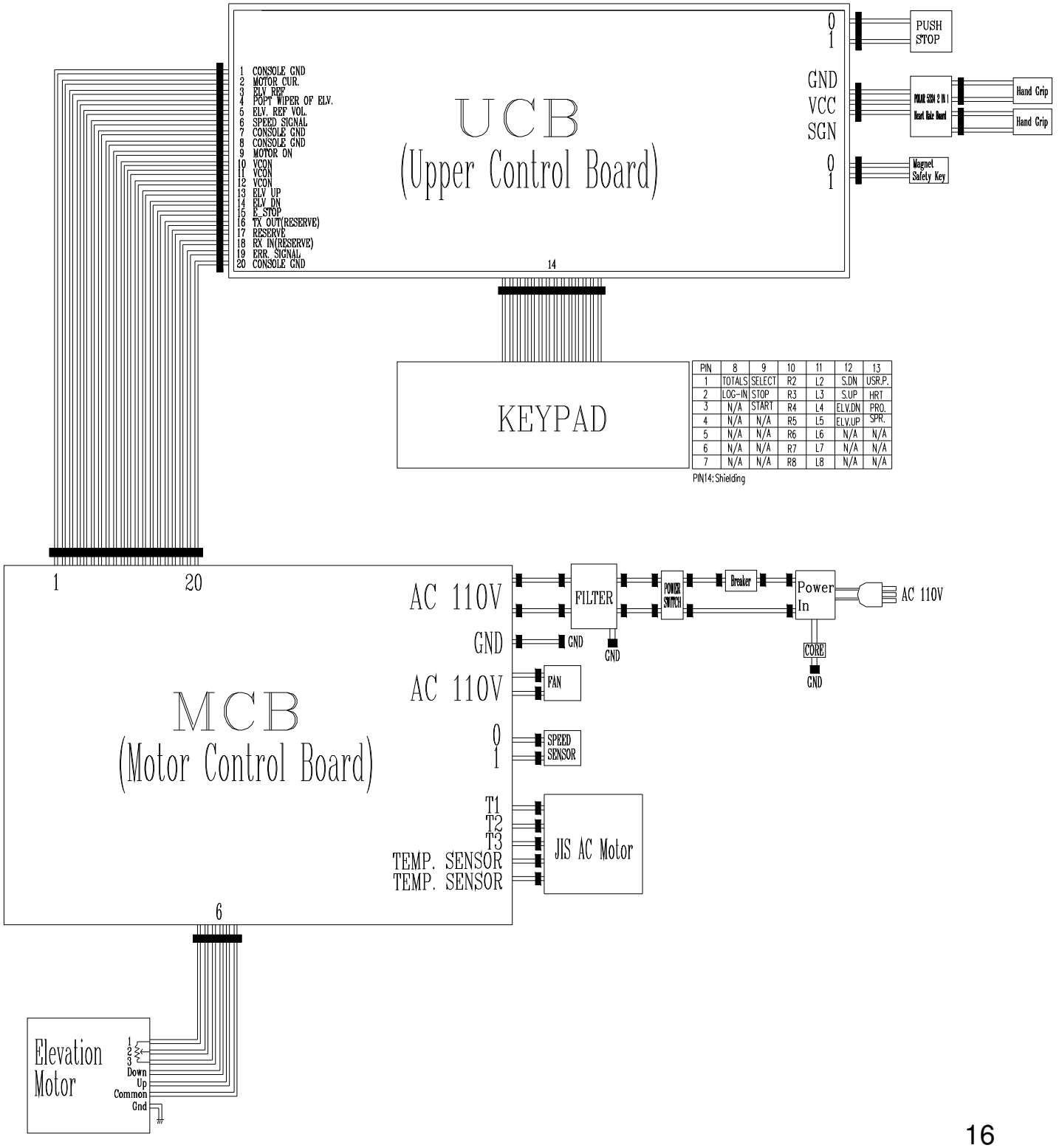
T9800(TM87) Electrical block diagram for 110V



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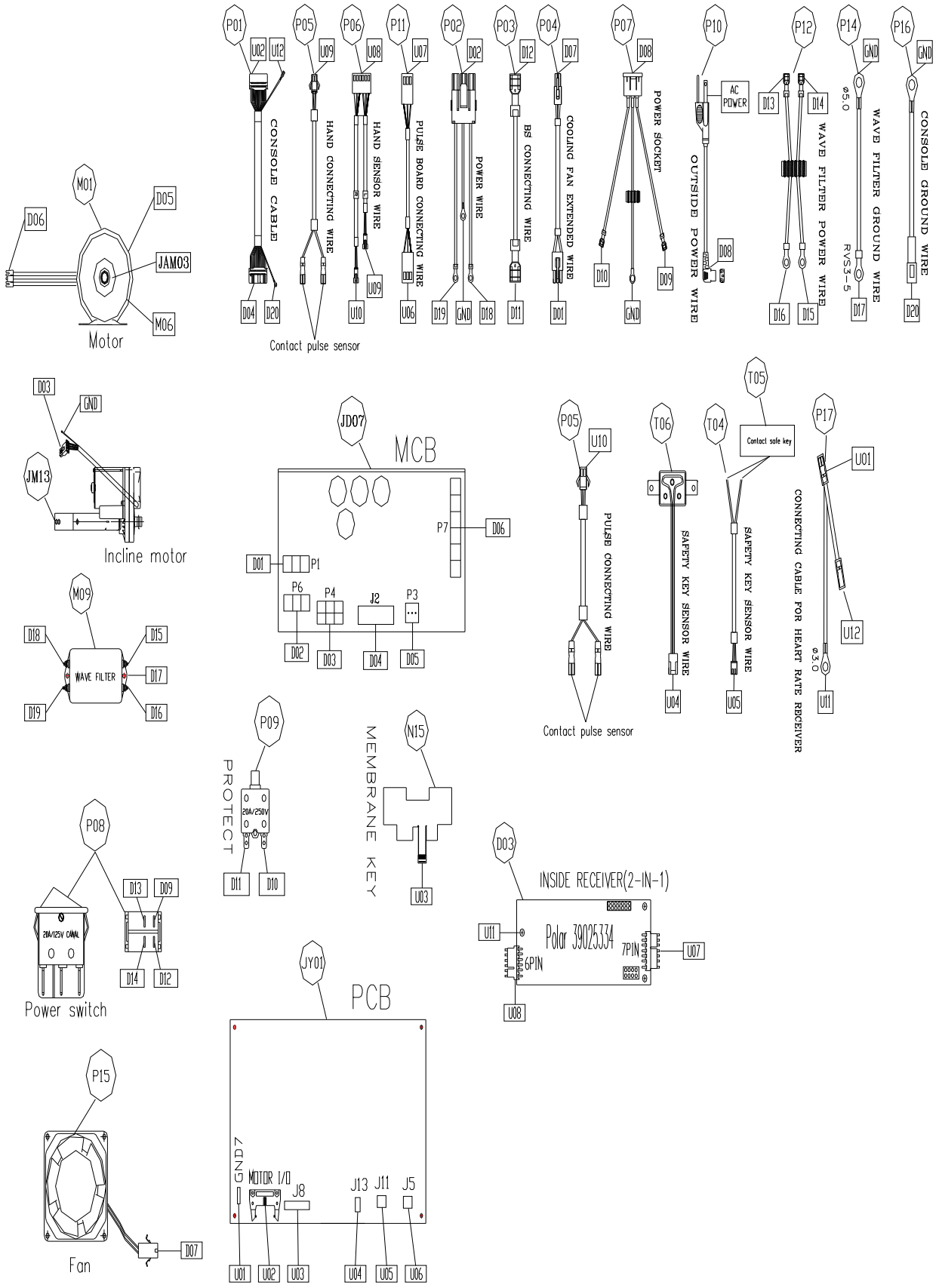
T9800(TM87) *WIRING DIAGRAM INSTRUCTION* for 110V



U01-U01
U02-U02
U03-U03
U04-U04
U05-U05
U06-U06
U07-U07
U08-U08
U09-U09
U10-U10
U11-U11
U12-U12

D01-D01
D02-D02
D03-D03
D04-D04
D05-D05
D06-D06
D07-D07
D08-D08
D09-D09
D10-D10
D11-D11
D12-D12
D13-D13
D14-D14
D15-D15
D16-D16
D17-D17
D18-D18
D19-D19
D20-D20

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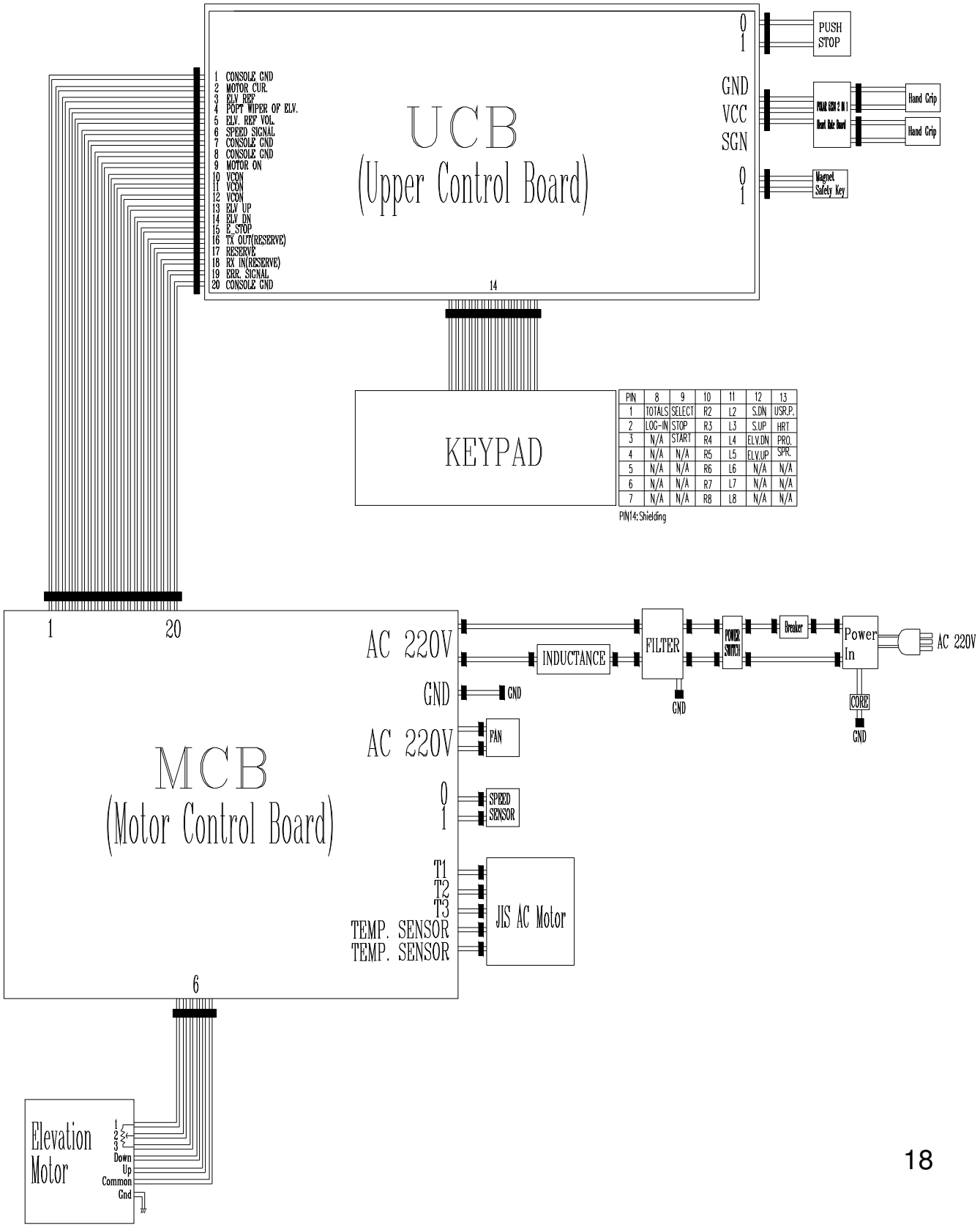
T9800(TM87) Electrical block diagram for 220V



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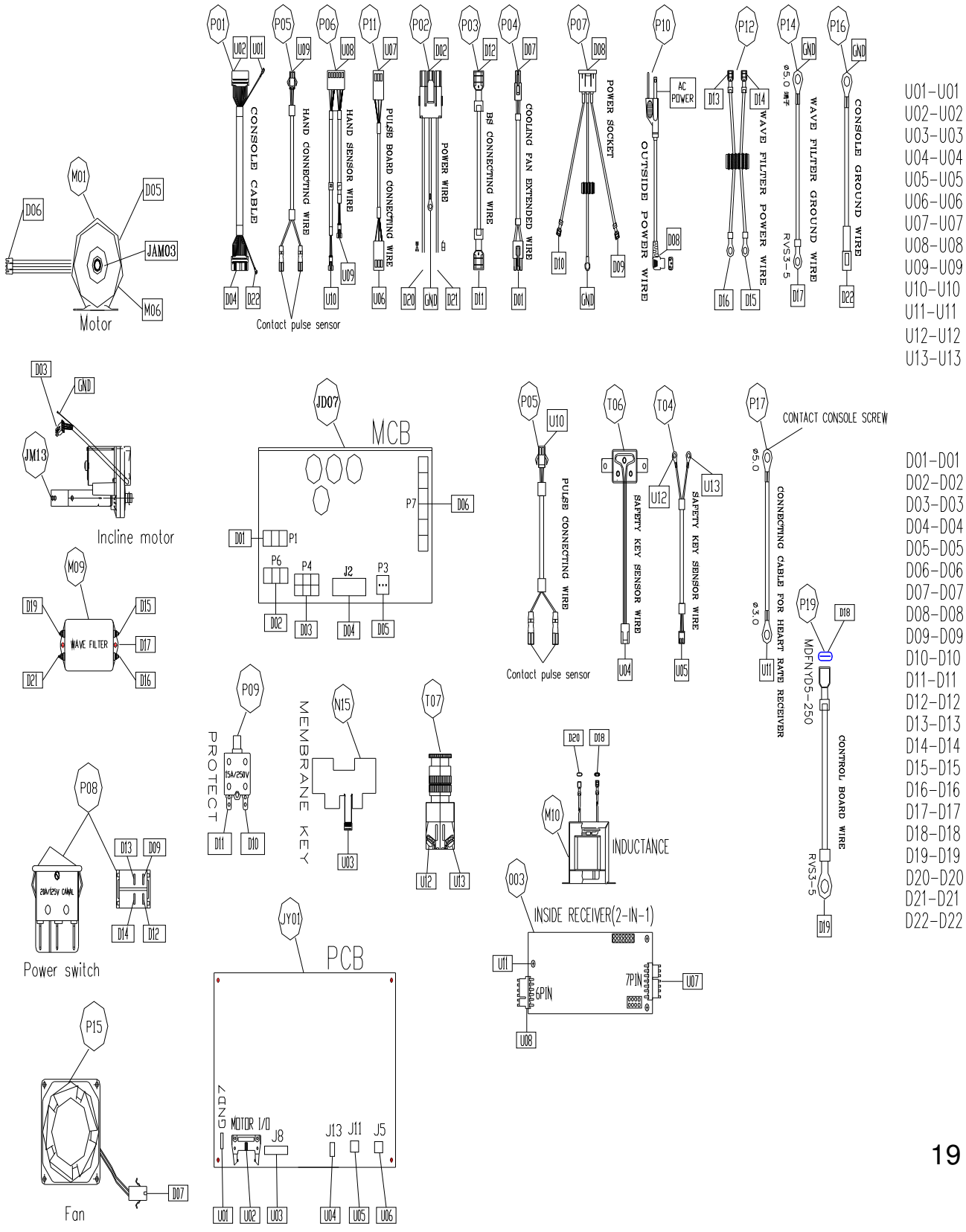

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SECTION 3
CONSOLE FUNCTIONAL FLOW DIAGRAM

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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.

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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

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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**			

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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

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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**			

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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

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SECTION 4

MCB LED INSTRUCTIONS

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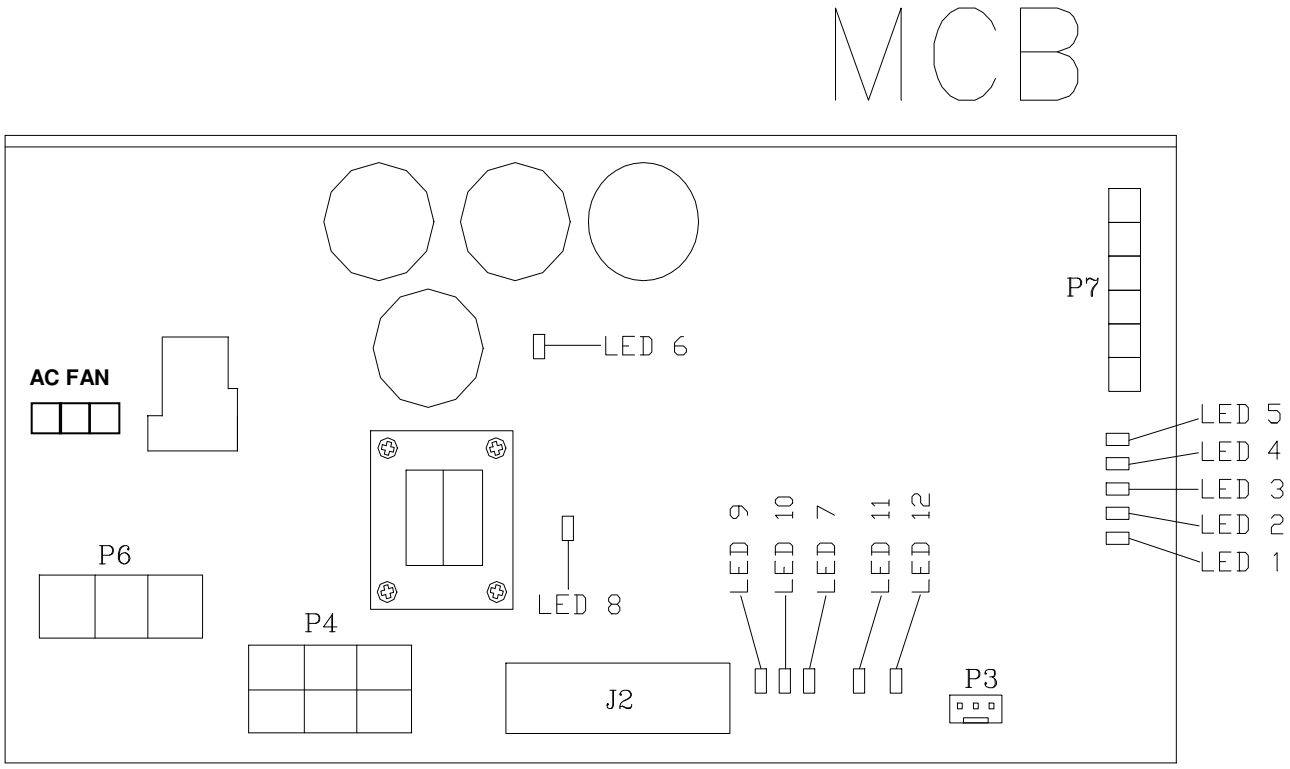

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LED	Reference Designator	Description
STATUS	LED 1	Auxiliary Status LED
	LED 2	Auxiliary Status LED
	LED 3	Auxiliary Status LED
	LED 4	Auxiliary Status LED/Digital to Analog Output.
	LED 5	Main Status/Error LED.
AC	LED 6	Indicates if the DC Buss is 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.

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SECTION 5

TROUBLESHOOTINGS

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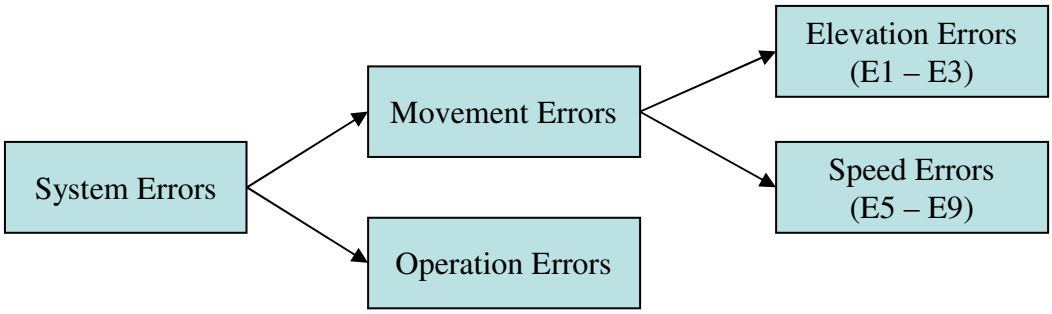
T9800 Console Error code

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).



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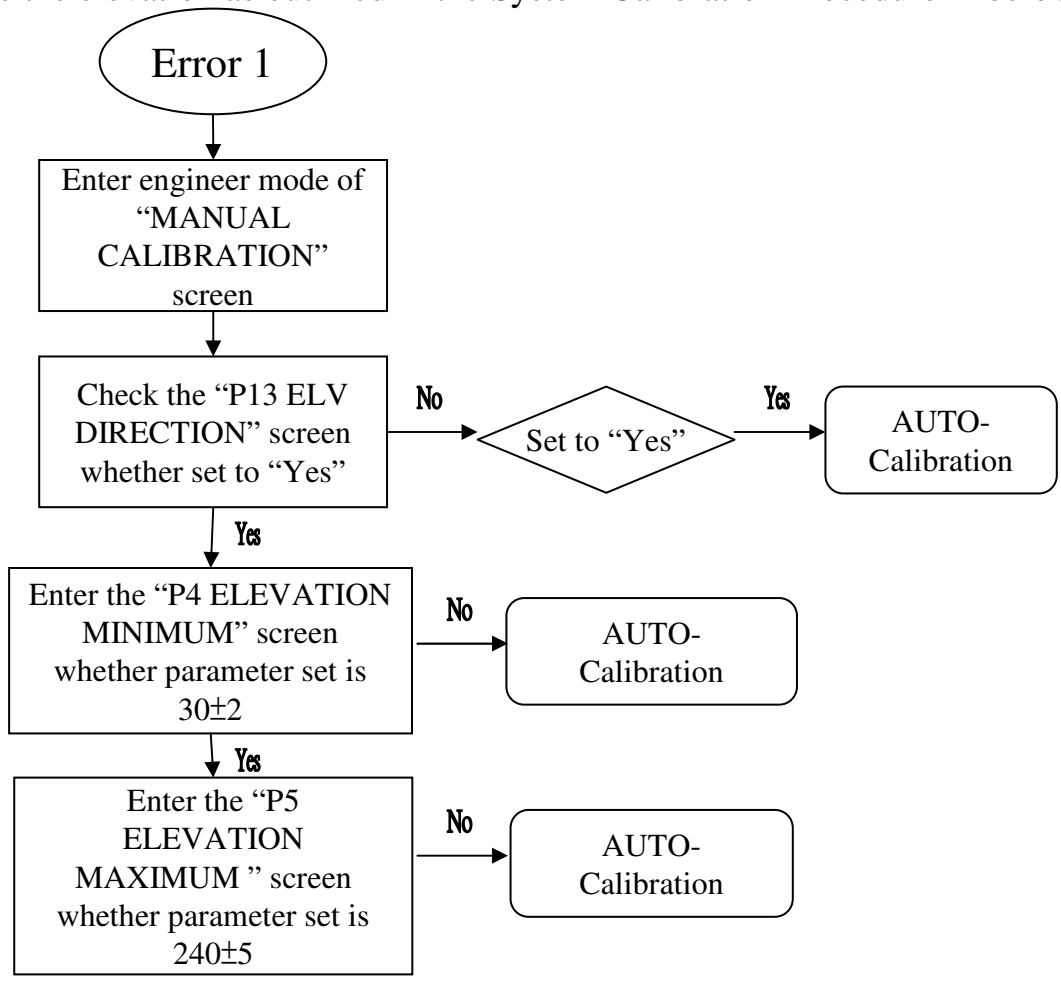
E1 - Reverse Elevation Pot

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.

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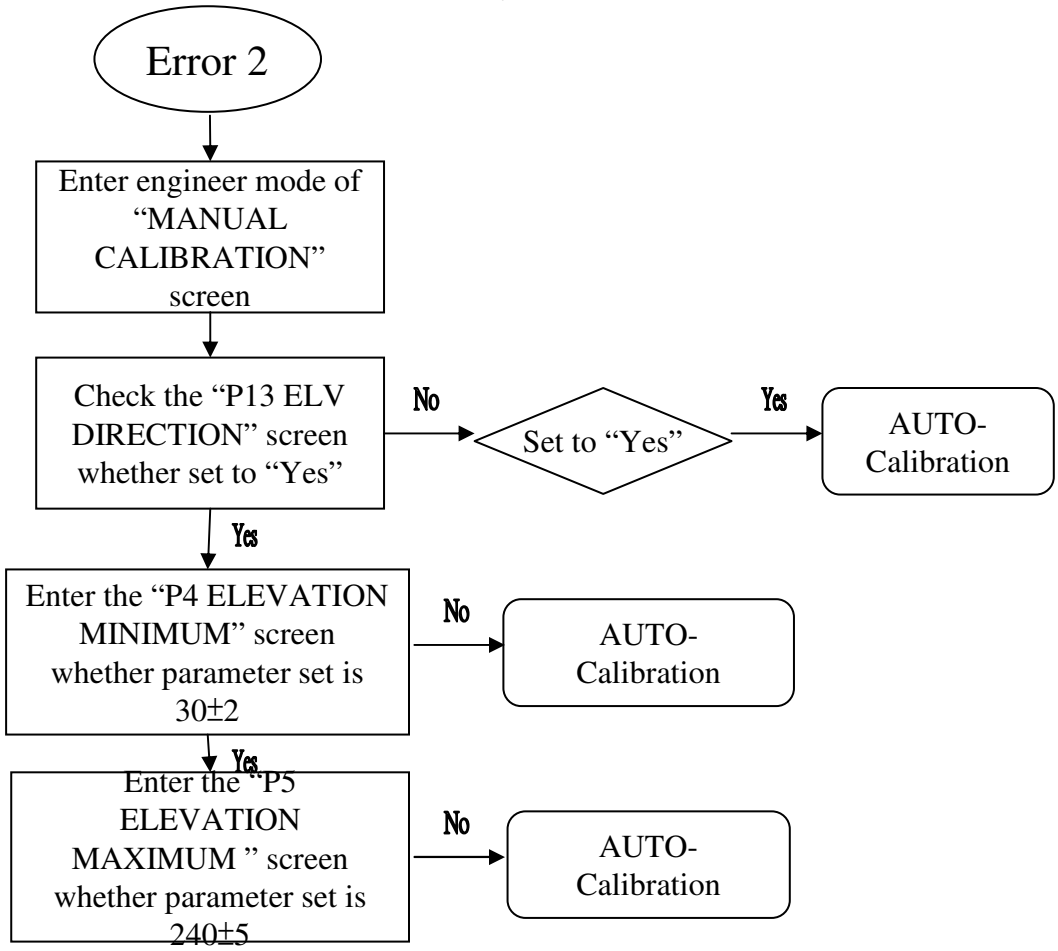
E2 – Elevation Out Of Range

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.

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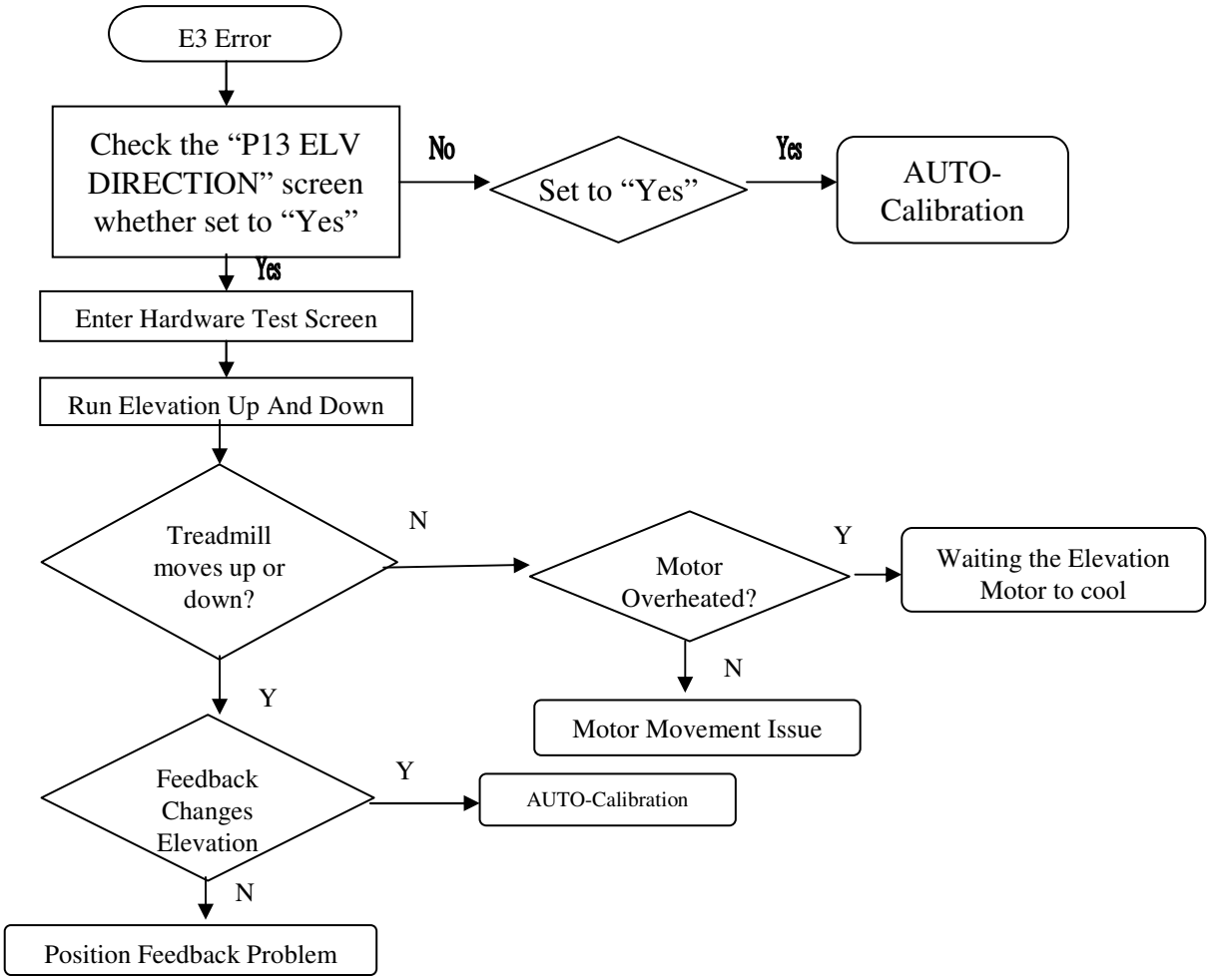
E3 – Elevation Stall

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.

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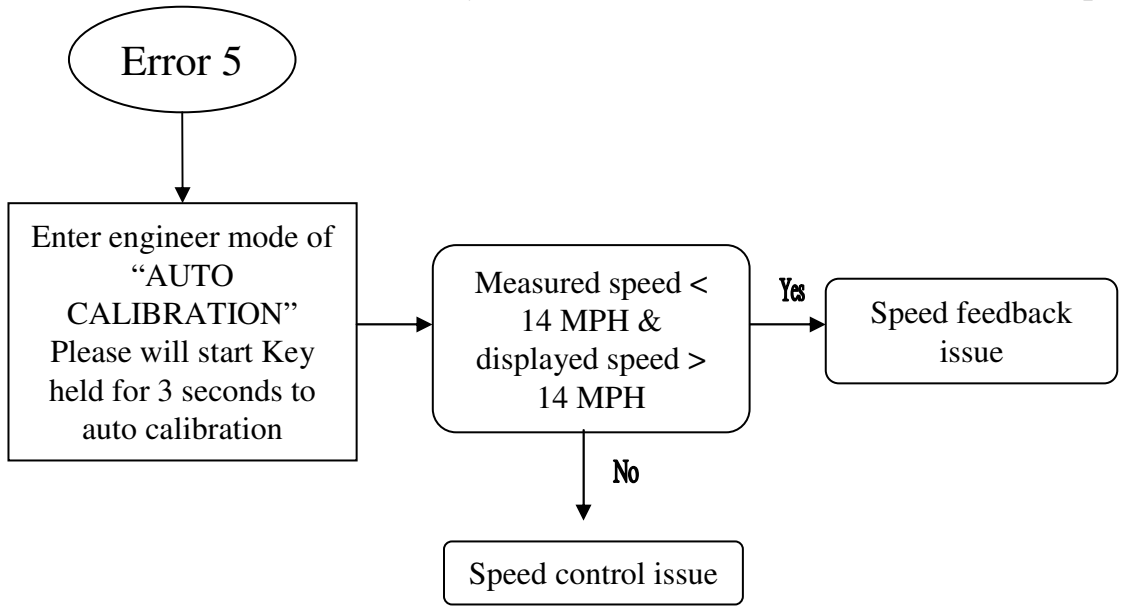
E5 – Over-speed Error

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.

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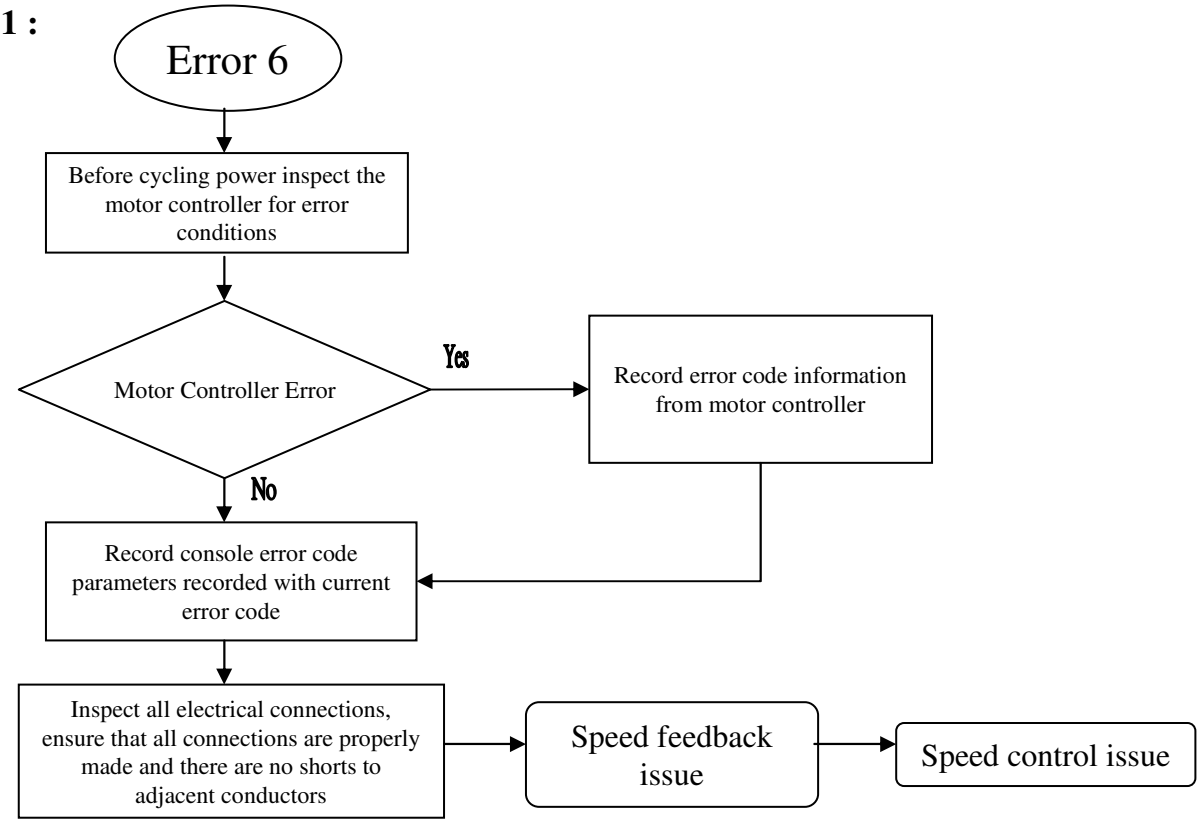
E6 – Runaway Belt Error

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.

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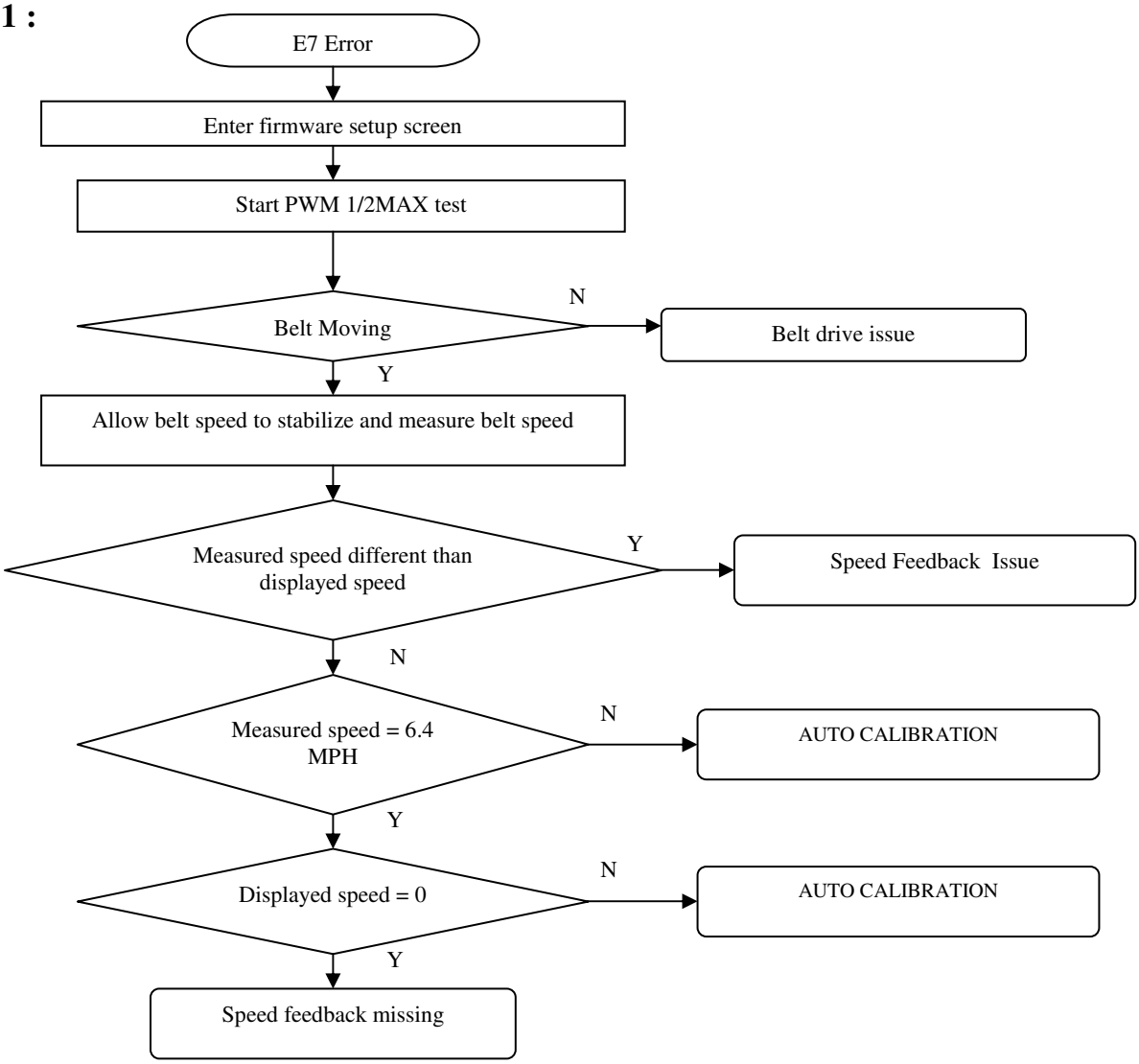
E7 – Speed Stall Error

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

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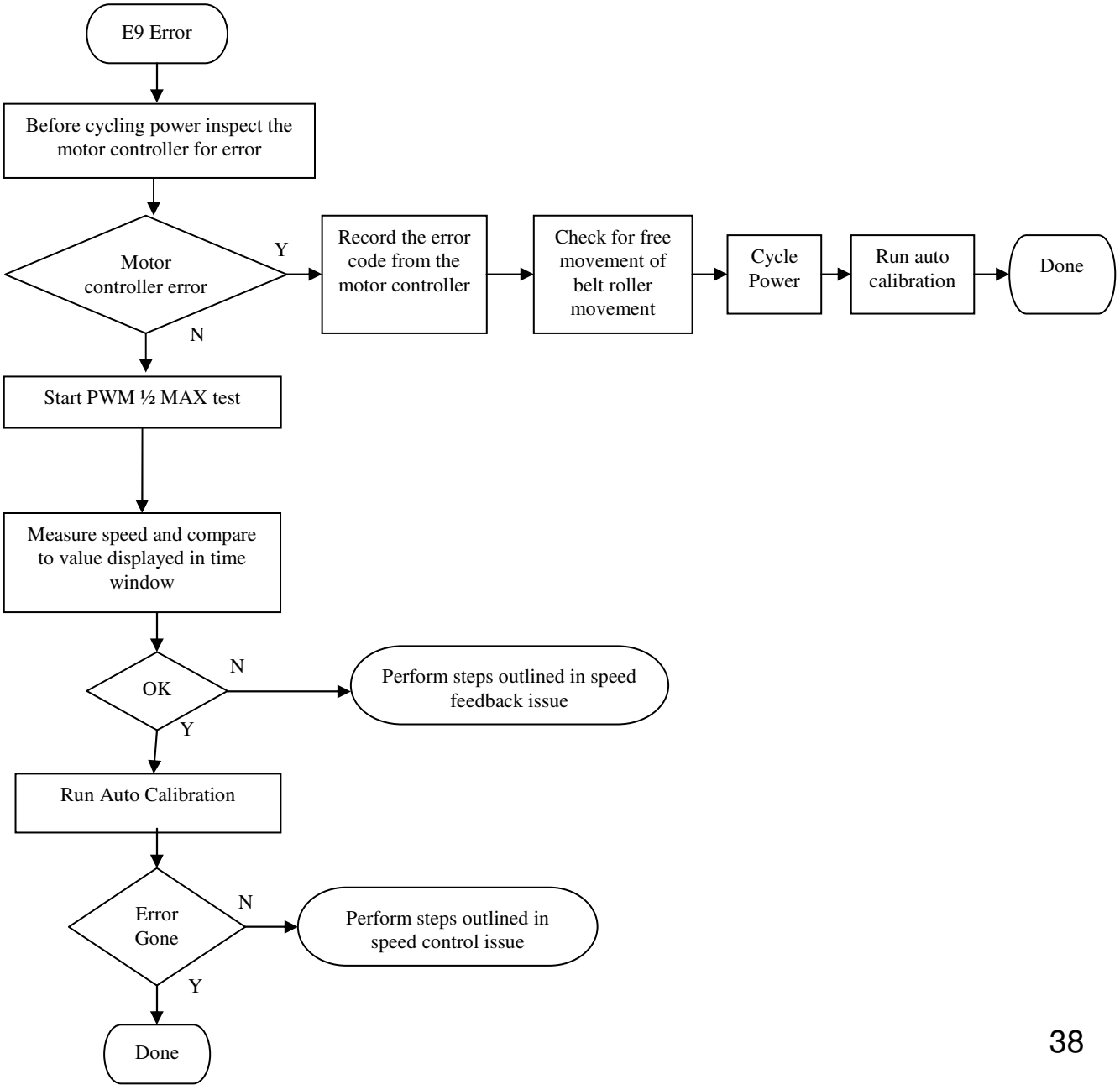
E9 – Speed Range Error

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.



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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.

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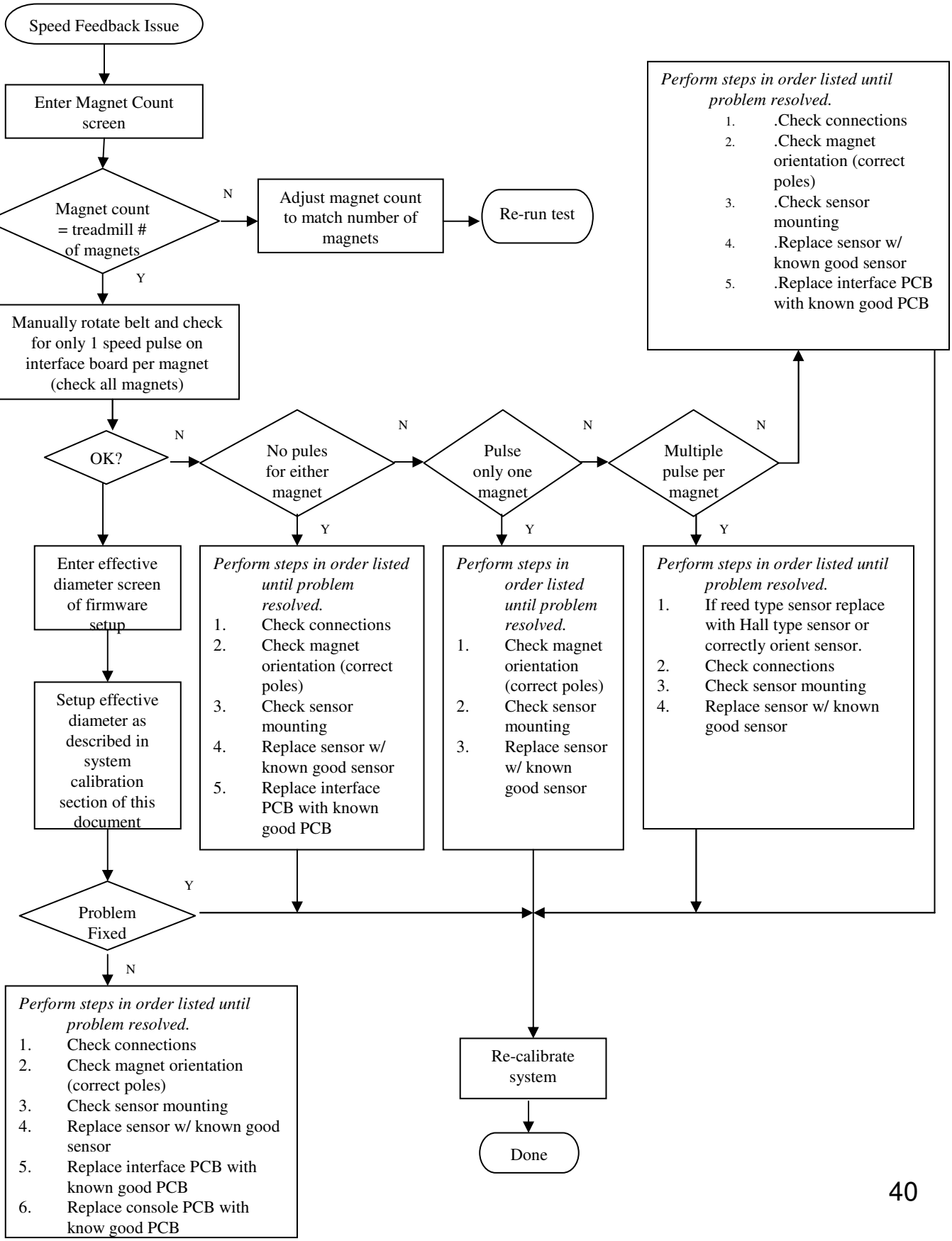
CORRECTIVE ACTION PROCEDURES – Speed Issues



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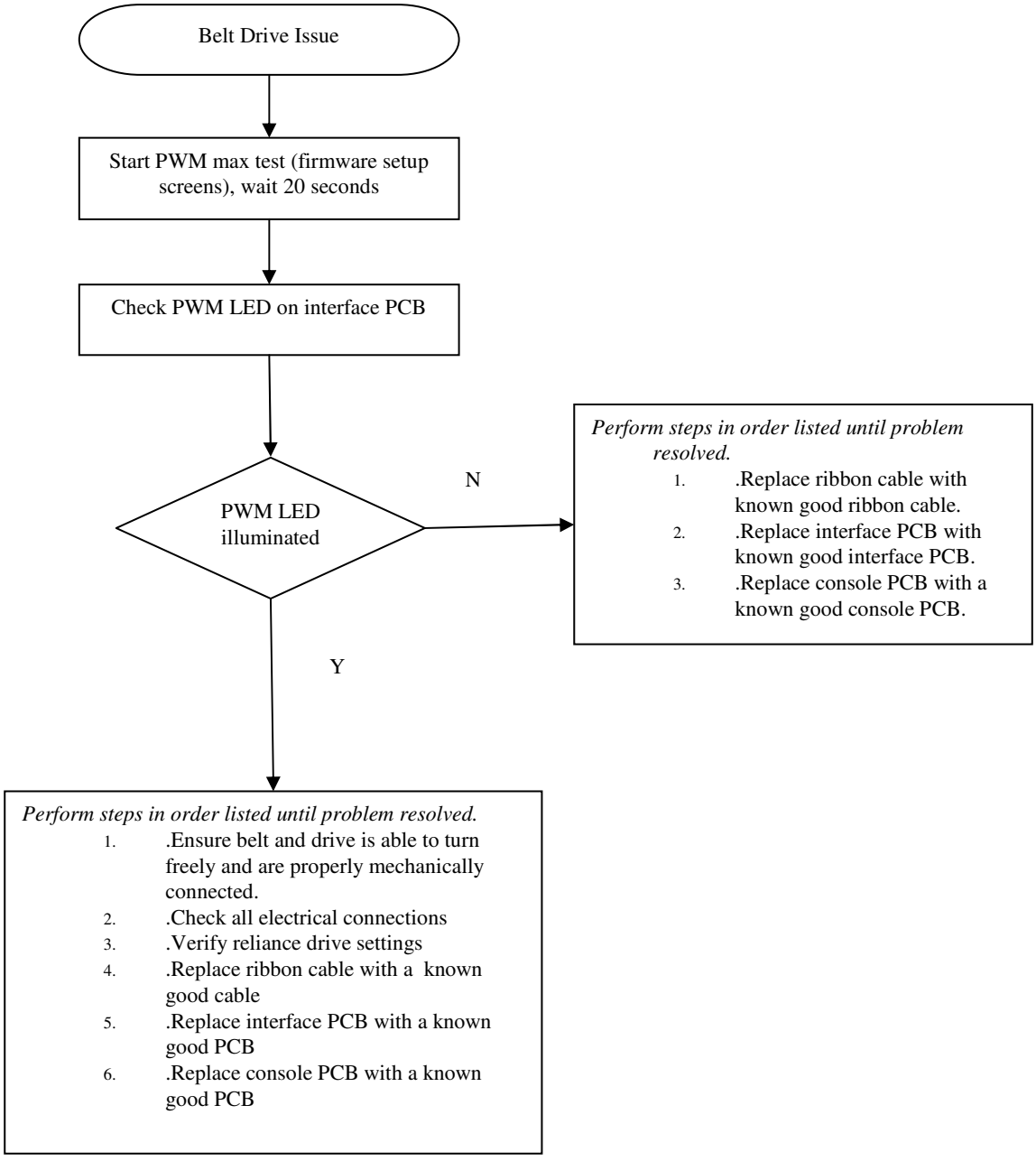
CORRECTIVE ACTION PROCEDURES – Belt Drive Issues



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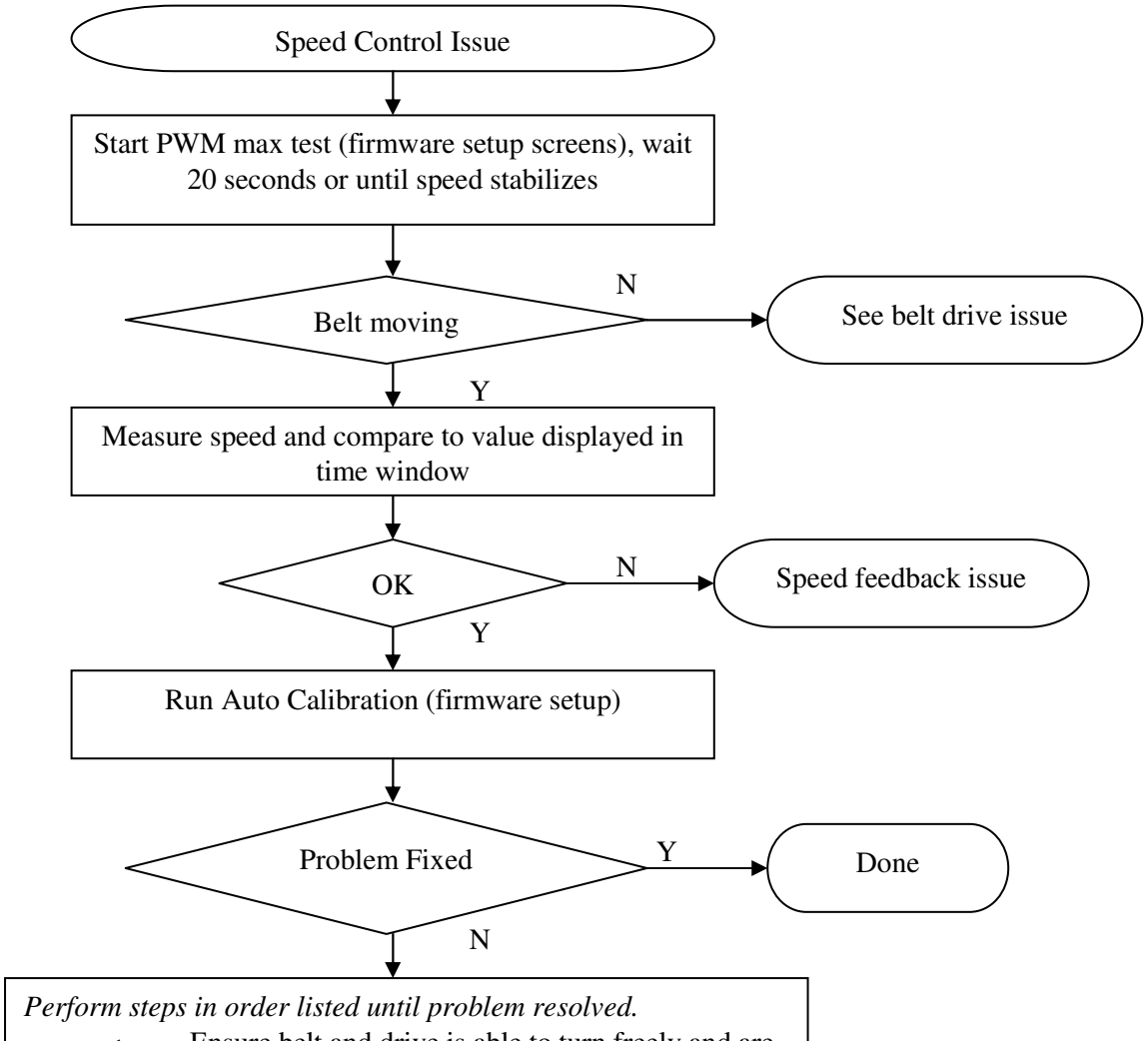
CORRECTIVE ACTION PROCEDURES – Speed Control Issues



Perform steps in order listed until problem resolved.

1. .Ensure belt and drive is able to turn freely and are properly mechanically connected.
2. .Check all electrical connections
3. .Verify reliance drive settings
4. .Replace ribbon cable with a known good cable
5. .Replace interface PCB with a known good PCB
6. .Replace console PCB with a known good PCB

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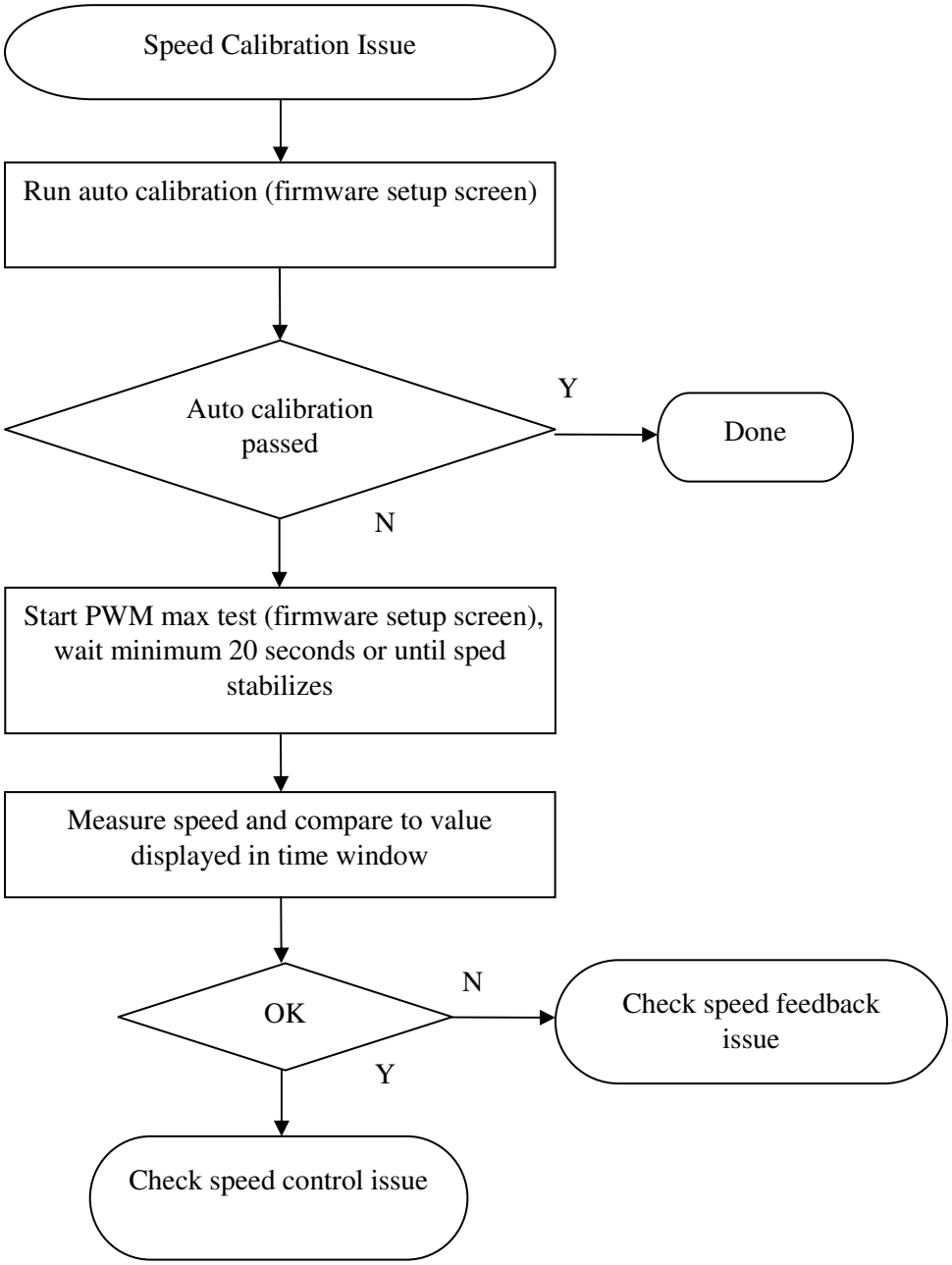
CORRECTIVE ACTION PROCEDURES – Speed Calibration Issue



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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.

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