

PowerMill™ Climber

95PS-03

Service Manual



Corporate Headquarters

Columbia Centre III, 9525 West Bryn Mawr Avenue, Rosemont, Illinois 60018 • U.S.A.

847.288.3300 • FAX: 847.288.3703

Service phone number: 800.351.3737 (toll-free within U.S.A., Canada)

Global Website: www.lifefitness.com

International Offices

AMERICAS

North America

Life Fitness, Inc.

Columbia Centre III
9525 West Bryn Mawr Avenue
Rosemont, IL 60018 U.S.A.
Telephone: (847) 288 3300
Service Email:
customersupport@lifefitness.com
Sales/Marketing Email:
commercialsales@lifefitness.com

Brazil

Life Fitness Brasil

Av. Rebouças, 2315
Pinheiros
São Paulo, SP 05401-300
BRAZIL
SAC: 0800 773 8282 option 2
Telephone: +55 (11) 3095 5200 option 2
Service Email: suportebr@lifefitness.com
Sales/Marketing Email:
vendasbr@lifefitness.com

Latin America and Caribbean*

Life Fitness, Inc.

Columbia Centre III
9525 West Bryn Mawr Avenue
Rosemont, IL 60018 U.S.A.
Telephone: (847) 288 3300
Service Email:
customersupport@lifefitness.com
Sales/Marketing Email:
commercialsales@lifefitness.com

EUROPE, MIDDLE EAST, and AFRICA (EMEA)

Netherlands and Luxemburg

Life Fitness Atlantic BV

Bijdorpplein 25-31
2992 LB Barendrecht
THE NETHERLANDS
Telephone: (+31) 180 646 666
Service Email:
service.benelux@lifefitness.com
Sales/Marketing Email:
marketing.benelux@lifefitness.com

United Kingdom

Life Fitness UK LTD

Queen Adelaide
Ely, Cambs, CB7 4UB
Telephone: General Office (+44)
1353.666017
Customer Support (+44) 1353.665507
Service Email: uk.support@lifefitness.com
Sales/Marketing Email: life@lifefitness.com

Germany, Austria, and Switzerland

Life Fitness Europe GMBH

Neuhofweg 9
85716 Unterschleißheim
GERMANY
Telephone:
+49 (0) 89 / 31775166 Germany
+43 (0) 1 / 6157198 Austria
+41 (0) 848 / 000901 Switzerland
Service Email:
kundendienst@lifefitness.com
Sales/Marketing Email:
vertrieb@lifefitness.com

Spain

Life Fitness IBERIA

C/Frederic Mompou 5,1ª^a
08960 Sant Just Desvern Barcelona
SPAIN
Telephone: (+34) 93.672.4660
Service Email:
servicio.tecnico@lifefitness.com
Sales/Marketing Email:
info.iberia@lifefitness.com

Belgium

Life Fitness Benelux NV

Parc Industriel de Petit-Rechain
4800 Verviers
BELGIUM
Telephone: (+32) 87 300 942
Service Email:
service.benelux@lifefitness.com
Sales/Marketing Email:
marketing.benelux@lifefitness.com

All Other EMEA Countries and Distributor Business EMEA*

Bijdorpplein 25-31
2992 LB Barendrecht
THE NETHERLANDS
Telephone: (+31) 180 646 644
Service Email:
EMEAServiceSupport@lifefitness.com

ASIA PACIFIC (AP)

Japan

Life Fitness Japan, Ltd

4-17-33 Minami Aoyama 1F/B1F
Minato-ku - Tokyo 107-0062
Japan
Telephone: (+81) 0120.114.482
Fax: (+81) 03-5770-5059
Service Email: service.lfj@lifefitness.com
Sales/Marketing Email:
sales@lifefitnessjapan.com

Hong Kong

Life Fitness Asia Pacific LTD

32/F, Global Trade Square
21 Wong Chuk Hang Road
Hong Kong
Telephone: (+852) 2575.6262
Service Email: Service.HK@lifefitness.com
Sales/Marketing Email:
hongkong.sales@lifefitness.com

All Other Asia Pacific countries and distributor business Asia Pacific*

32/F, Global Trade Square
21 Wong Chuk Hang Road
Hong Kong
Telephone: (+852) 2575.6262
Fax: (+852) 2575.6894
Service Email: Service.AP@lifefitness.com
Sales/Marketing Email:
Marketing.HK.Asia@lifefitness.com

*Also check www.lifefitness.com for local representation or distributor/dealer

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1. Introduction

Using this Manual

This service manual provides safe and efficient test and service procedures.

Descriptions using the words "left" and "right" refer to the orientation of a user using the product, facing the console. "Front" is the area of the product with the console. The "Rear" of the product is behind the user.

Customer Support Contact Information

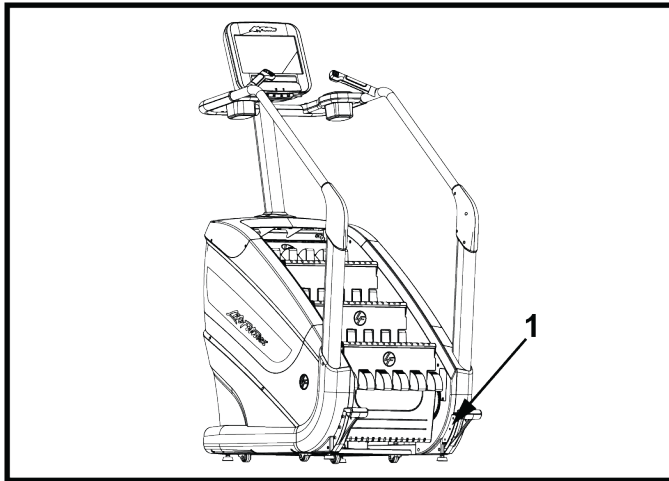
Refer to [Corporate Headquarters](#) for contact info.

To speed Customer Support Service's response, please provide the following information to the customer support technician:

- Serial number
- Model number
- Part name
- Part number
- Symptom of problem

Serial Number Location

The serial number is located in the lower right rear corner, where the step assist bolts on.



Item	Description
1	Serial number decal

Online References

Detailed Schematics are available online in Parts Manuals:

- <https://www.lftechsupport.com> access technical documentation and part manuals for Life Fitness, Hammer Strength, and ICG.
- <http://www.lifefitness.com/parts> service parts ordering for Life Fitness, Cybex, SCIFIT, Hammer Strength, and ICG products along with warranty parts ordering and technician requests.
- <https://lfworld.lifefitness.com> easy to find Knowledge Base articles with answers to frequently asked questions and product support documentation for Life Fitness, Cybex, SCIFIT, Hammer Strength, and ICG.

Related Products

The *PowerMill* uses the following consoles:

- Discover ST
- Discover SE3HD
- Integrity C
- Integrity X

2. Maintenance

Maintenance Video

Maintenance procedures for the PowerMill.

Video: [Link](#)

Preventive Maintenance Tips

The following preventive maintenance tips will keep the product operating at peak performance:

- Locate the product in a cool, dry place.
- Clean the top surface of the steps regularly.
- Clean the display console and all exterior surfaces with an approved or compatible cleaner (see *Approved Cleaners*) and a microfiber cloth.
- Long fingernails may damage or scratch the surface of the console; use the pad of the finger to press the selection buttons on the console.

NOTE: When cleaning the exterior of the unit, a non-abrasive cleaner and soft cotton cloth are strongly recommended. At no time should cleaner be applied directly to any part of the equipment.

Approved and Compatible Cleaners

Two preferred cleaners have been approved by reliability experts: PureGreen 24 and Gym Wipes. Both cleaners will safely and effectively remove dirt, grime and sweat from equipment. PureGreen 24 and the Antibacterial Force formula of Gym Wipes are both disinfectants that are effective against MRSA and H1N1.

PureGreen 24 is available in a spray which is convenient for gym staff to use. Apply the spray to a microfiber cloth and wipe down the equipment. Use PureGreen 24 on the equipment for at least 2 minutes for general disinfection purposes and at least 10 minutes for fungus and viral control.

Gym Wipes are large, durable pre-moistened wipes to use on the equipment before and after workouts. Use Gym Wipes on the equipment for at least 2 minutes for general disinfection purposes.

Contact Customer Support Services to order these cleaners (1-800-351-3737 or email: customersupport@lifefitness.com).

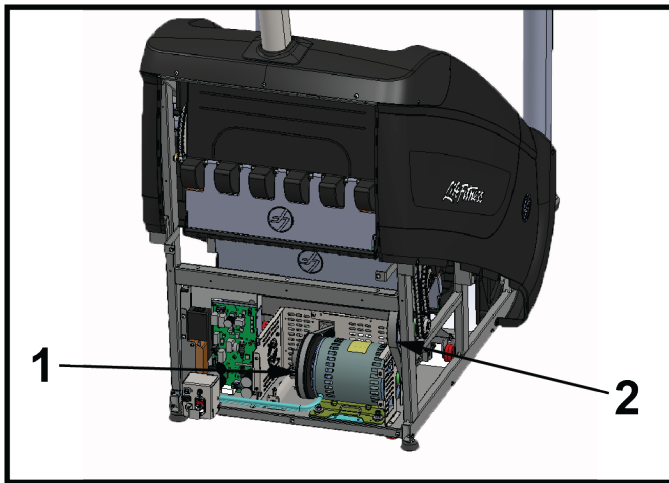
Mild soap and water or a mild non-abrasive household cleaner can also be used to clean the display and all exterior surfaces. Use a soft microfiber cloth only. Apply the cleaner to the microfiber cloth before cleaning. **DO NOT** use ammonia or acid based cleaners. **DO NOT** use abrasive cleaners. **DO NOT** use paper towels. **DO NOT** apply cleaners directly to the equipment surfaces.

Preventive Maintenance Schedule

Item	Weekly	Monthly	Quarterly	Biannually	Comments
Console Overlays	Clean			Inspect	
Cup Holder	Clean	Inspect			
Console Mounting Bolts				Inspect	
Frames	Clean			Inspect	
Plastic Covers	Clean	Inspect			
Lifepulse Sensors	Clean / Inspect				
Leg Levelers		Inspect / Adjust			
Side Hand Rails	Clean			Inspect	
Steps	Clean			Inspect	
TURN OFF AND UNPLUG THE POWERMILL PRIOR TO PERFORMING THE MAINTENANCE ITEMS BELOW!					
Step Chains			Inspect	Clean / Lubricate	Clean and lightly lubricate with 30w oil on a cloth.
Drive Chain			Inspect	Clean / Lubricate	Clean and lightly lubricate with 30w oil on a cloth.
Chain Sprockets			Inspect	Clean / Lubricate	Wipe off excess old grease and lightly apply lithium based grease to sprocket teeth.
Brake Belt / Drive Belt			Inspect		Check belts for wear and cracking
Bearing Tracks				Inspect / Lubricate	Wipe off excess old grease and lightly apply lithium based grease to tracks.
MCB Heat Sink				Inspect / Clean	Make sure heat sink is free of debris.
Electrical Connections				Inspect	
Front Step Shaft		Clean / Lubricate			Clean / lightly lubricate with "Breakfree" solution on cloth.
Rear Step Shaft		Clean / Lubricate			Clean / lightly lubricate with "Breakfree" solution on cloth.

Belt Inspection - Brake and Drive belts

The PowerMill has two belts. A brake belt and a drive belt.



Item	Description	Qty
1	Brake belt	1
2	Drive belt	1

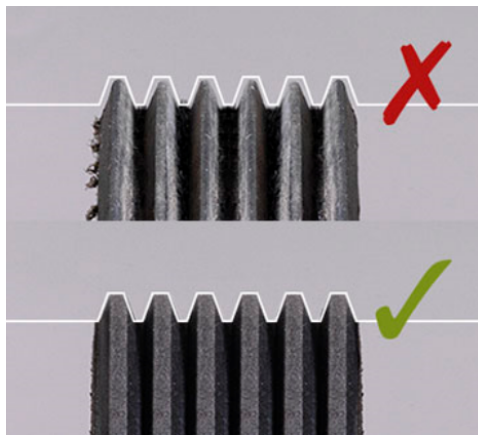
Inspect belts for cracking or wear.

Belt Cracking



If cracks appear 2 cm or less apart, then 80% of the belt life is gone and the belt should be replaced.

Belt Wear (Material Loss)



If material loss is occurring as shown above, the belt should be replaced.

NOTE: If the belt between the motor and the brake is removed for any reason, it must be replaced with a new one.

Lubrication

Lubrication tasks should be performed biannually.

Tools Required:

- Phillips screwdriver
- Breakfree CLP (Part number SK50-P0005-0000) or 3-IN-ONE oil.
- Non-Detergent motor oil, 30W
- Grease, White lithium
- Clean cloth

Disconnect power source

Unplug the power cord from the power outlet.

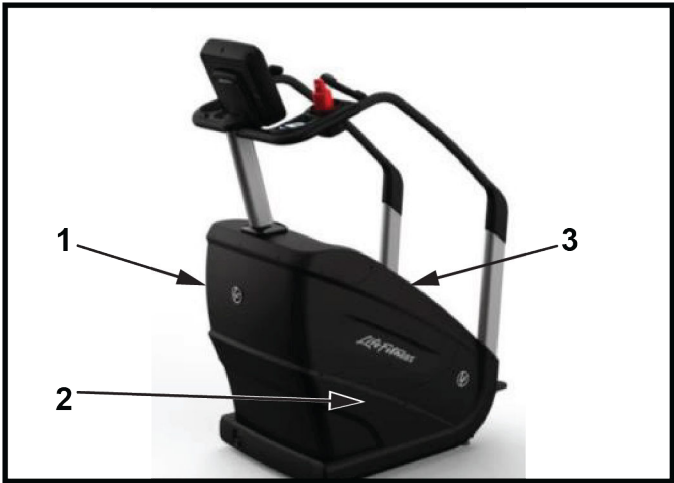


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

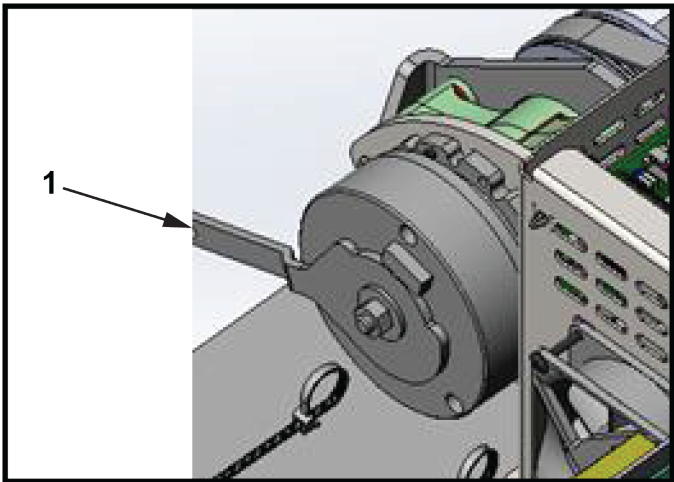
Lubrication Procedure

1. Inspect all steps for cracks or soft spots and test all features noting any failures or noise issues.
2. Remove front cover.



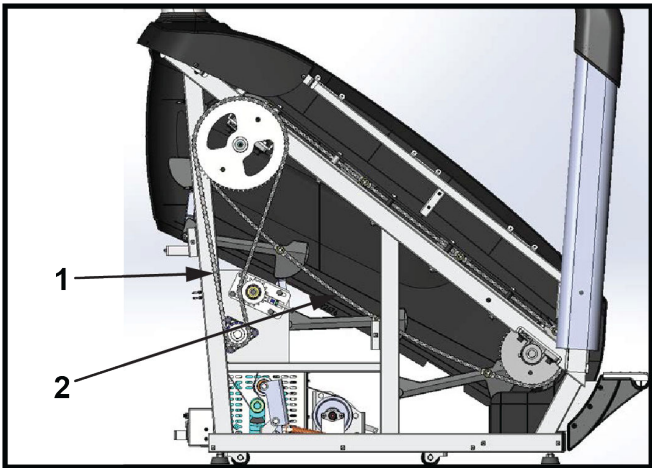
Item	Description	Qty
1	Front cover	1
2	Lower side panel	2
3	Upper side panel	2

3. Remove lower side panels.
4. Remove upper side panels.
5. Unlock the brake by moving the lever to the "UP" position.



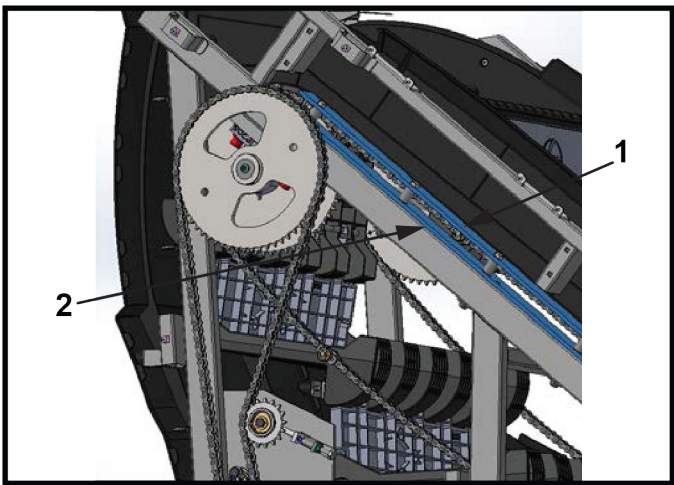
Item	Description	Qty
1	Brake lever	1

6. Oil the single large drive chain and the two main chain assemblies using only the 30W Non-Detergent motor oil.



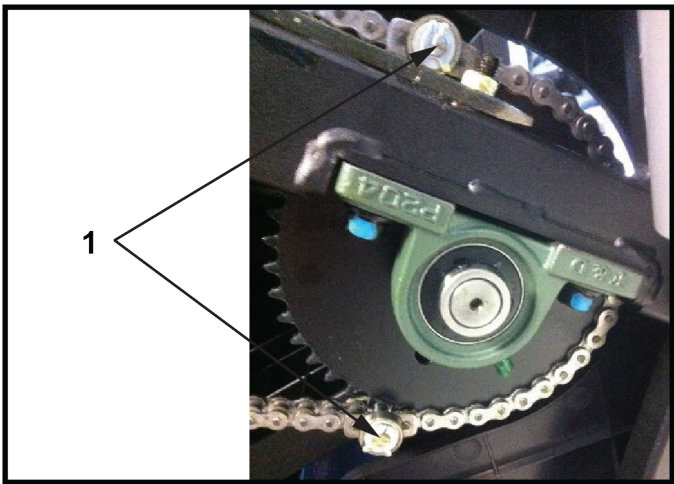
Item	Description	Qty
1	Drive chain assembly	1
2	Main chain assemblies	2

7. Grease the inside of the wear bars on both sides of the unit that guide the step chain bearings using the white lithium grease.



Item	Description	Qty
1	Upper wear bar	2
2	Lower wear bar	2

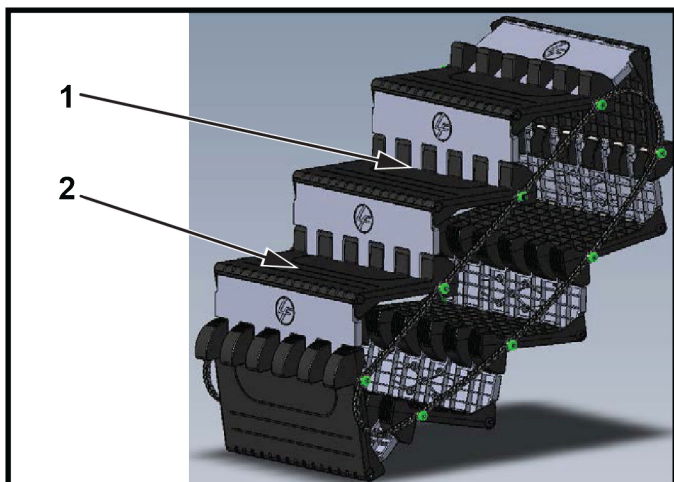
8. Add some additional grease and check for spin on the step chain bearings.



Item	Description	Qty
1	Step chain bearings	8

9. Inspect the inside for damage and clean the unit of any excess dust or debris.

10. Add a single drop of Breakfree CLP to each inside step rod hole to clean, lubricate, and prevent corrosion of the step rod.



Item	Description	Qty
1	Step rod hole	8
2	Steps	8

11. Thoroughly clean and wash each step to remove any excess oil to prevent possible slipping during use.
12. Install upper side panels.
13. Install lower side panels.
14. Install front cover.
15. Plug power cord into power outlet.

Complete Installation

Operate the unit at all levels to verify proper operation.

3. Theory of Operation

Handlebars and Heart Rate

The Lifepulse™ contact heart rate system is designed to sense the electrical signals originating from the heart as it beats and, using software, compute and display the corresponding heart rate value on the console readout. The two pairs of electrodes on the PowerMill Handlebars (left and right) are the point of contact at which these signals are picked up and transmitted from the body to the LifePulse circuitry. A hands-on detect circuit monitors for a change in voltage corresponding to the input for each of the left and right sensor pairs to determine if either or both are being held. Both sensors must be held in order for the electrical signal from the heart to be measured. This is similar to measuring the voltage of a battery with a voltmeter. In order to measure a battery the voltmeter must be connected across the battery terminals (one lead to the positive and one lead to the negative). Similarly, the heart can be thought of as a voltage source or battery and in order to measure it's voltage you must measure across its terminals. Essentially, when the left and right sensors are held they act like the leads of the voltmeter. Since an electrical path exists from the electrodes held in one hand, up the arm, across the body (and the heart), down the other arm and into the other hand holding the other pair of electrodes, a voltage can be measured. This is how the LifePulse signal is measured. And just like measuring a battery, the polarity of the voltage is important so the left and right electrodes must correspond to the left and right user hands.

To pick up the heart signal LifePulse must use a very sensitive high gain differential amplifier. This is primarily due to the signal's initial low amplitude as it originates from the heart (typically less than 2 millivolts peak to peak) and the resultant attenuation, or signal drop, as it travels through the body and into the electrodes. This type of amplifier is different from a regular amplifier in that only the differences between the inputs are amplified. In this way common signals, typically electrical noise, appearing on both inputs can be simultaneously ignored while the differences are amplified.

The output of this high gain differential amplifier, when neither or only one electrode pair is held, is meaningless because the inputs to the amplifier basically act as an antenna picking up and amplifying stray electrical signals from the environment. Ideally, once both electrode pairs are held, as detected by the hands-on circuitry, the heart signal can be isolated, amplified and presented to the software for analysis. In practice however, additional unwanted signals exist. Some of these signals come from other muscles which lay along the "voltage" path to the heart being measured (such as arm and chest muscles). Similarly, hand to electrode contact problems which tend to weaken the signal or even introduce new signals which hide the actual heart signal can occur. The LifePulse software attempts to isolate just the heart signal from all other unwanted signals and noise using complex software techniques.

Basically, the LifePulse software samples the amplified signal picked up at the electrodes many times a second looking for the heart pulses. Depending upon the amount of noise, size of signal and/or irregularity of the heart pulse, it may take many seconds (from 4 to 20 or more) to confidently determine a value. And if a value cannot be confidently determined, a heart rate will not be displayed. To increase the detection of a heart signal, the LifePulse software attempts to expand the sampled signal to maximize the important features. A Gain Value which represents the relative amount the signal was expanded is displayed in the LifePulse diagnostic screen and can range from 1 to 99. An assessment of the strength of the signal can be directly related to this gain value.

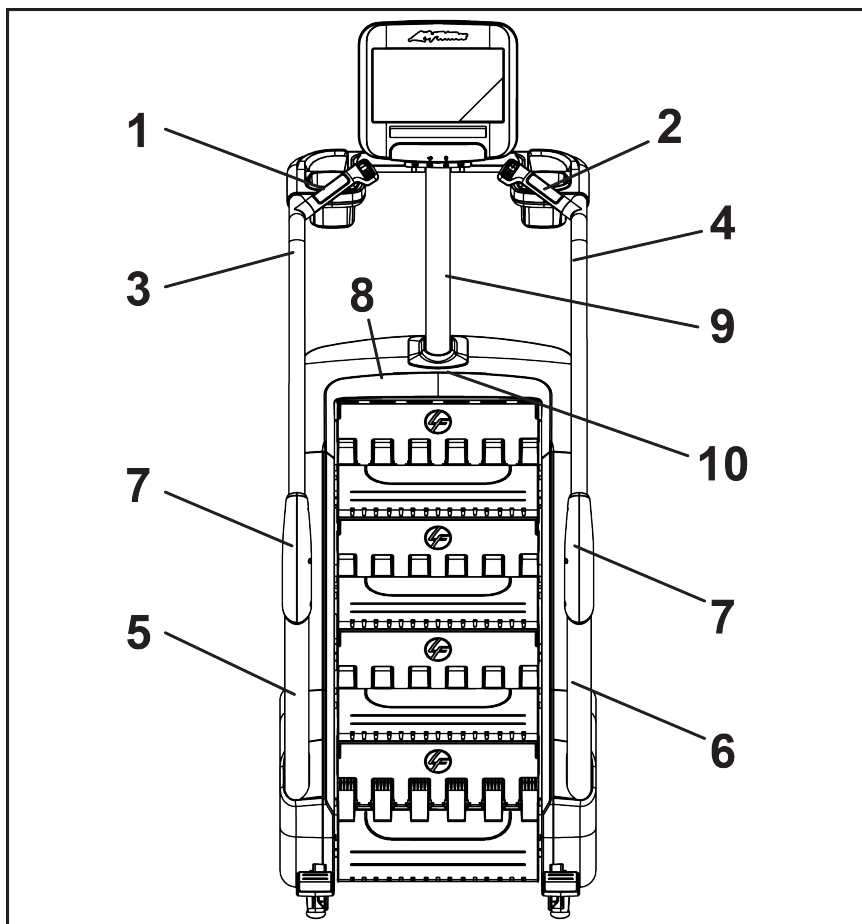
Input signals already at maximum levels require a low gain because their features cannot be further expanded without losing information. Very weak signals require more gain thus expanding them to full scale so their features can be easily picked out. This scaling is done dynamically over consecutive blocks of samples with each gain computed relative to the highest signal component within that block. The strength of the signal determines the effectiveness of the scaling. In general, weak signals are less desirable than strong ones and very strong signals are less desirable than weaker ones. Obviously, weak signals requiring high gain values means that the weak heart pulses will be competing with other low level background noise when both are scaled up making it hard to determine the heart signal from the background signals. On the other hand, strong signals, usually not from the heart pulse itself, will ultimately limit the amount of scaling that can be applied. Typical gain values for low noise signals which produce good LifePulse heart rates are generally between 10 and 30. Above 30 means the heart signal is weaker and below 10 means other noise signals are too strong thus overpowering the heart pulses. Just as the gain value indicates the strength of the heart signal the Confidence Number indicates the quality of the heart rate reading when one is displayed.

The LifePulse software uses many methods to analyze the heart signal and zero in on the heart rate reading. The Confidence number which is also displayed in the LifePulse diagnostic display indicates the agreement in the computed heart rate number among these different methods and therefore the confidence the heart rate displayed is correct. This is important when Cardio workouts, which change the load based on the difference between the current and target heart rates, are used. If a confident heart rate cannot be determined Cardio workout programs cannot automatically adjust the load to reach the target heart rate. Confidence values can range from 0 to 9 with 0 being the least confident reading and 9 being the most confident. Cardio program load changes occur when heart rate readings have confidence values of 5 or higher.

Factors that may affect the LifePulse software's ability to determine a heart rate include:

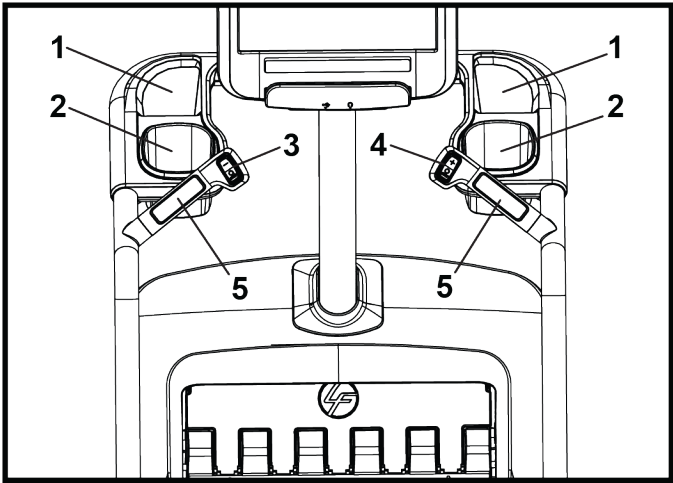
Hand slip and /or grip pressure changes on electrodes	Can produce noise spikes which drive up gain values and lower the ability to detect the features of the actual heart pulses.
Dry and/or calloused hands	Can further reduce the already low amplitude heart signal picked up from the hands by the electrodes.
Dirty and/or contaminated hands	Can also reduce the signal being measured.
Amount of upper body movement	Can add signals which must be evaluated and filtered out in the software. Sometimes these signals can be regular enough to look like heart pulses.
Individual's own heart pulse amplitude	Other noise signals compete with the low heart signals.
Irregular heart rhythms	Missing, skipped or irregular heartbeats require longer sample times to compute.
Pacemakers	Not specifically designed to work with pacemakers.

Handlebars



Item	Description	Qty
1	Left Bull Horn	1
2	Right Bull Horn	1
3	Left Handlebar Assembly	1
4	Right Handlebar Assembly	1
5	Left Upright	1
6	Right Upright	1
7	Handlebar Cover	2
8	Top Cover	1
9	Console Support	1
10	Console Support Gasket	1

Heart rate sensors



Item	Description	Qty
1	Accessory Tray	2
2	Cup Holder	2
3	Speed Down / Stop Buttons	1
4	Speed Up / Stop Buttons	1
5	Heart Rate Sensors	2

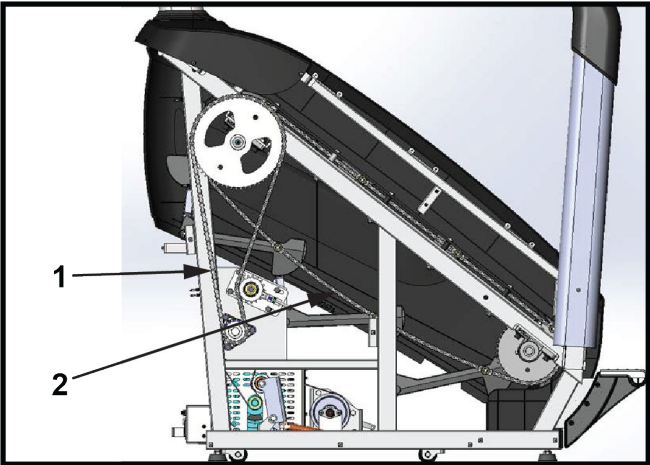
Drive System

The Drive System consists of the Drive Motor, Upper and Lower Axles, Main Chain Assemblies, Drive Chain Assembly, Sprocket Idler, and Hub Assembly Sprocket. The Wear Bars which supports the Step Bearings are also part of the Drive System. Together these items turn the electrical power provided by the Motor Controller into the mechanical power and which then turns the Stair Assembly.

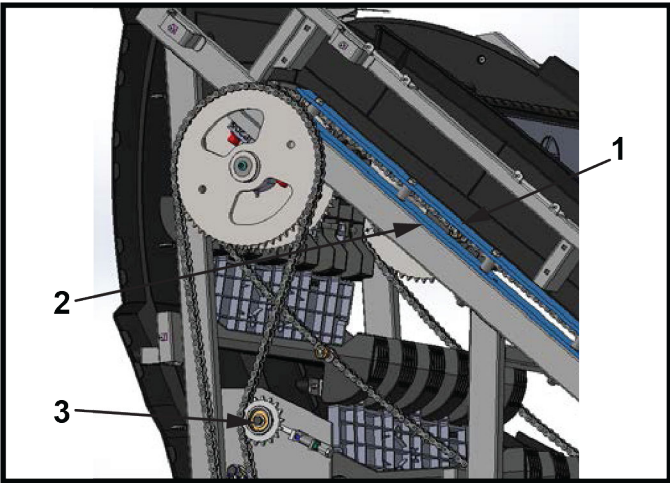
The Drive Motor’s output rotates the Drive Chain through a combination of a Poly-V belt and Hub Assembly Sprocket. The Sprocket Idler maintains the tension in the Drive chain which is connected to an Outer Sprocket on the Upper Axle. The Upper Axle is driven by the Drive Chain and this Outer Sprocket and in turn rotates the Lower Axle. The Upper and Lower Axles have an identical Main Chain on the left and right side of them. These chains ultimately move the user Steps providing the continuous Stair Assembly movement.

System Components

There are three chains on the PowerMill:



Item	Description	Qty
1	Drive Chain Assembly	1
2	Main Chain Assemblies	2

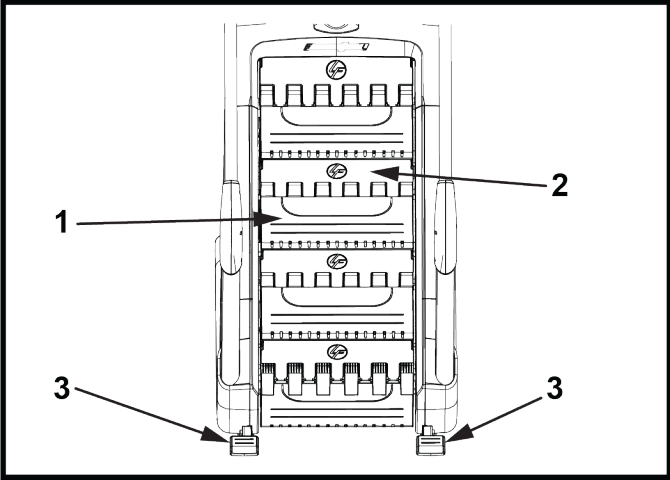


Item	Description	Qty
1	Upper Wear Bar	2
2	Lower Wear Bar	2
3	Sprocket Idler	1

Stepping System

The Stepping System is comprised of the Step Assist, Run and Rise Steps, and supporting hardware. The Step Assist is a pair of capped brackets on the rear of the unit that help reduce the step-up height for the user getting onto the unit. The Brackets are bolted onto the Frame in the rear and can be replaced if needed. There are two parts to each step, a Riser (colored light gray) and a Run (colored dark gray). When the machine is in use the user climbs in the continuous Steps which are supported by Shafts between each of them. Each Riser and Run step have both a Front and Rear Shaft. The ends of the Rear Shafts hold the Bearings that guide the Steps around their path. The Bearings are held onto the Rear Shafts with Crimped Retaining Rings that can be easily removed and installed.

System Components



Item	Description	Qty
1	Run Step (Dark Gray)	8
2	Riser Step (Light Gray)	8
3	Step Assist	2

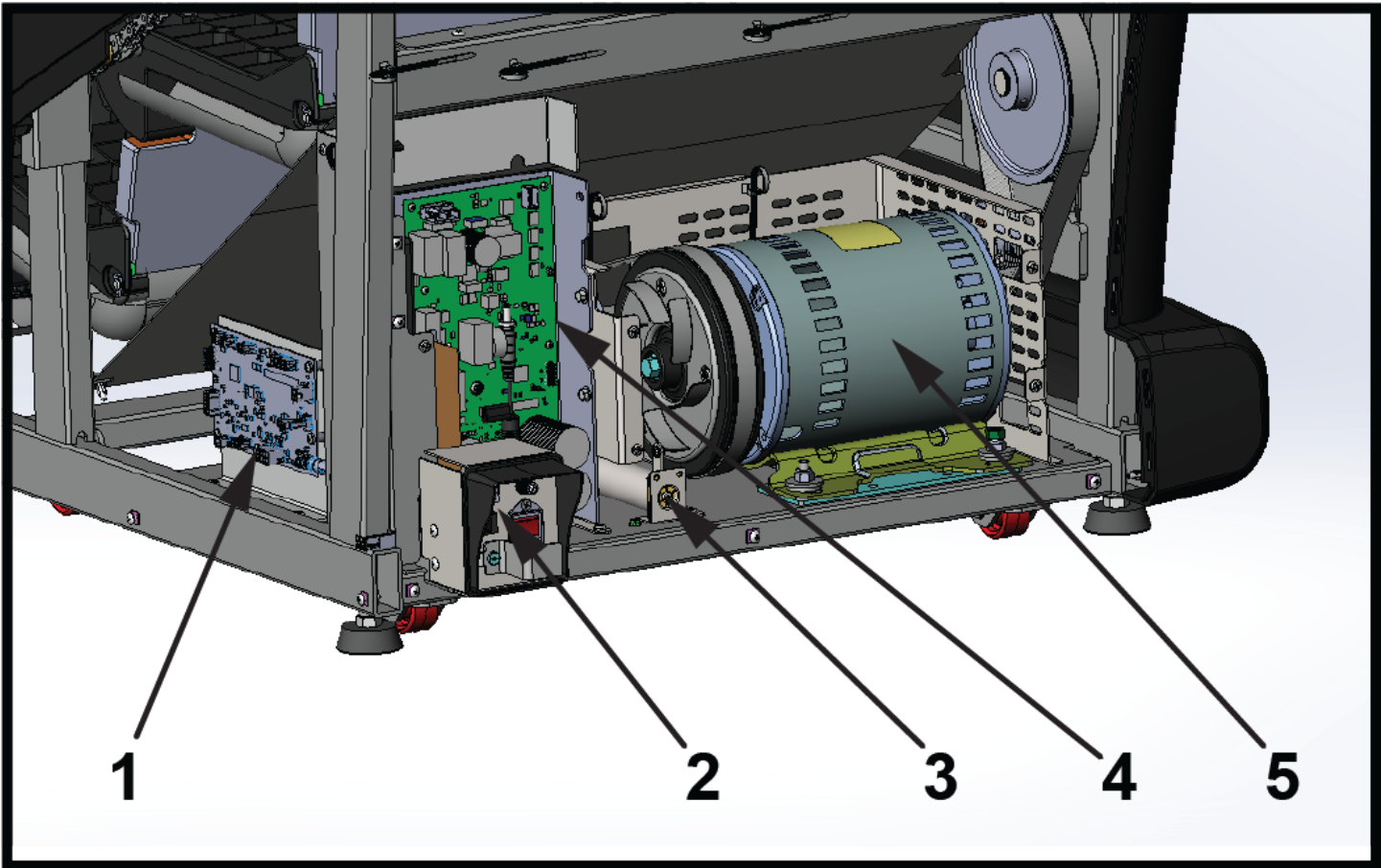
Base Electronics

The Motor Drive Board (MDB) in the base of the PowerMill controls the Drive Motor and provides power to the brake and the Encoder. The System Interface Board (SIB) provides power to the console and enables communication between the console and the MDB. The input power comes in from the Line Cord attached to an IEC Connector and is routed through a power switch. After the switch a filter is added to reduce radio frequency conducted emissions. The PowerMill base is designed for universal power input, meaning the internal electronics work anywhere from 95 to 265 VAC. The base is capable of accepting an Integrity or Discover console and is pre-wired for both.

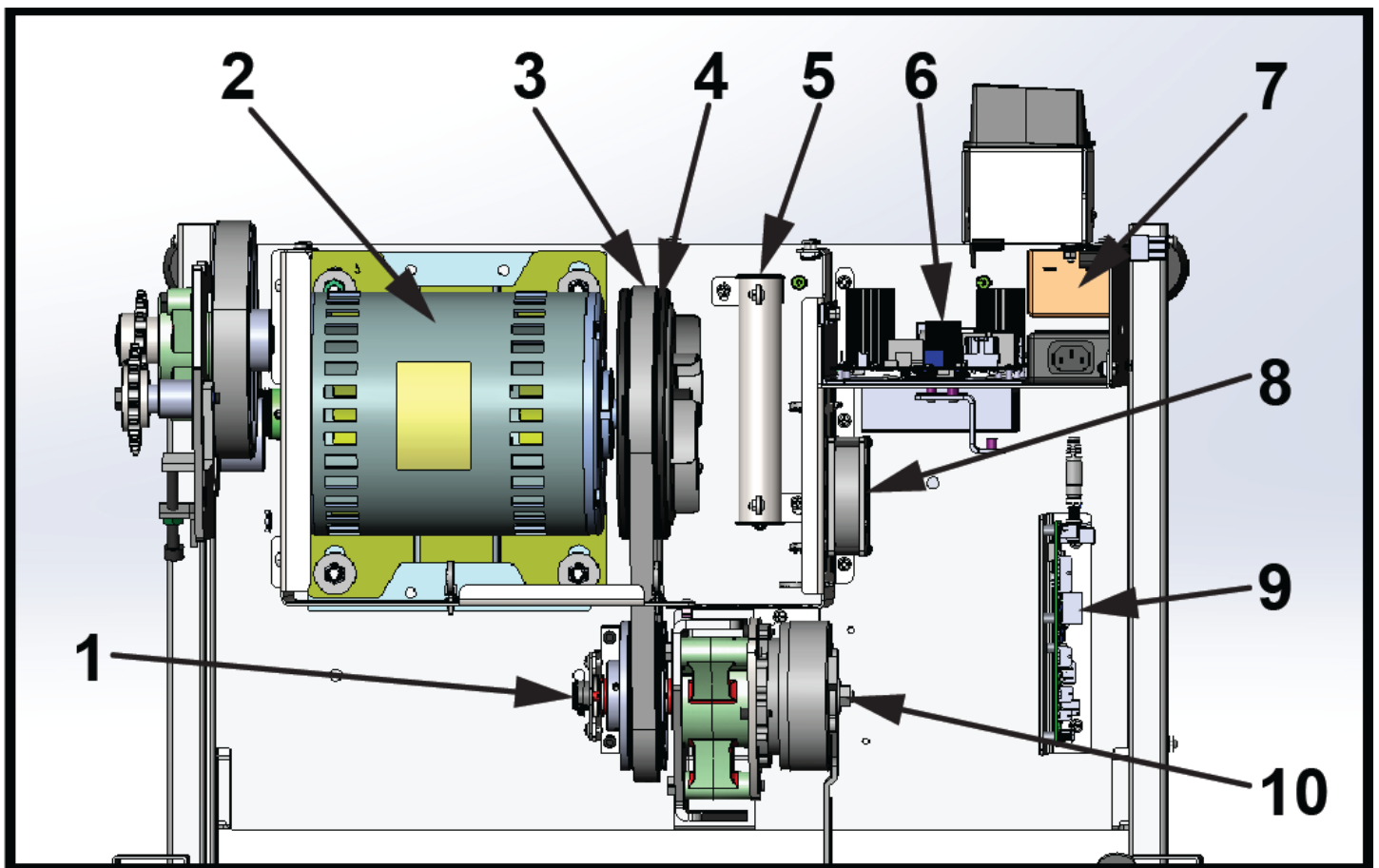
The encoder reads the internal RPM for the unit off the Brake Shaft Assembly. This reading is sent from the SIB to the console to convert RPM's to steps per minute.

The Brake prevents undesired movement of the Stair Assembly when the user is standing on the Steps and not in a workout. This is controlled from the MDB.

System Components



Item	Component	Description
1	System Interface Board (SIB)	Provides power to the console and enables communication between the console and the MDB.
2	Input panel	Coax, Ethernet, C-Safe. Base works with both high and low voltages.
3	Power resistor	Used to dissipate excess power created by the system (similar in function to part in alternator products).
4	Motor Drive Board (MDB)	Controls the Drive Motor and provides power to the brake and the Encoder.
5	Motor	AC Motor from our commercial treadmills (uses a unique flywheel).



1	Encoder	6	Motor Drive Board (MDB)
2	Motor	7	Line Filter
3	Drive Belt	8	Fan
4	Flywheel	9	System Interface Board (SIB)
5	Resistor	10	Brake

Consoles

The *PowerMill* can use Discover ST, Discover SE3HD, Integrity C, or Integrity X consoles. Each console has a unique support column that mechanically connects to the base. Refer to console manual for diagnostics information.

Discover ST



Item	Description	Qty
1	Screen size 16"	1
2	USB/ Headphone Assembly	1

Discover SE3HD



Item	Description	Qty
1	Screen size 16"	1
2	USB/ Headphone Assembly	1

Integrity C



Item	Description	Qty
1	LED Display	1
2	USB Port	1

Integrity X



Item	Description	Qty
1	Touch Screen Display	1
2	USB Port	1

4. How To's

Knowledge Base

See [Knowledge Base](#) for more detailed information.

Special Tools

NOTE: Specialized tools may be required to complete some service procedures safely (see list below). Using tools improperly can result in damage to equipment or personal injury.

- Life Fitness Encoding Kit (with positioning and centering tools), GK98-00001-0000
- Heavy Duty Strap

Handlebar Assembly

Tools Required:

- Phillips screwdriver
- 5 mm Allen wrench
- 6 mm Allen wrench

Time:

30 minutes (per Handlebar)

Disconnect power source

Unplug the power cord from the power outlet.

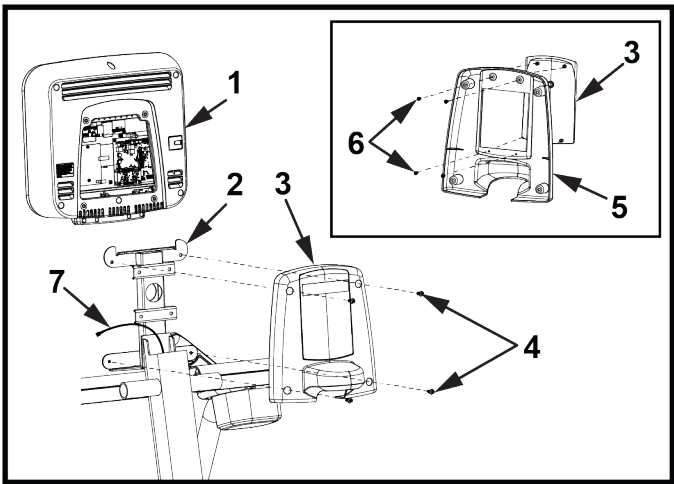


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Console Support Cover (Discover Console only)

1. Using a Phillips screwdriver remove the two bottom mounting screws securing the console support cover.

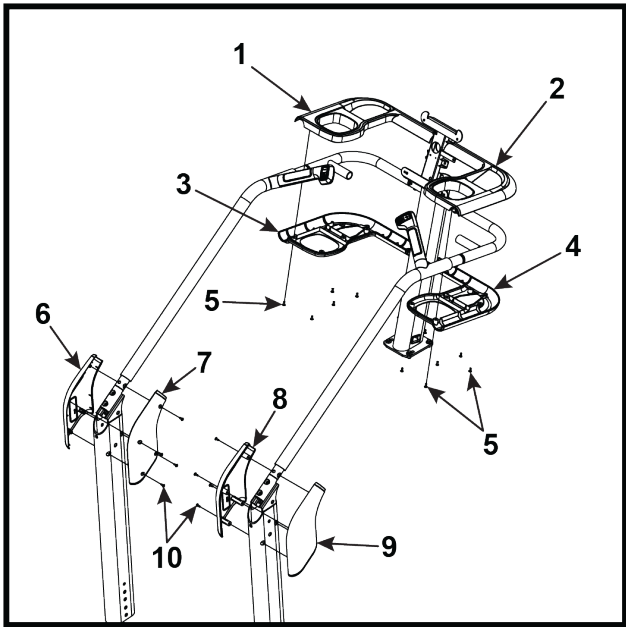


Item	Description	Qty
1	Discover Console	1
2	Console Support	1
3	Console Support Cover	1
4	Console Mounting Screws	4
5	Console Middle Cover	1
6	Console Cover Screws	4
7	Ground Wire	1

2. Carefully hold the bottom of the console as you remove the remaining Phillips screws that secure the console support cover to the console support.

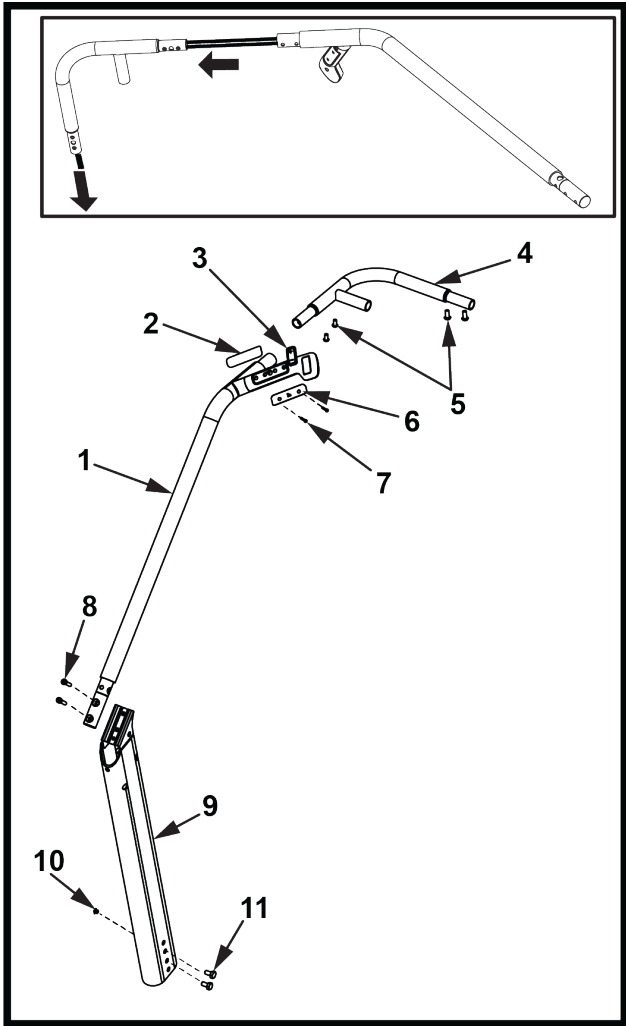
Remove Handlebar Assembly

1. Using a Phillips screwdriver, remove the rear handlebar covers and accessory tray from handlebar being replaced.



Item	Description	Qty
1	Top Accessory Tray, Left	1
2	Top Accessory Tray, Right	1
3	Bottom Accessory Tray, Left	1
4	Bottom Accessory Tray, Right	1
5	Accessory Tray Screws	12
6	Outer Handlebar Cover, Left	1
7	Inner Handlebar Cover, Left	1
8	Inner Handlebar Cover, Right	1
9	Outer Handlebar Cover, Right	1
10	Handlebar Cover Screws	8

2. Disconnect the heart rate cables in the rear of the console.
3. Use an 6 mm Allen wrench to remove the rear bolts on the handlebar.



Item	Description	Qty
1	Left Handlebar Assembly	1
2	Top Hand Sensor	1
3	Speed Down / Stop Button	1
4	Left Handlebar	1
5	Handlebar Front Bolts	4
6	Bottom Hand Sensor	1
7	Hand Sensor Screws	2
8	Handlebar Rear Bolts	2
9	Left Upright	1
10	Grommet	1
11	Handlebar Support Bolts	2

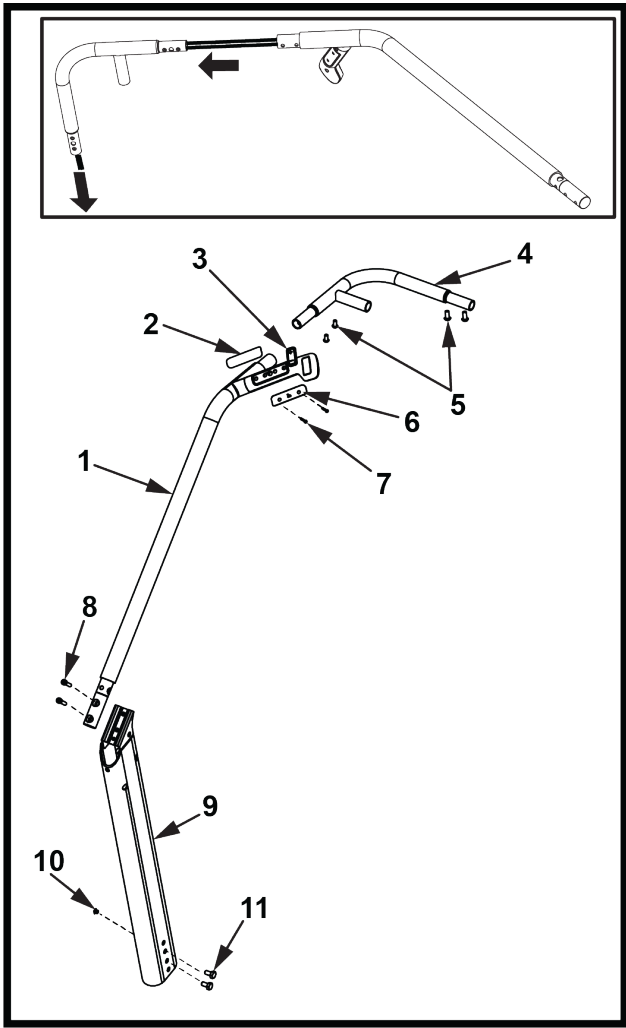
4. Remove the front bolts on the handlebar using an 5 mm Allen wrench.

5. Remove the handlebar, carefully sliding the heart rate cables through the console support and front handlebar weldment.

Install Handlebar Assembly

1. Run heart rate cable back through the front handlebar weldment and console support.

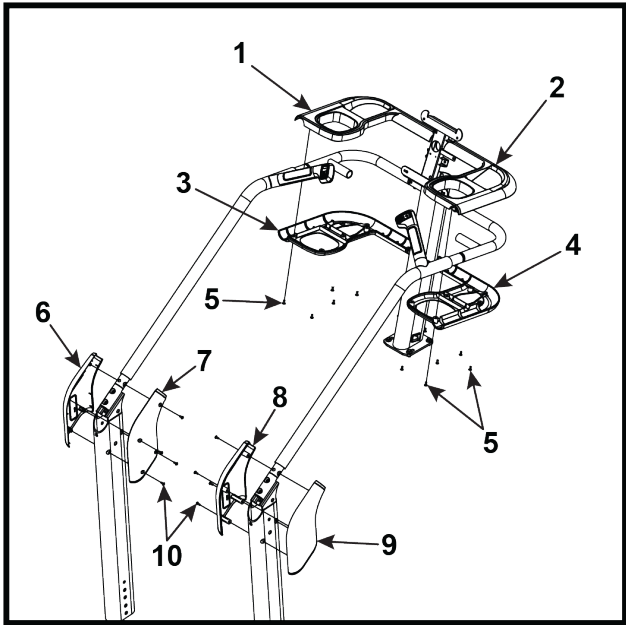
NOTE: Disconnecting front handlebar weldment from console support may make this easier.



Item	Description	Qty
1	Left Handlebar Assembly	1
2	Top Hand Sensor	1
3	Speed Down / Stop Button	1
4	Left Handlebar	1
5	Handlebar Front Bolts	4
6	Bottom Hand Sensor	1
7	Hand Sensor Screws	2
8	Handlebar Rear Bolts	2
9	Left Upright	1
10	Grommet	1
11	Handlebar Support Bolts	2

2. Install the handlebar assembly or the damaged component.
3. Install the upper bolts on the handlebar using an 5 mm Allen wrench.
4. Use an 6 mm Allen wrench to install the lower bolts on the handlebar.

5. Using a Phillips screwdriver, install the rear handlebar covers and accessory tray.

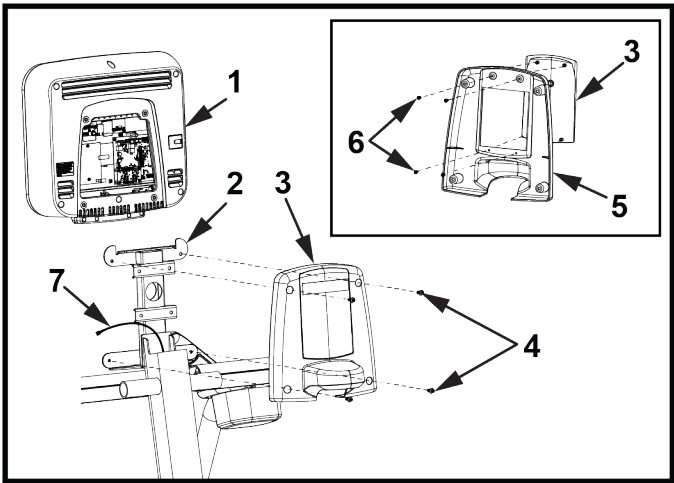


Item	Description	Qty
1	Top Accessory Tray, Left	1
2	Top Accessory Tray, Right	1
3	Bottom Accessory Tray, Left	1
4	Bottom Accessory Tray, Right	1
5	Accessory Tray Screws	12
6	Outer Handlebar Cover, Left	1
7	Inner Handlebar Cover, Left	1
8	Inner Handlebar Cover, Right	1
9	Outer Handlebar Cover, Right	1
10	Handlebar Cover Screws	8

6. Connect the heart rate cables in the rear of the console.

Install Console Support Cover (Discover Console only)

1. Carefully hold the bottom of the console as you install the two top Phillips screws that secure the console support cover to the console support.



Item	Description	Qty
1	Discover Console	1
2	Console Support	1
3	Console Support Cover	1
4	Console Mounting Screws	4
5	Console Middle Cover	1
6	Console Cover Screws	4
7	Ground Wire	1

2. Using a Phillips screwdriver install the two bottom mounting screws securing the console support cover.

Complete Installation

Operate the unit at all levels to verify proper operation.

Contact Heart Rate Sensor

Tools Required:

- Phillips screwdriver

Time:

3 minutes (per Handlebar)

Disconnect power source

Unplug the power cord from the power outlet.

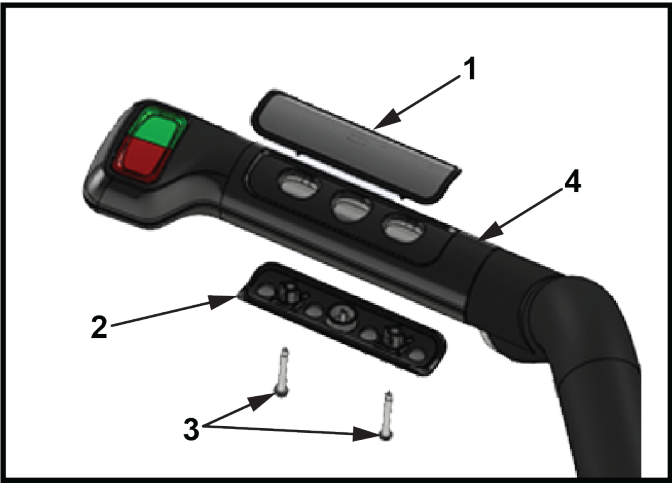


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Contact Heart Rate Sensor

1. Remove the screws that are used to fasten the top and bottom contact heart rate sensors together.

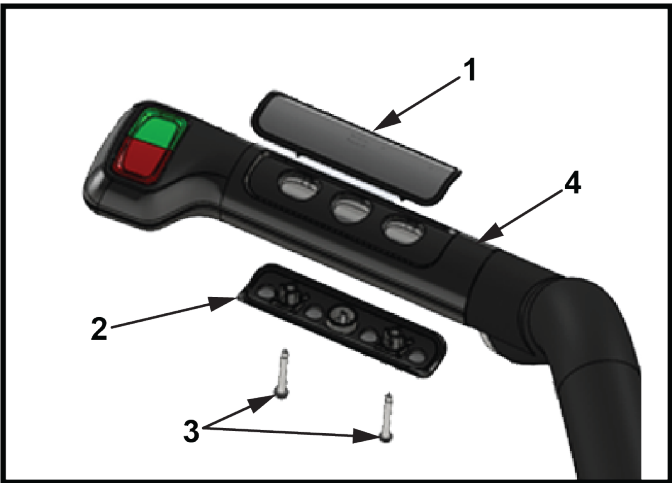


Item	Description	Qty
1	Top Contact Rate Sensor	1
2	Bottom Contact Rate Sensor	1
3	Screws	2
4	Handlebar Assembly	1

2. Pull the sensors away from handlebar assembly and disconnect the heart rate cable wire connected to each sensor.
3. Note the color of the wire connected to the top and bottom sensors. These are to be matched accordingly.

Install Contact Heart Rate Sensor

1. Reconnect the heart rate cable wire to each sensor.
2. Install the screws that are used to fasten the top and bottom contact heart rate sensors together.



Item	Description	Qty
1	Top Contact Rate Sensor	1
2	Bottom Contact Rate Sensor	1
3	Screws	2
4	Handlebar Assembly	1

Complete Installation

Operate the unit at all levels to verify proper operation.

Button Switch Assembly

Tools Required:

- Phillips screwdriver

Time:

5 minutes (per Handlebar)

Disconnect power source

Unplug the power cord from the power outlet.

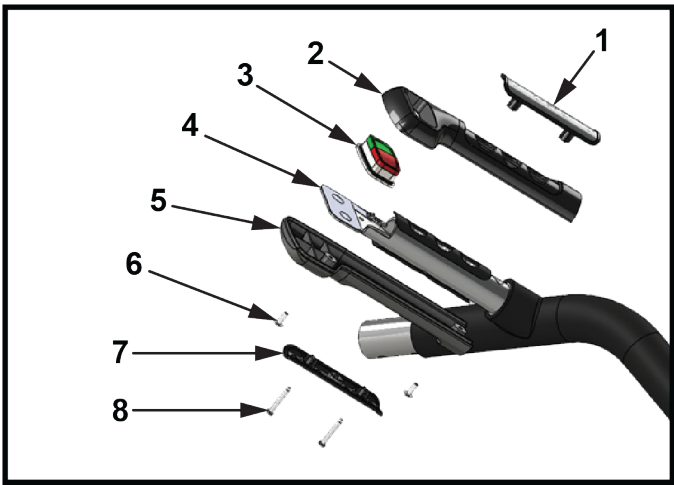


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Button Switch Assembly

1. Remove the screws that are used to fasten the top and bottom contact heart rate sensors together.



Item	Description	Qty
1	Top Heart Rate Contact Sensor	1
2	Top Handlebar Grip	1
3	Button	1
4	Button Switch Assembly	1
5	Bottom Handlebar Grip	1
6	Handlebar Grip Screws	2
7	Bottom Heart Rate Contact Sensor	1
8	Heart Rate Contact Sensor Screws	2

2. Pull the sensors away from the handlebar assembly and disconnect the heart rate cable wire connected to each sensor.

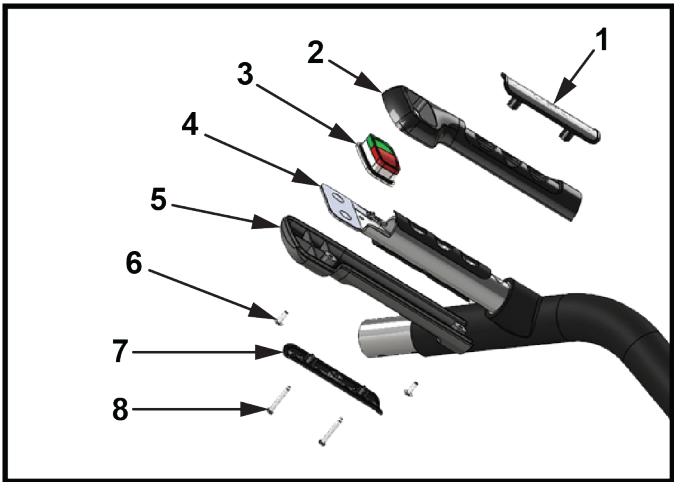
NOTE: Note the color of the wire connected to the top and bottom sensors. These are to be matched accordingly.

3. Remove the screws that are used to fasten the top and bottom handlebar grips.
4. Pull apart the top and bottom handlebar grips along with the **Start / Stop** or **Speed** control button.
5. Disconnect the button switch assembly cable connection and peel away the assembly from the handlebar assembly.

Install Button Switch Assembly

- 1. Assemble new button switch assembly onto handlebar assembly.

NOTE: Clean adhesive surface prior to assembly of new switch assembly.



Item	Description	Qty
1	Top Heart Rate Contact Sensor	1
2	Top Handlebar Grip	1
3	Button	1
4	Button Switch Assembly	1
5	Bottom Handlebar Grip	1
6	Handlebar Grip Screws	2
7	Bottom Heart Rate Contact Sensor	1
8	Heart Rate Contact Sensor Screws	2

- 2. Connect the button switch assembly cable connection to the handlebar assembly.
- 3. Attach the top and bottom handlebar grips along with the **Start / Stop** or **Speed** control button.
- 4. Install the screws that are used to fasten the top and bottom handlebar grips.
- 5. Attach the sensors to the handlebar assembly and connect the heart rate cable wire to each sensor.
- 6. Install the screws that are used to fasten the top and bottom contact heart rate sensors together.

Complete Installation

Operate the unit at all levels to verify proper operation.

Top Cover

Tools Required:

- Phillips screwdriver
- 5 mm Allen wrench
- 6 mm Allen wrench

Time:

40 minutes

Disconnect power source

Unplug the power cord from the power outlet.



WARNING: Shock and electrocution hazard.

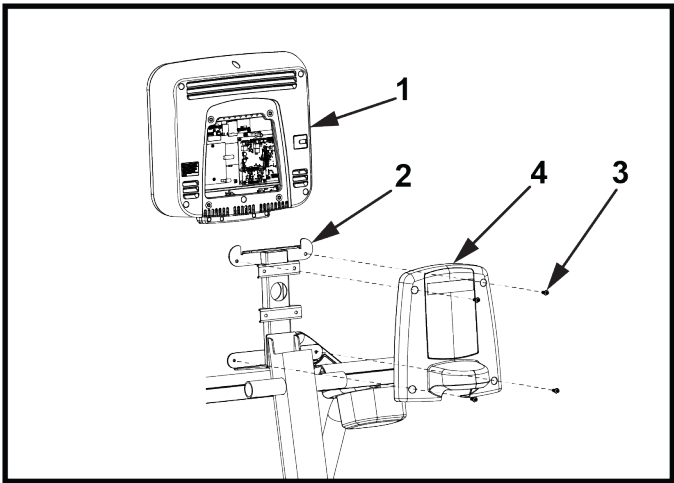
- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Console Assembly

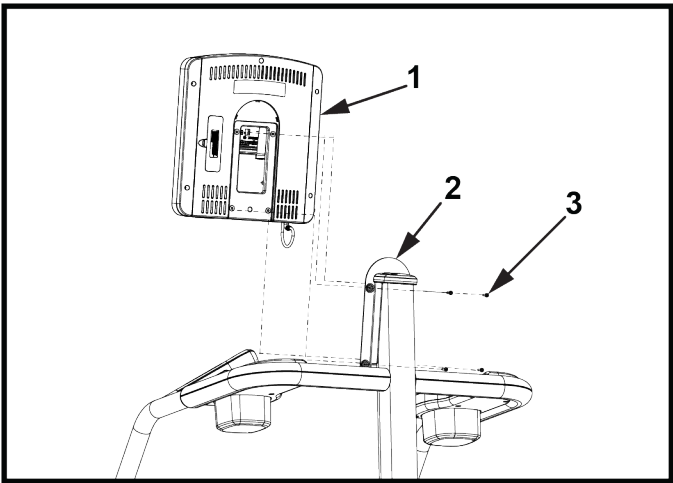
1. Using a Phillips screwdriver remove the console mounting screws securing the console.

NOTE: Carefully hold the bottom of the console as you remove the remaining Phillips screws.

Discover Console



Integrity Console

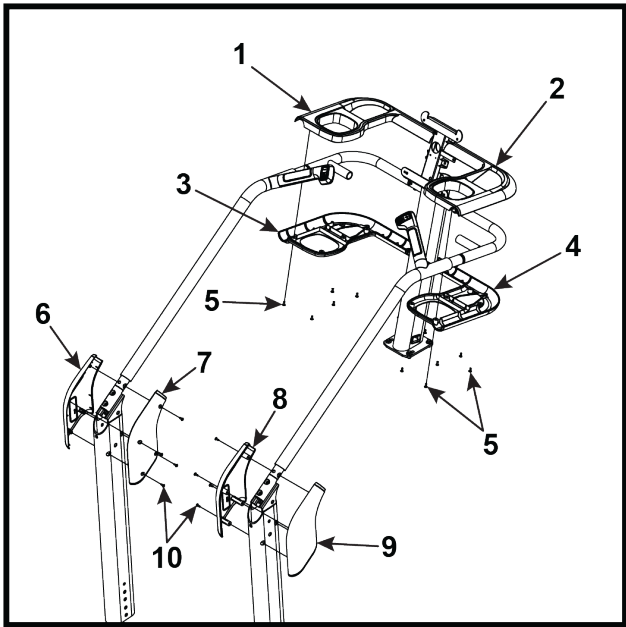


Item	Description	Qty
1	Console	1
2	Console Support	1
3	Console Mounting Screws	4
4	Console Support Cover	1

2. Disconnect all cables from the rear of the console and set the console aside.

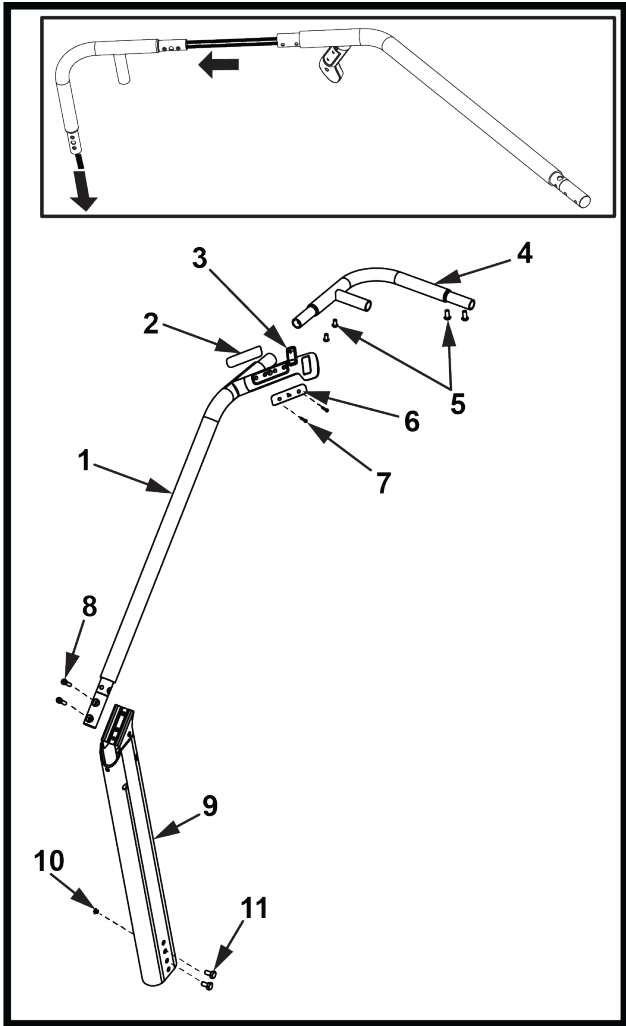
Remove Handlebar Assembly

1. Using a Phillips screwdriver, remove the rear handlebar covers and accessory tray from handlebar being replaced.



Item	Description	Qty
1	Top Accessory Tray, Left	1
2	Top Accessory Tray, Right	1
3	Bottom Accessory Tray, Left	1
4	Bottom Accessory Tray, Right	1
5	Accessory Tray Screws	12
6	Outer Handlebar Cover, Left	1
7	Inner Handlebar Cover, Left	1
8	Inner Handlebar Cover, Right	1
9	Outer Handlebar Cover, Right	1
10	Handlebar Cover Screws	8

2. Disconnect the heart rate cables in the rear of the console.
3. Use an 6 mm Allen wrench to remove the rear bolts on the handlebar.



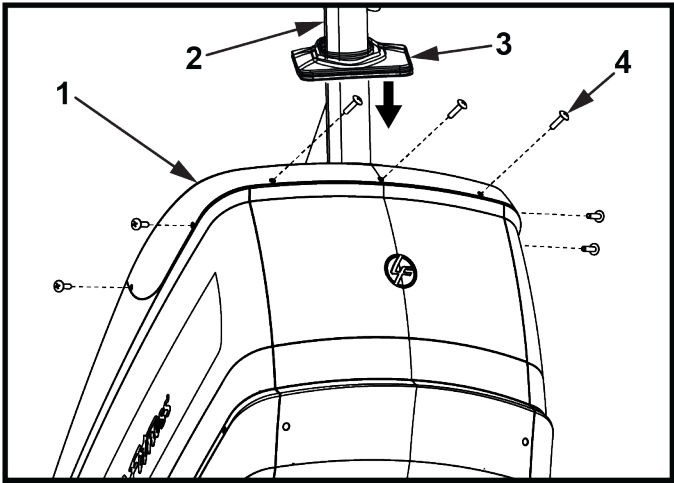
Item	Description	Qty
1	Left Handlebar Assembly	1
2	Top Hand Sensor	1
3	Speed Down / Stop Button	1
4	Left Handlebar	1
5	Handlebar Front Bolts	4
6	Bottom Hand Sensor	1
7	Hand Sensor Screws	2
8	Handlebar Rear Bolts	2
9	Left Upright	1
10	Grommet	1
11	Handlebar Support Bolts	2

4. Remove the front bolts on the handlebar using an 5 mm Allen wrench.

5. Remove the handlebar, carefully sliding the heart rate cables through the console support and front handlebar weldment.

Remove Top Shroud

1. Remove the screws from top shroud.

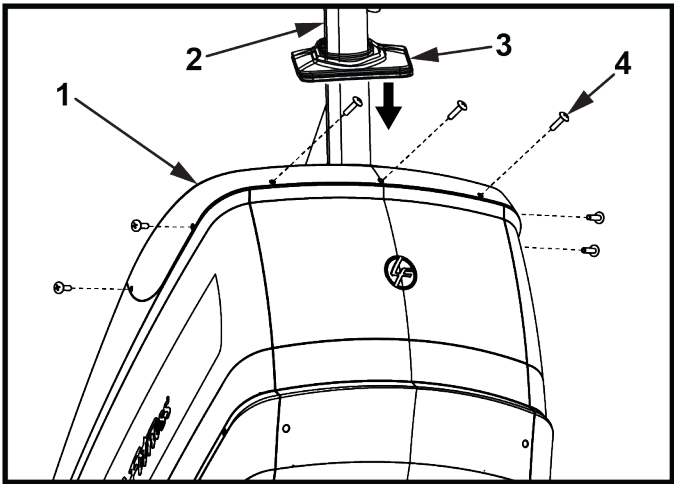


Item	Description	Qty
1	Top Shroud	1
2	Console Support	1
3	Console Support Gasket	1
4	Screws	7

2. Slide the console support gasket and top shroud over the console support

Install Top Shroud

1. Slide the top shroud over the console support and put the console support gasket back in place.

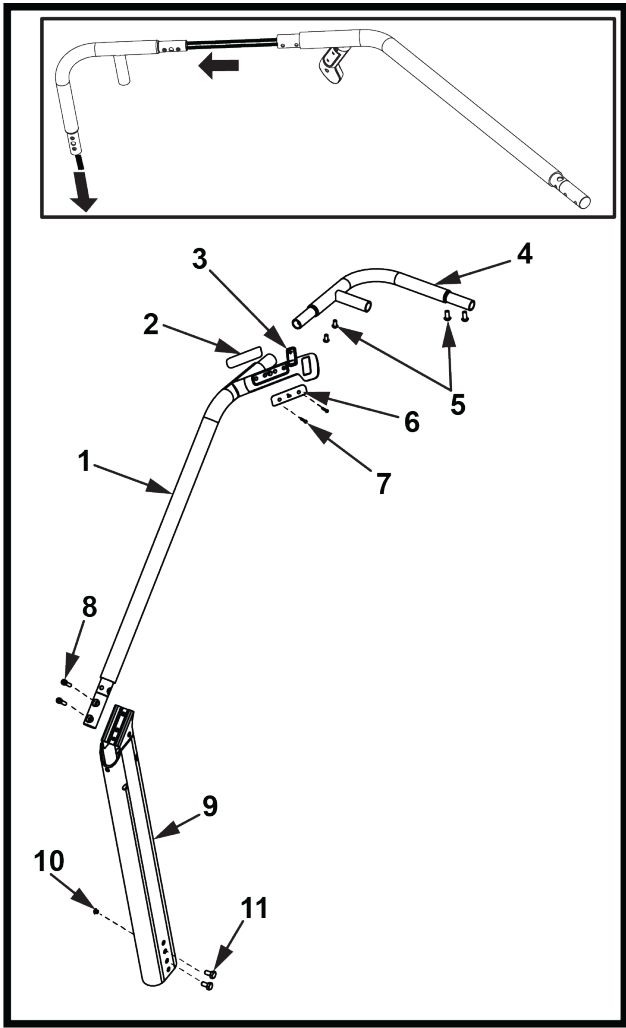


Item	Description	Qty
1	Top Shroud	1
2	Console Support	1
3	Console Support Gasket	1
4	Screws	7

2. Install the screws to the top shroud.

Install Handlebar Assembly

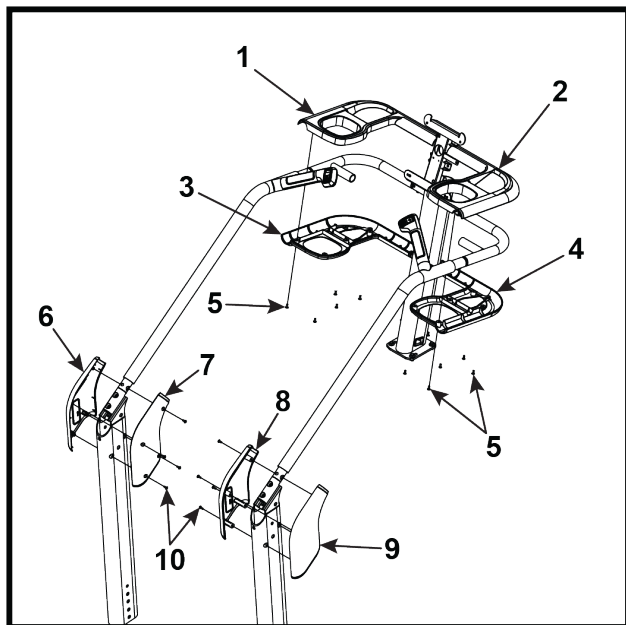
1. Run heart rate cable back through the front handlebar weldment and console support.
- NOTE:** Disconnecting front handlebar weldment from console support may make this easier.



Item	Description	Qty
1	Left Handlebar Assembly	1
2	Top Hand Sensor	1
3	Speed Down / Stop Button	1
4	Left Handlebar	1
5	Handlebar Front Bolts	4
6	Bottom Hand Sensor	1
7	Hand Sensor Screws	2
8	Handlebar Rear Bolts	2
9	Left Upright	1
10	Grommet	1
11	Handlebar Support Bolts	2

2. Install the handlebar assembly or the damaged component.
3. Install the upper bolts on the handlebar using an 5 mm Allen wrench.
4. Use an 6 mm Allen wrench to install the lower bolts on the handlebar.

- Using a Phillips screwdriver, install the rear handlebar covers and accessory tray.



Item	Description	Qty
1	Top Accessory Tray, Left	1
2	Top Accessory Tray, Right	1
3	Bottom Accessory Tray, Left	1
4	Bottom Accessory Tray, Right	1
5	Accessory Tray Screws	12
6	Outer Handlebar Cover, Left	1
7	Inner Handlebar Cover, Left	1
8	Inner Handlebar Cover, Right	1
9	Outer Handlebar Cover, Right	1
10	Handlebar Cover Screws	8

- Connect the heart rate cables in the rear of the console.

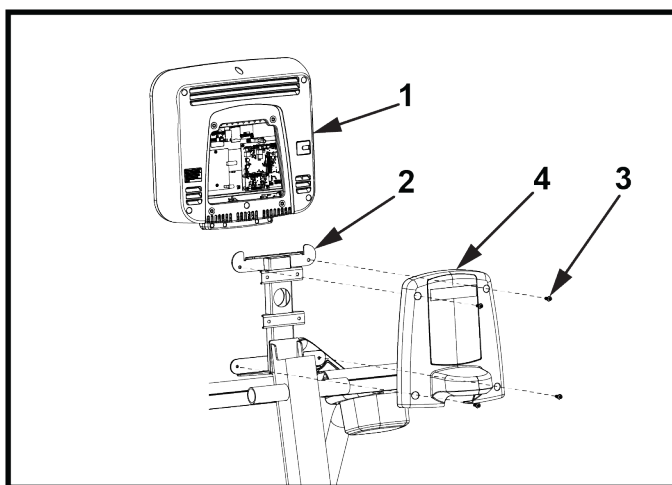
Install Console Assembly

- Connect all cables to the rear of the console.

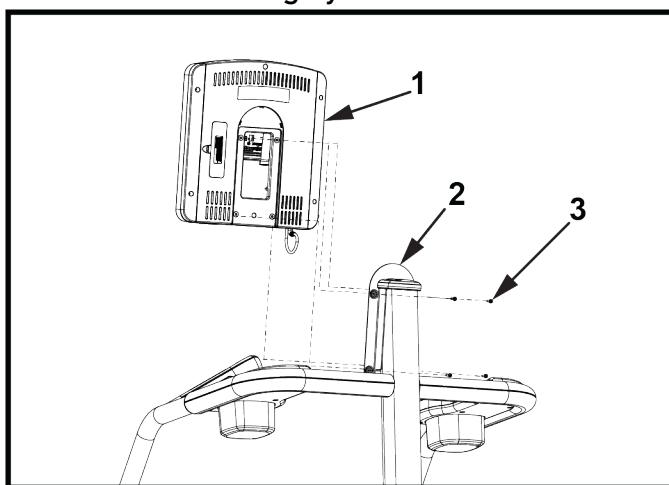
NOTE: Carefully hold the bottom of the console as you install Phillips screws.

- Using a Phillips screwdriver install the console mounting screws securing the console.

Discover Console



Integrity Console



Item	Description	Qty
1	Console	1
2	Console Support	1
3	Console Mounting Screws	4
4	Console Support Cover	1

NOTE: For consoles installed in metric system countries enter Diagnostics and change units of measure from English to Metric.

Complete Installation

Operate the unit at all levels to verify proper operation.

Console Support

Tools Required:

- Phillips screwdriver
- 5 mm Allen wrench
- 6 mm Allen wrench
- 13 mm Socket
- Ratchet

Time:

50 minutes

Disconnect power source

Unplug the power cord from the power outlet.



WARNING: Shock and electrocution hazard.

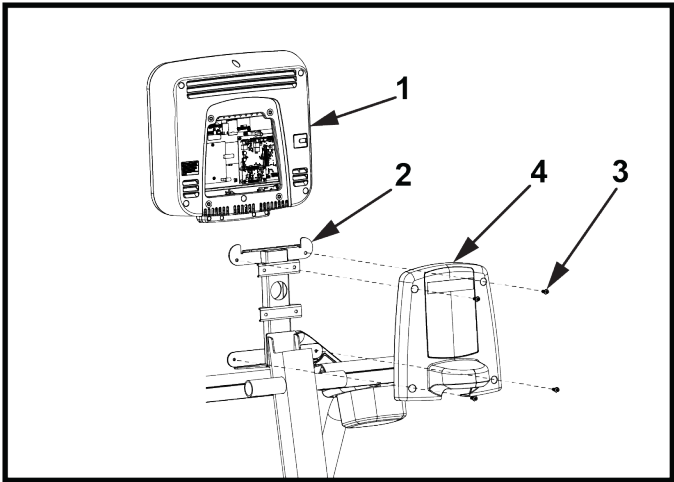
- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Console Assembly

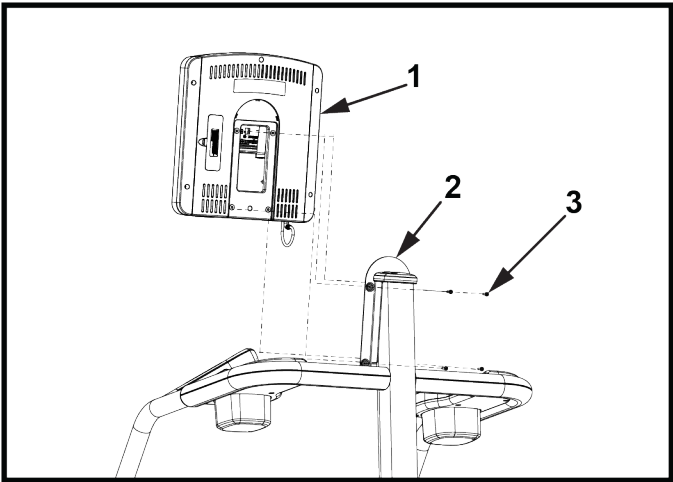
1. Using a Phillips screwdriver remove the console mounting screws securing the console.

NOTE: Carefully hold the bottom of the console as you remove the remaining Phillips screws.

Discover Console



Integrity Console

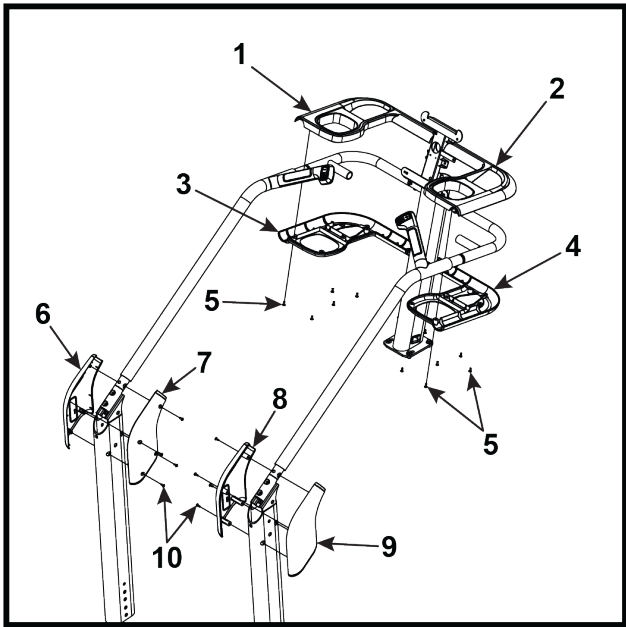


Item	Description	Qty
1	Console	1
2	Console Support	1
3	Console Mounting Screws	4
4	Console Support Cover	1

2. Disconnect all cables from the rear of the console and set the console aside.

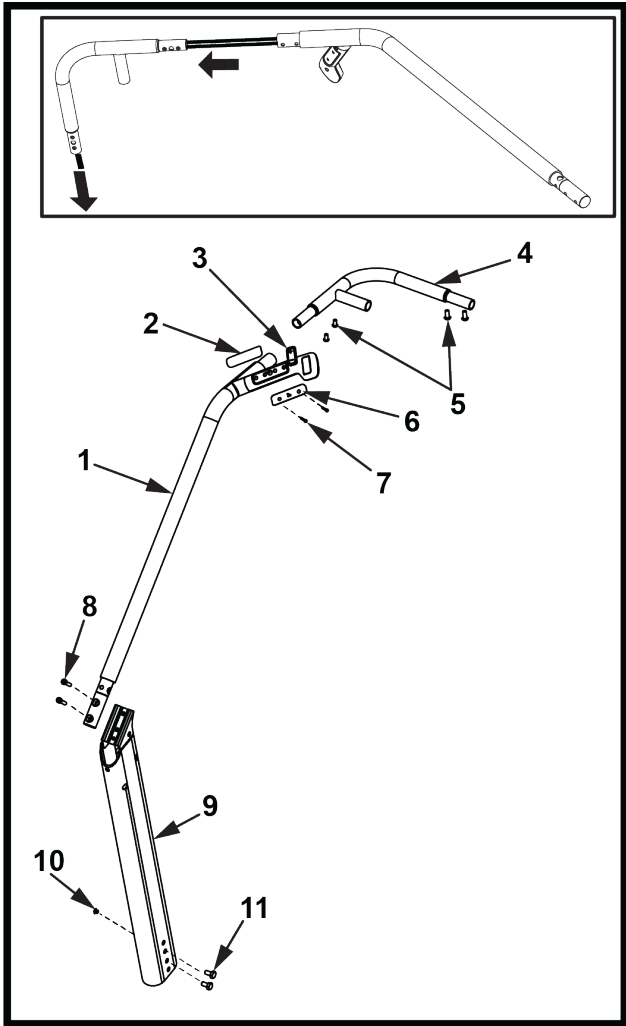
Remove Handlebar Assembly

1. Using a Phillips screwdriver, remove the rear handlebar covers and accessory tray from handlebar being replaced.



Item	Description	Qty
1	Top Accessory Tray, Left	1
2	Top Accessory Tray, Right	1
3	Bottom Accessory Tray, Left	1
4	Bottom Accessory Tray, Right	1
5	Accessory Tray Screws	12
6	Outer Handlebar Cover, Left	1
7	Inner Handlebar Cover, Left	1
8	Inner Handlebar Cover, Right	1
9	Outer Handlebar Cover, Right	1
10	Handlebar Cover Screws	8

2. Disconnect the heart rate cables in the rear of the console.
3. Use an 6 mm Allen wrench to remove the rear bolts on the handlebar.



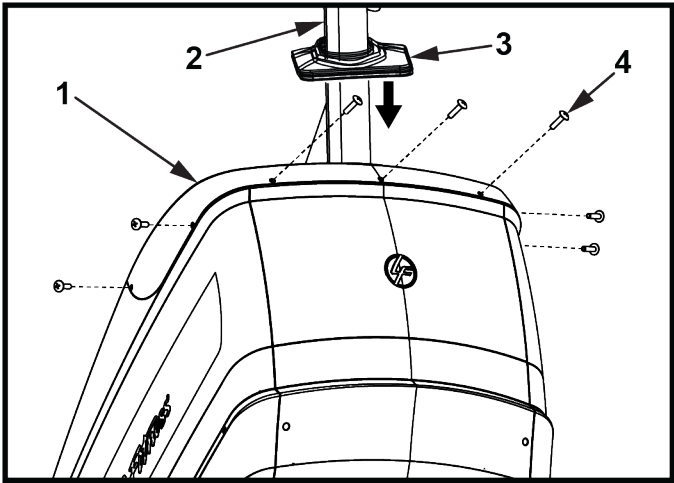
Item	Description	Qty
1	Left Handlebar Assembly	1
2	Top Hand Sensor	1
3	Speed Down / Stop Button	1
4	Left Handlebar	1
5	Handlebar Front Bolts	4
6	Bottom Hand Sensor	1
7	Hand Sensor Screws	2
8	Handlebar Rear Bolts	2
9	Left Upright	1
10	Grommet	1
11	Handlebar Support Bolts	2

4. Remove the front bolts on the handlebar using an 5 mm Allen wrench.

5. Remove the handlebar, carefully sliding the heart rate cables through the console support and front handlebar weldment.

Remove Top Shroud

1. Remove the screws from top shroud.

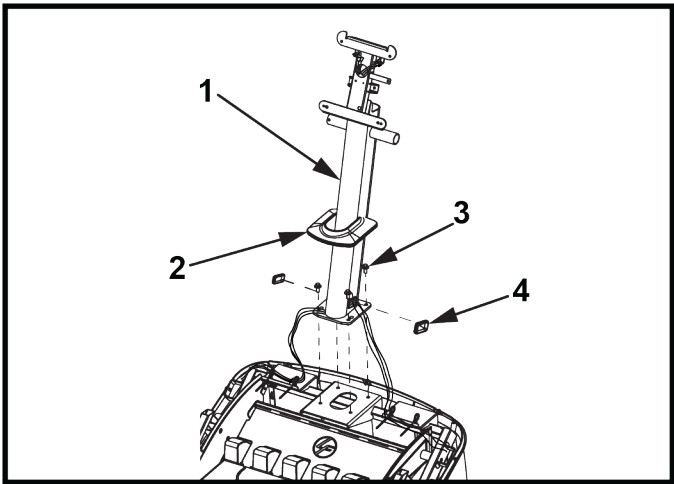


Item	Description	Qty
1	Top Shroud	1
2	Console Support	1
3	Console Support Gasket	1
4	Screws	7

2. Slide the console support gasket and top shroud over the console support

Remove Console Support

1. Using the 13 mm socket and ratchet to remove the four bolts securing the console support to the frame.

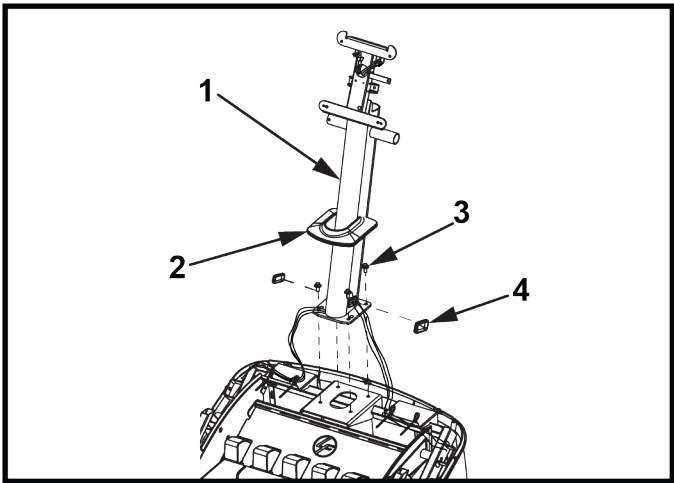


Item	Description	Qty
1	Console Support	1
2	Gasket	1
3	Bolts	4
4	Grommet	1

2. Carefully route all cables through the console support while taking the old console support off the frame.

Install Console Support

1. Install the new console support by running the cables through the console support and reinstalling onto the frame.

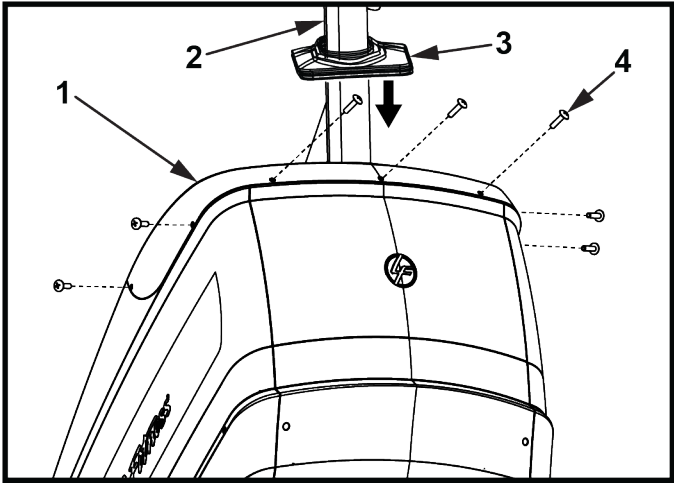


Item	Description	Qty
1	Console Support	1
2	Gasket	1
3	Bolts	4
4	Grommet	1

2. Using the 13 mm socket and ratchet to install the four bolts securing the console support to the frame.

Install Top Shroud

1. Slide the top shroud over the console support and put the console support gasket back in place.

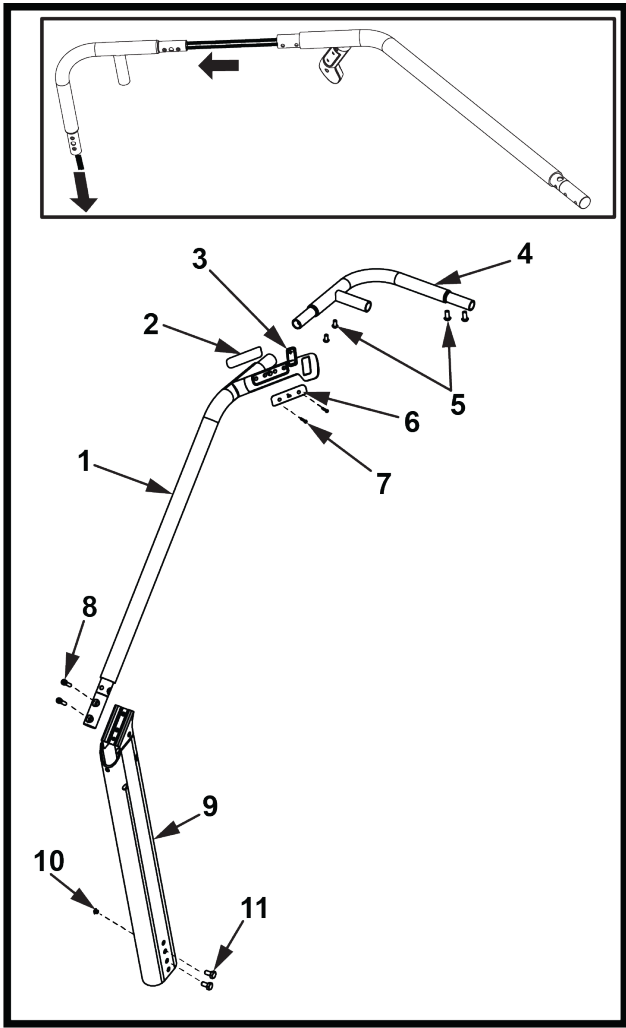


Item	Description	Qty
1	Top Shroud	1
2	Console Support	1
3	Console Support Gasket	1
4	Screws	7

2. Install the screws to the top shroud.

Install Handlebar Assembly

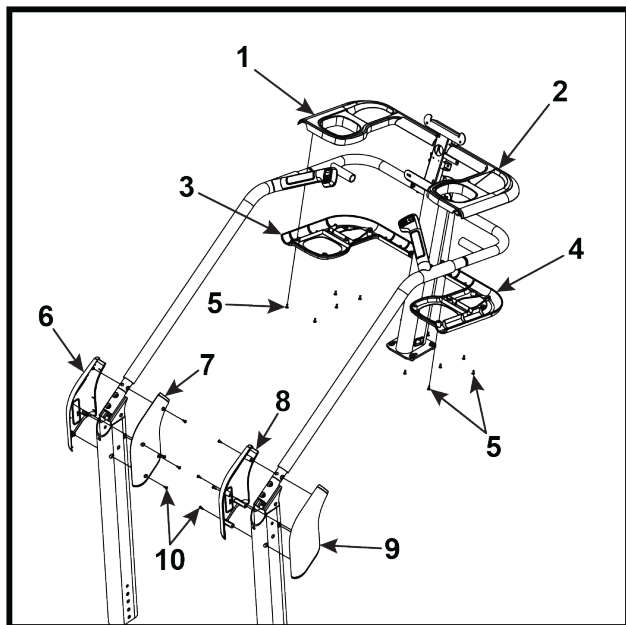
1. Run heart rate cable back through the front handlebar weldment and console support.
- NOTE:** Disconnecting front handlebar weldment from console support may make this easier.



Item	Description	Qty
1	Left Handlebar Assembly	1
2	Top Hand Sensor	1
3	Speed Down / Stop Button	1
4	Left Handlebar	1
5	Handlebar Front Bolts	4
6	Bottom Hand Sensor	1
7	Hand Sensor Screws	2
8	Handlebar Rear Bolts	2
9	Left Upright	1
10	Grommet	1
11	Handlebar Support Bolts	2

2. Install the handlebar assembly or the damaged component.
3. Install the upper bolts on the handlebar using an 5 mm Allen wrench.
4. Use an 6 mm Allen wrench to install the lower bolts on the handlebar.

- Using a Phillips screwdriver, install the rear handlebar covers and accessory tray.



Item	Description	Qty
1	Top Accessory Tray, Left	1
2	Top Accessory Tray, Right	1
3	Bottom Accessory Tray, Left	1
4	Bottom Accessory Tray, Right	1
5	Accessory Tray Screws	12
6	Outer Handlebar Cover, Left	1
7	Inner Handlebar Cover, Left	1
8	Inner Handlebar Cover, Right	1
9	Outer Handlebar Cover, Right	1
10	Handlebar Cover Screws	8

- Connect the heart rate cables in the rear of the console.

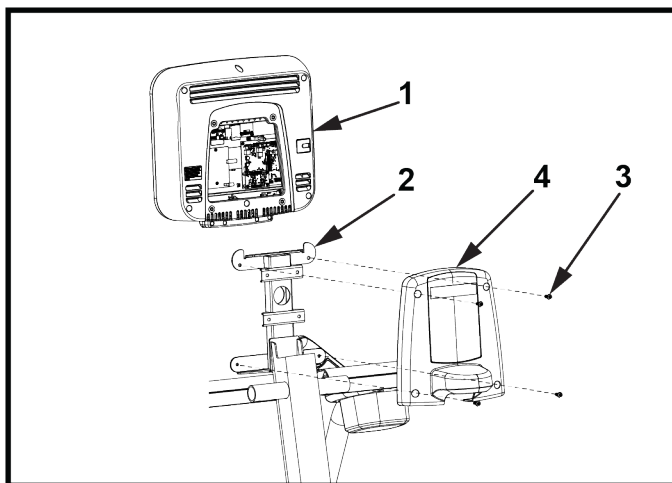
Install Console Assembly

- Connect all cables to the rear of the console.

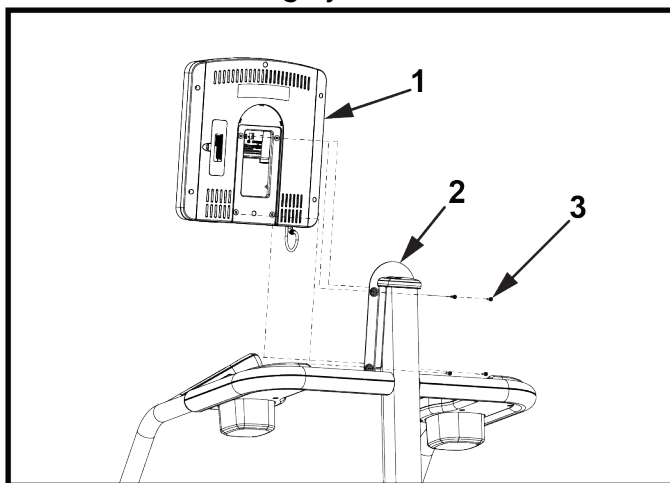
NOTE: Carefully hold the bottom of the console as you install Phillips screws.

- Using a Phillips screwdriver install the console mounting screws securing the console.

Discover Console



Integrity Console



Item	Description	Qty
1	Console	1
2	Console Support	1
3	Console Mounting Screws	4
4	Console Support Cover	1

NOTE: For consoles installed in metric system countries enter Diagnostics and change units of measure from English to Metric.

Complete Installation

Operate the unit at all levels to verify proper operation.

Drive Chain

Tools Required:

- Phillips screwdriver
- 13 mm Socket
- Ratchet

Time:

20 minutes

Disconnect power source

Unplug the power cord from the power outlet.

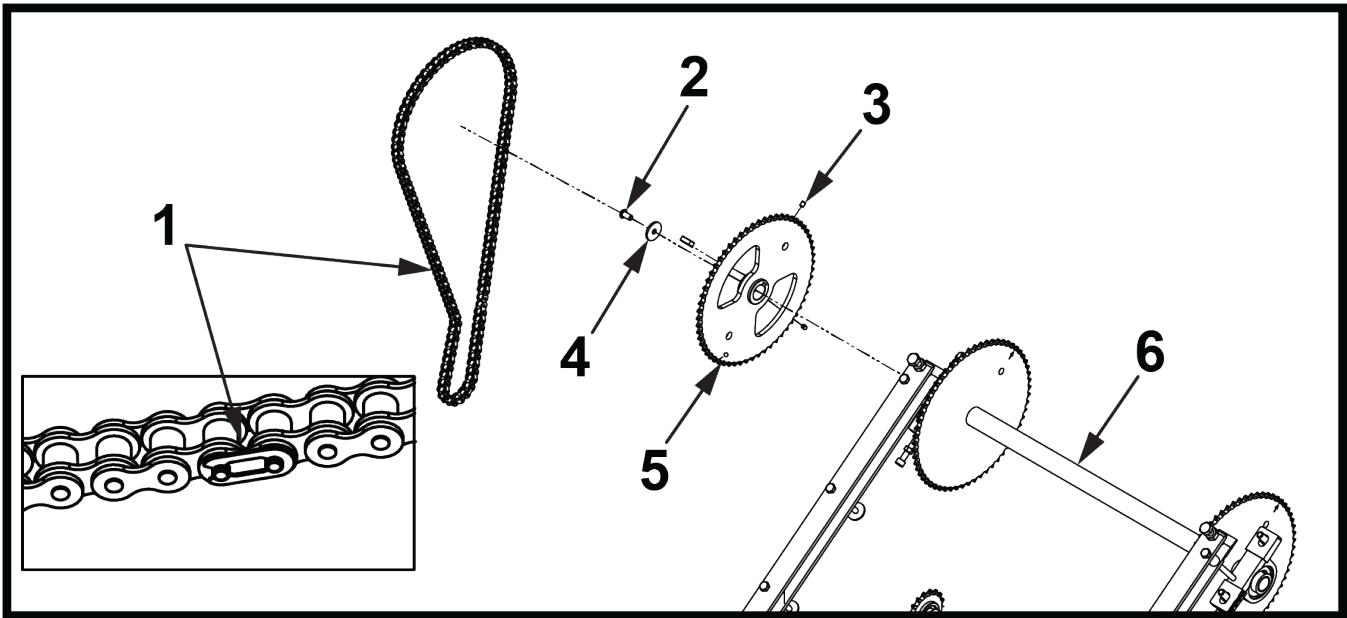


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Drive Chain

1. Remove the upper and lower left side panel assemblies.
2. Scribe a line against the mounting plate to mark the initial position of the sprocket idler bracket.
3. Take the tension out of the drive chain by backing off the sprocket idler tension bolt.
4. Slip the drive chain off the two sprockets by disconnecting the master link on the drive chain.

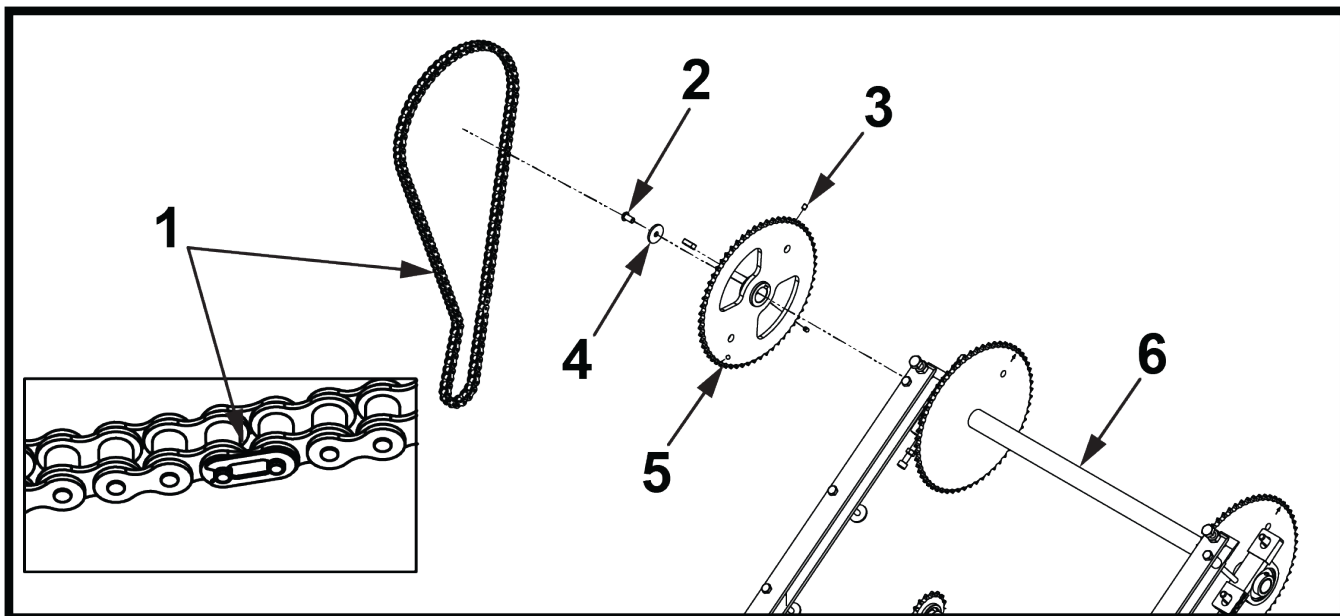


Item	Description	Qty
1	Master Link	1
2	Axle Set Screw	1
3	Set Screw	1
4	Axle Washer	1
5	Large Sprocket	1
6	Upper Axle	1

Install Drive Chain

1. Tighten the sprocket idler tension bolt until the sprocket idler returns to the initially marked position.

2. Put new drive chain onto the sprockets and secure master link.



Item	Description	Qty
1	Master Link	1
2	Axle Set Screw	1
3	Set Screw	1
4	Axle Washer	1
5	Large Sprocket	1
6	Upper Axle	1

3. Install the upper and lower left side panel assemblies.

Complete Installation

Operate the unit at all levels to verify proper operation.

Drive Belt

Tools Required:

- Phillips screwdriver
- 13 mm Socket
- Ratchet

Time:

20 minutes

Disconnect power source

Unplug the power cord from the power outlet.



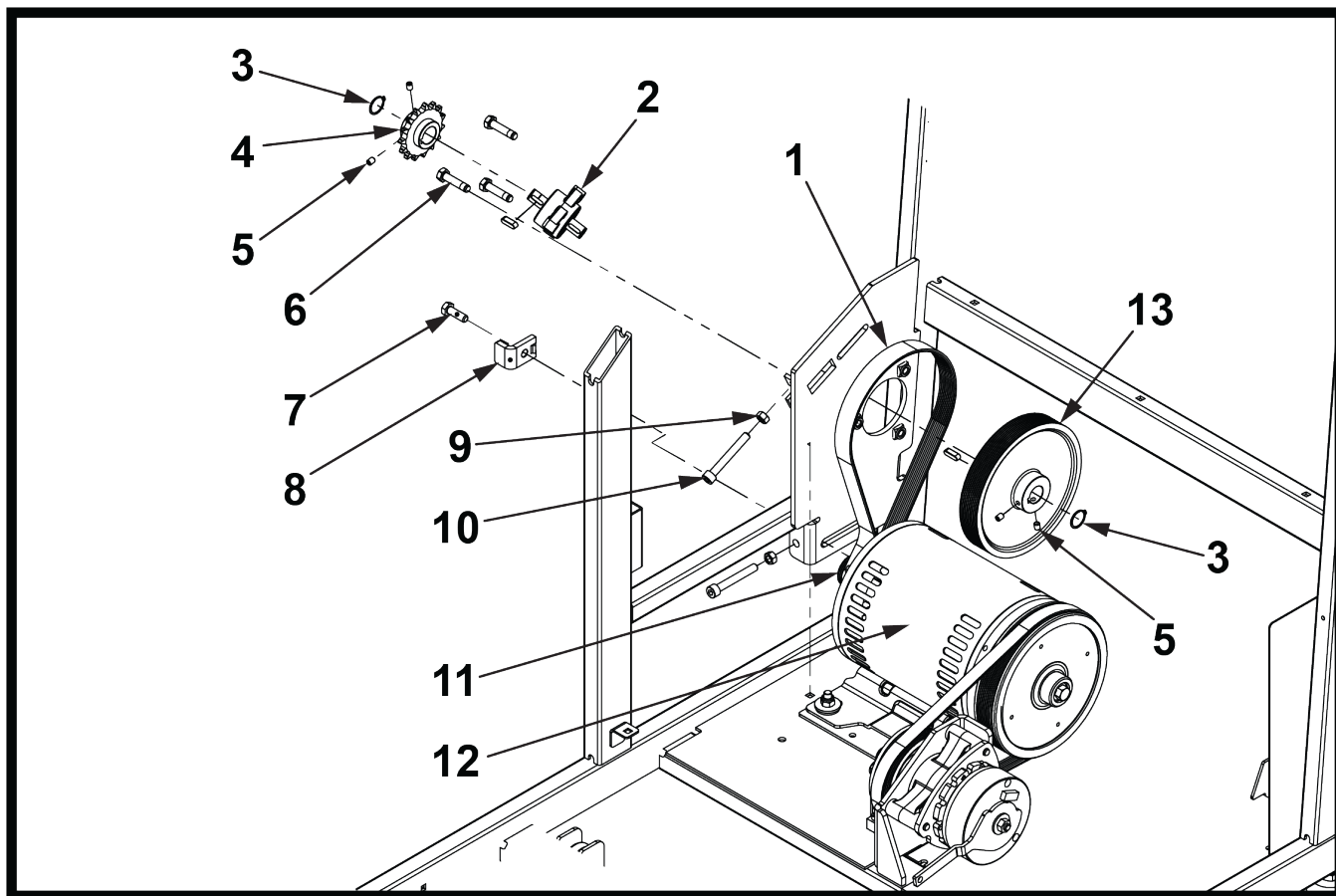
WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Drive Belt

1. Use a Phillips screwdriver to remove the screws in the top shroud.
2. Remove the front shroud and the lower left side panel.
3. Using a Phillips screwdriver remove the sheet metal motor shrouds.
4. Scribe a line on the back of the idler tensioner mounting bracket against the edge of the drive belt marking the initial position of the belt.
5. Using a ratchet and 13 mm socket release the tension on the drive belt by backing off the tensioning bolt.

6. Remove the old drive belt.

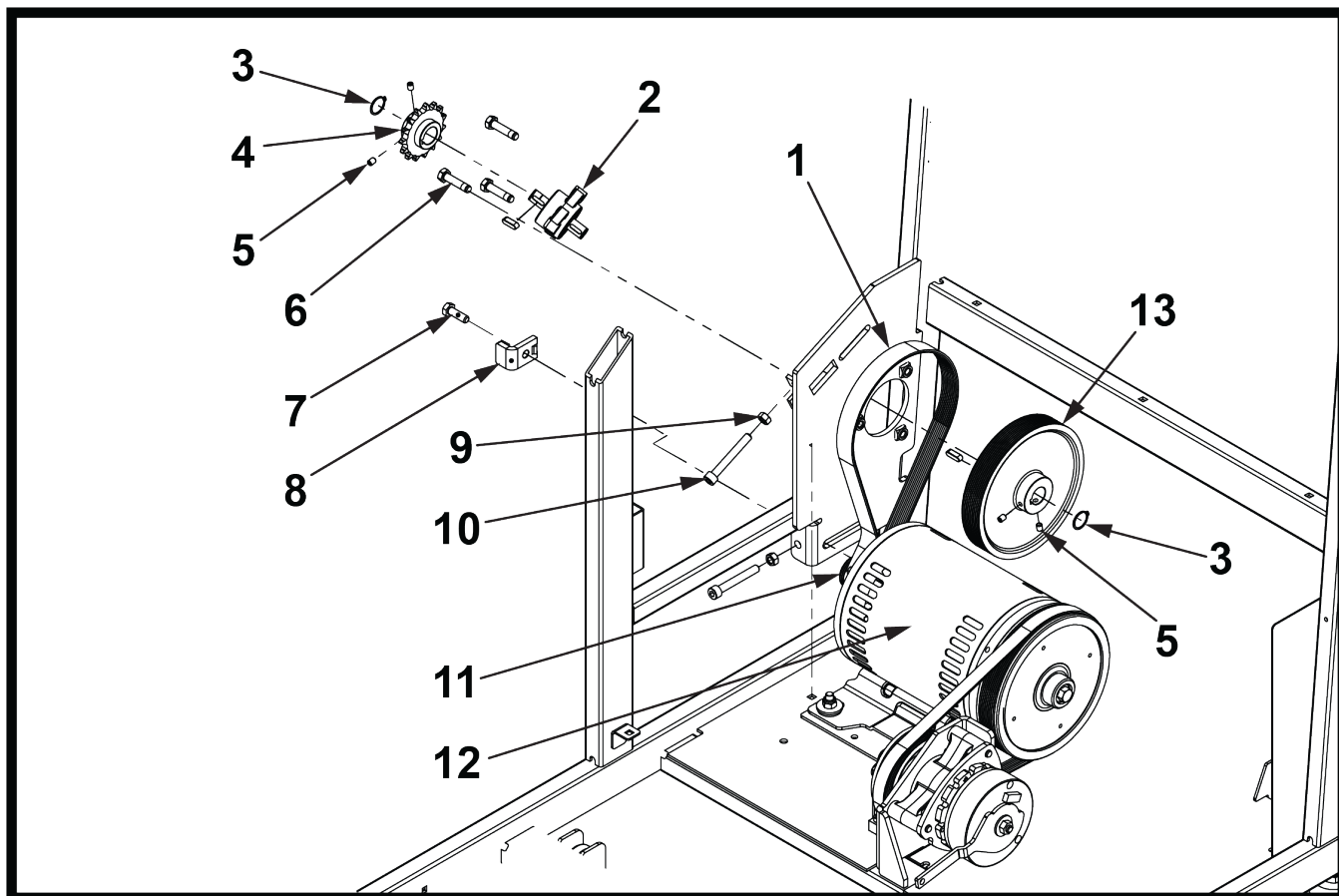


Item	Description	Qty
1	Drive Belt	1
2	Bearing Hub Assembly	1
3	Retaining Ring	2
4	Hub Assembly Sprocket	1
5	Set Screw	4
6	Hub Assembly Mounting Bolt	3
7	Bolt	1
8	Idler Push Arm	1
9	Nut	2
10	Sprocket/Idler Tensioning Bolt	2
11	Idler Pulley	1
12	Drive Motor	1
13	Pulley	1

Install Drive Belt

1. Tighten the tensioning bolt until the bracket is back to the initial position. (turn the tensioning bolt until the drive belt is in the initial position against the scribe).

2. Install the new drive belt.



Item	Description	Qty
1	Drive Belt	1
2	Bearing Hub Assembly	1
3	Retaining Ring	2
4	Hub Assembly Sprocket	1
5	Set Screw	4
6	Hub Assembly Mounting Bolt	3
7	Bolt	1
8	Idler Push Arm	1
9	Nut	2
10	Sprocket/Idler Tensioning Bolt	2
11	Idler Pulley	1
12	Drive Motor	1
13	Pulley	1

3. Using a Phillips screwdriver install the sheet metal motor shrouds.
4. Install the front shroud and the lower left side panel.
5. Use a Phillips screwdriver to install the screws in the top shroud.

Complete Installation

Operate the unit at all levels to verify proper operation.

Drive Motor

Tools Required:

- Phillips screwdriver
- 13 mm Socket
- Ratchet
- 9/16" Socket wrench
- 3 mm Allen wrench

Time:

45 minutes

Disconnect power source

Unplug the power cord from the power outlet.

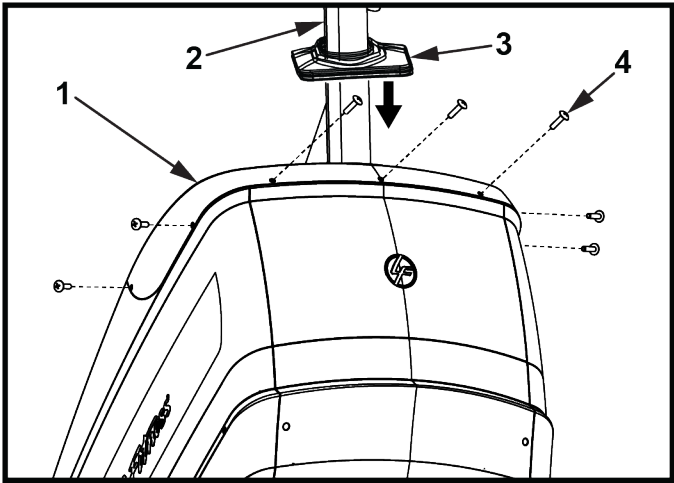


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Top Shroud

1. Remove the screws from top shroud.



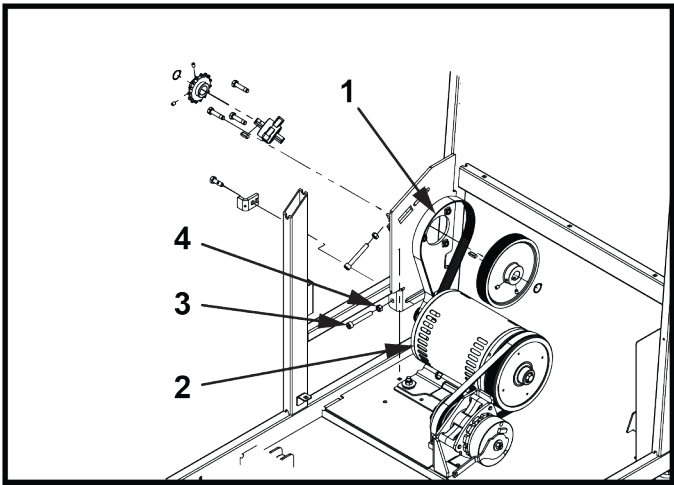
Item	Description	Qty
1	Top Shroud	1
2	Console Support	1
3	Console Support Gasket	1
4	Screws	7

2. Slide the console support gasket and top shroud over the console support

Remove Drive Motor

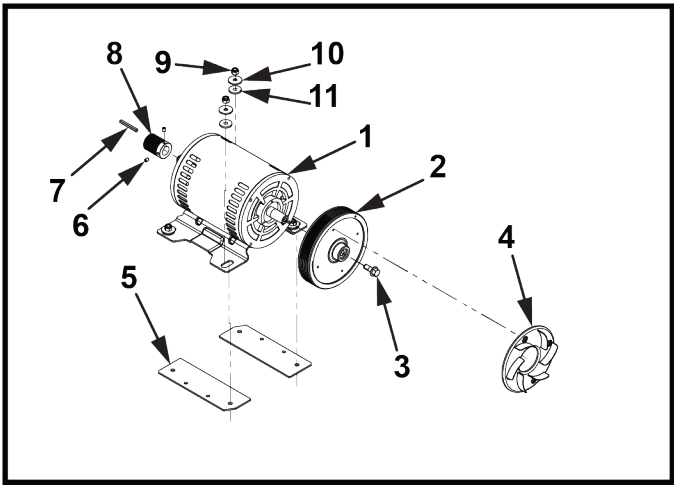
1. Remove the front shroud and the lower left side panel.
2. Disconnect the drive motor cable.

3. Using a ratchet and 13 mm socket release the tension on the drive belt by backing off the tensioning bolt.



Item	Description	Qty
1	Drive Belt	1
2	Drive Motor	1
3	Nut	2
4	Sprocket / Idler tensioning bolt	2

4. Using a ratchet and a 9/16" socket remove the nuts holding the drive motor in place and lift the motor over the mounting studs and remove from the unit.



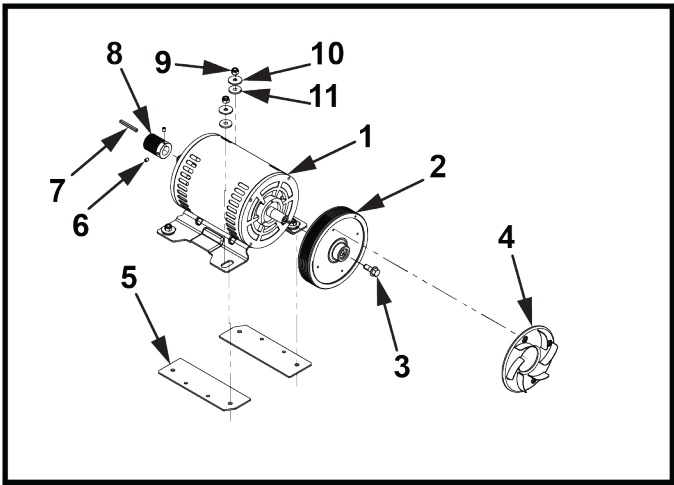
Item	Description	Qty
1	Drive Motor	1
2	Flywheel	1
3	Flywheel Bolt	1
4	Flywheel Fan	1
5	Isolating Pad	2
6	Set Screw	2
7	Key	1
8	Drive Motor Pulley	1
9	Nut	4
10	Washer	4
11	Shoulder Washer	4

5. **NOTE:** Note the relative position of each pulley on the motor shaft.
Disassemble pulleys from the drive motor assembly using the 9/16" socket and Allen wrench.

Install Drive Motor

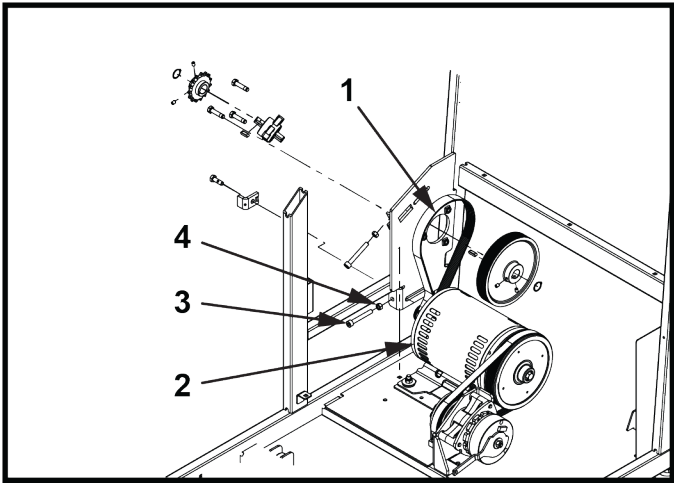
1. Install drive motor and flywheel pulleys onto new motor shaft in the same positions using the 9/16" socket and Allen wrench.

2. Set the drive motor assembly back onto the mounting studs.



Item	Description	Qty
1	Drive Motor	1
2	Flywheel	1
3	Flywheel Bolt	1
4	Flywheel Fan	1
5	Isolating Pad	2
6	Set Screw	2
7	Key	1
8	Drive Motor Pulley	1
9	Nut	4
10	Washer	4
11	Shoulder Washer	4

3. Align the right faces of the flywheel pulley and brake pulley.
4. Maintain this alignment, and using a ratchet and a 9/16" socket, install the nuts holding the drive motor in place.
5. Using a ratchet and 13 mm socket, tighten the tensioning bolt to tension the drive belt.

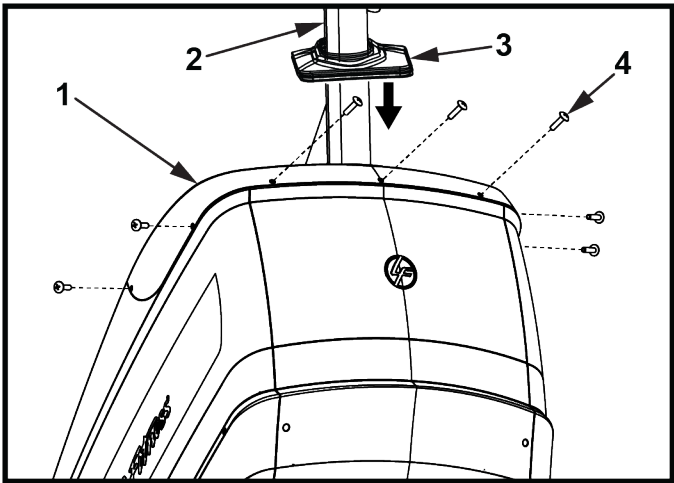


Item	Description	Qty
1	Drive Belt	1
2	Drive Motor	1
3	Nut	2
4	Sprocket / Idler tensioning bolt	2

6. Connect the drive motor cable.
7. Install the front shroud and the lower left side panel.

Install Top Shroud

1. Slide the top shroud over the console support and put the console support gasket back in place.



Item	Description	Qty
1	Top Shroud	1
2	Console Support	1
3	Console Support Gasket	1
4	Screws	7

2. Install the screws to the top shroud.

Complete Installation

Operate the unit at all levels to verify proper operation.

Motor Flywheel

Tools Required:

- Phillips screwdriver
- 13 mm Socket
- Ratchet
- Tool #AK58-00632-0000 (part of tapered flywheel removal kit #GK65-00002-014)

Time:

45 minutes

Disconnect power source

Unplug the power cord from the power outlet.

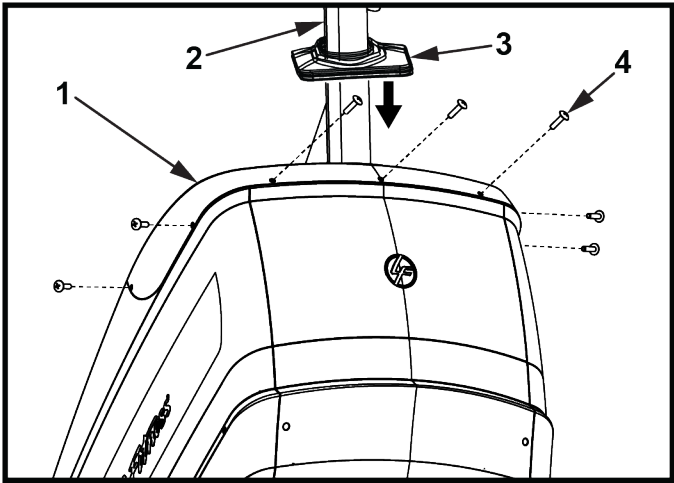


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Top Shroud

1. Remove the screws from top shroud.



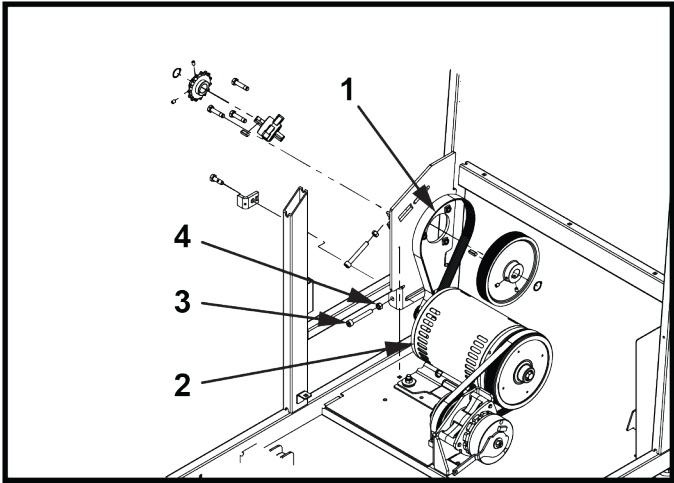
Item	Description	Qty
1	Top Shroud	1
2	Console Support	1
3	Console Support Gasket	1
4	Screws	7

2. Slide the console support gasket and top shroud over the console support

Remove Motor Flywheel

1. Remove the front cover and the lower left side panel.
2. Disconnect the drive motor cable.

3. Using a ratchet and 13 mm socket release the tension on the drive belt by backing off the tensioning bolt.

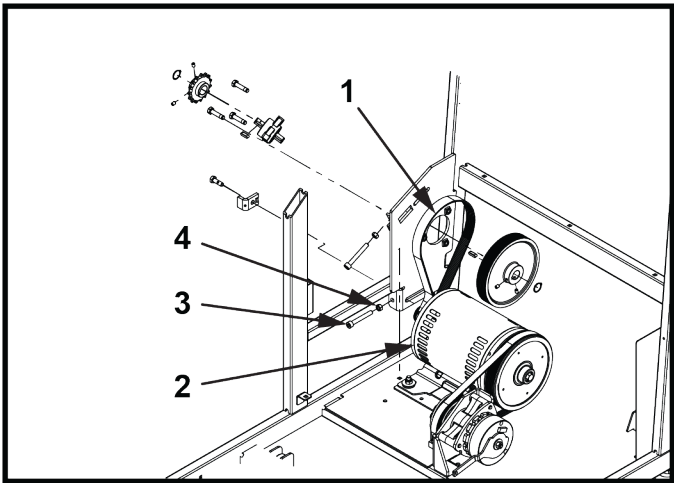


Item	Description	Qty
1	Drive Belt	1
2	Drive Motor	1
3	Nut	2
4	Sprocket / Idler tensioning bolt	2

4. Remove the flywheel / fan assembly by removing the flywheel bolt and set aside. Use tool #AK58-00632-0000 (part of tapered flywheel removal Kit #GK65-00002-014).

Install Motor Flywheel

- 1. Install the flywheel / fan assembly and drive motor pulley onto the drive motor.
- 2. Using a ratchet and 13 mm socket, tighten the tensioning bolt to tension the drive belt.

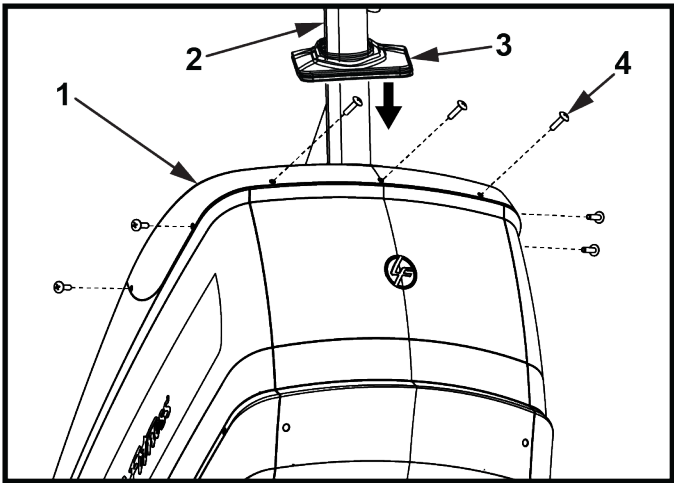


Item	Description	Qty
1	Drive Belt	1
2	Drive Motor	1
3	Nut	2
4	Sprocket / Idler tensioning bolt	2

- 3. Connect the drive motor cable.
- 4. Install the front cover and the lower left side panel.

Install Top Shroud

1. Slide the top shroud over the console support and put the console support gasket back in place.



Item	Description	Qty
1	Top Shroud	1
2	Console Support	1
3	Console Support Gasket	1
4	Screws	7

2. Install the screws to the top shroud.

Complete Installation

Operate the unit at all levels to verify proper operation.

Main Chain

Tools Required:

- Phillips screwdriver
- 6 mm Allen wrench
- 8 mm Allen wrench
- Tape measure
- Pliers

Time:

60 minutes

Disconnect power source

Unplug the power cord from the power outlet.



WARNING: Shock and electrocution hazard.

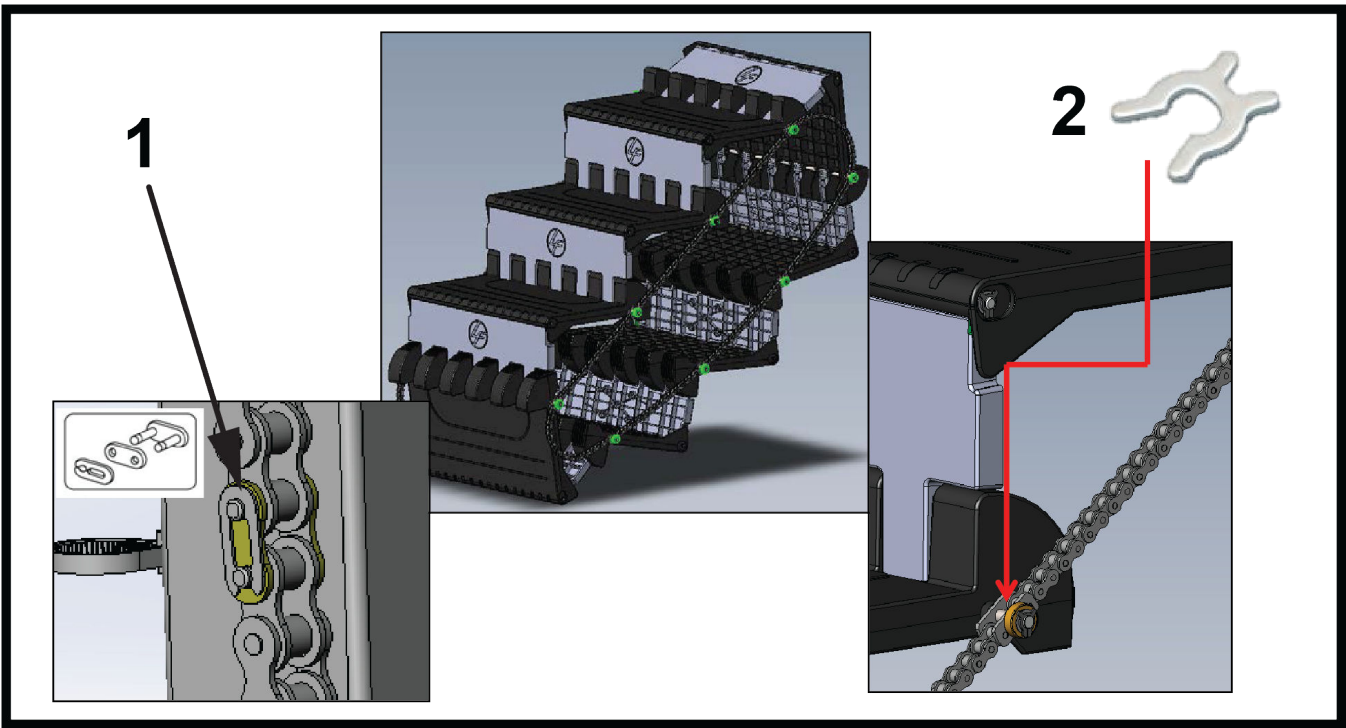
- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Main Chain

NOTE: Both the left and right main chain assemblies should be replaced when either side requires replacement.

When replacing the main chains it may be necessary to order replacement crimped retaining rings.

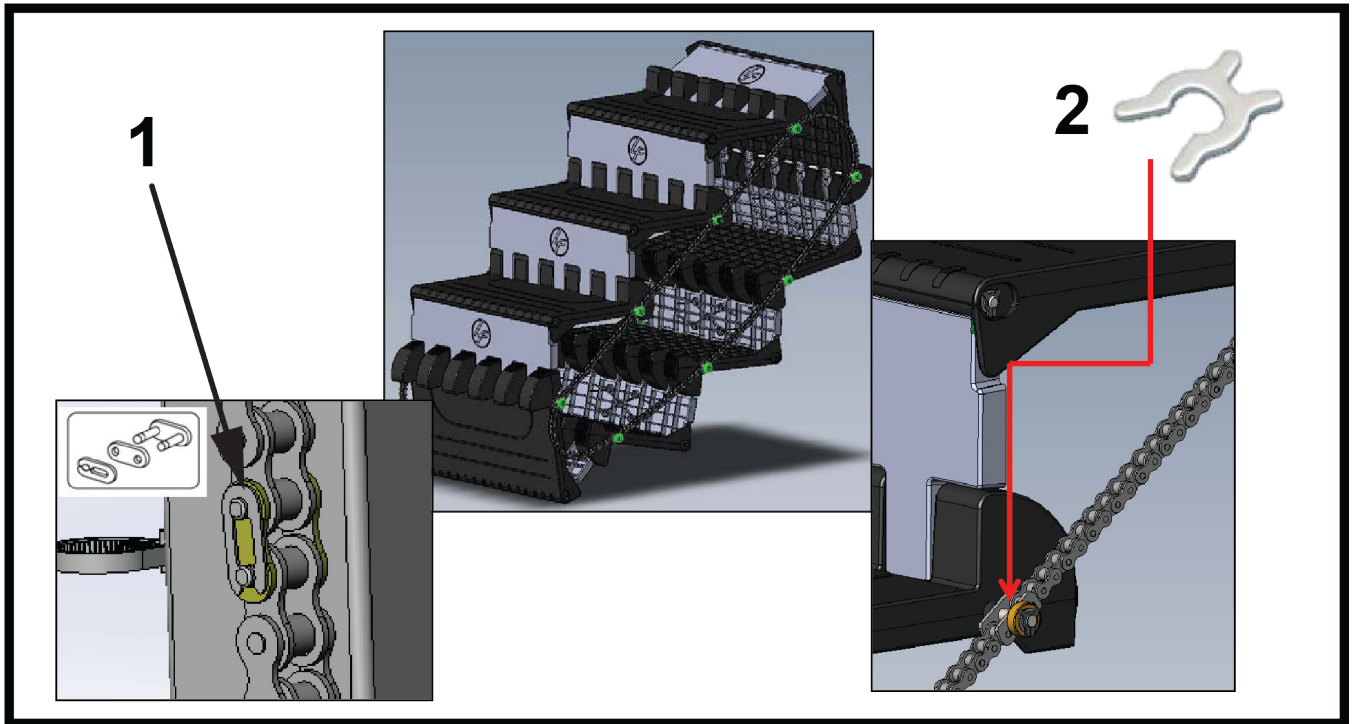
1. Use a Phillips screwdriver remove the upper and lower side panel assemblies on the left and right side of the unit.
2. Pull the lever on the brake assembly down and manually release the brake.
3. Disconnect the main chain at the master link, but do not remove chain. Proceed to [Install Main Chain](#).



Item	Description
1	Master Link - Each of the Chain Assemblies has a Master Link that allows for separation and reattachment of the ends of the Chain
2	K-Clip - The shaft is attached to a o-ring sealed chain via a special chain link and held in place with a washer and K-Clip.

Install Main Chain

1. Connect one end of the new chain to the master link and manually move the stair assembly so that the chain rotates in the direction that allows the new chain to feed into the drive system.
2. Rotate the stair assembly until there are two of the shaft bearings beyond the sprocket.
3. Using a pair of pliers remove the crimped retaining ring, bearing, and washer that are on the next shaft behind the master link.
4. Put the new main chain onto this shaft and reassemble the bearing, washer, and retaining ring (replace any bent or damaged retaining rings with a new retaining ring).
5. Repeat for all of the bearings on the old main chain and gradually feed the new main chain into the drive system
6. Repeat on opposite side.
7. Connect the main chain at the master link.



Item	Description
1	Master Link - Each of the Chain Assemblies has a Master Link that allows for separation and reattachment of the ends of the Chain
2	K-Clip - The shaft is attached to a o-ring sealed chain via a special chain link and held in place with a washer and K-Clip.

8. Re-tension main chains by tightening the tensioning bolts.
9. Use a tape measure to check that the distance between the main axle and lower axle is 37 1/8" (94.3 cm).
10. Once this distance is achieved lock the pillow blocks in place by tightening the mounting bolts on both sides.
11. Pull up on the brake assembly lever to manually engage the brake.
12. Use a Phillips screwdriver install the upper and lower side panel assemblies on the left and right side of the unit.

Complete Installation

Operate the unit at all levels to verify proper operation.

Main Upper Axle

Tools Required:

- Phillips screwdriver
- 13 mm Socket
- 5 mm Allen wrench
- 6 mm Allen wrench
- 8 mm Allen wrench
- Ratchet
- Heavy Duty Strap
- Two jaw puller
- Tape measure

Time:

90 minutes

Disconnect power source

Unplug the power cord from the power outlet.



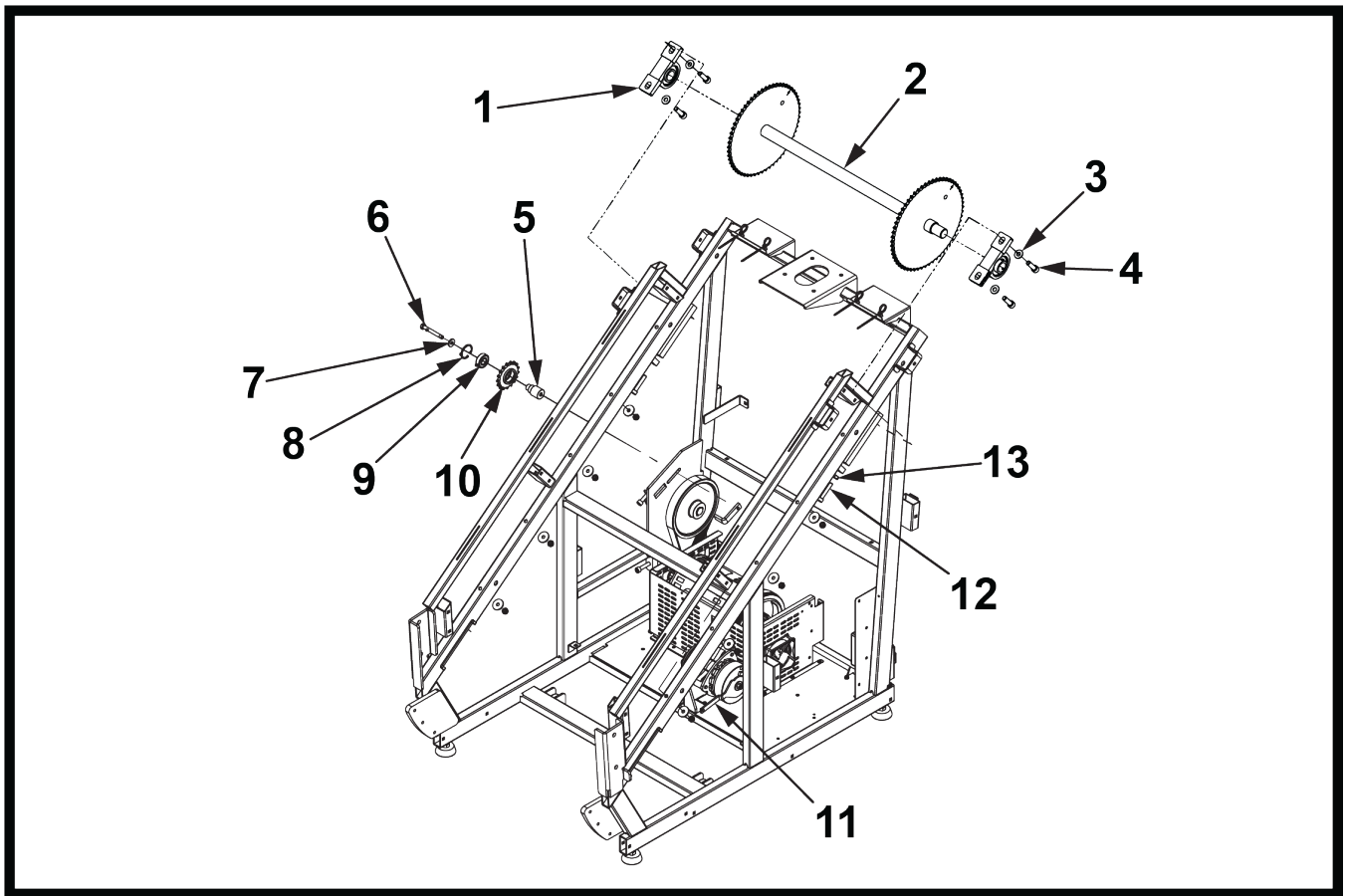
WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Main Upper Axle

1. Use a Phillips screwdriver remove the upper and lower side panel assemblies on the left and right side of the unit.

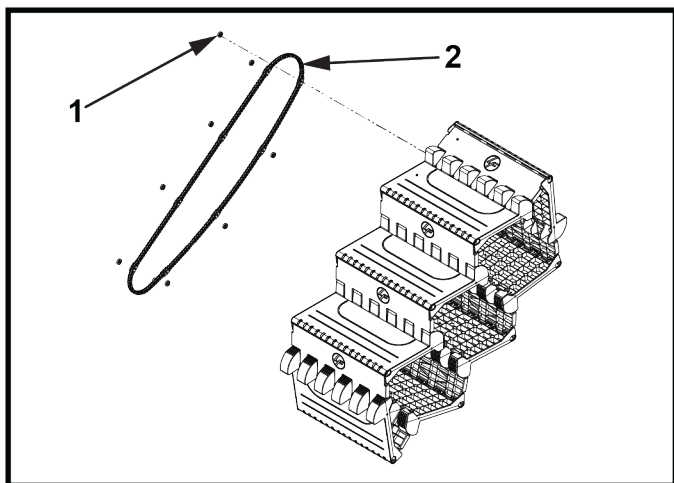
2. Pull the lever on the brake assembly down and manually release the brake.



Item	Description	Qty
1	Upper Pillow Block	2
2	Main Upper Axle	1
3	Washer	4
4	Upper Pillow Block Mounting Bolt	4
5	Sprocket Tensioner Spacer	2
6	Bolt	1
7	Washer	1
8	Retaining Ring	1
9	Sprocket Idler Bearing	1
10	Sprocket Idler	1
11	Break Assembly Lever	1
12	Chain Tensioning Bolt	2
13	Nut	2

3. Remove the left and right inner shroud panels with a Phillips screwdriver.
4. Scribe a line against the mounting plate to mark the initial position of the sprocket idler bracket.
5. Take the tension out of the drive chain by backing off the sprocket idler tension bolt with a 13 mm socket and ratchet.
6. Slip the drive chain off of the two sprockets by disconnecting the master link on the drive chain.
7. Before removing the main axle the stair assembly can be supported by running a heavy duty strap under the stairs from one side and wrapping it around the handlebar assemblies.

8. With a 5 mm Allen wrench remove the screw on the end of the main axle shaft and the washer.
9. Remove the set screw in the main axle driver sprocket.
10. Pull the main axle driver sprocket off the main axle using a two jaw puller.
11. Using a 6 mm Allen wrench remove the tension from the tension bolts on the pillow block bearings.
12. Use an 8 mm Allen wrench to take out the mounting bolts on the pillow block bearings and the main axle should come off of the unit with them.
13. Slide this assembly off of the chains and out from under the stair assembly.

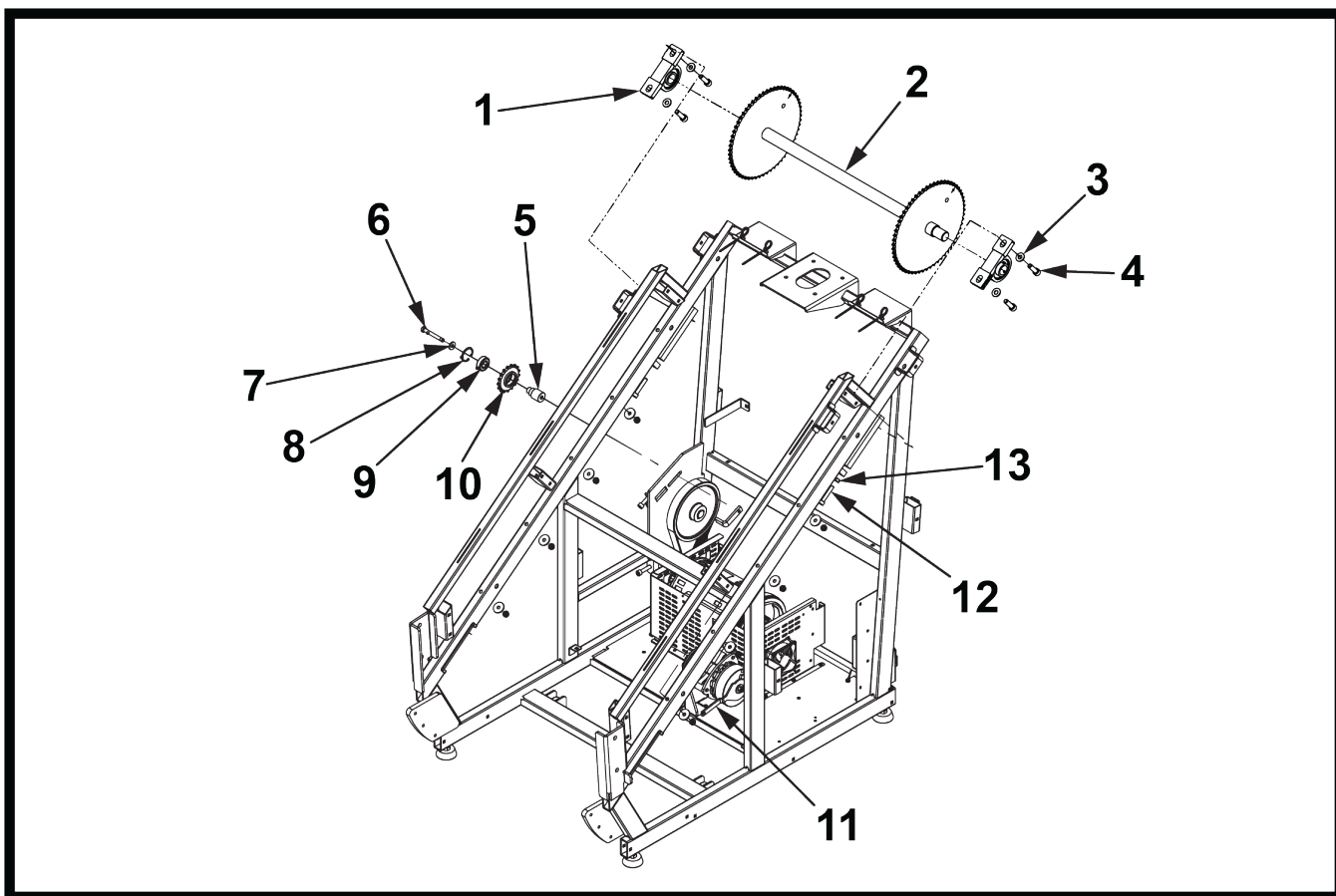


Item	Description	Qty
1	Chain Bearing	1
2	Main Chain	1

14. Remove the set screws in the pillow block bearings and take pillow blocks off old main axle and assemble onto the new axle.

Install Main Upper Axle

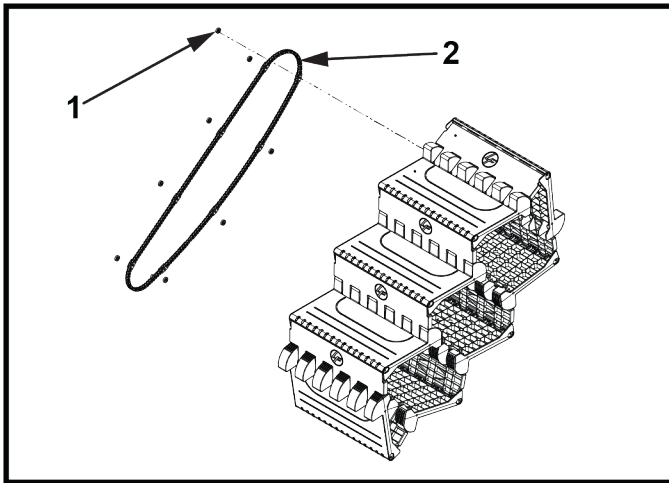
1. Return the sprocket idler to the scribed position and reengage the brake.



Item	Description	Qty
1	Upper Pillow Block	2
2	Main Upper Axle	1
3	Washer	4
4	Upper Pillow Block Mounting Bolt	4
5	Sprocket Tensioner Spacer	2
6	Bolt	1
7	Washer	1
8	Retaining Ring	1
9	Sprocket Idler Bearing	1
10	Sprocket Idler	1
11	Break Assembly Lever	1
12	Chain Tensioning Bolt	2
13	Nut	2

2. Once this distance is achieved lock the pillow blocks in place by tightening the mounting bolts on both sides.
3. Use a tape measure to check that the distance between the main axle and lower axle is 37 1/8" (94.3 cm).

4. Re-tension main chains by tightening the tensioning bolts on the pillow block bearings.



Item	Description	Qty
1	Chain Bearing	1
2	Main Chain	1

5. Reattach the axle / pillow block assembly to the frame with the mounting bolts snug but not fully tightened (make sure to place main chains onto the sprockets).
6. Install the set screws to the pillow block bearings and assemble onto the new axle.
7. Install the set screw in the main axle driver sprocket.
8. With a 5 mm Allen wrench install the screw to the end of the main axle shaft and the washer.
9. Slip the drive chain on the two sprockets by connecting the master link to the drive chain.
10. Install the left and right inner shroud panels with a Phillips screwdriver.
11. Use a Phillips screwdriver to install the upper and lower side panel assemblies on the left and right side of the unit.

Complete Installation

Operate the unit at all levels to verify proper operation.

Lower Axle

Tools Required:

- Phillips screwdriver
- 8 mm Allen wrench
- Heavy Duty Strap

Time:

80 minutes

Disconnect power source

Unplug the power cord from the power outlet.

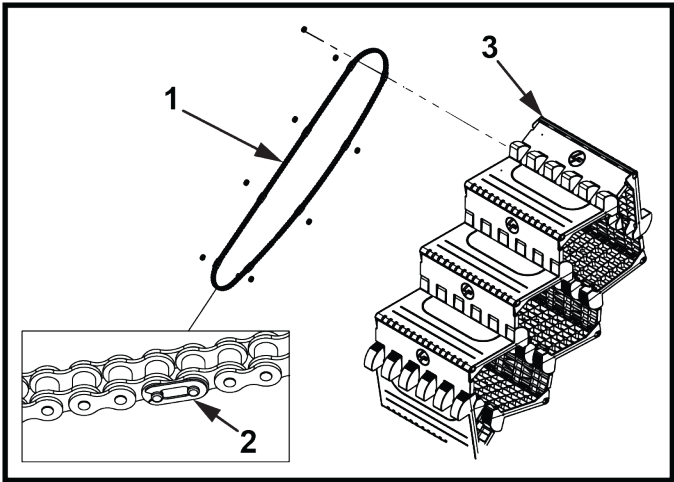


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
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Remove Lower Axle

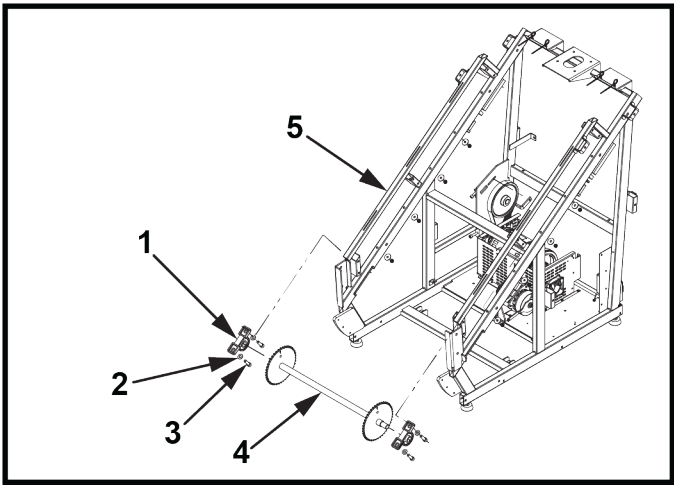
1. Use a Phillips screwdriver remove the upper and lower side panel assemblies on the left and right side of the unit.
2. Pull the lever on the brake assembly down and manually release the brake.
3. Remove the left and right inner shroud panels with a Phillips screwdriver.
4. Rotate the steps by hand until the master links are against the lower axle.



Item	Description	Qty
1	Main chain	2
2	Master Link	2
3	Steps	1

5. Run a heavy duty strap under the lower steps from one side and wrap it around the handlebar assemblies.
6. Remove the master link on both main chain assemblies.

7. Using an 8 mm Allen wrench remove the mounting bolts securing the pillow block bearings and lower axle to the frame.

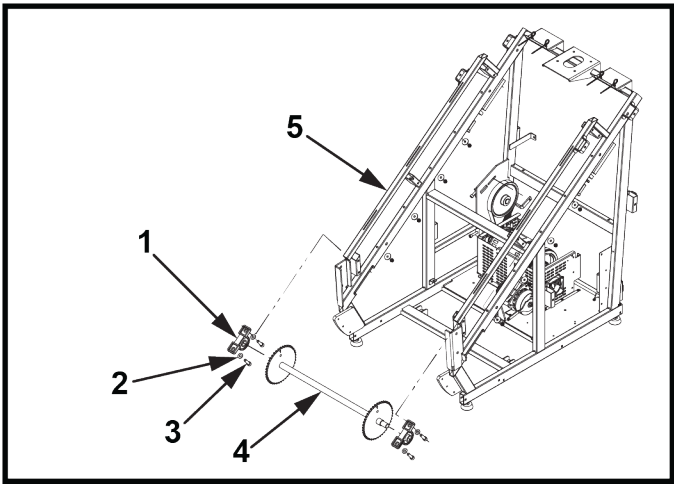


Item	Description	Qty
1	Pillow Block	2
2	Washer	4
3	Pillow Block Mounting Bolt	4
4	Lower Axle	1
5	Frame	1

8. Slide the axle / pillow block assembly from under the stair assembly.
9. Remove the set screws holding the pillow blocks onto the lower axle and replace with a new lower axle.

Install Lower Axle

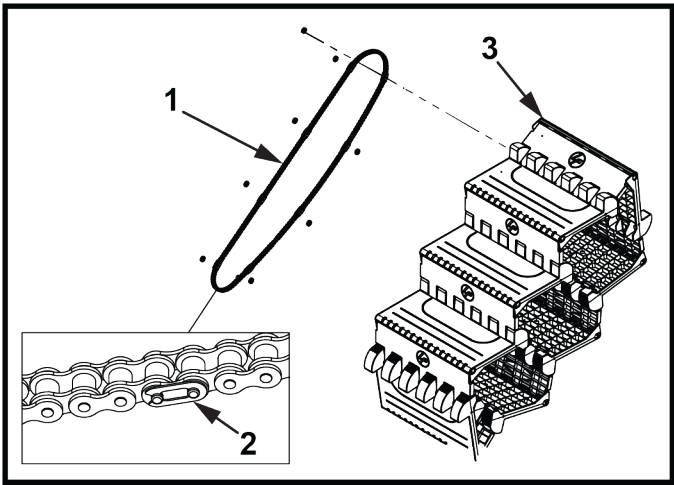
1. Slide pillow block bearings onto lower axle.



Item	Description	Qty
1	Pillow Block	2
2	Washer	4
3	Pillow Block Mounting Bolt	4
4	Lower Axle	1
5	Frame	1

2. Using an 8 mm Allen wrench install the mounting bolts securing the pillow block bearings and lower axle to the frame.
3. Tighten the set screws securing the pillow blocks onto the lower axle.

4. Place both main chain assemblies in position and install master links.



Item	Description	Qty
1	Main chain	2
2	Master Link	2
3	Steps	1

- 5. Re-engage brake.
- 6. Install the left and right inner shroud panels with a Phillips screwdriver.
- 7. Use a Phillips screwdriver install the upper and lower side panel assemblies on the left and right side of the unit.

Complete Installation

Operate the unit at all levels to verify proper operation.

Step

Tools Required:

- Phillips screwdriver
- 8 mm Allen wrench
- 6 mm Allen wrench
- Pliers
- Hammer

Time:

75 minutes

Disconnect power source

Unplug the power cord from the power outlet.

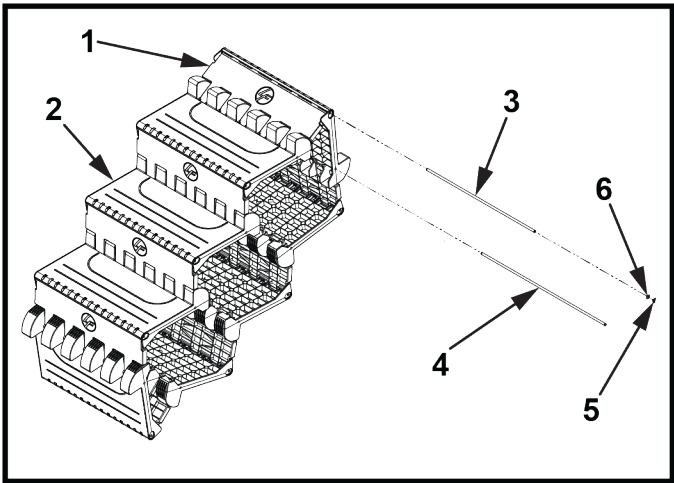


WARNING: Shock and electrocution hazard.

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- Keep water and liquids away from electrical parts.

Remove Step

1. Using a Phillips screwdriver remove the upper and lower side panel assemblies on the left and right side of the unit.
2. Pull the lever on the brake assembly down and manually release the brake.
3. Remove the left and right inner shroud panels with a Phillips screwdriver.
4. Move the stair assembly by hand so that the step that needs replacement is halfway down the unit.
5. Using a pair of pliers to remove the retaining ring on both ends of the bearing shaft that runs through the step.

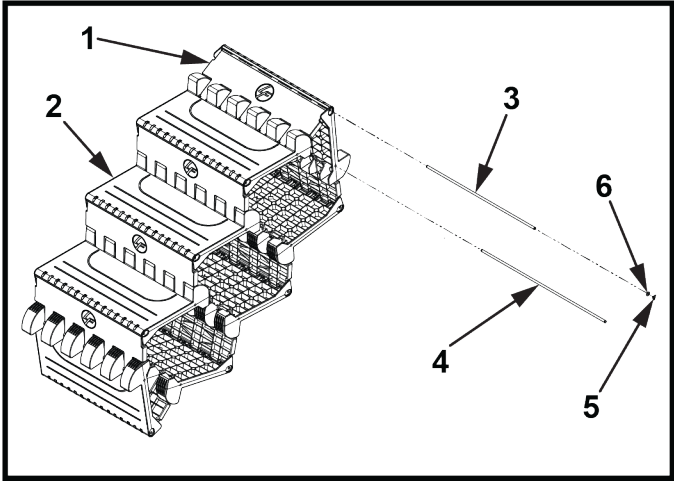


Item	Description	Qty
1	Riser Step	1
2	Run Step	1
3	Front Step Shaft	1
4	Rear Step Shaft	1
5	Crimped Retaining Ring	1
6	Washer	1

6. Take the bearings and washers off the shaft.
7. Use a hammer to carefully tap the bearing shaft on one end to push the shaft through the step.
NOTE: Use an item such as a spare shaft to tap the shaft through once it is flush with the chain / step.
8. Once the bearing shaft is out of the step the remaining shaft should be removed using the same method.

Install Step

1. Install the new step and any new components (replace any bent or damaged retaining rings with a new retaining ring).



Item	Description	Qty
1	Riser Step	1
2	Run Step	1
3	Front Step Shaft	1
4	Rear Step Shaft	1
5	Crimped Retaining Ring	1
6	Washer	1

2. Put the bearings and washers back on the shaft.
3. Using a pair of pliers to install the retaining ring on both ends of the bearing shaft that runs through the step.
4. Install the left and right inner shroud panels with a Phillips screwdriver.
5. Re-engage the brake.
6. Using a Phillips screwdriver install the upper and lower side panel assemblies on the left and right side of the unit.

Complete Installation

Operate the unit at all levels to verify proper operation.

Motor Controller

Tools Required:

- Phillips screwdriver
- 8 mm SocketRatchet

Time:

45 minutes

Disconnect power source

Unplug the power cord from the power outlet.

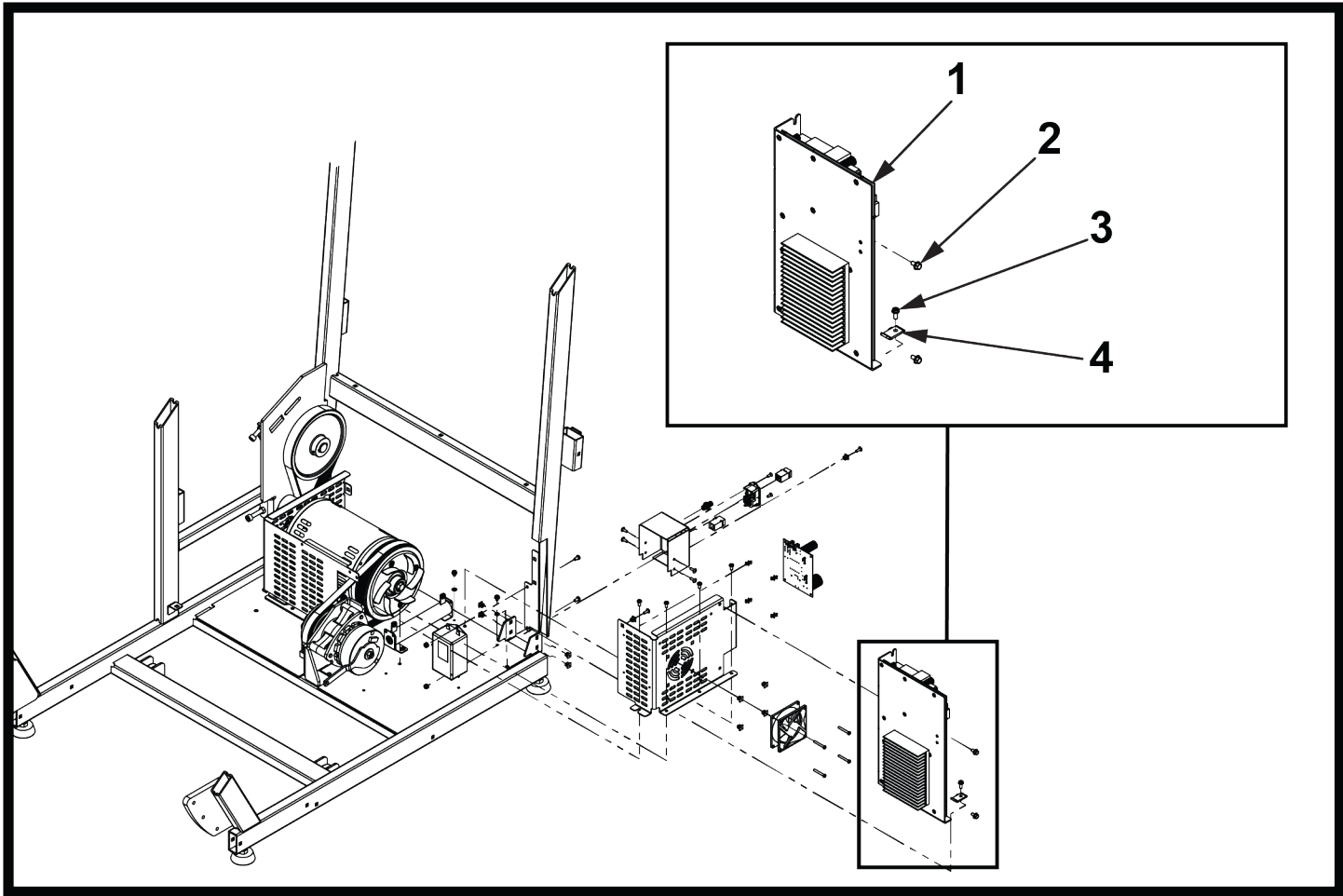


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Motor Controller

1. Remove screws from top shroud and take off the front shroud assembly.
2. Using a Phillips screwdriver to remove the sheet metal motor controller shield.

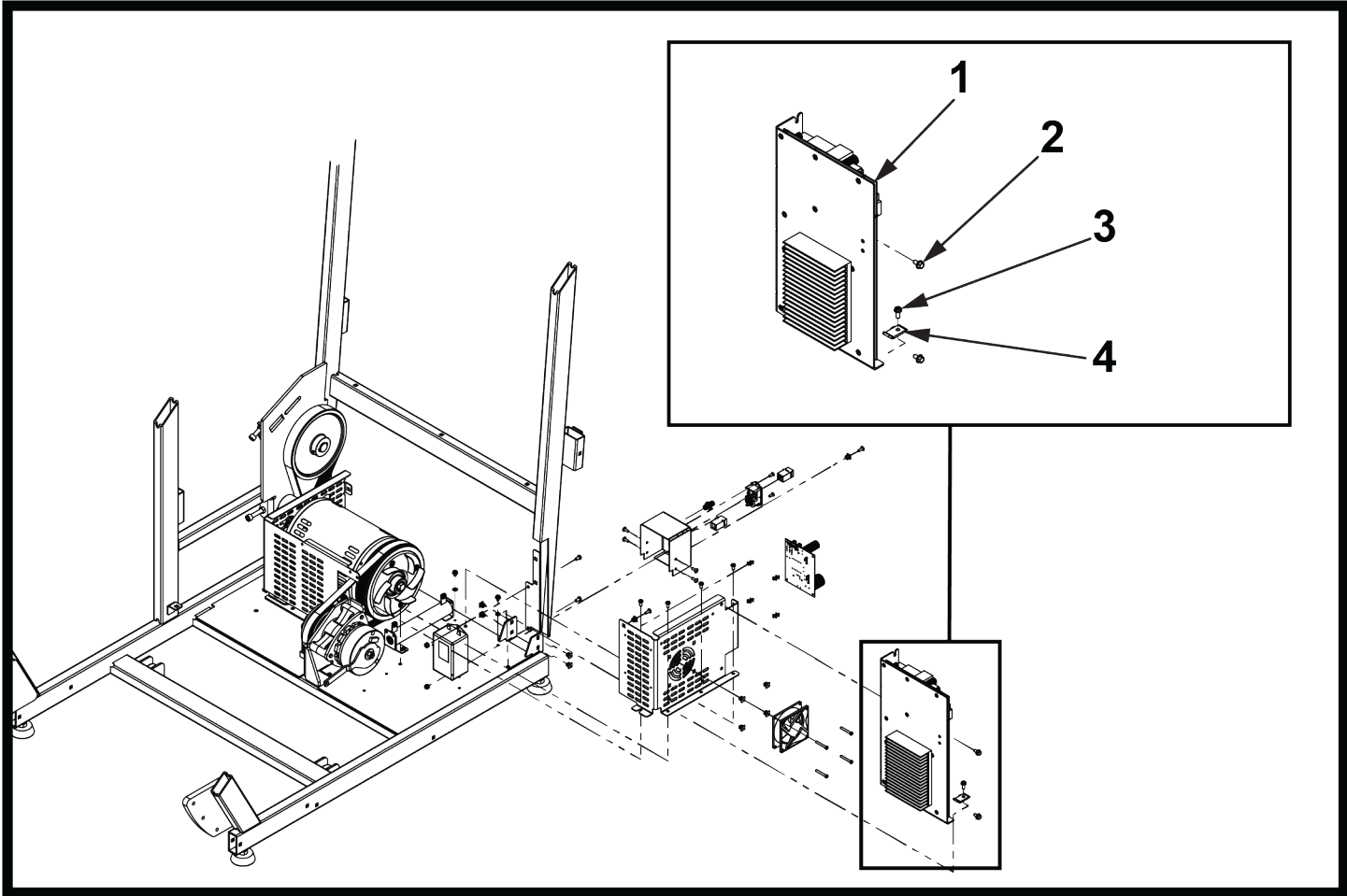


Item	Description	Qty
1	Motor Controller	1
2	Hex Bolt	2
3	Screw	1
4	Motor Controller Tab	1

- 3. Disconnect all cables connected to the motor controller.
- 4. Using a Phillips screwdriver and an 8 mm socket remove the hardware securing the motor controller.

Install Motor Controller

- 1. Using a Phillips screwdriver and an 8 mm socket install the hardware securing the motor controller.



Item	Description	Qty
1	Motor Controller	1
2	Hex Bolt	2
3	Screw	1
4	Motor Controller Tab	1

- 2. Connect all cables connected to the motor controller.
- 3. Use a Phillips screwdriver to install the sheet metal motor controller shield.
- 4. Install screws to secure the top shroud and shroud cover assembly.

Complete Installation

Operate the unit at all levels to verify proper operation.

System Interface Board (SIB)

Tools Required:

- Phillips screwdriver

Time:

30 minutes

Disconnect power source

Unplug the power cord from the power outlet.

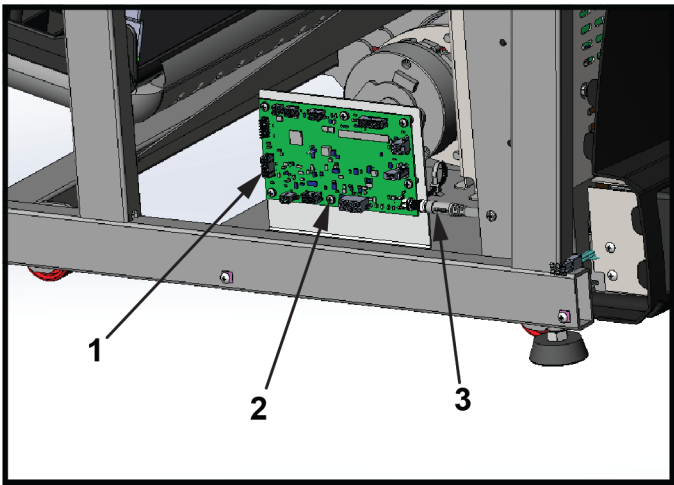


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove System Interface Board

1. Remove screws from top shroud and take off the front shroud and lower right side panel assemblies.
2. Unscrew the coax cable from the System Interface Board.

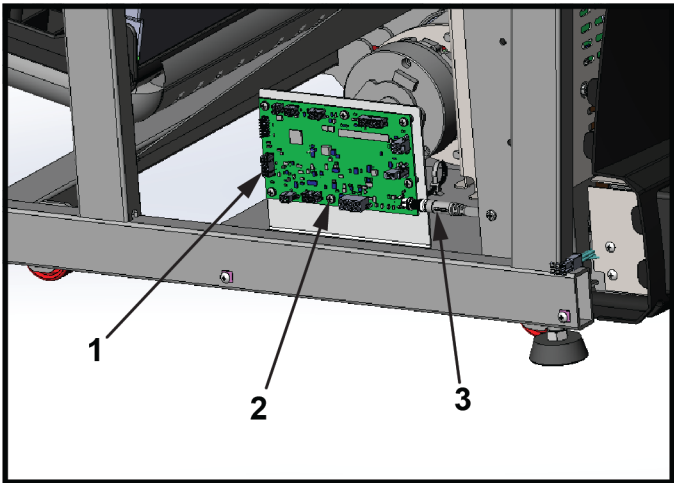


Item	Description	Qty
1	System Interface Board	1
2	Screw	6
3	Coax Cable	1

3. Disconnect all cables connected to the System Interface Board.
4. Using a Phillips screwdriver, remove the System Interface Board.

Install System Interface Board

1. Using a Phillips screwdriver, install the System Interface Board.



Item	Description	Qty
1	System Interface Board	1
2	Screw	6
3	Coax Cable	1

2. Connect all cables to the System Interface Board.
3. Screw the coax cable into the System Interface Board.

4. Install screws to install top shroud, front shroud and lower right side panel assemblies.

Complete Installation

Operate the unit at all levels to verify proper operation.

Brake

Tools Required:

- Phillips screwdriver
- 3 mm Allen wrench
- 4 mm Allen wrench
- 13 mm Socket
- Ratchet

Time:

60 minutes

Disconnect power source

Unplug the power cord from the power outlet.



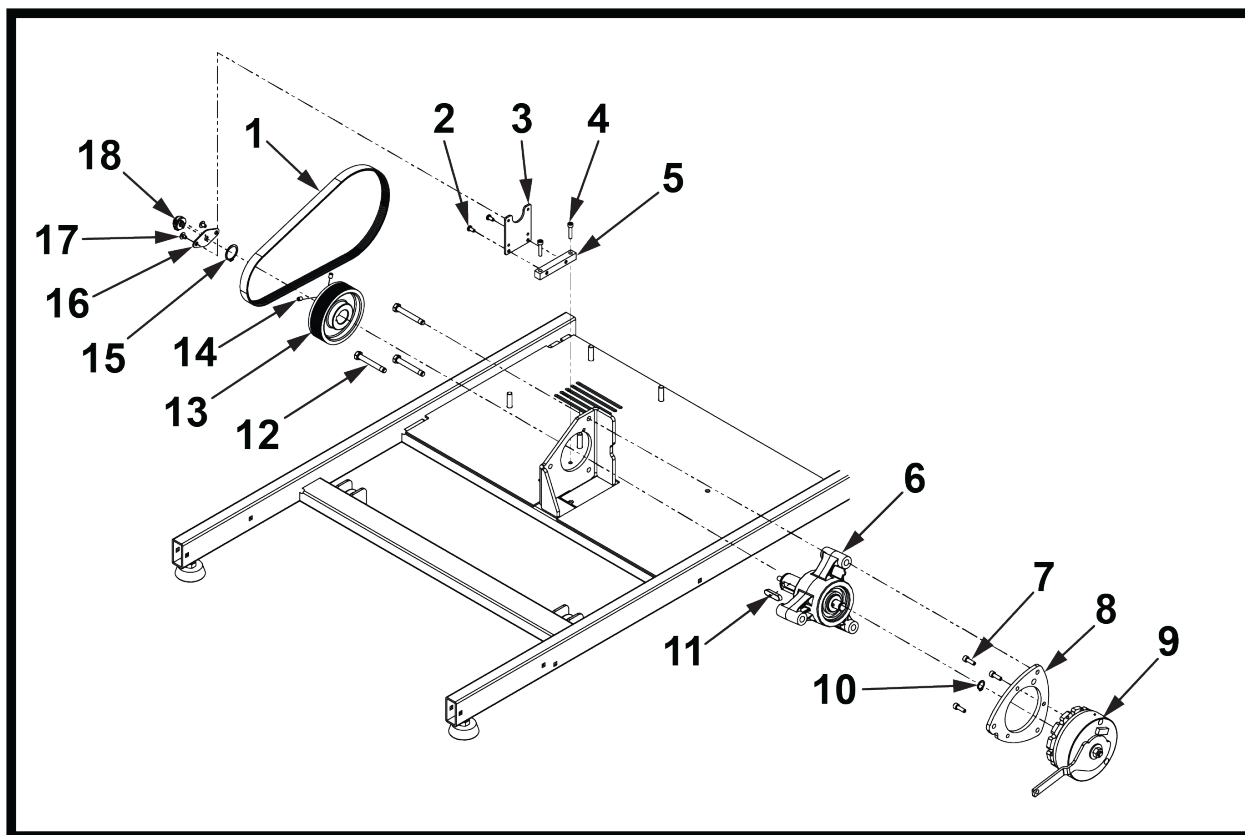
WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

Remove Brake

1. Remove the lower left side panel using a Phillips screwdriver.

2. Remove the encoder, encoder mounting plate, mounting bracket and mounting base from the unit.



Item	Description	Qty
1	Brake Belt	1
2	Mounting Bracket Screws	2
3	Encoder Mounting Bracket	1
4	Mounting Base Screws	2
5	Mounting Bracket Base	1
6	Brake / Drive Hub Assembly	1
7	Brake Mounting Bolts	3
8	Brake Mounting Plate	1
9	Brake	1
10	Retaining Ring	1
11	Key	1
12	Brake Drive / Hub Assembly Mounting Bolts	3
13	Brake Pulley	1
14	Set Screws	2
15	Retaining Ring	1
16	Encoder Alignment Plate	1
17	Encoder Alignment Plate Screws	2
18	Encoder Kit	1

3. Walk the flywheel belt off the pulley.
4. Disconnect the brake cable.

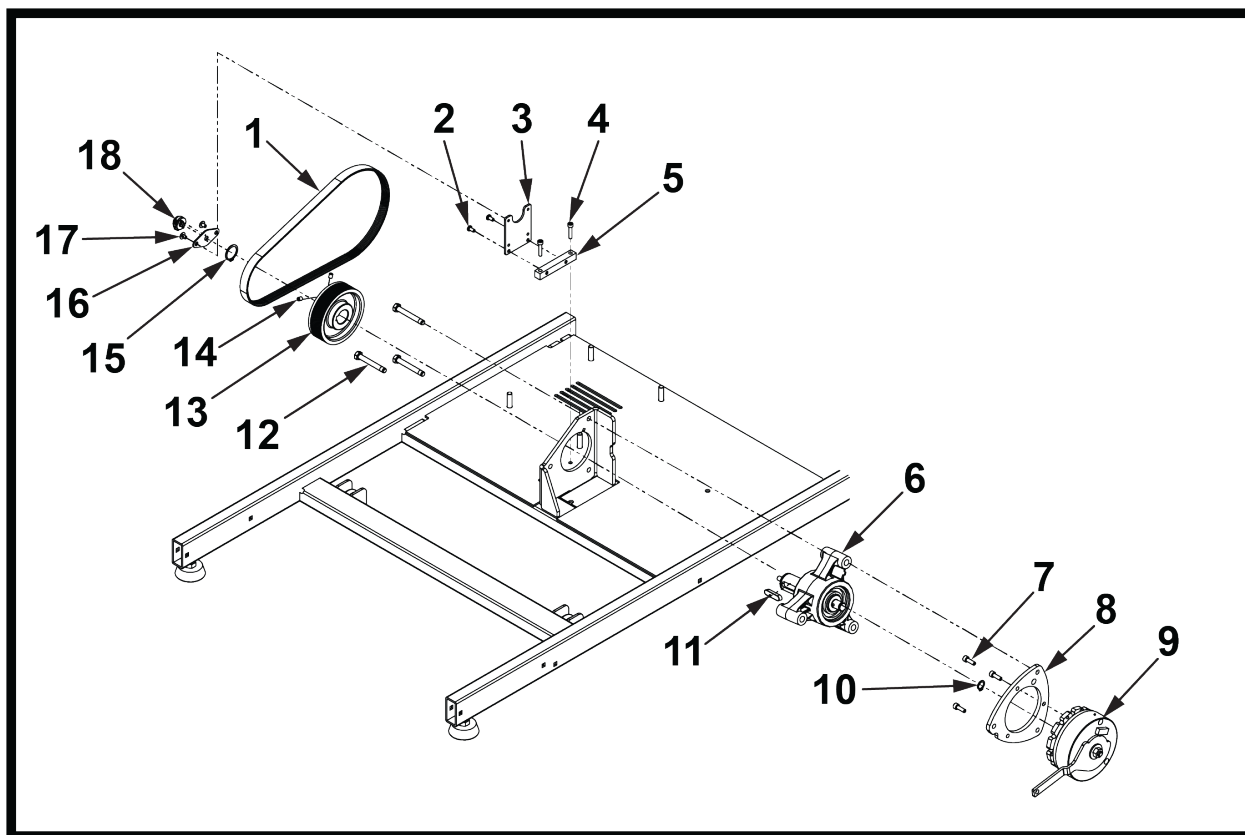
5. Remove the retaining ring from the pulley.
6. Using a 3 mm Allen wrench to loosen the two set screws.
7. Using the 13 mm socket to remove the three bolts securing the brake to the unit.

Install Brake

1. Install new brake assembly.

NOTE: Be certain to manually re-engage the brake before reassembly in order to ensure proper function! LEVER UP IS LOCKED!

2. Using the 13 mm socket install the three bolts securing the brake to the unit.



Item	Description	Qty
1	Brake Belt	1
2	Mounting Bracket Screws	2
3	Encoder Mounting Bracket	1
4	Mounting Base Screws	2
5	Mounting Bracket Base	1
6	Brake / Drive Hub Assembly	1
7	Brake Mounting Bolts	3
8	Brake Mounting Plate	1
9	Brake	1
10	Retaining Ring	1
11	Key	1
12	Brake Drive / Hub Assembly Mounting Bolts	3
13	Brake Pulley	1
14	Set Screws	2
15	Retaining Ring	1
16	Encoder Alignment Plate	1
17	Encoder Alignment Plate Screws	2
18	Encoder Kit	1

3. Using a 3 mm Allen wrench to tighten the two set screws.
4. Install the retaining ring on the pulley.

5. Connect the brake cable.
6. Attach the flywheel belt to the pulley.
7. Install the encoder, encoder mounting plate, mounting bracket and mounting base to the unit.
8. Install the lower left side panel using a Phillips screwdriver.

Complete Installation

Operate the unit at all levels to verify proper operation.

Encoder 9587500

Tools Required:

- Phillips screwdriver
- Encoder Centering Tool
- Encoder Alignment Tool

Time:

45 minutes

Disconnect power source

Unplug the power cord from the power outlet.

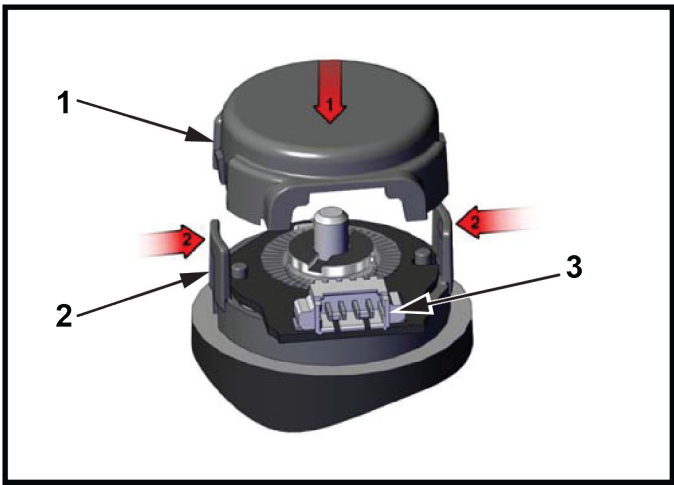


WARNING: Shock and electrocution hazard.

- Unplug unit and let sit 10 minutes before cleaning or performing maintenance.
- Electrical charge can remain in unit after unplugging.
- Keep water and liquids away from electrical parts.

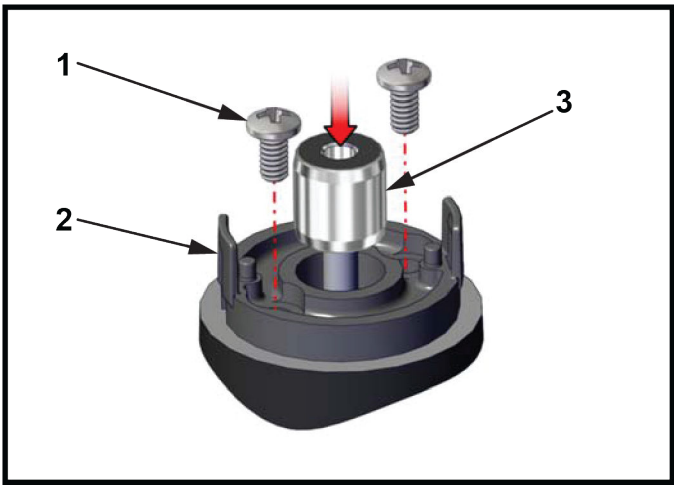
Remove Encoder with 9587500

1. Remove the lower left side panel using a Phillips screwdriver.
2. Unplug the encoder cable and pull the encoder cover and codewheel off of the unit.



Item	Description	Qty
1	Encoder Cover	1
2	Encoder Base	1
3	Encoder Cable	1

3. Remove the two screws holding the encoder base on the mounting plate.

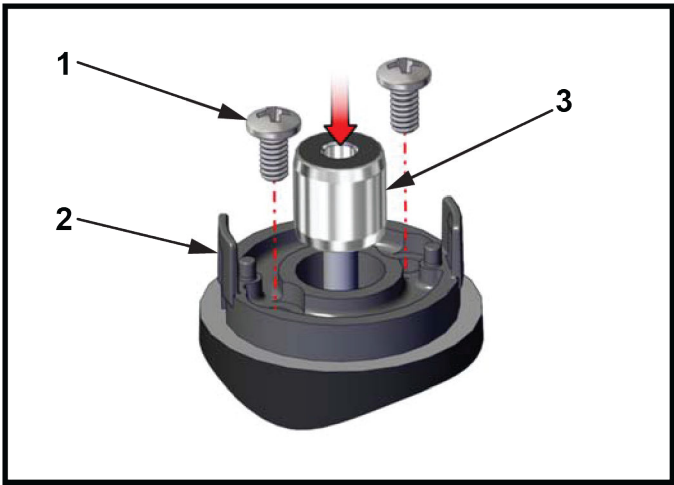


Item	Description	Qty
1	Screws	2
2	Encoder Base	1
3	Centering Tool	1

Install Encoder with 9587500

1. Place new encoder base on shaft.

2. Use the centering tool to help with alignment if needed (Slide tool through the base and onto the shaft to center the encoder base).



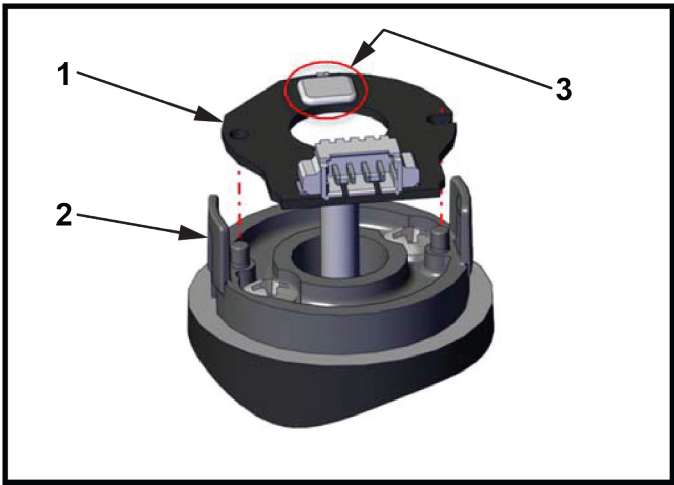
Item	Description	Qty
1	Screws	2
2	Encoder Base	1
3	Centering Tool	1

3. Secure base to mounting plate using two screws.
4. Remove centering tool and place the PCB on the base. Align the hole and slot to the two pins on the base.

NOTE: The base is symmetrical allowing the connector to exit out either side.



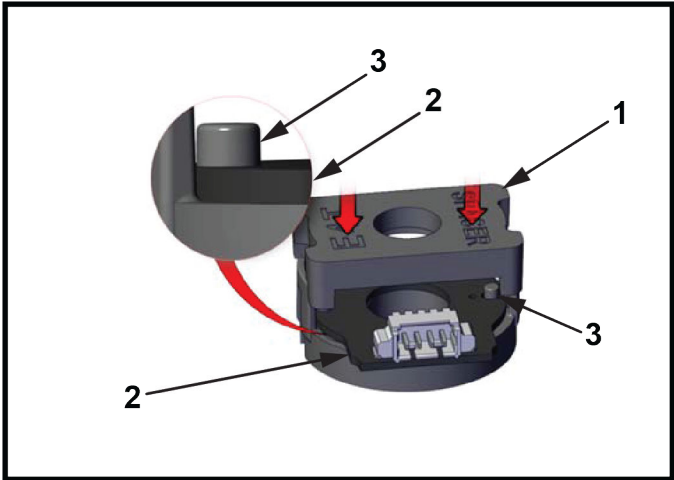
CAUTION: When handling the PCB, avoid directly touching the optical sensor!



Item	Description	Qty
1	PCB	1
2	Encoder Base	1
3	Optical Sensor	1

5. Use spacer tool to firmly press down on the PCB to push it over the alignment pins and completely onto the base surface.

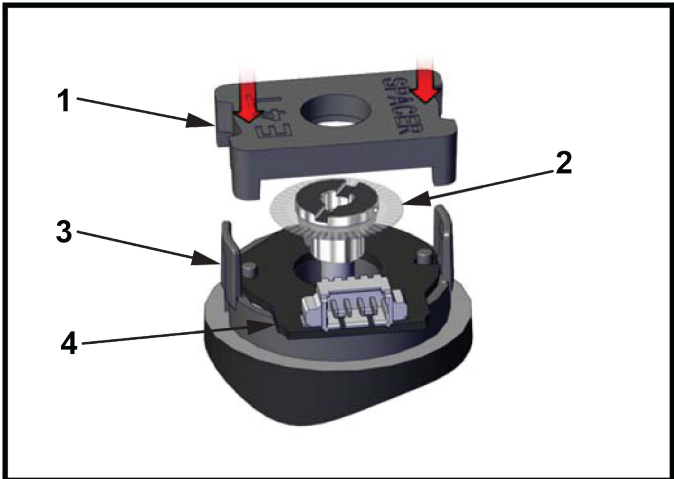
NOTE: Verify that the PCB is fully seated against the base. If not, use the spacer tool to press it again. Recheck that it is fully seated.



Item	Description	Qty
1	Spacer Tool	1
2	PCB	1
3	Alignment Pins	2

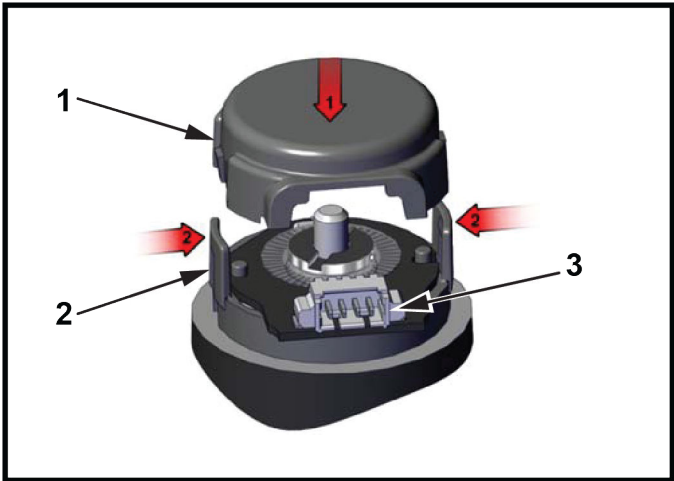
6. Place the hub disk onto the shaft with the longer end of the hub towards the base. Position the spacer tool onto the hub with the notches aligned to the latches of the base. Press down firmly until the tool bottoms out on the PCB. Verify that this action has pressed the PCB flush against the base.

CAUTION: When installing the hub disk ensure that the hub bore is parallel to the shaft. Forcing the hub onto the shaft at an angle may cause permanent damage to the hub.



Item	Description	Qty
1	Spacer Tool	1
2	Hub Disk	1
3	Encoder Base	1
4	PCB	1

7. Remove the spacer tool and snap the cover down onto base.



Item	Description	Qty
1	Encoder Cover	1
2	Encoder Base	1
3	Encoder Cable	1

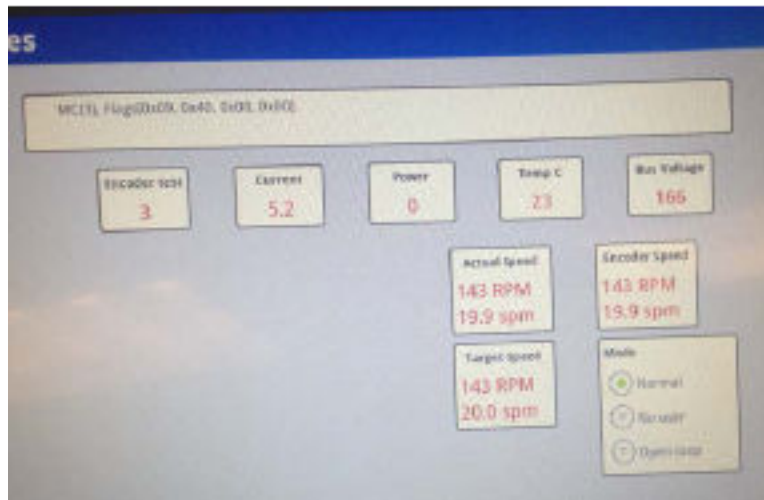
8. With thumb and finger, squeeze base latches together to ensure they are fully engaged with the cover.

9. Attach cable.
10. Run encoder test in system diagnostics motor module. [Encoder Test - Discover Console](#)
11. Install the lower left side panel using a Phillips screwdriver.

Complete Installation

Operate the unit at all levels to verify proper operation.

Encoder Test - Discover Console



Message Center Display	Description
NORMAL $xx.x$ yy	Normal operation mode where $xx.x$ = actual SPM rate and yy = commanded SPM rate.
NO USER $xx.x$ yy	No User Detect mode. Same as Normal operation mode except motor will continue to run without a user stepping on the step assembly.
ENCDR T zzz yy	Encoder Test Mode. This mode reports differential encoder readings in zzz , expressed in a range = 0 to 250. Problematic encoders will cause inconsistent readings that result in a high differential readings (readings of 50 to 250 = faulty encoder disc or encoder PCB). Properly functioning encoders will show readings in single digits (i.e. below 10).
OPEN LP $xx.x$ yy	Open Loop mode allows motor to run without using the encoder. Can be used to isolate encoder related problems. $xx.x$ = raw encoder rpm in SPM rate and yy = commanded SPM rate. $xx.x$ will keep showing 0.0 if no encoder is connected. $xx.x$ will show encoder reading if an encoder is connected but value is not used in the feedback compensation loop that controls the motor speed.

Current shows the motor current (which increases for heavier users/loads).

Encoder Test shows the % rpm deviation (ie. differential encoder reading), which is the same item that is shown on Integrity in the Encoder test mode via the zzz value listed in the table above.

5. Troubleshooting

Knowledge Base

See [Knowledge Base](#) for more detailed information.

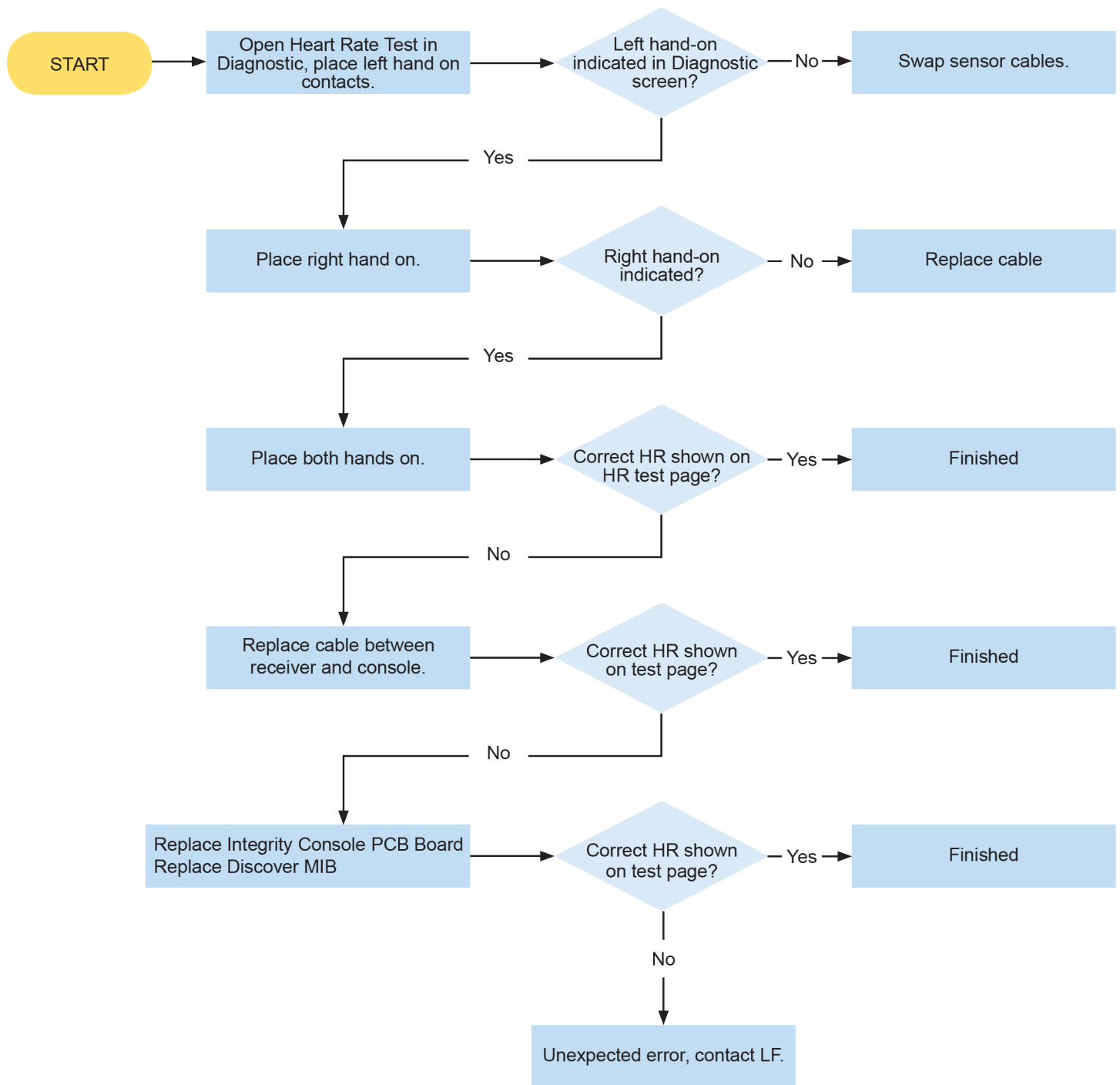
System Level Troubleshooting

Problem	Probable Cause	Section
Steps not moving	PowerMill not powered	Base Electronics - See Troubleshooting Flow Diagram - No Power on PowerMill .
	Console operation	Console
	Motor does not start upon workout start	Base Electronics
Noise and vibration	Drive chains not functioning properly	Drive System
	Belts not installed correctly	Drive System
	Motor not functioning properly	Base Electronics
	Broken or loose step	Stepping System
Steps do not support user properly	Brake disengaged or broken	Drive System
	Mechanical failure in stepping system component	Stepping System
	Mechanical failure in drive system component	Drive System
Structural failure	Broken upright, handlebar, or console support	Handlebars and Heart Rate
	Broken structural frame member	Frame
Error messages	Error message displayed on the console	Error/Info Message Table
Heart rate issue	Polar or Lifepulse™	Handlebars and Heart Rate
iPod, USB and headphone issues	Console and Option Panel	Console
Audio and video issues	Console and console connections	Console
	Base external connections	Base Electronics
Software issues	Software installed is not the latest version	Ensure that latest software is installed. Download the latest software https://www.halo.fitness/web/softwareDownload.html

Handlebars and Heart Rate

Problem	Probable Cause	Possible Solutions
Heart rate does not work	Damaged	Replace Heart Rate Sensors
	Not connected	Check connections
No / erratic Heart Rate	Possible Hand Sensor, Board, or Cable malfunction	See Troubleshooting Flow Diagram - LifePulse
Speed change does not work	Damaged button(s) or cable(s)	Replace if necessary
	Cable to Buttons is disconnected	Check connections
	Encoder damaged	Replace Encoder
Handlebars are loose	Mounting hardware loose or missing	Tighten or replace hardware
	Handlebars broken	Replace Handlebars
Handlebar Shroud or Accessory Tray is damaged or loose	Missing hardware	Replace hardware
	Handlebar Shroud or Accessory Tray is broken	Replace Handlebar Shroud / Accessory Tray
	Handlebar loose	Tighten hardware and secure handlebar
Handlebar Assembly damaged	Loose mounting hardware on Handlebar	Replace Handlebar if needed and tighten hardware
	Damaged by user	Replace handlebar
Start / Stop Buttons do not work	Switch malfunction	Replace Button Switch Assembly
	Cable disconnected	Check connections

Troubleshooting Flow Diagram - LifePulse



Drive System

Problem	Probable Cause	Possible Solutions
Squeaking noise when Steps move	Dry Bearing/Wear Bar	Clean area and apply approved lubricant
	Chain(s) not lubricated	Clean and lubricate Chains
Rubbing sound	Inner Panel Shrouds not fastened in place properly	Check and tighten Shroud hardware
Steps feel loose or not properly supported	Broken or loose Step Shaft	Replace Step Shaft or Step(s)
	Not enough tension in Chain(s)	Adjust increase tension in Chains
	Broken Axle	Replace Axle
Grinding noise when unit runs	Chains and Sprockets not properly lubricated	Clean and lubricate Chains and Sprockets
	Wear Bar not properly lubricated	Lubricate Wear Bars
	Bearings on Step Shaft failed	Replace Bearings
Squeaking noise from Drive Belt	Motor Flywheel Pulley misaligned	Align with Brake Pulley
	Bad Drive Belt	Replace Drive Belt
Drive Chain or Main Chains noisy	Chain(s) not properly tensioned	Adjust tension in Chains
	Chain(s) not lubricated	Clean and lubricate Chains
	Worn Chain(s) or Sprocket(s)	Replace Chains and/or Sprockets
Drive Motor noisy / has excessive vibration	Faulty Motor	Replace Motor
	Motor unbalanced	Adjust tension or mounting of Motor Flywheel-Pulley
	Motor Shaft bent	Replace Motor
	Flywheel-Pulley bolt loose	Tighten bolt
	Motor mounting hardware loose	Check hardware and tighten accordingly
	Motor Bearings bad	Replace Motor
Drive Motor does not run/operate	Motor not plugged into Motor Controller Board or connection faulty	Check connections. Replace if necessary.
	Failed Motor Controller	Verify all connections. Replace motor controller if required.
	Console has error message	Review error log chart
User not detected message on unit	Console or Motor not able to detect user	Run user Motor Test

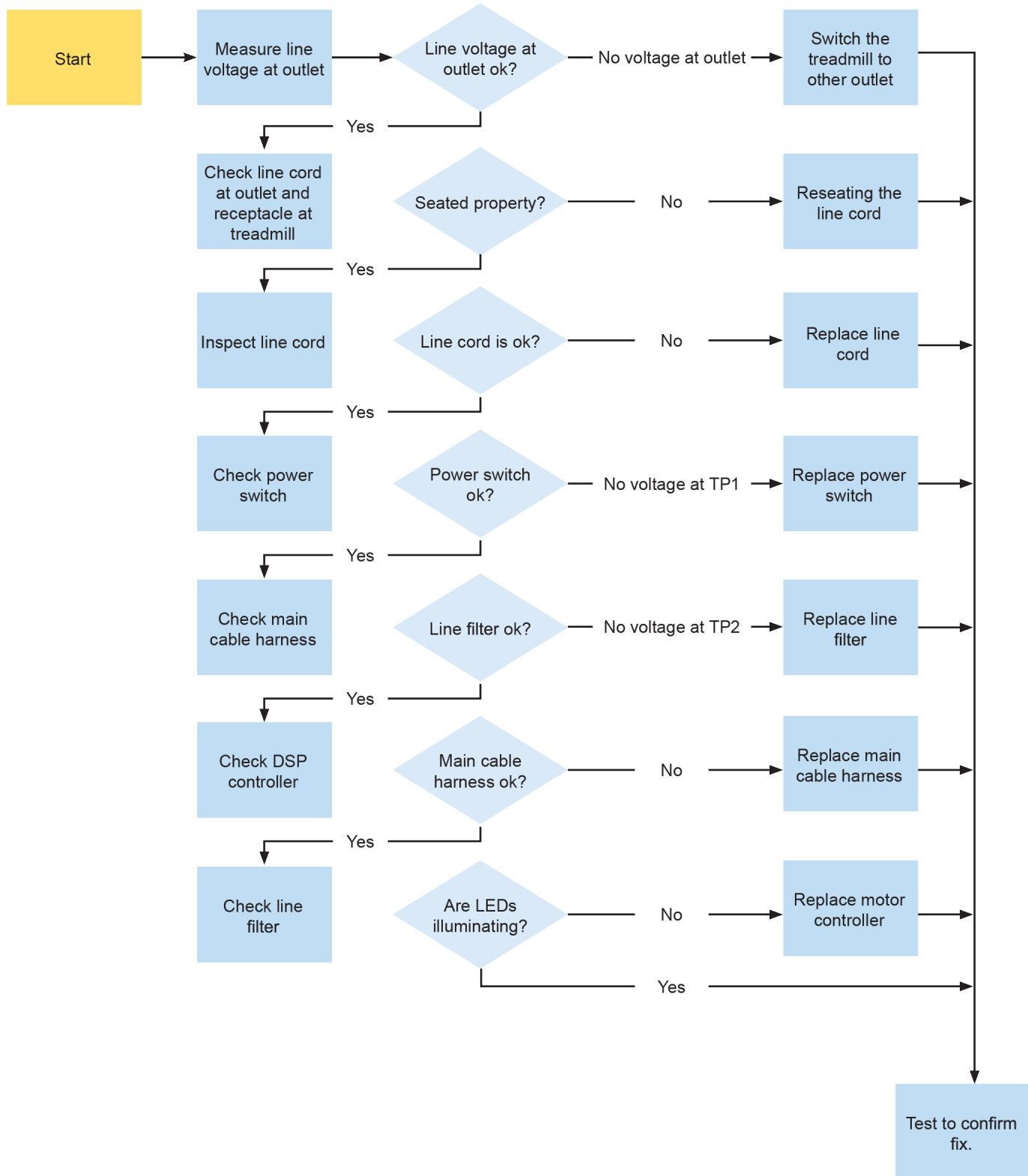
Stepping System

Problem	Probable Cause	Possible Solutions
Steps not moving	Failed Motor Controller	Test connections and replace Motor Controller if necessary
	Motor not plugged into Motor Controller Board	Check connections
	Item has become lodged between bottom of Steps and floor	Turn off unit and remove obstruction
Steps damaged	Damaged by user	Replace Step(s)
Noisy Steps on footfall	Broken / cracked Step	Replace Step(s)
	Bearings on Step Shaft failed	Replace Bearings
Noisy Steps (no user)	Interference between Step Shaft and Steps causing noise	Replace Step Shaft and Steps as needed
	Step Shaft Bearings not clearing leading edge of lower Wear Bar	Push leading edge of Lower Wear Bar down by tightening bolt
	Chain and/or Sprockets worn	Replace Chains/Sprockets
	Chain and Sprockets not properly lubricated	Clean and lubricate Chains
Rubbing sound when unit in use	Inner Shrouds rubbing against the Steps	Check hardware on shrouds and tighten as needed or replace shroud if warped
PowerMill pauses during workout	Item has become lodged between bottom of Steps and floor	Turn of unit and remove obstruction A user has not been detected by machine
	A user has not been detected by machine	No fix needed

Base Electronics

Problem	Probable Cause	Possible Solutions
No power to unit	Line Cord not fully seated in IEC connector or plugged into outlet	Plug in Line Cord
	No power from outlet	Call electrician
	Damaged or loose Power Cable	Replace or plug in Power Cable
Step speed is off or not reading	Encoder damaged	Replace Encoder
User weight not supported on steps	Brake disengaged	Engage Brake
	Brake failure	Replace Brake
Drive Motor noisy	Faulty motor	Replace motor
	Mounting hardware loose	Check and tighten hardware
	Motor Flywheel unbalanced	Replace Flywheel
	Flywheel Bolt loose	Tighten Flywheel Bolt
Drive Motor does not turn	Drive Motor unplugged	Check Cable Connection
	Bad Connection on Drive Motor	Test connector, replace Motor as needed

Troubleshooting Flow Diagram - No Power on PowerMill



6. Software

Refer to Console Service Manual

This product uses multiple consoles. Refer to the specific Console Service Manual for more detailed information.

List of consoles are found in the **Related Products** section of the [Introduction](#) chapter.

7. Diagnostics

Diagnostic menus display service information.

Refer to Console Service Manual

This product uses multiple consoles. Refer to the specific Console Service Manual for more detailed information.

List of consoles are found in the **Related Products** section of the [Introduction](#) chapter.

8. Error code list

Error codes notify user of a problem condition and are displayed on the console. Error codes can also help to indicate the part of the unit most likely to be causing the problem.

Refer to Console Service Manual

This product uses multiple consoles. Refer to the specific Console Service Manual for more detailed information.

List of consoles are found in the **Related Products** section of the [Introduction](#) chapter.

9. Network Information

Refer to Console Service Manual

This product uses multiple consoles. Refer to the specific Console Service Manual for more detailed information.

List of consoles are found in the **Related Products** section of the [Introduction](#) chapter.

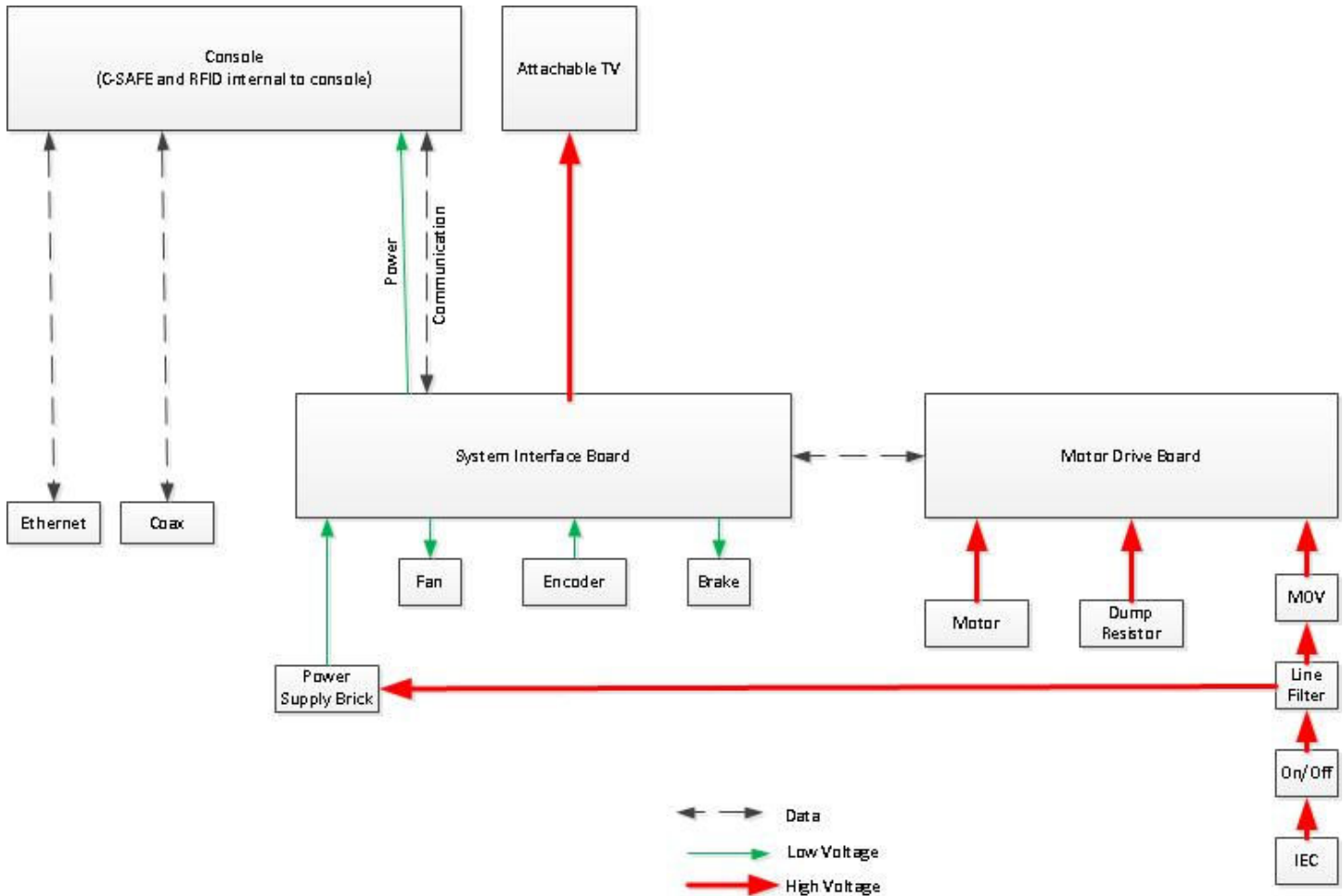
10. Schematics

Online References

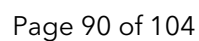
Detailed Schematics are available online in Parts Manuals:

- <https://www.lftechsupport.com> access technical documentation and part manuals for Life Fitness, Hammer Strength, and ICG.
- <http://www.lifefitness.com/parts> service parts ordering for Life Fitness, Cybex, SCIFIT, Hammer Strength, and ICG products along with warranty parts ordering and technician requests.
- <https://lfworld.lifefitness.com> easy to find Knowledge Base articles with answers to frequently asked questions and product support documentation for Life Fitness, Cybex, SCIFIT, Hammer Strength, and ICG.

Base Block Diagram

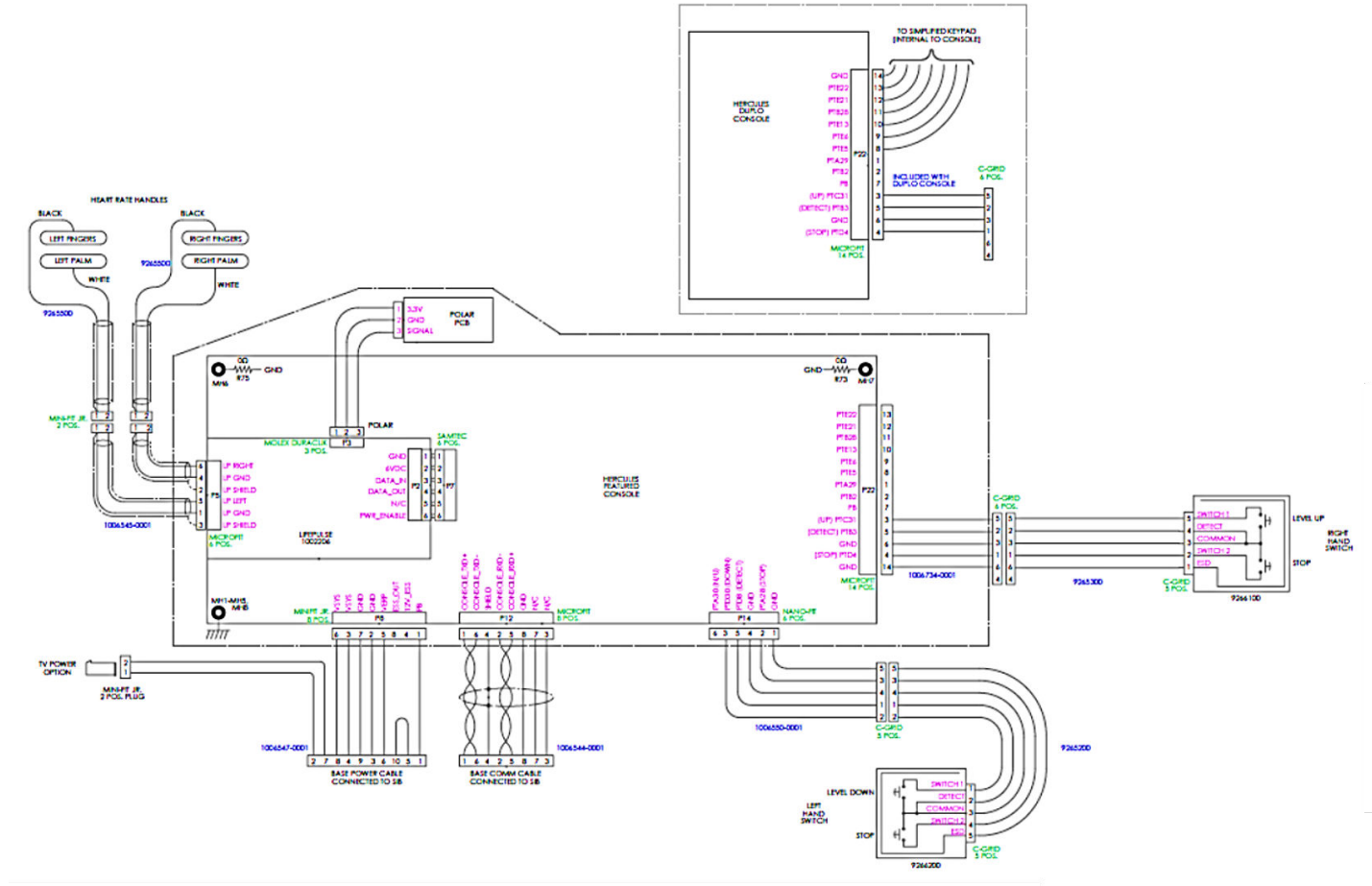


PowerMill with "C" Console

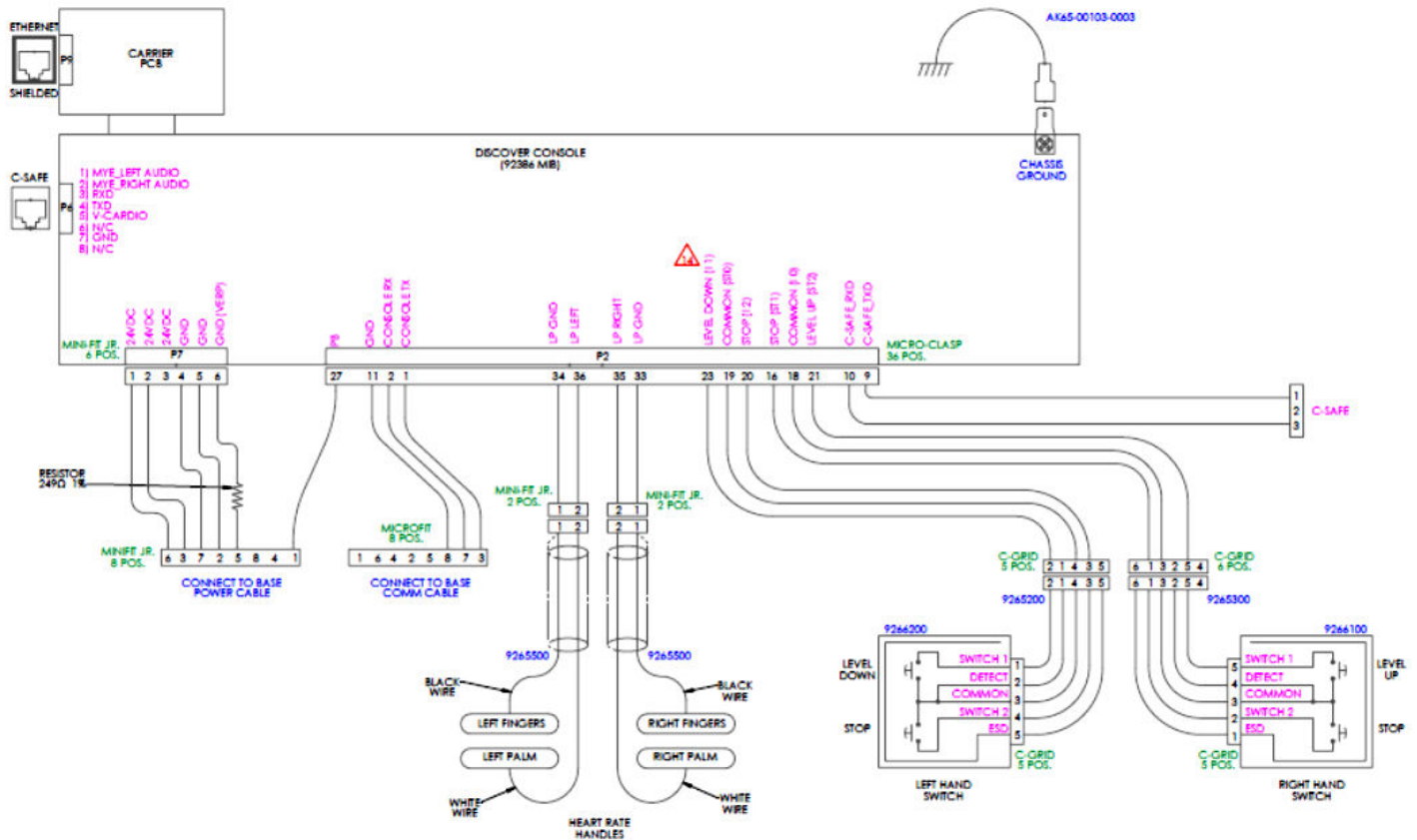


Console Wiring Diagram

PowerMill with "C" Console



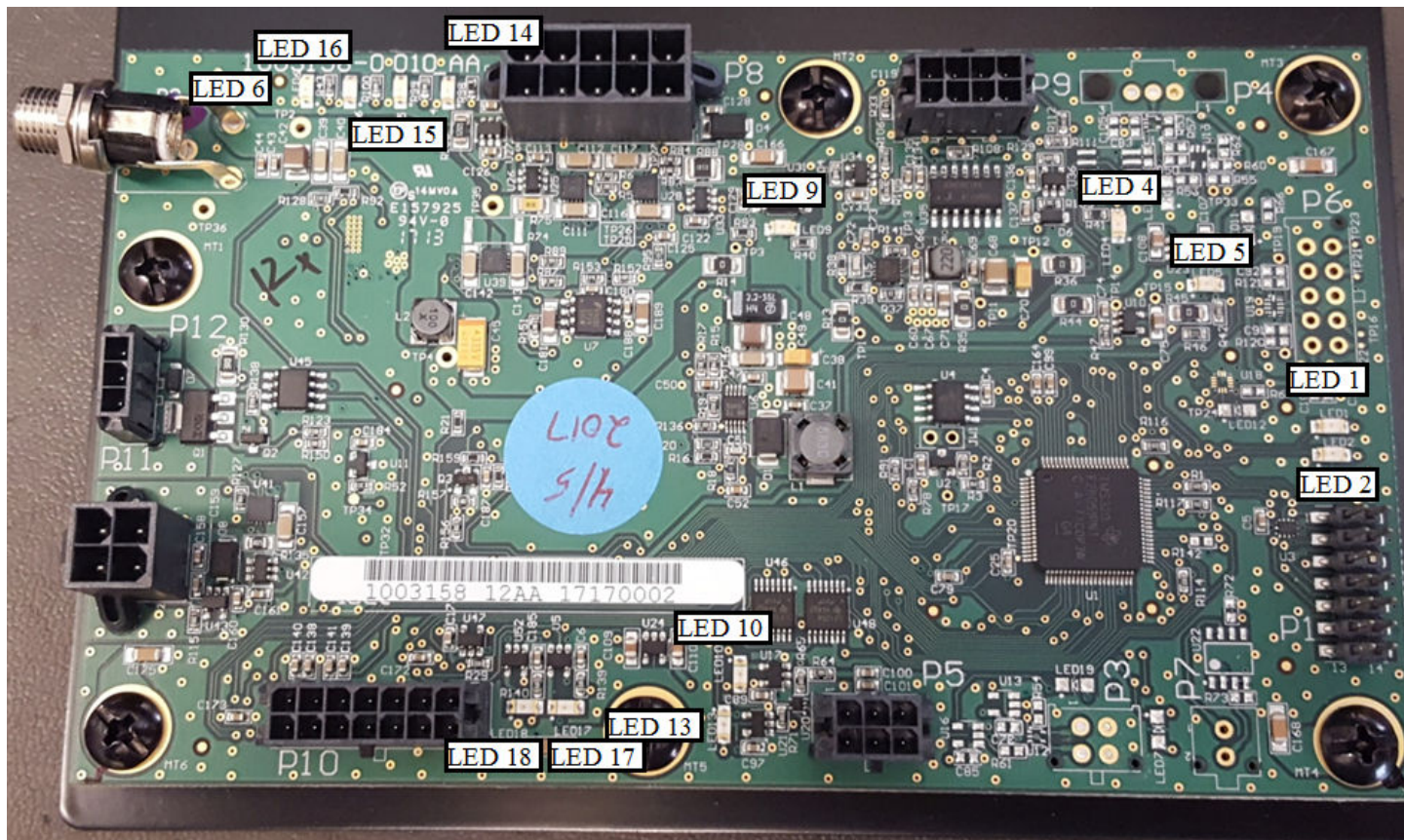
PowerMill with "C" Console



11. LED Chart

System Interface Board LED's

The System Interface Board (SIB) is a low voltage board used to communicate between the console and the high voltage Motor Drive Board (MDB). One SIB exists regardless of 120 VAC or 230 VAC input.

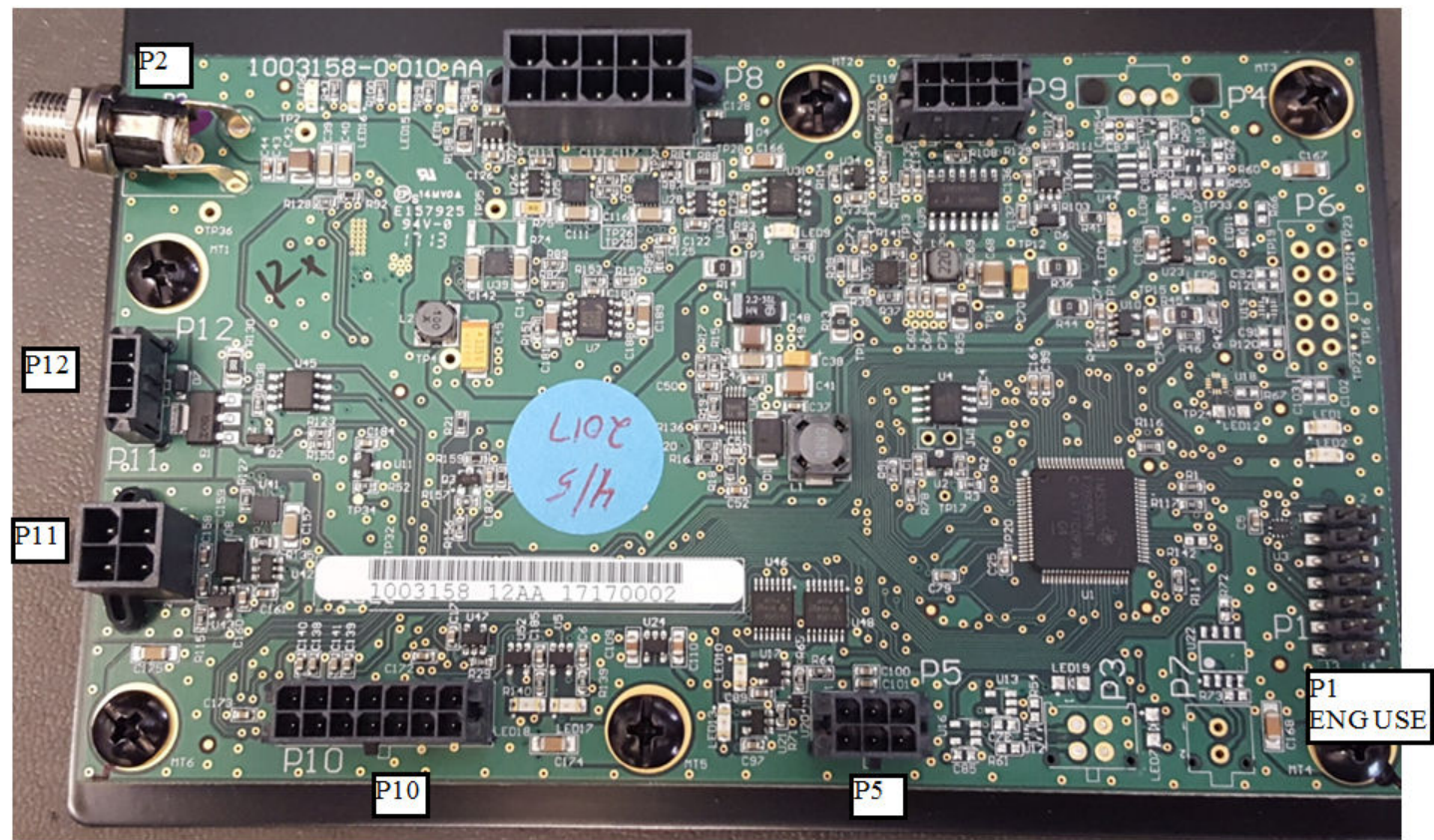


LED #	LED color	Description	Default
1	Green	Processor started correctly (Board has power)	On
2	Orange	Processor started correctly (Board is operating normally)	On
4	Amber	3.3 Volt Supply, Main board power present	On
5	Amber	5 Volt Supply, Communication power present	On
6	Amber	ESTOP Connected	On
9	Amber	Standby Supply (Main board power is present)	On
10	Red	Encoder Signal	Flashing w/ motor on
13	Red	Encoder Signal	Flashing w/ motor on
14	Blue	VSYS Voltage (Voltage to console)	On
15	Blue	VTV Voltage (Voltage to TV)	On
16	Blue	ESTOP Voltage	On
17	Red	MDB Comm (SPI signal from MDB to SIB)	Flashing
18	Red	MDB Comm (SPI CS to MDB)	Flashing

LED Diagnostics

LED #	Description
1	If OFF with POWER ON replace the SIB.
2	If OFF with POWER ON replace the SIB.
4	If OFF with POWER ON replace the SIB.
5	If OFF with POWER ON replace the SIB.
6	Verify the ESTOP Magnet is connected on console
9	If OFF with POWER ON replace the SIB.
10	Verify the ENCODER is working properly
13	Verify the ENCODER is working properly
14	If OFF with POWER ON replace the SIB.
15	If OFF with POWER ON replace the SIB.
16	If OFF with POWER ON replace the SIB.
17	If not FLASHING, replace the SIB, then the MDB
18	If not FLASHING, replace the SIB, then the MDB

System Interface Board Connectors



P1: Connector P1 is a 2x7 KK100 header for JTAG Interface.

NOTE: For engineering use only.

P2: Connector P2 is a L712RA Barrel Jack connector for the external power supply.

P5: Connector P5 is a six position Molex Micro-Fit connector for the Encoder Sensors

Pin#	Description
P5-1	+5V
P5-2	Encoder Output A
P5-3	Ground
P5-4	Encoder Output B
P5-5	Not Used
P5-6	Not Used

P8: Connector P8 is a ten position Molex Mini-Fit Jr Connector provides power to the console.

Pin#	Description
P8-1	Pushbutton from console
P8-2	VTV (TV Voltage, +12V)
P8-3	Ground
P8-4	Vsys (Console Voltage, +12V for Integrity, +24V for Discover)
P8-5	ESTOP Source (+12V up to the ESTOP board)
P8-6	ERP Voltage (+5V)

Pin#	Description
P8-7	Ground
P8-8	Vsys (See Pin 4)
P8-9	Ground
P8-10	ESTOP Return (+12V from the ESTOP board)

P9: Connector P9 is an eight pin Microfit connector that provides communication to the console from the base.

Pin#	Description
P9-1	Base RXD+ (Integrity)
P9-2	Base TXD- (Integrity)
P9-3	Base RX (Discover)
P9-4	Ground
P9-5	Base TXD+ (Integrity)
P9-6	Base RXD- (Integrity)
P9-7	Base TX (Discover)
P9-8	Ground

P10: Conector P10 is a fourteen position Microfit connector that provides communication between the SIB and MDB.

Pin#	Description
P10-1	3.3V Supply
P10-2	ESTOP signal to MDB
P10-3	Clock signal to MDB
P10-4	SIB Output, MDB Input
P10-5	Chip Select, MDB
P10-6	SIB Input, MDB Output
P10-7	Command MDB Microprocessor Reset
P10-8	Command MDB Flyback Reset
P10-9	Command MDB Flyback Disable
P10-10	Ground
P10-11	Encoder B Signal
P10-12	Encoder A Signal
P10-13	Ground
P10-14	Ground

P11: P11 is a 4 position Minifit Jr Connector used to connect the brake.

Pin#	Description
P11-1	24V To Brake (When Brake is Enabled)
P11-2	Ground
P11-3	Ground

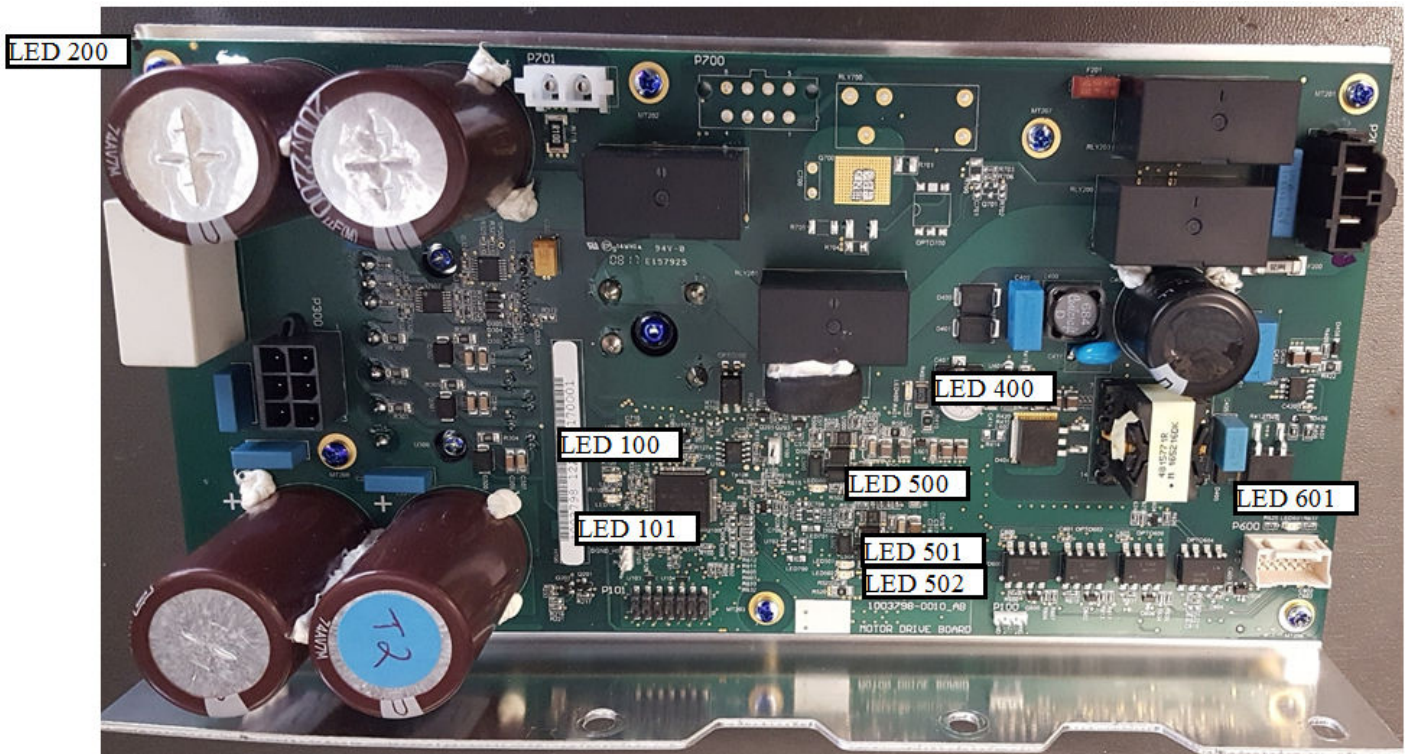
Pin#	Description
P11-4	Brake Switch Position Detection

P12: P12 is a 2 position Minifit Jr Connector used to connect the fan.

Pin#	Description
P12-1	Power to Fan
P12-2	Ground

Motor Drive Board LED's

The motor drive board is used to control the motor and brake resistor.

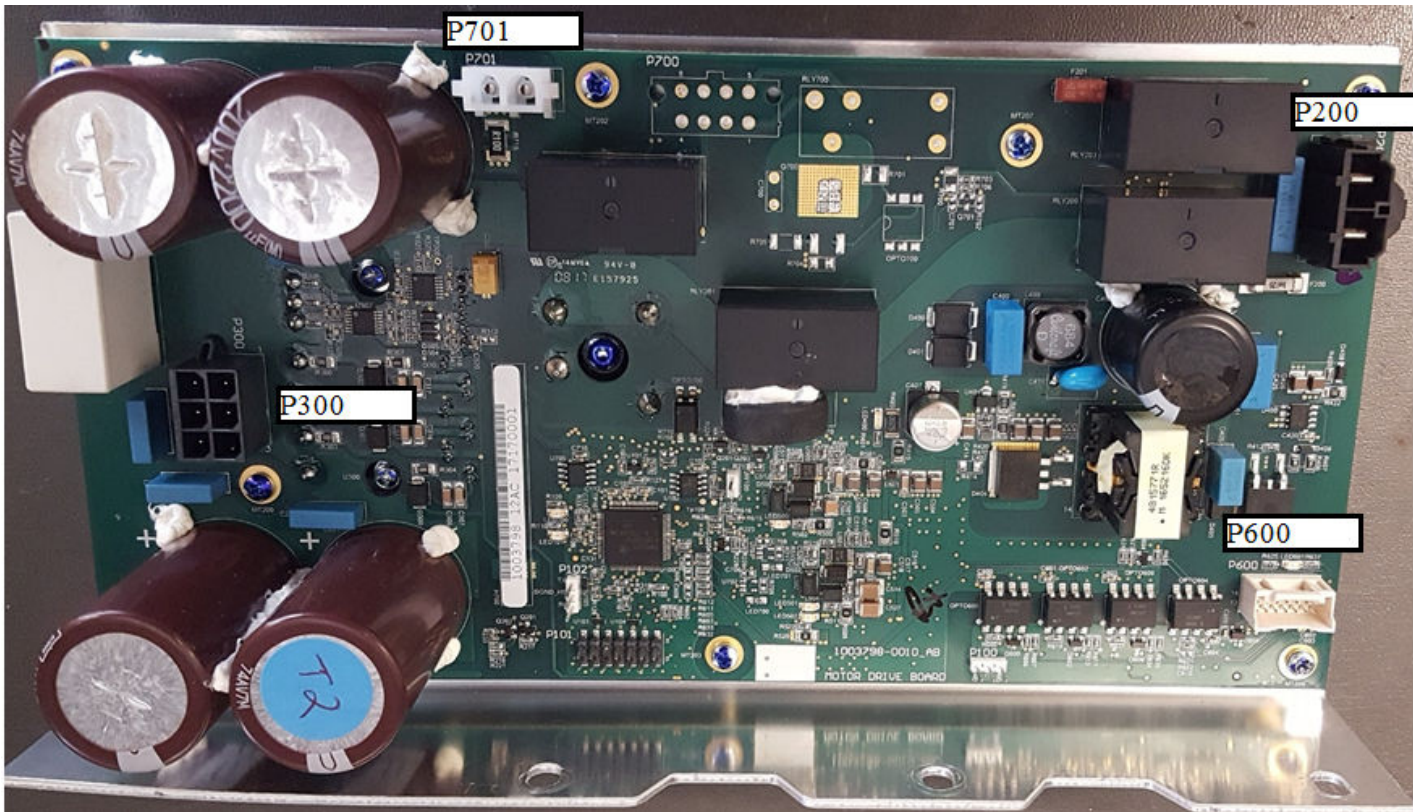


LED #	Description	Default
100	Processor started correctly	On
101	Processor started correctly	On
200	High Voltage Bus for motor present	On
400	Main High Voltage supply present	On
500	3.3V Supply, Main processor supply present	On
501	12V Supply, Main relay supply present	On
502	15V Supply, Main motor driver supply present	On
601	MDB-SIB communication present	Flashing
700	Not Used	Not Used
701	Not Used	Not Used

LED Diagnostics

LED #	Description
100	If OFF with POWER ON replace the MDB
101	If OFF with POWER ON replace the MDB
200	If OFF with POWER ON replace the MDB
400	If OFF with POWER ON replace the MDB
500	If OFF with POWER ON replace the MDB
501	If OFF with POWER ON replace the MDB
502	If OFF with POWER ON replace the MDB
601	Verify connection with SIB. Replace SIB then MDB.
700	Not Used
701	Not Used

Motor Drive Board Connectors



P101: Connector

NOTE: For engineering use only.

P102: Connector

NOTE: For engineering use only.

P200: P200 is a 2 position Mini-Fit Sr used to bring in AC input power.

Pin#	Description
P200-1	Hot
P200-2	Neutral

P300: P300 is a 6 position Mega-Fit connector used to connect the motor.

Pin#	Description
P300-1	Phase U
P300-2	Phase V
P300-3	Phase W
P300-4	Thermal Switch
P300-5	Thermal Switch
P300-6	Frame Ground

P600: P600 is the communication line from the SIB connected via a 14 position IGrid connector.

Pin#	Description
P600-1	3.3V Supply

Pin#	Description
P600-2	ESTOP signal from SIB
P600-3	Clock signal from SIB
P600-4	SIB Output, MDB Input
P600-5	Chip Select, MDB
P600-6	SIB Input, MDB Output
P600-7	Command MDB Microprocessor Reset
P600-8	Command MDB Flyback Reset
P600-9	Command MDB Flyback Disable
P600-10	Ground
P600-11	Encoder B Signal
P600-12	Encoder A Signal
P600-13	Ground
P600-14	Ground

P701: P701 is the connection to the dump resistor via a two position connector.

Pin#	Description
P700-1	VBUS
P700-2	Ground

12. Glossary

Brake Belt

Belt that prevents motor from turning after the brake is applied.

Connectors

Electrical plugs used to connect wiring into electrical component.

DCB

Display Console Board - Electronic board used for making direct input settings and monitoring output messages which are displayed in the digital readout display.

EEPROM

Electrically Erasable Programmable Read Only Memory.

Encoder

Device used to detect system speed and direction of travel.

Heart Rate Sensor / HR Sensor

Located in each handle grip and measures heart rate.

LCD

Liquid Crystal Display - Thin, flat electronic visual display that uses the light modulating properties of liquid crystals.

LED

Light Emitting Diode - LED's provide display functionality and are commonly used for indicator lights.

Levelers

Adjustable supports located under the unit, used to stabilize the unit.

Lifepulse™

Life Fitness' proprietary hardware and software system designed to measure user's heart rate by making electrical contact at user's palms.

Master Link

Special link on the Drive Chain which allows convenient connection and disconnection of the chain.

MDB

Motor Drive Board

SIB

System Interface Board

PCB

Printed Circuit Board

Polar Receiver

A device directly in front of the operator that monitors heart rate. Designed by the Polar® company.

RPM

Revolution Per Minute - A unit measure of how fast an object spins around a fixed axis.

Steps Climbed Display

The total number of steps climbed during a workout.

Wear Bar

Guide tracks for chain bearings.

13. Warranty

What is Covered

This *Life Fitness* commercial exercise equipment product is warranted to be free of all defects in material and workmanship.

Who is Covered

The original purchaser or any person receiving the product as a gift from the original purchaser. Warranty will be voided on subsequent transfers.

How Long is it Covered

	6 Months	1 year	2 Years	7 years
Frame				X
Electrical and Mechanical Components			X	
Labor		X		
Console Overlay	X			

Who Pays Transportation and Insurance For Service

If the Product or any covered part must be returned to a service facility for repairs, We, *Life Fitness*, will pay all transportation and insurance charges for the first year. You are responsible for transportation and insurance charge after the first year.

What We Will Do To Correct Covered Defects

We will ship to you any new or rebuilt replacement part or component, or at our option, replace the Product. Such replacement parts are warranted for the remaining portion of the original warranty period.

What is Not Covered

Any failures or damage caused by unauthorized service, misuse, accident, negligence, improper assembly or installation, debris resulting from any construction activities in the Product's environment, rust or corrosion as a result of the Product's location, alterations or modifications without our written authorization or by failure on your part to use, operate and maintain the Product as set out in your Operation Manual ("Manual").

One type RJ45 interchangeable Network ready and Fitness Entertainment port is supplied with the Product. This port complies with the FitLinxx CSAFE specification dated August 4, 2004 stating: 4.75VDC to 10VDC; maximum current of 85mA. Any Product damage caused by a load exceeding this FitLinxx CSAFE specification is not covered by warranty.

All terms of this warranty are void if this product is moved beyond the continental borders of the United States of America (excluding Alaska, Hawaii and Canada) and are then subject to the terms provided by that country's local authorized *Life Fitness* representative.

Owner's Manual

It is VERY IMPORTANT THAT YOU READ THIS MANUAL before operating the Product. Remember to perform the periodic maintenance requirements specified in the Manual to assure proper operation and your continued satisfaction.

How to Get Parts and Service

Refer to the Corporate Headquarters section of this manual for your local service contact information. Reference your name, address and the serial number of your Product (consoles and frames may have different serial numbers). They will tell you how to get a replacement part, or, if necessary, arrange for service where your Product is located.

Exclusive Warranty

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OF ANY KIND EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON OUR PART. We neither assume nor

authorize any person to assure for us any other obligation or liability concerning the sale of this Product. Under no circumstances shall we be liable under this warranty, or otherwise, of any damage to any person or property, including any lost profits or lost savings, for any special, indirect, secondary, incidental or consequential damages of any nature arising out of the use of or inability to use this Product. Some states do not allow the exclusion or limitation of implied warranties or of liability for incidental or consequential damages, so the above limitations or exclusions may not apply to you.

Changes in Warranty Not Authorized

No one is authorized to change, modify or extend the terms of this limited warranty.

Effects of State Laws

This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

