



DUAL STAGE PULLEY DRIVE SYSTEM TECHNICAL CERTIFICATION TRAINING

Field Engineering | 2010

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Course Objectives

- » Dual Stage Pulley Drive System: Bikes and Crosstrainers
- » Dual Stage Pulley Drive System: Stairclimbers and Summit Trainer
- » Common issues and concerns
- » Summary

Dual Stage Pulley Drive System: Bikes and Crosstrainers

Classic Bikes and Crosstrainers



**Classic
95C, 97C**



**Classic
95R**



CLSXH

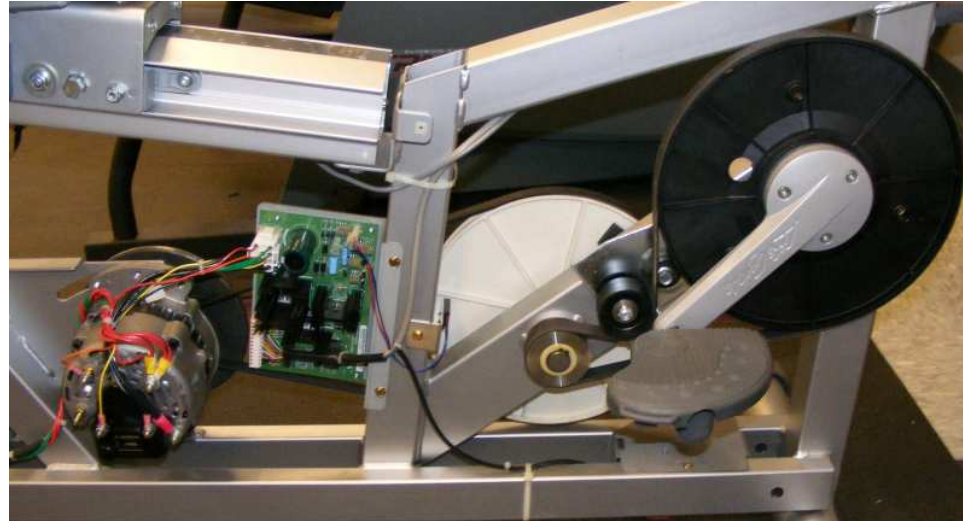
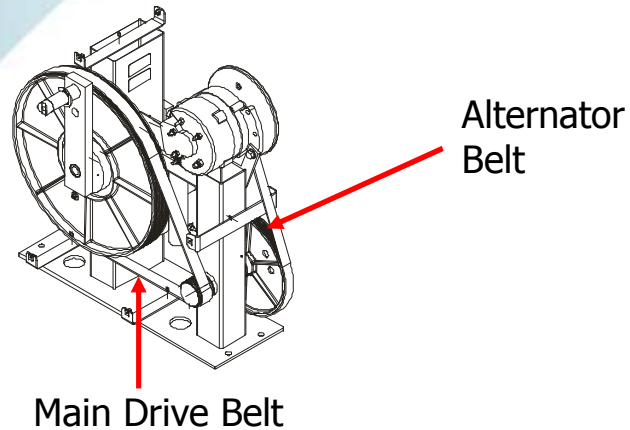


**91X,
CLSX**

Dual Stage Pulley Drive System | Technical Certification Training

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Theory of Operation

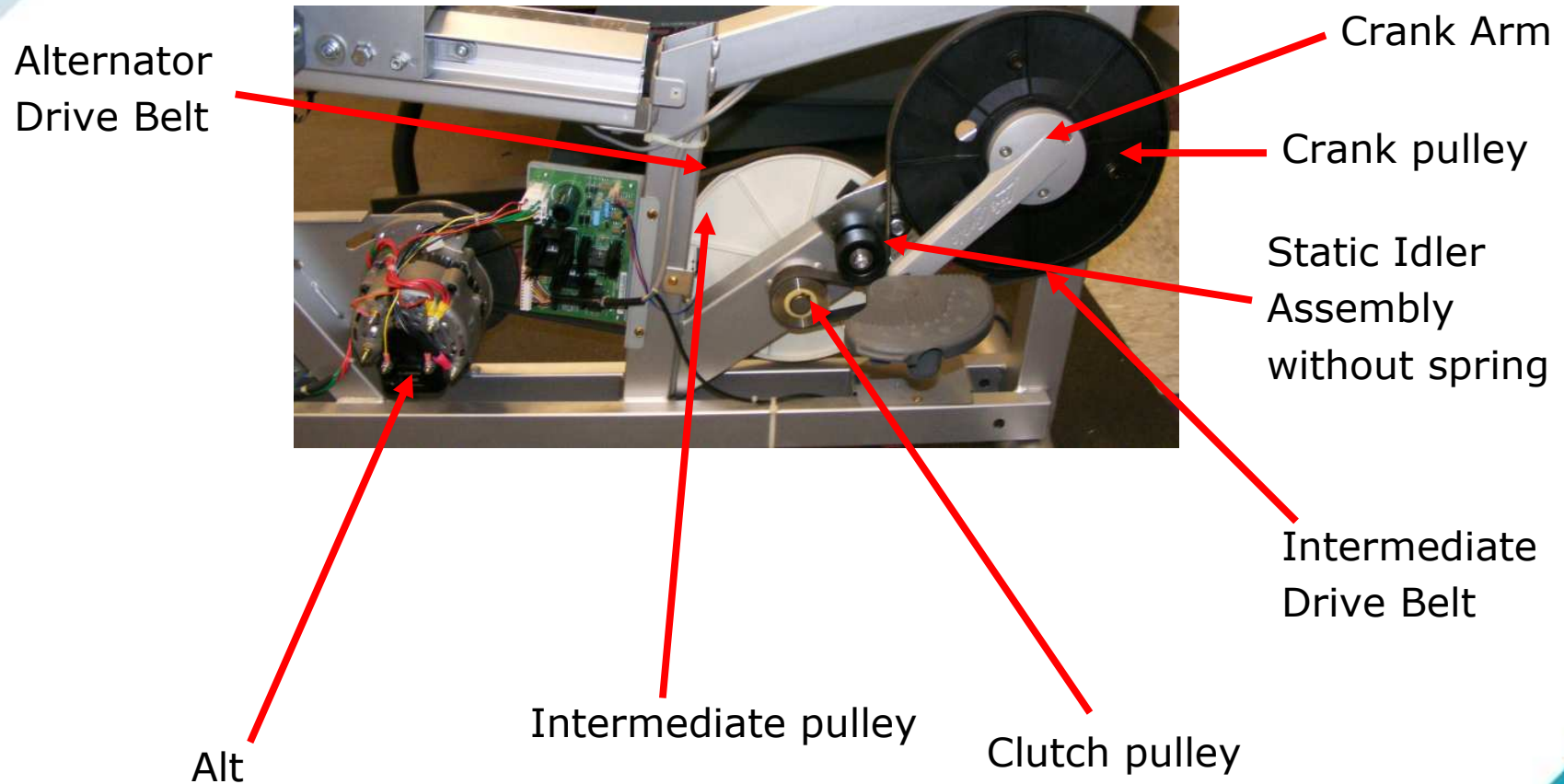


- » Pedals are connected to the crank arms.
- » When the user pedals, the crank pulley spins.
- » The crank pulley turns the intermediate pulley thru a poly -v drive belt.
- » The intermediate pulley turns the alternator pulley thru a second poly -v drive belt.

Components

- » J type Poly-v (non-stretchy) or Flexonic® (stretchy) drive belts are used depending on model.
- » Idler assembly necessary to maintain tension with non-stretchy belts
- » Idler assembly is fixed (static tension) with non-stretchy belts
- » No idler necessary when Flexonic® (stretchy) drive belts are used due to having the pulleys at fixed center-to-center distances.
 - ◆ Used on CLSXH – Classic Hungarian Crosstrainer.
- » The intermediate pulley on Bikes contains clutch
- » Note: Crank pulley, intermediate pulley, and alternator pulley diameters and # of ribs can vary depending on final drive ratio at the alternator and design parameters

Components – Visual Representation



Dual Stage Pulley Drive System: Stairclimber and Summit Trainer

Stairclimbers and Summit Trainer

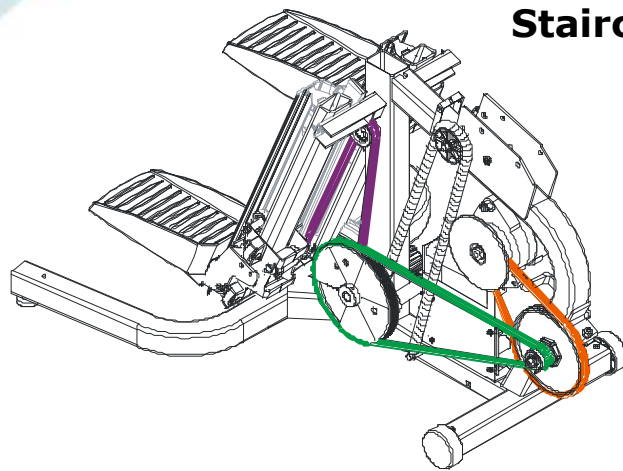


95Si



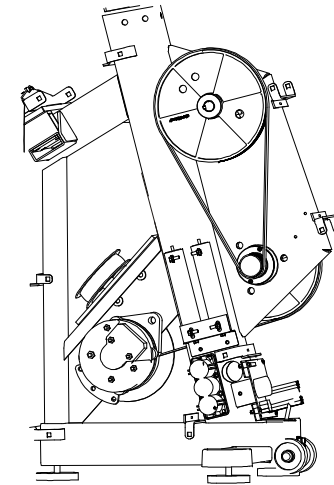
95Le

Theory of Operation



Stairclimber

**Summit
Trainer**

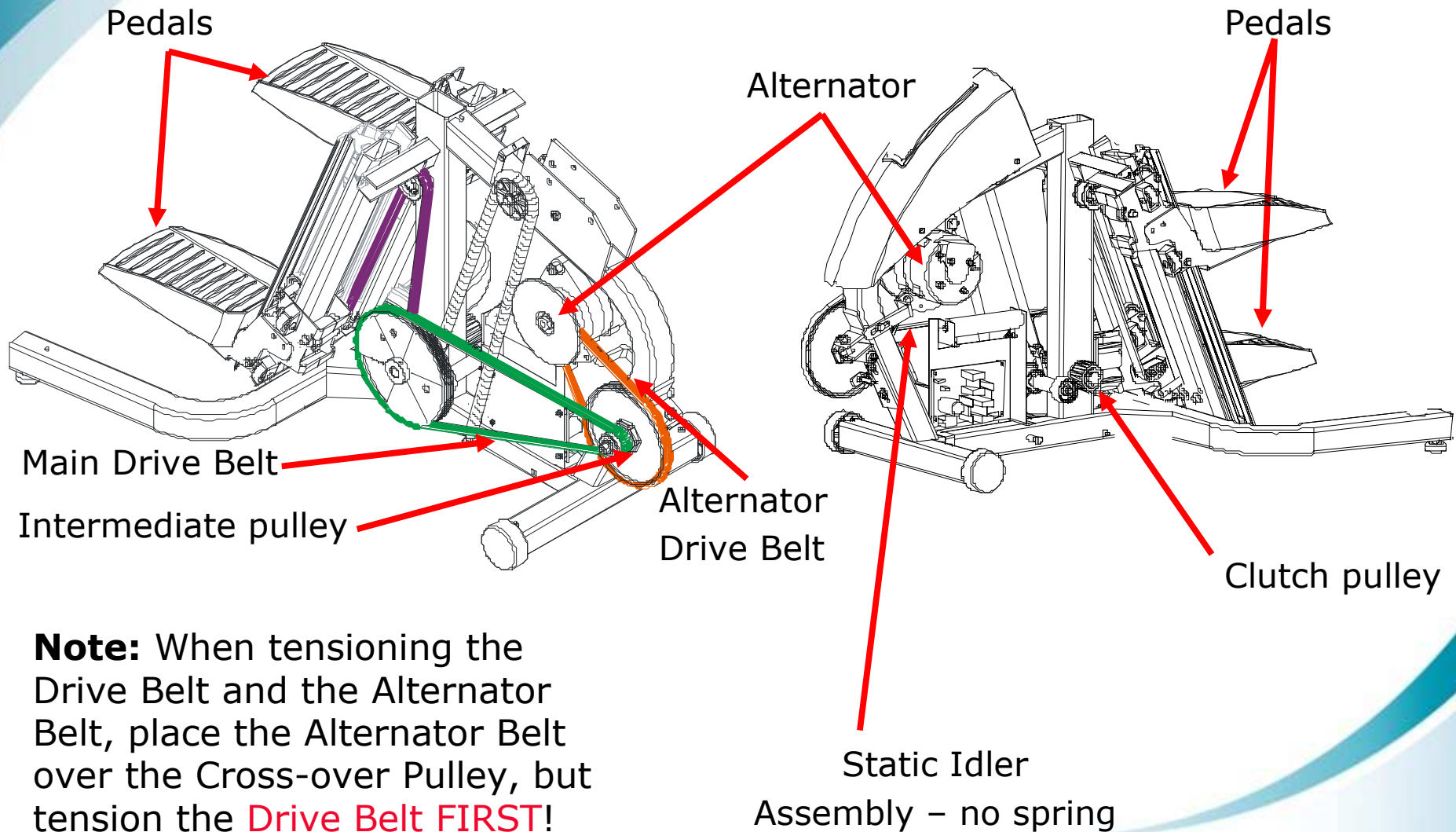


- » One-way clutch pulleys are connected to the crank pulley and to a series of timing belts (HTD profile).
- » The timing belts are connect to the pedals
- » When the user pedals:
 - ♦ The timing belts engage the one-way clutch pulleys
 - ♦ The clutch pulleys spin the crank pulley
 - ♦ The crank pulley turns the intermediate pulley thru a poly –v drive belt
 - ♦ The intermediate pulley turns the alternator pulley thru a poly –v drive belt

Components

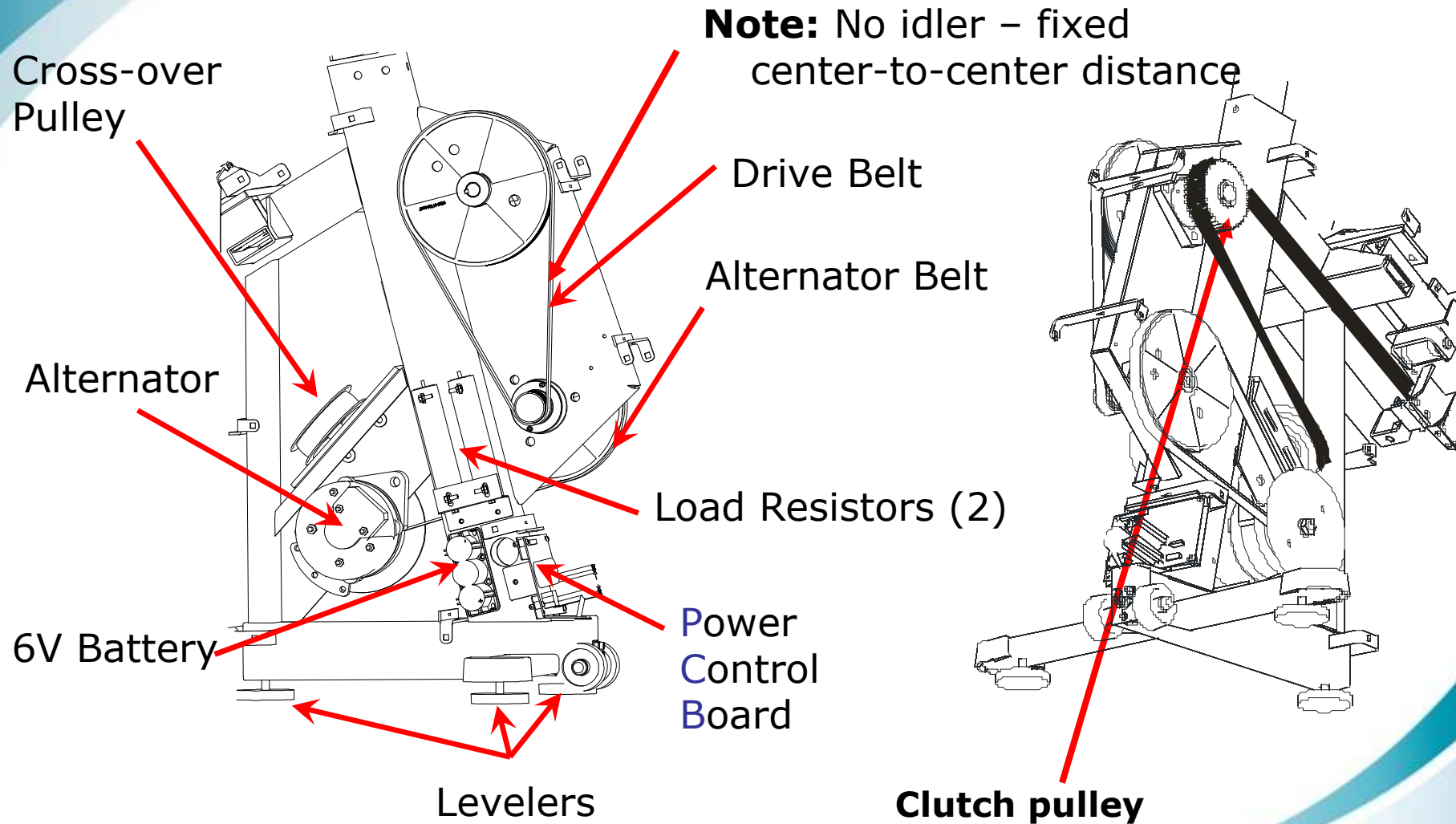
- » J type Poly-v (non-stretchy) belts used on Stairclimber
- » Flexonic® (stretchy) drive belts are used on Summit Trainer
- » Idler assembly necessary to maintain tension with non-stretchy belts
- » Idler assembly is fixed (static tension) with non-stretchy belts
- » No idler necessary when Flexonic® (stretchy) drive belts are used due to having the pulleys at fixed center-to-center distances.
- » Note: Crank pulley, intermediate pulley, and alternator pulley diameters and # of ribs can vary depending on final drive ratio at the alternator and design parameters

Components – Visual Representation

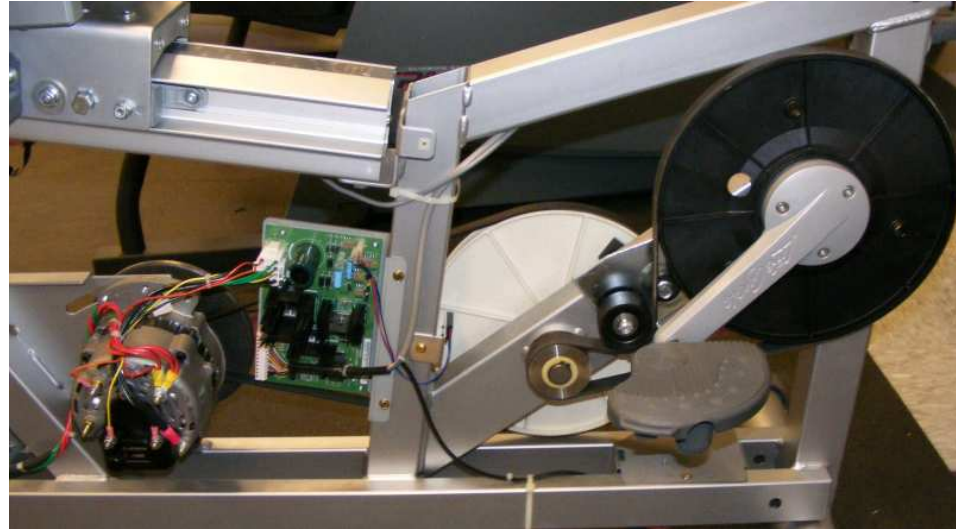


Note: When tensioning the Drive Belt and the Alternator Belt, place the Alternator Belt over the Cross-over Pulley, but tension the **Drive Belt FIRST!**

Components – Visual Representation



Drive Ratios



- » 91X/CLSX and CLSXH Classic Crosstrainer final drive ratio = 0.025:1
- » Classic 95R, 95C, 97C bikes final drive ratio = 0.029:1
- » 95S Stairclimber final drive ratio = 0.038:1
- » 95L Summit Trainer final drive ratio = 0.036:1

Common Issues

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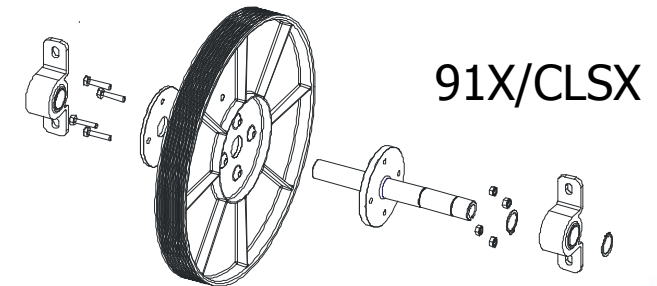
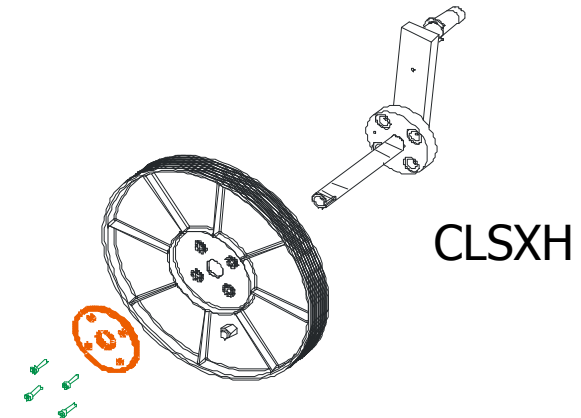
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Common CLSU & CLSR Bikes Issues

- » Difficult to pedal before the unit initializes:
 - ◆ Inspect mechanical drive components for proper operation and wear.
 - ◆ Note: To eliminate the electrical system interference and run mechanical only trouble-shooting, disconnect the alternator or the console.
- » “Hitch” or a “skip” felt in the left pedal:
 - ◆ Inspect Crank Arm Mounting Screws. If loose back them out, apply 242/243 Loctite and tighten. In case of continuing problem, replace the Crank Arm Hub Kit
 - ◆ Check the tension of both belts and adjust if needed.
 - ◆ Inspect Crank Bearings. Verify smooth movement when rotating the Crank Shaft.
- » Tips for troubleshooting noisy operation:
 - ◆ Pedal bike at rapid pace and listen
 - ◆ Abruptly stop pedaling and listen
 - ◆ Pedal backwards and listen
 - ◆ Pedal while standing and listen.

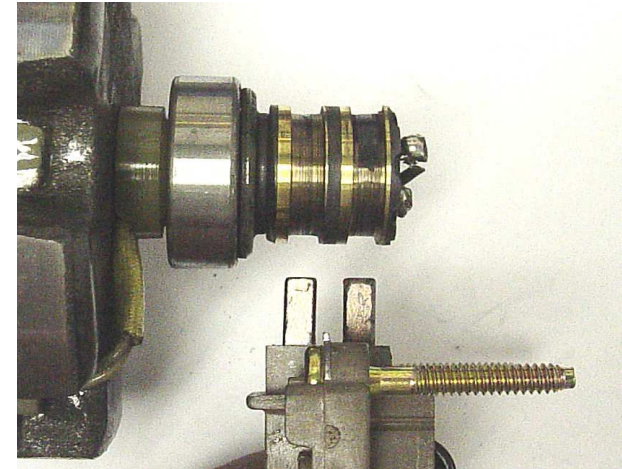
Common CLSX and CLSXH Crosstrainer Issues

- » Issue:
 - ◆ Noise from the rear of the unit
 - ◆ The user feels slipping when quickly starts or stops the workout.
- » Probable cause:
 - ◆ Hardware securing crank shaft pulley assembly may be loose
- » Solution:
 - ◆ Add Loctite® 242/243 to screws and re-tighten
 - ◆ Replace faulty cranks shaft pulley assembly if necessary
- » Reference:
 - ◆ Service Bulletin: CT04081201N



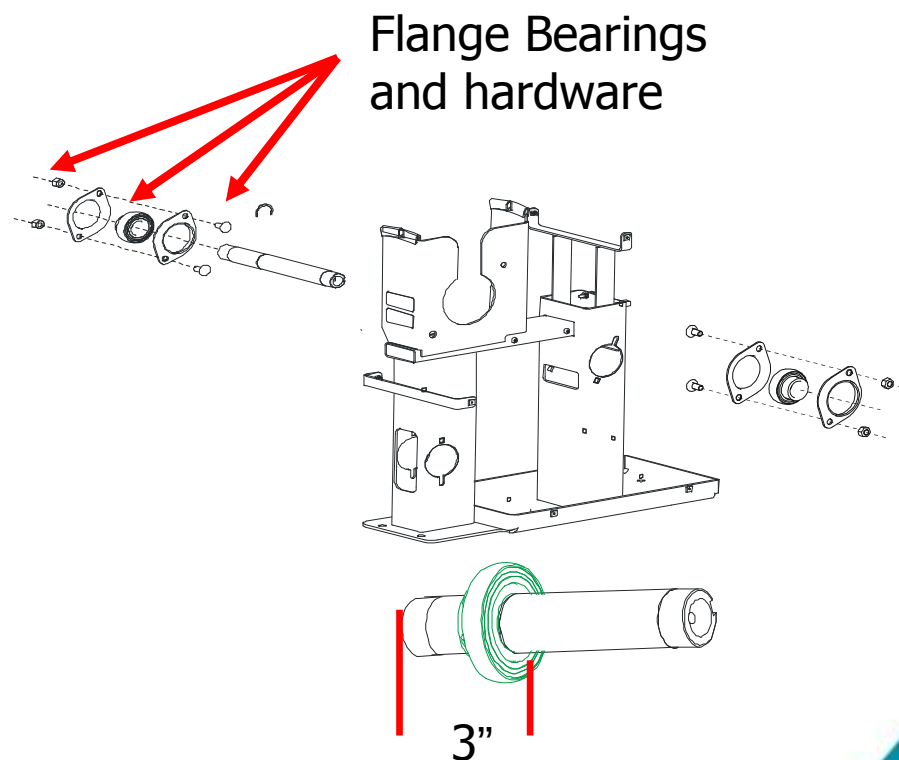
Common CLSX and CLSXH Crosstrainer Issues

- » Issue:
 - ◆ Noise from the rear of the unit
- » Probable cause:
 - ◆ High belts tension
 - ◆ Faulty alternator. Thumping indicates a faulty alternator – bad bearing.
- » Solutions:
 - ◆ Relieve tension on the alternator belt and spin the flywheel to check for smooth operation
 - ◆ In case of faulty alternator, replace it.



Common CLSXH Crosstrainer Issues

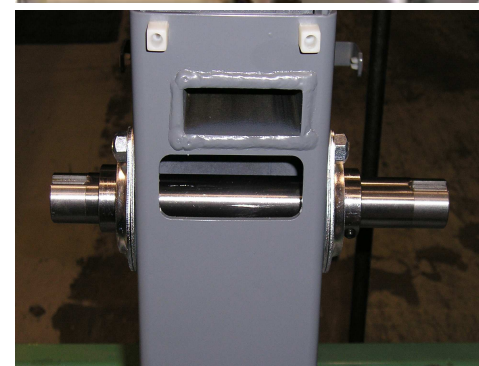
- » Issue:
 - ◆ Noisy operation from the rear of the unit.
- » Probable cause:
 - ◆ Loose crank shaft or intermediate shaft bearings.
- » Solution:
 - ◆ Apply the weld nut repair kit.: GK62-00002-0068
 - ◆ Inspect the upper and lower shaft bearings
- » Reference:
 - ◆ Service Bulletin: CT07022101R



95Xi, 95Xe and CSLXH weld nut

» Installation tips:

- ◆ Remove both pedal levers
- ◆ Move the power control board out of the way for access
- ◆ Position the weld nut flat side to frame and place the washer onto the bolt and install.



Installation of Flexonic® Belts

- » Instruction on proper installation:
 - ♦ Service Bulletin: CT07022301N
 - ♦ It recommends use of wire ties as shown below.



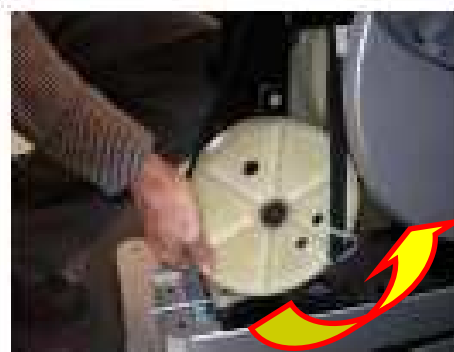
1.



2. note direction of rotation



3.



4.



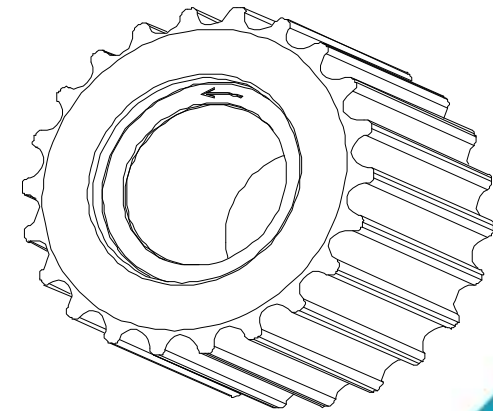
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6.

Common Summit Trainer Issues - Noise

- » Issue:
 - ◆ Noisy operation
- » Probable cause:
 - ◆ Worn Clutch Shaft bearings
 - ◆ Worn Clutch Pulley bearing
 - ◆ Worn Alternator bearings
 - ◆ Worn Pedal Roller bearings
 - ◆ Space between rocker arm and collar exceeding .005"
 - ◆ Worn Belts
 - ◆ Unleveled machine
- » Solution:
 - ◆ Pinpoint the noise source
 - ◆ Inspect the source of noise component or assembly
 - ◆ Replace any worn or damaged components
 - ◆ If the clutch shaft bearings are worn, replace the bearing housing assembly



Common Stairclimber Issues - Noise

» Issue:

- ◆ Slipping or squealing noise

» Probable cause:

- ◆ Loose belt
- ◆ Failed clutch assembly
- ◆ Loose belt/spring assembly

» Solution:

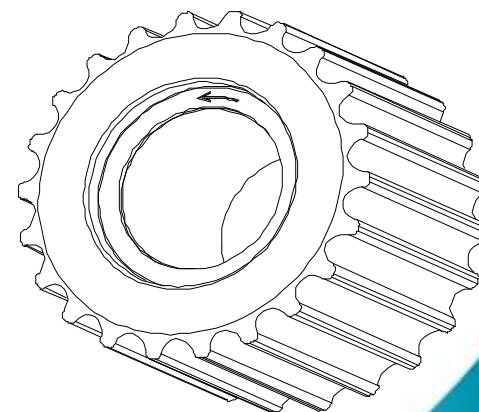
- ◆ Pinpoint the noise source
- ◆ Inspect the source of noise component or assembly
- ◆ Replace any worn or damaged components
- ◆ If the clutch shaft bearings are worn, replace the bearing housing assembly

» Issue:

- ◆ Grinding noise

» Probable cause:

- ◆ Bad drive shaft or alternator bearings
- ◆ Failed clutch
- ◆ Failed crossover pulley
- ◆ Worn pedal rollers



Loose Setscrews on All Products

- » Issue:
 - ◆ Setscrews backing out of the pulley hubs on the clutch and intermediate shafts
- » Probable cause:
 - ◆ Reapplying Loctite 242/243 and proper torque may not work long term.
- » Solution
 - ◆ Reapply Loctite 242/243 and properly torque the set screw - may not work long term
 - ◆ Replace the Allen key set screws with a square-headed set screws. They allow torque increase and provide greater “bite” into the shafts.
- » Reference:
 - ◆ Service Bulletin: SU09030201R.



Summary

- » What is the reason for using Dual Stage Pulley Drive System?
- » What Life Fitness equipment uses Dual Stage Pulley Drive System?
- » How can the alternator resistance system be eliminated for mechanical only troubleshooting of the system?
- » What is recommended to use for easy Flexonic belt installation?

Questions





THANK YOU!

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