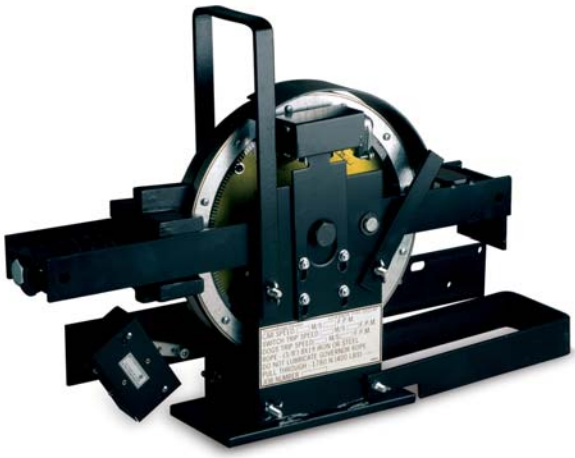
VERTICAL EXPRESS

# Governors



Every attempt has been made to ensure that this documentation is as accurate and up-to-date as possible. However, Vertical Express assumes no liability for consequences, directly or indirectly, resulting from any error or omission. The material contained herein is subject to revision. Please report any problems with this manual to Vertical Express, P.O. Box 2019, Memphis, Tennessee 38101.

Vertical Express • P.O. Box 2019 • Memphis, Tennessee 38101


Published June, 2012
First Edition
Printed in the United States of America

**Manual Number:** 89157 v.1.1

# Contents

# Contents

*(continued)*

# Safety Precautions

## IMPORTANT!

**Read this page before any work is performed on elevator equipment. The procedures contained in this manual are intended for the use of qualified elevator personnel. In the interest of your personal safety and the safety of others, do not attempt any procedure that you are not qualified to perform.**

All procedures must be accomplished in accordance with the applicable rules in the latest edition of the National Electrical Code, the latest edition of ASME A17.1, and any governing local codes.

## Terms in This Manual

**CAUTION**

**CAUTION statements identify conditions that may result in damage to the equipment or other property if improper procedures are followed.**

**WARNING**

**WARNING statements identify conditions that may result in personal injury if improper procedures are followed.**

## General Safety

**CAUTION**

**Before applying power to the controller, check that all factory wire connections are tight on relays, contactors, fuse blocks, resistors, and terminals on cards and DIN rail terminals. Connections loosened during shipment may cause damage or intermittent operation.**

Other specific warnings and cautions are found where applicable and do not appear in this summary. See the *Elevator Industry Field Employees' Safety Handbook* for electrical equipment safety information on installation and service.

## Electrical Safety

All wiring must be in accordance with the National Electrical Code and be consistent with all state and local codes.

### Use the Proper Fuse

To avoid fire hazards, use only a fuse of the correct type, voltage, and current rating. See the job specific drawings sheet (Power Supplies) for fusing information.

Electric shocks can cause personal injury or loss of life. Circuit breakers, switches, and fuses may not disconnect all power to the equipment. Always refer to the wiring diagrams. Whether the AC supply is grounded or not, high voltage will be present at many points.

### Printed Circuit Cards

Printed circuit boards may be damaged if removed or installed in the circuit while applying power. Before installation and/or removing printed circuit boards, secure all power.

Always store and ship printed circuit cards in separate static bags.

## Electrical Safety
*(continued)*

**Mainline Disconnect**

Unless otherwise directed, always Turn OFF, Lock, and Tag out the mainline disconnect to remove power from elevator equipment. Before proceeding, confirm that the equipment is de-energized with a volt meter. Refer to the *Vertical Express Employees' Safety and Accident Prevention Program Manual* for the required procedure.

**Test Equipment Safety**

Always refer to manufacturers' instruction book for proper test equipment operation and adjustments.

Megger or buzzer-type continuity testers can damage electronic components. Connection of devices such as voltmeters on certain low level analog circuits may degrade electronic system performance. Always use a voltmeter with a minimum impedance of 1M Ohm/Volt. A digital voltmeter is recommended.

**When Power Is On**

To avoid personal injury, do not touch exposed electrical connections or components while power is ON.

## Mechanical Safety

See the *Elevator Industry Field Employees' Safety Handbook* for mechanical equipment safety information on installation and service.

# Static Protection Guidelines

## IMPORTANT!

**Read this page before working with electronic circuit boards.**

Elevator control systems use a number of electronic cards to control various functions of the elevator. These cards have components that are extremely sensitive to static electricity and are susceptible to damage by static discharge.

Immediate and long-term operation of an electronic-based system depends upon the proper handling and shipping of its cards. For this reason, the factory bases warranty decisions on the guidelines below.

## Handling

- Cards shipped from the factory in separate static bags must remain in the bags until time for installation.
- Anti-static protection devices, such as wrist straps with ground wire, are required when handling circuit boards.
- Cards must not be placed on any surface without adequate static protection.
- Only handle circuit cards by their edges, and only after discharging personal static electricity to a grounding source. DO NOT touch the components or traces on the circuit card.
- Extra care must be taken when handling individual, discrete components such as EPROMS (which do not have circuit card traces and components for suppression).

## Shipping

- Complete the included board discrepancy sheet.
- Any card returned to the factory must be packaged in a static bag designed for the card.
- Any card returned to the factory must be packaged in a shipping carton designed for the card.
- “Peanuts” and styrofoam are unacceptable packing materials.

**Note:** Refer to the Vertical Express Replacement Parts Catalog to order extra static bags and shipping cartons for each card.

**Failure to adhere to the above guidelines will VOID the card warranty!**

## Arrival of Equipment

### Receiving

Upon arrival of the equipment, inspect it for damage. Promptly report all visible damage to the carrier. All shipping damage claims must be filed with the carrier.

### Storing

During storage in a warehouse or on the elevator job site, precautions should be taken to protect the equipment from dust, dirt, moisture, and temperature extremes.

### Revision Change Bars

Each revised page included in this manual will have a vertical line (change bar) to the left of the text that has been added or changed. The example at the left of this paragraph shows the size and position of the revision change bar.

This page
intentionally
left blank.

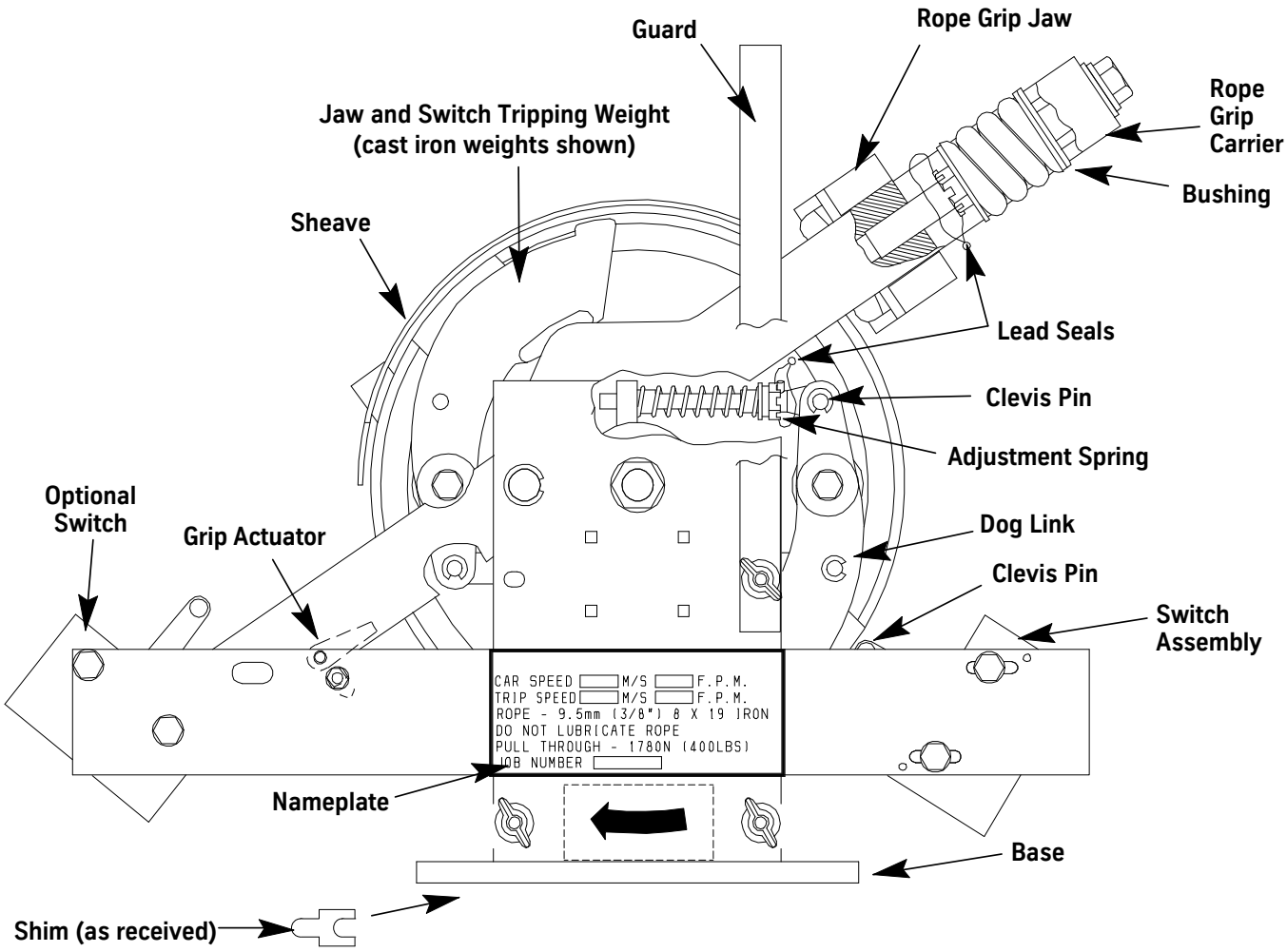
# 12” Governor

## Machine Information

- Travel - Up to 700 feet
- Rated Speed - Up to 1200 FPM
- Encoder Option - Digital Encoder Available
- Counterweight or Car
- Single or Double Switch Option Available
- Switch Rating - 60 VDC, 5A; 250VAC 15A
- Pull Through - 400 lbs.
- Rope Size - 3/8” 8 x 19

## Rope Specifications

- Iron or Traction Steel Grade
  1/2” - 8 x 19 Seale
  1/2” - 8 x 25 Wire
  1/2” - 8 x 19 Seale
- Grades and Construction
  Eight strand wire rope with vegetable fiber core
  8 x 25 filler wire
  8 x 19 Seale
  Right regular lay (unless otherwise specified)
  Length of rope lay cannot exceed 6 3/4 times nominal rope diameter
  Vegetable core is hard vegetable fibers, No jute fibers
  Evenly twisted, uniform fly



## Governor Selection Chart

| Net Travel (Feet) | Rated Speed (FPM) | Assembly Numbers | | | |
|---|---|---|---|---|---|
| | | Standard | Digital | Non-Digital | Counterweight |
| 0-700 | 0-1200 | 5501AF | 5501AE1 | 5501AE2 | 5501AE3 |
| 0-700 | 0-500 | | 5501AE4 | NA | 5501AE5 |
| 0-850 | 0-200 | — | 5501AA1<br>5501AA2 | 5501AB1 | 5501AB1 |
| 0-850 | 201-400 | — | 5501AA3<br>5501AA4 | 5501AB2 | 5501AB2 |
| 0-850 | 401-600 | — | 5501AA5<br>5501AA6 | 5501AB3 | 5501AB3 |
| 0-850 | 601-1200 | — | 5501AA7<br>5501AA8 | 5501AB4 | 5501AB4 |
| 0-850 | 1201-4000 | — | 5501AA9<br>5501AA10 | 5501AB5 | 5501AB5 |
| | | Synergy 85S | 5501AJ001 | | |
| | | Synergy 100/300R<br>Synergy 100/300S | 5501AE7 | | |

## Rope Dimensions

| Rope Diameter (in.) | Loaded Rope | Unloaded Rope | Out of Round Tolerances |
|---|---|---|---|
| .375 | .375/.390 | .382/.390 | .009 |
| .500 | .500/.515 | .510/.525 | .013 |

| 8 x 19 Class Wire Rope | | | Breaking Strength (lbs.) | | |
|---|---|---|---|---|---|
| Rope Diameter (in.) | Approximate Circumference (in.) | Weight (lbs. per foot) | Traction Steel | EHS | Iron |
| .250 | .750 | .09 | 3,600 | 4,500 | 1,800 |
| .313 | 1.000 | .14 | 5,600 | 6,900 | 2,900 |
| .375 | 1.125 | .20 | 8,200 | 9,900 | 4,200 |
| .438 | 1.375 | .28 | 11,000 | 13,500 | 5,600 |
| .500 | 1.625 | .36 | 14,500 | 17,500 | 7,200 |

**Notes:**

- Wire rope breaking strengths covered by specifications must not be less than these values.
- Loaded rope equals 10% of braking strength.

## Tensile/Torsional Requirements

| | Minimum Tensile | | Maximum Tensile | | Maximum Hardness | | Torsional |
|---|---|---|---|---|---|---|---|
| | P.S.I. | N/mm2 | P.S.I. | N/mm2 | Vickers | BHN | |
| Iron | 100,000 | 699.5 | 180,000 | 1241 | NA | NA | NA |
| Traction Steel | 170,000 | 1172.1 | 215,000 | 1482 | 450 | 425 | 34.5 - 25.0 d |
| EHS | 240,000 | 1654.7 | 285,000 | 1965 | 565 | 530 | NA |

**Note**: 1KPSI = 6.89476 $N/mm^2$, Maximum tensile strength applies only to the outer strand wires contacting the sheave.

## Spring Color / Speed Chart Selection

| Rated Speed FPM | Spring Color | Part Number | Rated Speed FPM | Spring Color | Part Number |
|---|---|---|---|---|---|
| 125 | Red | 780BA1 | 500 | Brown | 780BG1 |
| 150 | Yellow | 780BC1 | 600 | White | 780BH1 |
| 175 | Brown | 780BG1 | 700 | Green | 780AX1 |
| 200 | White | 780BH1 | 800 | Silver | 780BJ1 |
| 250 | Green | 780AX1 | 900 | Blue | 780AY1 |
| 300 | Silver | 780BJ1 | 1000 | Black | 780BK1 |
| 350 | Blue | 780AY1 | 1100 | Purple | 780BL1 |
| 400 | Black | 780BK1 | 1200 | Orange | 780BP1 |
| 450 | Purple | 780BL1 | | | |

## Tailweight Selection Chart

| Assembly # | Travel | Speed | Car Tailweight | Counterweight Tailweight | Tailweight Qty / No. | Tension Wt. (lbs) | Sheave Dia. | Rope Construction | Rope Material | Pull Through Tension |
|---|---|---|---|---|---|---|---|---|---|---|
| 5501AF | 0-300 | 0-500 | 5503AB5 | 5503AB4 | None Req. | 156 | 12.00 | .375 8 x 19 Seale | Iron or Steel | 400 lbs. |
| | | | 5503AB2 | | | | | | | |
| | | | 5503AB10 | | | | | | | |
| | | 501-1200 | 5503AG7 | 5503AG4 | | | | | Steel | |
| | | | 5503AG2 | | | | | | | |
| | 301-700 | 0-500 | 5503AB7 | 5503AB8 | | | | | Iron or Steel | |
| | | | 5503AB9 | 5503AB12 | | | | | | |
| | | 501-1200 | 5503AG8 | 5503AG5 | | | | | Steel | |
| | | | 5503AG3 | 5503AG6 | | | | | | |
| 5501A_ | 0-300 | 0-500 | 128800 136526 | 130505 | (1)129028 | 138 | 16.00 | .500 8 x 19 Seale or 8 x 25 Filler Wire | Iron or Steel | 600 lbs. |
| | | 501-800 | 5503AH1 5503AH2 | 5503AH4 | (1)129027 | 170 | | | | |
| | | 801-1400 | | | | | | | Steel | |
| | 301-700 | 0-500 | 128813 | 5503AF1 | (2)129028 | 276 | | | Iron or Steel | |
| | | | | 5503AF2 | | | | | | |
| | | 501-800 | 5503AH3 | 5503AH5 5503AH9 | | | | | | |
| | | 801-1400 | | | | | | | Steel | |
| | 501-850 | 0-500 | 122813 | 5503AF1 | (2)129027 | 340 | | | Iron or Steel | |
| | | | | 5503AF2 | | | | | | |
| | | 501-800 | 5503AH3 | 5503AH5 5503AH9 | | | | | | |
| | | 801-1400 | | | | | | | Steel | |

# 12” Governor Installation

1. Check the nameplate to ensure that the governor is designed for a speed range corresponding to the job site specifications. See Figure 1.

**Note:** Switch and jaw tripping speeds are stamped on the governor nameplate.

2. Mount the governor on a flat, level surface, or use shims to level the governor.

**Note:** Twisting at the base may cause the jaws to malfunction.

3. Ensure that all seals are intact.
4. Verify that all moving parts function properly.
5. Remove accumulations of dirt or excess grease and oil.
6. Check the job layout for location of governor and tailweight.

**CAUTION**

**Do NOT paint the governor; this could cause it to malfunction.**

7. Place the governor in the mounting location, with the jaw in position to correctly engage the governor rope. Do not fasten.
8. Install shims under the governor base to level the base from front-to-rear and side-to-side. See Figure 1.
9. On the car side, drop a plumb line from the center of the governor sheave. Align the governor rope position to the governor rope bracket and the tailweight sheave. If the plumb bob does not align properly, shift the governor until it does. See Figure 2 on page 11.
10. Make sure the centerline of the governor sheave groove is parallel with the back of the guide rail, and then bolt the governor down securely.

**Note:** The governor should be 1 3/4" behind the rail face.

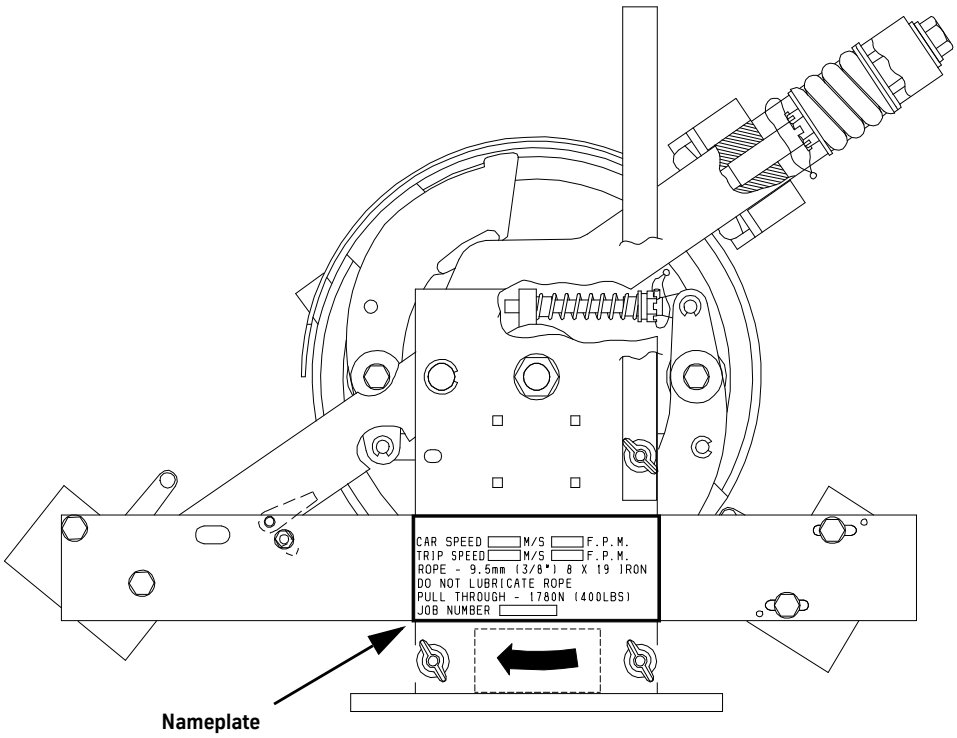



**Figure 1 - Governor Nameplate**

## Installation
*(continued)*

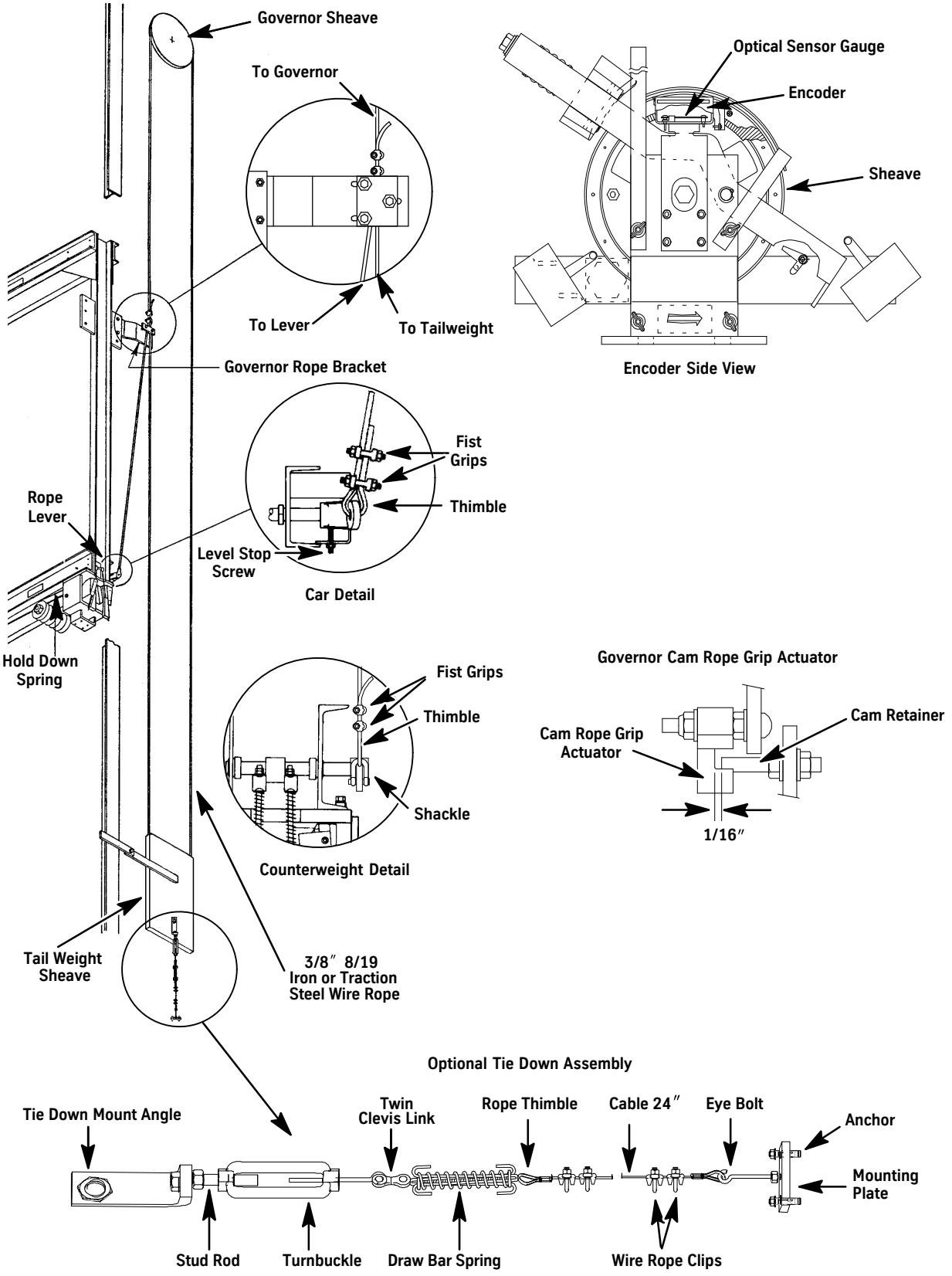



**Figure 2 - 12" Governor (5501AE) and Safety System**

## Encoder Sensor Adjustment

### Tools and Materials

- Suitable friction drive wheel
- Variable speed drill
- Tachometer
- "C" clamp or vise grips, and wood blocking

**Note**: A friction drive wheel can be made. See Figure 3.

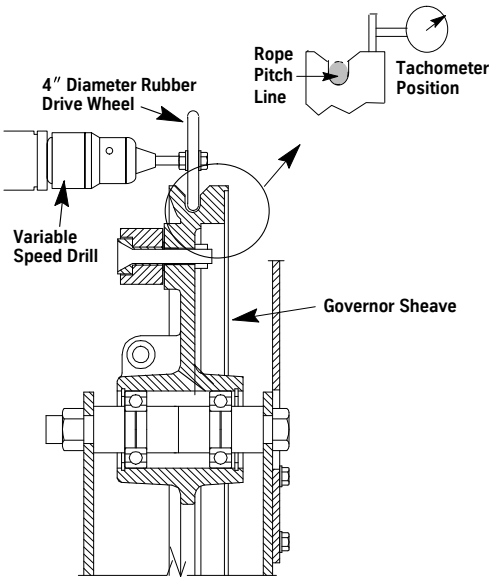



**Figure 3 - Friction Drive Wheel**

**WARNING** **Encoder cards can be damaged if not aligned properly and then contact is made with the encoder disk.**

1. Adjust the vertical sensor-to-disk engagement. See Figure 4.
   a. Loosen the four (4) sensor bracket nuts.
   b. Vertically adjust the bracket until the encoder disk engages the encoder sensor and the top of the sensor is aligned with the bottom of the engagement depth reference line.
   c. Start with the lower left nut, and tighten the four (4) sensor bracket nuts.
2. Check the horizontal front-to-back sensor card position. If necessary, adjust the card position.
   a. Loosen the screws holding the card.
   b. Insert the provided optical sensor gauge between the sensor and the encoder disk.
   c. Adjust the card in and out so that the disk touching the gauge is touching the sensor.
   d. Tighten the four (4) card mounting screws.
3. Recheck the vertical and horizontal adjustments.

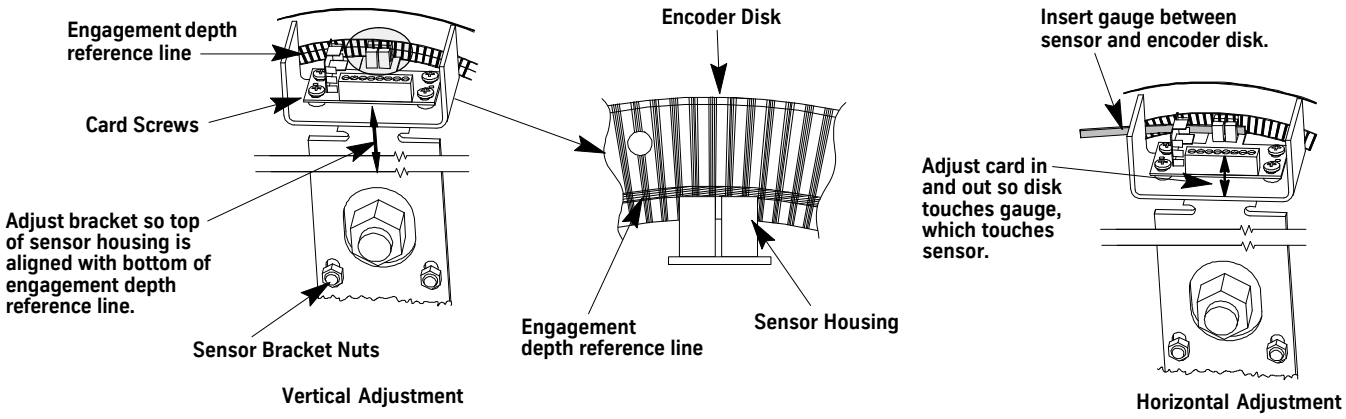



**Figure 4 - Sensor Depth Alignment Detail**

## Speed Check of Non-Roped Governors

**WARNING** **Keep fingers and hands clear of the carrier arm when checking tripping speeds.**

1. Chuck the drive wheel device in a 3/8" or 1/2" variable speed drill.
2. Hold a tachometer in place against the groove in the governor sheave. The tachometer should touch the approximate center of the sheave groove. See Table 1 for speed specifications.
3. Place the friction drive wheel against the rim of the governor sheave and slowly increase the speed until the governor switch trips.

**CAUTION** **Ensure that when the weights fly out, the tachometer is not damaged.**

4. Record the switch tripping speed.
5. Continue increasing the governor speed until the governor’s rope jaws trip. Record the jaw tripping speed.

**Note:** The recorded switch/jaw tripping speeds must comply with those listed in the speed specifications, as mandated by code. See Table 1.

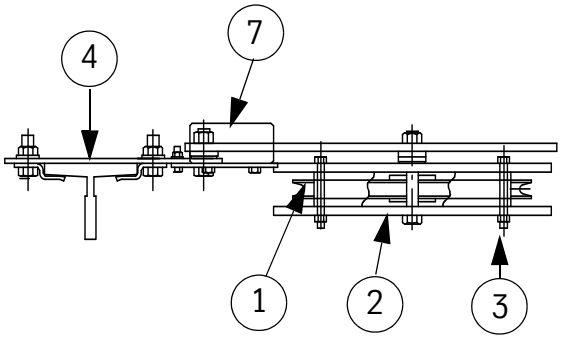
| Elevator Rated Speed (FPM) | Governor Tripping Speed | | 12″ Tachometer Reading | |
|---|---|---|---|---|
| | Switch | Jaws | Switch | Jaws |
| 100 | 135 | 135 | 146 | 146 |
| 125 | 175 | 175 | 190 | 190 |
| 150 | 210 | 210 | 228 | 228 |
| 175 | 225 | 250 | 244 | 271 |
| 200 | 250 | 280 | 271 | 303 |
| 225 | 275 | 308 | 298 | 334 |
| 250 | 300 | 337 | 325 | 365 |
| 300 | 350 | 395 | 379 | 428 |
| 350 | 400 | 452 | 433 | 490 |
| 400 | 455 | 510 | 493 | 553 |
| 450 | 510 | 568 | 553 | 615 |
| 500 | 560 | 625 | 607 | 677 |

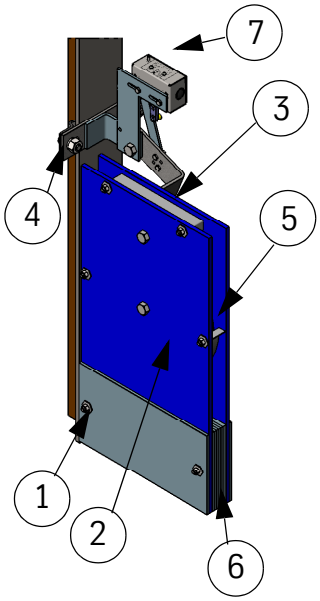
**Table 1 - Speed Specifications for 12” Governor**

# Tailweight Installation

1. Locate correct installation detail for specific job type. See Figure 5 and Figure 6 on page 15.
2. Verify correct placement of the governor tailweight location. See Figure 7 on page 16.

**5503AB2 (Car)**
**5503AG7**
•0-300 ft. of travel
•15# rail

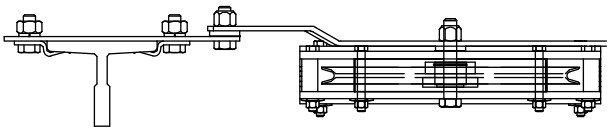


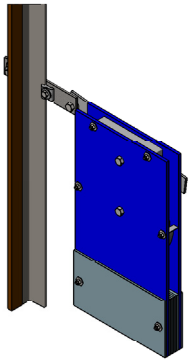




| ITEM | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | | Tailweight Sheave |
| 2 | | Tailweight Side Plate |
| 3 | | Dust Cover |
| 4 | | Rail Bracket |
| 5 | | Rope Guard |
| 6 | | Tailweight Filler |
| 7 | | Tailweight Switch Kit |

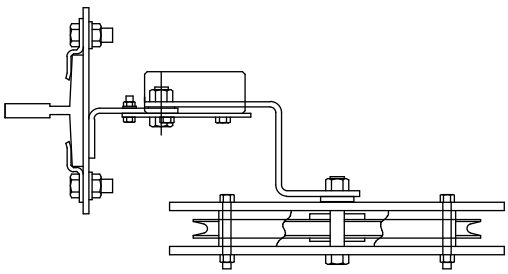
**5503AB_ (0-500 fpm)**
**5503AG_ (501-1200 fpm)**

**5503AB5 (Car)**
•0-300 ft. of travel
•11/12# rail
**5503AB10**
**5503AG2**
•18.5# rail





**5503AB4 (Counterweight)**
**5503AG4**
•0-300 ft. of travel
•15/18# rail



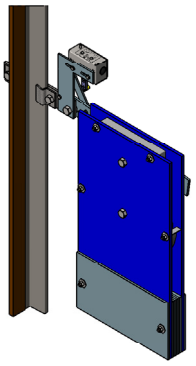
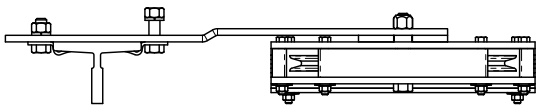
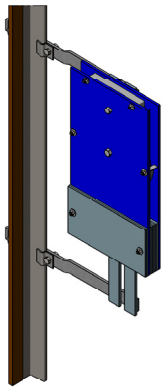


**Figure 5 - Tailweight Installation Details (1 of 2)**

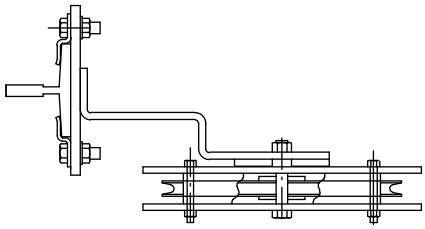
5503AB_ (0-500 fpm)
5503AG_ (501-1200 fpm)

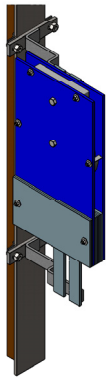
**5503AB7 (Car)**
**5503AG8**
•301-700 ft. of travel
•15# rail



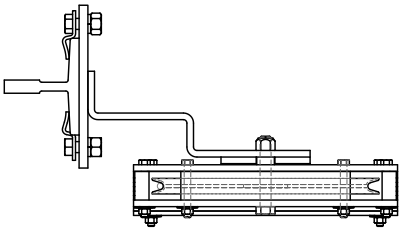


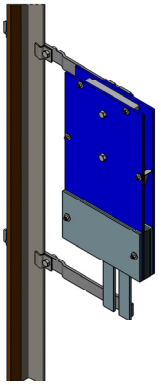
**5503AB8 (Counterweight)**
**5503AG5**
•301 -700 ft. of travel
•15# rail



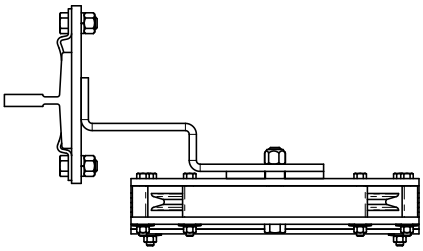


**5503AB9 (Car)**
**5503AG3**
•301-700 ft. of travel
•18.5# rail





**5503AB12 (Counterweight)**
**5503AG6**
•301-700 ft. of travel
•18.5# rail



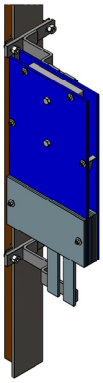


**Figure 6 - Tailweight Installation Details (2 of 2)**

## Tailweight Locations

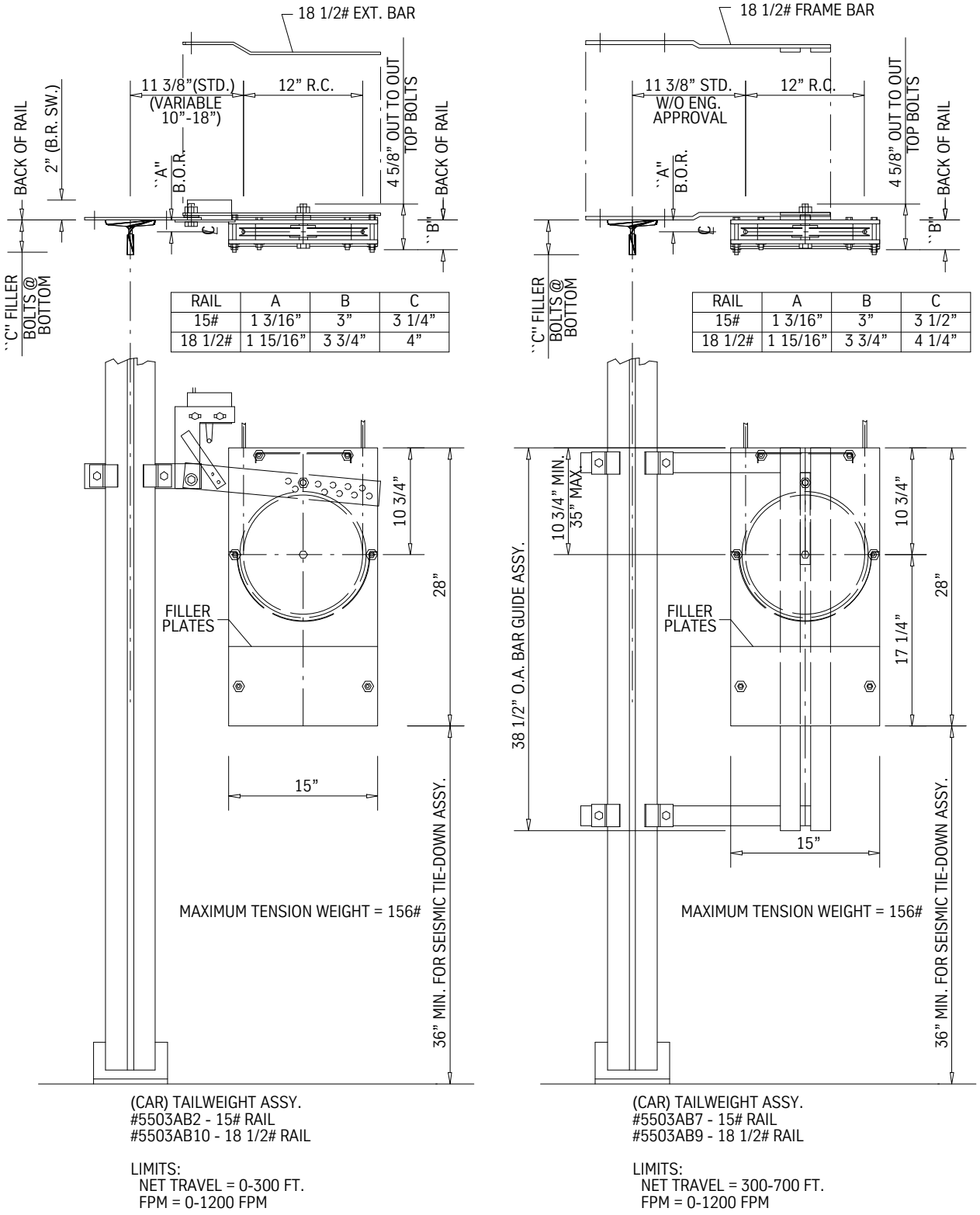



**Figure 7 - Tailweight Locations**

## Tailweight Installation
*(continued)*

3. Choose a position on the rail that provides adequate clearance from the bottom of the tailweight to the pit floor (36" minimum for seismic tie-down), and then mount the rail strap. Use the nylon thrust washers and any additional connection brackets required to connect the extension arm to the rail strap.

**Note:** Ensure that the extension arm pivots freely, and the sheave mounting position lines up with the center of the governor rope loop.

4. Install and adjust the governor rope to ensure that when the rope is in the sheave groove, the extension arm is horizontal or slightly above the rope.

5. Verify the proper weight-to-floor clearance, and also verify that the sheave rotates freely.

6. Install the tie-down assembly, from the weight to the pit floor. See Figure 8.
   a. Drill a 1/2" x 2 1/2 hole in the center of the weight for mounting.
   b. Before engaging the spring, adjust the assembly to allow for 1" of weight lift.
   c. Anchor the tailweight tie-down assembly to the pit floor.

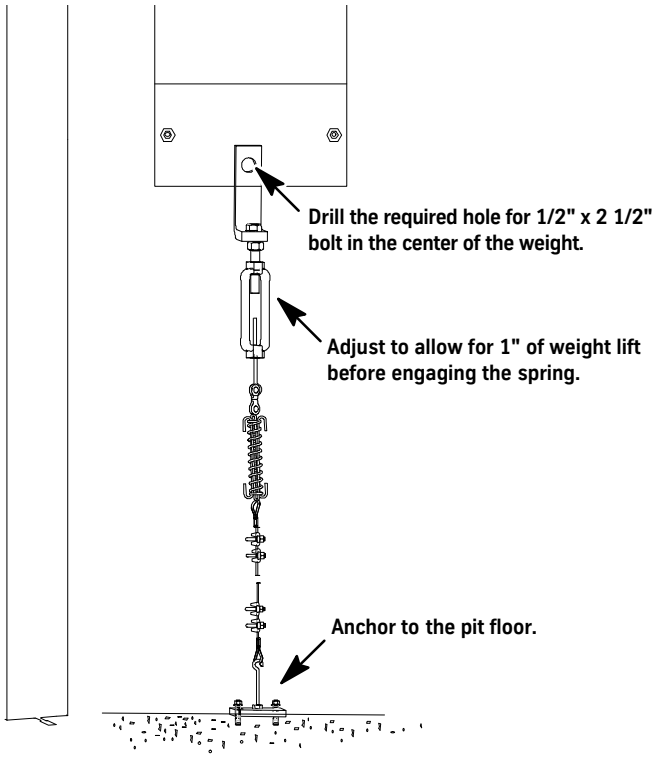



**Figure 8 - Tailweight Tie-Down**

## Speed Check of Roped Governor

## Verify the Calibration of Governor Switch and Jaw Activation

1. To access the governor, place the elevator on car top inspection operation and locate the car to the top of the hoistway.
2. Block up the governor tailweight sheave in the pit to provide slack in the governor rope.

**Notes:**

- Governors are calibrated, inspected, and sealed at the factory.
- The governor switch and jaw tripping speeds must be verified during periodic Category 5 testing.
- Switch and jaw tripping speeds are stamped on the governor nameplate.
- The recorded switch/jaw tripping speeds must comply with those listed in the speed specifications, as mandated by code. See Table 1 on page 13.

3. As a safety precaution, check all parts thoroughly before placing the elevator in service.
4. At the governor, pull the rope upward until it can be removed from the governor sheave.
5. Use vise grips or "C" clamps, and two (2) pieces of wood to clamp the ropes in place.
6. Check to make sure that the rope is free of kinks.
7. Verify that the rope, when rotated, does not interfere with the sheave.

## Switch and Jaw Tripping Adjustment

1. Remove the wire seal from the weight connecting rod, and loosen the locknut on the side to be adjusted.
2. Recheck the tripping speeds - Rotate the governor sheave until the tripping speeds are correct.

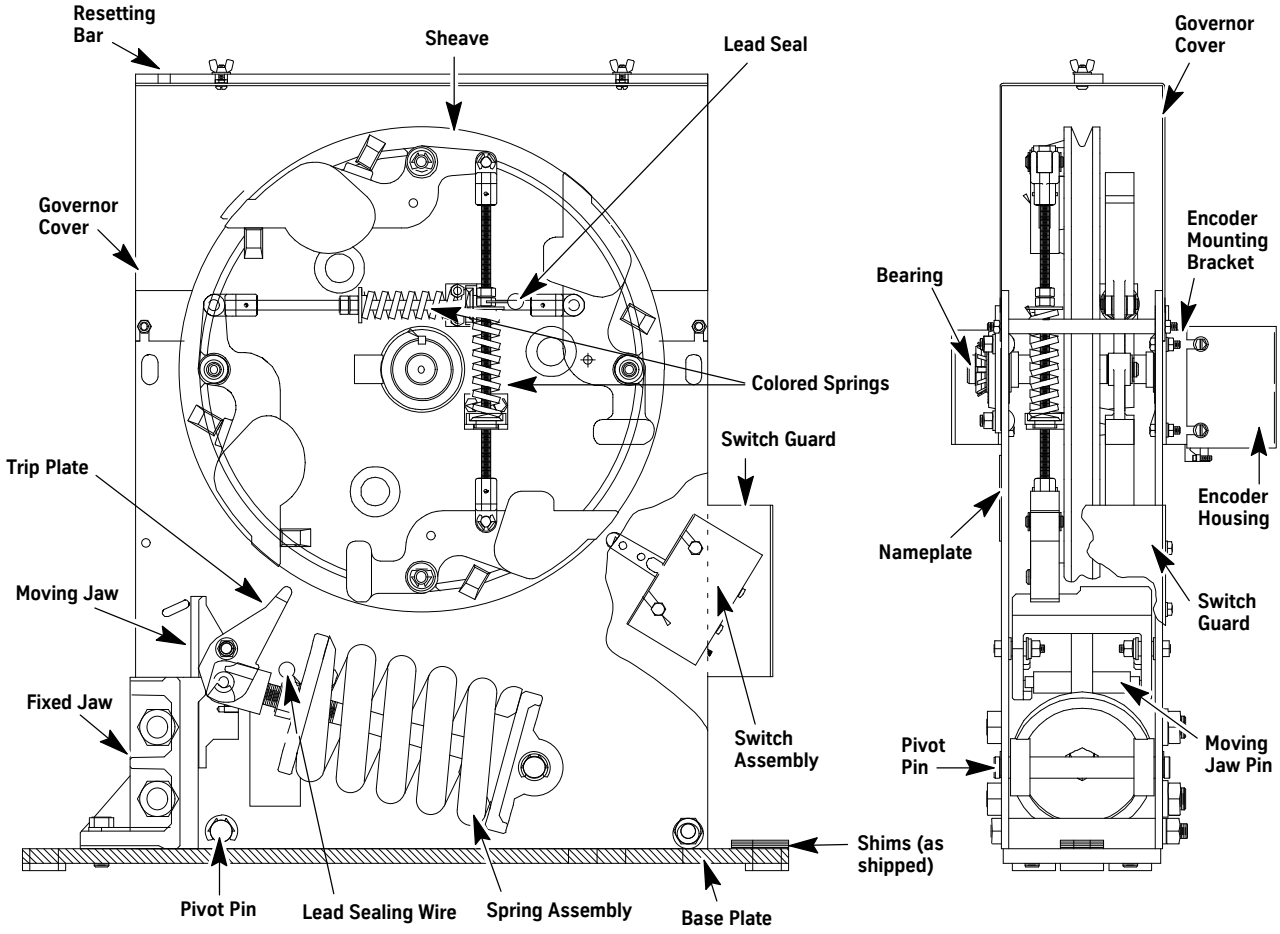
**Note:** A friction drive wheel can be made up. See Figure 3 on page 12.

3. Tighten the locknut against the spring retainer nut.
4. Drill a new hole in the adjustment nut and the connecting rod, and install a new seal.

# 16” Governor

## Machine Information

- Travel - Up to 850 feet
- Rated Speed - Up to 1400 FPM
- Encoder Option - Digital Encoder Available
- Single or Double Switch Option Available
- Switch Rating - 60 VDC, 5A; 250VAC 15A
- Pull Through - 600 lbs., (750 lbs. 30# rails)
- Iron or Traction Steel Grade Rope
- Rope Size - 1/2” 8 x 25
- Factory Tested and Sealed
- Easy Floor Mounting Base
- Reset Bar - Standard
- Weight - 183 lbs.




## Tensile and Torsional Requirements

| | Minimum Tensile | | Maximum Tensile | | Maximum Hardness | | Torsional |
|---|---|---|---|---|---|---|---|
| | P.S.I. | N/mm2 | P.S.I. | N/mm2 | Vickers | BHN | |
| Iron | 100,000 | 699.5 | 180,000 | 1241 | NA | NA | NA |
| Traction Steel | 170,000 | 1172.1 | 215,000 | 1482 | 450 | 425 | 34.5 - 25.0 d |
| EHS | 240,000 | 1654.7 | 285,000 | 1965 | 565 | 530 | NA |

Note: 1KPSI = 6.89476 $N/mm^2$, Maximum tensile strength applies only the outer strand wires contacting the sheave.

## Rope Dimensions

| Rope Diameter | Loaded Rope | Unloaded Rope | Out of Round Tolerances |
|---|---|---|---|
| .375 | .375/.390 | .382/.390 | .009 |
| .500 | .500/.515 | .510/.525 | .013 |

| 8 x 19 Class Wire Rope | | | | | |
|---|---|---|---|---|---|
| | | Breaking Strength (lbs.) | | | |
| Rope Diameter (in.) | Approximate Circumference (in.) | Weight (lbs. per foot) | Traction Steel | EHS | Iron |
| .250 | .750 | .09 | 3,600 | 4,500 | 1,800 |
| .313 | 1.000 | .14 | 5,600 | 6,900 | 2,900 |
| .375 | 1.125 | .20 | 8,200 | 9,900 | 4,200 |
| .438 | 1.375 | .28 | 11,000 | 13,500 | 5,600 |
| .500 | 1.625 | .36 | 14,500 | 17,500 | 7,200 |

Notes:

- Wire rope breaking strengths covered by specifications must not be less than the values.
- Loaded rope equals 10% of braking strength.

## Tailweight Selection Chart

| Net Travel (feet) | Governor Type # | Car Tailweight Assembly Number | CWT Tailweight Assembly Number | Tension Weight (lbs.) |
|---|---|---|---|---|
| 0-300 | 5501AF | 5503AB5<br>5503AB2 | 5504AB4 | 156 |
| | 501-1200 | 5503AG1<br>5503AG2 | 5503AG4 | |
| 301-700 | 5501AF | 5503AB7 | 5503AB8 | |
| | | 5503AG3 | 5503AG5 | |
| 0-300 | 5501A | 128800/136526 | 13505 | 138 |
| | | 5503AH1/136526/5503AH2 | 5503AH4 | 170 |
| | | 5503AH1/136526/5503AH2 | | |
| 301-500 | | 128813 | 5503AF1 | 276 |
| | | 5503AH3 | 5503AH5 | |
| 501-850 | | 122813 | 5503AF1 | 340 |
| | | 5503AH3 | 5503AH5 | |

## Installation
*(continued)*

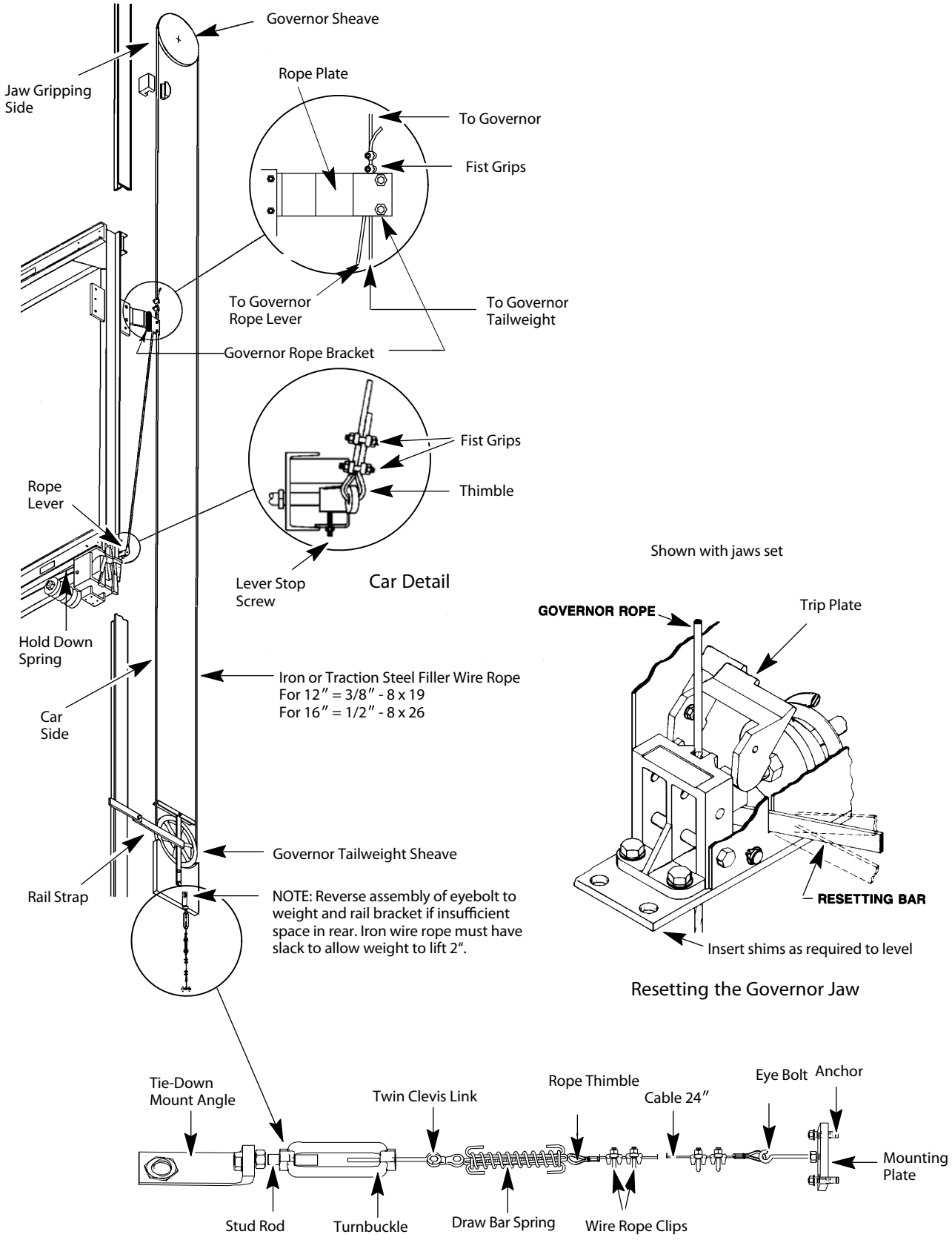



**Figure 9 - 16" Governor and Safety System**

# 16” Governor Installation

**Note:** The 16” Governor installs the same as the 12” Governor. See 12” Governor Installation on page 10.

## Speed Check of Non-Roped Governors

**WARNING** **Keep fingers and hands clear of the carrier arm when checking tripping speeds.**

1. Chuck the drive wheel device in a 3/8" or 1/2" variable speed drill.

2. Hold a tachometer in place against the groove in the governor sheave. The tachometer should touch the approximate center of the sheave groove. See Table 1 for speed specifications.

3. Place the friction drive wheel against the rim of the governor sheave and slowly increase the speed until the governor switch trips.

**CAUTION** **Ensure that when the weights fly out, the tachometer is not damaged.**

4. Record the switch tripping speed.

5. Continue increasing the governor speed until the governor’s rope jaws trip. Record the jaw tripping speed.

**Note:** The recorded switch/jaw tripping speeds must comply with those listed in the speed specifications, as mandated by code. See Table 2.

| Elevator Rated Speed (FPM) | 16 Governor Tripping Speed | | 16 Tachometer Reading | |
|---|---|---|---|---|
| | Switch | Jaws | Switch | Jaws |
| 1300 | 1398 | 1560 | 1354 | 1511 |
| 1400 | 1505 | 1440 | 1458 | 1628 |

**Table 2 - Speed Specifications for 16” Governor**

## Tailweight Installation

1. Locate correct installation detail for specific job type. See Figure 10 and Figure 11 on page 24.
2. Verify correct placement of the governor tailweight location. See Figure 12 on page 25.

**128800 (Car)**
- 0-300 ft. of travel
- 0-500 fpm
- 12/15# rail

**136526**
- 11/12/15/18.5/22.5# rail

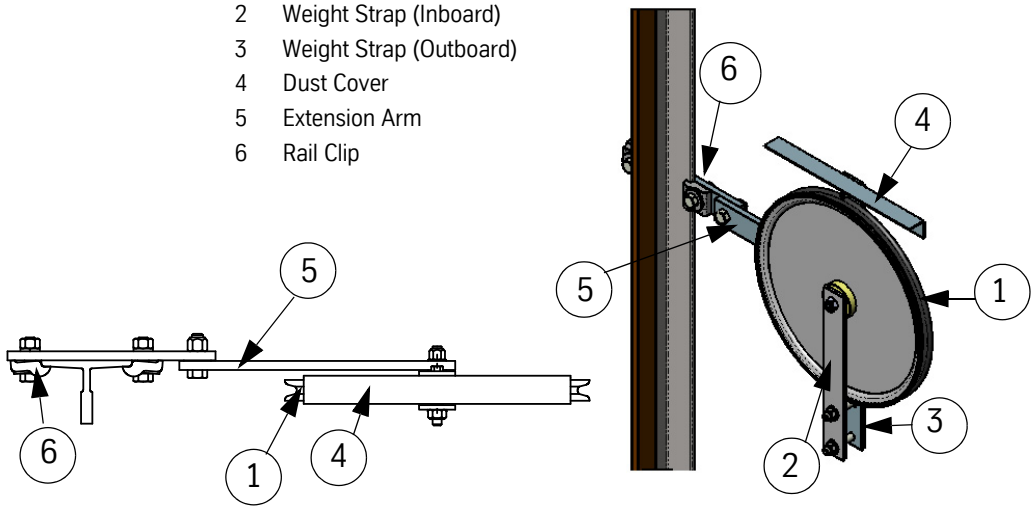
**5503AH1**
- 501-800 fpm

**5503AH2**
- 501-1400 fpm

**5503AH6**
- Variable gov. setting
- 12/15# rail

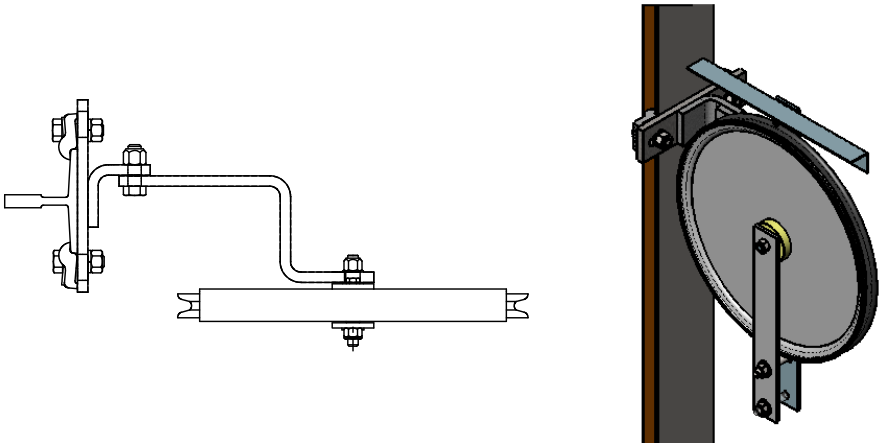
**5503AH7**
- 18.5/22.5# rail

| ITEM | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | | Tailweight Sheave |
| 2 | | Weight Strap (Inboard) |
| 3 | | Weight Strap (Outboard) |
| 4 | | Dust Cover |
| 5 | | Extension Arm |
| 6 | | Rail Clip |




**130505 (Counterweight)**
(Tension sheave assembly)
- 0-300 ft. of travel
- 0-500 fpm
- 15/18.5# rail

**5503AH4**
- 501-1400 fpm



**5503AH8 (Counterweight)**
- 0-300 ft. of travel
- 501-1400 fpm
- Variable gov. setting
- 30# rail

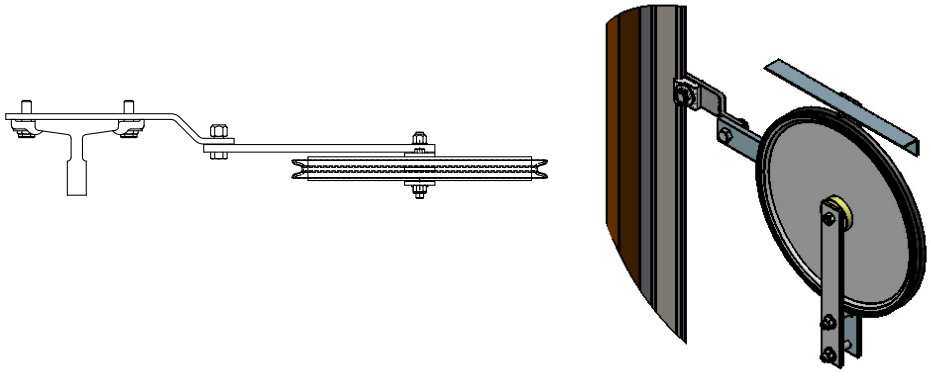


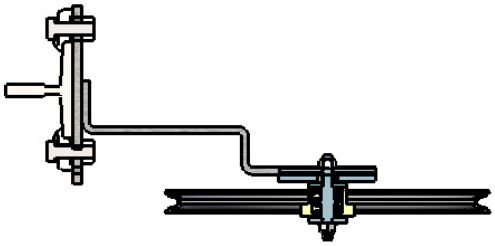
**Figure 10 - Tailweight Installation Details (1 of 2)**

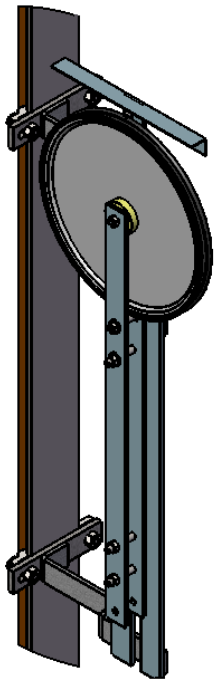
## Tailweight Installation
*(continued)*

**5503AH5 (Counterweight)**
- 301-850 ft. of travel
- 501-1400 fpm
- 15# rail

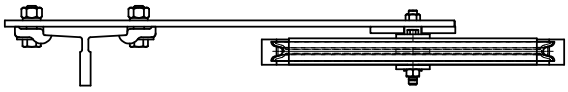
**5503AH9**
- 18.5 rail

**128813 (Car)**
- 0-500 fpm
- 11.5” gov. setting
- 12/15/18.5/22.5# rail





**5503AH (Car)**
- 301-850 ft. of travel
- 501-1400 fpm
- 15/18.5# rail



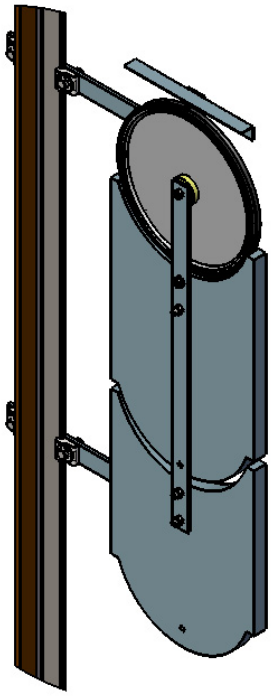


**Figure 11 - Tailweight Installation Details (2 of 2)**

## Tailweight Locations

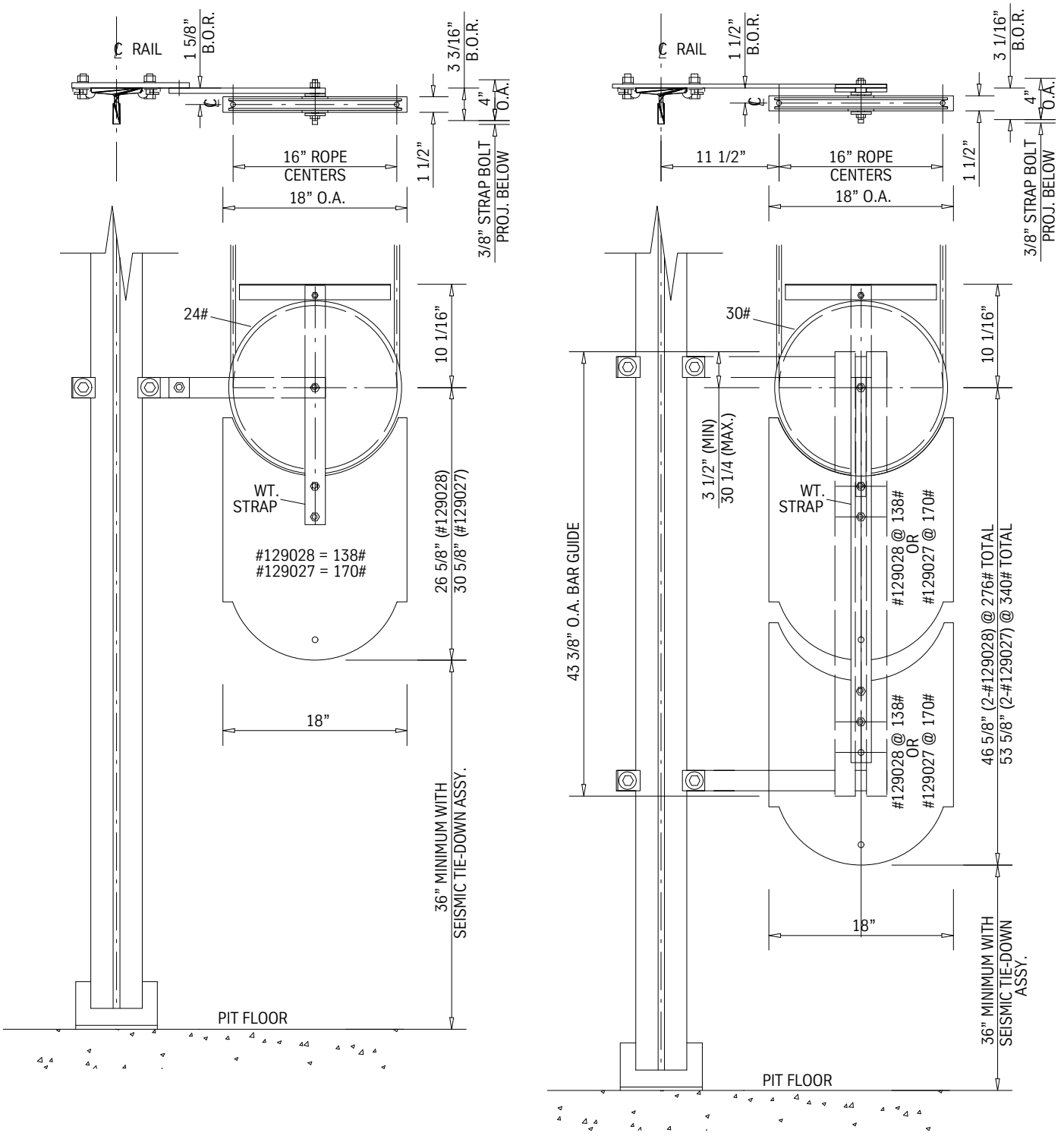



**Figure 12 - 16” Governor Tailweight Locations**

## Tailweight Installation
*(continued)*

3. Choose a position on the rail that provides adequate clearance from the bottom of the tailweight to the pit floor (36" minimum for seismic tie-down), and then mount the rail strap. See Figure 13.

4. Use the nylon thrust washers and any additional connection brackets required to connect the extension arm to the rail strap (corresponding to the model being used).

**Note:** Ensure that the extension arm pivots freely, and the sheave mounting position lines up with the center of the governor rope loop.

5. Install and adjust the governor rope to ensure that when the rope is in the sheave groove, the extension arm is horizontal or slightly above the rope.

6. Verify the proper weight-to-floor clearance, and also verify that the sheave rotates freely.

7. Install the tie-down assembly, from the weight to the pit floor. See Figure 13.

   a. Drill a 1/2" x 2 1/2 hole in the center of the weight for mounting.

   b. Before engaging the spring, adjust the assembly to allow for 1" of weight lift.

   c. Anchor the tailweight tie-down assembly to the pit floor.

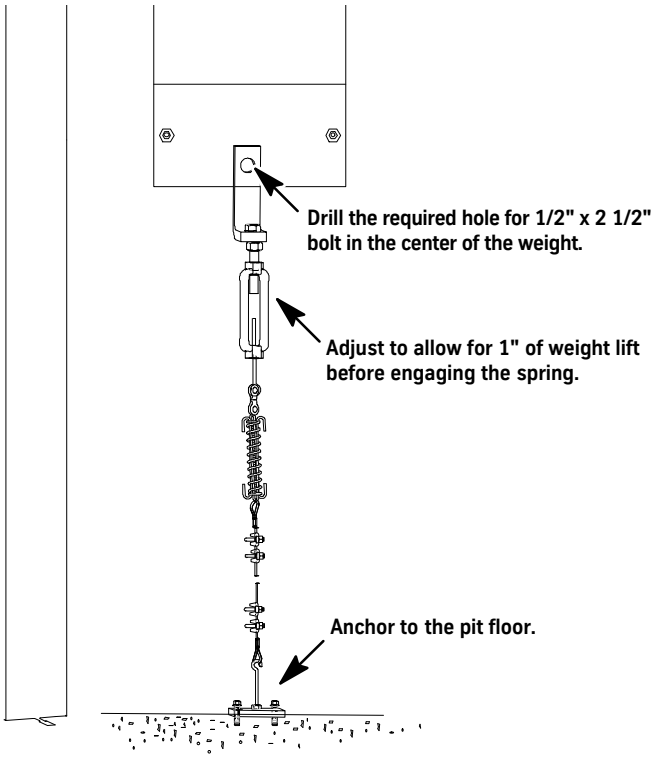



**Figure 13 - Tailweight Tie-Down**

## Speed Check of Roped Governor

### Tools and Materials

- Suitable friction drive wheel
- Variable speed drill
- Tachometer
- "C" clamp or vise grips, and wood blocking

**Note**: A friction drive wheel can be made. See Figure 14.

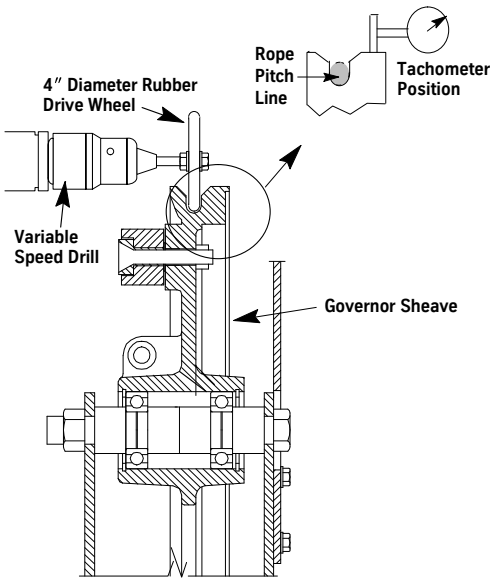



**Figure 14 - Friction Drive Wheel**

1. To access the governor, place the elevator on car top inspection operation and locate the car to the top of the hoistway.
2. Block up the governor tailweight sheave in the pit to provide slack in the governor rope.

**Notes:**

- Governors are calibrated, inspected, and sealed at the factory.
- The governor switch and jaw tripping speeds must be verified during periodic Category 5 testing.
- Switch and jaw tripping speeds are stamped on the governor nameplate.
- Maximum switch and jaw tripping speeds conforming to the rated elevator speed are shown in Table 2 on page 22.

3. As a safety precaution, check all parts thoroughly before placing the elevator in service.
4. At the governor, pull the rope upward until it can be removed from the governor sheave.
5. Use vise grips or "C" clamps, and two (2) pieces of wood to clamp the ropes in place.
6. Check to make sure that the rope is free of kinks.
7. Verify that the rope, when rotated, does not interfere with the sheave.

# Maintenance

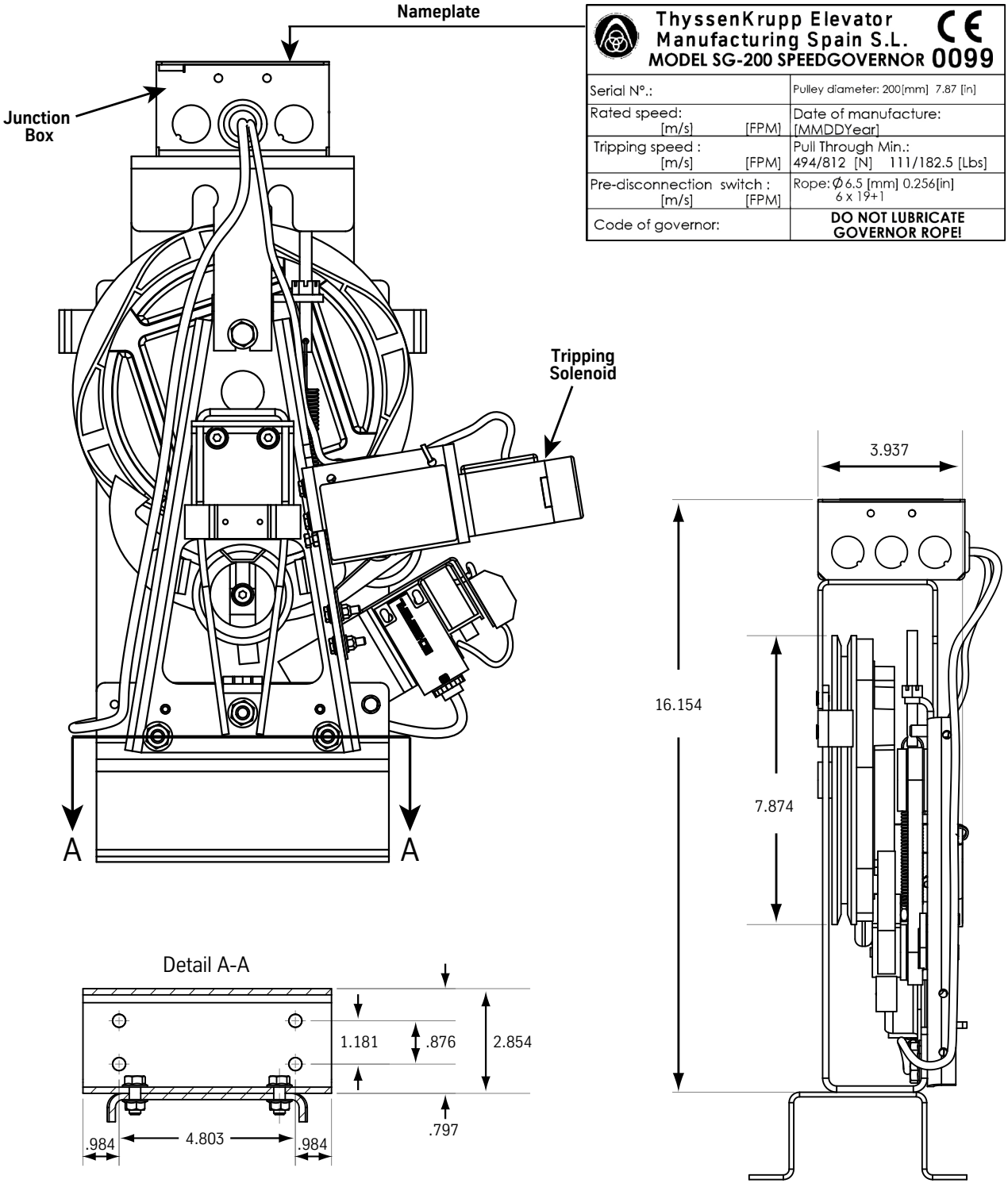
1. Capture and secure the car at a landing that allows free access to the governor area.
2. Turn OFF, Lock, and Tag out the mainline disconnect.
3. During regularly scheduled maintenance procedures, clean off all dust and dirt from the governor.
4. Examine the ropes for wear, kinks, or misalignment.
5. Signs of side-to-side sheave movement indicate bearing failure and require service or replacement.

**Note:** The optical disk on the 12” governor must be carefully cleaned. See Encoder Sensor Adjustment on page 12.

# MRL Products

**Note:** See the appropriate MRL product manual for additional information.

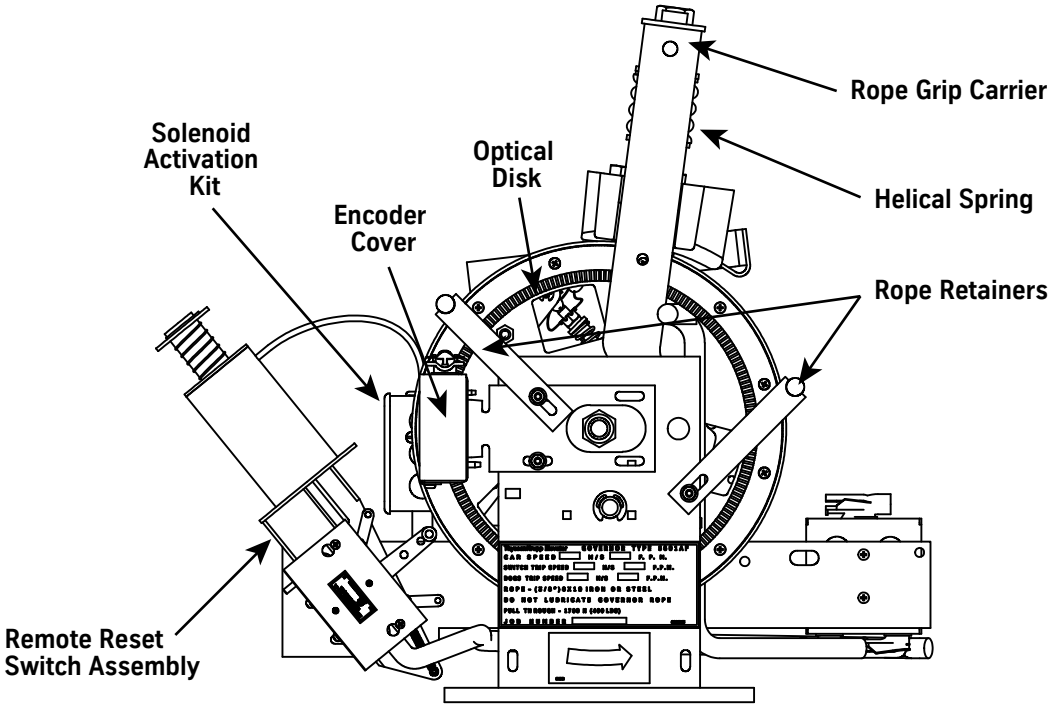
## Overspeed Governor (SG-200)



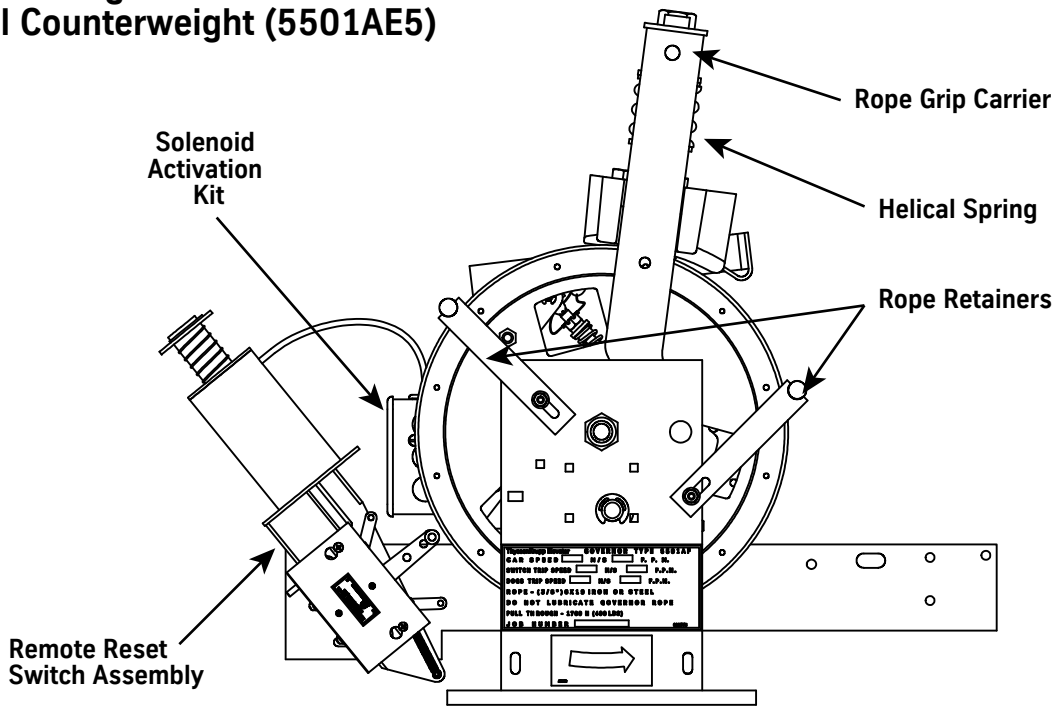
## Rope Specifications

| Diameter (mm) | Size | Maximum Pull Force (N) | Minimum Tensioning Force (N) | Tension Pulley Code |
|---|---|---|---|---|
| 6.5 | 6 x 19 | 500>300 | 494 | 1344.00.02 |
| | | | | 1344.00.01 |
| | | | | 1344.00.11 |
| | | | | 1344.00.15 |
| | | 900>800 | 812 | 1344.00.04 |
| | | | | 1344.00.06 |
| | | | | 1344.00.07 |
| | | | | 1344.00.08 |
| | | | | 1344.00.09 |
| | | 550>300 | 530 | 1345.10.02 |
| | | | | 1345.10.05 |
| | | | | 1345.15.02 |
| | | 850>800 | 820 | 1344.00.10 |
| | | | | 1344.00.12 |
| | | | | 1344.00.13 |
| | | | | 1344.00.16 |
| | | | | 1344.00.17 |
| | | | | 1345.10.01 |
| | | | | 1345.10.04 |
| | | | | 1345.15.01 |

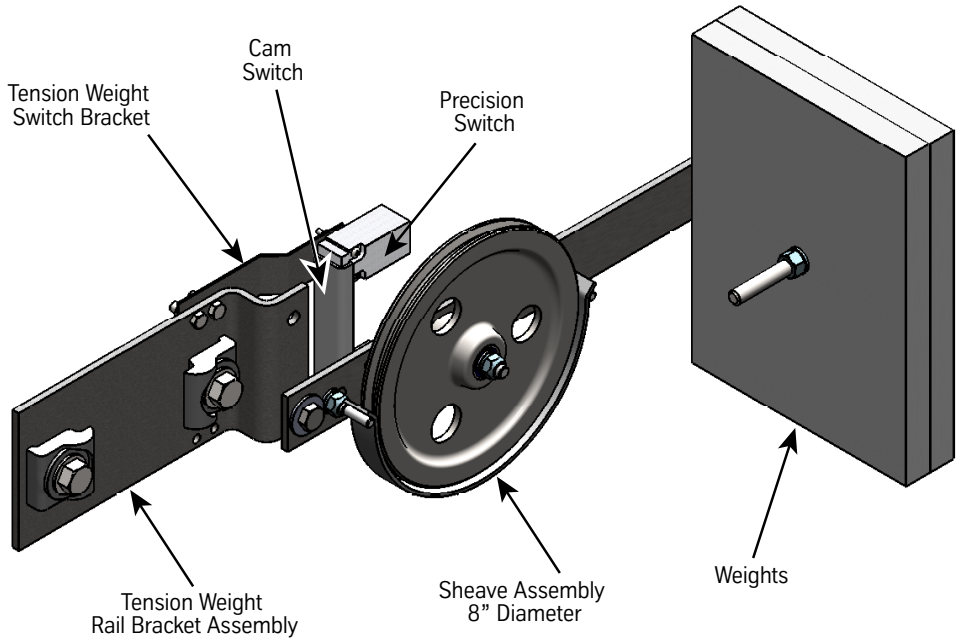
## 12” Self-Resetting Governor (5501AE7)

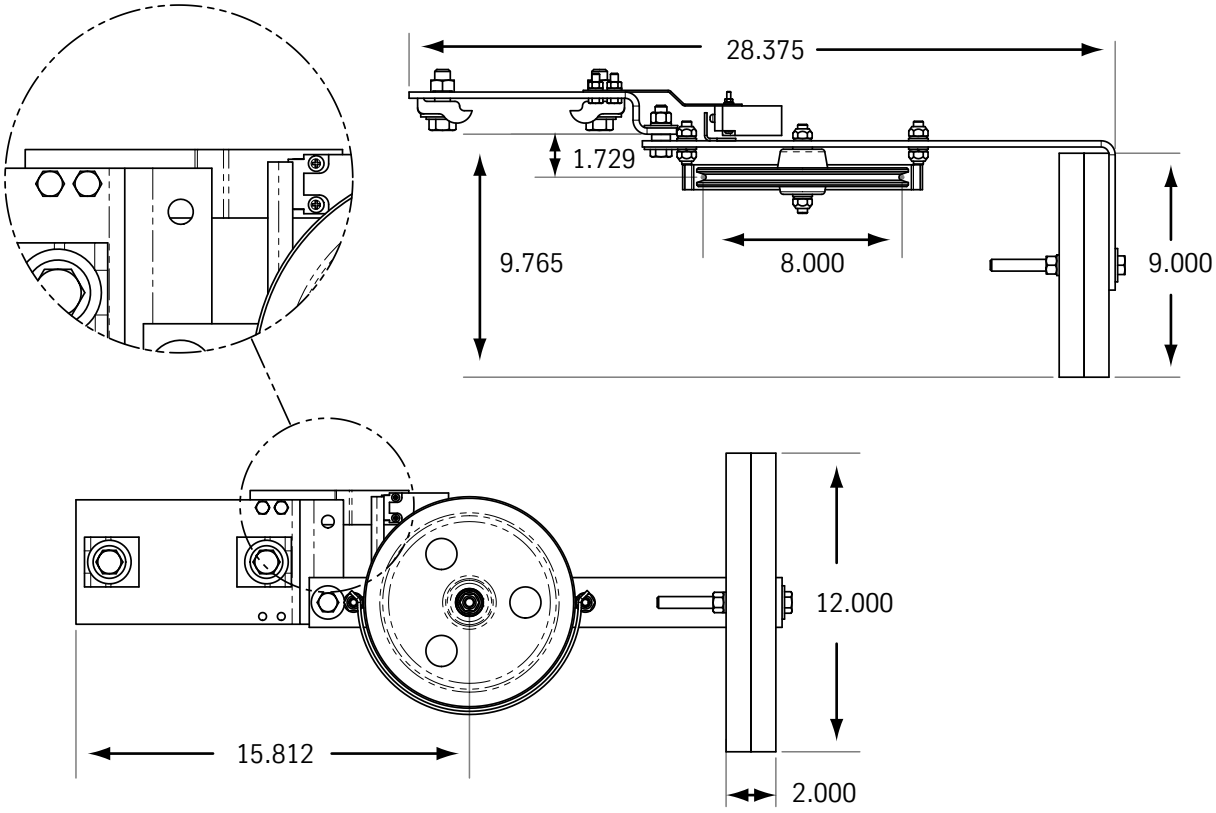



## 12” Self-Resetting Governor Non-Digital Counterweight (5501AE5)



# Governor Tailweight Assembly
# 5503AK001, Left Hand

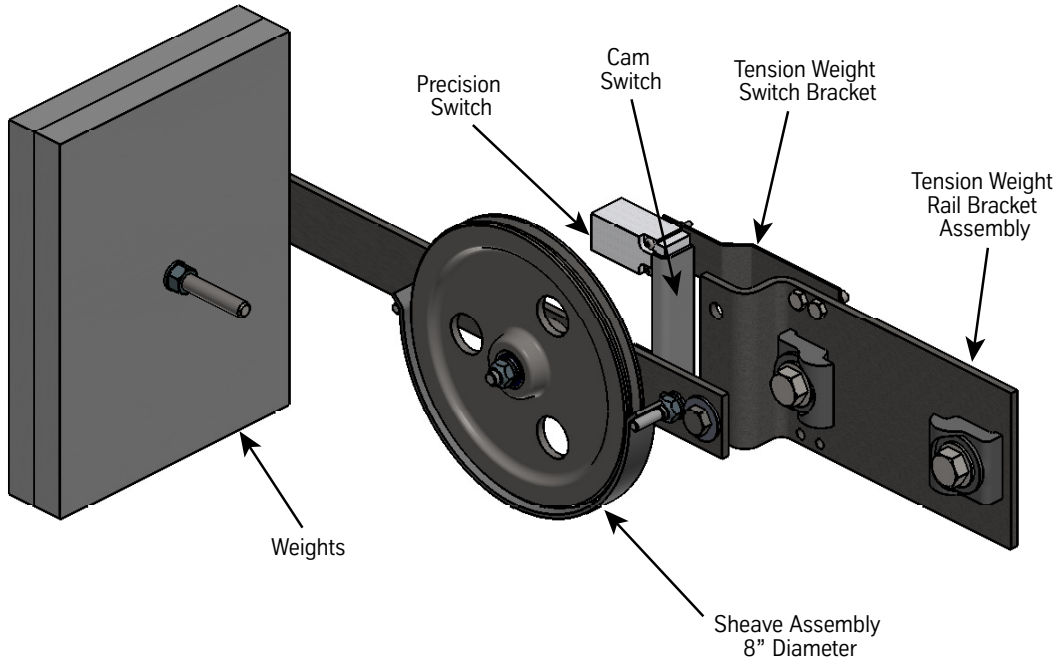


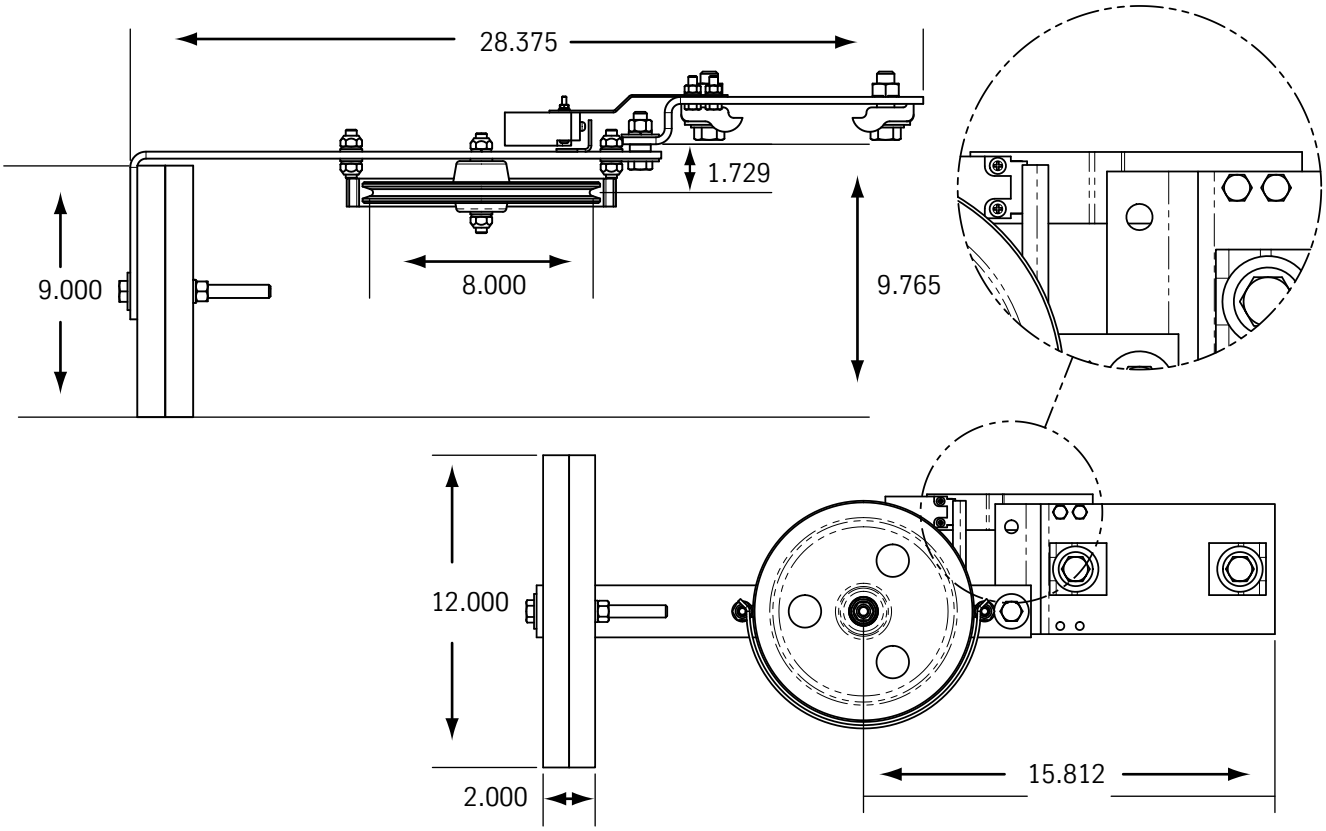




**Notes:**

- Use with .250 diameter, 8 x 19 rope.
- Mount only to 15# rail.

# Governor Tailweight Assembly
# 5503AK101, Right Hand

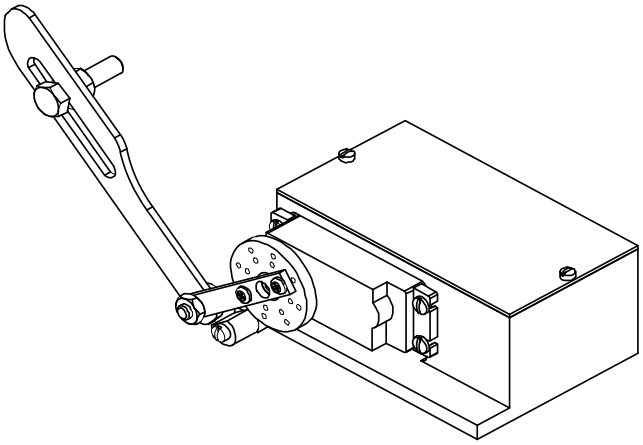


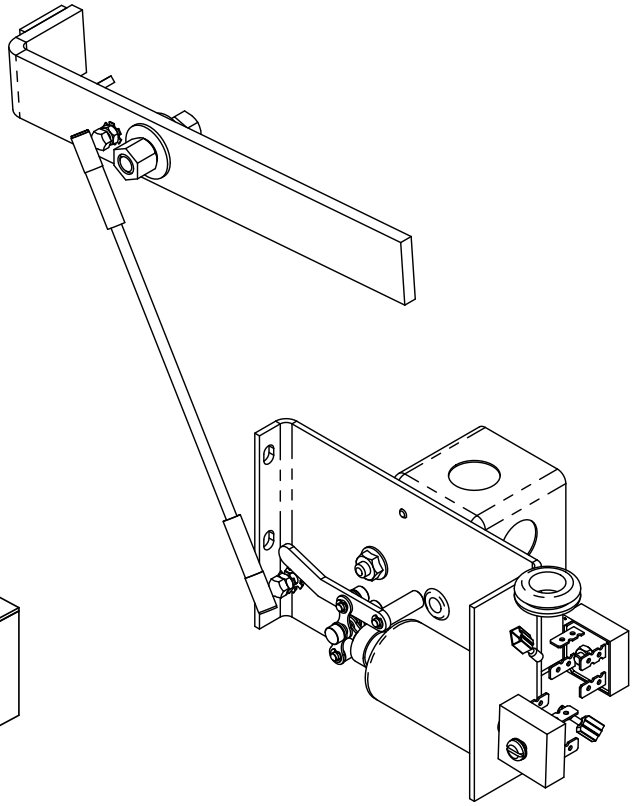

**Notes:**

- Use with .250 diameter, 8 x 19 rope.
- Mount only to 15# rail.

# Governor Kits



**Governor Solenoid Kit – 200APJ**



**Remote Governor Reset Assembly Kit – 200APD**

### Governor Solenoid Kit - 200APJ

- Mounted on the governor frame.
- Connected to the linkage mechanism which is mounted on the rope grip arm.
- Run three (3) 18 AWG conductors from the controller CVR1 terminal strip to the governor activation solenoid junction box. These wires may be run in the same conduit as the governor electrical switch.

### Remote Governor Reset Assembly Kit - 200APD

- Mounted on the governor electrical switch box.
- Controlled by the Temperature Fault Reset (TFR) card located in the controller.
- Run a three-conductor 18 AWG shielded cable, TKE print no. 220CW1, between the RGR and the TFR card. This cable may be run in the same conduit as the governor encoder cable.

# Governor Kits
*(continued)*

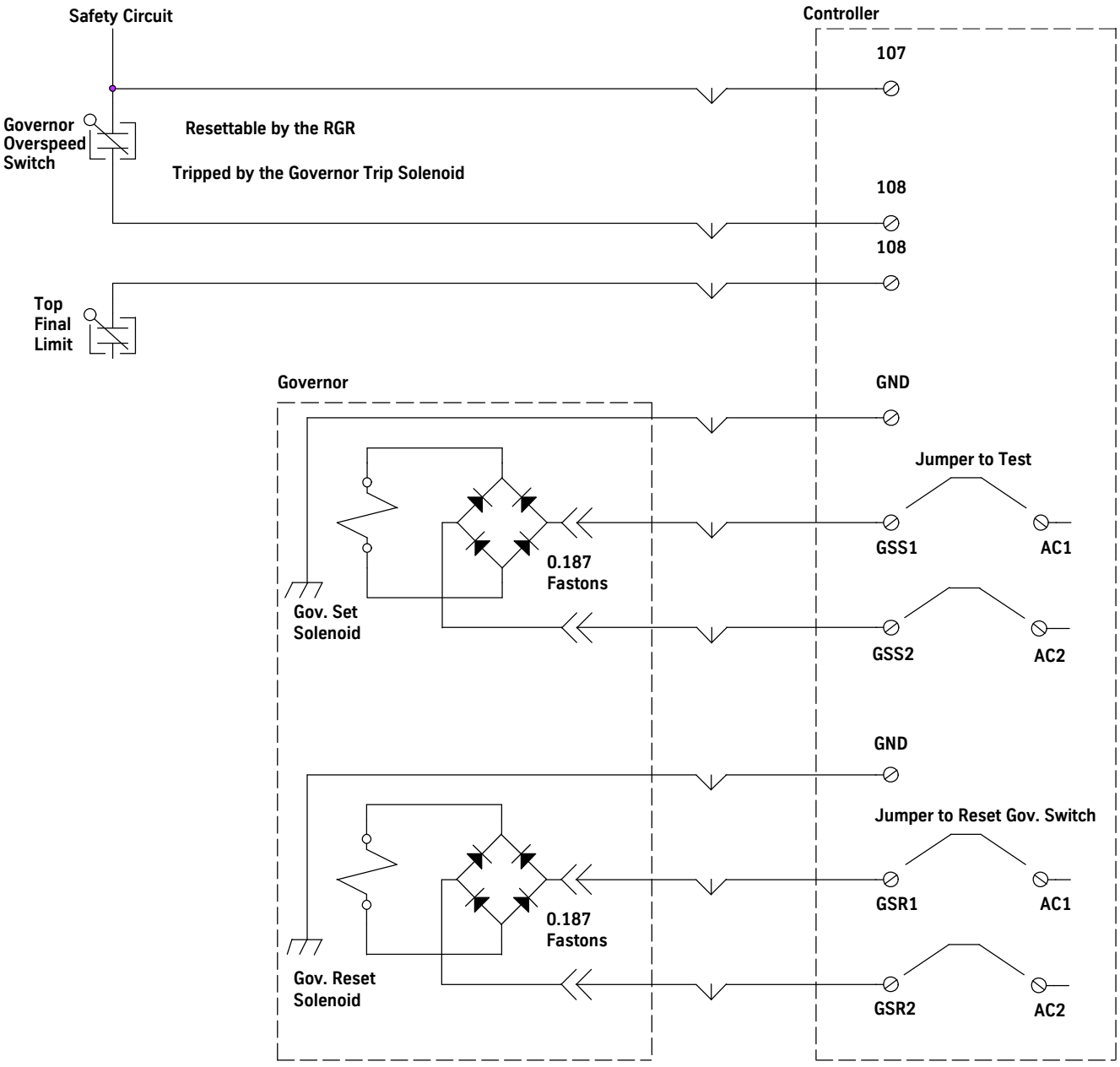
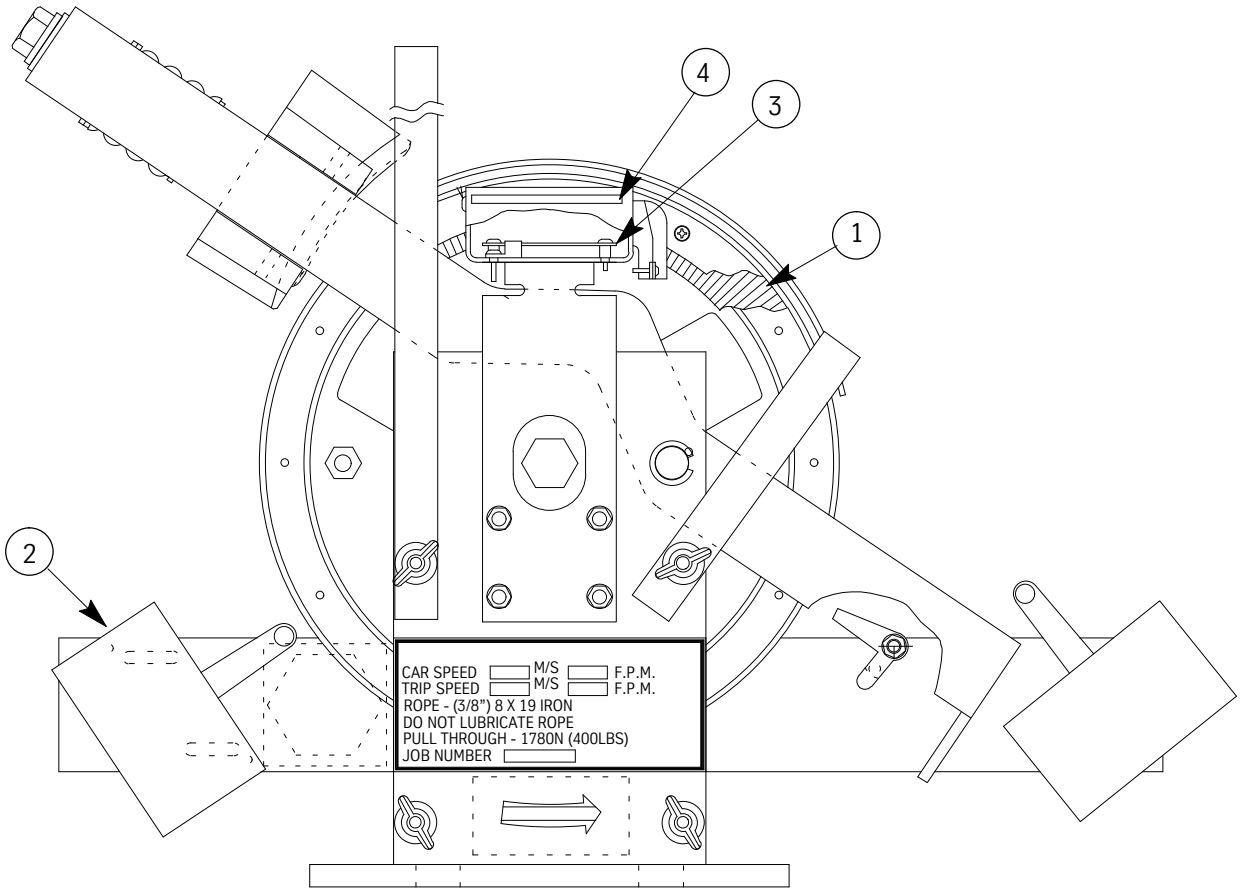



**Figure 15 - Wiring Diagram for 200APJ/200APD**

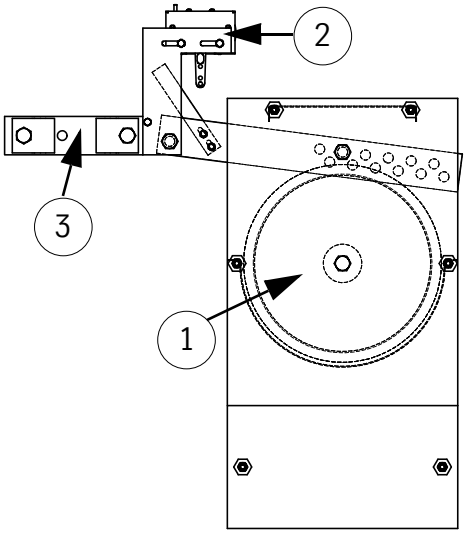
# Replacement Parts

## 12” Governor 5501AF Low Speed, 5501AE High Speed

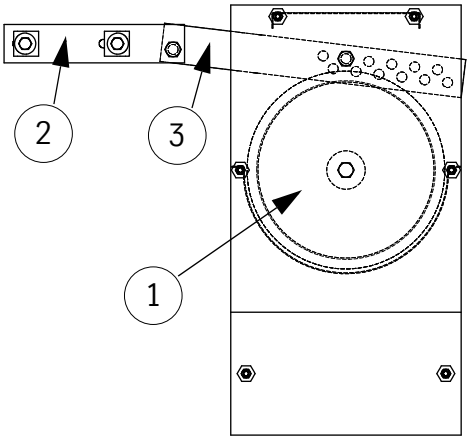



| ITEM | PART NO. | PRINT NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 9815739 | 356AA1 | Disk, Optical |
| 2 | 9745452 | 108051 | Switch Assembly |
| 3 | 9815740 | 6300FA1 | Encoder Card |
| 4 | | 421AA1 | Gauge, Optical Sensor |

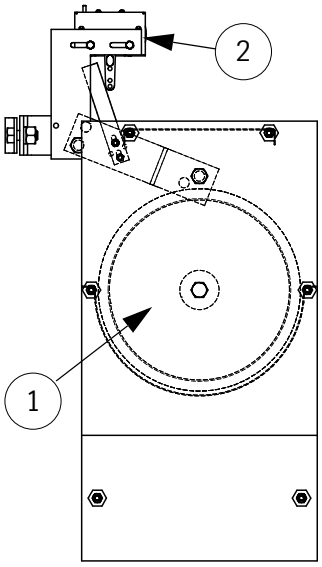
## 12” Tailweight Sheave



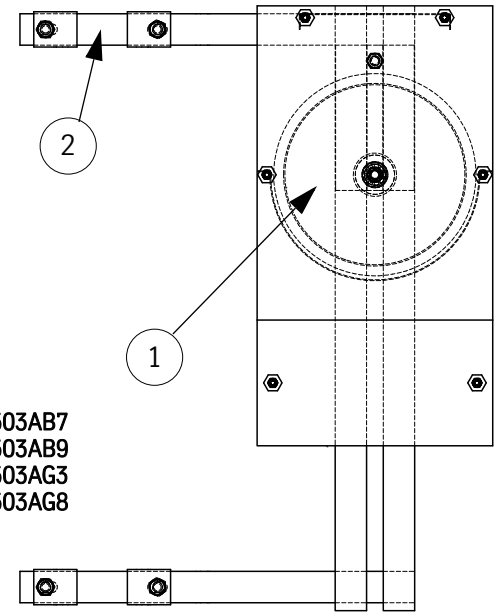

5503AB2
5503AB4
5503AB10
5503AG7



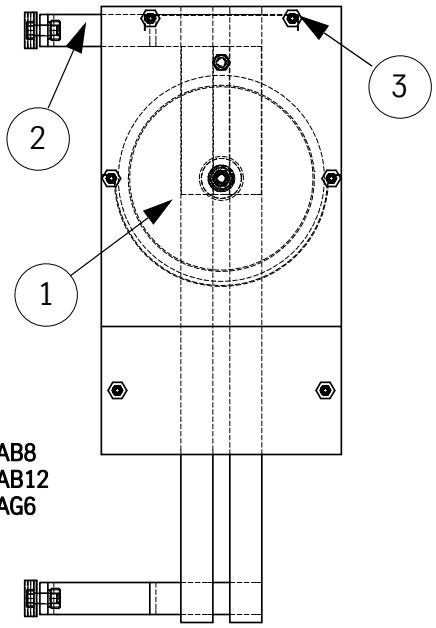

5503AB5
5503AB10
5503AG2




5503AB4
5503AG4
5503AG



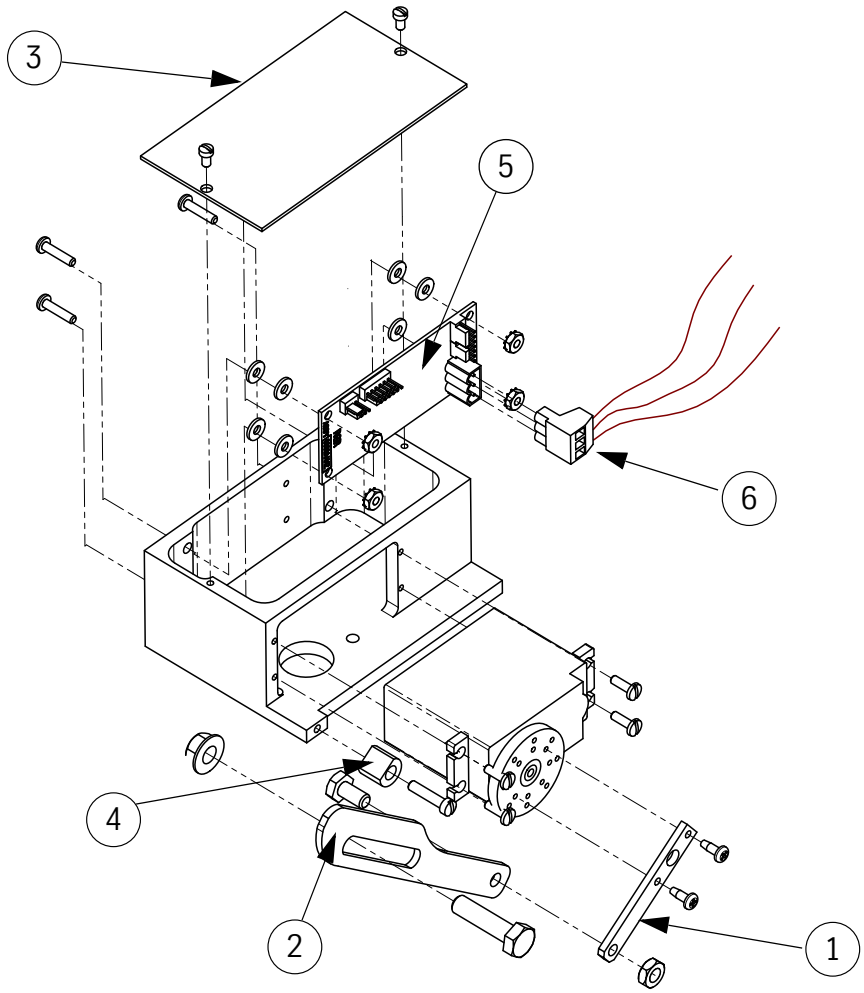

5503AB7
5503AB9
5503AG3
5503AG8




5503AB8
5503AB12
5503AG6

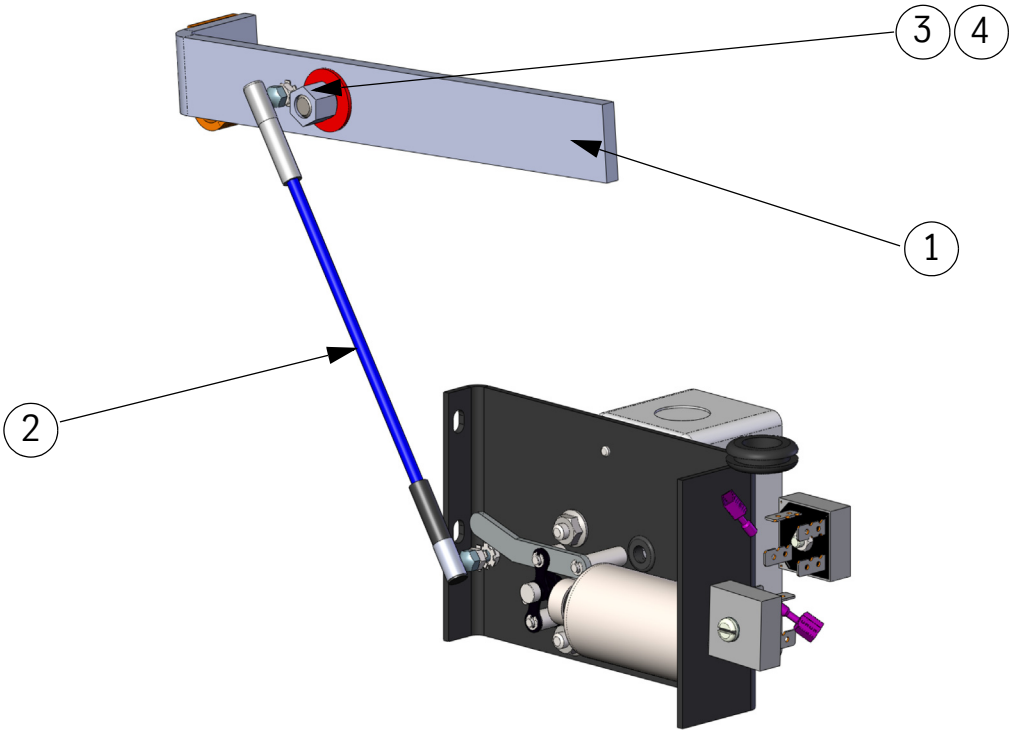
| ITEM | PART NO. | PRINT NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 9815752 | 750BH1 | Sheave Assembly with Bearings without Liner |
| 2 | | 750BH2 | Sheave Assembly with Bearings and Liner |
| 3 | | 200JT1 | Tailweight Switch Kit with Cam and Mounting Bracket |

## 12” Remote Governor Reset Assembly, 200APD



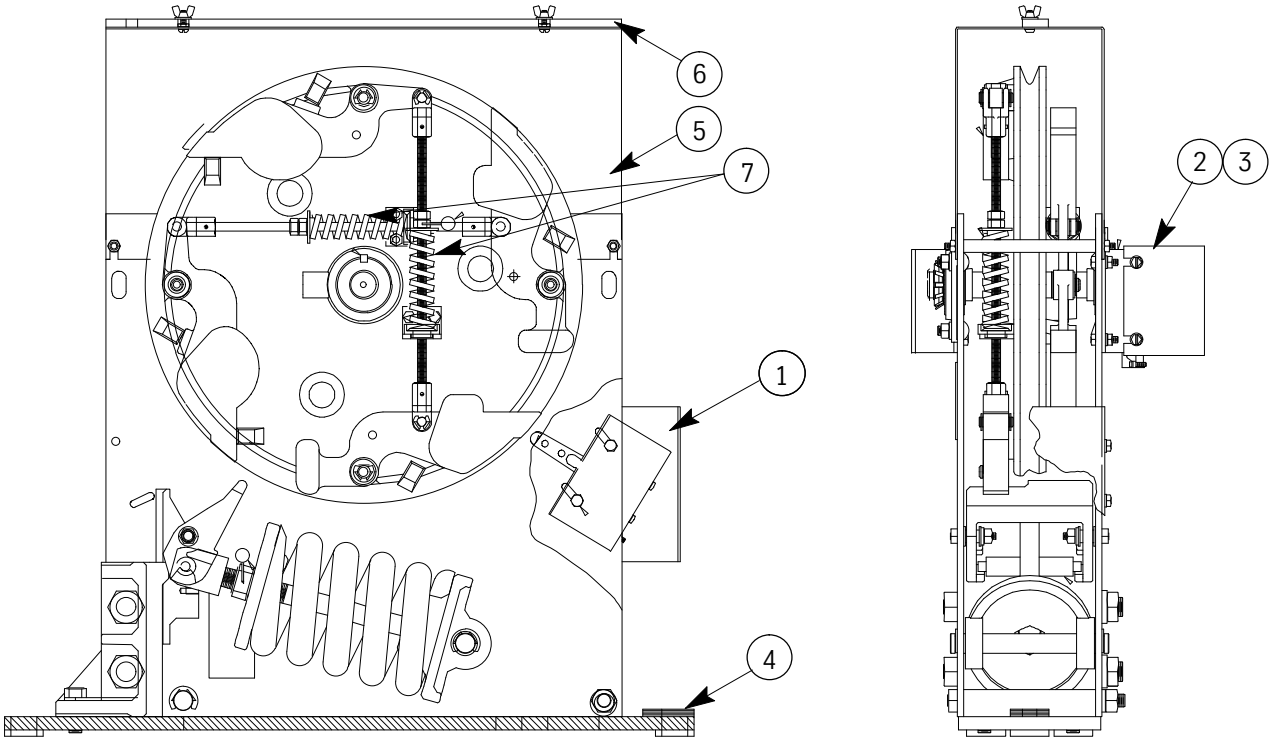

| ITEM | PART NO. | PRINT NO. | DESCRIPTION |
|---|---|---|---|
| 1 | | 558CJ1 | Reset Switch Lever, Governor Connect Arm |
| 2 | | 558CK1 | Reset Switch, Governor Arm |
| 3 | | 320LH1 | Cover, Governor Reset Switch |
| 4 | | 709AG1 | Restrictor, Governor Reset Switch |
| 5 | | 6300AAH2 | Card, Remote Governor Reset |
| 6 | | 292LR1 | RGR Connector Assembly |

## 12” Governor Solenoid Kit, 200APJ




| ITEM | PART NO. | PRINT NO. | DESCRIPTION |
|---|---|---|---|
| 1 | | 558CN1 | Interfering Arm Lever |
| 2 | | 718CJ3 | Link Rod Assembly |
| 3 | | 76190 | Brass Bushing |
| 4 | | 77226 | Bronze Washer |
| Parts not shown | | | |
| 5 | 9879183 | 689AE1 | Rectifier Bridge, 15 Amp, 1000v |
| 6 | | 141996 | Terminal, .250 Faston Insulated F/.032 Tab (18-22ga.) |

## 16” Governor, 5501AA Digital, 5501AB Non-Digital

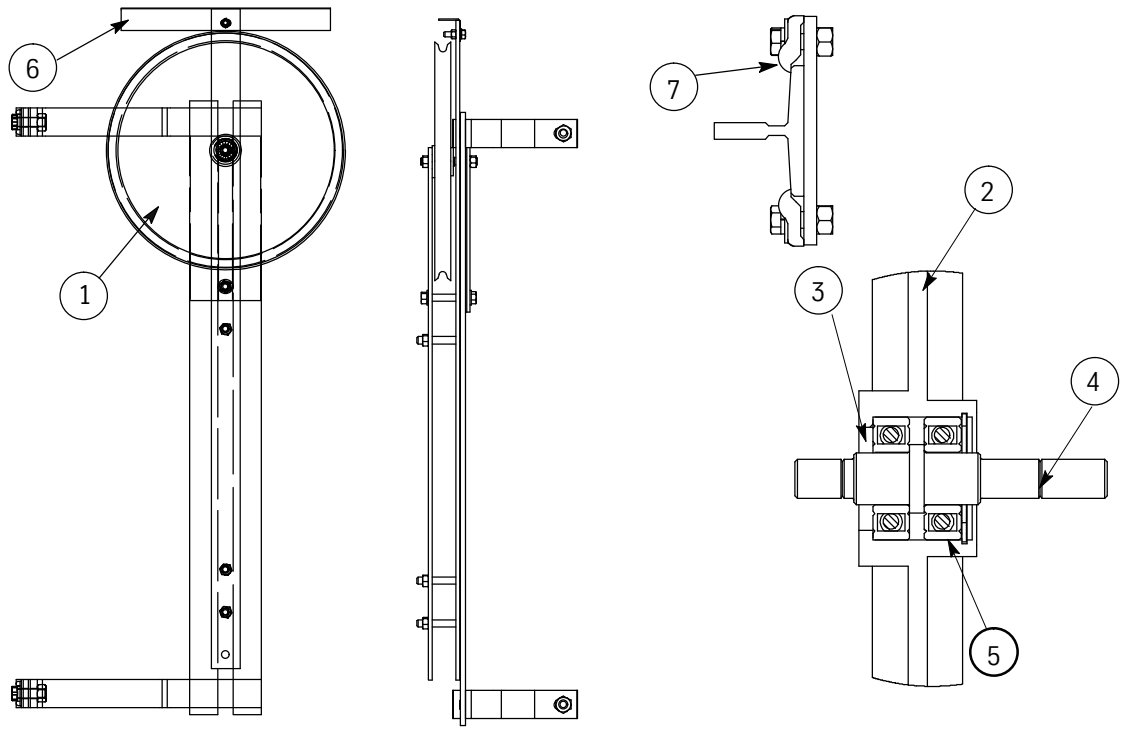



| ITEM | PART NO. | PRINT NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 9745452 | 108051 | Switch Assembly |
| 2 | 9875261 | 373AR1 | Position Encoder |
| 3 | 9867553 | 482AK1 | Encoder Housing |
| 4 | | 43949 | Shims |
| 5 | | 320BK1 | Cover |
| 6 | | 40976 | Resetting Bar |
| 7 | | 5502AA | Sheave Assembly, (see chart below) |

| Rated Speed FPM | Spring Color | Part Number |
|---|---|---|
| 1-200 | Red | 780AV4 |
| 201-400 | Orange | 780AV2 |
| 401-600 | Yellow | 780AV3 |
| 601-1200 | Green | 780AV1 |
| 1201-1400 | Blue | 780AV5 |

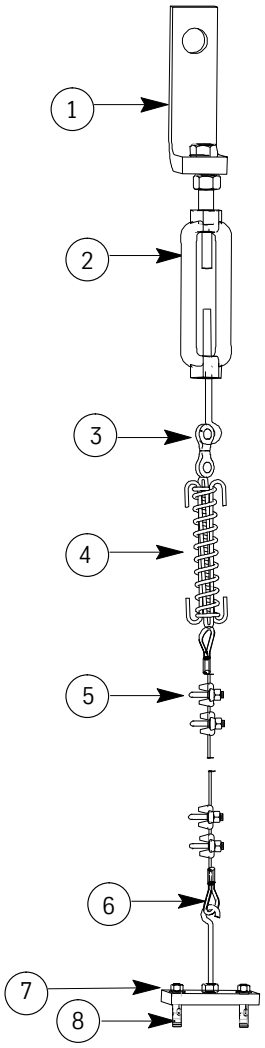
Spring Color/Speed Selection Chart

## 16” Tailweight Sheave, 5503AH3, 128813



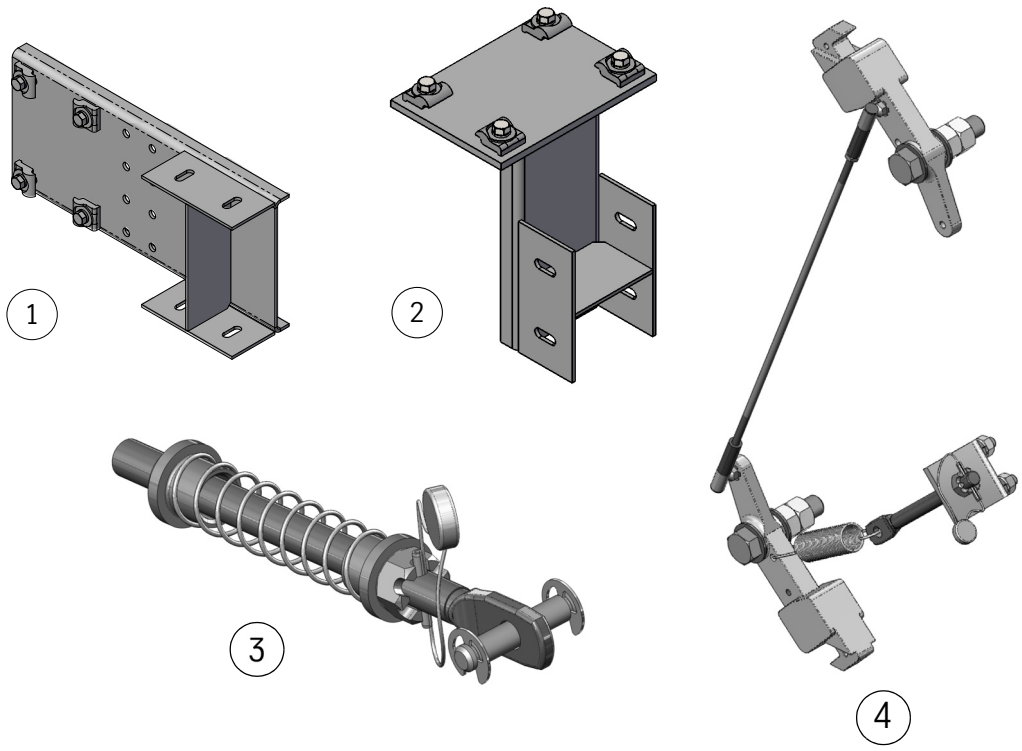

| ITEM | PART NO. | PRINT NO. | DESCRIPTION |
|---|---|---|---|
| 1 | | 751AX1 | Sheave and Shaft Assembly with Bearings 16 |
| | | 751AX2 | Sheave and Shaft Assembly with Bearings 16” with Liner |
| 2 | | 750DD | Sheave 16” without Bearings |
| 3 | 9760763 | 76076 | Ball Bearing, Sheave |
| 4 | | 128794 | Shaft, Sheave |
| 5 | | 128808 | Extension Arm |
| | 128798 | | Extension Arm |
| | | 130504 | Extension Arm |
| | | 130524 | Extension Arm |
| 6 | | 27842 | Rail Strap |
| | | 150483 | Rail Strap, 15# Rail |
| | | 150484 | Rail Strap, 18.5# and 22# Rail |
| | | 150485 | Rail Strap, 30# Rail |

## Tailweight Tie-Down Package, 148313




| ITEM | PART NO. | PRINT NO. | DESCRIPTION |
|---|---|---|---|
| 1 | | 129026 | Tie-Down Mount Angle |
| 2 | | 121692 | Turnbuckle |
| 3 | | 147964 | Twin Clevis Link |
| 4 | | 121693 | Draw Bar Spring |
| 5 | | 78025 | Cable Clip |
| 6 | | 77434 | Rope Thimble |
| 7 | | 120999 | Mounting Plate |
| 8 | | 117864 | Anchor |

## Kits/Assemblies




| ITEM | PART NO. | PRINT NO. | DESCRIPTION |
|---|---|---|---|
| 1 | | 461CN1 | Hanger Assembly, Car Governor |
| 2 | | 461CR1 | Hanger Assembly, CWT Governor |
| 3 | | 200BCT__ | Kit, 175 FPM for 12” Governor |
| 4 | | 200BCV001 | Kit, 175 FPM for 16” Governor |
| Parts not shown | | | |
| 5 | | 200JT1 | Kit, Governor Tailweight Switch |
| 6 | | 200BWT001 | Kit, Bolt, Governor Bracket |
| 7 | | 200AMP1 | Kit, Fasteners, Governor Stand |

**Vertical Express**

P.O. Box 2019  Memphis, TN  38101  Tel: (866) 448-3789 (toll-free)  Fax: (901) 261-1807  www.verticalxpress.com