

Installation / User Guide #1175 #211 Pit Mounted Governor with #195 Idler Sheave



Installation / User Guide



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This installation / user guide is intended for the use of qualified and authorized elevator personnel ONLY. For your safety and the safety of others, do not attempt ANY procedure that you are not qualified and authorized to perform. Recommended procedures must be done in accordance with the applicable rules of the latest edition of the National Electrical Code; the latest edition of ASME A17.1; and all governing local codes. Every attempt has been made to ensure that this guide is accurate and up to date. Hollister-Whitney Elevator Co. LLC assumes no liability for consequences resulting from any error or omission. Please notify Hollister-Whitney Elevator Co. LLC regarding any difficulties with this guide.

#211 PIT MOUNTED GOVERNOR #195 IDLER SHEAVE - BULLETIN #1175

Contents

1	User Guide		1-1
	1.1	Specifications	1-1
	1.2	Governor Data Plate	1-4
2		nstallation	
	2.1	Safety	2-1
	2.2	Verification	2-1
	2.3	Planning	2-1
		Placement	
	2.5	Governor #211 Installation	2-3
		Idler Sheave #195	
3	F	Field Testing	3-1
		Testing Per Code	
4	9	Service	4-1
	4.1	Lubrication	4-1
	42	Maintenance	4-1

List of Figures

Figure 1 - Governor Data Plate	1-4
Figure 2 - Component Placement	2-2
Figure 3 - Governor Base Plate	2-3
Figure 4 - Concrete Anchor Bolt Instaltion	2-4
Figure 5 - Installed Base Plate	2-5
Figure 6 - Install Guide Rods	2-6
Figure 7 - Setting the Governor	2-7
Figure 8 - Install Springs and Washers	2-8
Figure 9 - Install Reaction Spring Nut	2-9
Figure 10 - Align Governor Rope	2-10
Figure 11 - Securely Bolt Down the Base Plate	2-11
Figure 12 - Install Rope Stretch Switch	2-12
Figure 13 - Remote Set Solenoid	2-13
Figure 14 - Install Remote Set Solenoid Harness	2-14
Figure 15 - Install Wiring/Conduit for Overspeed Switch	2-15
Figure 16 - Install Wiring/Conduit for Rope Stretch Switch	2-16
Figure 17 - Remote Set Solenoid Wiring to Controller	2-17
Figure 18 - General View of Installed Governor	2-18
Figure 19 - #195 Idler Sheave	2-19
Figure 20 - Verification of Pull-Through	3-2
Figure 21 - Governor Pull Through Components	3-3
Figure 22 - Driving the Governor from Encoder	3-5
Figure 23 - Driving the Governor from Hex in Governor Shaft	3-6
Figure 24 - Tachometer Placement Outside of Rim	3-7

#211 PIT MOUNTED GOVERNOR #195 IDLER SHEAVE - BULLETIN #1175

Figure 25 - Spring / Eyebolt Assembly	3-8
Figure 26 - Over-speed Switch	3-9
Figure 27 – Manual Reset Button	3-9
Figure 28 - Verification of Rope Stretch Switch	3-11
Figure 29 - Yoke and Overspeed Switch Positions	3-12

List of Tables

Table 1- #211 Pit Mounted Governor Ratings	1-2
Table 2- Solenoid Ratings	1-2
Table 3- Overspeed Switch Ratings	1-3
Table 4- Rope Stretch Switch Ratings	1-3
Table 5 - RPM Ratio Values	3-7
Table 6 - Tripping Speeds	3-7

#211 PIT MOUNTED GOVERNOR #195 IDLER SHEAVE - BULLETIN #1175

Section

1 User Guide

1.1 Specifications

The 211 governor uses the same general operating principle as the model 207 governor, but the hammer actuation has been "flipped" upside down for the pit-mounted application. The governor is intended to "float" up and down on the guide rods to accommodate rope stretch and building expansion and contraction. In a sense, the governor is much like a tension weight and governor combined.

The 211 Pit Mounted Governor is a safety device that activates via centrifugal force when an elevator over-speeds and reaches its tripping speed limit(s). The 195 Idler Sheave supports the upper end of the governor rope loop and allows the pit mounted governor to maintain proper tension on the governor rope.

In the down direction, when an elevator reaches its electrical tripping speed limit, its pawl weight arms extend centrifugally triggering the safety switch which sends an electrical signal to the elevator control system to initiate its emergency shut down. If the elevator reaches its mechanical tripping speed limit, the over-speed governor releases its hammer pivot assembly via its pawl weight arms and engages the hammer head onto the governor rope. The resulting tension on the governor rope actuates the safety assemblies on the elevator car which clamp onto the guide rails to mechanically stop the elevator.

In the up direction, when an elevator reaches its electrical tripping speed limit, the over-speed governor triggers the safety switch in the same fashion as above to send an electrical signal to the elevator control system to initiate its emergency shut down. The over-speed governor does not engage the safety assemblies on the elevator car when traveling in the up direction. Separate ascending protection methods are available should the elevator reach its mechanical speed limit or experience unintended motion.

The 211 governors are capable of being set remotely. Setting the governor is accomplished by activating a solenoid at any speed less than normal over-speed, thus setting the grips and activating the safety.



The mechanical tripping speed limit is equal to or slightly greater than the electrical tripping speed limit (see Table 6).

The 211 Governor specifications are detailed in Table 1.

Table 1-#211 Pit Mounted Governor Ratings

Table 1-#211 Pit Mounted Governor Ratings				
Maximum Car Speed	500 fpm			
Maximum Mechanical Tripping Speed	625 fpm			
Sheave Diameter	12.5"			
Encoder Live Shaft Diameters Options	1/4", 12mm, 3/4", or 1"			
Rope Diameter	3/8"			
Rope Type (pre-formed/pre-stretched)	Traction Steel 8x19 or 8x21			
Hand	Left or Right			
Maximum Pull Through	800 lbs.			
Minimum Pull Through	300 lbs.			
Over Speed Switch	Standard			
Governor Rope Stretch Switch	Standard			
Speed Reducing Switch	(Optional)			
Remote Set	Standard/Required			
Maximum Sheave Load	650 lbs.			
Shipping Weight	130 lbs.			

Table 2- Solenoid Ratings

Manufacturer / Part number	Magnet-Schultz / S10549
Reference Spring Force	8.0 N Energized
Spring Rate	02 N/mm
Nominal Stroke	20mm
Operating Voltage	110 VAC/60Hz [97 VDC]
Force	Minimum 25lbs. @ 110 VAC [97VDC] @ 20°C
Coil Resistance	Nominal 34.85Ω ± 5% @ 20°C
Ambient Temperature Range	-40°C to +50°C
IP Rating	IP65

Table 3- Overspeed Switch Ratings

Actuator	Roller Plunger		
Contact Form	2NC		
Frequency	50/60 Hz		
Load	General Load/Micro Load		
Conduit	G1/2		
Ambient Temperature	-30°C to +70°C		
Ambient Humidity	95% max.		
IP Rating	IP67		

Table 4- Rope Stretch Switch Ratings

Adjustable Roller Level				
2NC				
50/60 Hz				
General Load/Micro Load				
G1/2				
-30°C to +70°C				
95% max.				
IP67				

1.2 Governor Data Plate

The governor data plate is located on the side of the governor.

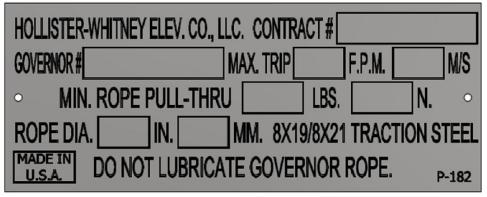


Figure 1 - Governor Data Plate

#211 PIT MOUNTED GOVERNOR #195 IDLER SHEAVE - BULLETIN #1175

Section

2 Installation

2.1 Safety

- Wear proper PPE (Personal Protective Equipment).
- Inspect tools and equipment to ensure they are in good condition and proper working order.
- Read and understand all instructions prior to proceeding.
- Follow standard elevator industry and governing safety requirements.

2.2 Verification

Verify all components are present so the #211 governor can be installed. It is recommended to fully review the #211 governor for the following:

- Check the governor data plate to verify that the governor is designed for the intended speed range and pull-through.
- Ensure that the assembly and all seals are in good condition.
- See the 211 governor drawings at the end of this document for additional info.
- Use 3/8" diameter 8x19 or 8x21traction steel governor rope. <u>Pre-formed</u> and <u>pre-stretched</u> is highly recommend.

2.3 Planning

- Determine the governor rope drop locations (match existing or refer to applicable job layouts).
- Confirm that the tension sheave assembly will have adequate clearance when positioned in line with the required rope drops.
- Prior to the installation of the governor assembly, plan and prepare for the electrical and/or conduit routing for the over-speed switch, set solenoid, and encoder (encoder by others if applicable).
- Ensure that electrical routing will not interfere with the governor operation or ease of removal. **NOTE- Conduit and fittings are not provided.**

2.4 Placement

Position the governor in the elevator pit between the rope drop locations with the hammer and grip opposite the car side rope attachment. The rope drop to the hammer/grip side of the governor must be a straight drop from the idler. The car side rope is offset at the car's safety rod angle and drops to the slave and yoke side of the governor (see). Right hand governor is shown.

Notice that the hammer is on the <u>opposite</u> side of the safety rod angle/safety lever. This is different from a typical overhead governor application.

Verify that the assembly positioning will not interfere with other elevator equipment (roller guides, car, counterweight, buffers, etc.) or other obstructions. Also, keep in mind the placement requirements of the Idler Sheave #195 (2.6) in the overhead area.

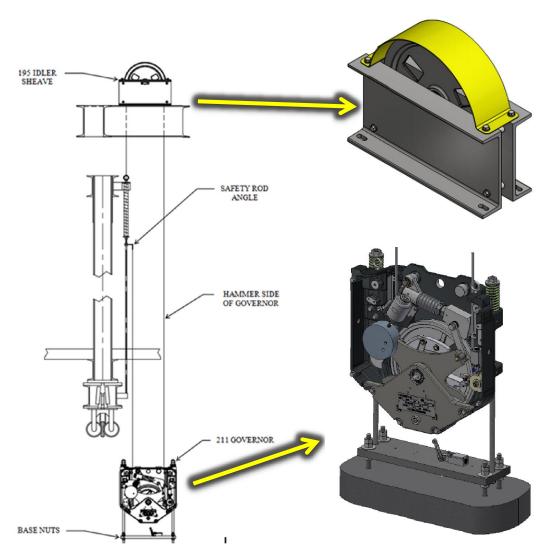


Figure 2 - Component Placement

2.5 Governor #211 Installation

2.5.1 Step 1: Mark Mounting Location

- 1 Use the governor base plate as a template to mark the mounting locations.
- 2 To ensure the rope drop from the 195 idler sheave is in-line with the governor sheave, drop a plumb line down from the idler sheave to the plumb line hole in the base plate (see image below). The plumb line hole is on the same pitch diameter as the governor sheave.
- 3 It is very important that the rope drop is straight down from the idler sheave on the <u>hammer side</u> of the governor for proper rope/grip/hammer alignment later.
- 4 Mark mounting locations as necessary.

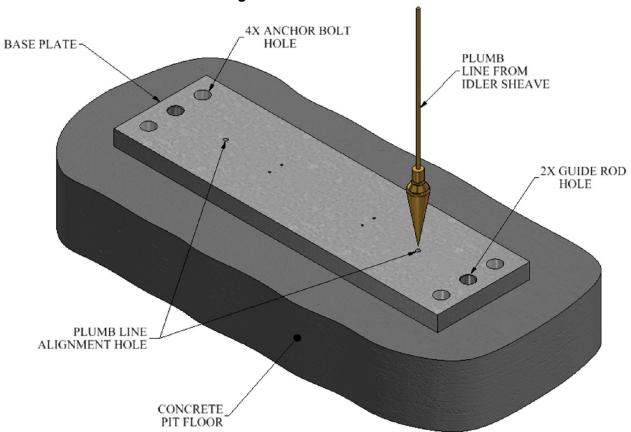


Figure 3 - Governor Base Plate

2.5.2 Step 2: Install Concrete Anchor Bolts

1 Using the marks which were made from the template, install four 5/8" concrete anchor bolts, **not included with the governor**.

- 2 The concrete anchor bolt depth into the concrete depends on the type of concrete being used. Consult a structural engineer for the minimum required bolt depth. For reference purposes, the maximum up-pull force on the governor is approximately 1600 lbs. (800 lbs. max. pull through which is then doubled for impact)
- 3 The height of the exposed threads above the pit floor should be 5". The height of the washers **not included with the governor** should be 2" above the pit floor.

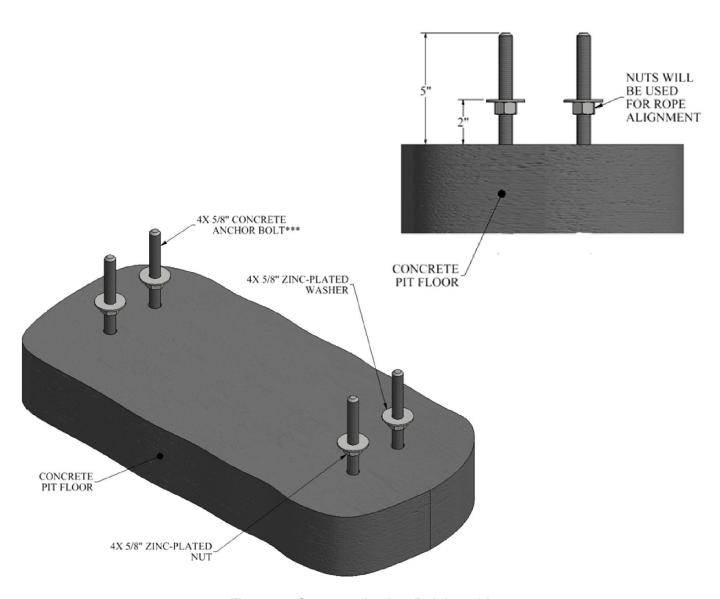


Figure 4 - Concrete Anchor Bolt Instaltion

2.5.3 Step 3: Install the Base Plate

- 1 Place the base plate over the four anchor bolts as shown and loosely install the plate retention nuts/washers.
- 2 The nuts under the base plate will be used to "level" the base plate to align the rope/grip/hammer after the governor has been installed.
- 3 The anchor bolts, nuts, washers are **not included with the governor**.
- 4 Grade 5 Zinc-plated, minimum, hardware is recommended.

***** IMPORTANT –

The plate must be installed in the correct orientation. There is a small lip on the inside of the guide rod holes. The lip must be placed on the pit floor side.

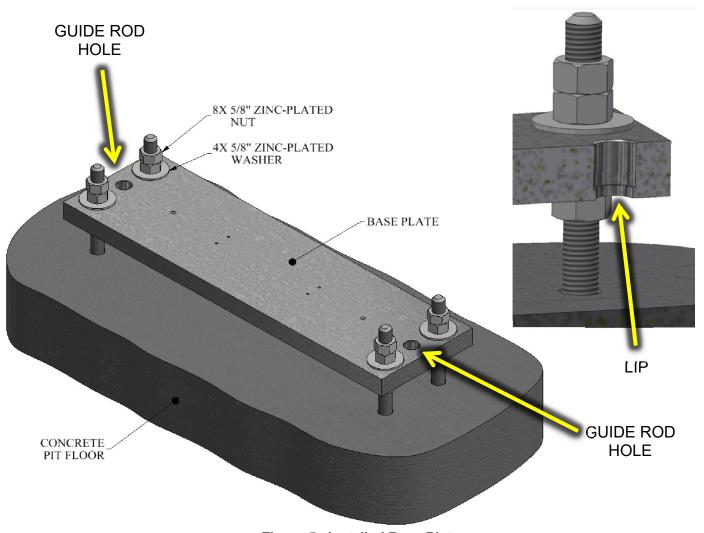


Figure 5 - Installed Base Plate

2.5.4 Step 4: Install Guide Rods

- 1 Install the two guide rods through the governor and into the governor rod holes.
- 2 Install the 5/8" lock nuts (included with the governor) to the exposed threaded end of the guide rod and tighten.
- 3 Place the governor on the base plate as shown. Take care as the governor weighs approximately 175 lbs.

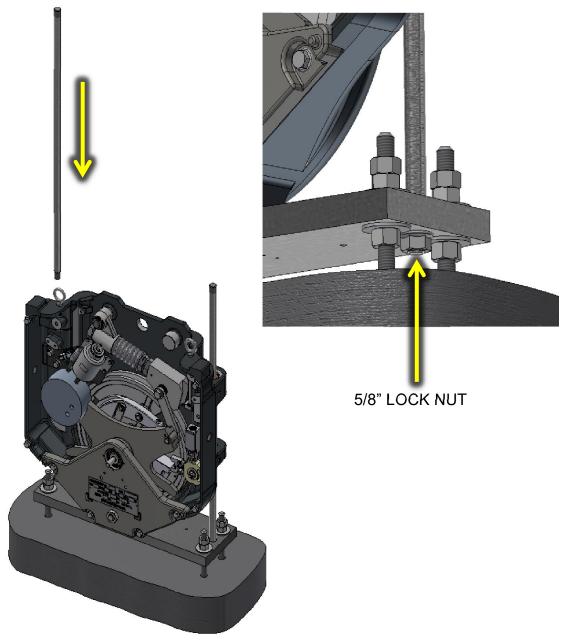


Figure 6 - Install Guide Rods

2.5.5 Step 5: Set Governor

- 1 Lift the governor above the plate surface and place a block underneath it to hold it up.
- 2 The block should be 5" tall. (H-W suggests cutting a 4" X 4" block of wood 5" long). The system requires 5" from the base plate to the bottom of the governor.
- 3 Install the governor rope.

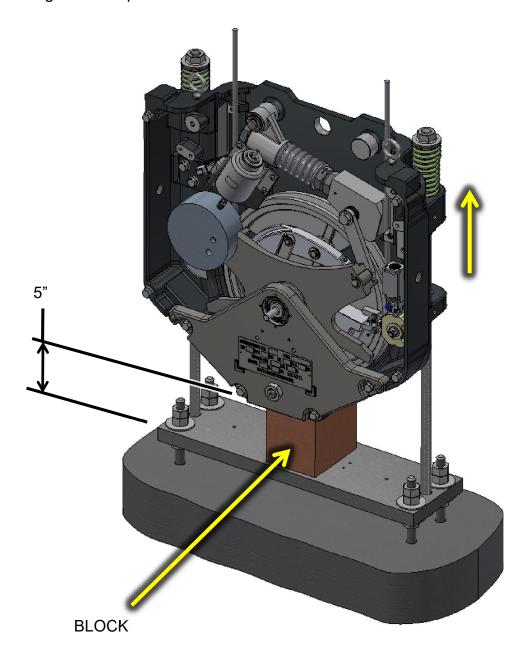


Figure 7 - Setting the Governor

2.5.6 Step 6: Install Springs and Washers

- 1 Remove the block and let the governor hang freely from the governor rope.
- 2 Install the two reaction springs (included with the governor).
- Install the appropriate number of washers (a total of 10 washers are included with the governor). At least one washer should be used. The top of the top washer(s) should come even to just below the bottom of the threads on the guide rods. (All 10 washers may not be needed).

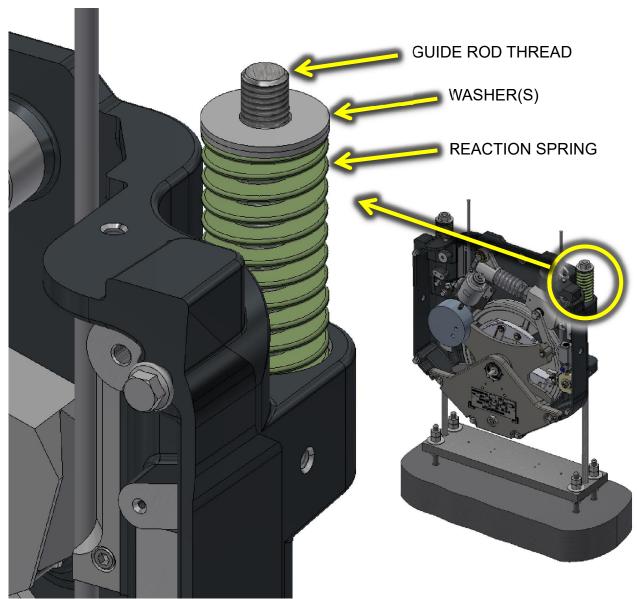


Figure 8 - Install Springs and Washers

2.5.7 Step 7: Install Spring Reaction Nut

- 1 Install the ³/₄" lock nuts (included with the governor) onto the exposed threads of the guide rode.
- 2 Tighten the ¾" lock nut as far as possible until you run out of threads on the guide rod.

* IMPORTANT -

Make sure that the 5/8" bolt which holds the guide rod to the base has not loosened.

***** IMPORTANT –

Avoid compressing the reaction spring. The washer(s) should fit loosely below the nut. A small gap (1/16") between the top of the top washer and the bottom of the lock nut is acceptable.

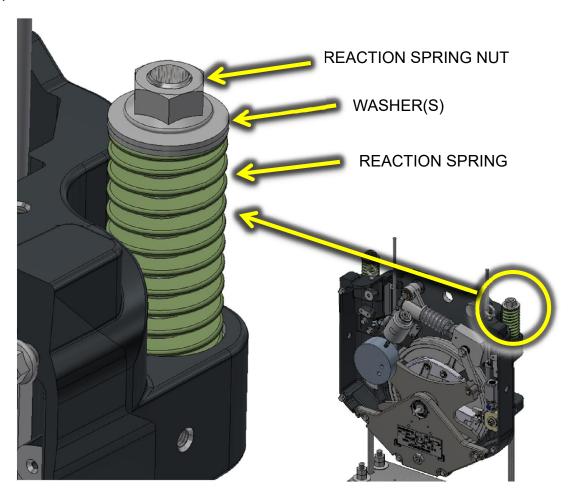


Figure 9 - Install Reaction Spring Nut

2.5.8 Step 8: Align Governor Rope with Grip / Hammer

If necessary, adjust the adjustment nuts below the base plate to align the rope relative to the grip and hammer.

***** IMPORTANT-

The rope should be centered as close as possible between the grip and hammer to ensure that the rope does not rub during normal operation.

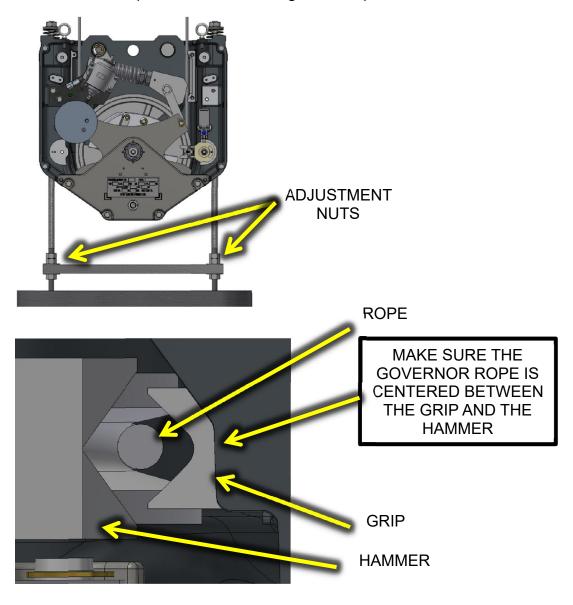


Figure 10 - Align Governor Rope

2.5.9 Step 9: Securely Bolt Down the Base Plate

Once the rope is aligned with the grip and hammer, tighten the top retention nuts and jam nuts.

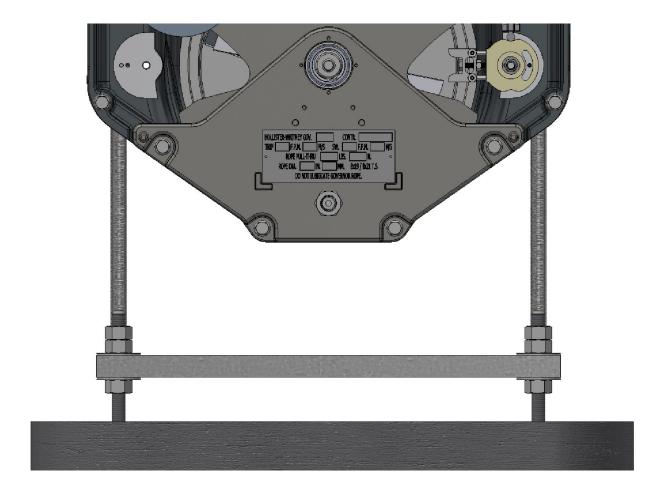


Figure 11 - Securely Bolt Down the Base Plate

2.5.10 Step 10: Install Rope Stretch Switch

1. Install the rope stretch switch with two #8-32 1" long bolts (included with the governor)

***** IMPORTANT-

Make sure the switch arm angle is adjusted properly such that the switch will actuate (go open) before the governor bottoms out on the limit switch body. The attached image shows the approximate angle and orientation of the switch arm and switch reset plunger. The switch assembly orientation will need to be repositioned when it is removed from its shipping box

2 The switch can be assembled with the main body pointing to the left or right, but the arm should <u>ALWAYS</u> be toward the center of the governor <u>AND</u> with the lever on the front cover side.

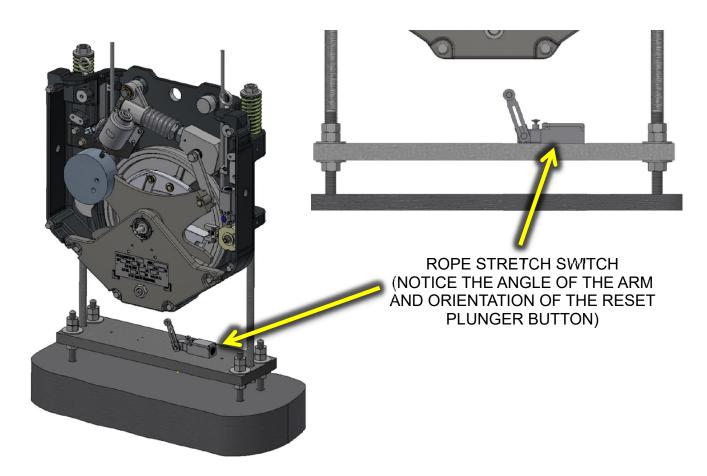


Figure 12 - Install Rope Stretch Switch

2.5.11 Step 11: Install Remote Set Solenoid



Figure 13 - Remote Set Solenoid

The remote set solenoid is meant for testing purposes only and may not be necessary in all jurisdictions or installations. Its purpose is to provide a method to trip the governor in a safe manner without the installer having to manually trip the governor while standing under the car in the pit.

- 1 Install the remote set solenoid harness (included with the governor)
- 2 Insert the sealed connector into mating solenoid fly lead connector.
- 3 Attach the ground fork terminal to the green ground screw. Check to make sure the circuit is properly grounded. Some paint removal from the solenoid mounting plate may be necessary.
- 4 Install <u>FLEXIBLE</u> conduit <u>not included with the governor</u> to protect the wire harness as it exits the governor housing. <u>FLEXIBLE</u> conduit is required for any conduit which is attached to the governor. The flexible conduit should be of enough length that it allows a free range of travel for the governor on its guide rod.

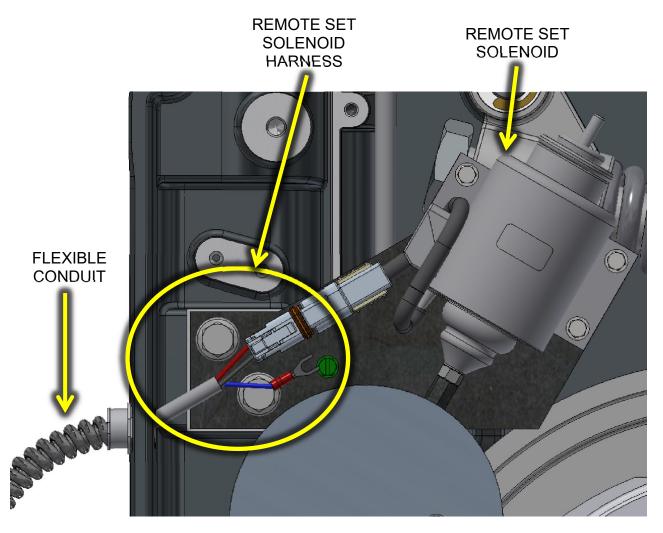


Figure 14 - Install Remote Set Solenoid Harness

2.5.12 Step 12: Install Wiring/Conduit for Over-speed Switch

- 1 Install the over-speed switch wiring **not included with the governor**. A connection diagram is included in the limit switch box.
- Install <u>FLEXIBLE</u> conduit to protect the wires as they exit the governor housing. <u>FLEXIBLE</u> conduit is required for any conduit which is attached to the governor. The flexible conduit should be long enough that it allows for a free range of travel for the governor on its guide rod.
- 3 Wire type and installation is the responsibility of the installer. Wires and installation should meet all applicable codes.

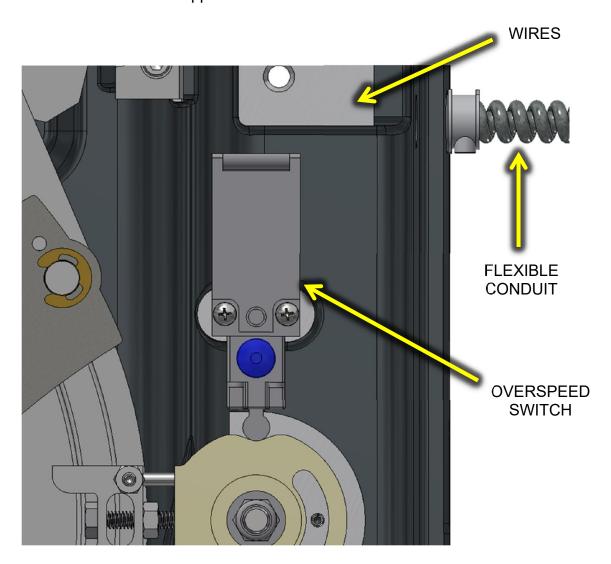


Figure 15 - Install Wiring/Conduit for Overspeed Switch

2.5.13 Step 13: Install Wiring/Conduit for Rope Stretch Switch

- 1 Install the rope stretch switch wiring <u>not included with the governor</u>. A connection diagram is included in the limit switch box.
- 2 Install conduit to protect the wires as they exit the governor.
- Wire type and installation is the responsibility of the installer. Wires and installation should meet all applicable codes.

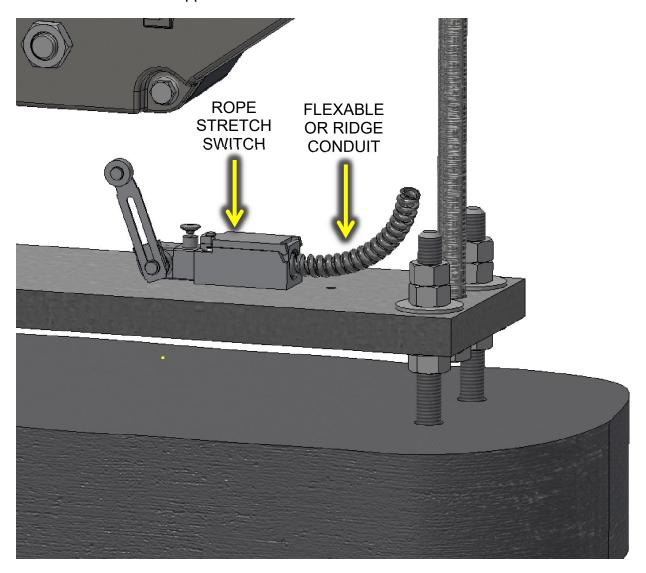


Figure 16 - Install Wiring/Conduit for Rope Stretch Switch

2.5.14 Step 14: Remote Set Solenoid Wiring to Controller

- 1 The remote set solenoid is rated to 110VAC/60Hz with a maximum activation time of 5 seconds.
- 2 The solenoid should be activated using a momentary rotary type switch which requires a key to actuate. The switch should not be activated for more than 5 seconds.
- 3 H-W recommends the switch be in the controller cabinet and labeled accordingly.

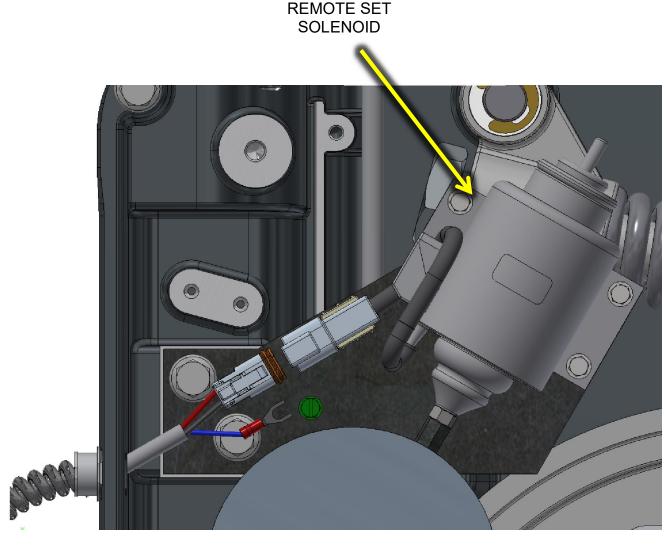


Figure 17 - Remote Set Solenoid Wiring to Controller

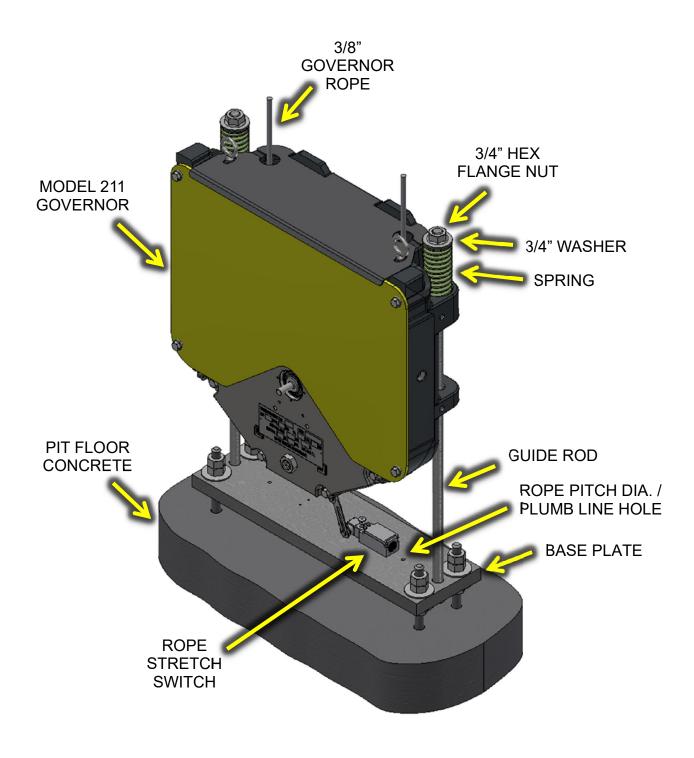


Figure 18 - General View of Installed Governor

2.6 Idler Sheave #195

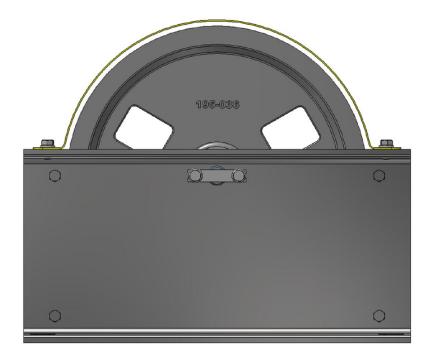


Figure 19 - #195 Idler Sheave

2.6.1 Verification

Ensure the assembly and all seals are in good condition.

See sample 195 Idler Sheave drawing on the last page of this document for reference

2.6.2 Planning

Determine the governor rope drop.

Confirm that the idler sheave will have adequate clearance when positioned in line with the required drops.

2.6.3 Placement

Center the idler sheave in the overhead between the rope drop locations.

Verify that the assembly positioning will not interfere with other elevator equipment (car, counterweight, overhead sheaves, etc.) or other obstructions.

2.6.4 Mark Mounting Locations

Use the idler sheave base as a "template" to mark the mounting locations by placing it in position.

Mark mounting locations as necessary.

Remove the idler sheave and prepare appropriate mounting hardware. (Mounting hardware is not included.)

2.6.5 Mount Idler Sheave

Reposition the idler sheave with shims as necessary to level the base from front-to-rear and side-to-side. Securely attach the assembly to the support structure using the appropriate mounting hardware.

Verify that all moving parts are working freely and free of dirt and lubricants.

Verify the alignment with the pit mounted governor below.

#211 PIT MOUNTED GOVERNOR #195 IDLER SHEAVE - BULLETIN #1175

Section

3 Field Testing

3.1 Testing Per Code

Testing should be performed in accordance with ASTM A17.2 test procedures.

Additional testing is required beyond the standard testing specified in ASME A17.2 code.

Testing procedures will need to be slightly altered from the code procedure in order to properly test the pit-mounted governor. These deviations are detailed in the following pages.

3.1.1 Test 1: Verification of Pull-Through

The pit-mounted governor pull-through can't be tested exactly as recommended in A17.2 due to its configuration. The general recommendation in A17.2 can be followed but modified slightly to accommodate the system. The exception is as follows:

- 1 For this test, make sure the safety has been made temporarily inoperable by means of blocking. Also, perform this procedure near the lower floors since the safety will not be in use.
- 2 Manually trip the governor as recommended in A17.2. Make sure that the rope is securely wedged between the governor hammer and grip prior to testing.
- 3 Attach one end of the dynamometer to a rigid mounting point directly on the car and attach the other end to the governor rope coming down from the idler sheave. The governor rope located below the dynamometer should have some slack.
- 4 **DO NOT** place a Come Along tool in the system
- 5 Instead of using a Come Along tool, place the elevator in inspection mode and run the elevator in the down direction (H-W recommends 10 ft/min or less) and measure the pull-through force.

See Figure 20 for a diagram.

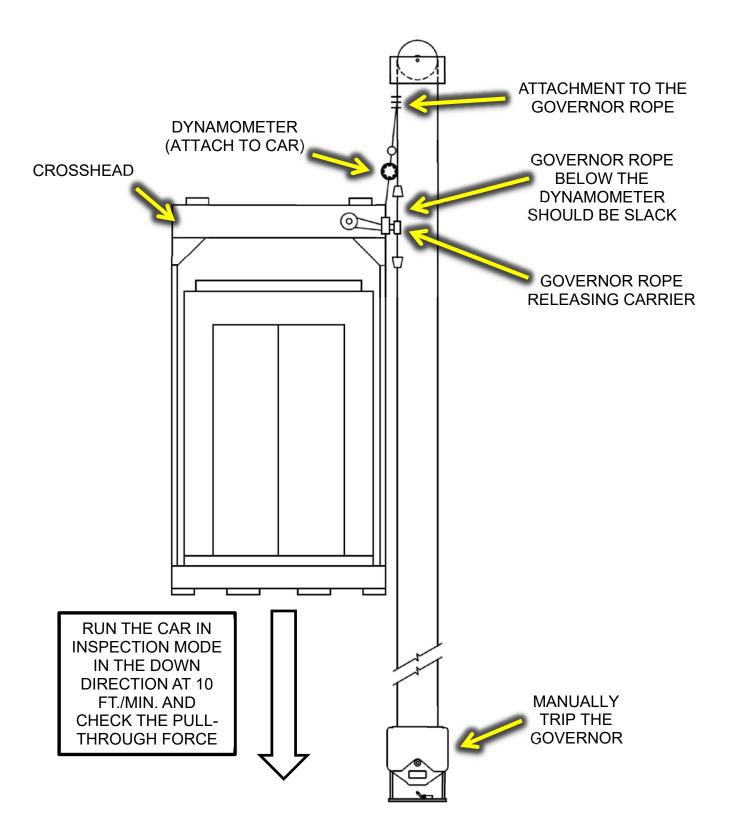


Figure 20 - Verification of Pull-Through

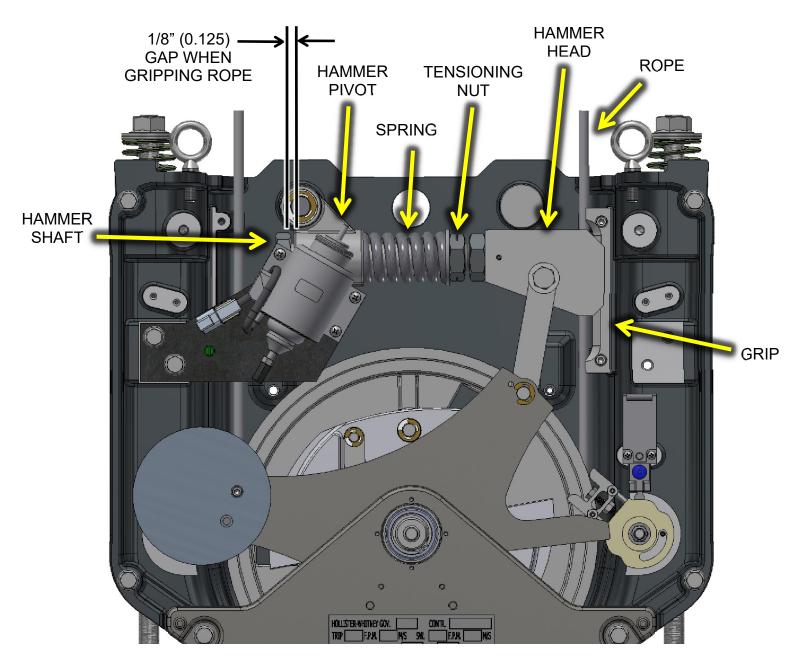


Figure 21 - Governor Pull Through Components

3.1.2 Adjusting Governor Pull Thru

To change pull through, turn the tensioning nut. Tighten against the spring to increase, loosen to decrease the pull through.

When the cable is gripped (hammer head horizontal as shown) the gap between the hammer pivot and the hammer shaft should be 1/8".

3.1.3 Test 2: Verification of Governor Tripping Speed

Tools needed to test the tripping speed



- Variable Speed Drill
- Handheld tachometer
- A 5/8" Hex Key

Follow the ASME A17.2 procedure except as follows:

Free the rotation of the sheave for testing tripping speed

The governor will need to be elevated along its guide rails in order to remove the tension in the governor rope so that the governor sheave can freely rotate. This can be accomplished in several ways including, but not limited to, the following:

- Remove the reaction springs, lift the governor up along the guide rails until the sheave is free to rotate and place a block under the governor. –or-
- Place a small bottle jack or scissor jack under the governor and lift the governor up until the sheave is free to rotate.

Driving the Governor Sheave

The use of a rubber wheel against the drive sheave may be difficult. Two alternative methods that can be used are:

- Drive Method 1 (see Figure 22):
 Attach a variable speed drill to the encoder shaft located on the end of the rotating governor shaft. Protect the shaft from damage if necessary. or
- Drive Method 2 (see Figure 23):
 Attach a 5/8" hex key to a variable speed drill and drive the governor using the hex pocket located in the back of the governor.

Placing the tachometer at the centerline of the groove can be difficult. It may be easier to place the tachometer wheel on the outside diameter (the outer rim) of the governor sheave and perform the appropriate speed conversion calculations as shown in Table 5 - RPM Ratio Values.

Q CAUTION

WHILE CHECKING TRIPPING SPEEDS STAY CLEAR OF ANY MOVING PARTS (SUCH AS THE YOKE WEIGHT AND HAMMER HEAD ASSEMBLY) THAT MOVE WHEN GOVERNOR IS ACTIVATED!

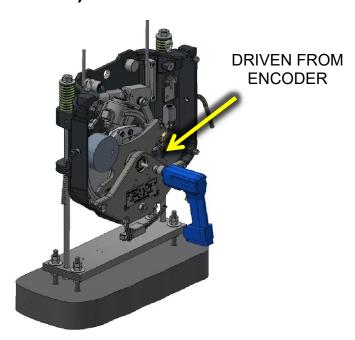


Figure 22 - Driving the Governor from Encoder



Figure 23 - Driving the Governor from Hex in Governor Shaft

Procedure:

- a. Remove rope contact from governor
- b. Check the mechanical speed first.
- c. Run hand tachometer wheel on governor sheave and spin the governor.
- d. Check the tachometer reading with a hand tachometer on <u>outside rim</u> of governor sheave (as shown in Figure 24), multiply the name plate value by 1.08. This calculated value will be <u>Higher</u> than the name plate value.
- e. Mechanical trip speed must be confirmed and set **prior** to the electrical switch speed.



Figure 24 - Tachometer Placement Outside of Rim

Table 5 - RPM Ratio Values

Sheave Size	Roping	On Outer Rim
12.5"	3/8"	1.08

Table 6 - Tripping Speeds

Table 6 - Tripping Speeds						
Rated Car Speed (FPM)	Governor Tripping Speed Per 2.18.2.1		Tachometer Reading at Sheave Rim 13.5"			
	Electrical Switch	Mechanical Jaws	Electrical Switch	Mechanical Jaws		
125	175	175	189	189		
150	210	210	226	226		
175	225	250	243	270		
200	252	280	272	302		
225	277	308	299	332		
250	303	337	327	363		
300	355	395	383	426		
350	407	452	439	488		
400	459	510	495	550		
450	512	568	552	613		
500	563	625	608	675		

If tripping speed adjustment is required:

- 1 Remove the seal on the spring / eyebolt assembly Figure 25 that connects one pawl to the sheave.
- 2 Adjust the spring to correct the mechanical trip speed.
- 3 After the mechanical trip speed is correct, re-adjust the bolt on trigger to correct electrical trip speed, if required.
- 4 Reseal the spring/eyebolt assembly.



ACTUAL SWITCH AND JAW TRIPPING SPEEDS MUST BE IN ACCORDANCE WITH THE SPEEDS LISTED IN "TABLE 6 - TRIPPING SPEEDS".

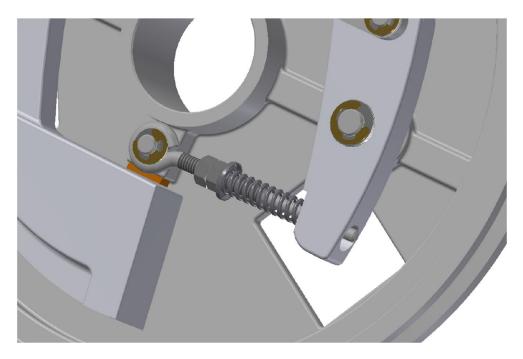


Figure 25 - Spring / Eyebolt Assembly

3.1.4 Test 3: Adjustment of Over-speed Switch Function

Using the same basic procedure used to verify the tripping speed (Test 2: Verification of Governor Tripping Speed). adjust the over-speed switch setting:

- 1. If it is not already in its original position, place the trigger mechanism back to its original horizontal position Figure 26.
- 2. Pull the blue manual reset button on the over-speed switch Figure 27.

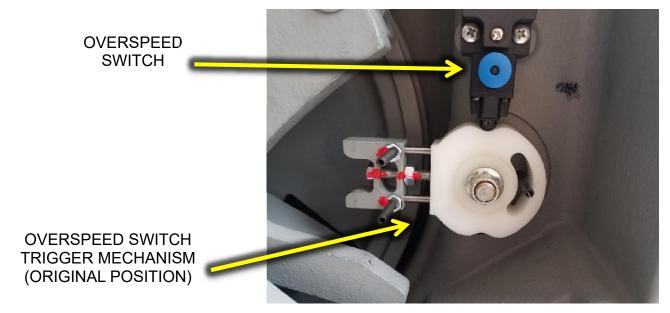


Figure 26 - Over-speed Switch

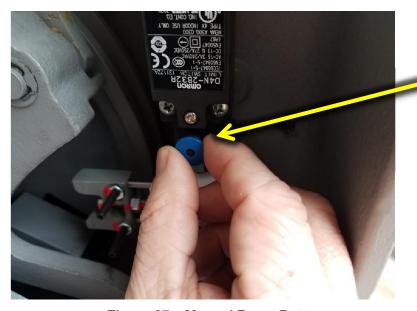


Figure 27 – Manual Reset Button

MANUAL RESET BUTTON PULL OUT TO RESET

3. Loosen the set screws, then loosen the jam nut between the pawl and cam.





- 4. Rotate the governor sheave to the required speed desired and adjust the center bolt in or out depending on that desired speed.
- 5. Tighten the locking nuts and reseal.



THE POSITION IS DEPENDENT ON THE REQUIRED SWITCH TRIP SPEED WHICH IS CONTROLLED BY THE FLYWEIGHTS. THE MECHANIC WILL HAVE TO ADJUST IT IN OR OUT DEPENDING ON THE REQUIRED SETTING.

3.1.5 Test 4: Verification of Rope Stretch Switch Function

Test the rope stretch switch using the procedure as specified for the over-speed switch detailed in A17.2 Item 2.13.2.A.2

To activate the rope stretch switch; rotate the arm towards the base plate (arrow direction) until the switch is tripped.

To reset the rope stretch switch: pull the blue manual reset button on the switch.

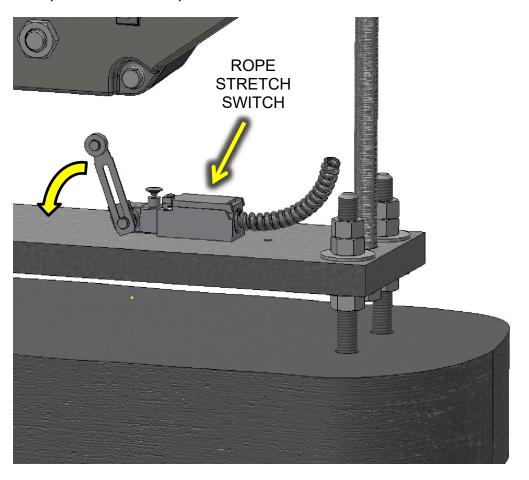
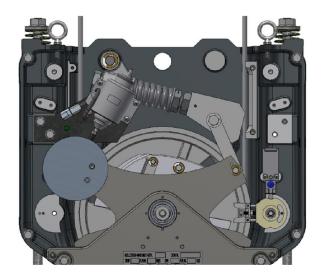


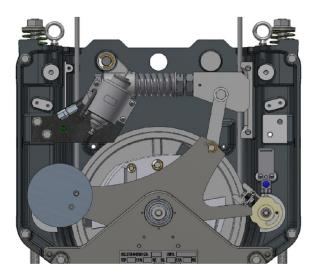
Figure 28 - Verification of Rope Stretch Switch

3.1.6 Test 5: Verification of Remote Set Function

With a stationary car, actuate the remote set solenoid keyed switch to ensure that the solenoid applies enough force to disengage the yoke (trip the governor) from its detent position.

Tripping the governor yoke will also trip the over-speed switch.





NORMAL OPERATING POSITION

TRIPPED POSITION

Figure 29 - Yoke and Overspeed Switch Positions

To "reset" the governor back to normal operation:

1. Rotate the yoke back to its normal operating detent position



2. Rotate the over-speaed switch trigger to its normal (horizontal) operating

position.



3. Pull the blue manual reset button on the over-speed switch to reset the switch.



3.1.7 Governor Set Sequence of Operation

To set the governor and safety:

- 1. Set up for normal safety test.
- 2. With car running in "DOWN" direction, energize the governor set solenoid. DO NOT energize for more than 5 seconds as this is not a continuous use solenoid.
- 3. After the governor trips and the safeties stop the car, run the car up as necessary, inspect the governor and manually reset the governor's yoke, hammer and switch.

#211 PIT MOUNTED GOVERNOR #195 IDLER SHEAVE - BULLETIN #1175

Chapter

4 Service

4.1 Lubrication

The governor and idler are provided with sealed bearings; therefore, bearing lubrication is not required.



DO NOT LUBRICATE GUIDE RODS.

4.2 Maintenance

Periodically perform inspections and tests in accordance with the latest edition of ASME A17.1 and all governing local codes to ensure sound condition and proper operation.

Maintain guide rods free of dirt and debris. This will allow the urethane bushings to freely guide the assembly for necessary movement on the guide rods.

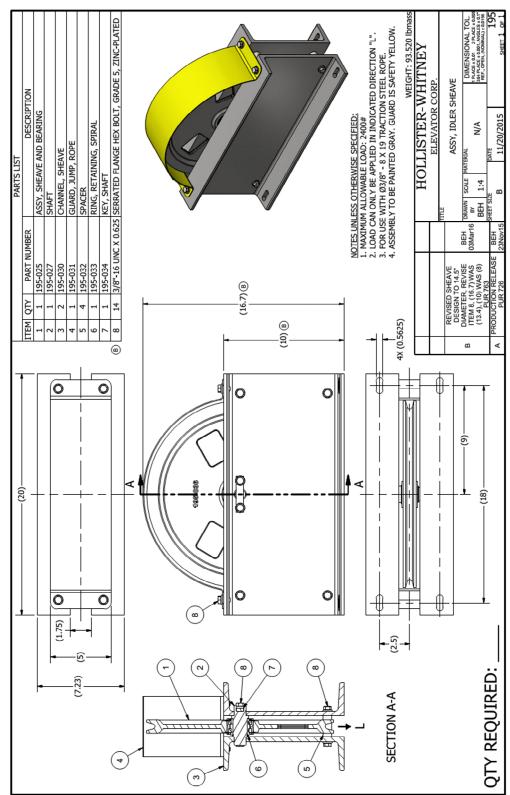
Inspect and adjust governor rope length as needed to maintain proper governor position. Recommend:

- Monthly for the first six (6) months after installation and turn-over.
- Every two (2) months for the second six (6) months.
- After 12 months from installation and turn-over perform routine inspections as necessary.

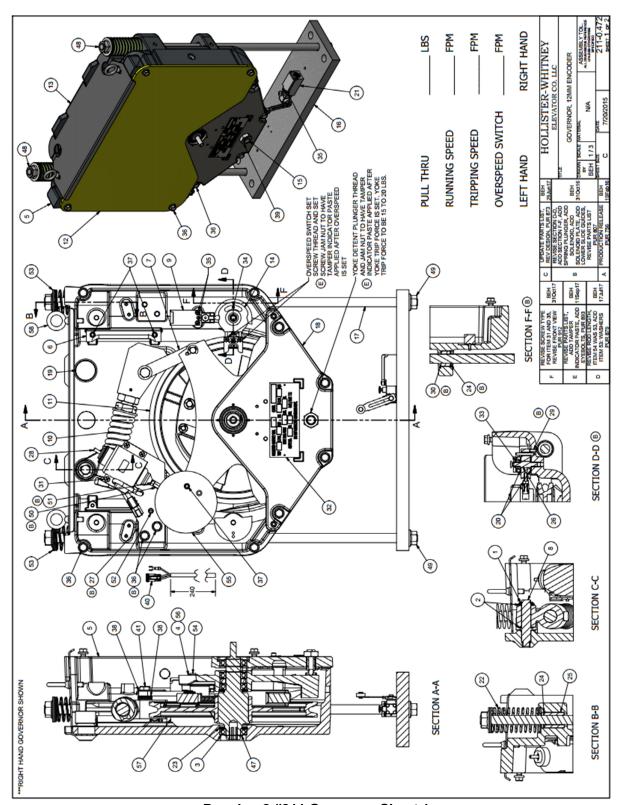


USE 3/8" DIAMETER 8X19 OR 8X21 TRACTION STEEL GOVERNOR ROPE. <u>PRE-FORMED</u> AND <u>PRE-STRETCHED</u> IS HIGHLY RECOMMEND.

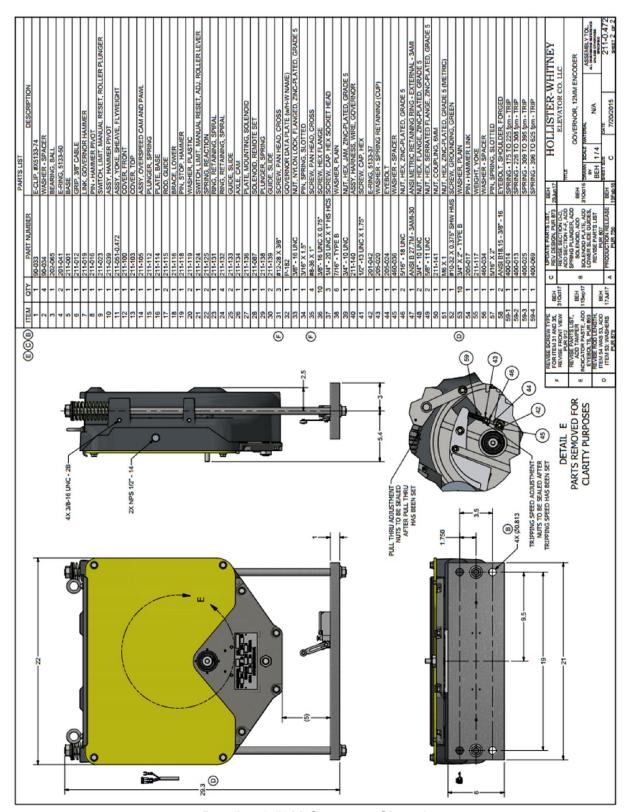
ROPE COMPOSITION AND CONSTRUCTION CAN DIFFER DEPENDING ON ROPE MANUFACTURERS. THEREFORE, ACTUAL INSPECTION AND ADJUSTMENT REQUIREMENTS MAY VARY.



Drawing 1 #195 Idler Sheave, Sheet 1



Drawing 2 #211 Governor, Sheet 1



Drawing 3 #211 Governor, Sheet 2