



# Hollister-Whitney Elevator Co., LLC

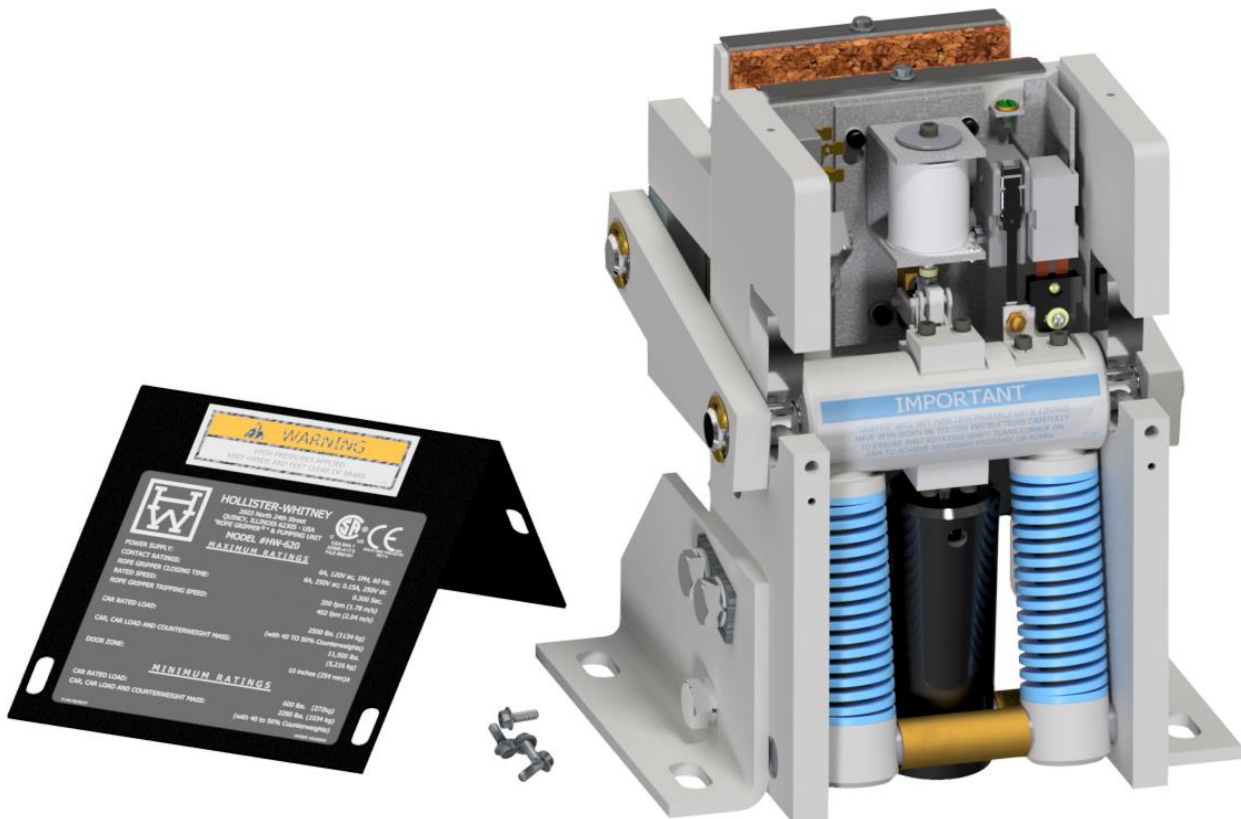
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## **INSTALLATION, MAINTENANCE, AND TROUBLE SHOOTING INSTRUCTIONS**

### **FOR**

**Models #620, #621, #622, #624, #625, #626, & #626SPL  
Hollister-Whitney “Rope Gripper”<sup>®</sup> & Pumping Unit  
(Patent # 5,228,540)  
CSA Certification File #88181**





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For Dimensional Sheets and Parts Lists See Supplemental Bulletin 1144S

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## “ROPE GRIPPER®” RATINGS CHART

			ROPE GRIPPER MODEL								
			620	621	622	624	625	626	626 SPL		
			MAX. OUT TO OUT OF	inch	5.25	6.5	6.5	10	11.5	10	13.75
1:1 ROPING	MAXIMUM RATINGS	DOOR ZONE	mm	133	165	165	254	292	254	349	
			inch	±3 (6 Total)							
			mm	± 76.2 (152.4 Total)							
		CLOSING TIME	sec.	0.300							
		POWER SUPPLY	6A, 120 VAC, 1 PH, 60Hz								
		CONTACT RATINGS	6A, 250 VAC, 0.15A, 250VDC								
		MINIMUM RATINGS	RATED SPEED	fpm	350	600		1200			
				m/s	1.78	3.05		6.10			
				m/m	107	183		366			
			ROPE GRIPPER TRIPPING SPEED	fpm	402	690		1368			
	m/s			2.04	3.51		6.95				
	m/m			123	210		417				
	CAR RATED LOAD		lbs	2500	4000	5000			10000		
			kg	1134	1814	2268			4536		
TOTAL SYSTEM LOAD	lbs		11500	18600					38000		
	kg		5216	8437					17237		
MINIMUM RATINGS	CAR RATED LOAD	lbs	600		1500			2500			
		kg	272		680			1134			
	CAR & CWT MASS	lbs	2280	5750	6000			8000			
		kg	1034	2608	2722			3629			

2:1 ROPING	MAXIMUM RATINGS	RATED SPEED	fpm	250	400		800				
			m/s	1.27	2.03		4.06				
			m/m	76	122		244				
		ROPE GRIPPER TRIPPING SPEED	fpm	303	459		921				
			m/s	1.54	2.33		4.68				
			m/m	92	140		281				
		CAR RATED LOAD	lbs	5000	8000	10000			20000		
			kg	2268	3628	4536			9072		
		TOTAL SYSTEM LOAD	lbs	23000	38000					76000	
			kg	10433	17237					34473	
	MINIMUM RATINGS	CAR RATED LOAD	lbs	1500		2500			5000		
			kg	680		1134			2268		
		CAR & CWT MASS	lbs	6000	7667	8000			16000		
			kg	2722	3477	3629			7257		

4:1 ROPING	MAXIMUM RATINGS	RATED SPEED	fpm	87	150		300				
			m/s	0.44	0.76		1.52				
			m/m	27	46		91				
		ROPE GRIPPER TRIPPING SPEED	fpm	110	189		355				
			m/s	0.56	0.96		1.80				
			m/m	33	58		108				
		CAR RATED LOAD	lbs	10000	16000	20000			40000		
			kg	4536	7256	9072			18144		
		TOTAL SYSTEM LOAD	lbs	46000	76000					152000	
			kg	20865	34473					68946	
	MINIMUM RATINGS	CAR RATED LOAD	lbs	3000		5000			10000		
			kg	1361		2268			4536		
		CAR & CWT MASS	lbs	12000	15333	16000			32000		
			kg	5443	6954	7257			14515		

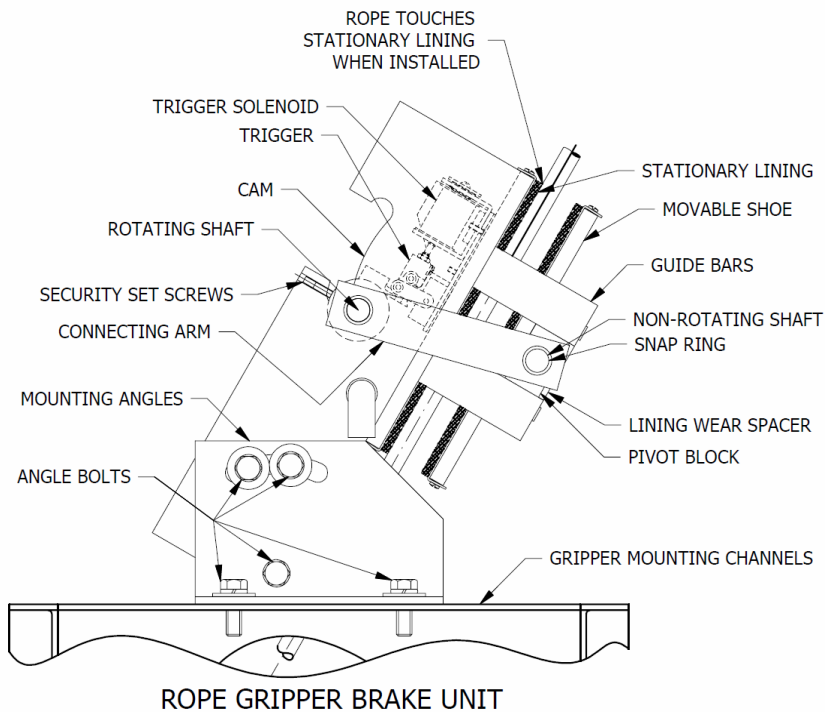
# HOLLISTER-WHITNEY “ROPE GRIPPER”®

\*\*\* With 620-100 Pumping Unit \*\*\*

Instructions for Model #620, 622, 624, 625, 626 & 626SPL (Patent #5,228,540)

**WARNING:** KEEP HANDS CLEAR OF “ROPE GRIPPER”®.

FORCES CREATED CAN CRUSH FINGERS.

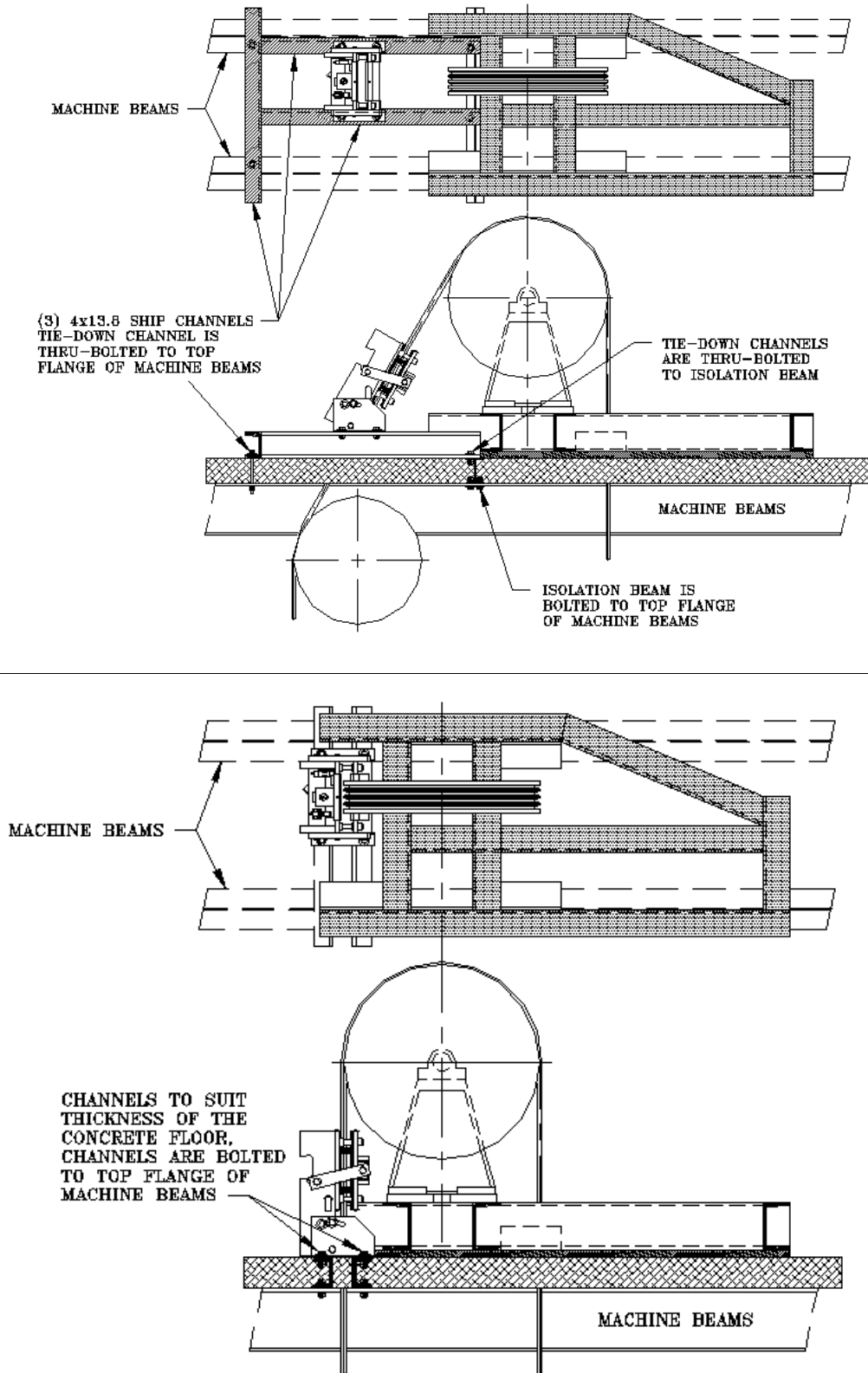


**FIGURE 1**

## “ROPE GRIPPER”® MOUNTING CHANNEL GUIDELINES

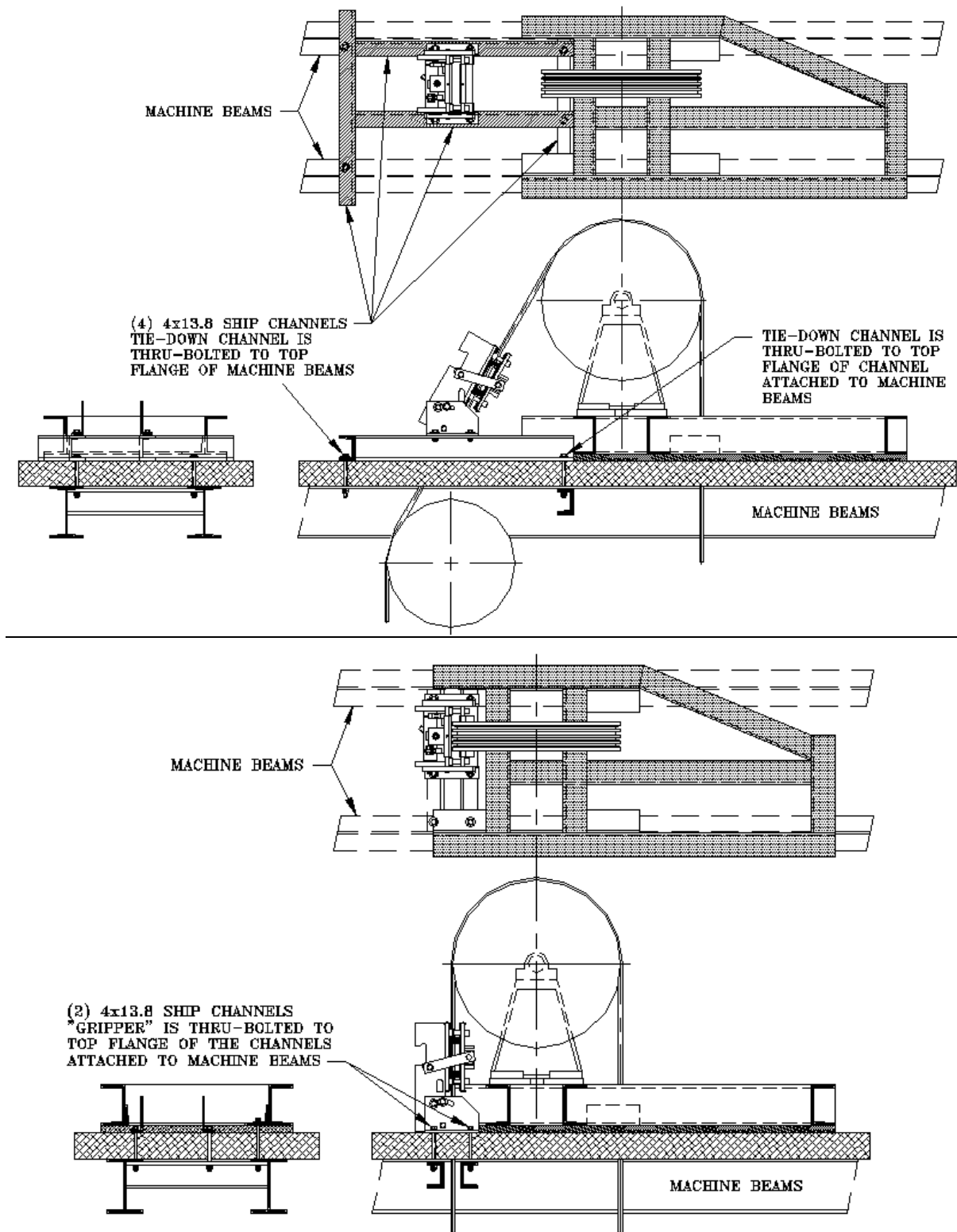
- The Mounting Channel Framework supporting the gripper must withstand upward and downward forces according to **Chart 1** below and applicable codes. Hollister-Whitney does not recommend anchoring “Rope Gripper’s”® directly to concrete.
- The Mounting Channel Framework must be sufficiently sized to securely hold the “ROPE GRIPPER”® and elevator while preventing any sliding. The Traction Machine must also be prevented from sliding. See **Figures 2 and 3** for suggested machine room mountings. Additionally, see **Figures 11 thru 14** for examples of Hollister-Whitney machines with built-in factory “Rope Gripper”® mounts.
- It is always recommended that the “Rope Gripper”® be mounted in the machine room. However, it may not be possible to mount the gripper in the machine room when adding a “Rope Gripper”® to an existing installation. It is acceptable to mount the “Rope Gripper”® in the hoist-way, and it can be mounted horizontally or upside down on the car or counterweight side, so long as proper consideration for access is given for future gripper maintenance and Pumping Unit location. The Pumping Unit must be mounted right side up. The hydraulic hose standard length is 27 inches. Various hose lengths of up to 8 feet are available in stock, with longer lengths up to 30 feet available by special order. The available lengths can be utilized to mount the Pumping Unit in the machine room if the “Rope Gripper”® is mounted remotely such as in the hoist-way.
- **Note:** If the “Rope Gripper”® is mounted upside down, consideration should be given to covering the “bottom” of the mechanism to help prevent dirt and debris from falling into the “Rope Gripper’s”® internal workings.

## Typical Mounting Arrangements for Overhead Machines New Installations



**FIGURE 2**

## Typical Mounting Arrangements for Overhead Machines Existing Installations



**FIGURE 3**

## INSTALLATION OF “ROPE GRIPPER®”

- For Dimensional Sheets and Parts Lists please refer to supplemental **Bulletin 1144S**.
- Remove shipping cap from oil reservoir and install oil cap.
- Be sure security set screws are holding the rotating shaft in the LOADED position as shown in **Figure 1** above.
- Remove both connecting arms after removing the four retaining rings.
- Remove movable shoe assembly.
- Attach “ROPE GRIPPER®” to mounting channels with appropriate bolts per **Chart 1** below. Do not fully tighten bolts yet.

MODEL #	APPROXIMATE UP & DOWN FORCE	GRADE 5 MOUNTING BOLTS* (Approximate Torques)
620	2000 lbs	1/2" UNC @ 74 ft-lbs
621 & 622	4000 lbs	1/2" UNC @ 74 ft-lbs
624	4000 lbs	5/8" UNC @ 143 ft-lbs
625	4000 lbs	5/8" UNC @ 143 ft-lbs
626 & 626SPL	8000 lbs	5/8" UNC @ 143 ft-lbs

Note: Mounting must conform to applicable codes.

### **CHART 1**

- Position the “ROPE GRIPPER®” so that the stationary shoe lining barely touches the ropes from top to bottom. Make sure the gripper is squarely aligned, and centered side to side as much as possible, with the ropes. Misalignment may cause uneven and/or excessive lining wear. Note:
  - In some cases, rope orientation may twist through the hoistway, such as when the overhead and car sheaves are not aligned. In this case, some “misalignment” to the stationary pad is necessary. This is acceptable so long as the ropes clear both pads while traveling.
  - Rope splay near the hitch may cause additional alignment challenges. In these cases, rope clamps such as **H-W’s Rope Guide (P/N 270-109)** may be utilized.
- Securely fasten the gripper mounting bolts (5 bolts per side). Torque to specifications in **Chart 1** above. \* **Note:** The 6 5/8" bolts supplied with the 626 and 626-SPL Grippers **ONLY** securing the mounting angles (3 per side) to the Gripper are Grade 8 and should be tightened to 225 ft-lbs.
- Double check rope alignment. Notes above notwithstanding, the ropes should touch the stationary shoe lining evenly if applicable.
- Reinstall movable shoe assembly.
- Reinstall connecting arms with chamfered edges facing inside the gripper and secure the four snap rings.
- Mount pumping unit in the best available location. Unit must be upright but can be placed on either side of the gripper. See hose length notes on Page 4.
- If necessary, wiring on the gripper can be rerouted to opposite side of assembly by relocating the box connector to the opposite side and pulling wire through.
- Remove the pumping unit knock-out for the hydraulic line, install the supplied Rubber Grommet and route male hydraulic fitting through knockout hole on the side of pumping unit. Inside pumping unit push male Quick-Connect fitting into female fitting while lifting

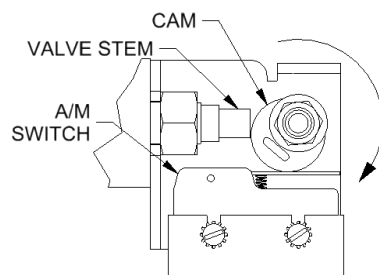
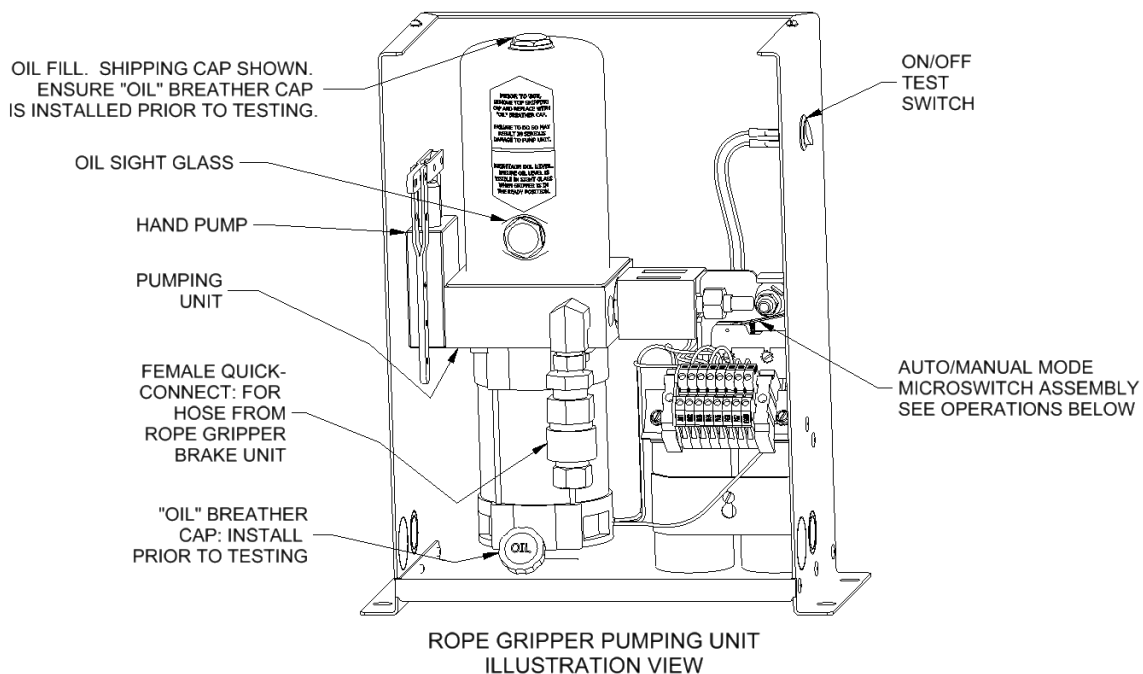
ring on female fitting. Release ring to secure the fittings together.

- Wiring from the gripper to pump unit is color coded per **Chart 2**.
- Connect terminals RG1 and RG2 to controller power, RG5 and RG7 to safety circuit; check control diagram for proper elevator control connection.
- When wiring and hydraulic connections are complete, make sure valve stem (dump valve) in pumping unit is set to AUTOMATIC. Turn pumping unit test switch ON (see **Figure 4**). The gripper latch solenoid should energize and push the trigger onto the latch. If it fails to do so, check control wiring.
- When the solenoid is energized, loosen the two security set screws a turn or two. If rotating shaft moves, turn valve stem to MANUAL and use hand pump to move shaft back, or jump terminal RG3 to RG4 to temporarily operate electric pump. Make sure the trigger has properly engaged the latch.
- Remove security set screws. **Once removed, store set screws in bottom of pump unit. NOTE: Security set screws must be completely removed when "ROPE GRIPPER®" activates to prevent gripper failing to set or damage to the unit.**
- Unit is now ready for required lining wear-in and testing.

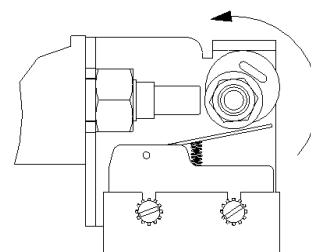
White	RG2
Black	RG3
Red	RG4
Orange	RG5
Blue	RG6
Green	Ground

**Pigtail to Pumping Unit Wiring**

**CHART 2**



**MANUAL MODE:** With Test Switch OFF, place flat head screwdriver in Cam Slot. Slowly rotate the Cam CLOCKWISE to push Switch Lever down & press Valve Stem closed. A/M Switch is now OPEN. Begin pumping Hand Pump.



**AUTOMATIC MODE:** With Test Switch OFF, place flat head screwdriver in Cam Slot. Slowly rotate the Cam COUNTER-CLOCKWISE to upper stop. Valve is now Open. A/M Switch is now closed. With Test Switch ON, Pumping Unit is ready for Automatic Operation.

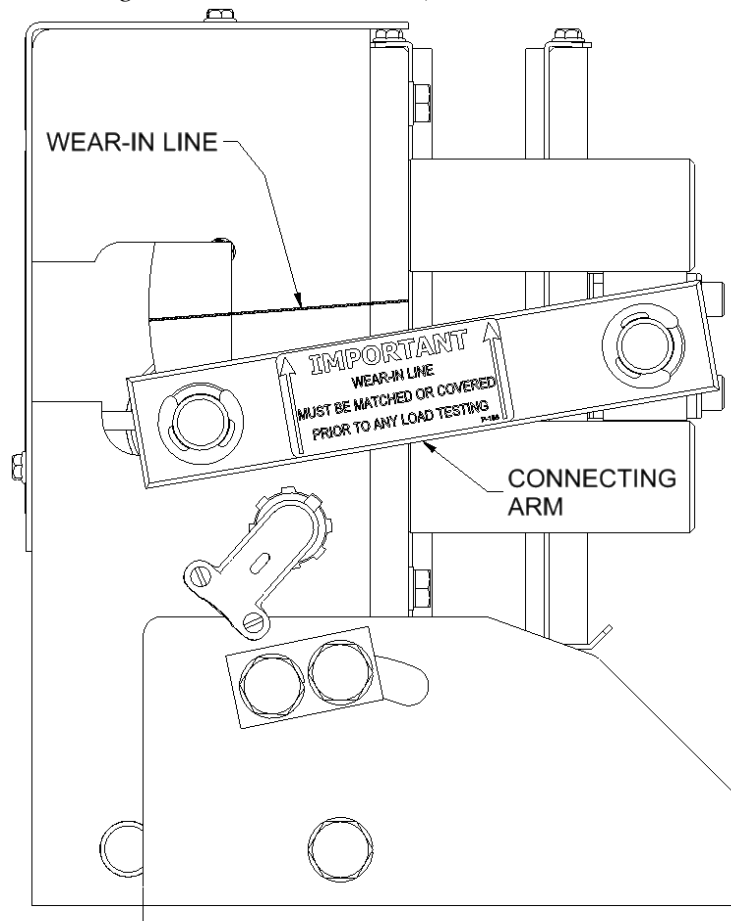
**FIGURE 4**

## TESTING OF “ROPE GRIPPER®”

- Make sure controller safety circuit is active and clear for running, and the pumping unit valve stem is in AUTOMATIC. Turn test switch ON. The “ROPE GRIPPER®” should be in the ready (LOADED) position (NOT gripping the ropes).
- Turn test switch to OFF. This should activate the “ROPE GRIPPER®”, gripping the ropes. Be sure that while gripping the ropes, the switch contacts on the “ROPE GRIPPER®” stop or prevent power from being applied to the motor and machine brake.
- Turn the valve stem in the pumping unit to MANUAL. This will open the manual microswitch contact and prevent the elevator from running.
- Use hand pump to return the gripper to the ready or loaded position.
- Turn test switch ON. Elevator should still be prevented from running.
- Turn the valve stem back to AUTOMATIC. The manual contact will close allowing the elevator to run.

### “ROPE GRIPPER®” LINING WEAR-IN

1. **A line has been marked on the side wall of the gripper** to aid in the Wear-In process. *Note that at this point in the procedure, this line is well **above** the Connecting Arm and will be met or covered by the Connecting Arm during the Wear-In process (refer to **Figures 1 & 5** for location of Connecting Arm and Wear-In line).*

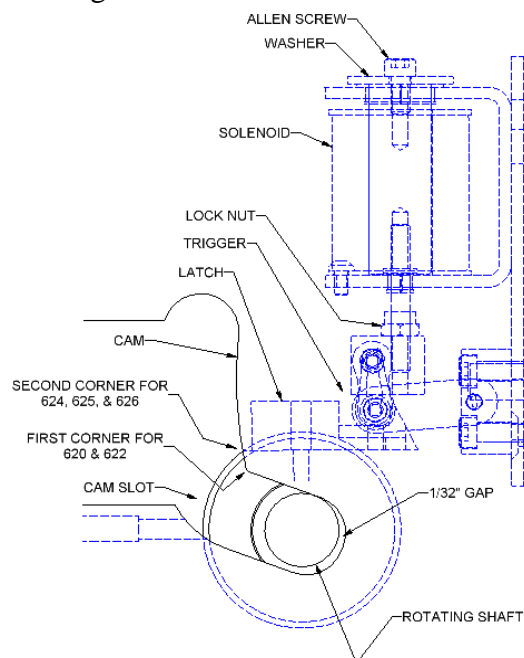


***FIGURE 5***

2. Confirm the moveable shoe has been set up for the proper size ropes (**Chart 3**). Shims on this chart are a general guideline and may vary. See Item 9 of this section.

3. Make sure pumping unit valve stem is in AUTOMATIC and test switch is ON.
4. Run the car at the slow or inspect speed and wipe down the ropes to remove any dirt and/or excess oil and grease from top to bottom. Return car to top floor.
5. Jump terminals RG5 to RG6 and run the empty car in slow speed in the direction that will pull the ropes thru the "ROPE GRIPPER®" (typically DOWN). When the car is up to speed, turn the test switch OFF. The "ROPE GRIPPER®" will grip the ropes with a light pressure and ropes will begin to wear grooves in the linings.
6. As the linings wear-in, the rotating shaft will move up the cam slot and around the corner(s) of the cam noted below (**Figure 6**), and the connecting arms will move up the side wall and begin to match or line up with the wear-in line (see **Figure 5**) marked on the side wall.

**Note:** #624, #625, #626 and #626SPL have two corners. These grippers are not worn-in until the rotating shaft goes past the **second** corner of the cam as noted below (see **Figure 6**) and the connecting arm meets or covers the line marked on the side wall.



**FIGURE 6**

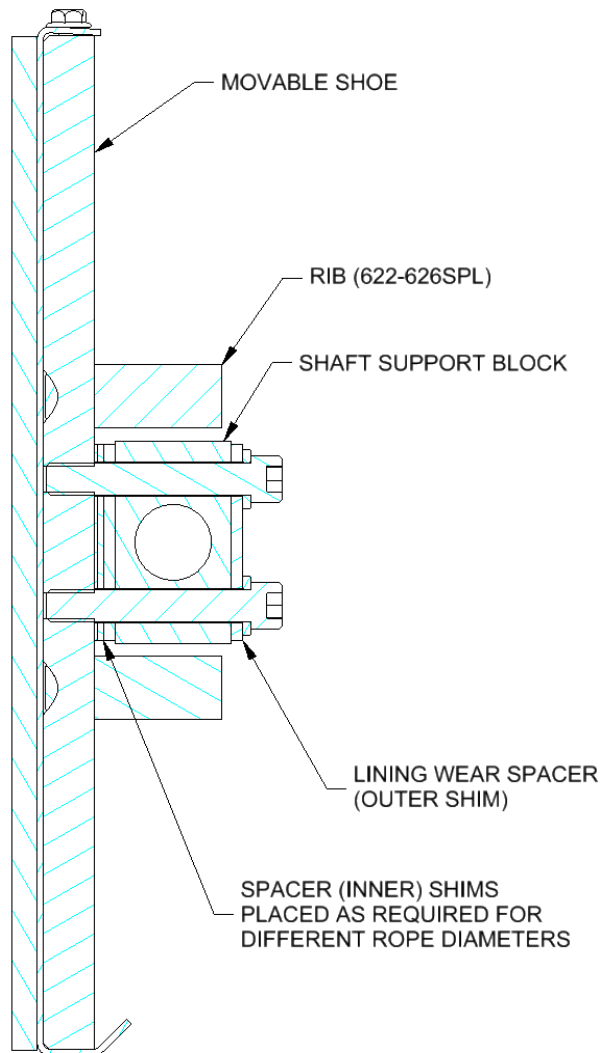
7. *Note that it may take several car-runs to complete lining wear-in.*
8. Once the rotating shaft has turned the corner(s) and the **wear-in line is matched or covered**, stop the car and remove the jumper from RG5 to RG6.
9. If the lining wear-in is not completed after the grooves in the linings have reached approximately 1/16" deep, spacer shims (**Figure 7**) can be moved from between the shaft support blocks and moveable shoe to the outside of the support block to allow the rotating shaft to completely turn the corner and move up the cam. Refer to **Chart 3** for initial spacer and shim set-up. **Note: Before changing spacers, install security set screws to prevent unintended "ROPE GRIPPER®" activation, which could lead to severe personal injury and/or damage to the unit.**

## LINING WEAR & REPLACEMENT

- The linings will wear, especially after multiple high-speed stops. When gripping moving ropes, material will be removed from the pads (lining wear) and the rotating shaft will move towards the upper end of the cam. Near the end of the cam, the excessive wear microswitch will open and the "ROPE GRIPPER®" will not automatically reopen.

Rope Sizes			620, 621 or 622		624, 625, 626 & 626SPL	
Nominal (Inch)	MM Range	Decimal Equivalent	Outer Shims	Inner Shims	Outer Shims	Inner Shims
			Lining Wear Spacer + Excess Spacers on Back of Block	Spacer Shims between Block and Shoe	Lining Wear Spacer + Excess Spacers on Back of Block	Spacer Shims between Block and Shoe
3/8"	9	0.354	1/8"	1/32 + 2 x 1/16 + 1/8"	1/8"	1/32 + 2 x 1/16 + 1/8"
	10	0.394				
7/16"	11	0.433	1/8"	1/32 + 1/16 + 1/8"	1/8"	1/32 + 1/16 + 1/8"
1/2"	12	0.472	1/16 + 1/8"	1/32 + 1/8"	1/16 + 1/8"	1/32 + 1/8"
	13	0.512				
9/16"	14	0.551	2 x 1/8"	1/32 + 1/16"	2 x 1/8"	1/32 + 1/16"
5/8"	15	0.591	1/16 + 2 x 1/8"	1/32"	1/16 + 2 x 1/8"	1/32"
	16	0.63				
11/16"	17	0.669			1/16 + 2 x 1/8"	1/32 & Flip Block Thin Side to Ropes
	18	0.709				
3/4"	19	0.748			1/32 + 1/16 + 2 x 1/8	Flip Block Thin Side to Ropes
	20	0.787				

**CHART 3**



**FIGURE 7**

- To inspect the lining wear, first reopen the gripper using the manual pump.
- Once in the open position install the security set screws so they touch the rotating shaft (preventing gripper from activating).
- Inspect Lining Groove Depth.
  - If lining wear is not excessive (less than 3/16”), spacer shims (**Figure 7**) can be re-located between the shaft support blocks and the moveable shoe. Remove the bolts that hold the blocks to the movable shoe and place the lining wear spacer shims under the blocks. Re-install and tighten bolts. Addition of the shim decreases the shoe clearance. The rotating shaft is now toward the bottom end of the cam when gripping the ropes.
  - If the grooves in the linings have worn to approximately 3/16” or greater, new linings should be installed as soon as possible. **Note: Before changing shoes or spacers, install security set screws to prevent unintended “ROPE GRIPPER®” activation, which could lead to severe personal injury and/or damage to the unit.**
- If installing new linings **NOTE: Always replace linings in pairs.**
  - Remove both connecting arms by removing 4 snap rings.
  - Remove moveable shoe assembly.
  - Remove screws from each lining assembly and remove linings.
  - Refer to **Chart 3** for initial spacer and shim set-up. **NOTE:** It may be necessary to loosen mounting bolts to tip gripper in order to allow access to stationary shoe.
  - Re-locate Lining Wear spacer shim (1/8” shim) from between the shaft support blocks and the moveable shoe to the back of the block.
  - When linings have been replaced, follow the **INSTALLATION OF “ROPE GRIPPER®”** procedure and the **LINING WEAR-IN** procedure.
- When inspection/replacement is complete, turn the valve stem to AUTOMATIC and the pumping unit ON. Carefully remove the security set screws. If necessary, use hand pump to prevent rotating shaft from moving when removing the security set screws. The “ROPE GRIPPER®” is now ready for operation. Check to ensure that the rotating shaft is around the corner(s) at the bottom of the cam and the connecting arm position **matches or covers the wear-in line** marked on the side wall when gripping the ropes.

## TESTING ALL CIRCUITS

- During each test the “ROPE GRIPPER®” should:
  - Grip the Ropes.
  - Stop the car and/or prevent the car from running, and
  - Open the control safety circuits disconnecting power to the motor and machine brake.
- The following three tests should be made while the car is running in slow speed in both the up and down directions.
  - 1) Turn the pump test switch OFF. Observe A, B, and C above.
  - 2) a) With the car in the door zone and the car doors and the hoistway doors not in the closed position (doors partially opened with the car door switch and the hoistway door interlock opened), disconnect the door zone feed (as if leaving the door zone) and observe A, B, and C above.  
b) Repeat the same test in 2) a) with the doors fully open.

**NOTE:** The controller’s safety circuits should require a manual reset before the “ROPE GRIPPER®” reopens. See **IMPORTANT** notes on **Page 15** under sections titled **OVERSPEED RESET** and **UNINTENDED MOTION RESET**.

- 3) Manually open the governor overspeed switch and observe A, B, and C above. **NOTE:** The controller’s safety circuits should require a manual reset before gripper reopens.

## SUGGESTED CONTROLLER CIRCUITS

- Both the B44 and A17.1-2000 Codes require new circuitry for activation of the “ROPE GRIPPER®”. It is the controller manufacturer’s responsibility to provide proper circuitry that meets all applicable codes and laws for operating this device.
- The function of the “ROPE GRIPPER®” is to grip the ropes and stop the car. We recommend that the gripper is activated when an overspeed occurs or when the car leaves the floor (door zone) with the doors open (hoistway door unlocked and/or the car gate switch open). If the doors happen to open while the car is between floors, the gripper should not be activated.
- In addition, the “ROPE GRIPPER®” activates when there is a loss of power. When power returns, if the car is in the door zone, we recommend resetting the gripper. If the car is between floors when power returns, or if changing from “Inspection” to “Automatic” operation, we suggest a time interval to signal door closure, and when the car gate switch or door interlock makes contact, then reset the “ROPE GRIPPER®”.
- The suggested circuits shown in **Diagrams 1 & 2** activate the gripper by opening contacts RG1, RG2, DZ1, and DZ2. Relay coils RG1, RG2, DZ1 and DZ2 are controlled by the Governor overspeed switch (GOS) and function blocks GRC1, GRC2, DZC1, and DZC2, respectively.

### GRC1 DESCRIPTION

- If the car is not in the door zone when main line power turns “ON”, or when switching from “Inspection” to “Normal Operation”, or when resetting the Governor overspeed switch; allow a time interval, signal the door closure, and when the car gate or door interlock contact makes, energize RG1.
- Anytime the car is in the door zone (“Inspection” or “Normal Operation”), RG1 is de-energized when both the car door contact and hoistway door interlock contact are opened. Should the car now leave the door zone (unintended motion), power to the gripper is removed and the gripper is activated. In the door zone, when the car door contact or hoistway door interlock contact is made, energize RG1. If the car should leave the door zone with RG1 energized, then gripper activation is prevented. RG1 should remain energized even if both the car and hoistway doors are opened while between floors. When the car is in the door zone again, RG1 should function as above.

### GRC2 DESCRIPTION

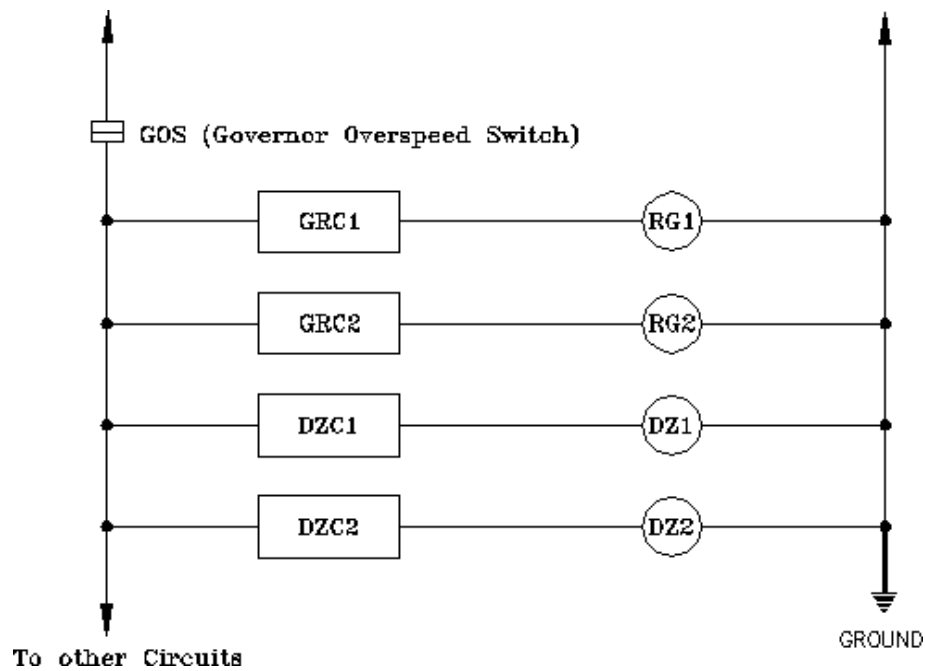
- Redundant circuits are required by the 2000 A17.1 and B44 Codes. Circuits for RG2 function identical to RG1 except separate logic for the timing function, door locks, gate switch and door zone should be used. DZC1 logic could be used for circuits of RG1 and DZC2 for circuits of RG2. (See NOTE in **Diagram 3**)

### DZC1 DESCRIPTION

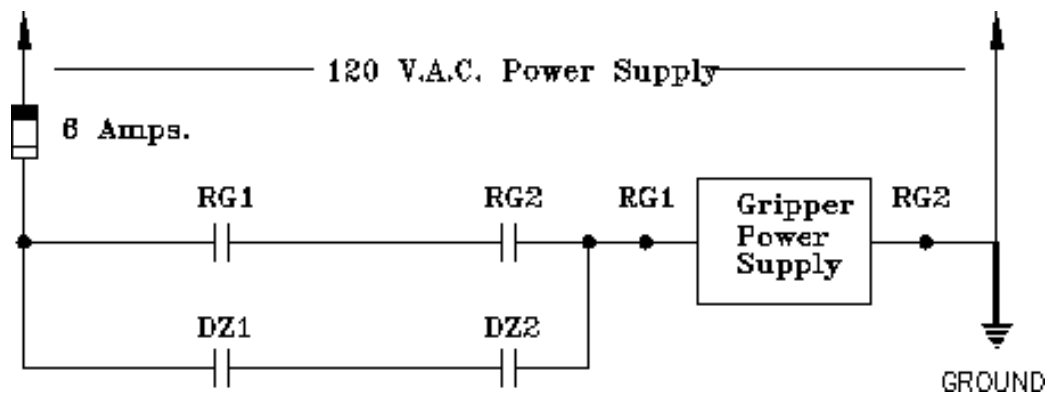
- DZ1 is energized in the door zone and de-energized outside of the door zone (See **Diagram 3** NOTE). Maximum door zone is  $\pm 3"$  (6 INCHES TOTAL).

### DZC2 DESCRIPTION

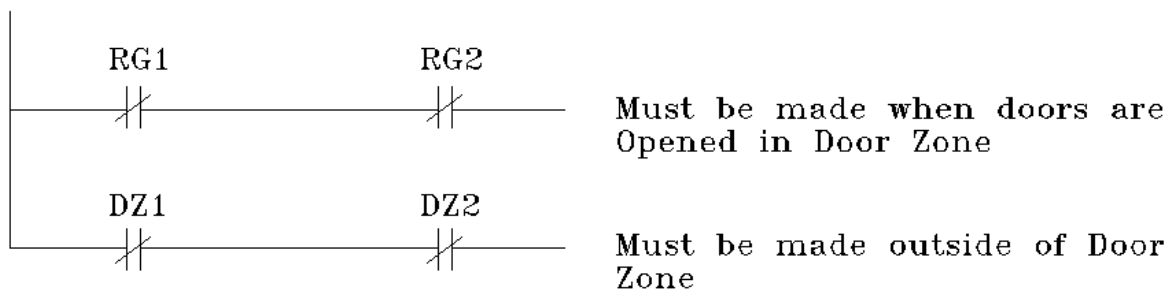
- Circuits for DZ2 function are identical to DZ1 except a separate door zone signal is utilized.
- If the above circuits (**Diagram 3**) do not make contact when required, the elevator must be prevented from running. If other types of relays are used, circuits must prove that contacts from RG1, RG2, DZ1 and DZ2 are functioning properly and when a failure is detected the elevator must be prevented from running.



**DIAGRAM 1**



**DIAGRAM 2**



**NOTE:** If force guided relays are used for RG1, RG2, DZ1, and DZ2, use this diagram.

**DIAGRAM 3**

# HOLLISTER-WHITNEY “ROPE GRIPPER®” OPERATION

## **NORMAL OPERATION**

- Power to the “ROPE GRIPPER®” is constantly maintained. When in the door zone DZ1 and DZ2 provide power to the gripper; when the doors close, RG1 and RG2 energize. As the car leaves the floor DZ1 and DZ2 de-energize, power to the “ROPE GRIPPER®” is maintained through RG1 and RG2. When approaching a new floor DZ1 and DZ2 again energize, when the doors open RG1 and RG2 de-energize.

## **OVERSPEED**

- When an overspeed is detected, the Governor overspeed switch opens. Additional overspeed can be detected by use of an encoder or tachometer that detects the speed of the elevator. (Not the motor or worm shaft of a geared elevator.) When detected, relays RG1, RG2, DZ1 and DZ2 de-energize. This removes power from the “ROPE GRIPPER®”, gripping the ropes and stopping the car.

## **OVERSPEED RESET**

- Overspeed reset is accomplished by resetting the Governor overspeed switch and possibly the elevator control circuits. Refer to and follow the controller manufacturer’s instructions for “ROPE GRIPPER®” reset.

**IMPORTANT:** The code requires that the “ROPE GRIPPER®” be manually reset if it is triggered by fault. It is intended that a qualified technician inspect for, and correct any, malfunction before the car is placed back into service. A dangerous situation can be produced if a gripper is manually reset without first correcting the cause of the fault. e.g.: If there has been a brake failure that has not been corrected, when the gripper is reset, it is very likely that the car will fall either up or down.

## **UNINTENDED MOTION**

- When at the floor with the doors not in the closed position, relays RG1 and RG2 are de-energized and relays DZ1 and DZ2 are energized. If the car leaves the floor, DZ1 and DZ2 de-energize, removing power from the “ROPE GRIPPER®”, gripping the ropes and stopping the car.

## **UNINTENDED MOTION RESET**

- Unintended motion reset is accomplished through elevator control circuits. Refer to and follow the control manufacturer’s instructions for “ROPE GRIPPER®” reset.

**IMPORTANT:** The code requires that the “ROPE GRIPPER®” be manually reset if it is triggered by fault. It is intended that a qualified technician inspect for and correct any malfunction before the car is placed back into service. A dangerous situation can be produced if a gripper is manually reset without first correcting the cause of the fault. eg: If there has been a brake failure that has not been corrected, when the gripper is reset, it is very likely that the car will fall either up or down.

## **MANUAL OPENING**

- During a power failure the “ROPE GRIPPER®” will activate. When power is restored the gripper will automatically reload and put the elevator back into service. If the car is to be moved during a power outage, a manual pump is provided to open the “ROPE GRIPPER®”.
- Turn the valve stem (**Figure 4**) in the pumping unit to MANUAL. Use the hand pump to move the “ROPE GRIPPER®” towards the loaded position releasing the ropes. If the hydraulic valve is left in the manually closed position, when power is restored a microswitch contact will prevent the elevator from running.

**CAUTION:** DURING THE FOLLOWING TESTS PASSENGERS SHOULD BE PREVENTED FROM ACCESS TO THE ELEVATOR

# **TEST PROCEDURE FOR COMPLIANCE WITH ELEVATOR SAFETY CODES**

**THE ROPE GRIPPER® MUST BE TESTED TO MEET ALL REQUIRED CODES**

**IN ADDITION TO THE TESTS BELOW, THE CONTROL MANUFACTURER MAY  
HAVE ADDITIONAL TEST RECOMMENDATIONS**

## **1) POWER INTERRUPTION TEST**

Run the car in slow speed and turn the toggle switch on the side of the pump unit to OFF. This will activate the “ROPE GRIPPER®” causing it to grip the ropes and stop the car. When the gripper is activated, the “ELEVATOR CAN RUN” contact will open and signal the controls to interrupt power to the driving motor and machine brake.

**DURING THE FOLLOWING 2 TESTS, ALLOW THE BRAKE TO STOP THE CAR  
IF THE “GRIPPER” DOESN’T. When activated by either of these tests, the  
“Gripper” circuits must be manually reset.**

## **2) ASCENDING CAR OVERSPEED TEST**

With an empty car, overspeed (approximately 10% over contact speed) the car in the “UP” direction while keeping the machine brake open. The Governor overspeed switch will activate the “ROPE GRIPPER®”. The gripper will stop the car before the counterweight strikes the buffer or, at least, reduce the car speed to the speed for which the buffer is designed. If it is impractical to overspeed the car, run the empty car up at high speed with the machine brake held open and manually trip the Governor overspeed switch. The gripper will cause the car to slow down and stop. The Governor can then be tested to make sure the Governor switch opens at the correct overspeed setting.

## **3) UCM - UNCONTROLLED CAR MOTION TESTS**

**CAUTION: DO NOT ALLOW ANYONE TO ENTER  
THE ELEVATOR DURING THIS TEST!!!**

- a) With the car at a floor with the doors partially open (not fully opened), open the machine brake. (With empty car the elevator moves up, with full load the elevator moves down.) The “ROPE GRIPPER®” should apply and stop the car within 48” (1220 mm).
  - b) Repeat test “a)” with the doors fully open. The “ROPE GRIPPER®” should apply and stop the car within 48” (1220 mm).
  - c) Register a call and as the car approaches the floor hold the brake open.
- For all tests, as the car drifts from the floor with a partially or fully open “ROPE GRIPPER®” should apply and stop the car within 1220 mm (48”). If the car does not move when the machine brake is opened, the brake drum or disc can be turned to start the car.

## **SUGGESTED ADDITIONAL SOFTWARE FOR ADDED SAFETY**

1. If the machine brake fails to drop when at the floor, (as indicated by the brake switch) the “GRIPPER” can be activated. In this case the car need not leave the door zone to apply the “GRIPPER”.
2. In addition to the overspeed switch on the governor, the “GRIPPER” can apply when any device in the system indicates overspeed, such as an encoder, tachometer and/or an emergency terminal stopping device.
3. The “GRIPPER” can be applied when any unintended motion is detected, such as the car moving without a signal to run, or the car moving up with a down signal and visa-versa.

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## **ROPE GRIPPER® TROUBLE SHOOTING GUIDE**

**WARNING! KEEP HANDS CLEAR OF ROPE GRIPPER. FORCES CREATED CAN CRUSH FINGERS.**

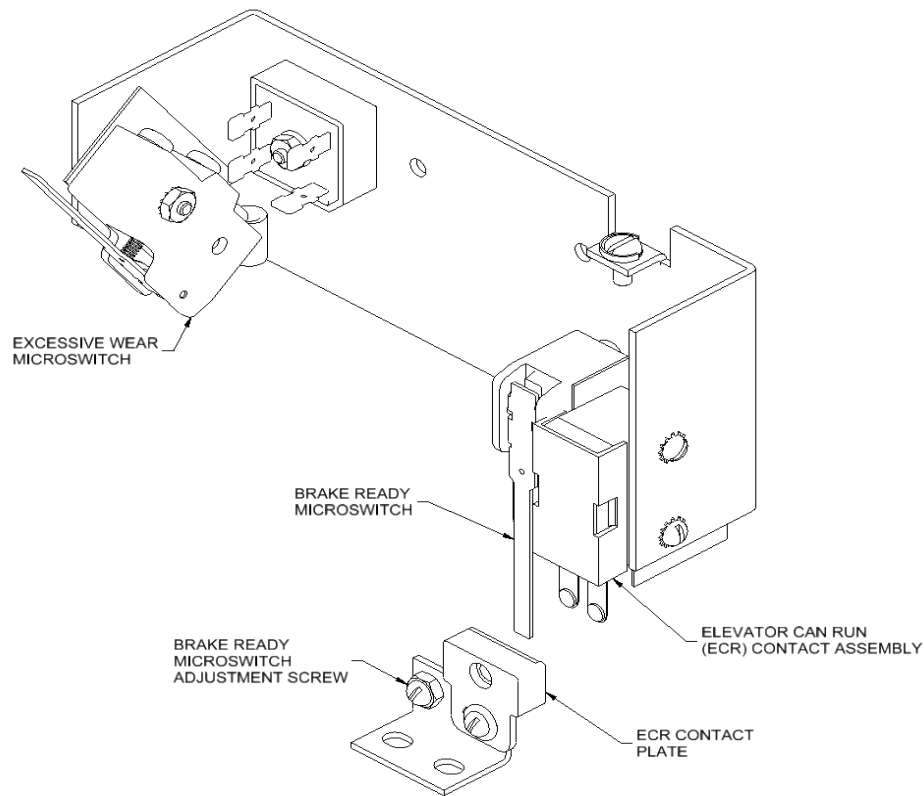
### **GRIPPER WILL NOT RESET - GRIPPER SET ON ROPES**

- Check location of rotating shaft in cam; if rotating shaft tube is against wear-out switch refer to section concerning Lining Replacement
- Check for open Safety circuit.
- Check for blown fuse; refer to that section

### **GRIPPER DRIFTING CLOSED, CONTINUOUS RELOADING, ECR CONTACT OPENING IN ERROR, PUMP UNIT CYCLING ON AND OFF**

These are all indications that the Rope Gripper latch is not holding the Rope Gripper open. Read and understand this section completely prior to performing any checks.

- First, it should be understood that the “ROPE GRIPPER®” is hydraulically pumped open to the “Ready” or “Loaded” position, and thereafter held electro-mechanically with a latching coil assembly (**See Figure 6**).
- When the gripper rotating shaft reaches the loaded position, the Brake-Ready microswitch contact will open turning off the pump. The pump should run just long enough to get the latch hook past the trigger, and then shut off. The hydraulic pressure may slowly bleed off until trigger and latch are resting together. At this point, the trigger and latch should be engaged as shown in **Figure 6**.
- Many problems can be traced back to the gripper not latching properly. Latch engagement problems are typically a result of:
  - 1) Dirty latch assembly (blow out with compressed air),
  - 2) Brake-Ready microswitch out of adjustment, causing mis-engagement of the trigger and latch,
  - 3) Improper latch coil pressure (**See Separate Bulletin 1164**) or less commonly,
  - 4) A malfunctioning latch coil, or
  - 5) Misalignment (side to side) of the latch.
- Any of the above will be indicated by the Pumping Unit cycling on and off. This cycling could be as quick as every 15 seconds or so, or as long as every couple of minutes. Repeated cycling may cause unnecessary wear on the cylinder and pump unit, requiring premature maintenance, fluid loss (cylinder leaks), and can cause motor and/or capacitor failure.
- The Brake-Ready microswitch (**Figure 8**) should be adjusted to allow proper engagement of the trigger and latch and to prevent the rotating shaft from bottoming out in the cam slot. There should be approximately 1/32" clearance between the rotating shaft and the bottom of the cam slot when the trigger and latch are engaged. In other words, the pump must run long enough to allow the trigger and latch to properly engage, yet not so long as to push the rotating shaft into the back of the cam slot.
- After “ROPE GRIPPER®” installation or after any maintenance check, it is suggested that the in-service gripper be observed for 15 minutes or so to assure proper operation.
- If ECR contact is continuing to open in error, confirm ECR assembly and contact plate are clean and free of debris, and are making good contact.



**Current Switch Assembly 620 or 622-064, ECR Contact Plate 618-067, Actuating Angle 600-051**

**For Older Style Switch Assembly: 620 or 622-050, See Figure 9, Page 24**

**FIGURE 8**

**MICROSWITCH ADJUSTMENT PROCEDURE** – Read and understand this section completely prior to performing any checks.

1. To check adjustment, first switch pumping unit OFF. This will activate the “ROPE GRIPPER®” and grip the ropes. Note the position of the large washer and Allen Screw on top of the latch coil (see Figure 6).
2. Switch pumping unit ON. This will return “ROPE GRIPPER®” to the “READY” position. While returning to the ready position, watch the large washer at the top of the latch coil. The washer (and Allen Screw) should rise with the passing of the latch under the trigger, then lower and return to its original position. If it does, move on to Step 5.
3. If the washer did not return to the fully seated position, either a.) the pump is not running long enough, indicating microswitch out of adjustment, or b.) as has happened on very rare occasions, the latch is slightly out of adjustment causing the trigger to bind on one edge of the latch. Visually, when the trigger and latch engage, you should see run-by clearance between the sides of the latch and the trigger, and the latch should be fairly well centered on the trigger. Run Steps 1 & 2 again to check your results. If the latch is centered, move on to Step 5.
4. *If the latch is not centered, you should consider calling Hollister-Whitney Technical support.* To center the latch, first switch pumping unit OFF. This will activate the gripper and grip the ropes. Slightly loosen screws holding latch, and tap latch into a more centered location, making sure the latch remains square. Retighten screws and repeat Steps 1 & 2.
5. Re-install the security screws so that they just touch the rotating shaft.

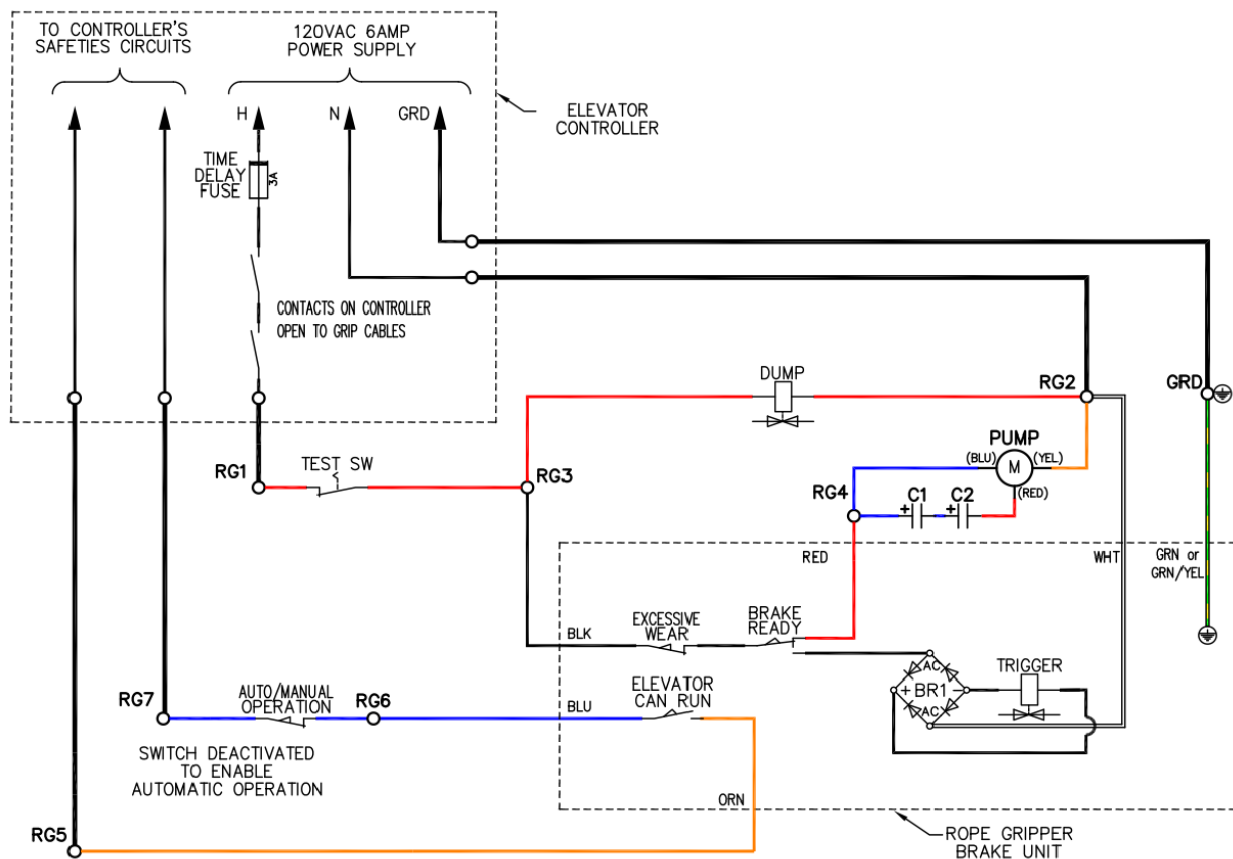
6. At this point, the coil should be activated. If the large washer and Allen Screw are seated properly, it should not be possible to raise the washer and Allen Screw with thumbnail pressure. If you can raise the washer, check all power to and across the coil. If there is a problem with the power or the coil, repair it now and move on to Step 9.
7. Remove one or both of the connecting arms from the gripper. Check the clearance between the rotating shaft and the cam slot (approximately 1/32", see **Figure 6**), and reinstall the connecting arm(s). Note: If clearance approaches zero, contact Hollister-Whitney Technical support.
8. Older style switch assemblies have two screws in the Actuating Angle, while current production has one and a contact bar. (See **Figure 8**) Locate the Brake-Ready Microswitch Adjustment Screw. To make the pump run longer, adjust the screw outwards in 1/4 turn increments. **WARNING: It is advised that you check the rotating shaft/cam slot clearance after each adjustment by repeating this procedure.** Additionally, if 1 full turn (4 adjustments or 4 x 1/4) has been made to the microswitch and the washer seems to be fully seated but still moves up with no improvement, see **Bulletin 1164** (Setting Rope Gripper Latch Pressure) found at: <http://www.hollisterwhitney.com/support/> and call Hollister-Whitney for additional technical support.
9. Remove the security screws and retest the "ROPE GRIPPER®" to check adjustment.

**BLOWING CONTROLLER FUSES** – Read and understand this section completely prior to performing any checks.

1. Check type of fuse being used. **Note:** Hollister-Whitney specifies a 3-amp Fusetron fuse, which is a dual element time delay fuse. (**Diagram 4**). Many controller manufacturers have not supplied this fuse. If the fuse is not correct, consult with your controller manufacturer. A 4 Amp MDL or 5 Amp MDL fuse may be substituted but only with the approval of your controller manufacturer. If the fuse is correct, see **CHECKING PUMP UNIT AMP DRAW** below.
2. Electric Pump runs, but Gripper does not open. First check hydraulic oil level. Refer to **FLUID LEVEL LOW** line item below. If the pump runs too long at low fluid levels, the fuse may blow, and in some cases, the pump, motor and/or motor capacitors may fail.
3. Check resistance of the Dump Valve Coil. Resistance should not be "open" it should be about 0.5 Mega Ohms. If you obtain an "open" reading, replace the Dump Valve Coil.
4. If Fluid Level, Dump Valve Coil, and Amp Draw are OK, place the Dump Valve in the Manual position and run the pump. If the gripper opens with the pump running and the valve in manual position, replace the Dump Valve.

### **CHECKING PUMP UNIT AMP DRAW**

1. Make sure the security set screws are installed or that the "ROPE GRIPPER®" is clamped to the ropes.
2. Switch the pump unit OFF.
3. Disconnect the power supply from the controller at RG1 and RG2 on the Pumping Unit.
4. Disconnect hydraulic line from "ROPE GRIPPER®" at the Quick Connect.
5. Get an extension cord and remove the female end. Bare the wire ends and connect cord L1 to RG1 and cord L2 to RG2. Plug the extension cord into a 120 VAC wall outlet. Put a Clamp-on Amp Meter around cord L1 and switch the pump unit ON. The pump motor should run. (NOTE: It may be necessary to jump out RG3 and RG4 to get pump unit to run.) After the initial high spike, you should see the amp draw drop and level out to no more than **7 amps**. 7A or less will indicate that there is no problem with your pump unit and you should consult with your controller manufacturer. If your Amp Draw is more than this value, call Hollister-Whitney Technical Support for assistance.



**DIAGRAM 4**

### **AIR IN LINE (CHANGING OUT HOSES OR CYLINDERS)**

Air can be introduced if replacing the hydraulic hose or cylinder. This air can cause complete failure of the resetting/reloading mechanism and must be bled.

- Prior to air bleeding, check that manual pump is operational, with valve stem at MANUAL and Quick-Connect disconnected. If lever has no, or little, resistance see manual for priming hand pump. If OK, place valve stem at AUTOMATIC, reconnect hose and extend cylinder fully.
- CYLINDER without Bleeder Valve: To bleed air, first loosen the hose swivel connection at cylinder, then use hand pump until no air is evident. Re-tighten hose.
- CYLINDER with Bleeder Valve: A Bleeder port has been provided next to the oil inlet. Use this port to bleed air when changing a hose or cylinder.

**HYDRAULIC CYLINDER REPLACEMENT INSTRUCTIONS NOTE:** Read and understand instructions prior to cylinder replacement!!! It is highly recommended that the mechanic have a long handled (7" long) 5/32" Ball End Allen wrench or driver in his kit, in addition to the normal mechanics tools including wrenches, screw drivers and Allen wrenches.

➤ **Situation 1: Leaking Cylinder**

1. Pump “ROPE GRIPPER®” into the LOADED or Ready position and install security screws to hold gripper shoes open.
2. Remove 4 snap rings, both connecting arms and movable shoe.

3. Turn pumping unit OFF and place valve stem in the MANUAL position. Using hand pump, pump cylinder down just enough to relieve pressure on security screw. Remove security screws.
4. Return valve stem to the AUTOMATIC position. The rotating shaft will go entirely up the cam. At this time, with the rotating shaft at the top of the cam, remove the hydraulic hose from the cylinder.
5. Remove 3 angle bolts from both sides of mounting angle, leaving mounting angles attached to floor (Gripper Mounting Channels).
6. Place "ROPE GRIPPER®" on a suitable work surface. Locate the shaft holding the cylinder and remove shaft from gripper.
7. Locate the block holding the cylinder stem to the rotating shaft tube. Using a long 5/32" Ball Nose Allen Wrench, remove (4) 10-32 screws from block. Remove block from cylinder.
8. Put block on new cylinder. Re-install cylinder by installing shaft first, then block and screws. Install hose on cylinder. Restore "ROPE GRIPPER®" to mounting angles.
9. With valve stem at MANUAL, bleed air out of system per above "AIR IN LINE" section until no air is evident.
10. Turn pumping unit ON. Hand pump cylinder down until pump motor takes over pumping. With rotating shaft down and trigger latched, install security set screws.
11. Re-assemble moveable shoe, arms, and snap rings to "ROPE GRIPPER®". When complete, remove security set screws, turn valve to AUTOMATIC and place gripper back into operation.

➤ **Situation 2: Cylinder will not pump down (or hold pressure)**

1. Make sure "ROPE GRIPPER®" is gripping ropes, the pumping unit is OFF and machine brake is set.
2. Remove 5 angle bolts from both mounting angles and set mounting angles aside.
3. Locate the shaft holding the cylinder and remove shaft from "ROPE GRIPPER®".
4. With valve stem on MANUAL, follow instructions 7., 8. and 9. above.
5. Return valve stem to AUTOMATIC and turn pumping unit ON. Gripper will return to loaded or open position.

**FLUID LEVEL LOW** – Gripper pumps partially down, pump continues to run

- With the "ROPE GRIPPER®" in the loaded position, the level should fully cover the Oil Level Window on the Oil Reservoir. Use **SHC524 Mobil 1 Synthetic Hydraulic Oil** or **Mobil 1 Fully Synthetic ATF (Automatic Transmission Fluid)** to top off oil level.

**HAND PUMP DOES NOT FUNCTION (AIR LOCK) GRIPPER WILL NOT PUMP OPEN MANUALLY**

- Check oil level and top off as necessary.
- Disconnect the Hydraulic hose from the gripper at the Quick-connect coupling.
- Put Dump Valve in manual position and lower the hand pump handle.
- Run pumping unit electrically. The hand pump handle should rise. This should prime the hand pump and force fluid into the system, allowing proper use of the hand pump.
- This procedure may need to be repeated a few times to effectively prime the pump system.

**"ROPE GRIPPER®" LUBRICATION**

- Apply a thin layer of a general-purpose grease lubricant to the cam surface, the trigger and latch mechanism, and the four movable shoe guides.

**WIRE ROPE LUBRICATION**

- Use a high friction lubricant such as: NYLUBE CABLE CARE #65 or AMERICAN OIL VITALIFE #600. Care should be taken not to over lubricate



# Certificate of Compliance

**Certificate:** 1002290

**Master Contract:** 155941

**Project:** 80016573

**Date Issued:** 2019-10-09

**Issued To:** Hollister-Whitney Elevator Co., LLC  
2603 North 24th St  
Quincy, Illinois, 62305  
United States

**Attention:** Donald Owens

**Issued by:** *Kevin Chieu*  
Kevin Chieu



CSA B44.1/ASME A17.5

## **PRODUCTS**

CLASS - C241101 - ELEVATOR EQUIPMENT-Open and Enclosed Elevator Electrical Equipment

CLASS - C241181 - ELEVATOR EQUIPMENT - Open and Enclosed Elevator Electrical Equipment -  
Certified to US Standards

"Rope Gripper", Models 600, 601, 605 and 610 (with pumping unit), electrical rating: 6A, 120Vac 60Hz, single phase, contact rating 250Vac, 6A/250Vdc, 0.15A

"Rope Gripper", Models 618, 620, 621, 622, 624, 625, 626 and 626 SPL (with pumping unit), electrical rating: 6A, 120Vac, 60Hz, single phase, contact rating 250Vac, 6A/250Vdc, 0.15A

## **APPLICABLE REQUIREMENTS**

CSA B44.1/ASME A17.5 - Elevator and Escalator Electrical Equipment



## *Supplement to Certificate of Compliance*

**Certificate:** 1002290

**Master Contract:** 155941

*The products listed, including the latest revision described below,  
are eligible to be marked in accordance with the referenced Certificate.*

### **Product Certification History**

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<b>Project</b>	<b>Date</b>	<b>Description</b>
80016573	2019-10-09	Update report 1002290 for addition of model 621, alternate construction and compliance with CSA B44.1-19/ASME A17.5-2019
000070215388	2019-03-05	Update to the report to add alternate construction of mechanical contact assembly.
000070127541	2017-05-12	Update report for alternate construction, addition of alternate contacts for ready switch.
000070086186	2016-12-14	Update report to cover alternate solenoid and under voltage re-test.
000070066621	2016-05-11	Update report to cover alternate construction and re-testing of solenoid under voltage test
0002556088	2012-10-23	Alternative rectifier; Moved mechanical and EC type certification information to Attestation report 2565004.
0001547818	2005-01-13	Addition of rope gripper model 626-SPL(LR 88181-2)

# EU-TYPE EXAMINATION CERTIFICATE

Issued by Liftinstituut B.V.  
identification number Notified Body 0400,  
commissioned by Decree no. 2018-0000125182

Certificate no. : NL01-400-1002-020-03      Revision no.: 7

Description of the product : "Rope Gripper", certified as stopping element of ascending car  
overspeed protection and/or unintended car movement protection

Trademark, type : "Rope Gripper", Models 618, 620, 622, 624, 625 and 626(SPL)

Name and address of the manufacturer : Hollister-Whitney Elevator Co., LCC      GumYoung General Co., Ltd.  
P.O. Box 4025      60, Donyu 1-ro, Paju-eup,  
2603 North 24th Street      Paju-si, Gyeonggi-do  
Quincy, Illinois 62305, USA      10832, Republic of Korea

Name and address of the certificate holder : G.A.L. Manufacturing Company, LCC  
50 East 153rd St., Bronx, NY 10451, USA

Certificate issued on the following requirements : Lifts Directive 2014/33/EU

Certificate based on the following standard : EN 81-1:1998+A3:2009  
EN 81-20/50:2014

Test laboratory : CSA International, Toronto, Canada  
Hollister Whitney, Quincy, Illinois, USA

Date and number of the laboratory report : August 25, 2009; CSA 155941-1002290 (LR 88181-2) Edition 10  
November 4, 2010; CSA 155941- 2308945 (LR 88181-2) Ed.1  
March 24, 2015; CSA Project 70015005 rev.5

Date of EU-type examination : Rev. 7; August 30, 2018

Additional document with this certificate : Report belonging to the EU-type examination certificate  
no.: NL01-400-1002-020-03 rev.7

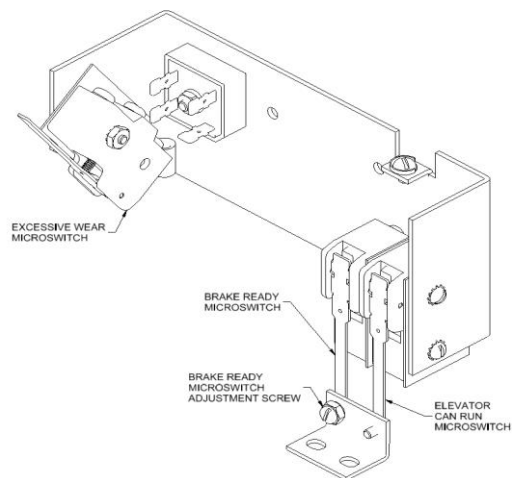
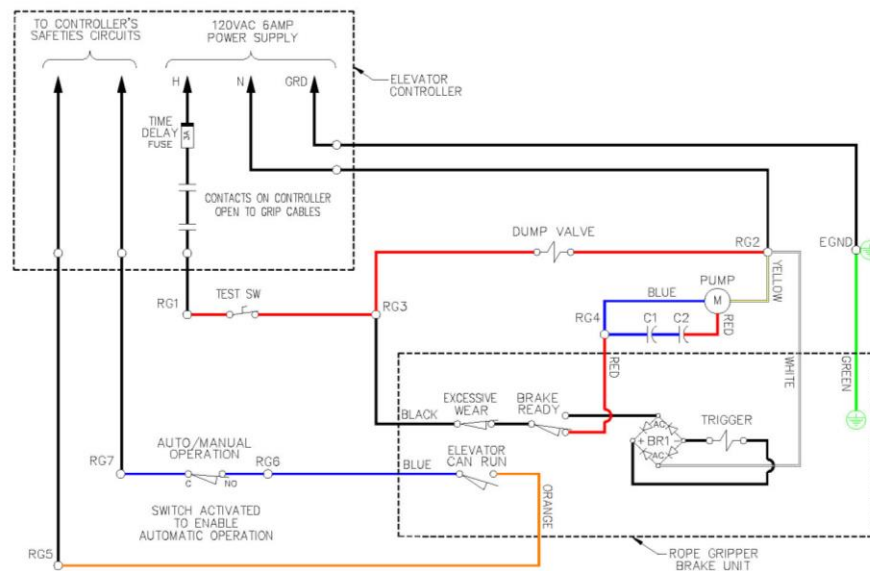
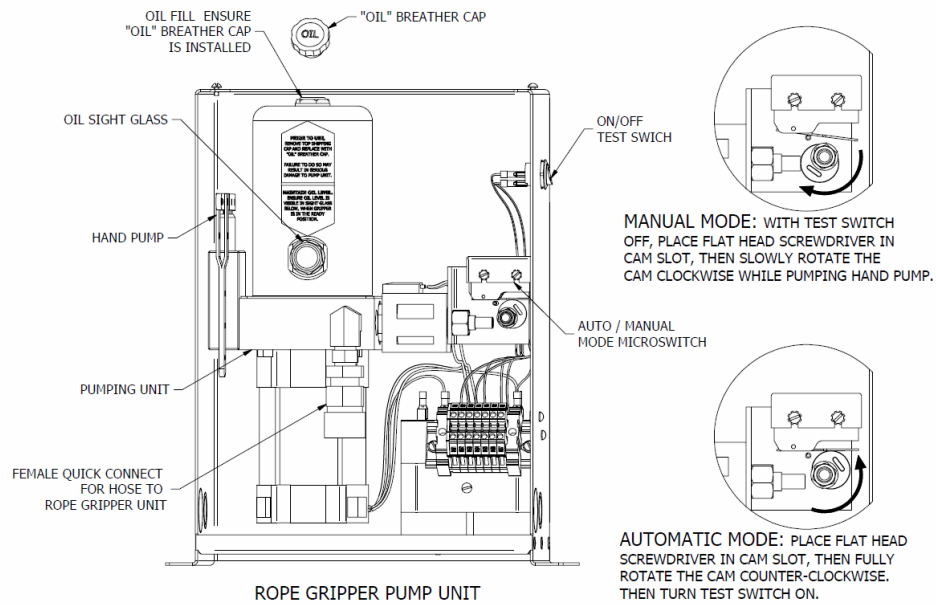
Additional remarks : None

Conclusion : The safety component meets the requirements of the Lifts Directive  
2014/33/EU taking into account any additional remarks mentioned  
above.

Amsterdam

Date : 30-08-2018  
Valid until : 31-08-2022

  
ing. P.J. Peeters  
Manager  
Certification decision by



**Older Model Pumping Unit, Wiring Diagram, Switch Assembly; Figure 9**

*MICROSWITCH / SOLENOID MOUNTING BRACKET (H.W.620-050)*

NOTES	DESCRIPTION	ITEM No.	SPECIFICATIONS	AMOUNT
H.W. 620-050	MICROSWITCH/SOLENOID MT'G. BRACKET	137	# 14 GAUGE C.R.S.	1
	RECTIFIER MOUNTING SCREW	117	6-32 x 5/8 LONG PAN HEAD SCREW	1
	CLAMP MOUNTING SCREW	118	6-32 x 3/8 LONG PAN HEAD SCREW	1
	FEMALE STUD	119	8-32 x 7/16 LONG	1
	CUP WASHER	120	# 8	1
	GROUND SCREW	121	8-32 x 5/16 LONG PAN HEAD SCREW	1
	RECTIFIER DIOD-0015N	122	GI # GBPC 2508	1
	CABLE CLAMP	123	HEYCO 12607	1
	BRASS FLAT WASHERS	124	# 8	2
	NUT	125	8-32 THREAD	2
	MICROSWITCH INSULATOR	126	1/32 FR700 INSULATOR	3
	MICROSWITCH	127	BZ-2RW855-A2-S	3
	MICROSWITCH MOUNTING SCREW	128	6-32 x 5/8 LONG PAN HEAD SCREW	1
	MICROSWITCH MOUNTING SCREW	129	6-32 x 1" LONG PAN HEAD SCREW	1
	MICROSWITCH MOUNTING SCREW	130	6-32 x 1 1/2 LONG ROUND HEAD SCREW	1
	MICROSWITCH MOUNTING SCREW	131	6-32 x 1 3/4 LONG ROUND HEAD CREW	1
	STAR WASHERS	132	# 6	8
	NUT	133	6-32 THREAD	4
	CABLE	134	CAROL CABLE 406 # 18-6 CONDUCTOR 45" LONG	1
	NYLON TIE	135	4" LONG	3

*MICROSWITCH / SOLENOID MOUNTING BRACKET (H.W.622-050)*

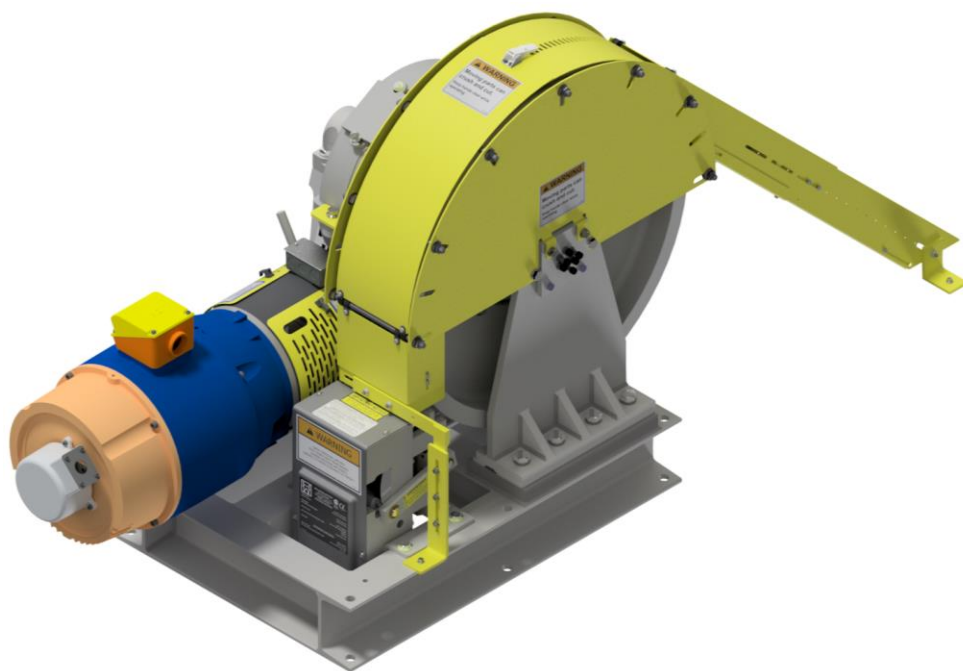
NOTES	DESCRIPTION	ITEM No.	SPECIFICATIONS	AMOUNT
H.W. 622-050	MICROSWITCH/SOLENOID MT'G. BRACKET	136	# 14 GAUGE C.R.S.	1
		117		
		118		
	FEMALE STUD	119	8-32 x 7/16 LONG	1
	CUP WASHER	120	# 8	1
	GROUND SCREW	121	8-32 x 5/16 LONG PAN HEAD SCREW	1
	RECTIFIER DIOD-0015N	122	GI # GBPC 2508	1
	CABLE CLAMP	123	HEYCO 12607	1
	BRASS FLAT WASHERS	124	# 8	2
	NUT	125	8-32 THREAD	2
	MICROSWITCH INSULATOR	126	1/32 FR700 INSULATOR	3
	MICROSWITCH	127	BZ-2RW855-A2-S	3
	MICROSWITCH MOUNTING SCREW	128	6-32 x 5/8 LONG PAN HEAD SCREW	1
	MICROSWITCH MOUNTING SCREW	129	6-32 x 1" LONG PAN HEAD SCREW	1
	MICROSWITCH MOUNTING SCREW	130	6-32 x 1 1/2 LONG ROUND HEAD SCREW	1
	MICROSWITCH MOUNTING SCREW	131	6-32 x 1 3/4 LONG ROUND HEAD CREW	1
	STAR WASHERS	132	# 6	6
	NUT	133	6-32 THREAD	2
	CABLE	134	CAROL CABLE 406 # 18-6 CONDUCTOR 45" LONG	1
	NYLON TIE	135	4" LONG	3

**Parts Lists, Older Model Switch Assemblies; Figure 10**

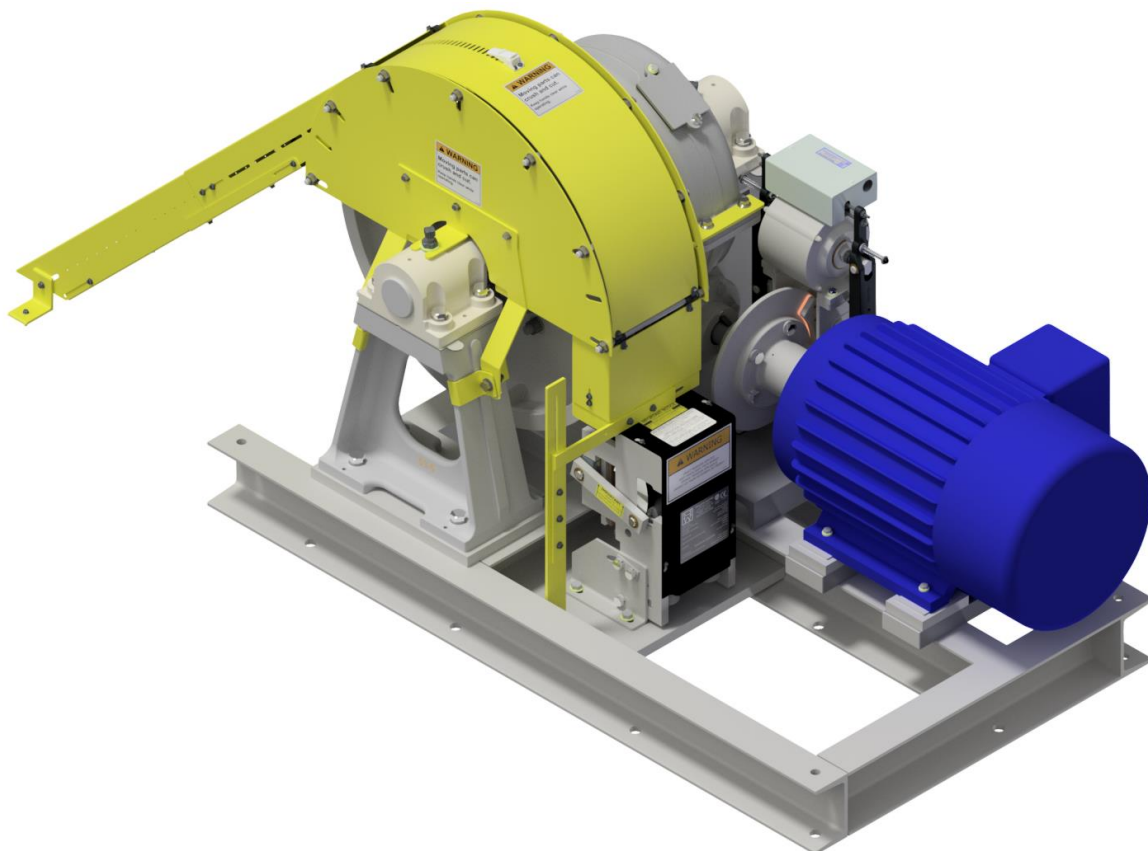
For Further Support Contact:

Hollister-Whitney Elevator Co., LLC  
2603 North 24th Street  
Quincy, Illinois 62305  
Phone: 217-222-0466  
Fax: 217-222-0493

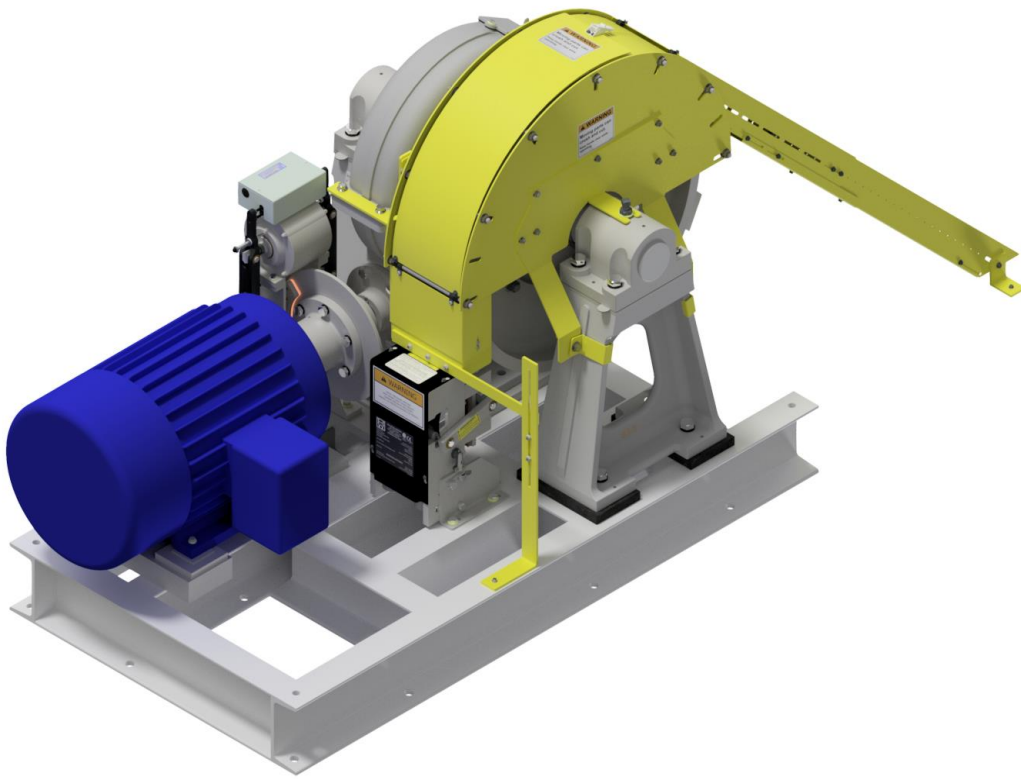
<http://www.hollisterwhitney.com/support/>



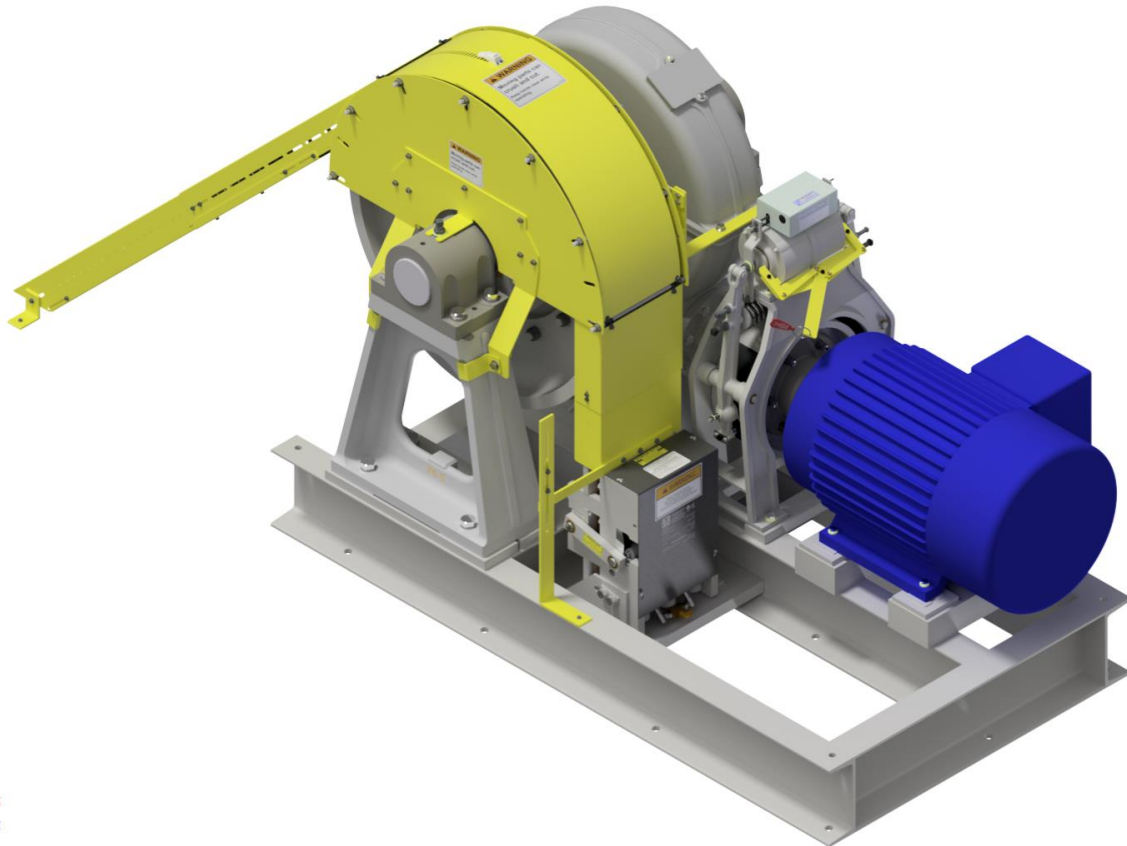
**Figure 11: Example Not to Scale, 44F Machine with Factory Rope Gripper Mount**



**Figure 12: Example Not to Scale, 54 Machine with Factory Rope Gripper Mount**



**Figure 13: Example Not to Scale, 64 Machine with Factory Rope Gripper Mount**



**Figure 14: Example Not to Scale, 74 Machine with Factory Rope Gripper Mount**

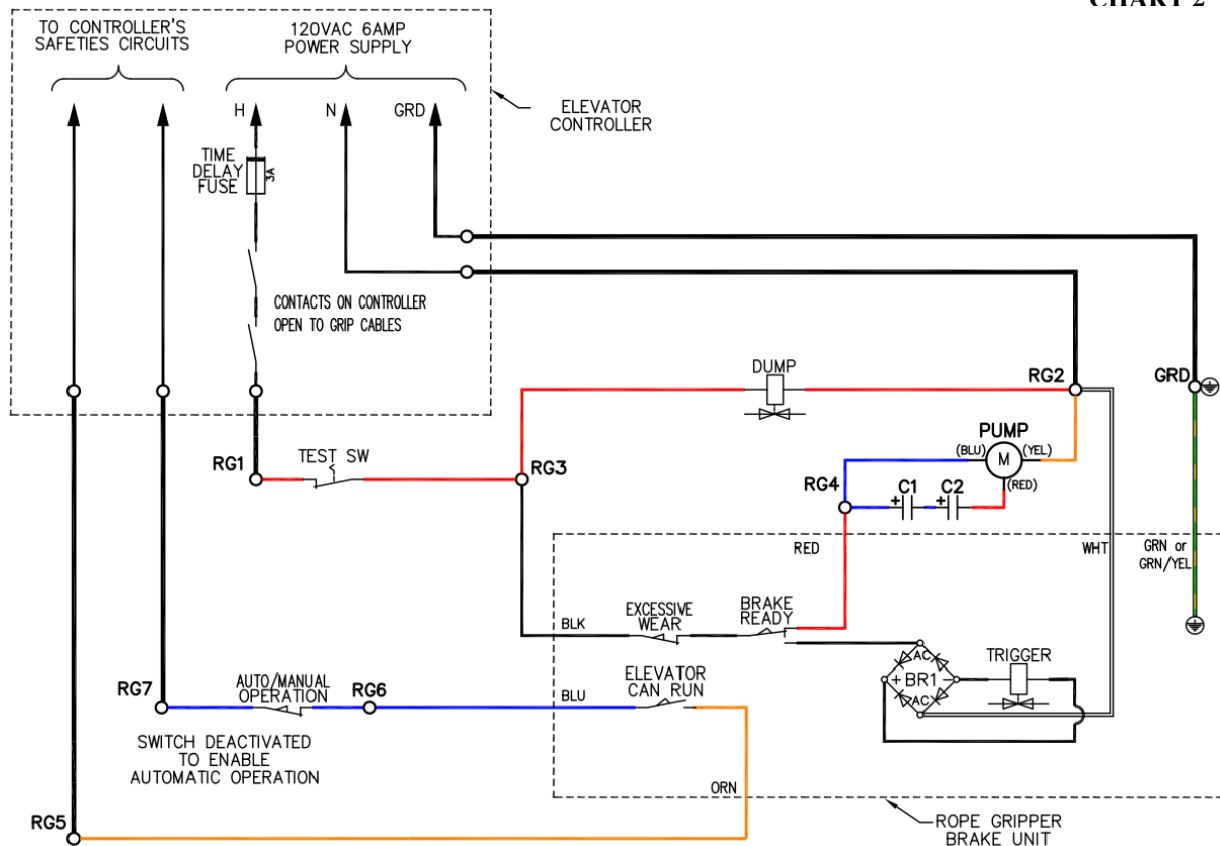


- Wiring from the gripper to pump unit is color coded per **Chart 2**.
- Connect terminals RG1 and RG2 to elevator control Power Wires
- Connect terminals RG5 and RG7 to elevator control Safety String.
- Check control diagram for proper connection.
- **GRIPPER WILL NOT RESET - GRIPPER SET ON ROPES**
  - Check location of rotating shaft in cam; if rotating shaft tube is against wear-out switch refer to section concerning Lining Replacement
  - Check for open Safety circuit.
  - Check for blown fuse; refer to that section

White	RG2
Black	RG3
Red	RG4
Orange	RG5
Blue	RG6
Green	Ground

## Pigtail to Pumping Unit Wiring

## CHART 2



**DIAGRAM 4**

## “ROPE GRIPPER®” Hydraulic Oil

- Check level with the “ROPE GRIPPER®” in the loaded position, the level should fully cover the Oil Level Window on the Oil Reservoir.
- Use **SHC524 Mobil 1 Synthetic Hydraulic Oil** or **Mobil 1 Fully Synthetic ATF (Automatic Transmission Fluid)** to top off oil level.

## WIRE ROPE LUBRICATION

- Use a high friction lubricant such as: NYLUBE CABLE CARE #65 or AMERICAN OIL VITALIFE #600. Care should be taken not to over lubricate

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