# SECTION 6 - MERIDIA ADJUSTMENT PROCEDURES WITH HPV 900

## *Hoistway Verification*

### Inspection Operation

1. Remove the car gate and door lock jumpers that were installed during temporary operation.
2. Remove any safety circuit jumpers that were installed during temporary operation.
3. Remove jumpers from normal and slowdown limits.
4. Remove temporary run cord and any wiring used to make temporary operation available.
5. Verify all Inspection switches are in the Inspection Mode and all safety circuit switches are in their correct positions.
6. Verify that the car is now ready for inspection operation via the top of car run station. [Refer to Table A.] All Inputs/Outputs are High. (High is 120 VAC for all except DRVS and NP which is 24 VDC.)

***Note:*** *If laptop with Wizard 15 software or RVU Unit is not available, use CCU to navigate and display the status of I/O. (See section 11 page 3).*

| I/Os required to run Car Top Inspection | | |
|---|---|---|
| **Port** | **Location** | **Module** |
| VIC | SDM 1 | UNL |
| VIC | SDM2 | SU1 |
| VIC | SDM3 | SU2 (If required) |
| VIC | SDM5 | GL |
| VIC | SDM6 | SD2 (If required) |
| VIC | SDM7 | SD1 |
| VIC | SDM 8 | DNL |
| VIC | ISM 5 | DLS |
| VIC | SM1 1 | GV |
| VIC | SM1 4 | CGS |
| VIC | SM1 7 | DRV |
| VIC | SM1 8 | GLB |
| VIC | SM2 1 | CG |
| VIC | SM2 2 | DL |
| VIC | SM2 7 | RDY |
| VIC | DM 3 | DRVS |
| VIC | EM 5 | NP |
| VIC | CM2 4 | GLT (output) |
| TOC | HSM 1 | CS |
| TOC | HSM 2 | ICS |
| TOC | HSM 4 | HS |
| TOC | HSM 1 | CS |
| TOC | RLM1 | TCI |

***Table A*** **Note:** *Check additional modules if rear doors or freight doors are used.*

### Door and Gate Check

While running from Car Top inspection switches, open each door and gate to verify the car stops.

### Safety Switch Check

1. While running the car, verify that each safety circuit device stops the car.
2. Verify that all limit switches are activated mechanically. (Example: Top final limit is broken by cam on car.)

***Note:*** *You will have to jump normal limits to check finals. You may also have to eliminate TOC comm. to get past Top and Bottom Floor level.*

### Normal Limits Check

1. Verify that that top directional switch stops the car from running up and the bottom directional switch stops the car when running down.
2. Verify that the directional switches open when the car is within 2 inch of the floor level.

### Vane and Switch Placement

1. If using encoder leveling (No tape), verify ULZ and DLZ sensors are moved to their maximum spacing.

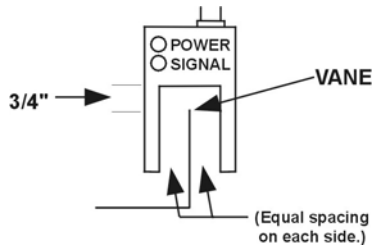



***Figure 6-1***

2. Verify that a floor leveling vane has been placed at each floor.

***Note****:* *Vanes are mounted equally between the ULZ and DLZ sensors with the car at floor level. Vanes should be mounted within +/- 0.50 inches of floor level or a new hatch scan will need to be done after the car is setup.*

3. Verify that the ETS vanes are mounted at the required distance from both terminal floors. [See Table B.]

| Meridia ETS Limit Distances* Version 7 and later | | | | |
|---|---|---|---|---|
| **Speed** | **ETS 1,5** | **ETS 2,6** | **ETS 3,7** | **ETS 4,8** |
| 50 FPM | 4" (10cm) | | | |
| 75 FPM | 5" (13cm) | | | |
| 100 FPM | 7"(18cm) | | | |
| 150 FPM | 9"(23cm) | | | |
| 200 FPM | 5"(13cm) | 17"(43cm) | | |
| 250 FPM | 7"(18cm) | 21"(53cm) | | |
| 300 FPM | 7"(18cm) | 21"(53cm) | 34"(86cm) | |
| 350 FPM | 14"(36cm) | 28"(71cm) | 42"(107cm) | |
| 400 FPM | 14"(36cm) | 28"(71cm) | 42"(107cm) | 56"(142cm) |
| 450 FPM | 15"(38cm) | 30"(76cm) | 45"(114cm) | 60"(152cm) |
| 500 FPM | 16"(41cm) | 32"(81cm) | 48"(122cm) | 64"(163cm) |

***Table B***

***Note:*** *Distance is measured from the center of the selector box to the leading edge of the vane when the car is at floor level. See prints for more detail.*

4. Verify the terminal slowdown switches open at the correct distance from the terminal floor +/-2". [See Table C.]

5. If using a tape, refer Magnet Placement section on page 6-5.

**Slowdown Distance**

| FPM | (m/s) | SLD1 Distance | TSV1 Value | SLD2 Distance | TSV2 Value |
|---|---|---|---|---|---|
| 50 | (0.25) | 3" (8cm) | 40 | | |
| 75 | (.375) | 6" (16cm) | 70 | | |
| 100 | (.50) | 9.5" (25cm) | 90 | | |
| 150 | (.75) | 15" (39cm) | 120 | | |
| 200 | (1.0) | 24.5" (63cm) | 160 | | |
| 250 | (1.125) | 30.5" (78cm) | 210 | | |
| 300 | (1.50) | 43" (110cm) | 260 | | |
| 350 | (1.75) | 49" (125cm) | 310 | | |
| 400 | (2.0) | 41" (105cm) | 310 | 62.5"(159cm) | 360 |
| 450 | (2.25) | 41" (105cm) | 310 | 68.5" (174cm) | 410 |
| 500 | (2.5) | 41" (105cm) | 320 | 84" (214cm) | 460 |

***Table C***

**DPP Setup**

***Note:*** *This step is only required if a tape driven selector is used. Skip this step if using a rail or governor mounted encoder.*

*AC Voltmeter Method*

1. Using a voltmeter on the **AC scale** to verify the DPP signals, connect it between DPP1+ (positive lead) and DPP1- (negative lead) on the DP1 and DP1/ on CPE or CTI boards.

2. Run the car Up and Down on Inspection at 50 FPM.

3. Adjust the meter settings to monitor the Pulsed voltage. The reading should be between 2.7 VAC to 3.0 VAC.

4. If not within tolerance, adjust the distance between the sensor and the magnet.

***Note:*** *Adjust the sensors and /or magnets IN or OUT in 360° increments. Failure to do so can result in improper selector operation.*

5. Repeat steps 2-4 until the reading is within tolerance.

6. Repeat steps 1-5 for DPP2-DPP2/.

*Oscilloscope Method*

An alternate and more accurate method of verifying the DPP signals is using the Oscilloscope method. It is the preferred method but can be bypassed if an Oscilloscope is not available.

1. With an isolated dual channel oscilloscope, connect the one channel to DPP1+ and the other channel to DDP2+ [with ground on TP4 (GND)] on the CPE or CTI boards.

2. Run the car Up and Down on Inspection at 50 FPM.

3. Verify the proper waveforms and amplitude of the square waves are correct. The Oscilloscope Time/div setting should be set at 0.5 seconds/div.

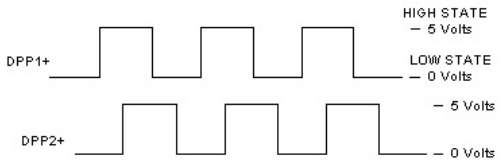



***Figure 6-2***

4. Adjust the sensors and magnets to obtain a 50% duty cycle. Signal should be high for the same amount of time as it is low.

5. Verify the two signals are 90° out of phase with each other.

Verify the following conditions **do not** exist in the DPP signals on the display.

- Excessive Noise Spikes
- Ringing or Oscillations
- Distortion

(See Figure 6-3 for examples of incorrect waveforms.)

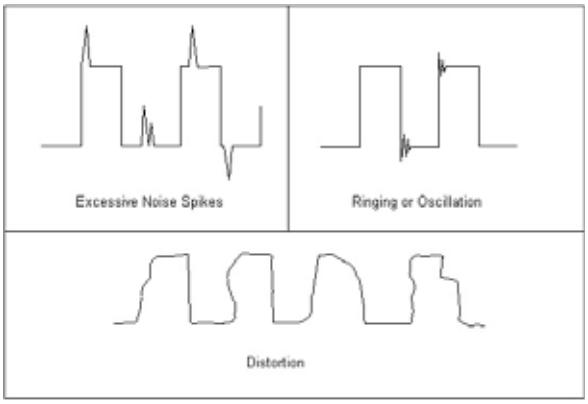



***Figure 6-3***

If any of these conditions exist, verify the following:

- The DPP signal is wired (continuous run) through the twisted shielded cable.
- The shielded cable is grounded on the controller ground terminal.
- The DPP wiring is not run in the same traveling cable with the high voltage signals (over 120 VAC).
- The minimum wire gauge for the DPP signal is 18 AWG.

Correct as necessary.

## Tape Car Position Transducer

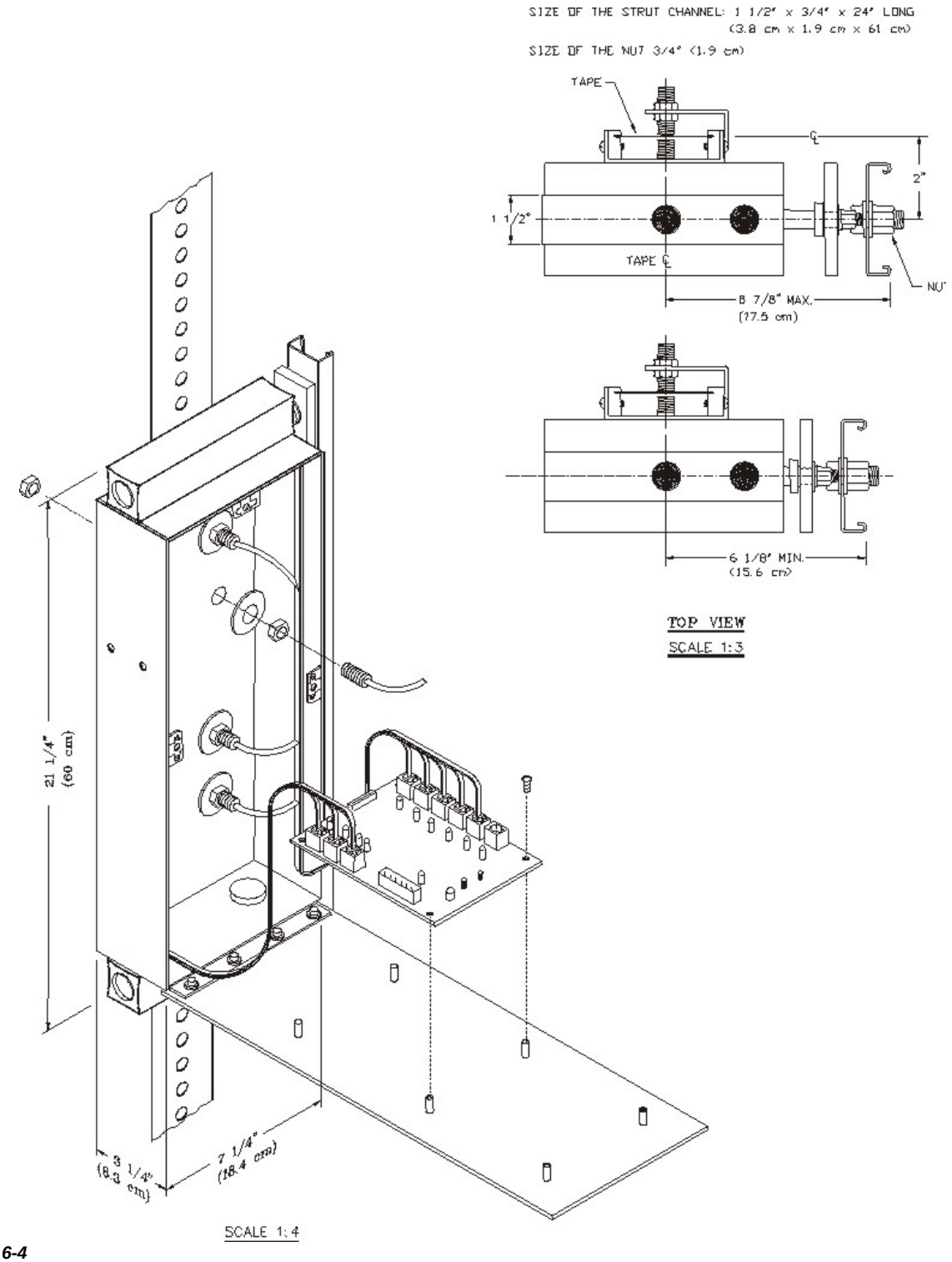



***Figure 6-4***

**Magnet Placement (when using Tape)**

The Meridia tape system incorporates a series of magnets for leveling. The magnets consist of a 12" Leveling Magnet.

1. Place the car floor exactly floor level.

2. Scribe a mark across the tape that is even with the top of the CPT.

***Note:*** *Do not mark across the bearing box.*

3. Using the template provided, place the template on the right side of the tape.

4. Align the top of the template to the scribed mark. Place the 12" magnet at the position shown on the template with its white mark outward.

5. Repeat until all floors have a leveling magnet installed.

**Door Operator Check**

Setup the door operation per manufacturer specifications.

**Note:** *If using a CEC supplied Door Board refer to appendix for Operator setup instructions.*

**Door Limit Check**

Verify the following modules:

| PARAMETER | OPEN | HALF OPEN | CLOSED |
|---|---|---|---|
| DOL | LOW | HIGH | HIGH |
| DLC | HIGH | HIGH | LOW |
| DL6 | HIGH | HIGH | LOW |

***Table D***

**CPE Communications Check**

In the top of the car box, plug the battery into the CPE board and check CPE communication according to the communications status chart. [See Table E.]

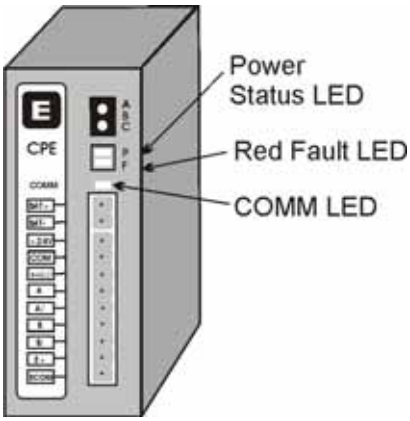



***Figure 6-5***

**Communications Status**

| The Power Status LED blinks as follows: | | |
|---|---|---|
| **MODE** | **24V+** | **BATTERY** |
| Solid | OK | OK |
| Double Blink | OK | Testing Battery |
| Fast Blink | OK | Charging Battery |
| Slow Blink | Fail | OK using battery power |
| Off | Look for Red Fault LED | |
| | | |
| Red Fault LED Status: | | |
| **MODE** | **OPERATION** | |
| Single Blink | Board in reset | |
| Double Blink | Battery fail or battery unplugged | |
| Off | Look at power status | |
| | | |
| Comm LED Status: | | |
| **MODE** | **OPERATION** | |
| Off | NO COMM to motor room | |
| Blink | COMM OK to motor room | |

***Table E***

## *Machine Room Verification*

1. Place all **Car inspection** switches in the automatic position.

2. Place the car on independent service using key switch in car or jump terminal 8 of the CFM board to VTC.

**Note:** *CFM board is normally found in COP.*

3. Verify the car will run the Up and Down using panel test buttons.

4. In the **Car Hoistway** submenu, set the TSV and ESV parameters to temporary values as follows:

   **If one slowdown switch is used:**
   TSV 1 =Contract speed minus 10 FPM.
   ESV 1 =Contract speed minus 10 FPM.

   **If two slowdown switches are used:**
   TSV 2 = Contract speed minus 10 FPM.
   ESV 2 = Contract speed minus 10 FPM.
   TSV 1 = Contract speed minus 20 FPM.
   ESV 1 = Contract speed minus 20 FPM.

5. In the **Car Hoistway** menu, set the ETV parameters as follows:

   **One Vane:**
   ETV 1 = Contract speed minus 10 FPM

   **Two Vanes:**
   ETV 2 = Contract speed minus 10 FPM
   ETV 1 = Contract speed minus 20 FPM

   **Three Vanes:**
   ETV 3 = Contract speed minus 10 FPM
   ETV 2 = Contract speed minus 20 FPM
   ETV 1 = Contract speed minus 30 FPM

   **Four Vanes:**
   ETV 4 = Contract speed minus 10 FPM
   ETV 3 = Contract speed minus 20 FPM
   ETV 2 = Contract speed minus 30 FPM
   ETV 1 = Contract speed minus 40 FPM

6. Go to the **Car Commands** submenu and scroll to **WRT** and press <ENTER>.

**Counter-weighting**

**Note:** *Until the brake is fully adjusted in the next step, extreme care should be taken when loading and unloading weights in car and counterweight*.

1. Place the balanced load on elevator. This is normally between 40 to 45% of capacity. (Example: 3000 lbs. x 45% =1575 lbs.)
2. Set the car inspection speed to 20 FPM.
3. Set Drive to display motor current at D2 of Drive.
4. Run the car through the center of the hoistway in both directions. Note the current in both directions while running the car.

***Note:*** ** If current is within 2-3 Amps. of each other, the car is counter balanced sufficiently.*
** If the current is larger in the up direction, then weights must be added to the counterweight.*
** If the current is larger in the down direction, then weights must be removed from the counterweight.*

5. Remove or add counterweights as necessary until current readings are equal in both directions.

**Note:** ***It is extremely important that the elevator is counter-balanced in order for the drive to operate correctly. You may wish to check the balance mechanically.***

**Brake Setup**

1. Move the elevator to the lowest landing and verify the brake can hold 125% of capacity by adjusting the brake spring tension.

2. Once the brake spring has been adjusted, place the balanced load on the elevator.

3. Verify parameter BMV is per power distribution print and BMA is set to maximum amps. used by brake.

4. Run the elevator up or down and adjust BRR so that the brake board has the output voltage equal to the BHV voltage setting.

5. Adjust brake per manufacturer specifications.

**Note:** Use both Manufacturer's setup procedure and Table F for electrical and mechanical setting of the brake.

**Brake Steps**

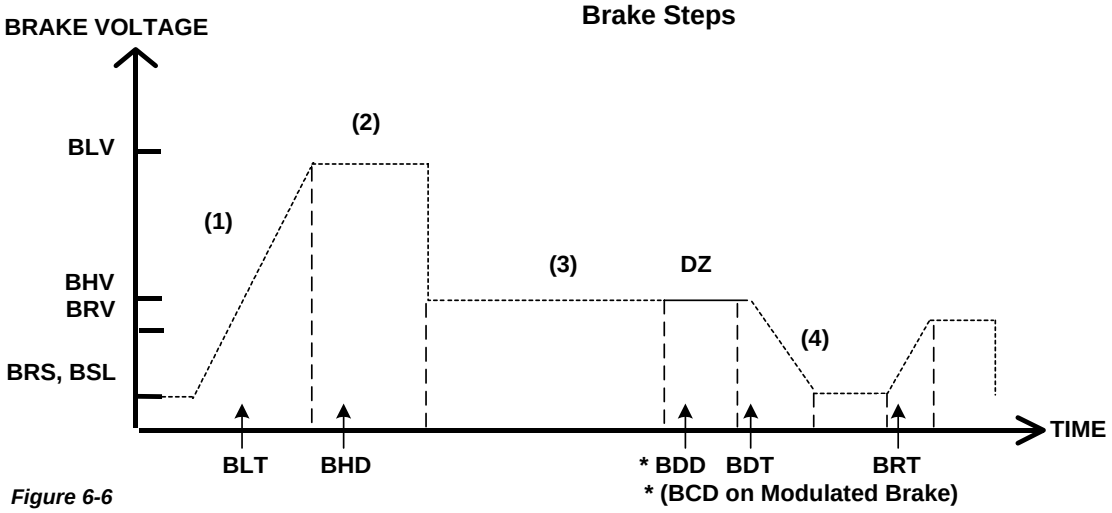



***Figure 6-6***

| Adjustment Parameters | | | |
|---|---|---|---|
| **Parameter** | **Range** | **Units** | **Description of Car Adjustment Parameters** |
| BMV | 20-500 | VOLTS | **B**rake **M**aximum line **V**oltage. - AC line voltage applied to the Brake board. |
| BMA | 1-20 | AMPS | **B**rake **M**aximum **A**mps. – Maximum Amps used by the brake. |
| | | | |
| BLV | 10-500 | VOLTS | **B**rake **L**ift **V**oltage. – Initial Brake voltage. Maximum value is 90% of the Brake Maximum Voltage (BMV) parameter. |
| BHV | 0-500 | VOLTS | **B**rake **H**old **V**oltage. - Brake voltage when the car is running. |
| BLT | 0-320 | 1/64 SEC | **B**rake **L**ift **T**ime. - Amount of time from Brake Start Lift (BSL) voltage to Brake Lift Voltage (BLV). |
| BHD | 0-320 | 1/64 SEC | **B**rake **H**old **D**elay. - Amount of time from when brake voltage reaches Brake Lift Voltage (BLV) to voltage being lowered to BHV value. |
| BCL | 0-32 | 1/64 SEC | **B**rake **C**ontrol **L**ift timer delay. –This parameter delays BKC output from energizing BK contactor.<br>**Note**: *Only used on VVVF drives*. |
| BSL | 0-100 | VOLTS | **B**rake **S**tart **L**ift voltage. - The brake voltage output to the brake when a run is initiated. |
| | | | |
| BRV | 1-500 | VOLTS | **B**rake **R**e-level **V**oltage. - Lift voltage during a re-level. |
| BRT | 0-320 | 1/64 SEC | **B**rake **R**e-level lift **T**ime. - The amount of time from the Brake Re-level Start voltage (BRS) to the Brake Re-level Lift Voltage (BRV). |
| BRS | 0-500 | VOLTS | **B**rake **R**e-level **S**tart lift Voltage. - The voltage output to the brake when a re-level is initiated. |
| | | | |
| BDD | 0-320 | 1/64 SEC | **B**rake **D**rop **D**elay. - Time delay after the 2” (5 cm) door zone Brake voltage is reduced to zero volts. |
| BDT | 0-320 | 1/64 SEC | **B**rake **D**rop **T**ime. - The rate at which the brake voltage is reduced to zero volts. |
| | | | |
| BRR | 0-65535 | NUMERIC | **B**rake **R**egulator **R**esistance – Brake Board scaling factor |

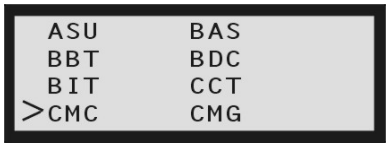
***Table F***

**Note**: *BDD and BDT will be set up after the car is H.S.*

### CCU Communications

1. If using the CCU, at the Main Menu select **Car Commands** and press <ENTER>.


2. Scroll down to the **CMC** Command and press <ENTER>. This will allow you to check the communication status to each board.



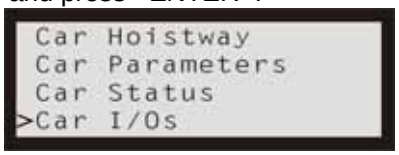

3. Verify that each board is communicating. [See sample screens in the CCU usage appendix.]


4. Scroll down through each board. If the board has input and output boards, use the ◄► arrow keys to check them.

**Note:** *See Car Commands for more information regarding the CMC*.

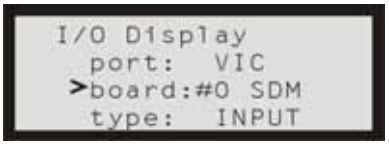
### Slowdown Switch Check

1. On the CCU, at the Main Menu, select **Car I/Os** and press <ENTER>.




2. Set **Port** to **VIC** using the ◄► keys.


3. Set **Board** to **SDM** using the ◄► keys.



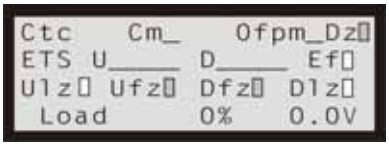

4. Run the car to both terminal landings and verify that the slowdowns and normal limits break in the correct order.
(Example: SU2 – 1st; SU1 – 2nd; UNL – 3rd)

5. If the switches do not break in the correct order, go back and see that the car is breaking switches as necessary.

### Selector and ETS Check

1. On the CCU, at the Main Menu, select **Car Status** and press <ENTER>.


2. Using the ◄► keys scroll to **CTC** screen.

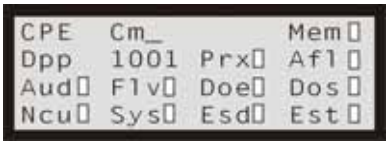



3. Run the car to both terminal landings and verify that the required ETS vanes turn on as floor level is reached.

4. While running the car in the up direction and passing an intermediate floor vane, verify that ULZ, UFZ, DFZ, and DLZ turn on then turn off in the correct order.

### Car Position Encoder Test

1. Using the ◄► keys, change the display screen to the **CPE** display.



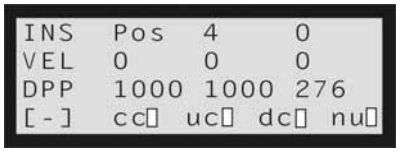

2. Run the car in the up direction and verify direction arrow is up and DPP is counting up.

3. Run the car in the down direction and verify direction arrow is down and DPP is counting down.

**Note:** *If either the arrow or the count direction is wrong, swap B and B coming from the car top encoder at the top of car terminal strip.*

**Note:** *If on a tape application, swap DPP1 and DPP2 sensor wiring at CTI Board located in the Selector box.*

4. Rotate the display screen to main display using the ◄► keys.




5. Run the car in both directions and verify DPP increases when running up and decreases when running down.

**Note:** *If the count is counting in reverse, swap the DP1 and DP1/ coming to the CCU Plug P2.*

6. Verify car speed is equal to Demand speed (**SR**) using a handheld tachometer. If it is not equal, change the A1 Contract Motor Speed of Drive.

7. Verify the displayed speed (**Vel)** is equal to the Demand speed (**SR**) within +/- 2 FPM in both directions. If not within tolerance, adjust the DPF parameter until **SR** and **Vel** are within +/- 2 FPM of each other.

8. Rotate to VIC display and verify direction and speed are correct. If direction is incorrect, swap B and B at the CCU encoder plug (P11). If speed is incorrect, adjust the RPM parameter in the **Car Control** submenu to match that of the A1 Contract Motor Speed.

**Note:** *If using the wizard program, some of the above steps will not be necessary. You may view the different boards and displays via the diagnostic screens.*

**Drive Parameters**

Verify the drive parameters are setup per prints.

**Auto Setup (Hatch Scan)**

1. Run the car so it is approximately 1-2 ft. above the first opening.

2. Go to the Main Menu on the CCU and select **Car Parameters** and press <ENTER>.


3. Scroll to **Vel** and press <ENTER>.

4. Scroll to **IVE** and enter 20 FPM.

5. Return to the Main Menu by pressing <MENU>.

6. Select **Car Commands** and press <ENTER>.


7. Scroll to **ASU** and press <ENTER>.

8. Using the panel run buttons, run the car down. It will stop past the bottom floor with just ULZ and UFZ activated.

**Note:** *You may have to jump out bottom final.*

9. Next run the car up until the car stops past the top floor.

**Note:** *If the elevator is stopped prior to reaching the top floor, the Auto Setup will be invalid and have to be done again.*

**Note:** *If using the Wizard, verify the position is advancing to the next floor as you run car up the hoistway.*

10. Once the car has stopped above the top landing, return to the Main Menu by pressing <MENU> button.

11. Scroll to **Car Hoistway** and press <ENTER>.

12. Scroll to **COT** and press <ENTER>.

13. Verify that the Center of Target has values that are different than default values of 1000, 1400, 1800, etc…

14. Verify parameters EUR, EDR, DLR and ULR under **Car Hoistway** submenu also have values different than the default. Verify the TSV, ESV and ETV settings are still set to those installed in step 4 of the Machine Room Verification on page 6-6.

**Note:** *If any of the above values are set to zero, insert a value that is approximately equal to where the switch is located in the hoistway.*

15. If these parameters all have values, return to the Main Menu and select **Car Commands** by pressing <ENTER>.

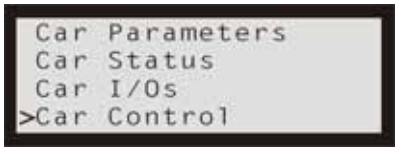
16. Scroll to the **WRT** command and press <ENTER>.

17. Run the car down away from the top terminal floor using the DN button.

**Preparation for Running High Speed**

1. Go to the Main Menu in the CCU.

2. Scroll to **Car Control** and press <ENTER>.




3. Scroll to **Door Disconnect** and press <ENTER> to remove doors from operation.

4. Scroll to **Pos** and increase FDZ parameter to 10.

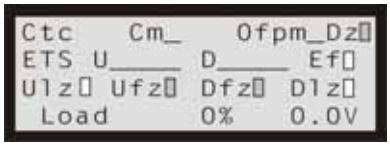
**Note:** *FDZ is only required when using rail or governor encoder.*

5. Use BIT command and set Bit 11 of Control Status Word 10 to turn on DPP count update. (BITS11, 10)

6. For Tape Selector applications, use the BIT command to set the Bit 10 of Control Status Word 10 to turn on the selector leveling sensors.

**Relevel Test**

1. Press <MENU> button until you get to the display window. Use the ◄► keys to scroll to the CTC display.




2. Run the car UP or DN until you get ULZ or DLZ to go high.

3. Turn the inspection switch to off to allow the car to go into automatic. Verify the car levels into floor level.

4. Turn the car back to inspection mode and run car so the other leveling sensor is high and repeat step 3.

**One Floor Run**

1. Go to the Main Menu in CCU.

2. Scroll to **Car Commands** and press <ENTER>.

3. Using the STD and STU commands run the car up and down one floor at a time. Verify the car will come into floor level and stop without overshooting the floor level.

**Note:** *You may have to make some temporary adjustments to the S-Curve to achieve this. If FDZ is too low, it may cause excessive relevels.*

**Preset "S" Curves**

1. Verify a balanced load is on the elevator.

2. Choose one of the S-Curve speed profiles provided using the SPD command.

- Profile 1 = Fast
- Profile 2 = Moderate
- Profile 3 = Smooth

**Note:** *You may manually set up the S-Curve profile by entering individual values for the S-Curve. See S-Curve Profile Table G. It is better to start out with a smoother ride Profile while tuning the drive.*

**Obtaining High Speed**

1. Once the car is able to make controlled stops at each floor, scroll to the SCC command and start to make Multi-Floor runs.

2. Verify the car will come to a controlled stop after each run.

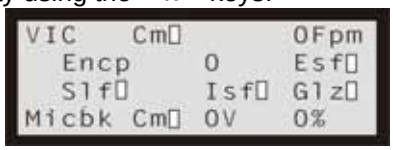
3. Once we have reached the point where the controller is demanding High Speed on a run and the car comes to a controlled stop, make long runs avoiding the terminal floors.

**Note:** *Demand speed may be viewed using the Main display screen.*

4. During a High Speed run verify the speed of the car using a handheld tachometer. To change the speed of car, raise or lower the Contract Motor Speed in the drive A1 parameter list.

5. Verify the displayed car speed is within 1-2 FPM of the demand speed. Raise or lower Parameter DPF to correct any speed deviations at High Speed. DPF is in the POS submenu.

6. Go to the display screen and scroll to the **VIC** display using the ◄► keys.




7. Verify the VIC displays the correct car speed. To change the VIC display, change the RPM setting in the Control submenu to a value equal to the Contract Motor Speed (A1) setting of the drive.

**HPV-900 Adaptive Tune**

**Note:** *For more detailed information see Section 5 of the HPV-900 manual.*

1. Using the BIT command set Bit 5 of Control Status Word 7.

2. Set MMS Parameter in submenu Motion to 70% of contract speed.

**Note:** *If control problems occur while using the MMS speed setting, you may have to adjust some of the following parameters: MRS, MAR, MRA, MRD, MDR, MRL, or MLG. These parameters mirror the S-Curve settings of the reduced speed profile.*

3. While running long 70% speed runs, refer to the HPV-900 manual Section 5.5.1.2. (Tuning Motor No-Load Current, page 134) and set the no-load current.

4. Using the BIT command, reset bit 5 of Word 7 to allow car to go back to running at contract speed.

5. While running at contract speed, refer to the HPV-900 manual section 5.5.1.2. (Tuning Motor's Flux Saturation Curve, page 135) to set the Flux Saturation Slope 2.

6. Place a full load on the car.

7. While running the car at 100% loaded and high speed, refer to HPV-900 Manual Section 5.5.1.3. (Tuning Rated Motor RPM, page 135) to set the Rated Motor RPM.

8. Place the balanced load back on the elevator.

9. While running with balanced load at High Speed, set up the System Inertia. Refer to section 5.6.1. of the HPV-900 manual (page 136).

**Note:** *Should Drive Case Charts be required refer to the end of this section.*

**Final Approach Adjustments**

1. Choose the desired S-Curve Profile under the SPD command or enter the values for the desired profile manually. [See S-Curve Table G.]

2. With the car running High Speed with a balanced load on car, perform the following:

   A. Run car to the middle of the hoistway.

   B. After car stops, enter the FDR command.

   C. Record the System Lag during deceleration.

   D. Go to the Motion submenu and enter this value into the LAG parameter.

   E. Repeat these steps several times to verify the LAG remains consistent.

3. With the car at balanced load, run car into a floor that is midway in the hoistway. Verify that the car is stopping the same way in both directions.

   A. Refer to Figure 6-7 to adjust the final approach to floor level.

   B. Verify that the car comes to a complete stop electrically prior to the brake setting.

   C. Go to the **Control** submenu and set SCT so the drive stays on until just after the brake sets.

**Observing the 'S' Curve on the Drive (HPV 900)**

(OPTIONAL)

Note: ***A dual channel storage scope is required to view the speed command and speed feedback.***

1. Set the 'O' scope to storage, 2 channels with a .5-second per division sweep.

2. Place Channel one probe (Speed Command) on TB1-33 (ANA OUT 1) and the ground clip on TB1-34 (ANA Output Common).

3. Place Channel two probe (Speed Feedback) on TB1-35 (ANA OUT 2) and the ground clip on TB1-34 (ANA Output Common).

4. Set ANA OUT 1 in the C4 submenu to "Speed Command."

5. Set ANA OUT 2 in the C4 submenu to Speed FBK.

6. Set the Probe Voltage to a setting to allow the 'S' curve to be completely shown on the screen. (10 Volt output at high speed.)

   **Note:** *To view final approach a lower voltage setting around .2V/Div may be used.*

7. Adjust the 'S' curve parameter until a stable final approach is achieved.

   **Note:** *With both traces set on the same division line prior to a run, a stable approach will have the speed feedback merging and following speed command during the LVE portion of the final approach.*

**Note:** *If the speed feedback crosses and goes below the speed command, the drive's response may be set too low.*

**Initial O'scope Setting:**

STORAGE 10V/div.
5 sec/div.

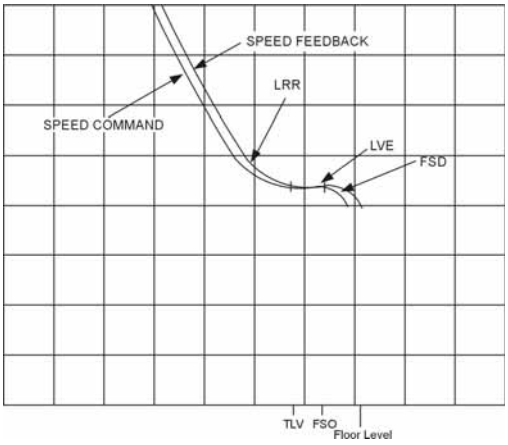



***Figure 6-7***

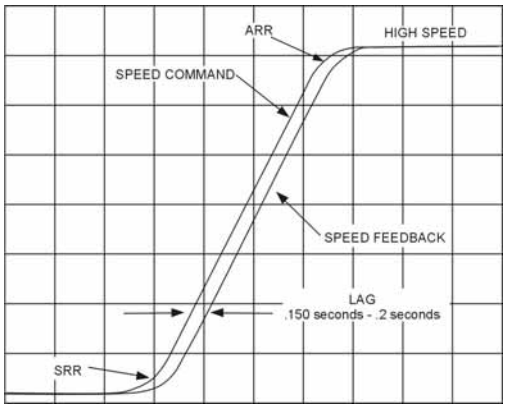



***Figure 6-8***

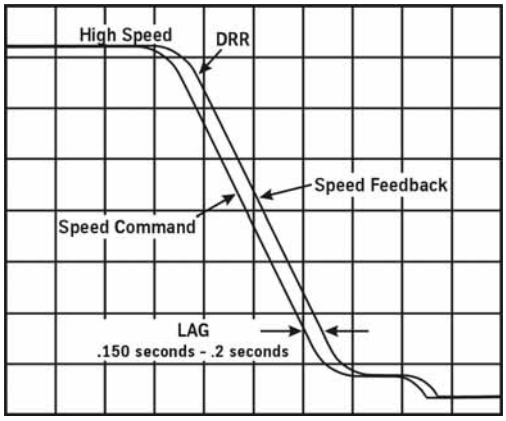



***Figure 6-9***

## Speed Profile

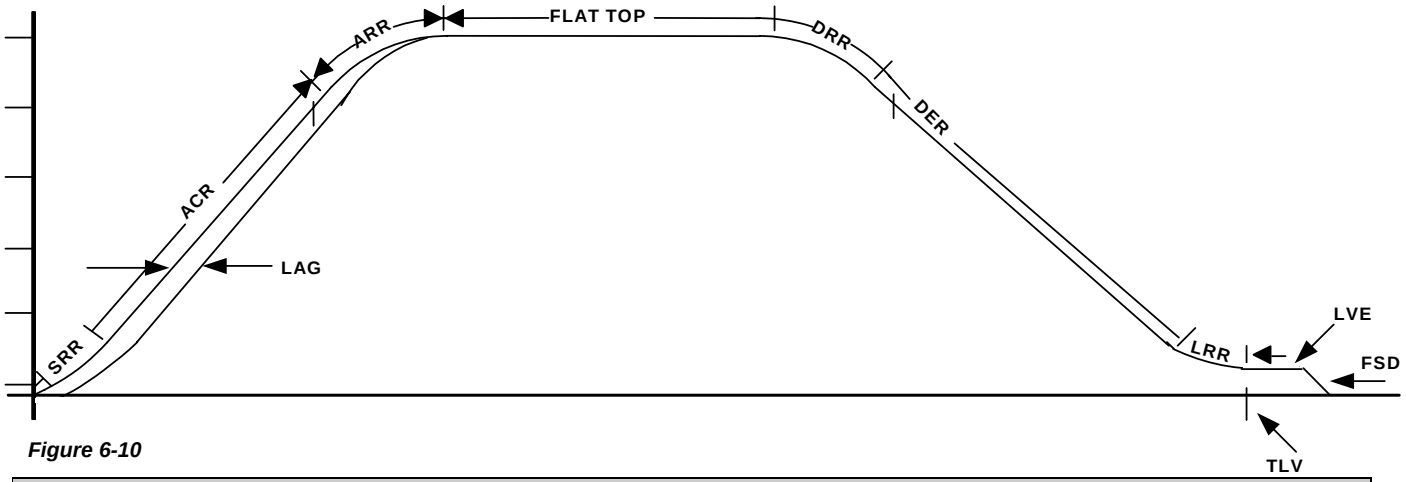



***Figure 6-10***

| Parameter | Range | Default | Units | Description of Car Adjustment Parameters |
|---|---|---|---|---|
| FSD | 0-24 | 0 | 1/64 sec | Final Stop Damping. Velocity Damping during the final stop. The damping time represents the number of samples that are averaged every 1/64 second. On final stop, the demand velocity is changed from the leveling velocity to zero instantly. Having a damping of 8 would cause the velocity to slope down from the leveling velocity to zero in 1/8 second (8/64). |
| FDZ | 1-32 | 5 | DPP | Floor Dead Zone: The number of counts the car must go out of dead level to cause the car to re-level. (In DPP counts) |
| FSO | 0-26 | 3 | DPP | Floor Stop Offset: Number of counts prior to reaching the floor dead level position that a stop sequence begins for a normal run. (In DPP counts) |
| DER | 80-300 | 150 | F/ms | Deceleration Rate: The rate of Constant Deceleration of the car to the transfer to leveling. Divide DER by 60 to convert to feet per second. (or multiply DER by 0.00508 to convert to $m/s^2$). Raising value makes ramp to floor level sharper. Lowering value makes ramp longer. |
| DRR | 1-480 | 250 | $F/ms^2$ | Decel Roll Rate: The rate in which the car rolls into Constant Deceleration from Top Speed. |
| ACR | 75-300 | 150 | F/ms | Acceleration Rate: The rate of constant acceleration for the car to top speed. Divide ACR parameter by 60 to convert value into feet-per-second. (multiply ACR by 0.00508 to convert to $m/s^2$) |
| ARR | 1-480 | 250 | $F/ms^2$ | Acceleration Roll Rate into top speed. Raise value for less rounding. |
| LAG | 1-320 | 0 | 1/64 sec | Car LAG compensation |
| LRR | 1-480 | 250 | $F/ms^2$ | Leveling Roll Rate into leveling speed. |
| LVE | 1-20 | 8 | F/m | Leveling VElocity (feet per minute). |
| RSO | 0-20 | 4 | DPP | Floor Re-level Stop Offset: Number of counts prior to reaching the floor dead level position that a stop sequence begins for a re-level. (In DPP counts) |
| SRR | 1-480 | 250 | $F/ms^2$ | Start Roll Rate from Zero speed. |
| TLV | 0-80 | 5 | DPP | Transfer to Leveling Vane (DPP): Distance from floor level at which the constant leveling velocity takes effect.<br>NOTE: When car enters the 2 inch Leveling Zone (5 cm), a constant leveling velocity is introduced. |

***Table G***

8. Once the car is leveling and stopping correctly with a balanced load, use full load and empty load to verify the car stops and starts throughout the load range.

   A. You may have to increase the response of the drive so the car will level with the full load.

   B. Verify the car does not have roll back when full or empty load is on the car. Use BLT, BLV, BSL, and SRR to achieve good starts.

**Floor Accuracy Adjustments**

1. Place balanced load on the elevator.

2. If using the encoder leveling system (no tape), verify that FDZ is set to minimize relevels.

**Note:** *To calculate the dead zone, use the following formula:*

$$\left(\frac{DPF}{10}\right) \div 12 = \text{Pulse Per Inch}$$

*For ¼" Dead zone and DPF of 2552, FDZ would equal approximately 5.*

**Note:** *The lower FDZ is set, the tighter the dead zone. (less movement for relevels) The higher FDZ is set, the more distance needed to cause a relevel.*

3. Run the car to each floor and check the Floor accuracy in both directions.

   A. If the car is stopping high, counts will need to be removed.

   B. If the car is stopping low, counts will need to be added.

4. To add or remove counts, change the FOF settings in the **Car Hoistway** submenu.

   A. To change counts, scroll to the desired floor and press <ENTER>.

   B. Use the ▲ key to add counts or the ▼ key to remove the desired counts then press <ENTER>.

**Note:** *FOF1 = the first opening;*
*FOF2 = the second opening; etc…*
*Care should be taken to change the correct floor.*

**Note:** *If using the Wizard Program, to change floor levels use the following for an example:*

*FOF3 = + 7 To add counts*
*FOF5 = 0 - 3 To remove counts*

**Note:** *The maximum amount of offset is 10. If you need to increase more than 10 you will have to move the leveling vane and then do a new Hatch Scan.*

5. Repeat steps 3 and 4 for each floor.

6. If using a tape and magnets for leveling, set the ULZ and DLZ sensors for the desired dead zone.

7. Set FSO to 1.

8. To change the floor level accuracy, you will have to move the 12" leveling magnet to get the car to stop at floor level.

**Note:** *If Magnets are moved more that 3/8 of an inch, a new Hatch Scan should be done.*

9. Once the floor offsets have been entered, go to the **Car Commands** at the CCU and press <ENTER>.

10. Then scroll to **WRT** command and press <ENTER> to store all changes.

## *Terminal Backup Setup and Tests*

**Terminal Backup using the CCU**

**Note:** *Proceed to the Appendix for a sample of the Terminal Backup Case Chart. Table B, C, and D are referred to in these steps.*

1. Set the **LPE** Parameter in the **Pos** parameter submenu to 1000.

2. Verify Bit 11 of the Control Status Word C10 is set using the BIT command in the Car Command submenu.

3. In the **Car Hoistway** submenu, verify the ETV, ESV, and TSV values are set high so the car will not fault out.

**Note:** *Refer to Machine Room verification for the values.*

4. Run the car into the top terminal floor at high speed. After the car stops, go to the **Car Hoistway** submenu and record the top terminal positions in Table B (of the Appendix) by entering the ULB and EUB commands.

5. Run the car into the bottom terminal floor at high speed. After the car stops, go to the **Car Hoistway** submenu and record the bottom terminal position and velocity in Table C (of the Appendix) by entering the DLB and EDB commands.

6. After both the top and bottom distances have been recorded, calculate the distance from the floor level and record in Table B and C (of the Appendix).

   A. If switches or vanes are not within 3 inches of each other, move either the top or bottom switch or vane to correct.

   B. If switches or vanes needed to be moved, repeat steps 4 – 6 until switches and vanes are in the correct location.

7. If the learned values are within 3" of each other, enter these learned values in their corresponding references The reference values are located under the **Car Hoistway** submenu.

   Example: ULR1 = 22568
   EUR = 22731

8. After switches are in their correct location and reference set, run the car into the top and bottom terminal floors. When the car stops, go to the **Car Hoistway** submenu and enter the appropriate commands listed in Table D (of the Appendix). Record the data in table.

9. After all data is recorded, verify up and down speeds are within +/- 5 of each other.

10. In the Car Hoistway submenu, enter the TSV, ETV, and ESV values from the table.

11. Set LPE to a value of 6".
    $LPE = (DPF \div 20)$
12. Run the car into both top and bottom terminals using multifloor runs and verify that there are no errors.

13. In the **Car Commands** submenu, scroll to **WRT** command and press <ENTER> to save all new values.


**Note:** *If using the Wizard program, the limit velocities and positions are accessed with different commands. See Table H.*

| CCU | Wizard |
|---|---|
| ULB | ULB |
| EUB | ELB |
| DLB | DLB |
| EDB | ELB |
| TUB | ULB |
| TDB | DLB |
| ETB | ELB |
| ESB | Not Used |

Note: ESV = TSV + 10 FPM
Therefore if TSV1 equals 178,
ESV1 equals 188

***Table H***

**Load Weigher Setup**

**Note:** *This procedure is only for the CEC proximity sensor.*

1. Place the elevator with no load at the bottom landing on car top inspection.
2. Using a voltmeter on the DC scale, connect the positive lead on LW2 and the negative lead on GND in the CTC. [See Figure 1-37.]
3. For crosshead mounted sensor, adjust the sensor until the voltmeter measures +1.0 to +1.4 Volts DC
4. For Isolated platform mount sensor the voltage will be between +4.2 and +4.6 VDC.
5. Lock the sensor in place with the lock nut.
6. Place the car on Independent Service.
7. Using the CCU select **Car Commands**.
8. Scroll down to the **LWU** command and press <ENTER>.
9. Select the **Proximity Sensor Setup** and press <ENTER>.
10. Select the installation type (either Cross head mount or under platform) and press <ENTER>.
11. With the car empty at the bottom floor, select **LWU1** and press <ENTER>.
12. Once the display shows **LWU1 OK**, press <ENTER>.
13. Place full load on the elevator.
14. Select **LWU2** and press <ENTER>.
15. Once the display shows **LWU2 OK**, press <ENTER>.
16. From inside the elevator, run the fully loaded car on Independent to the top floor.
17. Select **LWU3** and press <ENTER>.
18. Once the display shows **LWU3 OK**, press <ENTER>.
19. Remove all weights from inside the elevator.
20. Select **LWU4** and press <ENTER>.
21. Once the display shows **LWU4 OK**, press <ENTER>.
22. Press <ENTER> to scroll to the **WRT** command and press <ENTER> to save these readings.
23. Scroll to **LWU** and press <ENTER>.
24. Select **Activation Offset Calibration** and press <ENTER>.
25. Scroll to the **WRT** Command and press <ENTER> to save the new parameters.
26. Press <MENU> twice to return to the Main Menu

**Setting Pre-torque**

1. Place an empty car at the top floor.
2. Set the following CSW bits:
3. **CS3 bit 7 CS8 bit 9 CS9 bit 11**
4. Set car parameter BAL to the % amount the car is counterweighted. This is usually 40% to 45%.
5. Set car parameter PDT to 24.
6. Set SST car parameter to a value that will cause the car to roll back 1” before accelerating.
7. Increase car parameter TLC in increments of 500 until no roll back is present.
8. Scroll to the WRT Command and press ENTER to save the new parameters.

### Additional Parameter Adjustments

1. Scroll to the **Car Parameters** and press <ENTER>.

2. Scroll to **Vel** and press <ENTER>.

3. Set the following parameters. See Table I.

| | |
|---|---|
| **VEE** | Highest difference between Speed Reference and Velocity during Acceleration plus 30. |
| **MLV** | 150 (FPM) |
| **MRV** | 60 (FPM) |

***Table I***

4. Press the <MENU> button to return to the Car Parameter sub-menu.

| | |
|---|---|
| **CDL** | DPP position count of the elevator when the platform is even with the top of the counter-weight. **Only if CWT derailment is required.** |
| **CDH** | DPP position count of the elevator when the crosshead is even with the bottom of the counter-weight. **Only if CWT derailment is required.** |

***Table J***

## *Miscellaneous Adjustments*

### Setting the Hoistway Access

1. Place the car at the top floor on Inspection (ICA)

2. Set parameters ACT to a value to stop the car to a preferred level.

   **Note**: *ACT and ACB values are not used until the car travels off of SD1 or SU1.*

3. Access car down verifying car stops where desired.

4. Repeat at bottom floor setting ACB.

**Note:** If top access is located other that top floor, set ACF to the Top Access Floor

### Setting Earthquake Collision (If required)

1. Run the car on inspection 1-2' below the point where the bottom of the counterweight would strike the car.

2. Record the DPC count.

3. Set CDL to the value recorded in step 2.

4. Run the car up 1-2' beyond the point where the bottom of the car would strike the counterweight.

5. Record the DPC count.

6. Set CDH to the value recorded in step 5.

7. Enter the WRT command.

### *Various Door Parameters and Control Status Word Settings*

| DOORS | | | |
|---|---|---|---|
| **CSn** | **Bit** | **DEFAULT** | **DESCRIPTION** |
| 0 | 13 | R | When set and on independent service, the doors will close automatically when a car call is registered. |
| | | | |
| 1 | 4 | R | When set, pre-opening is disabled for the front doors. |
| 1 | 5 | R | When set, front door pre-opening will occur at the 2” leveling zone. |
| | | | |
| 2 | 1 | R | If set, pressing the door close button shortens the door open time. If reset, DCB has no affect on door open time. |
| 2 | 8 | R | If set, does not allow reopening of doors with the safety edge or the electric eye during nudging. |
| 3 | 13 | R | If set, door-nudging operation is disabled. |
| | | | |
| 4 | 5 | R | If set, front door pre-opening will occur when car reaches 6” from floor level. |
| | | | |
| 5 | 3 | R | If set, car will shutdown if car goes out of the level zone and doors are open. |
| **CSn** | **Bit** | **DEFAULT** | **DESCRIPTION** |
| 6 | 3 | R | Set to disable electronic detector edge time out. |
| 6 | 4 | R | Set to enable electronic detector edge operation Vs. mechanical safety edge. |
| 6 | 5 | R | Set to enable electronic proximity edge operation Vs. mechanical safety edge. |
| 6 | 14 | R | Set to enable drive fault GLR error. (both GLR input and DOL input active while at the floor) |
| | | | |
| 7 | 10 | R | Set to invert detector edge input. |
| | | | |
| 9 | 5 | R | Set to require DCL on (with GLI and GL) to start car. |

| DOORS | | | |
|---|---|---|---|
| **PAR** | **RANGE** | **UNIT** | **DESCRIPTION** |
| CDT | 16-200 | 1/16s | Door Open Time: Time for doors after answering a car call. |
| DCC | 2-20 | Units | Door Cycle protection Counter: Normally adjusted for 6 cycles before removing power form doors. |
| DCP | 5-20 | Sec. | Door Close Protection time: The amount of time the doors are given to close before taken out of service on door protect. |
| DDT | 0-80 | Sec. | Door open Time after activation of DOB input. |
| DHT | 0-64 | 1/16s | Door Hold Time: Delay time before high-speed door opening. Only used on Dover OHS door operator circuits. |
| DOH | 0-360 | Sec. | Extra Door Open button Hold time: Only used with door hold buttons. |
| DOP | 5-20 | Sec. | Door Open Protective time: Amount of time allowed to open the doors before taken out of service on door protects |
| DOT | 0-60 | Sec. | Door Open button Time-out: Maximum amount of time doors are allowed to remain open form the door open input. |
| LDT | 32-200 | 1/16s | Long Door open Time: Time used when car answers a hall call. |
| NDT | 5-120 | Sec. | Nudging Door Time: Time doors are allowed to be held open before nudging goes into effect. |
| SDT | 4-48 | 1/16s | Short Door Time: Door time after electric eye or safety edge has been activated. |

| FIRE | | | |
|---|---|---|---|
| **PAR** | **RANGE** | **UNIT** | **DESCRIPTION** |
| FAL | 1-# FLs | Unit | Fire recall Alternate Floor: The alternate floor to which car recalls when main fire floor sensor is activated. |
| FBT | 1-65535 | 1/64s | Fire Bypass Timer for GSA fire standard. |
| FIR | 1-# FLs | Unit | Fire Recall Floor: The main fire floor for phase 1 recall mode. |
| IFT | 0-300 | Sec. | Independent Fire Time: Time system takes to override independent service during fire phase 1 operation. |

| FIRE | | | |
|---|---|---|---|
| **CSn** | **Bit** | **DEFAULT** | **DESCRIPTION** |
| 1 | 8 | R | When set, the fire buzzer is pulsed. |
| 1 | 9 | R | When set, the fire emergency light is pulsed. |
| 1 | 10 | R | When set, the stop switch is not bypassed. When reset, it is bypassed according to bit 11. |
| 1 | 11 | R | When set, stop switch is bypassed all the time. When rest, the stopswitch is bypassed according to ANSI code standard. |
| 1 | 13 | R | When set, the in-car fire service light also operates during phase II. |
| **CSn** | **Bit** | **DEFAULT** | **DESCRIPTION** |
| 1 | 14 | R | When set, the doors will close when a car call is registered. If reset, the door must be closed with the door close button. |
| | | | |
| 3 | 3 | R | If set, allows car to shut automatically after phase II key switch is set to “OFF” and phase I condition exists. |
| 3 | 5 | R | When set, the door open button is disabled during phase I fire service. |
| 3 | 14 | R | If set, door-nudging operation is activated during phase I fire service operation while the door is closing. **This bit will override bit 13 (disable nudging).** |
| | | | |
| 4 | 0 | R | If reset, car will open front door automatically when it reaches the fire floor during phase I. |

| CALL | | | |
|---|---|---|---|
| **CSn** | **Bit** | **DEFAULT** | **DESCRIPTION** |
| 0 | 4 | R | If set, dumps all calls after consecutive car calls answered per CCD parameter number order with no electric eye break. |
| | | | |
| 4 | 10 | R | If set, car calls will not be cancelled when the car has a reversal slowdown. |
| 4 | 11 | R | If set, cancel car calls for positions above the car when the car is moving down and cancel car calls below the car when the car is moving up. |
| | | | |
| 7 | 15 | R | Set to pulse car call output for low intensity lights. |

**Buffer Test**

1. Place the car two floors above the bottom floor (for car buffer test) or two floors below the top floor (for a Counterweight buffer test).

**Note:** *For car buffer, place full load on car.*

2. Record the values for the following parameters: ETV, ESV, TSV, LPE and VEE.

3. Set the following parameters to their new Temporary values:
   ETV, ESV and TSV = CONTRACT SPEED, VEE=300, LPE=1000.

4. Install the following Temporary jumpers to bypass:

| FROM | TO | DESCRIPTION |
|---|---|---|
| SD1 | SU1 | Closest terminal slowdown* |
| UNL | DNL | Directional limits |
| HS | CS | Disable emergency inputs on car top. |
| LCS | HS | Final Limits (if required by local code.) |

* Other SU_ and SD_ slowdown switches will need to be jumpered if provided.

5. Enter BITS 0,1 so the DPC count is not updated when the car starts.

6. Set DPC is equal to the COT value for the next floor above the car for a car buffer test or next floor below for a counterweight buffer test.

7. Enter SCC1 for the car to run down to the car buffer or enter $SCC_n$ the top floor for the car to past the top floor for the counterweight buffer.

8. When the buffer is hit by the car or counterweight place the car on Panel test in the machine room.

9. Lift the car or counterweight off the buffer by running the car on Machine room inspection.

10. Repeat for the other buffer.

**Note:** *Remove the weight for CWT buffer.*

**Note:** *If using reduced speed buffers, lower High Speed using MMS parameter and set BIT 5 of CS7.*

**Over Speed Test**

1. Run fully loaded car to the top floor.

2. Place the car on Door Disconnect.

3. Record original value for VEE and temporarily set the parameter to 300.

4. Place a jumper around the governor switch.

5. Set the Overspeed Multiplier in the Drive A1 to desired value. Multiplier = (Governor Trip Speed divided by Car Speed) times 100.

6. Turn on Overspeed Test in Drive U4.

**Note:** *See page 80 of the HPV-900 manual for more details.*

7. Run car down by entering SCC2 car call.

8. Reset VEE to the original value recorded in step 3.

9. Remove the jumper from the governor switch.

10. Reset the A1 Multiplier setting to 100.