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Section 1 General Information

This manual provides the information necessary to install, adjust and troubleshoot an Ultra 2000 elevator controller. It should be read and understood completely before trying to work with the controller.

1.1 Technical Support
O. Thompson provides technical support on all of our products free of charge. Technical support is available at (718) 417-3131 from 8:00 AM to 5:00 PM, Eastern time. Please don’t hesitate to contact us with any questions or concerns you may have.

1.2 Training
O. Thompson provides regularly scheduled Ultra 2000 training classes at our facility. These classes are 8 hours in length. Please contact the O. Thompson Sales Department for class schedules. Training is available at other locations for an additional charge. Please contact the O. Thompson Sales Department for pricing and scheduling.

1.3 Testing
All O. Thompson controllers are fully tested before they leave our facility. They have been powered up, tuned and tested to run an elevator machine. This assures you, the customer, that the controller you receive will power up and run when properly installed.

1.4 Code Compliance
All O. Thompson controllers have been configured to apply with the code requirements as specified on the Controller Order Form. If you find an item that you believe does not comply with applicable codes, notify us immediately and, if necessary, we will address the issue.

1.5 Documentation
We are constantly enhancing our manuals, prints, and documentation and want to be sure that the information provided to our customers is accurate and easy to understand. If during the course of the installation and adjustment process you find an item in this manual that is confusing, or you believe is not accurate, please contact our Technical Support Department at:

O. Thompson Co.
84-00 73rd Ave. Unit F=
Glendale, NY 11386
(718) 417-3131
(718) 417-9075 fax

1.6 Warranty
O. Thompson warranties its control systems for a period of one year from the date that the elevator has been placed in operation. This warranty period cannot exceed 16 months from the date of controller shipment. If any part of the control system fails due to a defect in material or workmanship O. Thompson will replace the defective material at no cost.

If replacement of the controller’s drive system or any other component is ever required please contact O. Thompson’s Technical Support Department. O. Thompson will not accept any material for warranty exchange or repair without a Return Material Authorization (RMA) number issued by our Technical Support Department. Removing boards from the controller or drive without authorization may void the manufacturer’s or O. Thompson’s warranty.
Section 2 Personnel Safety

There are certain fundamental warnings that must be kept in mind at all times. If these fundamental warnings are not kept in mind, personal injury and/or death may occur. These Warnings include, but are not limited to:

- MicroFlite Controllers should only be installed by qualified, licensed, trained elevator personnel familiar with the operation of microprocessor-based elevator controls.

- Verify that all safety devices (limits, governors, hoistway locks, car gate, etc) are fully functional prior to attempting to run the elevator. Never operate the MicroFlite controls with any safety device rendered inoperative in any way.

- The User is responsible for compliance with the current National Electrical Code with respect to the overall installation of the equipment, and proper sizing of electrical conductors connected to the controls.

- The User is responsible for understanding and applying all current Local, State, Provincial, and Federal Codes which govern practices such as controller placement, applicability, wiring protection, disconnections, overcurrent protection, and grounding procedures.

- Controller equipment is at line voltage when AC power is connected. Never operate MicroFlite controls with covers removed from SCR Drives, Motor Field, or Brake controls.

- After AC power has been removed, internal capacitors can remain charged for up to 5 minutes after power has been removed. Therefore, wait at least 5 minutes after power down before touching any internal components of the controls.

- To prevent the risk of personal shock, all equipment should be securely grounded to earth ground, with a minimum of #8 AWG wire as outlined in the National Electrical Code. Failure to obtain an actual earth ground source may result in electrical shock to personnel.

- When using test equipment (oscilloscopes, etc.) with a power cord that electrically ties probe common to earth ground, an isolation transformer should be used to isolate the instrument common from earth ground.

- Care should be taken to remain clear of all rotating equipment while working on the controls.
Section 3 Equipment Safety

There are certain fundamental precautions that should be taken when working on any Microflite System. If these precautions are not taken, equipment damage and possibly personal injury could occur. These cautions include, but are not limited to:

- All equipment chassis should be securely grounded to earth ground, with a minimum of #8 AWG wire as outlined in the National Electrical Code. Failure to obtain an actual earth ground source may result in electrical shock to personnel. Improper grounding is the most common cause of electrical component failures and electrically noise-induced problems.

- All component replacement must be done with the main line power off. Additionally, internal capacitors remain charged for up to five minutes after power down. Therefore, component replacement should not take place until after this five minute waiting period. Damage to equipment or unexpected operation of the elevator may occur if this caution is not adhered to.

- Substitution of parts or unauthorized modifications to circuits or components should not be attempted before first contacting O. Thompson Engineering to ensure all safety features are maintained. O. Thompson will not be held responsible for circuit modifications made in the field unless they are approved in writing by O. Thompson Engineering.

- Circuit boards that are determined to be defective should be sent to O. Thompson for repair and subsequent testing. Field repairs may leave the board with undetected problems that may affect other parts of the control.

- Care should be taken when using test leads and jumpers to avoid applying high voltage or ground to low voltage microprocessor circuits.
Section 4 Installation Considerations

The installer should minimize exposure to the following:

1. Dust, carbon, or metallic particles should not accumulate on any part of the control.
2. Vibration and shock.
3. Rapid temperature change, high humidities, high ambient temperatures.
4. Caustic fumes.
5. Electromagnetic interference. This may be caused by radio transmitters, high voltage inductive spikes from unsuppressed relay coils, improper grounding, and improper wiring practices. The following should be noted:

   • The outer door will protect against interference only if it is closed. When the door is open, do not operate high wattage radios next to the microprocessor.

   • Noise from door operator reactors can cause a problem if mounted in the controller.

   • If the CRT shows lines, spikes or other signs of interference, check for electromagnetic interference (noise) by checking the following:

     Note: AC drives are very prone to cause noise interference. This is particularly evident on the Diagnostic monitor while the car is running. This is a normal condition and will not effect the operation of the controller.

     1. Check for proper (water pipe) grounding.
     2. Check that high voltage wiring is not running near the MPU board or monitor.
     3. If the noise is seen when the door motor is operating (CX or OX are lit on the screen), add suppression around the door operator circuitry.
     4. Try to pinpoint when the noise occurs (I.E. when the noise occurs, what relay is picking or dropping.) Once the problem relay is pinpointed, add arc suppression around the coil.

     Note: Standard arc suppressors (resistor/capacitor networks) are used on AC relays, and diode/resistor combinations work well for DC relays. Consult O. Thompson engineering for proper component sizing.

4.1 Piping and Wiring

Proper routing of the signal and power wires for the car and dispatcher is essential to a trouble free installation with any microprocessor based equipment. This part of the installation is where most people turn their heads and say "oh, I didn't see that section." As much as it sounds like an "engineering thing", low voltage and high voltage wiring cannot be run in the same conduit or duct.

4.1.1 How Electrical Noise Occurs

Electrical noise occurs in most cases when two wires run along side one another, one of them a high power conductor, and the other of relatively low signal level conductor. As current flows through the high power wire, magnetic lines of flux (voltage) expand outwards around the outside of the wire. With a low signal level wire along side the high voltage wire, a voltage from the magnetic lines of flux is induced in the low level conductor.
The low level conductor, in the case of Ultra 2000, may be a 24 volt input that really only needs to see 12 volts to turn on. If the voltage induced from the high power conductor is large enough to induce a 12 volt spike, the input can falsely turn on.

4.1.2 How to Avoid Electrical Noise Problems

Noise problems can be avoided in a variety of ways. The easiest way to avoid noise problems is in the proper routing of high and low level signal wiring. Keep low level wiring in separate conduit from high power wiring. The separate conduit provides a shield from electrical noise. If high and low power wiring must be run in the same duct, try to keep them a minimum of three to four inches apart. Also, if the two must cross each other, they should cross at a ninety degree angle to each other. Sometimes this is not practical.

A second way of protecting against electrical noise problems is to run low level wiring in shielded cable. It is very expensive to run all wiring in this manner, so only certain signals are run in this manner. The shield provides a conductor external to the actual signal wiring to collect any induced voltage from surrounding high power wiring.

The shield or "drain", as it is often referred to, is then connected to ground on one end. With the induced voltage connected directly to ground, the induced spike is suppressed immediately before affecting the actual signal being shielded. **The shield or "drain" should never be connected to ground at both ends.**

4.1.3 Possible EMI / RFI Interference

Many papers concerning recommended wiring practices have been written on EMI (Electro Magnetic Interference) and RFI (Radio Frequency Interference). The main sources of these types of problems are semiconductor devices that switch at high base frequencies such as variable frequency drives. The most common method of eliminating these types of problems is through proper power cable piping and routing and proper grounding. The following wiring practices should be followed when piping and wiring high voltage lines to avoid EMI problems:

1. Run all motor leads in a separate conduit all the way back to the control cabinet. All motor lead runs should be as short as possible and the entry into the control cabinet should be as close to the final termination point in the cabinet as possible.

2. Run main line supply leads in a separate conduit all the way back to the control cabinet.

3. Run all primary isolation transformer wiring in separate conduit from the main line to the transformer. (SCR Drives Only)

4. Run all secondary isolation transformer wiring in a separate conduit from the transformer to the drive cabinet. (SCR Drives Only)

5. **A SINGLE POINT GROUND** should be established inside the control cabinet and a #8 AWG ground wire should be run direct from each of the following devices to this one single point:

   A) Earth Ground from running water supply, hydro-electric supplied ground, or a ground supplied via an earthing rod to the single ground stud.

   B) Continuous wire from the main line disconnect to the single ground stud.

   C) Continuous wire from the motor frame to the single ground stud.
D) Continuous wire from the isolation transformer frame to the single ground stud (SCR jobs only)
E) Continuous wire from the DC choke frame to the single ground stud (SCR drive only)
F) Continuous wire from the line filter frame to the single point ground stud (AC Vector jobs only)
G) Jumper the “N” stud on the line filter to the line filter frame.
H) Continuous wire from the load reactor frame to the single point ground stud.
I) Continuous wire from the drive frame ground stud to the single point ground stud.

4.1.4 Tach Generator Wiring

The tach generator signal is the heart of the generator shunt field regulator. This signal must be as clean as possible or extreme instabilities may occur in the motor drive system. Instabilities caused by a noisy tach signal can take days of adjustment to filter out of regulator circuits. It only takes a couple of hours to run a separate pipe for the tach.

The tach signal should also be wired using a shielded twisted cable with the shield terminated to the controller ground terminal on the controller. **DO NOT ground the shield on both ends of the cable.** If the shield is grounded at both ends, an "antenna" is created, and more noise can be induced into the tach signal than if the shield were left completely ungrounded.

4.1.5 Low Voltage Signal Wiring

Low voltage signal wiring includes all the 24 volt inputs. These include the car calls, door limits, electric eyes, etc. The inputs on the I/O boards only need to see 12 volts or more to turn on. If the signal wires are run along side the 240 VDC door operator wiring, a 12 volt spike is very likely to occur. Keep low level signal wiring run at least 4 inches away from high power wiring to avoid false signal firing. Wherever this is not possible, and the low level wiring must cross the high power wiring, the two should cross at ninety degree angles to each other.

4.1.6 High Power Wiring

High power wiring that should be piped separately from all other signal wiring include the following:

- Main line connections to the cabinet.
- Motor armature and motor field wiring.
- Brake coil wiring.
- Generator Shunt Field wiring.
- Generator Armature wiring.

In most cases it is practical to run the motor armature, motor field, and brake wiring in one pipe. The other wiring should all be run in separate pipes, and **NOT** run in the common duct with all the signal wiring.

4.1.7 Traveling Cable Wiring

Although we have not yet experienced problems in this area, it is always best to consider the worst case scenario and try to avoid potential noise induced problems in the signal wiring.

When laying out traveling cable wiring, it is always best to have the low voltage signal wiring multiple layers away from any 14 AWG power wires used in the traveling cables.
4.1.8 Car Top Encoder Wiring

The car top encoder communicates to the car MPU (Micro Processor Unit) via a neuron network at an extremely high frequency. The devices at both ends of the network are extremely intelligent in that they check for errors in the message every time the information is sent.

However, to be extra cautious, we recommend the communication cable be a shielded pair wire. Preferably a shielded twisted wire, although this is not provided in most traveling cables. We also recommend the shield be tied to controller ground only at the controller end.

4.1.9 LonWorks Neuron Network Wiring

The neuron network is very noise immune, and grounding is not a tremendous concern, however the cable connecting two LonWorks devices should have their shields grounded at the source end. The drain wire from the shielded cable should be tied to earth ground at the input end and taped off at the other end. By this we mean the following:

**MPU board to Encoder board** - Ground the shield at the controller and tape off the shield wire at the encoder.

**Encoder board to Car Station board** - Ground the shield at the Encoder board and tape off the shield at the Car Station board.

**Dispatcher Link** (Network B connections from the dispatcher to the first car and from car to car) - Install the wire from the dispatch MPU board to the MPU board of the first car in the group. Ground the shield at the dispatcher end. The shield at the car end should not be connected. The next car in the group should have the shield grounded at the first car, and left off at the next car. Subsequent cars will be connected in a similar manner. Refer to the wiring diagrams proper connections.

4.1.10 Dispatcher Communication Wiring

Communication cables between the car and dispatcher should be run in a separate conduit from any power wiring. There are some required interconnections for redundant signals between the dispatcher and the cars. These can be run with the communication cable in the same conduit. Refer to the wiring diagrams for the proper connections.

Communication cables between the dispatcher and lobby displays or building management systems should be done in shielded pair wiring.

4.1.11 Proper Grounding Procedures

A proper ground is essential to trouble free operation. GROUND is defined as a direct connection to EARTH GROUND. This type of ground is not always available from the electrical supply panel. Electrical codes vary in some areas, and some electrical codes consider the conduit used to carry the conductors the ground for the system.

We do not consider the electrical conduit to be a sufficient ground for our system. Electrical ground should be obtained and certified from the electrical contractor. If this is not available, keep the following in mind when seeking an adequate connection to EARTH GROUND:

1. The building steel is not always earth ground. In most cases, building beams rest
on concrete beam pockets, and the earth connection is inadequate.

2. A sprinkler system water pipe is not adequate because the sprinkler system is, in most cases, isolated from a free flowing earth water source.

If either of the two methods above are chosen for ground, and a true electrical ground is later introduced to the system, a difference in potential can occur between the assumed ground and the actual earth ground. This may lead to unstable operating conditions, and the possibility of electrical shock to passengers or personnel.

3. A water pipe is an adequate ground only if the water in the pipe is connected to a continuous city water source.

4.1.12 Wiring Connections for Properly Grounded Systems

1. An uninterrupted ground wire of at least #8 AWG wire should be run from each car controller cabinet chassis or backplate to earth ground. The connection at the car controller must be scraped free of paint so the ground connection can be made to the bare metal of the enclosure. The car controller should read less than 1 ohms to ground with the power off.

2. Ground straps, or short loops of ground wire should be run from the controller ground connection to the primary duct connections.

3. An uninterrupted #8 AWG ground wire should be run from the hoist motor frame to the controller ground. Wherever the ground connection is made on the hoist motor should be free of paint.

4. A continuous looped ground wire should be run from each hall lantern and position fixture box to controller ground. The ground connection at each fixture should make an electrical connection to the bare metal of the fixture box and its cover. This connection should be free of paint.

5. An uninterrupted ground wire of a minimum of #14 AWG should be run from a termination point on the cab to the controller ground.

6. An uninterrupted ground wire should be run from the cab enclosure to the ground terminal on the cab to protect passengers and personnel from electrical shock.

7. An uninterrupted ground wire should be run from each car operating panel to the ground terminal on the cab to protect passengers and personnel from electrical shock.

8. An uninterrupted ground wire should be run from the dispatch cabinet chassis or backplate to earth ground. The connection at the dispatch cabinet must be scraped free of paint so the ground connection can be made to the bare metal of the enclosure.

9. A continuous looped ground wire should be run from each hall push button station to the dispatch or controller ground.

4.2 Encoder Wiring (Magnetek DSD 412 & HPV 900 only)

The encoder used on the Magnetek DSD 412 and HPV 900 drives is a quadrature encoder. The signals from the encoder are:
Sometimes referred to as:  

A A        B B 

A is pronounced A not  

B is pronounced B not 

Three twisted pairs, each with an overall shield is used to wire the encoder. 

A and A are wired with a single twisted pair with an overall shield wire.  

B and B are wired with a single twisted pair with an overall shield wire.  

The +5 volts and Com to the encoder is wired with a single pair with an overall shield wire.  

All the shield are connected together and terminated at the drive. There should be no connection of the shield at the encoder end. Tape off or insulate the shield wires at the encoder end.  

4.3 Proper Encoder Mounting Procedures  

The most often overlooked item in drive applications is the proper mounting of the encoder. Poor or improper mounting of the encoder leads to an unstable speed feedback signal to the drive. Unstable feedback signals become amplified within the regulator circuits and lead to oscillations and vibrations in the ride. 

The most common misunderstanding is that the speed feedback signal should exactly reflect the actions of the car. This is incorrect in that mechanical resonances and instabilities can exist in a system that should not be incorporated into the motor control. An example of mechanical instability would be improper gear lash in a geared application. 

The speed feedback signal should exactly reflect the action or speed of the motor in all cases. The encoder signal is also looked at in terms of resolution. An encoder with the proper PPR, or pulses per revolution, should be selected. As a rule of thumb, if the encoder is mounted to the motor shaft in a gearless installation, it should be roughly 10,000 PPR. If it is equipped with a wheel and mounted to drive sheave, it should be either 2,500 or 5,000, depending on motor RPM. An encoder driven of the motor or worm shaft should be 2,500 PPR. 

4.3.1 Encoder Mounting for Geared Applications  

WE RECOMMEND the encoder for geared applications be coupled directly to the motor or worm shaft using an isolated flexible coupling supplied by the encoder manufacturer. The encoder shaft should not be hard fixed to the motor shaft due to imperfections in the motor shaft alignment. If the encoder shaft is hard coupled to the motor shaft without a flexible coupling, premature encoder failure will occur. 

WE DO NOT RECOMMEND driving the encoder from the drive sheave on geared applications. This is primarily due to the mechanical inconsistencies in the gear box. These will be introduced into the motor control circuits, and the electrical stability of the system will be compromised. 

4.3.2 Encoder Mounting for Gearless Applications
WE RECOMMEND that the encoder for gearless applications be driven from the motor shaft. This will give the best speed feedback signal, and reduce the possibility of vibration in the signal leading to vibration in the ride of the car.

Since it is not always possible to drive the encoder off the motor shaft, as an alternate, you may choose to mount it on the drive sheave using a standard tach wheel. The tach wheel should ride on a smooth machined surface to the side of the rope grooves or directly on the brake pulley. This surface should be free of paint and excessive grooving. The encoder should be mounted to allow it to pivot with and closely follow the imperfections of the driving surface.

**Note:**

*If the encoder vibrates or bounces on the driving surface, this will most typically show up as a vibration during acceleration and deceleration. If this is the case, the spring on the mounting bracket should be tightened to hold the encoder to the driving surface. Please be careful that the if a spring is tightened, it should not apply any more than 7 ft/lbs of pressure on the encoder shaft.*

4.3.3 Tach Generator Mounting

The tach generator is used on jobs with MG sets. It provides speed and direction feedback to the generator shunt field regulator.

WE RECOMMEND that the tach be mounted to the motor or worm shaft on geared applications, and to the brake or drive sheave on gearless applications.

4.4 Environmental Conditions

We recommend that the controller be installed in an environment of 0 – 40° C (32 - 104°F) ambient temperature with a relative humidity of not more than 95% with no condensation.
Section 5  Hoistway Equipment Installation

5.1  Tape Installation

Microflite Ultra 2000 uses a perforated steel tape in the hoistway. The tape and car top encoder provide position, speed, and direction feedback to the control system.

Prior to the installation of the perforated tape, insure the location you choose will have adequate clearance from shaft way beams, walls, counterweights, cabs, and terminal limit devices. Also, make sure the stick is not placed too close to the governor lift arm so that when the car safeties are activated, the stick assembly is damaged or the car safeties can not apply.

1. The tape should be hung high enough in the hoistway so that when the counterweight is on a fully compressed buffer, the stick can continue to ride up high enough that it will not be damaged by overhead obstructions. A bracket is provided to attach the tape to the rails.

2. The tape should be attached in the pit low enough so that when the car is on fully compressed buffer, the stick and any car devices do not come in contact with the tape hold down assembly.

3. The tape spring tension should be adjusted to give adequate tension of the tape in the hoistway such that the tape should not make noise as the car travels up the hoistway.

4. During installation, the edges of the tape sometimes become gouged. After the tape installation is complete, as a preventative measure, the edges of the tape should be gone over with a fine file to remove any burrs or gouges in the tape. This will lead to much quieter operation of the encoder system as the car travels at contract speed.

5. After the tape edges are smooth, wipe off all excess oil and dirt from the face of the tape prior to installing magnets. Do not use rags that will leave lint on the tape during cleaning.

6. Apply a light film of silicone lubricant to the stick guides every 6 months to prolong guide life.
5.2 Stick Alignment

After the tape has been installed, adjust the stick front to back slightly so it does not ride hard on one side of the unistrut bracket during any part of the travel through the hoistway. In high rise buildings, the rails may vary in and out substantially. This may cause the encoder guides to wear prematurely unless the above precaution is taken.

5.3 Mounting the Floor Magnets

South facing magnets of different lengths are used to encode each floor position. The lengths start at 6 ½ inches at the bottom floor and increase by ½ inch for each successive floor. Looking at the perforated tape from the elevator car, the magnets for the door zone are mounted to the right of the perforated holes. The magnets should be mounted as close to the perforated holes as possible without covering any portion of the hole.

The 6 ½ inch magnet should be mounted on the lowest floor. Each successively larger magnet should be mounted on the next highest floor. For example:

<table>
<thead>
<tr>
<th>Landing #</th>
<th>Magnet Length (in inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 ½</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>7 ½</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>8 ½</td>
</tr>
</tbody>
</table>

The magnets are mounted on the perforated tape as follows:

1. The elevator is moved **level** with the lowest floor on inspection.
2. Next, make a mark on the tape even with the top of the encoder assembly back plate.
3. The top of the magnet is then placed 9 inches below the scribe mark and to the right of the perforated holes. The side edge of the magnet should line up as close as possible to the holes in the tape without actually covering any part of the holes in the tape.

**Note:**

*If the floor position magnet is designated as an express zone magnet, it should be mounted in the same vertical position, but on the left side of the tape so the door zone sensors will not sense a door zone at that floor.*

*Express Zone Magnets designate a position output, but not a floor stop. Example - This would be used to indicate an “X” for a blind hatch. Place magnets for express zones toward the middle of the zone.*

4. The elevator is then moved up to the next floor and steps 2 and 3 are repeated. This continues until the last floor is reached.
## Floor Magnet Installation Index

<table>
<thead>
<tr>
<th>Magnet Length</th>
<th>Shaft/Floor Position</th>
<th>PI Output</th>
<th>Express Zone (Y / N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 1/2&quot;</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>28&quot;</td>
<td></td>
<td></td>
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<tr>
<td>26 1/2&quot;</td>
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<td></td>
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<td>26&quot;</td>
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<td>25 1/2&quot;</td>
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<td>6 1/2&quot;</td>
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</tbody>
</table>

### Note:

**Stuck Assembly Shown At Floor Level***

Door zone magnets are installed on the right hand side of helicopter supercopter.
Express zone magnets and edge zone magnets are installed on the left hand side of helicopter supercopter.

20 pin computer cable to electronics box.
Section 6a  Start Up Procedures - Magnetek DSD 412 DC Drive

6a.1 Controller Inspection

**WARNING:**

Read Section 2 and 3 on Personal and Equipment Safety completely before starting this procedure.

Read Section 4 on Piping & Wiring completely before starting this procedure.

Read this section completely before beginning this start up procedure.

Have someone stand by the main line disconnect during the following phases of the start up procedure for added safety:

- First time power on of the controller.
- First time an attempt is made to move the car.

Insure all safety circuits are functional.

Insure all hoistway door interlocks are electrically functional.

Insure car gate circuitry is electrically functional.

**Prior to Applying Power:**

Verify all circuits are wired to the controller properly.

Check the following items:

- MPU switch down
- INSP switch down
- DDS switch down
- NON/RESET switch down (For troubleshooting purposes)

**Note:** NON/RESET switch up (When in automatic)

Verify, with an ohmmeter, that the governor overspeed switch and any other devices that are wired in at this time will open the safety circuit.

Physically verify that all hoistway doors are closed and locked.

Verify that the tach or encoder leads are wired to the motor drive system in the appropriate place.

Verify that the main line power supply voltage is the same as the controller order as seen on the prints shipped with the controller.
Verify the following connections between the 15 volt power of the motor drive, the MPU board, and the relay board:

<table>
<thead>
<tr>
<th>On Motor Drive</th>
<th>On MPU Board</th>
<th>Relay Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 15 volts</td>
<td>J9-2</td>
<td>J20-1</td>
</tr>
<tr>
<td>- 15 volts</td>
<td>J9-3</td>
<td>J20-3</td>
</tr>
<tr>
<td>15 volt common</td>
<td>J9-4</td>
<td>J20-2</td>
</tr>
<tr>
<td>Pattern In (+UP)</td>
<td>---------------</td>
<td>J20-7</td>
</tr>
<tr>
<td>Pattern In (-UP)</td>
<td>J7-2</td>
<td>J20-2</td>
</tr>
<tr>
<td></td>
<td>J7-1</td>
<td>J20-5</td>
</tr>
</tbody>
</table>

6a.2 Power Up the Controller

After powering up the controller for the first time, check the following:

I, IX, & IY relays should be de-energized. If they are energized, quickly switch the inspection switch on the controller to the opposite position.

SAF relay is energized on power up. If not, troubleshoot the safety string with a voltmeter.

REG relay is energized on power up. If not, check to see if the Drive has faulted. Troubleshoot the drive using Section 6.3 in this manual or Magnetek Technical Manual CS 0274.

DG & DGX relays should be energized. If not, find the open door lock or car gate switch.

CG & CGX relays should be energized. If not adjust the gate switch on the car so it is closed when the doors are fully closed.

LIM relay should be energized. Temporarily jump the SF1 and SF2 contacts on the limit board until the board can be set up properly.

BKA relay should be energized.

ACC relay should be de-energized. If this relay is energized, the inspection and access switches in the car should be switched to the auto position to allow the car to be run from the controller only.

6a.3 Magnetek Start Up

Instructions for installing the Magnetek Drive can be found in the separate manufacturers manual - Magnetek Technical Manual CS 0274 - enclosed with the project shipment.

The drive has been modified to meet O. Thompson’s specifications. The Magnetek Technical Manual CS 0274 that is shipped with the elevator control panel(s) can be used, with the exceptions listed below. The exceptions listed below supersede those in the standard manual.
6a.3.1 Hardware Modifications

Typically, the only hardware modification is the occasional use of a motor field transformer. You received a motor field transformer if it was dictated by the project specification data.

6a.3.2 Software Modifications

The following software modifications to the standard Magnetek 412 Digital System Drive are unique to the O. Thompson Microflite Ultra 2000 control.

The major change in the software is the nominal speed reference and speed feedback, input and output signals. This has been changed to ±7 volts, from the drive standard of ±10 volts. The ±7 volt speed reference is an O. Thompson Microflite Ultra 2000 control standard.

A second modification to the software is the addition of a Speed Error. This error condition is a speed reference (Pattern) vs. car speed (Tach) error condition that results in a new #410 error.

6a.3.3 Drive Programming

Once the controller is powered up, the drive needs to be programmed to interface correctly with the equipment on the job site. O. Thompson has pre-programmed the drive based on the information provided in the survey, but it is important to confirm it before attempting to run the car.

The drive may fault on initial power up due to incorrect parameters. This is normal, and should be ignored at this time.

1. To use the keypad, press the up arrow. The display should change to a “0.” Press the up arrow again, and it should change to a “1.” Press the DATA/CTN key and the value programmed into parameter one will be displayed.

2. Parameter #1, Current Limit, should be set to 275. If it is not, press the up or down arrow until 275 is reached. Press enter to save this value.

**NOTE:** Saved values are only held in the drive’s volatile RAM at this time. Powering down the drive or pressing the reset button will cause this data to be lost. For the data to become permanent, it must be saved to the drive’s non-volatile RAM. If you wish to save any value at this time, follow the procedure in step 20 below, or refer to the Quick Start Up and Reference Guide which was shipped with the controller. You do not need to perform the save procedure until you are told to do so in step 20.

3. Access parameter #3. Enter the motor nameplate rated armature current in amps. Press enter to save.

4. Access parameter #7. Enter the motor nameplate rated armature voltage in volts. Press enter to save.

5. Access parameter #9. Enter the nominal AC input voltage to the drive found on terminals L1, L2, and L3. Press enter to save.

6. Access parameter #10. Enter the pulses per revolution (PPR) of the motor encoder. This data can usually be found on the sticker attached to the encoder. Press enter to save.
Microflite Ultra 2000 - Magnetek DSD 412 DC Drive

7. Access parameter #11. Enter the motor nameplate RPM. Press enter to save.

8. Access parameter #16. This parameter is the gearless ratio of the encoder. If the encoder is mounted to the motor shaft, set this value to 1.000. If the encoder is driven by a wheel mounted to the drive or brake sheave, use the following formula to calculate the correct value:

   Sheave diameter divided by encoder wheel diameter

   Press enter to save.

9. Access parameter #17. Enter the contract speed of the car in feet per minute (FPM). Press enter to save.

10. Access parameter #21. Enter a value of 6.5. Press enter to save.

11. Access parameter #49. Enter the running field current in amps. If field weakening is not used, enter the full field current in amps. Press enter to save.

12. Access parameter #50. Enter the full field current in amps. This may or may not be the value on the motor nameplate, as the fields may have been re-wired. If you are unsure, check the survey data to see what the field current was with the old controller. Press enter to save.

13. Access parameter #52. Enter the full field voltage in volts. Press enter to save.

14. Access parameter #53. Enter the standing field current in amps. This value is typically half of the full field value from parameter 50. Press enter to save.

15. Access parameter #56. If the motor uses field weakening, enter a value of 90. If field weakening is not used, enter a value of 130. Press enter to save.

16. Access parameter #57. If the motor uses field weakening, enter a value of 70. If field weakening is not used, enter a value of 130. Press enter to save.

17. Access parameter #82. Enter a value of 1.428. Press enter to save.

18. Access parameter #87. Enter a value of 1.42. Press enter to save.

19. Access parameter #97. Enter a value of 0.7. Press enter to save.

20. Access parameter #98. Enter a value of 0.7. Press enter to save.

21. The programmed values must now be saved to the drive’s non-volatile RAM. Access parameter 994. Press the DATA/FCTN key. The display will read “rESt.” Press the up arrow. The display will change to “SAVE.”

22. On the upper, right hand side of the drive you will find a small slide switch. This switch is the NVRAM Protect switch, S3. Flip this switch to the up position. The red LED “NV RAM NOT PROTECTED” will illuminate. Press the “ENTER” key on the drive. The display should now read "994." Flip the NVRAM Protect switch back to the down position. The values are now saved.

6a.3.4 Self Tune
The Magnetek DSD 412 digital DC drive has a self tuning feature that dynamically calculates the armature resistance and inductance. This includes the choke and filter used in series with the armature. It also measures the motor field resistance and inductance.

After the self tune is successful, the calculated values are stored in the following parameters:

- #613 Measured Motor Resistance
- #614 Measured Motor Inductance
- #615 Measured Field L/R time constant

These values should then be transferred and stored to the proper locations.

- #613 value transferred to Function #4 Arm Ohms
- #614 value transferred to Function #6 Arm L
- #615 value transferred to Function #51 Field L/R

Use Function #997 for self tuning.

**Note:** Motor fields must be at full field current during self tune. Display parameter #612 must be the same as parameter #50. Check by running on inspection. Motor field fault will result if parameter #612 is less than parameter #50 during self tune.

**Note:** The following procedure is assuming a relay board version 2.3.

1. Place the car on Inspection with the doors closed. Remove the wires to the brake coil. This will prevent any inadvertent movement of the car.
2. Using the keypad on the drive, access parameter 997.
3. Flip the NVRAM Protect switch (S3) to the up, or not protected position. The red LED on the drive should illuminate.
4. Press the DATA/FCTN key. The display will change to “Entr.”
5. The self tune feature requires a temporary jumper to be placed from RJ 5-7 to RJ 7-7 on the relay board. This jumper will turn on the enable signal to the drive, picking the MA contactor.
6. Press the ENTER key on the drive keypad. The display will read “tESt.” The MA contactor should pick and drop several times. Current pulses will be sent to the motor armature and motor field.
7. When the Selftune procedure is complete, the display will read “PASS.” Remove the jumper from the relay board. Reconnect the brake wires.
8. Press the DATA/FCTN key to return to the parameter select mode. Using the down arrow, scroll to parameter 613. Press the DATA/FCTN key to view the value. Write this number down. It will be stored in parameter 4, Armature Resistance.
9. Access parameter 614. Write this value down. It will be stored in parameter 6, Armature Inductance.
10. Access parameter 615. Write this value down. It will be stored in parameter 51, Field L/R.
Microflite Ultra 2000 - Magnetek DSD 412 DC Drive

11. Access parameter 4. Change the value to that recorded from parameter 613.


13. Access parameter 51. Change the value to that recorded from parameter 615.

14. The programmed values must now be saved to the drive’s non-volatile RAM. Access parameter 994. Press the DATA/FCTN key. The display will read “rESt.” Press the up arrow. The display will change to “SAVE.”

15. On the upper, right hand side of the drive you will find a small slide switch. This switch is the NVRAM Protect switch, S3. Flip this switch to the up position. The red LED “NV RAM NOT PROTECTED” will illuminate. Press the “ENTER” key on the drive. The display should now read “994.” Flip the NVRAM Protect switch back to the down position. The values are saved.

6a.3.5 Attempt To Run The Car

1. Turn the inspection speed pot counter clockwise 10 turns or until the pot begins to click. Turn the pot 4 turns clockwise.

2. Momentarily press the Inspection Up button on the controller. The following relays should energize in this order: U, UX, PX, M, LPR, MA contactor, P, & BK.

3. If the car does not run up at a controlled speed when pressing the Up button, take the actions specified in the following chart:

<table>
<thead>
<tr>
<th>IF THIS HAPPENS</th>
<th>DO THIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car runs up very fast until the drive trips.</td>
<td>Swap wires TB1-4 (B) and TB1-5 (B-)</td>
</tr>
<tr>
<td>Car runs down very fast until the drive trips.</td>
<td>Turn off the main line power and wait 60 seconds. Swap the motor field connections, F1 &amp; F2.</td>
</tr>
<tr>
<td>Car runs down at a controlled speed.</td>
<td>Turn off the main line power and wait 60 seconds. Swap the motor field connections, F1 &amp; F2. Swap wires TB1-4 (B) and TB1-5 (B-)</td>
</tr>
</tbody>
</table>

4. While running the car on inspection, vary the inspection pot and observe the car to make sure the car speed varies.

5. Connect your red meter lead to the TB1-68 terminal of the drive, and your black meter lead to the TB1-63 terminal on the drive. As the car runs, adjust the inspection pot until .7 volts appears on the meter. If the car is running down, the polarity will be negative, and, if the car is running up the polarity will be positive.

6. Hand tach the car. It should be running at 10% of contract speed. If not, modify drive parameter 11 (Motor RPM) to achieve the correct speed.

7. Using the Inspection Speed pot on the relay board, set the inspection speed to 45 - 50 FPM.
8. Place the car somewhere near the center of the hoistway. On the Limit board, LED D9 should be turned off. It will come on when the car is on Automatic operation with the doors closed.

9. On the Limit board, press S3 and then press and release S1. Release S3. LED D25 will be blinking rapidly (on 1/8 second, off 1/8 second). Also, the D10, D11, and D17 LED's will be lit.

10. Run the car up on inspection about 5 feet. With the car running, press and release S3. D10 should turn off. If D11 turns off and D10 stays on this is OK.

11. Run the car down on inspection about 5 feet. With the car running, press and release S3. If D10 turned off in the previous step, D11 will turn off. D25 will now be on continuously, indicating that the Limit board inspection learn procedure was done correctly, and the board is now in normal operation.

6a.4 Brake Adjustment (see drawing on following page)

Note:
The brake assembly and all pins should be cleaned thoroughly and all spring tension set properly to hold 125% of car capacity prior to adjusting the brake driver. Brake shoes should be checked to insure at least 95% surface contact. If spring tensions are changed after this adjustment, the brake driver will need to be re-adjusted.

1. Insure the brake coil has been connected properly to the controller.

2. Connect a meter across the F- and F+ terminals of the drive. Set the meter range high enough to measure the brake lifting voltage level for the job.

3. With no inputs on at the J1 terminal of the drive, the V/I-4 pot will be selected. Adjust the V/I-4 pot fully counterclockwise.

4. Turn the main line power OFF. TEMPORARILY place a jumper from J1-1 to J1-3 on the brake driver.

5. Turn the main line power ON. Run the car on inspection and adjust the V/I-1 pot until brake pick voltage required for the job is obtained.

6. Turn the main line power OFF. Remove the jumper from the brake driver.

7. Turn the main line power ON. Run the car on inspection and wait until the LED over the V/I-2 pot lights. Adjust the V/I-2 pot until approximately 60% brake lifting voltage is obtained or the brake holding voltage previously measured. If the brake drops at this level, stop the car, turn the pot clockwise 1 full turn, and attempt to run the car again.

8. While running the car, turn the inspection speed pot counterclockwise until the car runs at approximately 8-10 fpm. Stop the car.

9. Remove the RL relay.
10. Turn the V/I-3 pot 10 turns counterclockwise, and then 2 turns clockwise.

11. Run the car on inspection and slowly turn the V/I-3 pot clockwise until the car runs through the brake.

**Note:** The brake shoes should *not* lift completely off the drum. If the shoes lift completely off the drum, stop the car. Turn the V/I-3 pot counterclockwise a couple of turns and repeat step 11. If the brake shoes lift completely on re-level, there may be insufficient torque in the hoist motor to assure adequate leveling control.

12. Replace the RL relay.

13. Turn the ACC1 pot fully clockwise. This will allow for a rapid response of the brake regulator from a lower voltage level to a higher voltage level.

14. Turn the DEC1 pot fully clockwise. This will allow for a rapid response of the brake regulator from a higher voltage level to a lower voltage level. This will also help prevent excessive arcing on the contacts of the BK relay.
15. Using the up and down inspections switch on the relay board, adjust pot PXT so that the MA contactor drops approximately 1 to 2 seconds after releasing the switch and the brake sets. Too much time will cause the car to take too long to re-level on automatic operation.

16. The car is now set up for inspection operation. When the hoistway tape and magnets are installed as per Section 5 of this manual and the car is ready to run, go to Section 6a.5.

6a.5 MPU Power Up

1. Power Up the MPU. While the MPU is powering up, press the Number 1 button. Refer to Section 11.5 of this manual for using the MPU key pad to navigate through the screens.

2. Go through all parameter screens to set all parameters applicable to the car. Only enable and set parameters that are applicable to the job. Refer to Section 11.7.1 of this manual for parameter settings and functions.

Note: *Pay no attention to the FLOOR LANDING VALUES at this time. These numbers mean nothing until a learn trip is performed.*

3. Write Values to Non-Volatile RAM.
   - Go to Floor Landing Values of the main car parameter screen.
   - Select "Get floor values from encoder".
   - When the enter button is pressed actual numbers starting with 2,000 at the bottom floor and increasing by 2,000 counts per floor should come up.

6a.6 Encoder

6a.6.1 Encoder - Preparation For Learn Trip

Verify that all phases of the encoder installation are complete:
   - Tape is installed.
   - All door magnets are installed.
   - Stick is mounted properly.
   - Stick cable is connected to encoder electronics box.
   - The U4 terminal limit is wired to J3-6 on the encoder processor board & D4 terminal limit is wired to J3-1 on the encoder processor board.
   - IP & IPX from the controller are wired to J2-1 & J2-4 on the encoder power supply board.
   - The IP wire from the controller is wired to J3-2 and J3-5 on the encoder processor board.
   - Shielded pair communication cable to the MPU is connected to the encoder board J4 connector. The shield on the cable is taped off at the encoder end.
   - Shielded pair communication cable to the Car Station board is connected to the J4 connector on the encoder and the J10 on the Car Station board. The shield on the cable is taped off at the Car Station board end.
6a.6.2 Performing the Learn Trip

1. Move the car on inspection into the bottom floor door zone. The DZ relay on the controller will pick up.

2. On the main parameter screen, move the cursor to “Learn Trip, Floor Names, Pre-Torque”. Press the 0 key.

3. Switch the INS switch on the controller up. The I, IX, & IY relays should pick.

4. Move cursor to “Learn Trip” and Press 0.

5. The screen will say “LEARN TRIP (IF YOU ARE SURE PRESS ENTER FOR LEARN TRIP !!!)”. Press 0.

6. The car will start the learn trip and move up the hoistway at about 24 fpm. It should stop as soon as it reaches the top floor door zone magnet. After reaching the top, the encoder card’s non-volatile memory will be programmed with the position of the magnets in the shaft.

7. The floor values now need to be sent from the encoder’s non-volatile memory to the MPU. To do this, go to the FLOOR LANDING VALUES screen. Select “GET FLOOR VALS FROM ENCODER”. When the “O” button is pressed, the values will be sent from the encoder to the car’s MPU board.

8. The values sent from the encoder do not take effect unless they are stored in the system’s non volatile memory. Go to the main parameter screen and move the cursor to the item “WRITE VALUES TO NONVOLATILE MEMORY.” Press the “O” button on the key pad.

9. RESET MPU

10. The system is now ready for high speed adjusting. Go to Section 7a.
Section 7a  High Speed Adjustment - Magnetek DSD 412

7a.1 Final System Checks Prior to High Speed Adjusting

1. Verify that all safety circuits are operative and that each device in the string will prevent the car from starting or continuing to run.

2. Verify that all hoistway door interlocks function properly both electrically and mechanically.

3. Verify that hoistway access circuits function according to your local applicable codes.

4. Verify that the car gate is set and functions properly according to local applicable codes.

5. On inspection, run the car to both extreme limits of travel to insure there is adequate pit and overhead clearance for both the car and counterweight in the event the car or counterweight should go onto their buffers during the initial adjustment process.

6. Verify that the electrical neutral of the hoist motor is set properly.

7. Set the up and down directional limits to open when the car is 1" beyond floor level at the top and bottom terminal floors.

8. Set the final limits to open when the car is 6" beyond floor level at the top and bottom terminal floors.

9. Verify the power wiring on the encoder electronics power supply and insure the D8 LED is on continuously on the encoder electronics board.

10. While riding on the car top on inspection, verify as the car travels up past the last top terminal slowdown that the D5 LED on the encoder electronics board turns on. If it does not, check the terminal slowdown wiring to the limit board and to the encoder electronics board.

11. While riding on the car top on inspection, verify as the car travels down past the last bottom terminal slowdown that the D6 LED on the encoder electronics board turns on. If it does not, check the terminal slowdown wiring to the limit board and to the encoder electronics board.

12. Verify that the terminal slowdown limit switches are set according to the tables in section 8.

13. On the car top, verify that all encoder and pretorque cables are securely plugged in inside the encoder electronics box.

14. On the car top, verify that all thumb screws on the cable from the sensor stick to the encoder electronics box are fastened securely to the boxes at each end.

7a.2 Initial Set Up

1. Place the car in the center of the hoistway. Mark the cables with chalk when the car crosshead and the counterweight crosshead are exactly adjacent to each other.
2. If the controller is not set up for seismic operation, go to step 5.

3. On the monitor, observe the encoder position on the diagnostic screen. Write this value down.

4. Access the car parameters menu. Open the “VIP, MEDICAL, EARTHQUAKE PARAMETERS” page. Program the encoder position recorded in step 3 into the “COUNTERWEIGHT ZONE” parameter. Save this by writing it to the system’s non-volatile memory.

5. Move the car a convenient floor. Place 40% of the car’s rated capacity in the car.

6. On inspection, run the car so it about 10 feet above the center of the hoistway.

7. Go to parameter 611 (measured armature current) in the drive and press the data/function key.

8. While observing the display on the drive, run the car down through the center of the hoistway. Write down the amperage displayed while the car passes by the chalk mark on the cables. The value may vary slightly, so average the value if necessary.

9. Place the car about 10 feet below the center of the hoistway.

10. While observing the display on the drive, run the car up through the center of the hoistway. Write down the amperage displayed while the car passes by the chalk mark on the cables. The value may vary slightly, so average the value if necessary.

11. Ignoring whether the recorded values were positive or negative, if the value recorded while the car was running up was greater than the value running down, the car is too heavy. Remove 100 pounds of weight from the car and repeat steps 8 through 10 until the recorded values are equal, but of opposite polarity.

12. Ignoring whether the recorded values were positive or negative, if the value recorded while the car was running down was greater than the value running up, the car is too light. Add 100 pounds of weight from the car and repeat steps 8 through 10 until the recorded values are equal, but of opposite polarity.

13. When the values are equal, but of opposite polarity, the car is balanced. Check how much weight is in the car. It should be between 40 and 50% of the car’s rated capacity. If not, the counterweighting needs to be adjusted. If the car is too heavy, weight needs to be added to the counterweight to get the car balanced between 40 and 50% of the car’s rated capacity. If the car is too light, weight needs to be removed from the counterweight to get it balanced between 40 and 50% of the car’s rated capacity.

14. After the appropriate adjustments are made to the counterweight, repeat steps 10 through 12 until balanced load is in the car. **Leave the weights in the car at this time.**

15. Place a **TEMPORARY** jumper on Limit board terminal SF1 and SF2 (J5 connector).

16. Place a **TEMPORARY** jumper on Limit board terminal SF3 and SF4 (J6 connector).

17. Unplug Limit board connectors J3 and J7 from the board.
18. Install a TEMPORARY jumper from J3-1 to J7-1.

19. Install a TEMPORARY jumper from J3-2 to J7-2.

7a.2.1 One Floor Up & Down

Make a one floor run up and a one floor run down in the middle of the hoistway.
Referring to Section 11.7 - Parameters, adjust motion parameters to get desired ride.

Note: Stay away from terminal floors.

7a.2.2 Two Floor Up & Down

Make a two floor run up and a two floor run down in the middle of the hoistway.
Referring to Section 11.7 - Parameters, adjust motion parameters to get desired ride.

Note: Stay away from terminal floors.

7a.2.3 Multi-Floor Up & Down

Make a multi-floor run up and a multi-floor run down in the middle of the hoistway.
Referring to Section 11.7 - Parameters, adjust SPEED CURVE parameter to get desired ride. Continue making multi-floor runs until the system demands contract speed.

Note: Stay away from terminal floors.

7a.3 High Speed Adjustment

1. Place a digital volt meter on MPU board terminals MJ7-1 (positive) to MJ7-2 (negative).

2. Run the car from the bottom floor to the top floor. Verify that the speed reference signal to the drive is +7.00 volts when at full speed. If not, adjust pot R25 on the MPU board to obtain +7.00 volts.

3. Run the car from the top floor to the bottom floor. Observe the meter. The voltage should be -7.00 volts. If not, adjust MPU pot R28 to obtain an equal voltage, but of opposite polarity, while the car is running up and down.

Note: It may be easier to adjust the R28 pot while the car is in leveling speed.
TEMPORARILY set the “ADVANCE COUNTS” parameter in the motion parameter screen to 90. Run the car and adjust R28 to obtain the same speed reference but opposite polarity while the car is leveling up and down.

4. If pot R28 was changed, it will be necessary to adjust pot R25 again. Verify that the voltage to the drive is +7.00 volts in the up direction, and -7.00 volts in the down.

5. Observe the diagnostic screen on the monitor. Check that the actual car speed as shown on the monitor is contract speed of the car. If not, adjust the MOTOR RPM parameter (#11) to obtain as close contract speed as possible.

6. On gearless machines, modify parameter 16, Gearless Ratio, to obtain exact contract speed from the machine.
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7. Run the car to a floor near the bottom of the hoistway. Place full load in the car.

8. Disable the car doors. On the drive, access parameter 610 (Motor Armature Voltage). Press the data/function key so armature voltage is displayed.

9. Enter a car call near the top of the hoistway. While the car is running up at contract speed, monitor the armature voltage.

10. After the car stops at the desired floor, compare the observed armature voltage to the value on the motor nameplate. If the observed armature voltage is above the value on the motor nameplate, reduce parameter 49, Weak Field Current, until nameplate armature voltage is obtained while the car is running up with full load. **NOTE:** If no change in armature voltage is observed, check parameters 56 and 57. These parameters control the speed at which the field is weakened and strengthened. Set 56 to a value of 90, and 57 to a value of 70.

11. If the observed armature voltage is below the value on the motor nameplate, increase parameter 49 until nameplate armature voltage is obtained while the car is running up with full load. **NOTE:** If the car has a geared machine, field weakening will not be required on this particular motor. Increase parameter 50, Full Field Current, until motor nameplate armature voltage is obtained while the car is running up at contract speed with full load. **BE CAREFUL NOT TO EXCEED THE NAMEPLATE FULL FIELD CURRENT VALUE OR THE FIELDS MAY BE DAMAGED.**

12. Run the car to a floor near the bottom of the hoistway. Place a car call near the top of the hoistway. After the car stops, access the scope screen on the monitor. Observe the first 5 seconds of the car's run. If the run appears smooth, with no distinct 'step' in the acceleration rate, go to step 13. If there is a step, decrease parameter 57, Field Weaken Speed, in the drive by a value of 5 until the step is completely gone. Go to step 14.

13. Increase parameter 57, Field Weaken Speed, in the drive by a value of 5. Run the car up and observe the scope screen. Keep increasing parameter 57 until a step seen in the acceleration. Decrease parameter 57 until the step is completely gone.

14. Permanently save all drive parameters by using function 994. Enable the car doors.

15. Remove the appropriate amount of weight and ride the car, staying away from the terminal floors. Make any necessary adjustments to the speed curve.

16. Remove the weight to the car, approximately 100 pounds at a time. Staying away from the terminal floors, observe one floor, two floor and multi floor runs to be sure that the car rides well under all load conditions.

17. Remove **ALL** jumpers from the Limit board and re-install all connectors.

18. Go to Section 8 and perform a learn procedure on the Limit board. After completing the learn procedure, go to Section 9 and perform the Pretorque set up, if applicable. Return to Section 7a.4 for final adjustments to the car's ride quality.

7a.4 Ride Quality and Performance Adjustments
7a.4.1 Drive Tracking

Drive tracking is the control system's most critical adjustment to get a high quality ride and superior performance. If the drive does not track the speed command well the ride quality will not be acceptable.

To determine how well the drive is tracking the speed command access the scope screen on the monitor. Enter various calls in the system and compare the desired car speed to the actual car speed. When the car decelerates, particularly coming out of high speed, there will be a slight delay between the desired speed and the actual speed. This delay should be between 150 milliseconds (0.15 seconds) and 250 milliseconds (0.25 seconds). If the delay is longer, or the car is overshooting, undershooting, or ‘spotting’ coming into the floor, the drive needs to be adjusted.

There are four (4) primary parameters used to achieve good tracking of the DSD 412 drive.

40 (Response)
This parameter is an adjustment as to how close the drive tracks the speed pattern. Typical values are numbers from 5 to 8. The higher the number the closer the tracking. Too high a number will cause vibration in the car, mostly noticed at slowdown. This is due to the drive trying to regulate the speed too closely. Too small a number may cause the car to overshoot the floor. This is due to the car not tracking the pattern close enough to stop the car at floor level.

41 (System Inertia)
This parameter is the inertia of the elevator system. Typical values are from 0.75 to 2.5. Too large a number may cause vibration, and too small a number will cause the speed regulator to become sluggish.

42 (Stability)
This parameter adjusts the amount of damping of the speed regulator. This value is usually left at the default of 1.0.

8 (Current Regulator Crossover)
This adjusts the bandwidth of the current regulator. This value is typically left at the default of 500. Too large a number will cause vibration in the car, usually at full speed or going into or out of full speed. Too small a number will cause the motor to become sluggish.

If it determined that the drive’s tracking needs to be improved the following procedure should be followed.
1. It is necessary to determine the motor’s base speed. Base speed is the motor speed at which the motor is turning with full field and lifting full load. If the machine is geared and not using field weakening, proceed to step 4.

2. To determine base speed, TEMPORARILY set drive parameter 11, Motor RPM, to 80% of its present value. Set drive parameters 56 and 57 to 130. Access the system’s motion parameters. Modify the “MAX SPEED” parameter to 80% of contract speed. Modify “ACCEL RATE” to 3.0, and “JERK RATE” to 6.0.

3. Place full load in the car. Disable the doors. Access drive parameter 610, Motor Armature Voltage. Place a car call and allow the car to run up. Monitor the motor armature voltage. If the voltage is low, increase drive parameter 11, Motor RPM, until the voltage is at the value on the motor nameplate while the car is running up. If the
armature voltage is high, reduce parameter 11 until nameplate armature voltage is obtained while running in the up direction.

4. Remove weights so balanced load is in the car. Access drive parameter 611, “Motor Armature Current.”

5. Place a car call several floors away so the car will be able to reach base speed. Monitor the display on the drive during acceleration and deceleration. Record the average value for accelerating current and decelerating current.

6. Access the scope screen on the diagnostic monitor. Look at the first 5 seconds of motion. Ignoring the initial take off and transition from acceleration to top speed, estimate if the acceleration had occurred at a constant rate, exactly how long, to the nearest tenth of a second, would it take for the car to go from zero to top speed. Record this number.

7. Using the following formula, calculate drive parameter 41, “System Inertia.”
\[
\frac{(\text{Accel Current} - \text{Decel Current})}{2} \times \frac{\text{Nameplate Armature Current}}{\text{Accel Time}}
\]

8. Program drive parameter 41 with the calculated value.

9. Restore drive parameters 11 (Motor RPM), 56 (Field Strength Speed) and 57 (Field Weaken Speed) to their correct values.

10. Restore speed parameters “MAX SPEED,” ACCEL RATE,” and “JERK RATE” to their correct values.

7a.5 Drive Reference Information

7a.5.1 Drive Faults

Drive faults will be indicated on the display as an “F” followed by a 2 or 3 digit number.

Example: “F 910”: This is an indication of a blown fuse.

There are two (2) error logs within the drive.

Parameter #800 contains a list of the last 16 faults that occurred. This list is constantly updated, with the newest error overwriting the oldest in the list. The list is stored on NVRAM and is never cleared. Errors on this list could be from the first time the drive was powered up, it is a continuous list, constantly updated.

Parameter #0 also contains a list of the last 16 faults that occurred. This list is also constantly updated, with the newest error overwriting the oldest in the list. However, this list can be cleared.

To view or clear this error list, do the following:
A. Use the arrow keys to scroll to Parameter #0.
B. Press DATA/FCTN key.
C. The first entry is “ALL”.

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D. Press ENT to clear all the errors in the list.

E. Use arrow keys to scroll past the “ALL” entry to view the error list.

F. The first error after “ALL”, is the latest error.

G. Press the ENT key to clear that particular error.

H. The end of the list will be indicated by “END”.

For a more complete description of the Parameters #800 & #0, refer to pages 3-6 through 3-8 of the Magnetek Technical Manual.

The following is a comprehensive list of faults detected by the drive. Also listed are specific corrective actions to be taken for each fault.
<table>
<thead>
<tr>
<th>Fault Number</th>
<th>Fault Name</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.L.</td>
<td>Loss of 115 VAC power to drive. Check fuses and AC input voltage at TB3-1 to TB3-7.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open Amtrap fuse or fuses. Check fuses and AC connections at TB3.</td>
</tr>
<tr>
<td>Prot</td>
<td>Parameter values protected. Generally seen when changing EEPROM’s. Drive must be initially powered up with NVRAM protect switch in the non-protected position.</td>
<td></td>
</tr>
<tr>
<td>F13</td>
<td>Illegal Instruction</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F14</td>
<td>Line 1010 Emulator</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F15</td>
<td>Line 1111 Emulator</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F16</td>
<td>Privilege Violation</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F17</td>
<td>Divide by Zero</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F21</td>
<td>Watchdog Timeout</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F22</td>
<td>Reserved Interrupt</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F23</td>
<td>Uninitialized Interrupt</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F24</td>
<td>Trace Exception</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F26</td>
<td>Spurious Exception</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F97</td>
<td>Overspeed Trip</td>
<td>Car speed greater than demanded speed (poor tracking). Bad encoder, fields too weak, speed regulator improperly tuned. Speed command exceeds maximum value. Check speed reference signal to drive.</td>
</tr>
<tr>
<td>F98</td>
<td>Tach Loss</td>
<td>Excessive motor feedback versus tach feedback. If motor has high starting current increase parameter 15, “Tach Sense.”</td>
</tr>
<tr>
<td>F99</td>
<td>Tach Reverse Connection</td>
<td>Tach feedback opposite direction of motor rotation. Reverse motor rotation (swap F1 &amp; F2) or encoder polarity (B B-).</td>
</tr>
<tr>
<td>F100</td>
<td>Not a Number</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F101</td>
<td>Math Overflow</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F102</td>
<td>Math Underflow</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F103</td>
<td>Floating Point Divide by Zero</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F104</td>
<td>Sign Error in Speed Regulator</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Fault Number</th>
<th>Fault Name</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>F112</td>
<td>Bad PCDU Pointer</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F114</td>
<td>Locked Up Queues</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F115</td>
<td>Multiplexer Config. Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F220</td>
<td>DCU ROM BUS Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F221</td>
<td>DCU RAM BUS Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F222</td>
<td>DCU NVRAM BUS Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F223</td>
<td>DCU DPRAM BUS Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F232</td>
<td>Unknown BUS Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F240</td>
<td>DCU ROM BUS Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F241</td>
<td>DCU RAM BUS Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F242</td>
<td>DCU NVRAM Add. Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F243</td>
<td>DCU DPRAM Add. Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F252</td>
<td>Unknown Address Error</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F400</td>
<td>Motor Overload</td>
<td>Timed excessive motor current. Check for brake not picking or other mechanical problem.</td>
</tr>
<tr>
<td>F401</td>
<td>Excessive Field Current</td>
<td>Drive detected too high motor field current. Generally caused by poor regulation on large field pieces. Perform a self-tune on the drive to ensure that parameter 51 is correct, and try increasing parameter 54. If problem persists, replace Field Card.</td>
</tr>
<tr>
<td>F402</td>
<td>Contactor Failure</td>
<td>“Loop Contactor Auxiliary” input to drive not turning off within 1 second of drive turning off LPR output.</td>
</tr>
<tr>
<td>F403</td>
<td>5 Minutes Full Field</td>
<td>The full field command to the drive has been on longer than 5 minutes. Directional limits not set to open 1” beyond floor or car stalled.</td>
</tr>
<tr>
<td>F404</td>
<td>Open Armature Circuit Fault</td>
<td>No connection from drive to motor armature. Check for blown F4 fuse or open wiring.</td>
</tr>
<tr>
<td>F405</td>
<td>Drive Safety Circuit Fault</td>
<td>Connection from TB3-1 TB3-6 is not closed 100 ms before enabling “Run” or not opening 100 ms after disabling drive. Check ‘SR’ &amp; ‘MB’ contacts to drive.</td>
</tr>
<tr>
<td>F406</td>
<td>10% Low Line</td>
<td>Incoming AC line 10% below value programmed at parameter 9.</td>
</tr>
<tr>
<td>F407</td>
<td>DCU CEMF Fault</td>
<td>Excessive CEMF. Check motor armature voltage and current while car is lifting full load and adjust motor field to obtain correct values.</td>
</tr>
<tr>
<td>Fault Number</td>
<td>Fault Name</td>
<td>Corrective Action</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>F408</td>
<td>PCU CEMF Fault</td>
<td>Excessive CEMF. Check motor armature voltage and current while car is lifting full load and adjust motor field to obtain correct values.</td>
</tr>
<tr>
<td>F409</td>
<td>PCU Loop Fault</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F410</td>
<td>Speed Error Fault</td>
<td>Difference between desired speed and actual speed exceeds the values programmed at parameters 99 and 100.</td>
</tr>
<tr>
<td>F411</td>
<td>Maximum Resets Attempted</td>
<td>If parameter 101 is set to “ON,” the drive has faulted more than 10 times in 1 hour.</td>
</tr>
<tr>
<td>F900</td>
<td>PCU Loop Fault</td>
<td>Drive enable signal turned on and safety line (TB3-1 to TB3-6) open or safety line closed while enable signal not turned on.</td>
</tr>
<tr>
<td>F901</td>
<td>PCU 1st Fault</td>
<td>Motor Armature Current exceeds 250% of rated current. Short in motor armature wiring, bad SCR, or poorly tuned regulator.</td>
</tr>
<tr>
<td>F902</td>
<td>Power Supply Fault</td>
<td>Bad power supply card, or shorted component drawing power supply low. Check +5, +24 and ±15 volt supplies.</td>
</tr>
<tr>
<td>F903</td>
<td>Line Sync Fault</td>
<td>Noise on AC line. May also be caused when building switches from Emergency Power to Normal Power. If problem does not clear when drive is reset, replace Armature Interface PCB.</td>
</tr>
<tr>
<td>F904</td>
<td>Low Line Voltage</td>
<td>Power line low based on value programmed at parameter 9. Also could be caused by open fuse.</td>
</tr>
<tr>
<td>F905</td>
<td>Field Loss Fault</td>
<td>Loss of or low field current. If resistance of field is correct, generally caused by poor regulation on large field pieces or incorrect phasing of field AC supply. Perform a self-tune on the drive to ensure that parameter 51 is correct, and try increasing parameter 54. If problem persists, replace Field Card.</td>
</tr>
<tr>
<td>F906</td>
<td>DCU Fault</td>
<td>Check power supply board, main control card, software and ribbon cables.</td>
</tr>
<tr>
<td>F907</td>
<td>Thermistor Fault</td>
<td>Open thermistor on heat sink. Also, heat sink temperature too high.</td>
</tr>
<tr>
<td>F908</td>
<td>Over Temperature Fault</td>
<td>Ambient temperature in drive too high. Check fans and verify proper air flow in drive.</td>
</tr>
<tr>
<td>F909</td>
<td>Excessive Ripple Fault</td>
<td>Noise on AC line. May also be caused when building switches from Emergency Power to Normal Power. If problem does not clear when drive is reset, replace Armature Interface PCB.</td>
</tr>
<tr>
<td>F910</td>
<td>Blown Fuse Fault</td>
<td>Open Amptrap fuse or fuses. Check fuses and AC connections at TB3. Check for loose connections from fuses to SCR bridge.</td>
</tr>
<tr>
<td>F912</td>
<td>Open SCR</td>
<td>Generally detect during 998, PCU Diagnostics. Bad SCR or doubler pack.</td>
</tr>
<tr>
<td>F915</td>
<td>Parameter Set Up Fault</td>
<td>Incorrect parameter settings. Check parameters 3, 7, 9, 50, and 52 values.</td>
</tr>
<tr>
<td>F917</td>
<td>Reverse Armature Voltage Connection</td>
<td>The polarity of the armature voltage feedback is reversed. Swap armature + and armature - wires at TB5 on the Armature Interface PCB. If problem persists replace Armature Interface PCB.</td>
</tr>
<tr>
<td>F920</td>
<td>Load Voltage Setting Error</td>
<td>Incorrect parameter settings. Check parameter 7.</td>
</tr>
</tbody>
</table>
## 7a.5.2 Drive Parameters

The following is a comprehensive list of the parameters in the drive. Also included with the parameters is a description of what they control and the proper setting procedure. This list is based on Software Revision R6,9 (Chips U13 &U14) and R6,5 (U39 & U40).

<table>
<thead>
<tr>
<th>#</th>
<th>Parameter Name</th>
<th>Units</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Reset Errors</td>
<td>None</td>
<td></td>
<td>Drive error list. Can be reset to display current errors.</td>
</tr>
<tr>
<td>1</td>
<td>Current Limit</td>
<td>% of Full Load Current</td>
<td>275</td>
<td>The percentage of full load current at parameter 3 that will cause the drive to trip on an over-current fault.</td>
</tr>
<tr>
<td>2</td>
<td>Use Self Tune</td>
<td>Logic</td>
<td>0</td>
<td>When set to “1” this parameter sets the drive to use the measured values from the self tune at parameters 613, 614 and 615 instead of the programmed values at parameters 4, 6 and 51. Typically set to “0.”</td>
</tr>
<tr>
<td>3</td>
<td>Rated Armature Current</td>
<td>Amperes</td>
<td>From Motor Nameplate</td>
<td>This parameter tells the drive what amount of current the motor is rated for.</td>
</tr>
<tr>
<td>4</td>
<td>Armature Resistance</td>
<td>Ohms</td>
<td>From Self Tune</td>
<td>This parameter tells the drive what the resistance value of the hoist motor armature is. It is derived from the self tune.</td>
</tr>
<tr>
<td>6</td>
<td>Armature Inductance</td>
<td>Millihenries</td>
<td>From Self Tune</td>
<td>This parameter tells the drive what the inductance value of the hoist motor armature is. It is derived from the self tune.</td>
</tr>
<tr>
<td>7</td>
<td>Rated Armature Voltage</td>
<td>DC Volts</td>
<td>From Motor Nameplate</td>
<td>This parameter tells the drive what voltage the motor armature is rated for.</td>
</tr>
<tr>
<td>8</td>
<td>Current Regulator Crossover</td>
<td>Radians</td>
<td>500</td>
<td>This parameter sets the band width of the current regulator. The responsiveness of the regulator will increase as the number increases.</td>
</tr>
<tr>
<td>9</td>
<td>Nominal AC Voltage</td>
<td>AC Volts</td>
<td>Measured at L1, L2, &amp; L3</td>
<td>This parameter tells the drive what the voltage of the incoming AC should be. It is used to detect an low line fault.</td>
</tr>
<tr>
<td>10</td>
<td>Encoder PPR</td>
<td>Pulses per Revolution</td>
<td>From Encoder Data</td>
<td>This parameter tells the drive the PPR value of the encoder. It is used to determine the speed at which the motor is turning.</td>
</tr>
<tr>
<td>11</td>
<td>Motor RPM</td>
<td>Revolutions per Minute</td>
<td>From Motor Nameplate</td>
<td>This parameter tells the drive the RPM the motor should be turning when the car is turning at rated speed.</td>
</tr>
<tr>
<td>12</td>
<td>Overspeed</td>
<td>Percentage of Rated Speed</td>
<td>110</td>
<td>This parameter sets the point at which the drive trip on an overspeed fault.</td>
</tr>
<tr>
<td>#</td>
<td>Parameter Name</td>
<td>Units</td>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>----</td>
<td>----------------------</td>
<td>------------------------</td>
<td>-------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>14</td>
<td>Voltage Sense</td>
<td>Percentage of Arm. Voltage</td>
<td>25</td>
<td>This parameter sets the minimum voltage level at which the tach loss and tach reverse connection faults will be detected.</td>
</tr>
<tr>
<td>15</td>
<td>Tach Sense</td>
<td>Percentage of Tach Feedback</td>
<td>5</td>
<td>This parameter sets the minimum level at which the tach loss and tach reverse connection faults will be detected.</td>
</tr>
<tr>
<td>16</td>
<td>Gearless Ratio</td>
<td>None</td>
<td>Calculated</td>
<td>This parameter is used when the encoder is not driven directly from the motor shaft. It is derived by the formula: Motor Sheave Diameter / Encoder Wheel Diameter</td>
</tr>
<tr>
<td>17</td>
<td>Rated Speed</td>
<td>Feet per Minute</td>
<td>Rated Speed of Car</td>
<td>This parameter tells the drive what the rated speed of the car is. It is used to display the speed of the car and the speed command in FPM at addresses 600 and 602. Also, the drive will not allow the car to accelerate or decelerate at a value greater than parameter 21, as scaled by this parameter.</td>
</tr>
<tr>
<td>21</td>
<td>Maximum Acceleration Rate</td>
<td>Feet per Second^2</td>
<td>6.5</td>
<td>This parameter tells the drive the maximum allowable acceleration and deceleration rate.</td>
</tr>
<tr>
<td>22</td>
<td>Error List Reset</td>
<td>Logic</td>
<td>OFF</td>
<td>This parameter resets the errors in the error list.</td>
</tr>
<tr>
<td>32</td>
<td>Field Sense</td>
<td>Percentage of Full Field</td>
<td>45</td>
<td>This parameter sets the amount of full field current required before allowing the main contactor to pick.</td>
</tr>
<tr>
<td>40</td>
<td>Response</td>
<td>Radians</td>
<td>6.0</td>
<td>This parameter controls the responsiveness of the speed regulator. It sets the band width of the speed regulator. Larger numbers make the system more responsive.</td>
</tr>
<tr>
<td>41</td>
<td>System Inertia</td>
<td>Seconds</td>
<td>2.0</td>
<td>This parameter tells the drive the moment of inertia of the system. See section 7a.4.1 for set up procedure.</td>
</tr>
<tr>
<td>42</td>
<td>Stability</td>
<td>None</td>
<td>1.0</td>
<td>This parameter modifies the response of the speed regulator. Increasing this value compensates for poor adjustment of the System Inertia parameter.</td>
</tr>
<tr>
<td>49</td>
<td>Weak Field Current</td>
<td>Amperes</td>
<td>See Section 7a.3</td>
<td>This parameter sets the amount of current applied to the fields while the car is running in the weak field mode. See Section 7a.3 for proper set up.</td>
</tr>
<tr>
<td>50</td>
<td>Full Field Current</td>
<td>Amperes</td>
<td>From Motor Data</td>
<td>This parameter tells the drive what amount of current the motor fields require during forcing conditions.</td>
</tr>
<tr>
<td>51</td>
<td>Field L/R</td>
<td>Seconds</td>
<td>From Self Tune</td>
<td>This parameter is measured during the self tune. It tells the drive how responsive the fields are to changes in current for proper regulation.</td>
</tr>
<tr>
<td>52</td>
<td>Rated Field Voltage</td>
<td>Volts</td>
<td>From Motor Data</td>
<td>This parameter tells the drive the rated voltage of the motor fields.</td>
</tr>
<tr>
<td>53</td>
<td>Standing Field Current</td>
<td>Amperes</td>
<td>Typically 50% of Parameter 50</td>
<td>This parameter tells the drive what amount of current the motor fields require during standing conditions.</td>
</tr>
<tr>
<td>54</td>
<td>Field Response</td>
<td>Radians</td>
<td>5.0</td>
<td>This parameter controls the responsiveness of the field regulator. Larger numbers make the regulator more responsive.</td>
</tr>
<tr>
<td>55</td>
<td>Field Volts AC</td>
<td>AC Volts</td>
<td>0</td>
<td>This parameter sets the AC input voltage to the motor field supply. Not used.</td>
</tr>
<tr>
<td>#</td>
<td>Parameter Name</td>
<td>Units</td>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>----</td>
<td>-------------------------</td>
<td>-------------------------</td>
<td>----------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>56</td>
<td>Field Strengthening Speed</td>
<td>Percentage of Rated Speed</td>
<td>See Section 7a.3</td>
<td>This parameter controls the point at which the field current will be increased from the weakened value to the full field value.</td>
</tr>
<tr>
<td>57</td>
<td>Field Weakening Speed</td>
<td>Percentage of Rated Speed</td>
<td>See Section 7a.3</td>
<td>This parameter controls the point at which the field current will be decreased from the full field value to the weakened value.</td>
</tr>
<tr>
<td>58</td>
<td>Field Strengthen Rate</td>
<td>Seconds</td>
<td>2.0</td>
<td>This parameter controls the amount of time it takes for the field current to be increased from the weakened value to the full field value.</td>
</tr>
<tr>
<td>59</td>
<td>Field Weaken Rate</td>
<td>Seconds</td>
<td>2.0</td>
<td>This parameter controls the amount of time it takes for the field current to be decreased from the full field value to the weakened value.</td>
</tr>
<tr>
<td>63</td>
<td>Up/Down Bit Pick Up</td>
<td>Percentage of Rated Speed</td>
<td>0.01</td>
<td>This parameter controls the threshold at which the drive turns on the internal bit for up or down motor rotation.</td>
</tr>
<tr>
<td>80</td>
<td>Overspeed Test</td>
<td>Logic</td>
<td>OFF</td>
<td>Used to activate an overspeed multiplier of the speed command. Can be used to overspeed the drive for testing purposes. Refer to Section 10 for testing procedures.</td>
</tr>
<tr>
<td>81</td>
<td>Overspeed Multiplier</td>
<td>None</td>
<td>1.0</td>
<td>Used to multiply the speed command for overspeeding the drive. Can be used to overspeed the drive for testing purposes. Refer to Section 10 for testing procedures.</td>
</tr>
<tr>
<td>82</td>
<td>Reference Multiplier</td>
<td>None</td>
<td>1.428</td>
<td>Used to multiply the speed command. Drive is configured for a standard ±10 volt reference, Microflite Ultra 2000 uses ±7 volts, so speed command needs to be multiplied.</td>
</tr>
<tr>
<td>83</td>
<td>Motor Overload Time Out</td>
<td>Seconds</td>
<td>90</td>
<td>This parameter sets the time component of the motor overload trip curve.</td>
</tr>
<tr>
<td>84</td>
<td>Motor Overload Level</td>
<td>None</td>
<td>1</td>
<td>This parameter sets the current level of the motor overload curve.</td>
</tr>
<tr>
<td>85</td>
<td>Current Decay Ramp</td>
<td>Seconds</td>
<td>0.2</td>
<td>This parameter sets the amount of time it takes to ramp to zero current after stopping the drive.</td>
</tr>
<tr>
<td>86</td>
<td>LPR Delay Time</td>
<td>Seconds</td>
<td>0.3</td>
<td>This parameter sets the amount of time it takes to ramp to zero current after stopping the drive.</td>
</tr>
<tr>
<td>87</td>
<td>Pretorque Multiplier</td>
<td>None</td>
<td>1.42</td>
<td>Used to multiply the pretorque command. Drive is configured for a standard ±10 volt reference, Microflite Ultra 2000 uses ±7 volts, so the command needs to be multiplied.</td>
</tr>
<tr>
<td>95</td>
<td>Analog Output 0</td>
<td>Logic</td>
<td>0</td>
<td>This parameter selects the analog output to monitored at TB1-45. A value of 0 sets the output to the Speed Reference signal.</td>
</tr>
<tr>
<td>96</td>
<td>Analog Output 1</td>
<td>Logic</td>
<td>0</td>
<td>This parameter selects the analog output to monitored at TB1-44. A value of 0 sets the output to the Speed Feedback signal.</td>
</tr>
<tr>
<td>97</td>
<td>Test Point 0 Multiplier</td>
<td>None</td>
<td>0.7</td>
<td>This parameter allows the magnitude of the analog output at TB1-45 to be modified. A value of 0.7 sets the output to be equal to the ±7 volt signal given the drive.</td>
</tr>
<tr>
<td>#</td>
<td>Parameter Name</td>
<td>Units</td>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>----</td>
<td>---------------------------</td>
<td>-----------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>98</td>
<td>Test Point 1 Multiplier</td>
<td>None</td>
<td>0.7</td>
<td>This parameter allows the magnitude of the analog output at TB1-44 to be modified. A value of 0.7 sets the output to be equal to the ( \pm 7 \text{ volt speed reference signal} ) given the drive.</td>
</tr>
<tr>
<td>99</td>
<td>Speed Error Time</td>
<td>Seconds</td>
<td>0.8</td>
<td>This parameter sets the amount of time the speed command will be allowed to vary from the speed feedback before the drive trips on a Speed Error fault.</td>
</tr>
<tr>
<td>100</td>
<td>Speed Error Limit</td>
<td>Percentage of Rated Speed</td>
<td>20.0</td>
<td>This parameter sets the magnitude the speed command will be allowed to vary from the speed feedback before the drive trips on a Speed Error fault.</td>
</tr>
<tr>
<td>101</td>
<td>Auto Fault On</td>
<td>Logic</td>
<td>OFF</td>
<td>This parameter allows the drive to self reset any faults. Set to “OFF” for O. Thompson controls.</td>
</tr>
<tr>
<td>102</td>
<td>3 Second Loop Fault</td>
<td>Logic</td>
<td>1</td>
<td>This parameter sets the sets the time for the Loop Pickup Fault to occur. 0 = 400Msec, 1 = 3 sec.</td>
</tr>
<tr>
<td>104</td>
<td>I Serial Gain Switch</td>
<td>Logic</td>
<td>0</td>
<td>This parameter determines the source of the Gain Reduce function at parameter 108. If set to 0 it is determined by parameter 105, Gain Switch Speed.</td>
</tr>
<tr>
<td>105</td>
<td>Gain Switch Speed</td>
<td>Percentage of Rated Speed</td>
<td>1.0</td>
<td>When parameter 104 is set to 0, this parameter determines at what speed the Gain Reduce function at parameter 108 occurs.</td>
</tr>
<tr>
<td>107</td>
<td>Tach Rate Gain</td>
<td>None</td>
<td>0.0</td>
<td>This parameter sets the gain of the Tach Rate circuit. It should be set to 0, but can be activated if vibration occurs which cannot be tuned out any other way. If activated, it should be kept as low as possible because it will effect the tracking of the system. Contact O.Thompson before activating.</td>
</tr>
<tr>
<td>108</td>
<td>Gain Reduce</td>
<td>None</td>
<td>1.00</td>
<td>If activated, this parameter sets the amount of gain reduction. It is used as an adaptive gain feature to reduce the amount of speed loop gain at higher speeds to eliminate vibration.</td>
</tr>
<tr>
<td>110</td>
<td>Multi-Step Enable</td>
<td>Logic</td>
<td>OFF</td>
<td>This parameter enables the drive’s internal S-curve functions.</td>
</tr>
<tr>
<td>150-164</td>
<td>Not Used</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7a.5.3 Display Parameters

The following parameters are used to display data in the drive. They can be useful for troubleshooting the drive to determine what signals the drive is seeing and the magnitude of the signals. They also allow the drive to be tuned without connecting a meter or Amprobe to the controller.

<table>
<thead>
<tr>
<th>#</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>Car Speed</td>
<td>This parameter displays the present speed of the car. It is derived from parameter 17, Rated Speed based on the speed of the motor. It is not an exact value, but rather the value that the drive thinks the car is moving at.</td>
</tr>
<tr>
<td>601</td>
<td>Motor RPM</td>
<td>This parameter displays the present speed of the motor in RPM. It is exact only if parameter 16, Gearless Ratio, is set correctly and parameter 10, Encoder PPR.</td>
</tr>
<tr>
<td>602</td>
<td>Speed Reference</td>
<td>This parameter displays the speed reference signal in feet per minute to the drive.</td>
</tr>
<tr>
<td>603</td>
<td>Pretorque Reference</td>
<td>This parameter displays the magnitude of the pretorque reference signal to the drive.</td>
</tr>
<tr>
<td>609</td>
<td>Counter EMF</td>
<td>This parameter displays the amount of counter EMF of the motor armature.</td>
</tr>
<tr>
<td>610</td>
<td>Motor Armature Voltage</td>
<td>This parameter displays the present motor armature voltage.</td>
</tr>
<tr>
<td>611</td>
<td>Motor Armature Current</td>
<td>This parameter displays the present motor armature current in amperes.</td>
</tr>
<tr>
<td>612</td>
<td>Motor Field Current</td>
<td>This parameter displays the present amount of motor field current.</td>
</tr>
<tr>
<td>613</td>
<td>Measured Motor Resistance</td>
<td>This parameter displays the measured motor armature resistor. It is measured during the self tune procedure.</td>
</tr>
<tr>
<td>614</td>
<td>Measured Motor Inductance</td>
<td>This parameter displays the measured motor armature inductance. It is measured during the self tune procedure.</td>
</tr>
<tr>
<td>615</td>
<td>Measured Motor Field Time Constant</td>
<td>This parameter displays the measured motor field time constant. It is measured during the self tune procedure.</td>
</tr>
<tr>
<td>616</td>
<td>Speed Error</td>
<td>This parameter displays the amount of speed error the drive is presently seeing.</td>
</tr>
<tr>
<td>617</td>
<td>Line Frequency</td>
<td>This parameter displays the observes frequency of the AC line in Hertz.</td>
</tr>
<tr>
<td>618</td>
<td>Heat Sink Temperature</td>
<td>This parameter displays the observed temperature of the heat sink assembly in degrees C.</td>
</tr>
<tr>
<td>619</td>
<td>AC Line Voltage</td>
<td>This parameter displays the present voltage of the AC line.</td>
</tr>
<tr>
<td>698</td>
<td>Software Version</td>
<td>This parameter displays the version of the software installed in the drive.</td>
</tr>
</tbody>
</table>
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6b.1 Controller Inspection

WARNING:

Read Section 2 and 3 on Personal and Equipment Safety completely before starting this procedure.

Read Section 4 on Piping & Wiring completely before starting this procedure.

Read this section completely before beginning this start up procedure.

Have someone stand by the main line disconnect during the following phases of the start up procedure for added safety:

- First time power on of the controller.
- First time an attempt is made to move the car.

Insure all safety circuits are functional.

Insure all hoistway door interlocks are electrically functional.

Insure car gate circuitry is electrically functional.

Prior to Applying Power:

Verify all circuits are wired to the controller properly.

Check the following items:

- MPU switch down
- INSP switch down
- DDS switch down
- NON/RESET switch down (For troubleshooting purposes)

Note: NON/RESET switch up (When in automatic)

Verify, with an ohmmeter, that the governor overspeed switch and any other devices that are wired in at this time will open the safety circuit.

Physically verify that all hoistway doors are closed and locked.

Verify that the tach or encoder leads are wired to the motor drive system in the appropriate place.

Verify that the main line power supply voltage is the same as the controller order as seen on the prints shipped with the controller.
Verify the following connections between the 15 volt power of the motor drive, the MPU board, and the relay board:

<table>
<thead>
<tr>
<th>On Motor Drive</th>
<th>On MPU Board</th>
<th>Relay Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 15 volts</td>
<td>J9-2</td>
<td>J20-1</td>
</tr>
<tr>
<td>- 15 volts</td>
<td>J9-3</td>
<td>J20-3</td>
</tr>
<tr>
<td>15 volt common</td>
<td>J9-4</td>
<td>J20-2</td>
</tr>
<tr>
<td>Pattern In (+UP)</td>
<td>--------------</td>
<td>J20-7</td>
</tr>
<tr>
<td>Pattern In (-UP)</td>
<td>J7-2</td>
<td>J20-2</td>
</tr>
<tr>
<td>--------------</td>
<td>J7-1</td>
<td>J20-5</td>
</tr>
</tbody>
</table>

6b.2 Power Up the Controller

After powering up the controller for the first time, check the following:

* I, IX, & IY relays should be de-energized. If they are energized, quickly switch the inspection switch on the controller to the opposite position.

* SAF relay is energized on power up. If not, troubleshoot the safety string with a voltmeter.

* REG relay is energized on power up. If not, check to see if the Drive has faulted. Troubleshoot the drive using Section 6.3 in this manual or MagneTek Technical Manual CS 0274.

* DG & DGX relays should be energized. If not, find the open door lock or car gate switch.

* CG & CGX relays should be energized. If not adjust the gate switch on the car so it is closed when the doors are fully closed.

* LIM relay should be energized. Temporarily jump the SF1 and SF2 contacts on the limit board until the board can be set up properly.

* BKA relay should be energized.

* ACC relay should be de-energized. If this relay is energized, the inspection and access switches in the car should be switched to the auto position to allow the car to be run from the controller only.

6b.3 Magnetek HPV 900 AC Vector Drive

Instructions for installing the Magnetek drive can be found in the separate manufacturer’s manual enclosed with the project shipment.

The drive has been modified to meet O. Thompson’s specifications.
6b.3.1 Software Modifications

The following software modifications to the standard MagneTek HPV 900 AC Vector drive are unique to the O. Thompson Microflite Ultra 2000 control.

The major change in the software is the normal speed reference and speed feedback input and output signals. This has been changed to ±7 volts, from the drive standard of ±10 volts.

6b.3.2 Inspection Start Up

1. Before applying power to the controller, confirm that the incoming three phase AC voltage at the main line matches the value on the wiring diagrams on page 3.

2. Confirm that the three leads from the controller to the motor are connected. If there are more than three leads coming out of the motor, make sure that the motor is wired in a delta configuration with correct field rotation, or follow the motor manufacturer’s recommendation.

3. Confirm that the encoder is connected correctly. Refer to the wiring diagrams for proper hook up.

4. Locate the Test sheets which were shipped with the controller. These sheets have the drive parameters that were calculated for your installation.

5. Apply power to the controller.

6b.3.3 Drive Parameters

Before attempting to run the drive, it is necessary to confirm that the parameters are set correctly. Verify that the parameters in the drive match those on the Test sheets.

For information on using the programming unit please refer to page 35 of the Magnetek HPV 900 manual.

The following parameters must be checked to confirm that they are set correctly for your application. Please note that many parameters are not listed, as their default values will not need to be modified or they are not used in this application.

1. Access the **ADJUST A0** menu on the drive.

2. Go to the sub menu, **DRIVE A1**.

3. The first parameter is **CONTRACT CAR SPD**. This parameter is the rated contract speed of the car. Set this to the speed in feet per minute which car is rated for.

4. The next parameter is **CONTRACT MTR SPD**. Set this parameter to the motor RPM which will make the car run at contract speed. This is not the data from the motor nameplate. It programs the speed at which the drive will run the motor when the car is at contract speed.

5. Skip down to the **ENCODER PULSES** parameter. Set this parameter to the PPR (Pulses Per Revolution) the encoder is rated for.
Microflite Ultra 2000 - Magnetek HPV 900 AC Vector Drive

6. Skip down to the SPD COMMAND MULT parameter. This parameter sets the magnitude of analog speed reference used on the drive. The drive is set up to accept a 10 volt command, so a value of 1.42 must be entered here so the car will do contract speed when the speed command is at 7.0 volts.

7. Skip down to the PRE TORQUE MULT parameter. This parameter sets the magnitude of analog pretorque reference used on the drive. The drive is set up to accept a 10 volt command, so a value of 1.42 must be entered here so the car will pretorque correctly with a 7.0 volt reference.

8. Go to the ADJUST A0 menu. Access the POWER CONVERT A4 sub-menu.

9. Go to the INPUT L-L VOLTS parameter. This parameter tells the drive what the input line to line voltage is. This value is used by the drive to declare a low line voltage fault. Set the parameter to the nominal AC voltage at the input to the drive.

10. Go to the ADJUST A0 sub-menu MOTOR A5.

11. Go to the RATED MTR PWR parameter. This parameter tells the drive how many horsepower or kilowatts the motor is rated for. Set this parameter to the value on the nameplate on the motor.

12. Go to the RATED MTR VOLTS parameter. This parameter tells the drive the how many volts the motor is rated for. Set this parameter to the value from the nameplate on the motor.

13. Go to the RATED EXCIT FREQ parameter. This parameter tells the drive the frequency at which the motor is excited to obtain motor nameplate rated RPM. Typically this is 60 Hz. Set this to the value from the motor nameplate or the manufacturer’s data sheet.

14. Go to the RATED MOTOR CURR parameter. This parameter tells the drive the current required by the motor to obtain rated power at rated speed. Set this parameter to the value from the motor nameplate.

15. Go to the MOTOR POLES parameter. This parameter tells the drive how many poles the motor has. To obtain this value, determine the motor’s speed at the rated excitation frequency without any slip.

   The formula is:

   \[ \frac{120 \times \text{Rated Frequency}}{\text{No Slip Motor RPM}} \]

   If you cannot determine the motor speed with zero slip, take the motor nameplate RPM and use it in the formula. Round the number up to the nearest even whole number to determine motor poles.

   Please note that this value must be an even number or a Setup Fault will occur.

16. Go to the RATED MTR SPEED parameter. This parameter tells the drive what speed the motor should be turning when it is excited at its rated frequency and producing rated power. Set this parameter to the value from the motor nameplate or the manufacturer’s data. If this value is not available temporarily set it for the value calculated by the following formula:

   \[ \frac{\text{No Slip Motor RPM}}{.98} \]
Microflite Ultra 2000 - Magnetek HPV 900 AC Vector Drive

The final setting can be calculated by the drive by performing an adaptive tune.

NOTE: This value must be less than 900 RPM on 8 pole motors, 1200 RPM on 6 pole motors, and 1800 RPM on 4 pole motors or a drive set up fault will occur.

17. Go to the % NO LOAD CURR parameter. This parameter tells the drive what current is required to turn the motor at rated speed with no load. This can be determined from the motor manufacturer’s data sheets on new motors. If it is not available, temporarily set it to 60% of the full load current on the motor nameplate. The final setting can be calculated by the drive by performing an adaptive tune on the drive.

6b.3.4 Moving the Car on Inspection

Make sure the controller is on inspection operation. Verify that the hoistway is clear, and the car is ready to be moved.

1. Using the up/dn toggle on the relay board, attempt to run the car by momentarily switching it up. The following relays should energize in this order: U, UX, PX, M, contactor P, & BK.

2. If the motor moves in the opposite direction, using the programmer, access the “Configure C0” menu. Go to “User Switches C1” and change parameter “Motor Rotation” from Forward to Reverse.

3. Run the car again and confirm that the car runs correctly in both directions.

4. Place a digital voltage meter on relay board terminals RJ20-7 (negative) and RJ20-2 (positive). Run the car up on inspection. Adjust pot R17 (Inspection Speed) on the relay board to obtain +0.7 volts.

5. Using a hand tach, measure the car speed. Using the programmer, access the “Adjust A0” menu. Access “User Switches A1.” Adjust the “Contract Motor Spd” parameter until the car is running at 10 percent of contract speed.

6. Adjust the Inspection Speed pot on the relay board to obtain desired inspection speed. If vibration is observed in the motor, especially during acceleration and deceleration, decrease the value of the “Response” parameter in “User Switches A1” menu until the vibration is gone.

7. Using the programmer, access the “Display D1” menu. Monitor parameter “Speed Reference.” Run the car in the down direction. The speed reference should be negative.

8. Monitor parameter “Speed Feedback.” Run the car in the down direction. The speed feedback should be negative. If not, reverse the A and A- signals from the encoder to the drive.

9. Using the Inspection Speed pot on the relay board, set the inspection speed to 45 - 50 FPM.

10. Place the car somewhere near the center of the hoistway. On the Limit board, LED D9 should be turned off. It will come on when the car is on Automatic operation with the doors closed.
11. On the Limit board, press S3 and then press and release S1. Release S3. LED D25 will be blinking rapidly (on 1/8 second, off 1/8 second). Also, the D10, D11, and D17 LED’s will be lit.

12. Run the car up on inspection about 5 feet. With the car running, press and release S3. D10 should turn off. If D11 turns off and D10 stays on this is OK.

13. Run the car down on inspection about 5 feet. With the car running, press and release S3. If D10 turned off in the previous step, D11 will turn off. D25 will now be on continuously, indicating that the Limit board inspection learn procedure was done correctly, and the board is now in normal operation.

6b.3.5 Drive Faults

If a fault occurs in the drive, the Fault LED on the front panel of the drive will illuminate. The MPU will reset the drive as long as the RESET / NON RESET switch on the relay board is in the up, or RESET position.

To access the drive faults, using the hand held programmer, go to the FAULTS F0 menu. This menu has two sub-menus, ACTIVE FAULTS F1 and FAULT HISTORY F2. Use the arrow keys to access the desired menu. If the drive is faulted, ACTIVE FAULTS will display the present fault. FAULT HISTORY will display faults which have occurred.

For a complete list of drive faults, refer to the MagneTek HPV 900 manual.

6b.4 Brake Adjustment (see drawing on following page)

Note:

The brake assembly and all pins should be cleaned thoroughly and all spring tensions set properly to hold 125% of car capacity prior to adjusting the brake driver. Brake shoes should be checked to insure at least 95% surface contact. If spring tensions are changed after this adjustment, the brake driver will need to be completely re-adjusted.

1. Ensure the brake coil has been connected properly to the controller.

2. Connect a meter across the F- and F+ terminals of the drive. Set the meter range high enough to measure the brake lifting voltage level for the job.

3. With no inputs on at the J1 terminal of the drive, the V/I-4 pot will be selected. Adjust the V/I-4 pot fully counterclockwise.

4. Turn the main line power OFF. TEMPORARILY jump from J1-1 to J1-2 on the brake driver.
5. **Turn the main line power ON.** Run the car on inspection and adjust the V/I-1 pot until brake pick voltage required for the job is obtained.

6. **Turn the main line power OFF.** Remove the jumper from the brake driver.

7. **Turn the main line power ON.** Run the car on inspection and wait until the LED over the V/I-2 pot lights. Adjust the V/I-2 pot until approximately 60% brake lifting voltage is obtained or the brake holding voltage previously measured. If the brake drops at this level, stop the car, turn the pot clockwise 1 full turn, and attempt to run the car again.

8. While running the car, turn the inspection speed pot counterclockwise until the car runs at approximately 8-10 fpm. Stop the car.

9. Remove the RL relay.

10. Turn the V/I-3 pot 10 turns counterclockwise, and then 2 turns clockwise.

11. Run the car on inspection and slowly turn the V/I-3 pot clockwise until the car runs through the brake.

**Note:**

_The brake shoes should not lift completely off the drum. If the shoes lift completely off the drum, stop the car. Turn the V/I-3 pot counterclockwise a couple of turns and repeat step 11. If the brake shoes lift completely on re-level, there may be insufficient torque in the hoist motor to assure adequate leveling control._

12. Replace the RL relay.
13. Turn the ACC1 pot fully clockwise. This will allow for a rapid response of the brake regulator from a lower voltage level to a higher voltage level.

14. Turn the DEC1 pot fully clockwise. This will allow for a rapid response of the brake regulator from a higher voltage level to a lower voltage level. This will also help prevent excessive arcing on the contacts of the BK relay.

15. Using the up and down inspections switch on the relay board, adjust pot PXT so that the MA contactor drops approximately 1 to 2 seconds after releasing the switch and the brake sets. Too much time will cause the car to take too long to re-level on automatic operation.

6b.5 MPU Power Up

1. Power Up the MPU. While the MPU is powering up, press the Number 1 button. (Refer to Section 8 of this manual.)

2. Go through all parameter screens to set all parameters applicable to the car. Only enable and set parameters that are applicable to the job.

Note: Pay no attention to the FLOOR LANDING VALUES at this time. These numbers will mean nothing until a learn trip is complete.

3. Write Values to Non-Volatile RAM.
   - Go to “Floor Landing Values” of the main car parameter screen.
   - Select “Get floor values from encoder”.
   - When the enter button is pressed actual numbers starting with 2,000 at the bottom floor and increasing by 2,000 counts per floor should come up.

6b.6 Encoder

6b.6.1 Encoder - Preparation For Learn Trip

Verify that all phases of the encoder installation are complete:
- Tape is installed.
- All door magnets are installed.
- Stick is mounted properly.
- Stick cable is connected to encoder electronics box.
- The U4 terminal limit is wired to J3-6 on the encoder processor board & D4 terminal limit is wired to J3-1 on the encoder processor board.
- IP & IPX from the controller are wired to “J2-1 & J2-4” on the encoder power supply board.
- The IP wire from the controller is wired to J3-2 and J3-5 on the encoder processor board.
- Shielded pair communication cable to the MPU is connected to the encoder board J4 connector. The shield on the cable is taped off at the encoder end.
- Shielded pair communication cable to the Car Station board is connected to the J4 connector on the encoder and the J10 on the Car Station board. The shield on the cable is taped off at the Car Station board end.

6b.6.2 Performing the Learn Trip
1. Move the car into the bottom floor door zone.

2. On the main parameter screen, move the cursor to “Learn Trip, Floor Names, Pre-Torque”. Press the 0 key.

3. Switch the INS switch on the controller up. The I, IX, & IY relays should pick.

4. Move cursor to “Learn Trip” and Press 0.

5. The screen will say “LEARN TRIP (IF YOU ARE SURE PRESS ENTER FOR LEARN TRIP !!!!)”. Press 0.

6. The car will start the learn trip and move up the hoistway at about 24 fpm. It should stop as soon as it reaches the top floor door zone magnet. After reaching the top, the encoder card’s non-volatile memory will be programmed with the position of the magnets in the shaft.

7. The floor values now need to be sent from the encoder’s non volatile memory to the MPU. To do this, go to the FLOOR LANDING VALUES screen. Select “GET FLOOR VALS FROM ENCODER”. When the enter button is pressed, the values will be sent from the encoder to the car’s MPU board.

8. The values sent from the encoder do not take effect unless they are stored to non volatile memory. Go to the main parameter screen and WRITE VALUES TO NONVOLATILE MEMORY.

9. RESET the MPU.
Section 7b High Speed Adjustment - Magnetek HPV 900

7b.1 Final System Checks Prior to High Speed Adjusting

1. Verify that all safety circuits are operative and that each device in the string will prevent the car from starting or continuing to run.

2. Verify that all hoistway door interlocks function properly both electrically and mechanically.

3. Verify that hoistway access circuits function according to your local applicable codes.

4. Verify that the car gate is set and functions properly according to local applicable codes.

5. On inspection, run the car to both extreme limits of travel to insure there is adequate pit and overhead clearance for both the car and counterweight in the event the car or counterweight should go onto their buffers during the initial adjustment process.

6. Verify that the car to counterweight is correctly balanced to no less than 40% and no more than 50% of full rated capacity of the car.

7. Set the up and down directional limits to open when the car is 1" beyond floor level at the top and bottom terminal floors.

8. Set the final limits to open when the car is 6" beyond floor level at the top and bottom terminal floors.

9. Verify the power wiring on the encoder electronics power supply and insure the D8 LED is on continuously on the encoder electronics board.

10. While riding on the car top on inspection, verify as the car travels up past the last top terminal slowdown that the D5 LED on the encoder electronics board turns on. If it does not, check the terminal slowdown wiring to the limit board and to the encoder electronics board.

11. While riding on the car top on inspection, verify as the car travels down past the last bottom terminal slowdown that the D6 LED on the encoder electronics board turns on. If it does not, check the terminal slowdown wiring to the limit board and to the encoder electronics board.
12. Verify that the terminal slowdown limit switches are set according to the tables in Section 8.

13. On the car top, verify that all encoder and pretorque cables are securely plugged in inside the encoder electronics box.

14. On the car top, verify that all thumb screws on the cable from the sensor stick to the encoder electronics box are fastened securely to the boxes at each end.

7b.2 Initial Set Up

1. Place the car in the center of the hoistway. Mark the cables with chalk when the car crosshead and the counterweight crosshead are exactly adjacent to each other.

2. If the controller is not set up for seismic operation, go to step 5.

3. On the monitor, observe the encoder position on the diagnostic screen. Write this value down.

4. Access the car parameters menu. Open the “VIP, MEDICAL, EARTHQUAKE PARAMETERS” page. Program the encoder position recorded in step 3 into the “COUNTERWEIGHT ZONE” parameter. Save this by writing it to the system’s non-volatile memory.

5. Move the car a convenient floor. Place 40% of the car’s rated capacity in the car.

6. On inspection, run the car so it about 10 feet above the center of the hoistway.

7. Place an Amprobe on one of the leads to the motor armature.

8. While observing the display on the Amprobe, run the car down through the center of the hoistway. Write down the amperage displayed while the car passes by the chalk mark on the cables. The value may vary slightly, so average the value if necessary.

9. Place the car about 10 feet below the center of the hoistway.

10. While observing the display on the amprobe, run the car up through the center of the hoistway. Write down the amperage displayed while the car passes by the chalk mark on the cables. The value may vary slightly, so average the value if necessary.

11. Ignoring whether the recorded amperage values were positive or negative, if the value recorded while the car was running up was greater than the value running down, the car is too heavy. Remove 100 pounds of weight from the car and repeat steps 8 through 10 until the recorded values are equal, but of opposite polarity.

12. Ignoring whether the recorded values were positive or negative, if the value recorded while the car was running down was greater than the value running up, the car is too light. Add 100 pounds of weight from the car and repeat steps 8 through 10 until the recorded values are equal, but of opposite polarity.

13. When the values are equal, but of opposite polarity, the car is balanced. Check how much weight is in the car. It should be between 40 and 50% of the car’s rated capacity. If not, the counterweighting needs to be adjusted. If the car is too heavy, weight needs to be added to the counterweight to get the car balanced between 40 and 50% of the...
Microflite Ultra 2000 - Magnetek HPV 900 AC Vector Drive

car’s rated capacity. If the car is too light, weight needs to be removed from the counterweight to get it balanced between 40 and 50% of the car’s rated capacity.

14. After the appropriate adjustments are made to the counterweight, repeat steps 10 through 12 until balanced load is in the car. Leave the weights in the car at this time.

15. Place a TEMPORARY jumper on Limit board terminal SF1 and SF2 (J5 connector).

16. Place a TEMPORARY jumper on Limit board terminal SF3 and SF4 (J6 connector).

17. Unplug Limit board connectors J3 and J7 from the board.

18. Install a TEMPORARY jumper from J3-1 to J7-1.

19. Install a TEMPORARY jumper from J3-2 to J7-2.

7b.2.1 One Floor Up & Down

Make a one floor run up and a one floor run down in the middle of the hoistway. Referring to Section 11.7 - Parameters, adjust the motion parameters to get desired ride. Check for the same speed both up and down.

Note: Stay away from terminal floors.

7b.2.2 Two Floor Up & Down

Make a two floor run up and a two floor run down in the middle of the hoistway. Referring to Section 11.7 - Parameters, adjust the motion parameters to get desired ride. Check for the same speed both up and down.

Note: Stay away from terminal floors.

7b.2.3 Multi-Floor Up & Down

Make a multi-floor run up and a multi-floor run down in the middle of the hoistway. Referring to Section 11.7 - Parameters, adjust the motion parameters to get desired ride. Check for the same speed both up and down. Continue making multi-floor runs until the system demands contract speed.

Note: Stay away from terminal floors.

Note: The actual speed of the car may not reach contract speed. Do not change any parameters to make the car go contract speed. This will be adjusted next.

7b.3 High Speed Adjustment - Magnetek HPV 900 AC Vector Drive

1. Place a digital volt meter on relay board terminals RJ20-7 (positive) to RJ20-7 (negative).

2. Run the car from the bottom floor to the top floor. Verify that the speed reference signal to the drive is +7.00 volts when at full speed. If not, adjust pot R25 on the MPU board to obtain +7.00 volts.
Microflite Ultra 2000 - Magnetek HPV 900 AC Vector Drive

3. Run the car from the top floor to the bottom floor. Observe the meter. The voltage should be -7.00 volts. If not, adjust MPU pot R28 to obtain an equal voltage, but of opposite polarity, while the car is running up and down.

Note: It may be easier to adjust the R28 pot while the car is in leveling speed. TEMPORARILY set the “ADVANCE COUNTS” parameter in the motion parameter screen to 90. Run the car and adjust R28 to obtain the same speed reference but opposite polarity while the car is leveling up and down.

4. If pot R28 was changed, it will be necessary to adjust pot R25 again. Verify that the voltage to the drive is +7.00 volts in the up direction, and -7.00 volts in the down.

5. Observe the diagnostic screen on the monitor. Check that the actual car speed as shown on the monitor is contract speed of the car. If not, adjust the CONTRACT MTR SPD parameter to obtain as close contract speed as possible.

The car should now be running at contract speed. Some minor modifications may be necessary to obtain the best ride from the car. If an adaptive tune is required, it must be performed at this time.

7b.4 HPV 900 Adaptive Tune

If the motor to which the drive is connected is an old motor and no data is available for it, an adaptive tune must be performed. The adaptive tune requires that the car is run at contract speed and is capable of lifting full load.

1. Select the “Default Motor” option for the Motor ID parameter. This will load default values into the motor data parameters to prepare the drive for the adaptive tune.

2. Enter the following motor data into the drive:
   a. Motor HP or kW from nameplate into “RATED MTR POWER.”
   b. Motor AC voltage from nameplate into “RATED MTR VOLTS.”
   c. Motor AC frequency (usually 60 cycles) into “RATED EXIT FREQ.”
   d. Motor nameplate full load amps into “RATED MTR CURR.”
   e. The number of motor poles into “MOTOR POLES.”
   f. Motor RPM with full load at the correct frequency into “RATED MTR SPEED.”

NOTE: The Motor RPM value must be less than 900 for 8 pole motors, 1200 for 6 pole motors, and 1800 for 4 pole motors or a drive fault will occur. The motor nameplate may not be correct.

3. Place a balanced load into the car. Reduce the car speed to 70% of contract speed. To do this, adjust pot R25 on the MPU so 4.9 volts is present at relay board terminals RJ20-7 (positive) to RJ20-7 (negative).

4. Run the car from top to bottom and back. While the car is running, monitor the MOTOR TORQUE (found under Display Menu – Power Data D2). The torque should be between + 15%. If not, verify that the car is balanced correctly.

Note: If the car does not have compensation, the motor torque will vary depending on where in the hoistway the car is. Verify that the motor torque is between ± 15% as the car passes through the center of the hoistway.
Microflite Ultra 2000 - Magnetek HPV 900 AC Vector Drive

5. Verify that the FLUX REFERENCE (found under Display Menu – Power Data D2) is 100%. If not, reduce the car speed until it is.

6. With the car running from top to bottom and back, observe EST NO LOAD CURR (found under Display Menu – Power Data D2). Enter this estimated value into the parameter % NO LOAD CURR.

7. Repeat steps 5 and 6 until the value of the EST NO LOAD CURR and the % NO LOAD CURR are equal.

8. Verify that the motor torque is still ± 15% and flux reference is still 100%. If not, adjust accordingly and adjust the %NO LOAD CURR as needed.

9. Increase the car speed to 100% of contract speed. To do this, re-adjust MPU pot R25 so 7.00 volts is present at relay board terminals RJ20-7 (positive) to RJ20-7 (negative) when contract speed is demanded.

10. With balanced load still in the car, run the car from top to bottom and back. While the car is running, observe EST NO LOAD CURR (found under Display Menu – Power Data D2). Compare this value to the value found under %NO LOAD CURR (found under Adjust Menu – Motor M5).

11. If the EST NO LOAD CURR value is 2% larger than the %NO LOAD CURR then increase FLUX SAT SLOPE 2 by 10%. If the EST NO LOAD CURR and %NO LOAD CURR values are within 2%, continue to step 12.

12. Repeat steps 10 and 11 until EST NO LOAD CURR and %NO LOAD CURR are within 2%.

13. Place full load in the car. Run the car at contract speed from top to bottom and back.

14. Observe EST RATED RPM (found under Display Menu – Power Data D2).

15. Enter this value into RATED MTR SPEED (found under Adjust Menu – Motor M5).

16. Remove full load from the car and place balanced load in it. Run the car from bottom to top and back.

17. Observe EST INERTIA (found under Display Menu – Elevator Data D1). Write down the value for up and down.

18. Average the up and down values of EST INERTIA. Enter this value into INERTIA (found under Adjust Menu – Drive A1).

7b.5 Ride Quality Adjustments

1. If an Adaptive Tune was not required, it is now necessary to determine the system’s inertia. Access the EST INERTIA parameter in the drive (found under Display Menu – Elevator Data D1). If the Adaptive Tune was performed, go to step 4.

2. With balanced load still in the car, make a high speed run up and down. Average the up and down values of EST INERTIA.

3. Enter the value calculated in the previous step into INERTIA (found under Adjust Menu...
4. Ride the car up and down, staying away from the terminal floors. Observe the ride. There should be no vibration at any point. If vibration is present, try adjusting the RESPONSE parameter under ADJUST A0, DRIVE A1 to a slightly lower value.

5. Make any final changes to the motion parameters to obtain the desired ride.

6. Remove all weights from the car. Staying away from the terminal floors, make one, two and multi-floor runs up and down.

7. Add weight to the car, approximately 100 pounds at a time. Staying away from the terminal floors, observe one, two, and multi floor runs to be sure that the car rides well under all load conditions. Keep adding weight until the car has full load, less the weight of anyone riding the car.

8. Remove all jumpers from the Limit board and re-install all connectors.

9. Go to Section 8 of this manual and perform a learn procedure for the Limit board.

7b.6 Drive Reference Information

7b.6.1 Using the Programmer

The hand held programmer comes standard on the HPV 900 drive. It is used to program the drive and display data from the drive to facilitate tuning and troubleshooting.

There are three menu levels in the drive. They are the Menu level, the Sub-menu level, and the Entry level. There are five keys on the front of the programmer. These keys perform different function, depending at what menu level the programmer is at.

When the programmer is at the Main Menu level, the left and right arrows move the programmer between the Main Menu selections. The up and down keys move the programmer into the various Sub-Menus at each Main Menu selection. Pressing the “Enter” key will move the programmer into the Sub-Menu currently displayed on the programmer.

When the programmer is at the Sub-Menu level the up and down arrows display various parameters in the Sub-Menu. Pressing the “Escape” key will move the programmer back to the Main Menu level. Pressing the “Enter” key while at the Sub-Menu level moves the programmer into the Entry level to modify the displayed parameter.

At the Entry level, the left and right arrows move a cursor to highlight data. When a digit is highlighted, pressing the up arrow will increase the value, and pressing the down arrow will decrease it. Pressing the “Enter” key will save the value displayed on the programmer. Pressing the “Escape” key will move the programmer back to the Sub-Menu level.
### 7b.6.2 Drive Parameters

The following is a list of the parameters in the drive. Also included are an explanation of the parameter and how it should be set. Refer to Section 6b.3.3 for the initial programming of the drive.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract Car Speed</td>
<td>Feet per Minute</td>
<td>Contract Speed</td>
<td>This parameter tells the drive what the rated speed of the car is. It is used to display the speed of the car and the speed command in FPM at the Elevator Data D1 menu.</td>
</tr>
<tr>
<td>Contract Mtr Speed</td>
<td>Revolutions per Minute</td>
<td>Motor RPM at Contract Speed</td>
<td>This parameter tells the drive the RPM the motor should be turning when the car is turning at rated speed.</td>
</tr>
<tr>
<td>Response</td>
<td>Radians</td>
<td>10.0</td>
<td>This parameter controls the responsiveness of the speed regulator. It sets the band width of the speed regulator. Larger numbers make the system more responsive.</td>
</tr>
<tr>
<td>Inertia</td>
<td>Seconds</td>
<td>2.0</td>
<td>This parameter tells the drive the moment of inertia of the system. See section 7b.5 for set up procedure.</td>
</tr>
<tr>
<td>Inner Loop XOver</td>
<td>Radian per Second</td>
<td>2.00</td>
<td>This parameter controls the frequency of the inner speed loop crossover in the speed regulator.</td>
</tr>
<tr>
<td>Gain Reduce Mult</td>
<td>Percentage of Gain</td>
<td>100</td>
<td>This parameter sets the amount of gain for the speed regulator to use in the Gain Reduce mode. It is a percentage, and modifies the Response parameter.</td>
</tr>
<tr>
<td>Gain Chng Level</td>
<td>Percentage of Rated Speed</td>
<td>0.00</td>
<td>This parameter sets the speed at which the Gain Reduce mode becomes active.</td>
</tr>
<tr>
<td>Tach Rate Gain</td>
<td>None</td>
<td>0.00</td>
<td>This parameter is controls the Tach Rate Gain function. It should not be used except to tune out vibrations which cannot be removed by any other means. <strong>Contact O. Thompson before activating.</strong></td>
</tr>
<tr>
<td>Spd Phase Margin</td>
<td>Degrees</td>
<td>80.0</td>
<td>This parameter sets the phase margin of the speed regulator, assuming a pure inertial load.</td>
</tr>
<tr>
<td>Ramped Stop Time</td>
<td>Seconds</td>
<td>0.20</td>
<td>This parameter sets the ramp down of the motor torque after the drive is stopped.</td>
</tr>
<tr>
<td>Contact Fault Time</td>
<td>Seconds</td>
<td>0.50</td>
<td>This parameter sets the maximum amount of time the drive will wait for the main contactor’s auxiliary contact before declaring a Contactor Fault.</td>
</tr>
<tr>
<td>Brake Pick Time</td>
<td>Seconds</td>
<td>1.00</td>
<td>If the Brake Pick fault is enabled, this parameter sets the maximum amount of time the drive will wait for the brake’s contactor’s auxiliary contact before declaring a Brake Pick Fault. Not activated on O. Thompson controls.</td>
</tr>
<tr>
<td>Brake Hold Time</td>
<td>Seconds</td>
<td>0.20</td>
<td>If the Brake Hold fault is enabled, this parameter sets the maximum amount of time the drive will wait for the brake’s brake hold feedback to match the brake pick command before declaring a Brake Hold Fault. Not activated on O. Thompson controls.</td>
</tr>
<tr>
<td>Overspeed Level</td>
<td>Percentage of Rated Speed</td>
<td>115</td>
<td>This parameter sets the speed level at which an Overspeed fault is declared. Set in conjunction with Overspeed Time.</td>
</tr>
<tr>
<td>Overspeed Time</td>
<td>Seconds</td>
<td>1.00</td>
<td>The amount of time the overspeed condition must exist before an Overspeed fault is declared. Set in conjunction with Overspeed Level.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Units</td>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------</td>
<td>-------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Overspeed Mult</td>
<td>Percentage of Rated Speed</td>
<td>125</td>
<td>This parameter sets the percentage of rated speed for the Overspeed Test at the User Switches C1 menu.</td>
</tr>
<tr>
<td>Encoder Pulses</td>
<td>Pulses per Revolution</td>
<td>From Encoder Data</td>
<td>This parameter tells the drive the PPR value of the encoder. It is used to determine the speed at which the motor is turning.</td>
</tr>
<tr>
<td>Spd Dev Lo Level</td>
<td>Percentage of Rated Speed</td>
<td>10.0</td>
<td>This parameter sets the amount of speed deviation underflow allowed before declaring a Speed Deviation fault. Set in conjunction with Spd Dev Time.</td>
</tr>
<tr>
<td>Spd Dev Time</td>
<td>Seconds</td>
<td>0.50</td>
<td>This parameter sets the amount of time the allowed for speed deviation level to be exceeded before declaring a Speed Deviation fault.</td>
</tr>
<tr>
<td>Spd Dev Hi Level</td>
<td>Percentage of Rated Speed</td>
<td>10.0</td>
<td>This parameter sets the amount of speed deviation exceeding the demanded velocity allowed before declaring a Speed Deviation fault.</td>
</tr>
<tr>
<td>Spd Command Bias</td>
<td>Volts</td>
<td>0.00</td>
<td>This parameter subtracts a voltage from the speed command signal. Not used on O. Thompson controls.</td>
</tr>
<tr>
<td>Spd Command Mult</td>
<td>None</td>
<td>1.43</td>
<td>Used to multiply the speed command. Drive is configured for a standard ±10 volt reference, Microflite Ultra 2000 uses ±7 volts, so speed command needs to be multiplied.</td>
</tr>
<tr>
<td>Pre Torque Bias</td>
<td>Volts</td>
<td>0.00</td>
<td>This parameter subtracts a voltage from the pretorque signal. Not used on O. Thompson controls.</td>
</tr>
<tr>
<td>Pre Torque Mult</td>
<td>None</td>
<td>1.43</td>
<td>Used to multiply the pretorque signal. Drive is configured for a standard ±10 volt reference, Microflite Ultra 2000 uses ±7 volts, so the pretorque signal needs to be multiplied.</td>
</tr>
<tr>
<td>Zero Speed Level</td>
<td>Percentage of Rated Speed</td>
<td>1.00</td>
<td>This parameter sets the threshold for zero speed detection. It is only used to generate the Zero Speed output, not used on O. Thompson controls.</td>
</tr>
<tr>
<td>Zero Speed Time</td>
<td>Seconds</td>
<td>0.10</td>
<td>This parameter sets the amount of time required before turning on the Zero Speed output. Not used on O. Thompson controls.</td>
</tr>
<tr>
<td>Up/Down Threshold</td>
<td>Percentage of Rated Speed</td>
<td>1.00</td>
<td>This parameter sets the threshold for up and down speed detection. It is only used to generate the Car Going Up and Car Going Down outputs. Not used on O. Thompson controls.</td>
</tr>
<tr>
<td>Mtr Torque Limit</td>
<td>Percentage of Rated Torque</td>
<td>200</td>
<td>This parameter sets the maximum of torque allowed while in the forward motoring mode.</td>
</tr>
<tr>
<td>Regen Torq Limit</td>
<td>Percentage of Rated Torque</td>
<td>200</td>
<td>This parameter sets the maximum of torque allowed while in the regenerative motoring mode.</td>
</tr>
<tr>
<td>Flux Wkn Factor</td>
<td>Percentage of Torque Limit</td>
<td>100</td>
<td>This parameter limits the maximum amount of torque at higher speeds.</td>
</tr>
<tr>
<td>Ana Out 1 Offset</td>
<td>Percentage</td>
<td>0.00</td>
<td>This parameter sets an offset for scaling the output voltage of Analog output 1. 0.00 sets no offset, making the output bi-polar.</td>
</tr>
<tr>
<td>Ana Out 2 Offset</td>
<td>Percentage</td>
<td>0.00</td>
<td>This parameter sets an offset for scaling the output voltage of Analog output 2. 0.00 sets no offset, making the output bi-polar.</td>
</tr>
<tr>
<td>Ana Out 1 Gain</td>
<td>None</td>
<td>0.70</td>
<td>This parameter sets a gain for the scaling of the voltage output at Analog Output 1. A value of 0.70 allows the speed command to be set to ±7 volts at rated speed.</td>
</tr>
<tr>
<td>Ana Out 2 Gain</td>
<td>None</td>
<td>0.70</td>
<td>This parameter sets a gain for the scaling of the voltage output at Analog Output 2. A value of 0.70 allows the speed feedback to be set to ±7 volts at rated speed.</td>
</tr>
<tr>
<td>Flt Reset Delay</td>
<td>Seconds</td>
<td>5.00</td>
<td>When the drive is set for automatic resets, this parameter sets the amount of time for the drive to wait before resetting a fault. Not Used on O. Thompson controls.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Units</td>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Fault Reset/Hour</td>
<td>Faults</td>
<td>3</td>
<td>When the drive is set for automatic resets, this parameter sets the maximum amount of times in a one hour period the drive will reset a fault. Not Used on O. Thompson controls.</td>
</tr>
<tr>
<td><strong>Adjust A0</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S-Curves A2</td>
<td></td>
<td></td>
<td>Not Used</td>
</tr>
<tr>
<td><strong>Adjust A0</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multistep Ref A3</td>
<td></td>
<td></td>
<td>Not Used</td>
</tr>
<tr>
<td><strong>Adjust A0</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Convert A4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Id Reg Diff Gain</td>
<td>None</td>
<td>1.00</td>
<td>This parameter sets differential gain of the current regulator flux generation.</td>
</tr>
<tr>
<td>Id Reg Prop Gain</td>
<td>None</td>
<td>0.30</td>
<td>This parameter sets proportional gain of the current regulator flux generation.</td>
</tr>
<tr>
<td>Iq Reg Diff Gain</td>
<td>None</td>
<td>1.00</td>
<td>This parameter sets differential gain of the current regulation of motor torque.</td>
</tr>
<tr>
<td>Iq Reg Prop Gain</td>
<td>None</td>
<td>0.30</td>
<td>This parameter sets proportional gain of the current regulation of motor torque.</td>
</tr>
<tr>
<td>PWM Frequency</td>
<td>kHz</td>
<td>10</td>
<td>This parameter sets the PWM, or carrier frequency of the drive. It can be adjusted to tune out audible noise in the motor. If the number is increased the drive may need to be de-rated. Please contact O. Thompson if it is necessary to increase this value.</td>
</tr>
<tr>
<td>UV Alarm Level</td>
<td>Percentage of Nominal Voltage</td>
<td>90.0</td>
<td>This parameter sets the level at which an Under Voltage alarm is declared.</td>
</tr>
<tr>
<td>UV Fault Level</td>
<td>Percentage of Nominal Voltage</td>
<td>80.0</td>
<td>This parameter sets the level at which an Under Voltage fault is declared.</td>
</tr>
<tr>
<td>Extern Reactance</td>
<td>Percentage of Reactance</td>
<td>0.00</td>
<td>This parameter sets the value of the reactor connected between the drive and the motor. Set as a percentage of base impedance.</td>
</tr>
<tr>
<td>Input L-L Volts</td>
<td>AC Volts</td>
<td>From AC Line</td>
<td>This parameter tells the drive what the input voltage should be.</td>
</tr>
</tbody>
</table>
### Adjust A0

#### Motor A5

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor ID</td>
<td>None</td>
<td>Default Motor</td>
<td>This parameter programs specific values for various motor parameters. The Default Motor selection requires various values to be entered for these parameters.</td>
</tr>
<tr>
<td>Rated Mtr Power</td>
<td>Horse Power or Kilowatts</td>
<td>From Motor Nameplate</td>
<td>This parameter tells the drive what horsepower or kilowatts the motor is rated for.</td>
</tr>
<tr>
<td>Rated Mtr Volts</td>
<td>AC Volts</td>
<td>From Motor Nameplate</td>
<td>This parameter tells the drive what the rated voltage of the motor is.</td>
</tr>
<tr>
<td>Rated Excit Freq</td>
<td>Hertz</td>
<td>From Motor Nameplate</td>
<td>This parameter tells the drive what the rated excitation frequency of the motor is. Typically 60.</td>
</tr>
<tr>
<td>Rated Motor Current</td>
<td>Amperes</td>
<td>From Motor Nameplate</td>
<td>This parameter tells the drive what the rated current of the motor is.</td>
</tr>
<tr>
<td>Motor Poles</td>
<td>None</td>
<td>From Motor Data</td>
<td>This parameter tells the drive how many poles the motor has. The formula is: [(120 \times \text{Rated Frequency}) / \text{No Slip Motor RPM}].</td>
</tr>
<tr>
<td>Rated Motor Speed</td>
<td>Revolutions per Minute</td>
<td>From Motor Data or Adaptive Tune</td>
<td>This parameter tells the drive what speed the motor should be turning when it is excited at its rated frequency and producing rated power. <strong>This value must be less than 900 RPM on 8 pole motors, 1200 RPM on 6 pole motors, and 1800 RPM on 4 pole motors or a drive set up fault will occur.</strong></td>
</tr>
<tr>
<td>% No Load Current</td>
<td>Percentage of Rated Current</td>
<td>From Adaptive Tune</td>
<td>This parameter tells the drive what current is required to run the motor at rated speed with no load on the motor. Calculated during the Adaptive Tune.</td>
</tr>
<tr>
<td>Stator Leakage X</td>
<td>Percentage Reactance of Base Impedance</td>
<td>9.00</td>
<td>This parameter sets the stator reactance leakage as a percentage of base impedance. Base impedance is based on parameters Rated Mtr Pwr and Rated Mtr Volts.</td>
</tr>
<tr>
<td>Rotor Leakage X</td>
<td>Percentage Reactance of Base Impedance</td>
<td>9.00</td>
<td>This parameter sets the rotor reactance leakage as a percentage of base impedance. Base impedance is based on parameters Rated Mtr Pwr and Rated Mtr Volts.</td>
</tr>
<tr>
<td>Stator Resist</td>
<td>Percentage Resistance of Base Impedance</td>
<td>1.30</td>
<td>This parameter sets the amount of resistance in the motor stator as a percentage of base impedance. Base impedance is based on parameters Rated Mtr Pwr and Rated Mtr Volts.</td>
</tr>
<tr>
<td>Motor Iron Loss</td>
<td>Percentage of Rated Power</td>
<td>0.50</td>
<td>This parameter sets the motor iron loss at the rated frequency of the motor.</td>
</tr>
<tr>
<td>Motor Mech Loss</td>
<td>Percentage of Rated Power</td>
<td>1.00</td>
<td>This parameter sets the motor mechanical losses at the rated frequency of the motor.</td>
</tr>
<tr>
<td>Ovld Start Level</td>
<td>Percentage of Rated Current</td>
<td>110</td>
<td>This parameter sets the current level that the motor will be allowed to run at continuously. It also defines the current component of the motor overload curve.</td>
</tr>
<tr>
<td>Ovld Time Out</td>
<td>Seconds</td>
<td>60.0</td>
<td>This parameter sets the amount of time before a motor overload trip occurs. Formula is: [(\text{Ovld Start Level}) + (40% \text{Rated Motor Current})].</td>
</tr>
<tr>
<td>Flux Sat Break</td>
<td>Percentage of Flux</td>
<td>75.0</td>
<td>This parameter sets the flux saturation curve slope change point.</td>
</tr>
<tr>
<td>Flux Sat Slope 1</td>
<td>Slope</td>
<td>0.00</td>
<td>This parameter sets the flux saturation curve for low flux conditions.</td>
</tr>
<tr>
<td>Flux Sat Slope 2</td>
<td>Slope</td>
<td>50.0</td>
<td>This parameter sets the flux saturation curve for high flux conditions.</td>
</tr>
</tbody>
</table>
## Configure C0

### User Switches C1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spd Command Src</td>
<td>Logic</td>
<td>Analog Input</td>
<td>This parameter sets source of the speed command. Microflite Ultra 2000 uses an analog input.</td>
</tr>
<tr>
<td>Run Command Src</td>
<td>Logic</td>
<td>External TB1</td>
<td>This parameter sets source of the run command. Microflite Ultra 2000 uses an input at TB1-2.</td>
</tr>
<tr>
<td>Hi/Lo Gain Src</td>
<td>Logic</td>
<td>Internal</td>
<td>This parameter sets source of the Gain Switch. Microflite Ultra 2000 uses the internal activation based on car speed.</td>
</tr>
<tr>
<td>Speed Reg Type</td>
<td>Logic</td>
<td>Elev Spd Reg</td>
<td>This parameter defines which type of speed regulator to use.</td>
</tr>
<tr>
<td>Motor Rotation</td>
<td>Logic</td>
<td>Forward</td>
<td>This parameter allows the motor rotation to be reversed.</td>
</tr>
<tr>
<td>Spd Ref Release</td>
<td>Logic</td>
<td>Reg Release</td>
<td>This parameter tells the drive when to release the Speed Reference. Reg Release sets it release when the Speed Regulator is released.</td>
</tr>
<tr>
<td>Contact Confirm Src</td>
<td>Logic</td>
<td>External TB1</td>
<td>This parameter sets source of the pretorque signal. Microflite Ultra 2000 uses an input at TB1-9.</td>
</tr>
<tr>
<td>Pre Torque Src</td>
<td>Logic</td>
<td>Analog Input</td>
<td>This parameter determines if the pretorque signal is latched. It must be set to “Latched” for Microflite Ultra 2000 controllers.</td>
</tr>
<tr>
<td>Pre Torque Latch</td>
<td>Logic</td>
<td>Latched</td>
<td>If the Pre Torque Latch parameter is set to “Latched” this parameter determines the source of the latch. It must be set to “External TB1”</td>
</tr>
<tr>
<td>Ptorq Latch Click</td>
<td>Logic</td>
<td>External TB1</td>
<td>If the Pre Torque Latch parameter is set to “Latched” this parameter determines the source of the latch. It must be set to “External TB1”</td>
</tr>
<tr>
<td>Fault Reset Src</td>
<td>Logic</td>
<td>External TB1</td>
<td>This parameter determines the source of the fault reset signal. It must be set to “External TB1” for Microflite Ultra 2000 controllers.</td>
</tr>
<tr>
<td>Overspd Test Src</td>
<td>Logic</td>
<td>External TB1</td>
<td>This parameter determines the source of the overspeed test. It must be set to “External TB1” for Microflite Ultra 2000 controllers.</td>
</tr>
<tr>
<td>Brake Pick Src</td>
<td>Logic</td>
<td>Internal</td>
<td>This parameter allows the Speed Reference to be released without an external brake input. It must be set to “none” for Microflite Ultra 2000 controllers.</td>
</tr>
<tr>
<td>Brake Pick Cnfm</td>
<td>Logic</td>
<td>None</td>
<td>This parameter allows the drive to hold the car stopped through the Brake Pick output. It must be set to “Internal” for Microflite Ultra 2000 controllers.</td>
</tr>
<tr>
<td>Brake Hold Src</td>
<td>Logic</td>
<td>Internal</td>
<td>This parameter allows the drive to use torque ramp down based on the parameter Stop Time and Ramp Down En Src.</td>
</tr>
<tr>
<td>Ramp Speed Sel</td>
<td>Logic</td>
<td>Ramp on Stop</td>
<td>This parameter allows the drive to ramp down the motor torque when the run command is removed.</td>
</tr>
<tr>
<td>Ramp Down En Src</td>
<td>Logic</td>
<td>Run Logic</td>
<td>This parameter allows the drive to use torque ramp down based on the parameter Stop Time and Ramp Down En Src.</td>
</tr>
<tr>
<td>Brake Pick Flt Ena</td>
<td>Logic</td>
<td>Disable</td>
<td>This parameter disables the Brake Pick fault. It must be set to “Disable” on Microflite Ultra 2000 controllers.</td>
</tr>
<tr>
<td>Brake Hold Flt Ena</td>
<td>Logic</td>
<td>Disable</td>
<td>This parameter disables the Brake Hold fault. It must be set to “Disable” on Microflite Ultra 2000 controllers.</td>
</tr>
</tbody>
</table>
### Configure C0

#### Logic Inputs C2

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logic In 1 TB1-1</td>
<td>Logic</td>
<td>Drive Enable</td>
<td>Sets this input to turn on drive enable.</td>
</tr>
<tr>
<td>Logic In 2 TB1-2</td>
<td>Logic</td>
<td>Run</td>
<td>Sets this input enable the run command.</td>
</tr>
<tr>
<td>Logic In 3 TB1-3</td>
<td>Logic</td>
<td>Fault Reset</td>
<td>Sets this input to reset a drive fault.</td>
</tr>
<tr>
<td>Logic In 4 TB1-4</td>
<td>Logic</td>
<td>Pre Torque Latch</td>
<td>Sets this input to enable pretorque.</td>
</tr>
<tr>
<td>Logic In 5 TB1-5</td>
<td>Logic</td>
<td>No Function</td>
<td>No function assigned to this input.</td>
</tr>
<tr>
<td>Logic In 6 TB1-6</td>
<td>Logic</td>
<td>No Function</td>
<td>No function assigned to this input.</td>
</tr>
<tr>
<td>Logic In 7 TB1-7</td>
<td>Logic</td>
<td>No Function</td>
<td>No function assigned to this input.</td>
</tr>
<tr>
<td>Logic In 8 TB1-8</td>
<td>Logic</td>
<td>No Function</td>
<td>No function assigned to this input.</td>
</tr>
<tr>
<td>Logic In 9 TB1-9</td>
<td>Logic</td>
<td>Contact Confirm</td>
<td>Sets this input to confirm the main contactor is picked.</td>
</tr>
</tbody>
</table>

#### Logic Outputs C3

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Out 1 TB1-14</td>
<td>Logic</td>
<td>Ready to Run</td>
<td>This function is turned on when the drive is ready to run and no faults are present.</td>
</tr>
<tr>
<td>Log Out 2 TB1-15</td>
<td>Logic</td>
<td>Run Commanded</td>
<td>This function is turned on when the drive is commanded to run.</td>
</tr>
<tr>
<td>Log Out 3 TB1-16</td>
<td>Logic</td>
<td>Mtr Overload</td>
<td>This function is turned on when a motor overload has been detected.</td>
</tr>
<tr>
<td>Log Out 4 TB1-17</td>
<td>Logic</td>
<td>Encoder Flt</td>
<td>This function is turned on when an encoder fault has been detected.</td>
</tr>
<tr>
<td>Relay Coil 1</td>
<td>Logic</td>
<td>Ready to Run</td>
<td>This relay is picked when the drive is ready to run and no faults are present.</td>
</tr>
<tr>
<td>Relay Coil 2</td>
<td>Logic</td>
<td>Close Contact</td>
<td>This function turns on the output when the drive is enabled, commanded to run and no faults are present.</td>
</tr>
</tbody>
</table>

#### Logic Outputs C3

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ana Out 1 TB1-33</td>
<td>Logic</td>
<td>Speed Ref</td>
<td>This function sets the analog output to monitor the speed reference.</td>
</tr>
<tr>
<td>Ana Out 2 TB1-35</td>
<td>Logic</td>
<td>Speed Feedbk</td>
<td>This function sets the analog output to monitor the speed feedback.</td>
</tr>
</tbody>
</table>
### Display D0
#### Elevator Data D1

| Parameter         | Units               | Description                                                                 |
|-------------------|---------------------|                                                                            |
| Speed Command     | Feet per Minute     | This parameter displays the command before the speed reference generator.  |
| Speed Reference   | Feet per Minute     | This parameter displays the speed reference after the speed reference generator. |
| Speed Feedback    | Feet per Minute     | This parameter displays the encoder feedback.                            |
| Speed Error       | Feet per Minute     | This parameter displays the speed error.                                 |
| Pre Torque Ref    | Percentage of Rated Torque | This parameter displays the pretorque reference.                              |
| Spd Reg Torq Cmd  | Percentage of Rated Torque | This parameter displays the torque command from the speed regulator.            |
| Tach Rate Cmd     | Percentage of Rated Torque | This parameter displays the torque command after the tach rate gain function.  |
| Aux Torq Cmd      | Percentage of Rated Torque | This parameter displays the feed forward torque command from auxiliary source. |
| Est Inertia       | Seconds             | This parameter displays the estimated elevator system inertia.             |

### Display D0
#### Power Data D2

| Parameter         | Units             | Description                                                                 |
|-------------------|-------------------|                                                                            |
| Torque Reference  | Percentage of Rated Torque | This parameter displays the torque reference used by the vector control.  |
| Motor Current     | Amperes           | This parameter displays RMS motor current.                                |
| % Motor Current   | Percentage of Rated Current | This parameter displays percentage of motor current.                      |
| Motor Voltage     | AC Volts          | This parameter displays the RMS motor voltage.                            |
| Motor Frequency   | Hertz             | This parameter displays the electrical frequency output.                  |
| Motor Torque      | Percentage of Rated Torque | This parameter displays the calculated motor torque output.               |
| Power Output      | Kilowatts         | This parameter displays calculated power output of the drive.             |
| DC Bus Voltage    | DC Volts          | This parameter displays the measured DC bus voltage.                      |
| Flux Reference    | Percentage of Rated Flux | This parameter displays the flux reference used by the vector control.   |
| Flux Output       | Percentage of Rated Flux | This parameter displays measured flux output.                             |
| Slip Frequency    | Hertz             | This parameter displays the commanded slip frequency.                     |
| Motor Overload    | Percentage of Overload | This parameter displays percentage of motor overload trip level reached. |
| Drive Overload    | Percentage of Overload | This parameter displays percentage of drive overload trip level reached. |
### Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flux Current</td>
<td>Percentage of Rated Current</td>
<td>This parameter displays the measured flux producing current.</td>
</tr>
<tr>
<td>Torque Current</td>
<td>Percentage of Rated Current</td>
<td>This parameter displays the measured torque producing current.</td>
</tr>
<tr>
<td>Flux Voltage</td>
<td>Percentage of Rated Voltage</td>
<td>This parameter displays the flux voltage reference.</td>
</tr>
<tr>
<td>Torque Voltage</td>
<td>Percentage of Rated Voltage</td>
<td>This parameter displays the torque voltage reference.</td>
</tr>
<tr>
<td>Base Impedance</td>
<td>Ohms</td>
<td>This parameter displays the calculated base impedance.</td>
</tr>
<tr>
<td>Est No Load Current</td>
<td>Percentage of Rated Current</td>
<td>This parameter displays the estimated no load current of the motor.</td>
</tr>
<tr>
<td>Est Rated RPM</td>
<td>Revolutions per minute</td>
<td>This parameter displays the estimated rated RPM of the motor.</td>
</tr>
</tbody>
</table>

### 7b.6.3 Drive Faults

The following is a comprehensive list of detected drive faults. Listed after each fault is a description of what the fault is, and a suggested corrective action.

<table>
<thead>
<tr>
<th>Fault</th>
<th>Description</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>AtoD Fault</td>
<td>Analog to digital convertor on control board not responding.</td>
<td>Cycle power to controller and see if fault clears. If not, replace Control board.</td>
</tr>
<tr>
<td>Brk Hold Fault</td>
<td>Brake hold state does not match the commanded state.</td>
<td>Disabled on O. Thompson Controls.</td>
</tr>
<tr>
<td>Brk IGBT Fault</td>
<td>Brake IGBT overcurrent.</td>
<td>An overcurrent of the braking IGBT has occurred. Fault latches, but does not shut the car down until it stops to allow passengers to safely get off the car. Confirm that the motor data is correctly entered into the drive, that the braking resistance at TB1+3 and TB1 +4 is connected and sized correctly, and that the car is balanced correctly.</td>
</tr>
<tr>
<td>Brk Pick Fault</td>
<td>Brake pick state does not match the commanded state.</td>
<td>Disabled on O. Thompson Controls.</td>
</tr>
<tr>
<td>Charge Fault</td>
<td>DC Bus has not charged.</td>
<td>The DC Bus has not reached the desired stabilized voltage level within 2 seconds.</td>
</tr>
<tr>
<td>Contactor Fault</td>
<td>Contactor state does not match the commanded state.</td>
<td>The drive has turned on the command to close the Main Contactor and the Contactor Confirm signal at TB1-9 is not present for the amount of time specified by the “Contact Flt Time” parameter.</td>
</tr>
<tr>
<td>Cube Data Fault</td>
<td>The drive parameters are invalid.</td>
<td>Check all drive parameters. Cycle power to the drive. If fault re-occurs, replace Control board.</td>
</tr>
<tr>
<td>Cube ID Fault</td>
<td>The drive identification is invalid.</td>
<td>Cycle power to the drive. If fault re-occurs replace Control board.</td>
</tr>
<tr>
<td>Curr Reg Fault</td>
<td>Actual current does not match the commanded current.</td>
<td>Check motor connections and motor windings for open circuit. Check main contactor for bad contact. If OK, bad current sensor or bad drive unit.</td>
</tr>
<tr>
<td>DCU Data Fault</td>
<td>The DCU parameters are not set correctly.</td>
<td>Check all drive parameters. Cycle power to the drive. If fault re-occurs, replace Control board.</td>
</tr>
<tr>
<td>Drv Overload</td>
<td>The drive has exceeded the overload curve.</td>
<td>Check motor connections, main contactor contacts and motor windings. Make sure the brake is lifting. Verify that the encoder is properly connected, and feedback matches motor speed.</td>
</tr>
<tr>
<td>Fault</td>
<td>Description</td>
<td>Corrective Action</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Encoder Fault</td>
<td>The drive is in a run condition and encoder is not operating.</td>
<td>Check encoder connections. If drive has been running, replace encoder. If this fault occurs on initial start up of drive, swap A and A- connections to drive.</td>
</tr>
<tr>
<td>Fuse Fault</td>
<td>The DC Bus fuse on the drive is open.</td>
<td>Check fuse. If OK, check motor connections and check motor for continuity from windings to ground. If OK, drive unit needs to be replaced.</td>
</tr>
<tr>
<td>Ground Fault</td>
<td>The sum of all phase currents has exceeded 50% of the rated amperage of the drive.</td>
<td>Disconnect motor from drive. Cycle power to drive. If problem clears, possible bad motor or wiring. If problem does not clear, possible bad grounding of system.</td>
</tr>
<tr>
<td>Mtr Data Fault</td>
<td>Invalid motor parameters.</td>
<td>Check all drive parameters. Cycle power to the drive. If fault re-occurs, replace Control board.</td>
</tr>
<tr>
<td>Overcurr Fault</td>
<td>Phase current exceeded 300% of rated current.</td>
<td>Check encoder. Possible bad encoder or encoder connection. Possible bad motor or motor connection. Check motor, motor connections, motor windings and main contactor contacts.</td>
</tr>
<tr>
<td>Overspeed Fault</td>
<td>Motor speed exceeded user entered parameters.</td>
<td>Check parameters OVERSPEED LEVEL (A1) and OVERSPEED TIME (A1). If OK, check tracking of motor to desired speed and tune regulator for better performance.</td>
</tr>
<tr>
<td>Overtemp Fault</td>
<td>The heatsink temperature is too high.</td>
<td>The temperature of the heatsink on the drive has exceeded 105°C (221°F). Check fans on drive, make sure adequate airflow is present.</td>
</tr>
<tr>
<td>Overvolt Fault</td>
<td>The DC Bus voltage is too high.</td>
<td>The voltage on the DC Bus exceeded 850 volts on a 460 volt drive and 425 volts on a 230 volt drive. Check braking resistance at TB1+3 and TB1 +4 is connected. Possible high AC line, check AC input voltage to drive. If everything checks OK, possible braking IGBT. Drive unit needs to be replaced.</td>
</tr>
<tr>
<td>PCU Data Fault</td>
<td>PCU parameters not correct.</td>
<td>Check all drive parameters. Cycle power to the drive. If fault re-occurs, replace Control board.</td>
</tr>
</tbody>
</table>
| Setup Fault 1 | Rated motor speed, poles and frequency not set correctly.                   | The parameters “RATED EXCIT FREQ” (A5), “RATED MTR SPEED” (A5) and “MOTOR POLES” (A4) do not satisfy the formula:  

\[ 9.6 + \left(\frac{120 \text{ (Excit Freq)}}{(\text{Motor Poles})(\text{Motor Speed})}\right) + 1222.3 \]

| Setup Fault 2 | Encoder PPR and motor poles not set correctly.                             | Check “ENCODER PULSES” and “MOTOR POLES” parameters. The values must satisfy the formula:  

\[
\left(\frac{\text{Encoder Pulses}}{(\text{Motor Poles})}\right), 64
\]

| Setup Fault 3 | Motor Poles parameter not set correctly.                                    | The “MOTOR POLES” parameter must be set to an even number.                        |
| Setup Fault 4 | The Encoder PPR and Motor Speed parameters are not set correctly.          | Check the “ENCODER PULSES” (A1) and “RATED MTR SPEED” (A1) parameters. The values must satisfy the formula:  

\[300,000 + \left(\frac{\text{Rated Motor Speed}(\text{Encoder Pulses})}{18,000,000}\right)\]

| Setup Fault 5 | The Rated Motor Power and Rated Motor Voltage parameters are not set correctly. | Check the “RATED MOTOR PWR” (A4) and “RATED MTR VOLTS” (A4) parameters. They must satisfy the formula:  

\[
0.07184 \left(\frac{\text{Motor Pwr}}{(\text{Motor Voltage})}\right) \times \text{Drive Current Rating}
\]

| Undervolt Fault | DC Bus voltage low.                                                        | The voltage on the DC Bus has dropped below the user entered values of the parameters “INPUT L-L Volts” (A4) and “UV FAULT LEVEL” (A4). Check braking resistance and connections. Verify proper AC input voltage to drive. Possible disturbances on the AC line. |
Section 6c Start Up Procedures - Amicon Regulator

6c.1 Controller Inspection

**WARNING:**

Read Section 2 and 3 on Personal and Equipment Safety completely before starting this procedure.

Read Section 4 on Installation Considerations - completely before starting this procedure.

Read this section completely before beginning the start up procedure.

Have someone stand by the main line disconnect during the following phases of the start up procedure for added safety:

- First time power on of the controller.
- First time an attempt is made to move the car.

Insure all safety circuits are functional.

Insure all hoistway door interlocks are electrically functional.

Insure car gate circuitry is electrically functional.

**Prior to Applying Power:**

Verify all circuits are wired to the controller properly.

Check the following items:

- MPU switch down
- INSP switch down
- DDS switch down
- NON/RESET switch down (For troubleshooting purposes)
- MG switch down (Amicon)

**Note:** NON/RESET switch up (When in automatic)

Verify, with an ohmmeter, that the governor overspeed switch and any other devices that are wired in at this time will open the safety circuit.

Physically verify that all hoistway doors are closed and locked.

Verify that the tach or encoder leads are wired to the motor drive system in the appropriate place.

Verify that the main line power supply voltage is the same as the controller order as seen on the prints shipped with the controller.
Verify the following connections between the 15 volt power of the motor drive, the MPU board, and the relay board:

<table>
<thead>
<tr>
<th>On Motor Drive</th>
<th>On MPU Board</th>
<th>Relay Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 15 volts</td>
<td>J9-2</td>
<td>J20-1</td>
</tr>
<tr>
<td>- 15 volts</td>
<td>J9-3</td>
<td>J20-3</td>
</tr>
<tr>
<td>15 volt common</td>
<td>J9-4</td>
<td>J20-2</td>
</tr>
<tr>
<td>Pattern In (+UP)</td>
<td>------------</td>
<td>J20-7</td>
</tr>
<tr>
<td>Pattern In (-UP)</td>
<td>J7-2</td>
<td>J20-2</td>
</tr>
<tr>
<td></td>
<td>J7-1</td>
<td>J20-5</td>
</tr>
</tbody>
</table>

6c.2 Power Up the Controller

After powering up the controller for the first time, check the following:

I, IX, & IY relays should be de-energized. If they are energized, quickly switch the inspection switch on the controller to the opposite position.

SAF relay is energized on power up. If not, troubleshoot the safety string with a voltmeter.

REG relay is energized on power up. If not, check to see if the Regulator has faulted. Troubleshoot the regulator using Section 6.5 of this manual.

Phase sequence failure may appear on the reverse phase monitor. If so, check the phase to phase voltage to see if one of the fuses has blown. If all fuses are in tact, shut the main line power off and swap two of the three incoming feeds to the top controller.

DG & DGX relays should be energized. If not, find the open door lock or car gate switch.

CG & CGX relays should be energized. If not adjust the gate switch on the car so it is closed when the doors are fully closed.

LIM relay should be energized. Temporarily jump the SF1 and SF2 contacts on the limit board until the board can be set up properly.

BKA relay should be energized.

ACC relay should be de-energized. If this relay is energized, the inspection and access switches in the car should be switched to the auto position to allow the car to be run from the controller only.
6c.3 Motor Generator Start Up

1. After applying power to the controller, verify that the reverse phase monitor is on. The reverse phase monitor is O.K. if the red light is on. If the red light is not on, shut the main line power off, and swap 2 of the 3 phase connections to the controller.

2. Verify all transformer and power supply voltage levels are correct as per the prints.

3. If any fuses blow, with main line power off, find and remedy the short circuit.

4. Momentarily close the MG switch on the relay board. Open the MG switch as soon as the generator begins to rotate. Note the direction of rotation of the generator. If the generator rotated in the proper direction as noted on the plate on the generator frame, move on to step 5. If the direction is incorrect, shut off the main line power, reverse any two of the three phases to the MG.

5. Connect a DC volt meter across the generator armature.

WARNING:
The next two steps should be done together. If loop voltage builds too high, the car may drive through the brake if you do not pay close attention to the meter while performing the next two steps.

6. Start the generator and insure that the generator transfers from wye to delta properly if using a wye delta system. If using a resistance start, make sure there is adequate time before transfer. If the transfer time is not adequate on wye delta systems, adjust the TA timer as needed. If the time is inadequate for resistance start systems, check the resistor grid wiring.

7. With the generator running, note the meter reading of the armature. If there is any voltage on the meter above 10 VDC, shut off the generator immediately. This may indicate the suicide circuit connections may be reversed.

WARNING:
A build up of loop voltage will move the car in one direction or the other without direction relays energized. Another cause of a build up of loop voltage may be caused by excessive series field turns. Verify that the series field is disconnected.

Note: If a build up of loop voltage was seen, shut the main line power off and wait at least 5 minutes, then reverse the generator shunt field connections at the controller. Repeat step 8 and make sure that there is no build up of loop voltage.

Important Note:
There are many different generator field configurations that exist. It is the responsibility of the installer to choose the best field winding configuration for the application. In some cases, leveling fields will need to be wired in parallel with the main fields to yield enough loop voltage to achieve contract speed.

8. With the meter on the Generator Armature, push in the PS relay. If the voltage on the meter rises +1.00 VDC, the neutral is OFF. Adjust the neutral of the MG and repeat.
6c.4 Initial Hoist Motor Field Adjustment

Note: The following settings will need to be touched up during the high speed adjustment.

We will refer to Standing Field as the field current when the car is sitting at the floor with the doors fully open, or when it is parked. We will refer to Full Field as the field current when the car is accelerating or leveling into the floor. We will refer to Run Field as the field current required to allow the car to reach contract speed without exceeding the rated armature voltage and current by more than 10% while lifting full load.

1. Insure the motor fields have been connected properly to the controller.

2. Connect a meter in line with the F+ terminal or an amp-probe around the F+ wire of the motor field driver. The meter or Amprobe should be large enough to handle the amount of current that the unit can supply - unit ranges are 10, 20 and 30 amp.

3. With no inputs on at the J1 terminal of the driver, the V/I-4 pot will be selected. Adjust the V/I-4 pot until standing field current is obtained.

4. Next, the field loss trip point can be set.

   Note: The field loss trip point is typically set at 80% of standing field current. (I.E. If standing field current is 10 amps, field loss should be set to trip at 8 amps).

5. Calculate the field loss trip point for the job. (Standing Field Times .8)

6. Adjust pot V/I-4 for the proper field loss trip point.

7. If the REG relay de-energized while lowering the V/I-4 setting, continue to adjust the V/I-4 pot until the desired trip level is seen on the meter or amp-probe, Then turn the FL pot counterclockwise until the REG relay just energizes.

8. If the REG relay remained energized while lowering the V/I-4 setting, slowly begin turning the FL pot clockwise until the REG relay de-energizes. Then turn the FL pot counter-clockwise until the REG relay re-energizes.

9. Set V/I-4 back up to the desired standing field current level.

10. Turn the main line power OFF. Temporarily jump from AC2 on the controller to J1-1 on the driver.

11. Turn the main line power ON. Adjust the V/I-1 pot until full field current is obtained.

12. Turn the main line power OFF. Move the end of the jumper connected to J1-1 to J1-2 on the driver.

13. Turn the main line power ON. Adjust the V/I-2 pot until run field current is obtained. This setting will need to be adjusted again with the car running at contract speed with full load.
**Microflite Ultra 2000 - Amicon Regulator**

**Note:**
*The field weakening point is set via a FFB parameter on Page 1 of the parameters on the Ultra 2000 MPU. This is typically set from 70% to 90% of contract speed.*

9. **Turn the main line power OFF.** Remove one end of the jumper from the J1-2 end. When power is turned back on, you will touch this jumper to the J1-2 terminal again to adjust the acceleration rate of the motor field driver.

10. **Turn the main line power ON.** Watch the meter, and touch the jumper to the J1-2 terminal. Turn the ACC1 pot such that switching from standing current level to full field current level takes between 2 to 2.5 seconds.

11. Remove the jumper from the J1-2 terminal. Turn the DEC1 pot such that switching from full field current level to standing current level takes between 2 - 2.5 seconds.

12. **Turn the main line power OFF.**

**6c.5 Amicon Regulator Start Up**

**Note:**
*All potentiometers on the regulator board have been preset during testing. Minor adjustments will need to be made as follows.*

1. Temporarily place a jumper from the XY3 pin to the XY9 pin on the regulator.

2. Switch the EMGi switch on the controller UP, or ON. The car will run as open loop. Speeds will vary - depending on counter balance. Adjust resistors R11 and R12 to have enough voltage on the generator field to move the car down.

3. Connect the meter between terminals XY3 and XY4 on the regulator board with the red meter lead on terminal XY4.

4. Run the car up. If the car runs down, shut the main line power off and swap the F+ and F- connections on the hoist motor field regulator. The car should now run up when the up relays are energized and down when the down relays are energized.

5. Connect your meter to check the polarity of the tach feedback. Place the red lead of the meter on the XY5 test point on the regulator, and the black meter lead on the XY3 test point on the regulator board.

6. As the car runs up, the polarity on the meter should be positive for up running, and negative for down running. If it is reversed, stop the car and swap the tach connections at terminals 1 & 2 on the regulator board.

7. While running the car on inspection, turn the inspection speed pot on the relay board until .7 volts is seen on the meter (should be positive for up and negative for down).

8. Move the red meter lead to the XY6 test point. Run the car up. The polarity on the meter should be negative in the up direction and positive in the down direction. If it is reversed, stop the car and swap the A+ and A- connection on the regulator power board.
**Microflite Ultra 2000 - Amicon Regulator**

**Note:**

*The S3 switch must be on the RUN position when the car is placed on automatic. If the switch is on TEST, tach feedback is ignored and the regulator will output constant voltage. Speed will vary, depending on the load.*

9. Calculate the raw tach voltage at contract speed using the following formulas:

**Gearless**

\[
\text{Tach RPM @ contract Speed} = \frac{\text{Circumference of Drive Sheave \times Nameplate RPM of Motor}}{\text{Circumference of Tach Wheel}}
\]

Where: Circumference = 3.1416 X the diameter

Tach RPM @ contract speed X .10 = **Tach Volts @ Contract Speed**

**Geared**

Nameplate RPM of Motor X .10 = **Tach Volts @ Contract Speed**

Where: Tach Generator is directly coupled to the hoist motor shaft.

10. Perform rough tach scaling by switching the SW1 switches on the regulator board using the following table:

<table>
<thead>
<tr>
<th>Tach Volts @ Contract Speed</th>
<th>SW1 Switch Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - 10 volts</td>
<td>SW1 - SW8 = ON</td>
</tr>
<tr>
<td>10 - 18 volts</td>
<td>SW1 - SW7 = ON</td>
</tr>
<tr>
<td>18 - 35 volts</td>
<td>SW1 - SW6 = ON</td>
</tr>
<tr>
<td>35 - 65 volts</td>
<td>SW1 - SW5 = ON</td>
</tr>
<tr>
<td>65 - 110 volts</td>
<td>SW1 - SW4 = ON</td>
</tr>
<tr>
<td>110 - 180 volts</td>
<td>SW1 &amp; SW2 = ON</td>
</tr>
<tr>
<td>180 - 300 volts</td>
<td>SW1 - SW8 = OFF</td>
</tr>
</tbody>
</table>

11. While running the car, adjust the inspection pot for .7 volts of pattern. Hand tach the car to see if it is running at 1/10 of contract speed. If the car is running too slow, turn the **NMAX** pot clockwise until the car runs 1/10 of contract speed. If the car is running too fast, turn the pot counterclockwise to slow the car down.

**Note 1:**

*If the car is running less than 1/10 of contract speed in both directions with the NMAX pot fully clockwise, it will be necessary to move the switch settings to the next highest range in the above table.*
Note 2:

If the car being adjusted is a high speed car - Set reference +.35 volts and adjust for 5% of contract speed.

12. Move the red meter lead to the XY6 test point on the regulator. While the car runs at 1/10 of contract speed, adjust the ACAL pot until you see .75 volts on the meter.

13. If instability exists, make note of the original setting of the pot and turn the PN pot clockwise 1/4 turn at a time. If this seems to make the instability worse, go back to the original setting of PN and begin to turn the ACMP pot clockwise 1/4 turn at a time.

14. Move the red meter lead to the XY5 test point. While the car is running at 1/10 of contract speed, adjust the TFB pot until .7 volts is seen on the meter.

Note:

The TFB pot has no affect on the speed regulation. This setting is only used for overspeed detection purposes.

15. Move the red meter lead to the XY7 test point. With the car stopped and the doors closed, adjust the OVS pot for approximately 7.8 volts.

16. Remove the temporary jumper from XY3 to the XY9 of the regulator board.

17. Place the EMGI switch in the OFF position.

Note:

Adjustments will need to be touched up during the high speed adjustment period, but this is close enough to get you into high speed.

18. Using the Inspection Speed pot on the relay board, set the inspection speed to 45 - 50 FPM.

19. Place the car somewhere near the center of the hoistway. On the Limit board, LED D9 should be turned off. It will come on when the car is on Automatic operation with the doors closed.

20. On the Limit board, press S3 and then press and release S1. Release S3. LED D25 will be blinking rapidly (on 1/8 second, off 1/8 second). Also, the D10, D11, and D17 LED’s will be lit.

21. Run the car up on inspection about 5 feet. With the car running, press and release S3. D10 should turn off. If D11 turns off and D10 stays on this is OK.

22. Run the car down on inspection about 5 feet. With the car running, press and release S3. If D10 turned off in the previous step, D11 will turn off. D25 will now be on continuously, indicating that the Limit board inspection learn procedure was done correctly, and the board is now in normal operation.
6c.6 Brake Adjustment

Note:

The brake assembly and all pins should be cleaned thoroughly and all spring tensions set properly to hold 125% of car capacity prior to adjusting the brake driver. Brake shoes should be checked to insure at least 95% surface contact. If spring tensions are changed after this adjustment, the brake driver will need to be completely re-adjusted.

1. Ensure the brake coil has been connected properly to the controller.

2. Connect a meter across the F- and F+ terminals of the drive. Set the meter range high enough to measure the brake lifting voltage level for the job.

3. With no inputs on at the J1 terminal of the drive, the V/I-4 pot will be selected. Adjust the V/I-4 pot fully counterclockwise.

4. Turn the main line power OFF. TEMPORARILY jump from J1-1 to J1-2 on the driver.

5. Turn the main line power ON. Run the car on inspection and adjust the V/I-1 pot until brake pick voltage required for the job is obtained.

6. Turn the main line power OFF. Remove the jumper from J1-1 on the driver.

7. Turn the main line power ON. Run the car on inspection and wait until the LED over the V/I-2 pot lights. Adjust the V/I-2 pot until approximately 60% brake lifting voltage is obtained or the brake holding voltage previously measured. If the brake drops at this level, stop the car, turn the pot clockwise 1 full turn, and attempt to run the car again.

8. While running the car, turn the inspection speed pot counterclockwise until the car runs at approximately 8-10 fpm.

9. Remove the RL relay.

10. Turn the V/I-3 pot 10 turns counterclockwise, and then 2 turns clockwise.

11. Run the car on inspection and slowly turn the V/I-3 pot clockwise until the car runs through the brake.

Note:

The brake shoes should not lift completely off the drum. If the shoes lift completely off the drum, stop the car. Turn the V/I-3 pot counterclockwise a couple of turns and repeat step 11. If the brake shoes lift completely on re-level, there may be insufficient torque in the hoist motor to assure adequate leveling control.

12. Replace the RL relay.

13. Turn the ACC1 pot fully clockwise. This will allow for a rapid response of the brake regulator from a lower voltage level to a higher voltage level.

14. Turn the DEC1 pot fully clockwise. This will allow for a rapid response of the brake regulator from a higher voltage level to a lower voltage level. This will also help prevent excessive arcing on the contacts of the BK relay.
15. Using the up and down inspections switch on the relay board, adjust pot PXT so that the MA contactor drops approximately 1 to 2 seconds after releasing the switch and the brake sets. Too much time will cause the car to take too long to re-level on automatic operation.
6c.7 MPU Power Up

1. Power Up the MPU. While the MPU is powering up, press the Number 1 button. (Refer to Section 8 of this manual.)

2. Go through all parameter screens to set all parameters applicable to the car. Only enable and set parameters that are applicable to the job.

Note: *Pay no attention to the FLOOR LANDING VALUES at this time. These numbers will mean nothing until a learn trip is complete.*

3. Write Values to Non-Volatile RAM.
   - Go to the *Floor Landing Values* of the main car parameter screen.
   - Select "Get floor values from encoder".
   - When the enter button is pressed actual numbers starting with 2,000 at the bottom floor and increasing by 2,000 counts per floor should come up.

6c.8 Encoder

6c.8.1 Encoder - Preparation For Learn Trip

Verify that all phases of the encoder installation are complete:
- Tape is installed.
- All door magnets are installed.
- Stick is mounted properly.
- Stick cable is connected to encoder electronics box.
- The U4 terminal limit is wired to J3-6 on the encoder processor board & D4 terminal limit is wired to J3-1 on the encoder processor board.
- IP & IPX from the controller are wired to J2-1 & J2-4 on the encoder power supply board.
- The IP wire from the controller is wired to J3-2 and J3-5 on the encoder processor board.
- Shielded pair communication cable to the MPU is connected to the encoder board J4 connector. The shield on the cable is taped off at the encoder end.
- Shielded pair communication cable to the Car Station board is connected to the J4 connector on the encoder and the J10 on the Car Station board. The shield on the cable is taped off at the Car Station board end.

6c.8.2 Performing the Learn Trip

1. Move the car into the **bottom floor door zone**.

2. On the main parameter screen, move the cursor to *Learn Trip, Floor Names, Pre-Torque* and press the 0 key.

3. Switch the INS switch on the controller up. The I, IX, & IY relays should pick.

4. Move cursor to *Learn Trip* and Press 0.
5. The screen will say “LEARN TRIP (IF YOU ARE SURE PRESS ENTER FOR LEARN TRIP !!!)”. Press 0.

6. The car will start the learn trip and move up the hoistway at about 24 fpm. It should stop as soon as it reaches the top floor door zone magnet. After reaching the top, the encoder card’s non-volatile memory will be programmed with the position of the magnets in the shaft.

7. The floor values now need to be sent from the encoder’s non volatile memory to the MPU. To do this, go to the FLOOR LANDING VALUES screen. Select “GET FLOOR VALS FROM ENCODER”. When the enter button is pressed, the values will be sent from the encoder to the car’s MPU board.

8. The values sent from the encoder do not take effect unless they are stored to non volatile memory. Go to the main parameter screen and WRITE VALUES TO NONVOLATILE MEMORY.

9. RESET MPU
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Section 7c High Speed Adjustment - Amicon Regulator

7c.1 Final System Checks Prior to High Speed Adjustment

1. Verify that all safety circuits are operative and that each device in the string will prevent the car from starting or continuing to run.

2. Verify that all hoistway door interlocks function properly both electrically and mechanically.

3. Verify that hoistway access circuits function according to your local applicable codes.

4. Verify that the car gate is set and functions properly according to local applicable codes.

5. On inspection, run the car to both extreme limits of travel to insure there is adequate pit and overhead clearance for both the car and counterweight in the event the car or counterweight should go onto their buffers during the initial adjustment process.

6. Verify that the car to counterweight is correctly balanced to no less than 40% and no more than 50% of full rated capacity of the car.

7. Verify that the electrical neutral of the hoist motor and the generator is set properly.

8. Set the up and down directional limits to open when the car is 1" beyond floor level at the top and bottom terminal floors.

9. Set the final limits to open when the car is 6" beyond floor level at the top and bottom terminal floors.

10. Verify the power wiring on the encoder electronics power supply and insure the D8 LED is on continuously on the encoder electronics board.

11. While riding on the car top on inspection, verify as the car travels up past the last top terminal slowdown that the D5 LED on the encoder electronics board turns on. If it does not, check the terminal slowdown wiring to the limit board and to the encoder electronics board.

12. While riding on the car top on inspection, verify as the car travels down past the last bottom terminal slowdown that the D6 LED on the encoder electronics board turns on. If it does not, check the terminal slowdown wiring to the limit board and to the encoder electronics board.

13. Verify that the terminal slowdown limit switches are set according to the tables in Section 8 of this manual.

14. On the car top, verify that all encoder and pretorque cables are securely plugged in inside the encoder electronics box.

15. On the car top, verify that all thumb screws on the cable from the sensor stick to the encoder electronics box are fastened securely to the boxes at each end.
7c.2 Initial Set Up

1. Place the car in the center of the hoistway. Mark the cables with chalk when the car crosshead and the counterweight crosshead are exactly adjacent to each other.

2. If the controller is not set up for seismic operation, go to step 5.

3. On the monitor, observe the encoder position on the diagnostic screen. Write this value down.

4. Access the car parameters menu. Open the “VIP, MEDICAL, EARTHQUAKE PARAMETERS” page. Program the encoder position recorded in step 3 into the “COUNTERWEIGHT ZONE” parameter. Save this by writing it to the system’s non-volatile memory.

5. Move the car a convenient floor. Place 40% of the car’s rated capacity in the car.

6. On inspection, run the car so it about 10 feet above the center of the hoistway.

7. Place an Amprobe on one of the leads to the motor armature.

8. While observing the display on the Amprobe, run the car down through the center of the hoistway. Write down the amperage displayed while the car passes by the chalk mark on the cables. The value may vary slightly, so average the value if necessary.

9. Place the car about 10 feet below the center of the hoistway.

10. While observing the display on the Amprobe, run the car up through the center of the hoistway. Write down the amperage displayed while the car passes by the chalk mark on the cables. The value may vary slightly, so average the value if necessary.

11. Ignoring whether the recorded amperage values were positive or negative, if the value recorded while the car was running up was greater than the value running down, the car is too heavy. Remove 100 pounds of weight from the car and repeat steps 8 through 10 until the recorded values are equal, but of opposite polarity.

12. Ignoring whether the recorded values were positive or negative, if the value recorded while the car was running down was greater than the value running up, the car is too light. Add 100 pounds of weight from the car and repeat steps 8 through 10 until the recorded values are equal, but of opposite polarity.

13. When the values are equal, but of opposite polarity, the car is balanced. Check how much weight is in the car. It should be between 40 and 50% of the car’s rated capacity. If not, the counterweighting needs to be adjusted. If the car is too heavy, weight needs to be added to the counterweight to get the car balanced between 40 and 50% of the car’s rated capacity. If the car is too light, weight needs to be removed from the counterweight to get it balanced between 40 and 50% of the car’s rated capacity.

14. After the appropriate adjustments are made to the counterweight, repeat steps 10 through 12 until balanced load is in the car. Leave the weights in the car at this time.

15. Place a TEMPORARY jumper on Limit board terminal SF1 and SF2 (J5 connector).

16. Place a TEMPORARY jumper on Limit board terminal SF3 and SF4 (J6 connector).
17. Unplug Limit board connectors J3 and J7 from the board.

18. Install a TEMPORARY jumper from J3-1 to J7-1.

19. Install a TEMPORARY jumper from J3-2 to J7-2.

7c.2.1 One Floor Up & Down

Make a one floor run up and a one floor run down in the middle of the hoistway.
Referring to Section 11.7 - Parameters, adjust motion parameters to get desired ride.
Note: Stay away from terminal floors.

7c.2.2 Two Floor Up & Down

Make a two floor run up and a two floor run down in the middle of the hoistway.
Referring to Section 11.7 - Parameters, adjust the motion parameters to get desired ride.
Note: Stay away from terminal floors.

7c.2.3 Multi-Floor Up & Down

Make a multi-floor run up and a multi-floor run down in the middle of the hoistway.
Referring to Section 11.7 - Parameters, adjust motion parameters to get desired ride.
Continue making multi-floor runs until the system demands contract speed.

Note: Stay away from terminal floors.

7c.3 High Speed Adjustment

1. Place a digital volt meter on MPU board terminals MJ7-1 (positive) to MJ7-2 (negative).

2. Run the car from the bottom floor to the top floor. Verify that the speed reference signal to the regulator is +7.00 volts when at full speed. If not, adjust pot R25 on the MPU board to obtain +7.00 volts.

3. Run the car from the top floor to the bottom floor. Observe the meter. The voltage should be -7.00 volts. If not, adjust MPU pot R28 to obtain an equal voltage, but of opposite polarity, while the car is running up and down.

Note: It may be easier to adjust the R28 pot while the car is in leveling speed. TEMPORARILY(128,618),(870,673) set the “ADVANCE COUNTS” parameter in the motion parameter screen to 90. Run the car and adjust R28 to obtain the same speed reference but opposite polarity while the car is leveling up and down.

4. If pot R28 was changed, it will be necessary to adjust pot R25 again. Verify that the voltage to the drive is +7.00 volts in the up direction, and -7.00 volts in the down.

5. Observe the diagnostic screen on the monitor. Check that the actual car speed as shown on the monitor is contract speed of the car. If not, adjust the NMAX pot to obtain as close contract speed as possible.

5. If contract speed cannot be maintained while running the empty car down, go to step 6. Otherwise, go to step 7.
6. If contract speed cannot be maintained while running empty the car down, it is necessary to check the following jumper configuration on the power and regulator boards of the regulator:

**Note:**

*The Regulator board is the front board on the regulator. The power board can be accessed by pulling on the 2 pull pins located on the top corners of the regulator board. The regulator board will then hinge down to expose the power board.*

a. **Turn the Main line power OFF.** Disconnect one of the generator shunt field wires from the GF1 stud on the controller and measure the resistance of the generator shunt field.

b. Note from the prints the voltage coming in on the “U” and “V” terminals on the power board of the regulator (In most cases this will be 208 VAC). Calculate the amount of field current that will be required by using the formula below:

\[
\text{Maximum Current Out} = \frac{0.67 \times \text{AC Voltage} \_ \text{at “U” - “V”}}{\text{Total Generator Field Resistance}}
\]

c. Based on the Field Current calculated in step 4, check the power and regulator boards to make sure the following board modifications have been made to your job. **If the modifications have not been made, contact O. Thompson Engineering prior to making any board revisions.**

*On the Power Board* (R2 & R3 resistors are located on the top left corner of the board)

- For Field Current up to 5 amps: R2 & R3 should be clipped out
- For Field Current up to 10 amps: R3 only clipped out
- For Field Current up to 15 amps: Both resistors in circuit

*On the Regulator Board* (CV Jumper and R168 resistor are located towards the top right corner of the board)

- For Field Current up to 5 amps: CV jumper & R168 resistor in circuit
- For Field Current up to 10 amps: Cut off CV jumper
- For Field Current up to 15 amps: Cut off CV jumper & R168 resistor

7. Run the car to a floor near the bottom of the hoistway. Place full load in the car.

8. Disable the car doors. Place a volt meter on the motor armature leads A1 and A2.

9. Enter a car call near the top of the hoistway. While the car is running up at contract speed, monitor the armature voltage.

10. After the car stops at the desired floor, compared the observed armature voltage to the value on the motor nameplate. If the observed armature voltage is above the value on the motor nameplate, reduce pot V/I-2 on the Motor Field Regulator until nameplate armature voltage is obtained while the car is running up with full load.

11. If the observed armature voltage is below the value on the motor nameplate, increase pot V/I-2 until nameplate armature voltage is obtained while the car is running up with full load.
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**NOTE:** If the car has a geared machine, field weakening may not be required on this particular motor. Increase pot V/I-2 until motor nameplate armature voltage is obtained while the car is running up at contract speed with full load. If the setting of pot V/I-2 is equal to that of V/I-1, disable field weakening by accessing the Motion Parameters and setting the FFB speed to value above contract speed in both Accel and Decel.

**BE CAREFUL NOT TO EXCEED THE NAMEPLATE FULL FIELD CURRENT VALUE OR THE FIELDS MAY BE DAMAGED.**

12. Run the car to a floor near the bottom of the hoistway. Place a car call near the top of the hoistway. After the car stops, access the scope screen on the monitor. Observe the first 5 seconds of the car’s run. If the run appears smooth, with no distinct ‘step’ in the acceleration rate, go to step 12. If there is a step, access the Motion Parameters and decrease the FFB Accel speed by a value of 5% and re-attempt the up run. If the step is still visible, continue to decrease the FFB speed in Accel until it is completely gone. Go to step 14.

13. Access the Motion Parameters. Increase FFB speed in Accel by a value of 5%. Run the car up and observe the scope screen. Keep increasing FFB speed in Accel until a step is seen in the acceleration. Decrease it until the step is completely gone.

14. Place the red meter lead on terminal XY6 in the regulator. Place the black lead on XY3. Adjust the meter scale to 10 volts.

15. With the car running up at contract speed with full load, adjust the ACAL pot on the regulator to obtain 7.5 volts at XY6.

16. Move the red meter lead to terminal XY5. With the car running up at contract speed, adjust the TFB pot to obtain 7 volts.

17. Move the meter leads to terminals MF1 and MF2. Run the car on high speed and observe what the motor field voltage is with the car running at contract speed.

18. Place the car on inspection. While running the car on inspection, adjust pot V/I-1 to obtain motor nameplate field voltage. If only field current is given on the nameplate, place an Amprobe on the wire attached to terminal MF1 and adjust the V/I-1 pot to obtain the desired current.

19. Open the main line disconnect and install a **TEMPORARY** jumper from AC2 to terminal J1-3 on the Motor Field Regulator.

20. Close the main line disconnect. Adjust pot V/I-3 to obtain the same voltage as that of V/I-2 observed in step 13.

21. Open the main line disconnect and remove the jumper from AC2 to terminal J1-3 on the Motor Field Regulator.

22. Enable the car doors. Remove the appropriate amount of weight and ride the car, staying away from the terminal floors. Make any necessary adjustments to the speed curve.

23. Remove the weight to the car, approximately 100 pounds at a time. Staying away from the terminal floors, observe one floor, two floor and multi floor runs to be sure that the car rides well under all load conditions.
24. If vibration occurs while the car is accelerating or decelerating, turn the PN pot counterclockwise in small increments until the vibration is decreased. If this does not remedy the vibration, turn the PN pot back to its original setting and turn the ACMP pot clockwise or counterclockwise to reduce the vibration felt in the car.

25. If poor tracking is observed during acceleration and deceleration, turn the PN pot clockwise until the car tracks the pattern properly without vibration being introduced into the ride.

26. Remove ALL jumpers from the Limit board and re-install all connectors.

27. Go to Section 8 and perform a learn procedure on the Limit board. After completing the learn procedure, go to Section 9 and perform the Pretorque set up, if applicable. Return to Section 7c.4 for final adjustments to the car’s ride quality.

7c.4 Ride Quality Adjustments

The tracking of the regulator is the control system’s most critical adjustment to get a high quality ride and superior performance. If the regulator does not track the speed command well, the ride quality will not be acceptable.

To determine how well the regulator is tracking the speed command access the scope screen on the monitor. Enter various calls in the system and compare the desired car speed to the actual car speed. When the car decelerates, particularly coming out of high speed, there will be a slight delay between the desired speed and the actual speed. This delay should be between 150 milliseconds (0.15 seconds) and 250 milliseconds (0.25 seconds). If the delay is longer, or the car is overshooting, undershooting, or ‘spotting’ coming into the floor, the regulator needs to be adjusted.

There are several pots on the regulator that effect the performance and tracking.

- **PN** Speed loop gain. Turn clockwise to improve tracking. Adjust in conjunction with ACMP pot to reduce vibration.

- **PI** Current Loop Gain. Increase when “TE” light will not go off during any runs. If extreme instability of the system exists, turn pot clockwise as a last resort.

- **ACMP** Armature Voltage Compensation adjustment to the speed regulator.
To adjust the regulator for optimum ride quality and performance the following step should be taken.
1. Place an oscilloscope on drive terminal XY8. The common lead should be placed on XY3.

2. While running the car, observe the scope. If the generator field current is unstable, turn the ACMP pot clockwise to improve regulator stability and reduce vibration. If the generator field current is stable, turn the pot counterclockwise in small increments to improve regulator tracking. Too much ACMP will cause the car to spot in leveling and run at speeds lower than contract speed.

7c.5 Amicon Regulator Reference Information

7c.5.1 Status and Fault Indicators

RUN (Run Input) - Indicates that the control has a run input and is currently enabled.

LL (Re-Level Limit) - Indicates that the re-leveling overspeed circuit is enabled and re-level overspeed trip limit is reduced to approximately 10% of contract speed.

TE (Tracking Error) - Indicates that there is currently a difference between commanded speed and actual speed of greater than 10% of full scale.

SPD (Overspeed Fault) - The overspeed trip is adjustable from 110% to 125% of the contract speed setting or at approximately 10% of the contract speed when the “LL” contact is pulled in during re-leveling. The overspeed fault circuit will latch if the scaled tachometer feedback should exceed 7.0 volts by more than overspeed trip percentage (110-1125%).

SCR (SCR Power Fault) - When a run command is given to the control, the main SCR power is applied at the same time. If the control does not sense at least 250VAC with 2 seconds after a run command, the SCR power fault will latch. Similarly, when the run command is removed from the control, the main SCR power is disconnected at the same time. If the control does not sense that the SCR voltage has dropped to less than 50VAC within 2 seconds after the run command has been removed, the SCR power fault will latch.

TACH (Tach Loss Fault) - If at any time the motor armature voltage and tach feedback are more than 20% different as is the case when the tach wires becomes disconnected or are reversed, the tach loss fault will latch.

DIR (Direction Fault) - Indicates and disables the control when the tachometer’s direction is different from the command speed. If the speed reference direction is up and the tach moves more than 10% in the down direction or if the speed reference direction is down and the tach moves more than 10% in the up direction, the direction fault will latch.

MP (Positive Bridge Enabled) - Indicates the positive SCR bridge (motoring) is enabled.

MN (Negative Bridge Enabled) - Indicates the negative SCR bridge (regenerating) is enabled.

+/- 15 (Power Supplies OK) - Indicates the controls low voltage power supplies are present.
7c5.2 Potentiometer Functions

PN (Speed Loop Gain) - Sets the gain of the speed feedback loop. The gain should be adjusted for good regulation and stability of the system.

NMAX (Contract Speed) - Fine adjustment for setting contract speed with the maximum speed reference input to the control. (This adjustment should be made after selecting the appropriate tach feedback scaling switch setting of S1.)

ACAL (Armature Feedback Calibration) - The armature feedback calibration adjustment is used to achieve good stability and response of the machine. It is manually adjusted by monitoring the armature feedback test point (XY6) and adjusting the armature feedback potentiometer clockwise for 7.0V at contract speed. This adjustment may be fine tuned for maximum stability of the system. The response may be too slow if the armature feedback is too high. This adjustment, as well as stability gain, sets the armature voltage reference for the tach loss circuit. Setting will vary depending on the load. To adjust, run one car at contract speed in both directions to determine the voltage difference by subtracting one reading from the other. One-half of this difference should be subtracted from the baseline of 7.0V. Example - If difference is .20 volts. Subtract .1 (½ of .20) from 7.0V. Therefore, pot should be adjusted to 6.9 up.

ACMP (Armature Feedback Compensation) - The armature feedback compensation increases the effect of the armature feedback. The response of the machine may be too slow if the ACMP is too high. The ACMP potentiometer should be adjusted to achieve good, smooth operation. Too much ACMP may also affect running regulation.

IDN (Current Limit Setpoint) - It is set for the amount of field current the control can regulate. The IDN pot is preset and sealed at the factory. It should not be readjusted. This pot sets the maximum amount of current output. It is preset for 15 amps. Instability in the system could result if the current is adjusted too high.

OFFSET - Provide and offset adjustment to prevent the elevator from “creeping” when zero speed is commanded to the control.

PI (Current Loop Gain) - Normally left about mid range. Provides a means to increase or decrease the gain of the control loop if the generator field current is unstable.

TFB (Tach Feedback Calibration) - The tach feedback adjustment is used to calibrate the tach feedback at contract speed for 7.0V. (ATXY5) This signal is used in the tach loss, direction fault and overspeed circuits as well as for monitoring the actual vs. set speed.

OVS (Overspeed Setpoint) - The overspeed setpoint is used to set the overspeed trip point of the control from 110% (fully CCW) to 125% (fully CW). The re-level limit will also be affected by this adjustment from 10% (fully CCW) to 12.5% (fully CW).

7c.5.3 Regulator Test Points

XY3 (COMMON) - Common test point for all other test points. The black meter lead should always be connected to this test point when referencing other test points.

XY4 (REF IN) - Pattern reference test point. With the red meter lead on this test point, the polarity should be positive when the pattern reference on terminal 5 is positive in respect to terminal 7.
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**XY5 (TACH)**
This test point monitors tach feedback. The polarity on this test point should be positive when the car is traveling in the up direction.

**XY6 (ARM FB)**
This test point monitors armature voltage feedback. The polarity on this test point should be negative when the car is traveling in the up direction.

**XY7 (OVERSPEED)**
This test point monitors the overspeed threshold setting. This should be 7.75 volts if the OVS pot is set to have the overspeed fault occur at 10% above contract speed.

**XY8 (FLD CURR)**
This test point monitors generator shunt field current. The actual generator field current as it relates to the reading seen on the meter is offset by a multiplier depending on how the regulator is set up initially. The actual generator field current is obtained by multiplying the appropriate multiplier in the following table by the actual meter reading:

<table>
<thead>
<tr>
<th>Power Supply Board Jumpers</th>
<th>Regulator Board Jumpers</th>
<th>Regulator Rating</th>
<th>Meter Reading Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>R2 &amp; R3 OFF</td>
<td>CV ON &amp; R168 ON</td>
<td>5 amps</td>
<td>.33</td>
</tr>
<tr>
<td>R3 OFF &amp; R2 ON</td>
<td>CV OFF &amp; R168 OFF</td>
<td>10 amps</td>
<td>.67</td>
</tr>
<tr>
<td>R2 &amp; R3 ON</td>
<td>CV OFF &amp; R168 OFF</td>
<td>15 amps</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Section 8  Limit Board & ETSL System

8.1  Limit Board Version 2 Software

O. Thompson has released an enhanced version of Limit board software for use on the Microflite Ultra 2000 Control System. This new software utilizes a rotary encoder to monitor the position of the car in the hoistway. By constantly monitoring the position of the car, the Limit board will have the ability to gently slow and stop the car if it is approaching either the top or bottom of travel at a speed greater than the normal deceleration rate. This deceleration rate is slightly greater than the normal deceleration rate, and will not be detectable by any passengers who may be in the car.

8.1.1  Hardware Requirements

The Version 2 software requires a Limit board with Revision level 2.0 or greater. If an earlier version of hardware is used the board could intermittently trip.

8.2  Limit Board Wiring

This version of software requires an input from a rotary encoder attached to the hoist motor. If this software is installed on an existing controller, an encoder feed must be wired into the board at connector J9. Also, if the controller’s existing Limit board did not have the speed reference signal wired to it, it must be installed for the board to function properly. Refer to Figure 1 below for the proper wiring of the board.

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Figure 1

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8.3 Limit Switch Distances

After the board is installed and wired, it may be desirable to relocate the existing limit switches in the hoistway. Leaving the switches in their present position may cause the Limit board to limit the car’s maximum speed if power is removed or if the board is reset at a position away from a terminal floor. This will occur because the Limit board has lost its position, and it has determined that the maximum safe speed at which the car can operate is less than contract speed. The maximum safe speed is the speed at which the Limit board can safely slow and stop the car based on the setting of the slowdown switches and the maximum measured deceleration rate.

Relocating the switches is not mandatory, but may be desired for optimum operation of the board.

To determine the distance which the limit switches should be set to it is first necessary to determine the maximum deceleration rate of the car. To do this, access the “Motion Parameters” Menu. Check the “Acceleration Rate” parameter. The largest value saved here will be the maximum deceleration rate. Typically, this will be between 2.0 ft/s² and 4.0 ft/s². Referring to the following tables, find the table that has a deceleration rate equal to or greater than the largest programmed acceleration rate value. For speeds not divisible by 100 (i.e.: 350 FPM), use the distance values from the next greater speed.

<table>
<thead>
<tr>
<th>Car Speed</th>
<th>1SU / 1SD</th>
<th>2SU / 2SD</th>
<th>3SU / 3SD</th>
<th>4SU / 4SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>3’</td>
<td></td>
<td>1’ 6”</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>5’ 6”</td>
<td></td>
<td>3’</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>9’</td>
<td></td>
<td>3’</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>13’ 6”</td>
<td></td>
<td>3’</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>18’ 6”</td>
<td>12’</td>
<td>3’</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>24’</td>
<td>16’</td>
<td>3’</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>31’</td>
<td>22’</td>
<td>15’</td>
<td>3’</td>
</tr>
<tr>
<td>900</td>
<td>38’ 6”</td>
<td>28’</td>
<td>17’</td>
<td>3’</td>
</tr>
<tr>
<td>1000</td>
<td>46’ 6”</td>
<td>33’</td>
<td>20’</td>
<td>3’</td>
</tr>
<tr>
<td>1100</td>
<td>55’ 6”</td>
<td>39’</td>
<td>23’</td>
<td>3’</td>
</tr>
<tr>
<td>1200</td>
<td>65’</td>
<td>45’</td>
<td>26’</td>
<td>3’</td>
</tr>
<tr>
<td>1300</td>
<td>76’</td>
<td>53’</td>
<td>30’</td>
<td>3’</td>
</tr>
<tr>
<td>1400</td>
<td>87’</td>
<td>59’</td>
<td>33’</td>
<td>3’</td>
</tr>
<tr>
<td>1500</td>
<td>99’ 6”</td>
<td>67”</td>
<td>37’</td>
<td>3’</td>
</tr>
</tbody>
</table>
### Table 2 - Acceleration Rate ≥3.0 but ≤ 3.5 ft/s²

<table>
<thead>
<tr>
<th>Car Speed</th>
<th>1SU / 1SD</th>
<th>2SU / 2SD</th>
<th>3SU / 3SD</th>
<th>4SU / 4SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td></td>
<td></td>
<td>3'</td>
<td>1' 6&quot;</td>
</tr>
<tr>
<td>300</td>
<td></td>
<td></td>
<td>5' 6&quot;</td>
<td>3'</td>
</tr>
<tr>
<td>400</td>
<td></td>
<td></td>
<td>8' 6&quot;</td>
<td>3'</td>
</tr>
<tr>
<td>500</td>
<td></td>
<td>12'</td>
<td>7&quot;</td>
<td>3'</td>
</tr>
<tr>
<td>600</td>
<td>16' 6&quot;</td>
<td>10'</td>
<td>3'</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>22'</td>
<td>12'</td>
<td>3'</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>28'</td>
<td>19'</td>
<td>19'</td>
<td>3'</td>
</tr>
<tr>
<td>900</td>
<td>34' 6&quot;</td>
<td>23'</td>
<td>13'</td>
<td>3'</td>
</tr>
<tr>
<td>1000</td>
<td>41' 6&quot;</td>
<td>29'</td>
<td>16'</td>
<td>3'</td>
</tr>
<tr>
<td>1100</td>
<td>49' 6&quot;</td>
<td>33'</td>
<td>18'</td>
<td>3'</td>
</tr>
<tr>
<td>1200</td>
<td>58'</td>
<td>39'</td>
<td>21'</td>
<td>3'</td>
</tr>
<tr>
<td>1300</td>
<td>67' 6&quot;</td>
<td>45'</td>
<td>24'</td>
<td>3'</td>
</tr>
<tr>
<td>1400</td>
<td>77' 6&quot;</td>
<td>53'</td>
<td>28'</td>
<td>3'</td>
</tr>
<tr>
<td>1500</td>
<td>88'</td>
<td>59'</td>
<td>31'</td>
<td>3'</td>
</tr>
</tbody>
</table>

### Table 3 - Acceleration Rate ≥3.5 but ≤ 4.0 ft/s²

<table>
<thead>
<tr>
<th>Car Speed</th>
<th>1SU / 1SD</th>
<th>2SU / 2SD</th>
<th>3SU / 3SD</th>
<th>4SU / 4SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td></td>
<td>2' 6&quot;</td>
<td>1' 6&quot;</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td></td>
<td></td>
<td>5&quot;</td>
<td>3'</td>
</tr>
<tr>
<td>400</td>
<td></td>
<td></td>
<td>7' 6&quot;</td>
<td>3'</td>
</tr>
<tr>
<td>500</td>
<td></td>
<td></td>
<td>11'</td>
<td>7&quot;</td>
</tr>
<tr>
<td>600</td>
<td></td>
<td></td>
<td>15'</td>
<td>9&quot;</td>
</tr>
<tr>
<td>700</td>
<td></td>
<td></td>
<td>20'</td>
<td>11'</td>
</tr>
<tr>
<td>800</td>
<td>25'</td>
<td>17'</td>
<td>10'</td>
<td>3'</td>
</tr>
<tr>
<td>900</td>
<td>31'</td>
<td>22'</td>
<td>11'</td>
<td>3'</td>
</tr>
<tr>
<td>1000</td>
<td>37' 6&quot;</td>
<td>27'</td>
<td>15'</td>
<td>3'</td>
</tr>
<tr>
<td>1100</td>
<td>44' 6&quot;</td>
<td>31'</td>
<td>17'</td>
<td>3'</td>
</tr>
<tr>
<td>1200</td>
<td>52' 6&quot;</td>
<td>37'</td>
<td>20'</td>
<td>3'</td>
</tr>
<tr>
<td>1300</td>
<td>61'</td>
<td>41'</td>
<td>22'</td>
<td>3'</td>
</tr>
<tr>
<td>1400</td>
<td>70'</td>
<td>47'</td>
<td>25'</td>
<td>3'</td>
</tr>
<tr>
<td>1500</td>
<td>79' 6&quot;</td>
<td>53'</td>
<td>28'</td>
<td>3'</td>
</tr>
</tbody>
</table>
The values in these tables are suggested distances. If the switches are set closer to the floor, the car will not have enough distance to slow down from contract speed at the maximum acceleration rate measured during the learn procedure. Setting the switches further than these values will have no effect on the operation of the board.

### 8.4 Limit Board Set Up

Before the Limit board learn procedure is performed, it is necessary to program the car speed. Locate the rotary switch “SW1” on the Limit board. Using the chart below, locate the contract speed of the car. SW1 will be set based on the car speed. If the contract speed of the car is not divisible by 100 (for example, 350 FPM), S2 will be used to add 50 FPM to the programmed car speed.

<table>
<thead>
<tr>
<th>Car Speed</th>
<th>SW1</th>
<th>Car Speed</th>
<th>SW1</th>
<th>Car Speed</th>
<th>SW1</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1</td>
<td>600</td>
<td>6</td>
<td>1100</td>
<td>B</td>
</tr>
<tr>
<td>200</td>
<td>2</td>
<td>700</td>
<td>7</td>
<td>1200</td>
<td>C</td>
</tr>
<tr>
<td>300</td>
<td>3</td>
<td>800</td>
<td>8</td>
<td>1300</td>
<td>D</td>
</tr>
<tr>
<td>400</td>
<td>4</td>
<td>900</td>
<td>9</td>
<td>1400</td>
<td>E</td>
</tr>
<tr>
<td>500</td>
<td>5</td>
<td>1000</td>
<td>A</td>
<td>1500</td>
<td>F</td>
</tr>
</tbody>
</table>

Set SW1 to the value specified above. If 50 FPM needs to be added, place S2 in the right most position. If not, S2 must remain in the left most position.

Microflite Ultra 2000

The Limit board requires a learn procedure for calibration. With the car on inspection, place it somewhere near the center of the hoistway, away from all terminal floor slowdown switches. Verify that all of the limit switches are turned on by checking the LED's on the board. Use the chart below to determine which LED corresponds to which limit.

<table>
<thead>
<tr>
<th>Limit</th>
<th>LED</th>
<th>Limit</th>
<th>LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1</td>
<td>D1</td>
<td>D1</td>
<td>D5</td>
</tr>
<tr>
<td>U2</td>
<td>D2</td>
<td>D2</td>
<td>D6</td>
</tr>
<tr>
<td>U3</td>
<td>D3</td>
<td>D3</td>
<td>D7</td>
</tr>
<tr>
<td>U4</td>
<td>D4</td>
<td>D4</td>
<td>D8</td>
</tr>
</tbody>
</table>

LED D9 should be turned off. It will come on when the car is on Automatic operation with the doors closed.

Next, bring the car to the lowest landing door zone on inspection operation. Disable the doors, and place the car on Automatic operation. Press and hold switch S3. Press and release switch S1. Release switch S3. D25 will begin blinking rapidly, and D10, D11 and D12 will be illuminated.

Do a high-speed run to the top floor. After the car stops, D10 will turn off. This confirms that the board has recorded the positions of the top and bottom limit switches and learned the contract speed of the car. If D10 or D11 LED's are flashing, the board has detected a fault. Refer to Section 5 for an explanation of the fault.

The next step of the learn procedure requires the car to make a one floor run in the up direction. To do this, run the car down to a floor toward the middle of the hoistway. This floor must be of typical height for the building. Make a one floor run in the up direction.

Run the car back to the top floor. Once the car stops, D11 will turn off, indicating that the Limit board has measured and saved the maximum deceleration of the car.

Run the car back down to the bottom floor. After the car stops, D12 will turn off, and D25 will stop blinking and remain on. This will indicate the learn procedure has been completed successfully.

8.5 Learn Procedure Faults
If the Limit board detects a fault during the learn procedure it will begin flashing the D10 or D11 LED's. Refer to the following table for an explanation of the faults and corrective action.

<table>
<thead>
<tr>
<th>LED</th>
<th>Fault Description</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>D10</td>
<td>Speed Feedback Fault</td>
<td>The Limit board has not detected the Speed Feedback signal from the encoder. Check the encoder wiring at connector J9.</td>
</tr>
<tr>
<td>D11</td>
<td>Encoder Wiring Fault</td>
<td>The Limit board has detected a problem with the Speed Feedback signal. The most likely cause is a wiring error of the encoder signal at connector J9. Check the wiring and confirm that it is wired as shown in Figure 1.</td>
</tr>
<tr>
<td>D10 &amp; D11</td>
<td>Speed Reference Fault</td>
<td>The Limit board has not detected a Speed Reference signal at connector J3. Confirm that J3 is wired as shown in Figure 1. If the problem persists, replace the Limit board.</td>
</tr>
</tbody>
</table>
8.6 Limit Board Testing

After the learn procedure has been performed, run the car on automatic operation. The car should run at contract speed and decelerate normally. Run the car to the top and bottom floor and confirm that LED D25 on the board stays on continuously. If it starts to flash at any time, the board has detected the car was approaching a terminal floor too fast, and has brought the car into the floor. If this occurs, the board has not been set up correctly, and the learn procedure must be performed again.

Once it has been confirmed that the car runs normally, it is necessary to test the board. **BEFORE THE BOARD IS TESTED, IT MAY BE NECESSARY TO PREVENT THE CAR SAFETY AND/OR COUNTERWEIGHT SAFETY FROM APPLYING.** To do this, disable the safety devices by tying the safety arm down so it will not apply if the car or counterweight strikes the buffer.

After the safeties have been disabled, run the car on automatic to a floor in the center of the hoistway. Access the Parameters menu on the MPU. Go to the “Floor Landing Values” menu. Change the bottom floor to “000002.” Change the top floor value to a value 10,000 counts above its present setting. Save these changes and exit the Parameters menu.

### 8.6.1 NTS Testing

Place a car call for the bottom floor. The processor will not attempt to slow the car down, and the Limit board will slow and stop the car in the door zone of the bottom floor. Place a car call for the top floor. Again, the processor will not attempt to slowdown, and the Limit board will slow and stop the car in the door zone of the top floor.

### 8.6.2 ETS Testing

Run the car back to the center of the hoistway. After the car stops, remove connectors J3 and J7 from the limit board. Using two short pieces of wire, jump J3-1 to J7-1 and J3-2 to J7-2. Place a car call for the bottom floor. The car will not attempt to slowdown, and the Limit board will attempt to slow the car down. When the car does not respond, the Limit board will trip, removing power from the hoist motor and brake, stopping the car. This will occur when the speed of the car exceeds a value at which the Limit board can safely slow and stop the car. Place a car call for the top floor. Again, the car will not attempt to slowdown, and the Limit board will trip and stop the car.

### 8.7 Limit Board Faults

After the car is placed in operation, some of the diagnostic LED’s may blink, indicating that a fault has occurred. Refer to the following Table for an explanation of the faults.

<table>
<thead>
<tr>
<th>LED</th>
<th>Fault Description</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>D25 Flashing</td>
<td>Terminal Slowdown Occurrence</td>
<td>The Limit board has detected that the car was approaching a terminal floor at a speed greater than it should have. The board initiated a slowdown and stopped the car.</td>
</tr>
<tr>
<td>D10</td>
<td>Speed Feedback Loss</td>
<td>The Limit board has detected that the car has been running, but no Speed Feedback has been present. This will cause the Limit board to trip, removing power from the hoist motor and brake.</td>
</tr>
<tr>
<td>D11</td>
<td>Slowdown Sequence Fault</td>
<td>The Limit board has detect that the slowdown switches are opening in a sequence other than that which was seen during the learn procedure. This could be caused by faulty wiring or a bad limit switch.</td>
</tr>
</tbody>
</table>
8.8 ETSL Set Up Procedure

ETSL (Emergency Terminal Speed Limiting) is only required where reduced stroke buffers are installed. The purpose of the ETSL system is to slow the speed of the car to a point at or below the buffer’s rated striking speed. O. Thompson’s ETSL system accomplishes this by opening the safety circuit and dropping the brake.

The O. Thompson ETSL system consists of a sensor board, two memory reed switches, and two magnet bracket assemblies. The sensor board and reed switches are mounted on top of the car. The magnet brackets are mounted at specific distances (based on car speed and buffer stroke) from the top and bottom terminal floors. As the car passes the magnet bracket, the speed of the car must be slow enough that the reed switches are closed for more than 100 milliseconds. If the switches are closed for less than 100 milliseconds, the car is traveling too fast, and the sensor board will open contacts in the safety circuit, initiating an emergency stop.

Before adjusting the ETSL system, the car must be up to contract speed and all motion parameters set to their final values. Failure to do this could cause nuisance trips of the ETSL system.

8.8.1 ETSL Wiring

The O. Thompson ETSL board will accept 18 -24 volts AC or DC. Power must be wired to terminal J3-8 and J3-9.

The memory reed switches are wired to terminal J1. Switch 1 is wired to J1-1 and J1-2. Switch 2 is wired to J1-3 and J1-4.

In compliance with ANSI code, no single jumper or short can disable the ETSL system. To comply with this, the safety circuit must be opened in two different locations. Wire the sensor board so terminals J3-4 and J3-5 are in series with the stop switch on top of the car. Wire J3-6 and J3-7 so they are in series with the low side of the safety circuit relay, or if this is not possible, it can be wired in series to interrupt the controller feed to the safety circuit.
When power is applied to the board the green LED should flash slowly. This indicates that the board is functioning correctly. There are two red LED’s on the board, one indicating that the board has tripped and one indicating a malfunction.

### 8.8.2 Bracket Mounting and Set Up

Referring to the chart below, locate the speed of the car and the stroke of the buffer. Write down the distance from the terminal floor for Bracket 1 and Bracket 2.

<table>
<thead>
<tr>
<th>Car Speed</th>
<th>Buffer Stroke</th>
<th>Bracket 1</th>
<th>Bracket 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>8.5”</td>
<td>6’ 9”</td>
<td>2’</td>
</tr>
<tr>
<td>600</td>
<td>8.5”</td>
<td>11’ 3”</td>
<td>2’</td>
</tr>
<tr>
<td>600</td>
<td>18”</td>
<td>6’ 4”</td>
<td>3’</td>
</tr>
<tr>
<td>700</td>
<td>18”</td>
<td>11’ 6”</td>
<td>3’</td>
</tr>
<tr>
<td>800</td>
<td>39”</td>
<td>6’ 6”</td>
<td>4’ 4”</td>
</tr>
<tr>
<td>1,000</td>
<td>39”</td>
<td>20’ 3”</td>
<td>4’ 4”</td>
</tr>
<tr>
<td>1,000</td>
<td>49”</td>
<td>15’ 3”</td>
<td>4’ 10”</td>
</tr>
<tr>
<td>1,000</td>
<td>59”</td>
<td>10’ 0”</td>
<td>5’ 4”</td>
</tr>
<tr>
<td>1,200</td>
<td>49”</td>
<td>31’ 9”</td>
<td>4’ 10”</td>
</tr>
<tr>
<td>1,200</td>
<td>59”</td>
<td>26’ 8”</td>
<td>5’ 4”</td>
</tr>
<tr>
<td>1,200</td>
<td>74”</td>
<td>19’ 0”</td>
<td>6’</td>
</tr>
<tr>
<td>1,400</td>
<td>74”</td>
<td>38’ 4”</td>
<td>6’</td>
</tr>
<tr>
<td>1,600</td>
<td>89”</td>
<td>52’ 9”</td>
<td>6’ 6”</td>
</tr>
</tbody>
</table>

Referring to the diagram on the following page, mount the magnet brackets at the top and bottom floors the distance recorded from the previous table.
After the brackets are installed it is necessary to adjust the distance between the magnets. The top magnets on the bracket should be south pole and the bottom magnets north pole.

Using the chart below, adjust both sets of magnets on the bracket so they are the correct vertical distance apart.

<table>
<thead>
<tr>
<th>Car Speed</th>
<th>Buffer Stroke</th>
<th>Distance</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>8.5&quot;</td>
<td>10.5&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>600</td>
<td>8.5&quot;</td>
<td>13.5&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>600</td>
<td>18&quot;</td>
<td>10.25&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>700</td>
<td>18&quot;</td>
<td>13.5&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>800</td>
<td>39&quot;</td>
<td>10.25&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>1,000</td>
<td>39&quot;</td>
<td>17.75&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>1,000</td>
<td>49&quot;</td>
<td>15.5&quot;</td>
<td>19.5&quot;</td>
</tr>
<tr>
<td>1,000</td>
<td>59&quot;</td>
<td>12.75&quot;</td>
<td>21&quot;</td>
</tr>
<tr>
<td>1,200</td>
<td>49&quot;</td>
<td>22.25&quot;</td>
<td>19.5&quot;</td>
</tr>
<tr>
<td>1,200</td>
<td>59&quot;</td>
<td>20.33&quot;</td>
<td>21&quot;</td>
</tr>
<tr>
<td>1,200</td>
<td>74&quot;</td>
<td>17.25&quot;</td>
<td>24&quot;</td>
</tr>
<tr>
<td>1,400</td>
<td>74&quot;</td>
<td>24.5&quot;</td>
<td>26&quot;</td>
</tr>
<tr>
<td>1,600</td>
<td>89&quot;</td>
<td>28.5&quot;</td>
<td>26&quot;</td>
</tr>
</tbody>
</table>

After the magnets are adjusted, remove any jumpers from the ETSL sensor board contacts. These jumpers may have been placed on the controller.

As the car passes the magnet brackets, the yellow LED’s for the reed switches should turn on and then off. Confirm that if the car is stopped with the sensor between the magnets, that the yellow LED is lit. If not, the magnets may be installed incorrectly, or the sensors are installed upside down. If this LED is on for less than 100 milliseconds, indicating the car is traveling at a speed greater than it should be at this distance, the ETSL board will trip, opening the contacts in the safety circuit.

Run the car at contract speed with both full load and no load into the top and bottom floors to ensure that the sensor board does not trip. If the board does trip, confirm that the bracket is the correct distance from the floor and the magnets are the correct distance apart. Also, check the deceleration rate of the car. If the deceleration rate is greater than 3.5 \(\text{ft/s}^2\), then the brackets may need to be relocated closer to the terminal floors. Contact O. Thompson Technical Support for assistance.

Assuming the system does not trip, move the magnets on the top terminal bracket closer together, approximately half of the correct distance. Run the empty car into the top floor at contract speed. As the car passes the bracket, the sensor board will trip, opening the
safety circuit and stopping the car. After the board trips, it should automatically reset after 15 seconds. Return the magnets to their correct position and repeat this procedure for the bottom bracket.
Section 9  
K-Tech Load Weigh System (Pretorque only)

Controllers with pretorque use the K-Tech Load Weigh System. Proper installation and adjustment of this device is essential to the operation of the control system. Failure to follow the procedures outlined in this section can result in poor ride quality and improper operation of the control system.

This section is intended as a supplement to the K-Tech Installation Adjustment manual. Read all related material before beginning installation of the unit.

Before installing the and adjusting the K-Tech Load Weigh system you must first determine which system you have. To do this, look at the cover of the electronics box. On it you will see a label with the model number of the unit.

There are two systems presently in use, the LW3200, and the LW4201. The latter is the latest system, and incorporates an automatic re-calibration feature, eliminating the need for periodic re-calibration of the unit. For installation of the LW3200, refer to section 9.1 of this chapter. For LW4201, refer to section 9.2.

9.1  K-Tech LW3200

9.1.1 Preparation
Before beginning the installation of the unit, the car should be adjusted and running at contract speed. The cab should be complete, with all walls, ceiling panels, and flooring installed. If not, do not install the unit until the cab is complete!

9.1.2 Sensor Mounting
The sensor must be mounted while the car is empty and at the lowest landing. Failure to do so could cause the sensor to ‘unload’ at lower floors and lead to erratic operation.

| RECOMMENDED SENSOR LOCATIONS |

Locate an area of the crosshead about 1/3 of the way from the end. This area should be clear of brackets or other structural members.
File, sand or lightly grind the area where the sensor will be located to remove any paint. Lay the sensor on the cleaned area of the crosshead about ½” away from the edge. Shine a light behind the sensor to ensure that it lays flat on the crosshead. If light can be seen under the sensor, file the area until the sensor lies perfectly flat.

Locate the sensor ½” in from the outer edge of the crosshead channel. The sensor should be mounted so the wiring connection is facing toward the center of the crosshead. Also, make sure the edge of the sensor is parallel with the edge of the crosshead channel.

Mark the crosshead where the hole closest to the center of the car is located. Carefully drill a 9/32” hole at this point. Locate the position where the hole next to the first one must be drilled. Carefully drill this hole. Loosely install the mounting bolts in these holes. Mark the location of the last two holes. Remove the sensor. The last two holes should be drilled using an 11/32” drill bit. Carefully drill these holes.

Loosely mount the sensor to the crosshead. It should be able to move slightly in the mounting holes. If not, lightly ream the holes so it can.

Install the sensor to the crosshead using the supplied hardware. The bevel washers are installed under the lip of the crosshead so the mounting bolts are not tightened on an angle. Erratic operation may occur if the bolts are not tightened flat against the sensor.

9.1.3 Electronics Box Mounting
Mount the blue electronics box in close proximity to the sensor. If possible, mount it so adjustments can be made while standing on a landing. This is not critical, but makes the adjustment procedure easier.

After the box is mounted, route the sensor cable through the knock out provided. Coil any excess cable inside the box. Tighten the nylon nut onto the strain relief.

9.1.4 Electrical Connections
Refer to drawing on the following page for terminal locations.
Connect the sensor cable to the terminal block labeled “SENSOR” on the amplifier board.

Connect the AC power supply (Terminals IP and IPX) to the terminal strip terminals AC HOT (IPX) and 4 (IP). Ground the lug in the electronics box to controller ground.

A twisted - shielded cable must be run for the output of the unit to the car top encoder. The output of the amplifier board, “SET POINTCONNECT” terminals T4 & T5 will be connected to the O. Thompson Encoder power supply board terminals J3-1 and J3-2. Route the cable through the knockout in the K-Tech electronics box to the Encoder. Connect the cable shield to the ground terminal in the K-Tech box.

Confirm that K-Tech terminal T4 is connected to Encoder terminal J3-1 and K-Tech terminal T5 is connected to encoder terminal J3-2. Ground the shield of the cable inside the Encoder box.

The electronics box is now connected, the sensor mounted, and the unit is ready to be calibrated.

### 9.1.5 Sensor Calibration

If possible, perform the calibration while standing off the car top. If this is not possible, be sure to stand in the same position for each procedure.

1. Bring the car to the lowest landing. There should be nothing in the car or on top of it.
2. Connect the positive (red) lead of a Digital Volt Meter (DVM) to test point T3 (signal) and the negative lead (black) to test point T5 (ground). Set the meter to the millivolt scale.

   **Note:** If the controller is powered up, the red LED should be illuminated. If the controller is not powered up, do so now.

3. While standing on the car, turn the “SENSOR ADJUST” pot until the meter reads zero, plus or minus one millivolt.
4. Step off the car. The meter should change, and the voltage should be positive. If the voltage is negative, the “NON-INVERT/INVERT” switch must be in the “INVERT” position.

   **Note:** The observed voltage at test point T3 will not change. It will remain negative. This is OK.

5. Step back onto the car at the same position where you were previously. Adjust the “SENSOR ADJUST” pot to obtain the same value that was seen with you off, only
opposite polarity. For example, if the meter read +10 mV with you off the car, step back on the car and adjust the meter for –10 mV.

6. Step off the car. The meter should read zero. If not, adjust the “SENSOR ADJUST” pot until it does.

9.1.6 Amplifier Board Calibration
1. Remove the positive meter lead from T3 and place it on T4. Set the meter to read 0 – 10 volts.
2. Step back on the car to the same position you were in previously. Turn the “ZERO ADJUST” pot to obtain 1.0 volts, plus or minus .05 volts.
3. Step off the car. The meter reading should drop a little. Calculate how much the voltage drop was by subtracting the current meter reading from 1.00.
4. Step back on top of the car. Adjust the “ZERO ADJUST” to exactly equal the observed voltage drop. For example, if the meter dropped to .80 volts when you stepped off, adjust the pot to obtain 0.20 volts with you standing on the car.
5. Step back off the car. The meter should read 0.00 volts, plus or minus .05 volts. If not, adjust the “ZERO ADJUST” pot to obtain 0.00 volts with an empty car.
6. Place the car with a full load on it at the top floor. Adjust the “GAIN ADJUST” pot to obtain 8.00 volts, plus or minus .05 volts.
7. Step off the car. Observe the meter reading. Calculate how much the voltage dropped (8.00 minus current meter reading).
8. Step back on the car to the same position, and adjust the “GAIN ADJUST” pot to obtain 8.00 plus the observed voltage drop.
9. Step off the car. The meter should read 8.00, plus or minus .05 volts. If not, adjust the “GAIN ADJUST” pot until it does.
10. Remove the weight from the car and bring it back to the bottom landing.
11. With the meter still on T4, adjust the “ZERO ADJUST” pot to get 1.00 volts.
12. Step off the car. Observe the meter reading and calculate the voltage drop.
13. Step back on the car. Adjust the “ZERO ADJUST” pot to get 1.00 plus the observed voltage drop.
14. Step off the car. The meter should read 1.00 volts, plus or minus .05 volts. If not, adjust the “ZERO ADJUST” pot until it does.

The K-Tech load weigh device is now properly adjusted for the controller. The controller must now be set up for proper operation. When the car is running at contract speed and all final adjustments have been made to the motion parameters, refer to Section 9.4 of this chapter for the controller pretorque set up procedure.

9.2 Sensor Re-calibration Procedure - LW3200
The sensor on the K-Tech LW 3200 Load Weigh unit will require periodic re-calibration. This is because of changes in ambient temperature of the equipment. The re-calibration procedure should only take about five minutes.

1. Move the car to the lowest landing in the hoistway. Access the top of the car. If necessary, run the car down so it is floor level at the bottom floor.
2. Connect the positive (red) lead of a Digital Volt Meter (DVM) to test point T4 and the negative lead (black) to test point T5. Set the meter to the millivolt scale.

3. While standing on the car, turn the “ZERO ADJUST” pot until the meter reads one hundred millivolts, plus or minus five millivolts.

4. Step off the car. The voltage will drop slightly. Calculate how much the drop was by subtracting the present voltage reading from 100 millivolts.

5. Step back onto the car at the same position where you were previously. Adjust the “ZERO ADJUST” pot to obtain 100 millivolts, plus the value calculated in the previous step. For example, if the meter read 75 millivolts with you off the car, step back on the car and adjust the meter for 125 millivolts.

6. Step off the car. The meter should read 100 millivolts. If not, repeat steps 4 and 5 and adjust the “ZERO ADJUST” pot until it does.
9.3 K-Tech LW4200

9.3.1 Preparation
Before beginning the installation of the unit, the car should be adjusted and running at contract speed. The cab should be complete, with all walls, ceiling panels, and flooring installed. If not, do not install the unit until the cab is complete!

9.1.2 Sensor Mounting
The sensor must be mounted while the car is empty and at the lowest landing. Failure to do so could cause the sensor to ‘unload’ at lower floors and lead to erratic operation.

Referring to the figure below, locate the area of the crosshead where the sensor will be mounted. This area should be clear of brackets or other structural members.

File, or sand the area where the sensor will be located to remove any paint or unevenness. Included in the box with the sensor is a drill template. The template will properly locate the holes for the sensor. Lay the template on the cleaned area of the crosshead with the bend
facing down. Hold the bend securely against the edge of the crosshead, and clamp it in place. Using a 3/8” drill bit, drill two holes through the template where the pilot holes are located.

After cleaning all shavings, remove the template from the crosshead. File the crosshead to remove any burrs.

Referring to the figure below, install the sensor to the crosshead using the supplied hardware. The bevel washers are installed under the lip of the crosshead so the mounting bolts are not tightened on an angle. Tighten the bolts to 20 - 30 ft/lbs.

After the sensor is installed, the drill template will be installed on top of it as a guard. Place the template over the sensor and secure it to the bolts with the supplied acorn nuts. The bolts must only be loosely tightened. If they are too tight the sensor will not operate properly.

9.3.3 Electronics Box Mounting
Mount the blue electronics box in close proximity to the sensor. If possible, mount it so adjustments can be made while standing on a landing. This is not critical, but makes the adjustment procedure easier.

After the box is mounted, route the sensor cable through any of the knock outs on the electronics box. Plug it in to the connector marked “J1.” Coil any excess cable inside the box.

9.3.4 Electrical Connections
Refer to drawing on the following page for terminal locations.

Connect the AC power supply (controller terminals IP and IPX) to K-Tech terminals AC HOT (IPX) and AC RET (IP). Ground the electronics box to controller ground.

The output of the K-Tech unit will be connected to the O. Thompson Encoder power supply board terminals J3-1 and J3-2. A twisted - shielded cable must be run from terminals LW+ and
LW- to the car top encoder. Route the cable through the knockout in the K-Tech electronics box to the Encoder. Confirm that K-Tech terminal LW+ is connected to Encoder terminal J3-1 and K-Tech terminal LW- is connected to encoder terminal J3-2. Ground the shield of the cable inside the Encoder box.

Connect the terminal “Input 1” (J4) on the K-Tech electronics board to terminal “CAL” on the O. Thompson Car Station board. Refer to the O. Thompson wiring diagrams for the exact terminal location, as it will vary on job to job basis. This signal will be activated periodically by the Car Station board, energizing the relay on the K-Tech board to re-calibrate the crosshead sensor.

The electronics box is now connected, the sensor mounted, and the unit is ready to be calibrated.

### 9.3.5 Calibration

Apply power to the controller and allow it remain on for at least 30 minutes prior to adjusting the unit. Failure to do this could require the unit to be re-adjusted later. If possible, perform the calibration while standing off the car top. If this is not possible, be sure to stand in the same position for each procedure.

**Empty Car, Bottom Floor**

1. Bring the car to the lowest landing. There should be nothing in the car or on top of it.
2. Switch “S3” to the “+” position.
3. One or more of the red and green LED’s on the left hand edge of the board will be illuminated. If the “-” LED is not on, Slowly turn the “COARSE” pot counter-clockwise until it does.
4. Slowly adjust the “COARSE” pot clockwise until the green “0” LED turns on. Continue turning the pot clockwise until the “-” LED just turns off and the “+” LED turns on.
5. Turn the “FINE A” pot counter-clockwise until just the “0” LED is on.
6. Press the “RESET” button on the K-Tech board. This will set the output of the unit to 1 VDC at LW+ and LW-.

**Full Load, Top Floor**
1. Bring the car to the top floor. Place full load in the car. You may leave an appropriate amount of weight off the car to compensate for your body weight. Make sure the weights are evenly distributed.
2. Slowly adjust the “GAIN A” pot until either of the yellow LED’s come on and the green LED just turns off. Slowly turn the “GAIN A” pot in the opposite direction until the green LED just turns back on.
   
   **NOTE:** If you are unable to adjust the “GAIN A” pot so either of the yellow LED’s are on and the green LED is on, referring to the chart below, set SW1 to the next highest gain setting. Remove the weight from the car and go to step 3 of the “Empty Car, Bottom Floor” set up procedure.

<table>
<thead>
<tr>
<th>Pole 1</th>
<th>Pole 2</th>
<th>Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>200</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>300</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>400</td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
<td>500</td>
</tr>
</tbody>
</table>

3. If the - yellow LED is on, set SW3 to the minus (-) position. If the + yellow LED is on, no action needs to be taken.

The K-Tech load weigh device is now properly adjusted for the controller. The controller must now be set up for proper operation. When the car is running at contract speed and all final adjustments have been made to the motion parameters, refer to Section 9.4 of this chapter for the controller pretorque set up procedure.

### 9.4 Controller Pretorque Set Up Procedure

**NOTE:** Before attempting this procedure a learn trip must have been performed and the car needs to be running at contract speed.

1. Remove all weight from the car. Disable the doors and run it to the bottom floor. Leave it on automatic operation.
2. On the MPU board, turn pot R32 fully clockwise.
3. Using the MPU key pad, access the car parameter menu. Go to “LEARN TRIP, FLOOR NAMES, PRETORQUE.”
4. Access the “PRETORQUE” screen. The screen should look something like this:

```
RELEASE BRAKE AND CHECK FOR ROLLBACK
POWER N BRAKE N GENERATOR N
Encoder: Present 000000   Top 0000000
                     Bottom 0000000
Pulse height: +/-____ (max 3200)
TURN ON STRAIN GUAGE CALIBRATION-CAL:OFF
------------------------------------
Pulse height: Bottom empty +/-____
               Top empty   +/-____
               Top full load +/-____
Weight value: Bottom empty ___
               Top empty ___
               Top full load ___
Weight of load(lbs) ___
Present weight value 000
```

If this car has the LW4200 load weigh unit, move the cursor to “TURN ON STRAIN GUAGE CALIBRATION” and press “0.” This will calibrate the load weigh unit.

5. At the bottom of the screen is the present weight value coming from the strain gauge. It should be around 22 counts. Move the cursor to the item “WEIGHT VALUE: BOTTOM EMPTY.” Enter the present weight value in the space after this item.
6. Move the cursor to the top section of the screen. Set the “PULSE HEIGHT” to -1000.
7. Move the cursor to the item “RELEASE BRAKE AND CHECK FOR ROLLBACK.” Press the “O” key.
8. After delay of about 5 seconds, the brake will lift. Observe the drive sheave. It may move slightly, either up or down.
9. Move the cursor to the “PULSE HEIGHT” item. If the car moved up, make the value more negative (try -1200). If the car moved down, make the value more positive (try -800).
10. Release the brake again and observe the drive sheave. Modify the “PULSE HEIGHT” until the car holds zero speed when the brake is released. This value should be kept as low as possible, but no movement of the car should be visible.
    **NOTE:** The car should hold zero speed for at least several seconds. It may move slightly, either up or down, after that. This is normal, and the speed should be very slow.
11. Move the cursor to the lower screen section and save the pulse height that held the car at zero speed in the space after “PULSE HEIGHT: BOTTOM EMPTY.”
12. Exit to the main menu. Save the changes to the system’s non-volatile memory.
13. Reset the MPU. Allow the system to power up normally and run the car to the top floor.
14. Access the parameters and go to the pretorque set up screen.
15. Add -200 counts to the value that held the car at zero speed at the bottom floor. If -1200 worked at the bottom floor, make “PULSE HEIGHT” -1400.
16. Move the cursor to “RELEASE BRAKE AND CHECK FOR ROLLBACK.” Press the “O”
17. Edit the “PULSE HEIGHT” value until the car holds zero speed when the brake lifts.
18. Move the cursor to the bottom section of the screen. Enter the value that held the car at zero speed into “PULSE HEIGHT: TOP EMPTY.”
19. Move the cursor to the item “WEIGHT VALUE: TOP EMPTY.” Enter the value displayed after the item “PRESENT WEIGHT VALUE.”
20. Move the cursor to the item “WEIGHT OF LOAD (LBS).” Enter the rated capacity of the car here.
21. Exit to the main menu. Save the changes to the system’s non-volatile memory.
22. Reset the MPU. Allow the system to power up normally. Place full load in the car.
23. Access the parameters and go to the pretorque set up screen.
24. Set the “PULSE HEIGHT” item to +2000.
25. Move the cursor to “RELEASE BRAKE AND CHECK FOR ROLLBACK.” Press the “O” key and observe the drive sheave.
26. Edit the “PULSE HEIGHT” value until the car holds zero speed when the brake lifts. If the car moves down, make the value larger. If it moves up, make it smaller.
27. Move the cursor to the bottom section of the screen. Enter the value that held the car at zero speed into “PULSE HEIGHT: TOP FULL LOAD.”
28. Move the cursor to the item “WEIGHT VALUE: TOP FULL LOAD.” Enter the value displayed after the item “PRESENT WEIGHT VALUE.” It should be about 225 counts.
29. Exit to the main menu. Save the changes to the system’s non-volatile memory.
30. Reset the MPU. Allow the system to power up normally. Remove the weights from the car.

The pretorque set up is now complete.
Section 10  Testing

10.1  Terminal Limit Test - Top

NTS Test
1. Place the car 3 - 5 floors below the top landing.
2. Go to Page 12 of the Parameters (Floor Landing Values).
3. Move the cursor to the top floor position and write down the current value.
4. Add 5000 counts to the top floor position count.
5. Go back to the main parameter screen and save the new temporary value.
6. Put a call in for the top floor. The car should begin decelerating too late, and trip the limit board, initiating the alternate speed profile. The alternate speed profile should bring the car speed down to about 5% of contract speed, and the car should stop at the next available floor.

ETS Test
1. Run the car back to a floor 3 - 5 floors below the top landing.
2. Remove J3 and J7 connectors from Limit board.
3. Place TEMPORARY jumpers from J3-1 to J7-1, and J3-2 to J7-2.
4. Put a call in for the top floor. The car should not decelerate and the alternate speed profile is disabled, so the board will trip and open the safety circuit, stopping it prior to striking the buffer.
5. Change the top floor value back to its correct value. Remove all jumpers from the Limit board.

10.2  Terminal Limit Test - Bottom

NTS Test
1. Place the car 3 - 5 floors above the bottom landing.
2. Go to Page 12 of the Parameters (Floor Landing Values).
3. Move the cursor to the bottom floor position and write down the current value.
4. Set the bottom floor count to 00002.
5. Go back to the main parameter screen and save the new temporary value.
6. Put a call in for the bottom floor. The car should begin decelerating too late, and trip the limit board, initiating the alternate speed profile. The alternate speed profile should bring the car speed down to about 5% of contract speed, and the car should stop at the next available floor.

ETS Test
1. Run the car back to a floor 3 - 5 floors above the bottom landing.
2. Remove J3 and J7 connectors from Limit board.
3. Place TEMPORARY jumpers from J3-1 to J7-1, and J3-2 to J7-2.
4. Put a call in for the bottom floor. The car should not decelerate and the alternate speed profile is disabled, so the board will trip and open the safety circuit, stopping it prior to striking the buffer.
5. Change the bottom floor value back to its correct value. Remove all jumpers from the Limit board.
10.3 Counterweight Buffer Test

Note:

*On higher speed cars (700 fpm or higher), it is sometimes best to tie down the car safety arm for this test as the car may bounce in the overhead and set the car safeties and become lodged in the overhead.*

1. Place the car 3 - 5 floors below the top landing.
2. Go to Page 12 of the Parameters (Floor Landing Values)
3. Move the cursor to the top floor position and write down the current count.
4. Add 5000 counts to the top floor position count.
5. Go back to the main parameter screen and save the new temporary value.
6. Place temporary jumpers between the SF1 & SF2 and SF3 & SF4 terminals on the limit board to prevent the limit board from stopping the car.
7. Remove the connectors and place temporary jumpers from Speed Ref In + to Speed Ref Out +, and Speed Ref In - to Speed Ref Out -.
8. Put a call in for the top floor. The car will continue into the overhead, compressing the counterweight buffer.
9. Immediately place the car on inspection. Remove the temporary jumpers from the limit board.
10. Check that the compensating sheave has not come out of its rails if applicable.
11. Go back to the Floor Landing Values Screen and put the original floor count for the top floor in the top floor position. **Remember to write the value to non-volatile memory before putting the car back in automatic.**
12. Run the car on inspection down to one floor below the top floor.
13. Put the car back in automatic and place a call for the top floor. Make sure the car makes a normal stop and comes into the top floor level.

10.4 Car Buffer Test

Note:

*On higher speed cars (700 fpm or higher), it is sometimes best to tie down the counterweight safety arm for this test as the counterweight may bounce in the overhead and set the counterweight safeties and become lodged in the overhead.*

1. Place the car 3 - 5 floors above the bottom landing.
2. Go to Page 12 of the Parameters (Floor Landing Values)
3. Move the cursor to the bottom floor position and write down the current count (should be 2000).
4. Change the bottom floor position count to 100.
5. Go back to the main parameter screen and save the new temporary value.
6. Place a temporary jumper between the SF1 & SF2 and SF3 & SF4 terminals on the limit board to prevent the limit board from stopping the car.
7. Remove the connectors and place temporary jumpers from Speed Ref In + to Speed Ref Out +, and Speed Ref In - to Speed Ref Out -.
8. Put a call in for the bottom floor. The car will continue into the pit, compressing the car.
buffer.
9. Immediately place the car on inspection. Remove the temporary jumpers from the limit board.
10. Check that the compensating sheave has not come out of its rails if applicable.
11. Go back to the Floor Landing Values Screen and put the original floor count for the bottom floor in the bottom floor position (should be 2000). **Remember to write the value to non-volatile memory before putting the car back in automatic.**
12. Run the car on inspection up to one floor above the bottom floor.
13. Put the car back in automatic and place a call for the bottom floor. Make sure the car makes a normal stop and comes into the bottom floor level.

### 10.5 Car Governor Overspeed Test

**Note 1:**

*On higher speed cars (500 fpm or higher) if the counterweight is equipped with safeties, it is sometimes best to tie down the counterweight safeties during this test as the counterweight may bounce onto safeties after the car safeties have set.*

**Note 2:**

*If the Ultra 2000 “OVERSPEED” parameter is set, you will need to change this to a value equal to approximately 150% of contract speed to perform the normal overspeed tests for your local inspectors. This parameter should be set back to 110% of contract speed after this test is complete.*

1. Bring the car to a floor above the bottom floor where there is enough room to accelerate to a speed which will trip the governor. It is best to perform this test toward the bottom of the hoistway so if the safety does not release, it can be easily accessed.
2. **TEMPORARILY** set the Motor RPM parameter in the drive to 150% of its present value. (Parameter 11 on the Magnetek DC drive, and CONTRACT MTR SPD in the Magnetek AC drive). On the Amicon generator shunt field regulator, set the SW1 dip switches to their next highest setting. See page 6c-8 for switch settings.
3. If applicable, tie the Counterweight governor jaw up to prevent it from dropping.
4. Place a **temporary jumper** across the car governor overspeed switch.
5. Place a **temporary jumper** between the SF1 & SF2 and SF3 & SF4 terminals on the limit board to prevent the limit board from stopping the car.
6. Remove the connectors and place **temporary jumpers** from Speed Ref In + to Speed Ref Out +, and Speed Ref In - to Speed Ref Out -.
7. Put the main line power on. Place a car call such that the car will reach top speed for a long period of time. Do not place a call any closer than three floors from the bottom.
8. The car will accelerate past contract speed until the governor trips. Immediately place the car on inspection.
9. Check that the comp sheave has not come out of its rails, if applicable.
10. Check the car, cab, and counterweight for damage
11. Reset the governor overspeed switch.
12. Inch the car up until the governor jaw can be reset.
13. Untie the car governor jaw and reset the latch.
14. Remove the temporary jumper placed across the governor overspeed switch.
15. Remove the temporary jumpers from the Limit board.
16. Restore the Motor RPM parameter to its correct value, or reset SW1 on the Amicon regulator.

**10.6 Counterweight Governor Overspeed Test (If Applicable)**

**Note:**

*If the Ultra 2000 “OVERSPEED” parameter is set, you will need to change this to a value equal to approximately 150% of contract speed to perform the normal overspeed tests for your local inspectors. This parameter should be set back to 110% of contract speed after this test is complete.*

1. Bring the car to a floor above the bottom floor where there is enough room to accelerate to a speed which will trip the governor. It is best to perform this test toward the bottom of the hoistway so if the safety does not release, it can be easily accessed.
2. **TEMPORARILY** set the Motor RPM parameter in the drive to 150% of its present value. (Parameter 11 on the Magnetek DSD 412 DC drive, and CONTRACT MTR SPD in the Magnetek AC drive). On the Amicon generator shunt field regulator, set the SW1 dip switches to their next highest setting. See page 6c-8 for switch settings.
3. Tie the Car governor jaw up to prevent it from dropping.
4. Place a temporary jumper across the car governor overspeed switch.
5. Place a temporary jumper between the SF1 & SF2 and SF3 & SF4 terminals on the limit board to prevent the limit board from stopping the car.
6. Remove the connectors and place temporary jumpers from Speed Ref In + to Speed Ref Out +, and Speed Ref In - to Speed Ref Out -.
7. Put the main line power on. Run the car to the bottom floor. Place a call such that the car will reach top speed for a long period of time. Do not place a call any closer than three floors from the top.
8. The car will accelerate past contract speed until the governor trips. Immediately place the car on inspection.
9. Check that the comp sheave has not come out of its rails, if applicable.
10. Check the car, cab, and counterweight for damage
11. Reset the car and counterweight governor overspeed switches.
12. Inch the car down until the counterweight governor jaw can be reset.
13. Untie the car governor jaw and reset the latch.
14. Remove the temporary jumper placed across the car governor overspeed switch.
15. Remove the temporary jumpers from the Limit board.
16. Restore the Motor RPM parameter to its correct value, or reset SW1 on the Amicon regulator.
Section 11 Diagnostic Screen Display / Parameter Entry

11.1 Car Diagnostic Screen

Example:

<p>| | | | | | | | | | | | | |</p>
<table>
<thead>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15:49:48</td>
<td>01/08/03</td>
<td>WEDNESDAY</td>
<td>018R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>266 PARK AVENUE</td>
<td>CAR 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>10C</td>
<td>11C</td>
<td>12C</td>
<td>MGS</td>
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<td></td>
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</tr>
<tr>
<td>5</td>
<td>BZI</td>
<td>ATT</td>
<td>UPB</td>
<td>DNB</td>
<td>BYP</td>
<td>INDC</td>
<td>DOB</td>
<td>DCB</td>
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</tr>
<tr>
<td>6</td>
<td>SE</td>
<td>EE</td>
<td>DOL</td>
<td>DOL</td>
<td>FKS</td>
<td>RES</td>
<td>FDH</td>
<td>DDS</td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>INS</td>
<td>LIM</td>
<td>CC</td>
<td>DG</td>
<td>REG</td>
<td>SAF</td>
<td>MSGH</td>
<td>DDSH</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>BKR</td>
<td>PWA</td>
<td>LEV</td>
<td>DZ</td>
<td>IUP</td>
<td>DOBH</td>
<td>IDN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>LRN</td>
<td>LMGS</td>
<td>OSPD</td>
<td>CWSW</td>
<td>CWL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>IC1</td>
<td>IC2</td>
<td>IC4</td>
<td>IC8</td>
<td>UDAC</td>
<td>DDAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>UDG</td>
<td>DDG</td>
<td>DAL</td>
<td>UAL</td>
<td>FRLC</td>
<td>FPC</td>
<td>BUZ</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>12</td>
<td>CXXP</td>
<td>CXP</td>
<td>OXP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>13</td>
<td>APW</td>
<td>RBK</td>
<td>EFX</td>
<td>FFA</td>
<td>UP</td>
<td>DWN</td>
<td>LEV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>FRLH</td>
<td>FRX</td>
<td>TCU</td>
<td>UPG</td>
<td>DNG</td>
<td>EML</td>
<td>EQL</td>
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</tr>
<tr>
<td>15</td>
<td>IH1</td>
<td>IH2</td>
<td>IH4</td>
<td>IH4</td>
<td>IH8</td>
<td>WBL</td>
<td>UDAH</td>
<td>DDAH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>SPEED-ACT: 0500</td>
<td>DES: 0500</td>
<td>DEV: 000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>ENC 004932</td>
<td>LDG 2</td>
<td>HLDG 3</td>
<td>HLDR U</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>%FL</td>
<td>TR 04</td>
<td>M07</td>
<td>L0</td>
<td>020 010 02</td>
<td>375</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>022</td>
<td>EVENTS DETECTED</td>
<td>017N</td>
<td>1</td>
<td>HP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At line 1 on the top of the screen the time, date and day of the week are displayed. Following this information is a number that is changing rapidly. This number represents the amount of time between data sent and received between the various processors on the LON network. This number doesn’t represent true time, but rather an internal value that system displays for diagnostic purposes.

**NOTE:** If the value is less the 60 counts the system is operating properly. If the value gets too large then there is a problem that is effecting the communication rate between the processors.

In the figure above the last item in line 1 is the cursor. This ‘box’ will be flashing on and off when the system is operating properly.

Line 2 on the screen shows the job address and car number.

Lines 3 and 4 show the car call inputs/outputs. The items shown are a combination of the input and output signals. When the car call push button is pressed the signal will go high. When the call is latched (acknowledged) the signal will remain high until the call is answered or the car is no longer able to respond to the call.

**NOTE:** The inputs and outputs are shown in reverse video when they are turned on and the controller is operating properly. In the figure above note that the fourth floor car call is on. Also, the DCL, CG, DG and PWA inputs are on. The IC2, UDAC, APW, RBK, EFX, FFA, UP, IH2 and UDAH outputs are on as well.

Lines 5 and 6 are inputs that are mapped to the Intelligent Car Station board. Note that the DCL, or door close limit, input on line 6 is on. This signal will be highlighted when the door close limit switch indicates that the car door is closed. This may not be the true status of the door close limit switch.
The signal may be reversed by the Car Station software so it interfaces correctly with the CPU software.

Lines 7, 8, and 9 on the diagnostic screen are inputs that are mapped to the controller. These inputs may be on the Relay board or one or more of the I/O cards.

Lines 11, 12, and 13 are outputs that are mapped to the Intelligent Car Station board. IC1, IC2, IC4, and IC8 are the outputs for a binary position indicator in the car.

Lines 14, 15, and 16 are outputs that are mapped to the controller. As with the inputs at lines 7, 8, and 9, these signals could be on the Relay board or one or more of the I/O cards. IH1, IH2, IH4, and IH8 are the outputs for a binary position indicator for a hall fixture.

Line 17 shows the actual speed of the car and the desired speed. The next item is encoder deviation. This value is the number of counts difference between where the door zone magnet was at the last floor stop versus where the encoder believes it should have been. Each count represents $\frac{1}{16}$th of an inch. If the value ever reached 10 or more counts the car will shut down with an “Encoder Excess Deviation” fault. This would indicate that the encoder was losing or gaining counts.

The first item on line 18 shows the present encoder position. The next item shows the floor that the car is presently at. Note that when the car is in motion the position output will be advanced from the true car position.

The next items on line 18 are signals received from the dispatcher. The first value (HLDG) is the floor that the dispatcher desires the car to go to. The next item (HDR) is the demand at that floor. If the car is being assigned to pick up a hall call, either U or D will be displayed. If the assignment at the floor is for the car to park there and not open the doors then no direction will be shown. The last item is a flashing signal that indicates that the car has communication with the dispatcher. If the signal is not flashing the indicator will not be flashing.

The first item on line 19 is “%FL.” This is the percentage of full load that is presently in the car. This value comes from the strain gauge, and will not be shown if the system is not set up for pretorque.

The next item on line 19 is the TR status. The TR status displays the target floor. Note that the number corresponds to the numerical value of the floor from the lowest floor (for example, the lowest floor = 1), not the actual floor name.

- The target floor is displayed whenever the car is moving.
- The current floor is displayed when the car is at rest.

The next item on line 19 is the M status. The M status displays the present motion status of the car. The number 7 in this example means that the car is at the plateau. Refer to the list below for definitions of the motion status values.

- 0 = Just Stopped
- 1 = Halted
- 2 = Apply Power For Run
- 3 = Release Brake For Run
- 4 = Initialize DA For Run
- 5 = Ramp UP
- 6 = Transition To Plateau
- 7 = Plateau
- 8 = Decelerating
• 9 = Stopping
• 10 = Releveling

The next item on line 19 is the L status. The L status is the leveling status and displays the position of the car relative to floor level.
• 0 = Not level
• 1 = Door Zone
• 2 = Level at floor.

The next item on line 19 is the C status. The C status represents the closest floor. The floor number corresponds to the numerical value of the floor from the lowest floor (the lowest floor = 1), not the actual floor name.
• When running, this value corresponds to the nearest floor that the car can safely stop at.
• When the car is stopped, it displays the current floor.

The remaining numbers on line 19 are values used for software diagnostic purposes. O. Thompson personnel use these values for developmental purposes.

The first information on line 20 is the percentage of full load presently in the car. 022 indicates that the car is at 22% of full load.

The next item is a status message. This message will indicate if any events have been detected. If the detected event requires that the control system shut down the message on the bottom of the screen will enunciate the fault. If the system has detected an event that did not require a shut down, the most recent event is shown next. In Figure 14.1 “017” is the event number. Refer to the appendix at the end of this manual for a complete list of event numbers. The “N” following the event number indicates that the event is no longer active. If it were, a “Y” would be displayed. The next number is the floor that the car was on when the event occurred.

The final item in line 20 is an indicator of the present motion parameters in use. HP indicates that the control system is using the high performance values. EC would be displayed if the energy conservation values were in use.

11.2 Comprehensive Fault Listing

Irrecoverable fault messages (overspeed and brake failure) are displayed at the bottom of the car's main screen, while all other faults are displayed by fault number.

All the faults are also listed on the car's alternate screen, by name. To view the alternate screen, press the "Enter" button on the car MPU when the cursor is in the upper right hand corner.

To see a complete list of all Events (The events consist of faults, status changes or a need for elevator maintenance) see the Appendix - Section A2 at the end of this manual.

The job site specific information must be entered into the computer's memory. These parameters set the floor landing values, door dwell times, speed control settings, among many other features.

11.3 Diagnostic Screen Display - Inputs

Inputs such as car calls, car locks, hall calls for simplex cars, etc are displayed on the main I/O screen and will vary from job to job. The following is a listing in alphabetical order of the most typical inputs seen on jobs:
**Standard Inputs**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATT</td>
<td>attendant</td>
</tr>
<tr>
<td>BKR</td>
<td>brake released</td>
</tr>
<tr>
<td>BYP</td>
<td>attendant bypass</td>
</tr>
<tr>
<td>BZI</td>
<td>buzzer inhibit/floor passing chime disable</td>
</tr>
<tr>
<td>CG</td>
<td>car gate</td>
</tr>
<tr>
<td>nCF or nC</td>
<td>front car call at n floor</td>
</tr>
<tr>
<td>nCR</td>
<td>rear car call at n floor</td>
</tr>
<tr>
<td>DCBF or DCB</td>
<td>door close button front</td>
</tr>
<tr>
<td>DCBR</td>
<td>door close button rear</td>
</tr>
<tr>
<td>DCLF or DCL</td>
<td>door close limit front</td>
</tr>
<tr>
<td>DCLR</td>
<td>door close limit rear</td>
</tr>
<tr>
<td>DDSH</td>
<td>door disconnect service sw on relay board</td>
</tr>
<tr>
<td>DDS</td>
<td>door disconnect service in car (on when car top inspection)</td>
</tr>
<tr>
<td>nDF or nD</td>
<td>front down hall call at n floor (simplex cars only)</td>
</tr>
<tr>
<td>nDR</td>
<td>rear down hall call at n floor (simplex cars only)</td>
</tr>
<tr>
<td>DG</td>
<td>door gate</td>
</tr>
<tr>
<td>DNB</td>
<td>down attendant button</td>
</tr>
<tr>
<td>DOBF or DOB</td>
<td>door open button front</td>
</tr>
<tr>
<td>DOB</td>
<td>door open button rear</td>
</tr>
<tr>
<td>DOBH</td>
<td>emergency door open on relay board</td>
</tr>
<tr>
<td>DOBR</td>
<td>door open button rear</td>
</tr>
<tr>
<td>DOLF or DOL</td>
<td>door open limit front</td>
</tr>
<tr>
<td>DOLR</td>
<td>door open limit rear</td>
</tr>
<tr>
<td>DZ</td>
<td>car is in door zone</td>
</tr>
<tr>
<td>EEF or EE</td>
<td>electric eye front</td>
</tr>
<tr>
<td>EER</td>
<td>electric eye rear</td>
</tr>
<tr>
<td>FDH</td>
<td>fire door hold</td>
</tr>
<tr>
<td>FKS</td>
<td>fireman key switch</td>
</tr>
<tr>
<td>GIN</td>
<td>generator is running (generator jobs only)</td>
</tr>
<tr>
<td>INDC</td>
<td>independent</td>
</tr>
<tr>
<td>INS</td>
<td>inspection</td>
</tr>
<tr>
<td>IUP</td>
<td>inspection up demand (used for power closing car doors)</td>
</tr>
<tr>
<td>IDN</td>
<td>inspection down demand (used for power closing car doors)</td>
</tr>
<tr>
<td>LEV</td>
<td>leveling input</td>
</tr>
<tr>
<td>LIM</td>
<td>limit board tripped</td>
</tr>
<tr>
<td>LRN</td>
<td>lobby return</td>
</tr>
<tr>
<td>MGS</td>
<td>mg switch in car</td>
</tr>
<tr>
<td>MGSH</td>
<td>mg sw on relay board</td>
</tr>
<tr>
<td>OSPD</td>
<td>overspeed</td>
</tr>
<tr>
<td>PWA</td>
<td>power applied</td>
</tr>
<tr>
<td>REC</td>
<td>recall (simplex cars only)</td>
</tr>
<tr>
<td>REG</td>
<td>motor drive faulted</td>
</tr>
<tr>
<td>RES</td>
<td>fireman call cancel</td>
</tr>
<tr>
<td>SAF</td>
<td>safety</td>
</tr>
<tr>
<td>SEF or SE</td>
<td>safety edge front</td>
</tr>
<tr>
<td>SER</td>
<td>safety edge rear</td>
</tr>
<tr>
<td>nUF or nU</td>
<td>front up hall call at n floor (simplex cars only)</td>
</tr>
<tr>
<td>UPB</td>
<td>up attendant button</td>
</tr>
<tr>
<td>nUR</td>
<td>rear up hall call at n floor (simplex cars only)</td>
</tr>
<tr>
<td>WTA</td>
<td>weight switch activates anti-nuisance</td>
</tr>
<tr>
<td>WTB</td>
<td>weight button/load switch (Only present on non pre-torque jobs)</td>
</tr>
<tr>
<td>WTD</td>
<td>weight dispatch (Only present on non pre-torque jobs)</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>AB</td>
<td>alarm bell</td>
</tr>
<tr>
<td>ALD</td>
<td>alternate dispatcher/swing car</td>
</tr>
<tr>
<td>AREC</td>
<td>first alternate recall (simplex cars only)</td>
</tr>
<tr>
<td>BREC</td>
<td>second alternate recall (simplex cars only)</td>
</tr>
<tr>
<td>CME</td>
<td>in car medical emergency switch</td>
</tr>
<tr>
<td>CWL</td>
<td>counterweight latch</td>
</tr>
<tr>
<td>CWSW</td>
<td>counterweight switch</td>
</tr>
<tr>
<td>DB</td>
<td>dynamic brake</td>
</tr>
<tr>
<td>DHLF or DHL</td>
<td>door hold front</td>
</tr>
<tr>
<td>DHLR</td>
<td>door hold rear</td>
</tr>
<tr>
<td>EC</td>
<td>energy conservation</td>
</tr>
<tr>
<td>EMG</td>
<td>emergency power (simplex cars only)</td>
</tr>
<tr>
<td>EP</td>
<td>emergency power select (simplex cars only)</td>
</tr>
<tr>
<td>FBY</td>
<td>fireman bypass (simplex cars only)</td>
</tr>
<tr>
<td>FDH</td>
<td>fireman door hold</td>
</tr>
<tr>
<td>FDTF or FDT</td>
<td>freight door time front</td>
</tr>
<tr>
<td>FDTR</td>
<td>freight door time rear</td>
</tr>
<tr>
<td>nHL</td>
<td>front hall call lock n floor (simplex cars only)</td>
</tr>
<tr>
<td>nHR</td>
<td>rear hall call lock n floor (simplex cars only)</td>
</tr>
<tr>
<td>HSP</td>
<td>hospital</td>
</tr>
<tr>
<td>HP</td>
<td>high performance (When key activated High Performance Used)</td>
</tr>
<tr>
<td>LKS</td>
<td>shuttle service (simplex car only)</td>
</tr>
<tr>
<td>LDHF or LDH</td>
<td>lobby door hold front</td>
</tr>
<tr>
<td>LDHR</td>
<td>lobby door hold rear</td>
</tr>
<tr>
<td>nLF, nLK or nL</td>
<td>front car call lock n floor</td>
</tr>
<tr>
<td>LKO</td>
<td>car call lockout override</td>
</tr>
<tr>
<td>LMGS</td>
<td>lobby return followed by a motor generator shutdown</td>
</tr>
<tr>
<td>nLR</td>
<td>rear car call lock n floor</td>
</tr>
<tr>
<td>LRN2</td>
<td>lobby return with doors closed</td>
</tr>
<tr>
<td>nM or nFM</td>
<td>front med emerg recall n floor simplex cars only</td>
</tr>
<tr>
<td>nRM</td>
<td>rear med emerg recall n floor simplex cars only</td>
</tr>
<tr>
<td>MGS</td>
<td>motor generator shutdown switch</td>
</tr>
<tr>
<td>MGSH</td>
<td>Lobby MG Switch</td>
</tr>
<tr>
<td>NUP</td>
<td>normal up limit</td>
</tr>
<tr>
<td>NDN</td>
<td>normal down limit</td>
</tr>
<tr>
<td>OFFL</td>
<td>lobby recall switch off (Canadian Fire Code - Simplex Car)</td>
</tr>
<tr>
<td>OFFR</td>
<td>remote recall switch off (Canadian Fire Code - Simplex Car)</td>
</tr>
<tr>
<td>OSV</td>
<td>out of service</td>
</tr>
<tr>
<td>PG2</td>
<td>page two</td>
</tr>
<tr>
<td>PTL</td>
<td>potential (older jobs only, not currently used)</td>
</tr>
<tr>
<td>RECL</td>
<td>lobby recall switch on (Canadian Fire Code - Simplex Car)</td>
</tr>
<tr>
<td>RECR</td>
<td>remote recall switch on (Canadian Fire Code - Simplex Car)</td>
</tr>
<tr>
<td>RSP</td>
<td>reduce speed (used for high wind in highrise jobs)</td>
</tr>
<tr>
<td>SA0 - SA4</td>
<td>binary inputs from optional fault board</td>
</tr>
<tr>
<td>SEC</td>
<td>security</td>
</tr>
<tr>
<td>STB</td>
<td>stop button (older jobs only, not currently used)</td>
</tr>
<tr>
<td>TOP</td>
<td>test operation</td>
</tr>
<tr>
<td>WTA</td>
<td>weight anti-nuisance</td>
</tr>
<tr>
<td>WTB1</td>
<td>weight bypass bottom half of shaft</td>
</tr>
<tr>
<td>WTB2</td>
<td>weight bypass top half of shaft</td>
</tr>
</tbody>
</table>
11.4 Diagnostic Screen Display - Outputs

Outputs such as position indicators, signals for lanterns, buzzers, lights, motion control outputs, etc are displayed on the main screen and will vary somewhat from job to job. The following is a listing in alphabetical order of the most typical outputs seen on jobs:

**Standard Outputs**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APW</td>
<td>apply power</td>
</tr>
<tr>
<td>BUZ</td>
<td>buzzer</td>
</tr>
<tr>
<td>CXPF</td>
<td>door close motor front</td>
</tr>
<tr>
<td>CXPR</td>
<td>door close motor rear</td>
</tr>
<tr>
<td>CXSPF</td>
<td>nudge motor front</td>
</tr>
<tr>
<td>CXSPR</td>
<td>nudge motor rear</td>
</tr>
<tr>
<td>DAL</td>
<td>down attendant light</td>
</tr>
<tr>
<td>DCLX</td>
<td>Verification of door close limit</td>
</tr>
<tr>
<td>DDAC</td>
<td>down direction arrow in car</td>
</tr>
<tr>
<td>DDAH</td>
<td>down direction arrow in hall (controller)</td>
</tr>
<tr>
<td>DDG</td>
<td>down direction car lantern and/or gong</td>
</tr>
<tr>
<td>DWN</td>
<td>down direction relay</td>
</tr>
<tr>
<td>EFX</td>
<td>field forcing relay (SCR drives only)</td>
</tr>
<tr>
<td>FFA</td>
<td>field forcing relay A</td>
</tr>
<tr>
<td>FPC</td>
<td>floor passing chime</td>
</tr>
<tr>
<td>FRLC</td>
<td>fire light in car</td>
</tr>
<tr>
<td>FRLH</td>
<td>fire light in hall (controller)</td>
</tr>
<tr>
<td>FRX</td>
<td>fire return stop switch bypass</td>
</tr>
<tr>
<td>GRN</td>
<td>generator run output (generator jobs only)</td>
</tr>
<tr>
<td>IC1  - IC32</td>
<td>binary position indicator floor in car</td>
</tr>
<tr>
<td>IH1  - IH32</td>
<td>binary position indicator floor in hall (controller)</td>
</tr>
<tr>
<td>LEV</td>
<td>leveling output</td>
</tr>
<tr>
<td>OXPF</td>
<td>or OXP</td>
</tr>
<tr>
<td>OXPR</td>
<td>or OXP</td>
</tr>
<tr>
<td>RBK</td>
<td>release brake</td>
</tr>
<tr>
<td>TCU</td>
<td>this car up light in lobby</td>
</tr>
<tr>
<td>UAL</td>
<td>up attendant light</td>
</tr>
<tr>
<td>UDAC</td>
<td>up direction arrow in car</td>
</tr>
<tr>
<td>UDAH</td>
<td>up direction arrow in hall</td>
</tr>
<tr>
<td>UDG</td>
<td>up direction car lantern and/or gong</td>
</tr>
<tr>
<td>UP</td>
<td>up direction relay</td>
</tr>
</tbody>
</table>

**Outputs (Optional) from the Car Microprocessor**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWL</td>
<td>counterweight light</td>
</tr>
<tr>
<td>DNG</td>
<td>advanced down direction front gong and/or lantern</td>
</tr>
<tr>
<td>DNGR</td>
<td>advanced down direction rear gong and/or lantern</td>
</tr>
<tr>
<td>EC</td>
<td>energy conservation</td>
</tr>
<tr>
<td>EQL</td>
<td>earthquake light</td>
</tr>
<tr>
<td>FAN</td>
<td>fan</td>
</tr>
<tr>
<td>FDL</td>
<td>freight door light</td>
</tr>
<tr>
<td>HP</td>
<td>high performance</td>
</tr>
<tr>
<td>IB1  - IB32</td>
<td>binary position indicators 1 through 32</td>
</tr>
<tr>
<td>ISV</td>
<td>in service light</td>
</tr>
<tr>
<td>IX</td>
<td>X position indicator for blind shaft</td>
</tr>
<tr>
<td>L[n]/D[n]/LF[n]/DF[n]</td>
<td>front directory light n floor</td>
</tr>
<tr>
<td>LR[n]/DR[n]</td>
<td>rear directory light n floor</td>
</tr>
<tr>
<td>MEL</td>
<td>medical emergency light</td>
</tr>
<tr>
<td>MGL</td>
<td>motor generator light</td>
</tr>
</tbody>
</table>
11.5 Using the Keypad & Accessing Diagnostic Screens

A telephone style keypad is located in the center of the MPU board. The keypad is used to access parameter, diagnostic, fault, and scope screens. The keypad is also used to edit parameter values. The three primary keys used to move the cursor around the screen and enter values are the "*", "0", and "#" keys.

As far as cursor movement, the three keys act as follows:

* Key = Move cursor on the screen to the left (previous)
0 Key = Value of zero when entering numeric values
        Toggles between Yes or No for logical values
        Acts as an "ENTER" button for changing screens and saving values to memory.
# Key = Move cursor on the screen to the right (next)

11.5.1 Entering Car Calls

Car call entry can be accomplished by pressing the # key or the * key until the cursor highlights the desired floor’s car call on the screen. To register the car call press the 0 key. The 0 key must be pressed and held until the car begins to move, if the car is on Independent Service.

Note: If the C next to a floor’s car call is already highlighted, it means the car call is locked out on the call lockout screen. This cannot be bypassed by this method of entering car calls.

Note: When the cursor is not in the upper right hand corner of the I/O screen, only the main screen can be displayed. No fault or speed curve screens can be examined. If the cursor is not returned manually to the top right corner and no car call entry takes place for 5 minutes, the cursor is automatically returned to the top right corner.

11.5.2 Controller Event Log

To access this screen, the cursor must be moved until it is blinking in the top right hand corner of the main diagnostic screen. Then the 0 key is pushed.

This screen is used to display additional inputs that can not fit on one diagnostic screen and the last 100 faults on jobs. Hall calls will be located on this screen for simplex cars and calls may be entered in the same fashion as on screen one. The fault log is accessed by moving the cursor to one of the following four positions: view previous events; view next event; view latest event; and clear fault memory.
When the 0 button is pressed while on 'View previous events', the event previous to the one presently shown is displayed, until the least current fault is on the screen. Pressing 0 while on 'View next event' brings the next event to the screen, until the most current event is displayed. Pressing 0 while on 'View latest event' causes the display to move to the most recent event. When 0 is pressed while on 'Clear fault memory', all stored events are cleared. The ?Faults Detected? message on the main diagnostic screen will still display that faults have been detected after the fault memory is cleared until the main processor has been reset.

11.5.3 Acceleration/Deceleration Curves

To access this screen, the cursor must be moved until it is blinking in the top right hand corner of the Fault / Hall Call Screen. Then the 0 key is pushed. Screen 3 is used to display the acceleration and deceleration curves. The cursor is used to select the mode of operation. When the cursor is moved to the mode area on the bottom right of the screen, pressing the 0 button will either turn off the curve display or bring up either the acceleration or deceleration curve display. Two graphs are displayed. The top graph displays the desired speed versus time and the bottom graph displays the actual speed versus time. The screen will only be updated when the motion status on the bottom left corner of the screen says “Halt”.

ACC / DEC Screen Displays

To access this screen, the cursor must be moved until it is blinking in the top right hand corner of the Accel / Decel Curve Screen. Then the 0 key is pushed

To change modes of the display, move the cursor to bottom left corner of the screen and press the 0 key until the desired mode is selected. The display mode can only be changed while the car is halted. The status of the car will be displayed at the bottom left hand side of the screen as either “HALT” or “RUN”. Located on the lower right hand corner of the screen, is an indicator of whether the display is set to acceleration, deceleration or off. The following are the three display modes.

OFF - In this mode no curve updates occur.

Acceleration Display - In this mode the speed curve generated in the first 5 seconds of motion, after the car leaves a floor, is displayed.

Deceleration Display - In this mode the speed curve generated in the last five seconds of motion, before the car is halted at the floor, is displayed.

11.5.4 Actual vs. Desired Speed

Screen 4 is used to display the difference between the actual speed and the desired speed (i.e. speed error). The cursor can be moved to two sections of the screen, ACC/DEC or GAIN. If the 0 button is pressed when the cursor is on gain selection, it will change the scale of the display to look more closely at the actual difference between desired and actual. There are four different gains: x1; x2; x4 and x8. The gain may be changed, only when the car is halted.

The lower left and right hand corners display the same mode and motion information as on screen 3. The mode of operation may be altered when the cursor is positioned on mode of operation selection, using the 0 button. In the ACC mode, the first 5 seconds of the previous run is displayed. In the DEC mode, the last 5 seconds of the previous run is displayed.
11.5.5 Accessing Parameter Screens

Any time the parameter screens are accessed, the car is not capable of running. Therefore, the car should be halted and removed from group service prior to attempting to switch from the diagnostic mode to the parameter mode of operation.

With the car halted, press the RESET button on the top of the MPU board. After the processor reset, the following message will be displayed on the screen for 4 seconds:

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Technical Support (718) 417-3131
MicroFlite Ultra 2000

Press 1 Now to Alter Parameters

If the “1” button is pressed, the main car parameter screen is displayed.

- **MOTION PARAMETERS**
- **BRACE AND HOISTWAY DEVICES PARAMETERS**
- **CAR OPERATING DEVICES PARAMETERS**
- **DOOR PARAMETERS**
- **FIRE, EMERGENCY POWER PARAMETERS:**
- **VIP, MEDICAL, EARTHQUAKE PARAMETERS**
- **MISCELLANEOUS PARAMETERS**
- **SIMPLEX/INC RISER PARAMETERS**
- **CE VOICE ANNUNCIATOR MESSAGES**
- **EVENT DISABLE PARAMETERS**
- **CAR CALL LOCK ENTRY**
- **UP HALL LOCK ENTRY (SIMPLEX/IR ONLY)**
- **DOWN HALL LOCK ENTRY (SIMPLEX/IR ONLY)**
- **FLOOR LANDING VALUES, PI OUTPUTS**
- **LEARN TRIP, FLOOR NAMES, PRETORQUE**
- **MODEM PARAMETERS**
- **PASSWORD/JOBF CONFIG/TIME/CLEAR EVENTS**
- **WRITE VALUES TO NON VOLATILE MEMORY**

The values of the parameters that do not apply to this job do not affect anything. To save new parameters, DO NOT RESET the board. Return to this screen first, and press ENTER (the “0” button) while the cursor is blinking on “WRITE VALUES TO NON VOLATILE MEMORY”.

11.6 Saving Parameter Values

- Do not press the RESET button on the MPU board.
- After a value of a particular parameter has been changed, move the cursor until it is on the word “RETURN” at the bottom of each parameter screen.
- With the cursor on “RETURN”, press the 0 button. This will get you back to the main parameter screen.
- Move the cursor until it is on “WRITE VALUES TO NON VOLATILE MEMORY”.
- Always check that your values have been saved.
11.7 PARAMETERS
11.7.1 Motion Parameters Menu

NOTE 1: The S-Curve parameters have **HIGH PERFORMANCE** and **ENERGY CONSERVATION** settings. This allows for the adjustment of 2 independent S-Curves for peak and off peak traffic times.

NOTE 2: There are two sets of values for **HIGH PERFORMANCE**, one for long runs and one for short runs. The short run values are used on one-floor runs. This allows for independent adjustment of the speed profile for high-speed runs and one floor runs.

NOTE 3: All Energy Conservation settings will be used while the car is on emergency power if the HP/EC switch parameter is set to "**DYMANIC**." All Energy Conservation values should be adjusted such that the car will come into the floor with reduced acceleration, deceleration, and jerk rates.

**SPEED (FPM) RELEVEL 00  MAXIMUM 0000  MINIMUM 000**
This parameter sets the contract speed, the final leveling speed, and the re-leveling speed for the system. Minimum speed should be set from 4 to 6 FPM (try 4). Higher settings may result in hard stops. Re-leveling speed should be set from 2 to 10 FPM (try 5).

**WARNING:** Setting the Maximum Speed parameter to something other than contract speed will not result in a lower car speed. Scaling of the car speed is accomplished through adjustment of the drive or regulator. This value **MUST** be set to contract speed or the car will not operate properly.

**ENERGY CONSERVATION SWITCH: HIGH PERF (HP) ENERGY CONSERVATION (EC)**
**DYNAMIC** - The two performance levels, high performance and energy conservation, are implemented by switching between two distinct speed curves. These curves are generated based on two sets of user-entered parameters. The car will use both speed profiles only if this parameter is set to "**DYNAMIC**". If this parameter is set for high performance or energy conservation mode the car will run continuously in the selected performance mode.
MAX FLOOR DISTANCE FOR HPS (COUNTS)
This parameter sets the distance in counts (16 per inch) to switch from the short run values (HPS) to the long run values (HPL) when in the High Performance mode of operation. A value of 2500 (approximately 13 feet) is recommended. Make the value larger if the typical floor heights are greater than 13 feet.

INIT JERK RATE HPL 00.0 HPS 00.0 EC 00.0
This parameter sets the jerk rate to be applied for the very beginning of the car’s motion. Range is from 0.0 to 10.9. A lower number can be used to compensate for a sluggish brake or poor drive or regulator tracking. A higher number can be used to compensate for a sluggish hoist motor and will minimize roll back. Reasonable values range from 0.5 to 8.0. Try an initial setting of 2.0.

ACCEL RATE HPL 0.0 HPS 0.0 EC 0.0
This parameter sets the acceleration and deceleration rate. Reasonable values range from 1.5 to 3.5. Try an initial setting of 2.5.

JERK RATE HPL 00.0 HPS 00.0 EC 00.0
This parameter sets the rate of change of acceleration (Jerk) in the high performance long run, high performance short run, and energy conservation modes. A number from 1.0 to 25.9 may be used. This value is in feet per second cubed. A value equal to the ACCEL RATE will take the car one second to make the transition from linear acceleration to high speed or plateau; from start to linear acceleration; and from linear deceleration to minimum speed. A value of twice the ACCEL RATE will take the car one half a second to make the transition and a value one half the ACCEL RATE will take two seconds. Reasonable values range from 1.0 to 8.0. Try an initial setting of 2.5.

RESPONSE TIME (1/100 SEC) HP 00 EC 00 – This parameter compensates for the responsiveness of the drive and hoist motor. This value acts as a ‘look ahead’ time, telling the speed profile generation software the amount of time it takes the car to follow the speed demand. A setting of 0 assumes the car will precisely follow the speed profile with no delay. The more sluggish the system, the larger the number required to compensate for drive tracking.
Higher values make the system initiate changes in the profile sooner since the car will not follow the demanded profile closely. Setting this value too large will lengthen the slow down and adversely impact floor-to-floor times. Reasonable values range from 15 to 50. Try an initial setting of 25 and monitor the scope screen to determine if adjustments are required.

NOTE: The Response Time parameter is one of the most critical adjustments in the speed profile. If the parameter is set too high the car will have a prolonged deceleration. If it is set too low a noticeable bump will be felt in the car ride after the jerk rate from continuous speed to deceleration is applied.

FINAL JERK HP RATE: HPL 0.0 HPS 0.0 EC 0.0
This parameter controls the transition from deceleration to approach into the floor. It controls how sharp the transition will be. A rate from 1.0 to 8.0 is reasonable. Try an initial setting of 4.0.

FINAL JERK DIST. (Inches) HPL 00 HPS 00 EC 00
This parameter controls where the transition from deceleration to approach into the floor will occur. Reasonable values range from 2 to 8. Try an initial setting of 4 inches.

NOTE: Final Jerk Rate and Final Jerk Distance is another critical adjustment. If the final speed that is generated when coming off the final jerk parameter does not meet the Final Jerk Rate value a bump will be felt in the ride when the car is approximately 3 to 6 inches away from the floor.

ADVANCE (COUNTS) HPL 00 HPS 00 EC 00 – This parameter sets the distance from the target floor (in encoder counts) the desired speed is set to the minimum speed. This provides a constant leveling speed reference (equal to minimum speed parameter). Reasonable values range from 0 to 20. A low value is recommended, as high values will result in long floor-to-floor times. Try an initial setting of 8.

PRE-OPENING (COUNTS) HPL 000 HPS 000 EC 000 - The number of counts (in sixteenths of an inch) from the target floor to begin pre-opening the door. The car must, however, be in the door zone to actually open the door. The range is from 10 to 90. A value of 48 (3 inches) is recommended.

PLATEAU LENGTH INCHES 00 - This parameter refers to the minimum distance (in inches) the
car will travel at a constant speed before initiating the slow down into the target floor. This parameter is generally not used on jobs with AC or DC drives, but only on jobs with MG sets. This is because some MG sets have a relatively large time constant for the field pieces. They do not respond quickly to demands to switch from positive to negative current. Reasonable values range from 0 to 20. A value of 0 is recommended for SCR drives, and 10 for MG jobs.

**ADD. PLAT. LNG (FT) 00 SPEED 0000** - The additional distance (in feet) that is added to the above plateau length at higher speeds to provide more stability in weak field conditions. Typically only used on MG jobs. Initially set at 1 or 2 feet, but if re-leveling is observed on higher speed runs, increasing this value will be beneficial. Reasonable values range from 2 to 10. A value of 0 is recommended for SCR and AC drives, and a value of 2 is recommended for MG’s.

**ADDITIONAL PLATEAU LENGTH SPEED** refers to the minimum speed required to change the plateau length to the above value. This speed is usually set 50 to 100 FPM below the speed the car reaches with full field voltage across the hoist motor field on a one floor run.

**NOTE:** To disable these parameters set Additional Plateau Length to zero and Additional Plateau Speed to contract speed (Maximum Speed).

**DIST. (COUNTS) LEVEL 00** - This parameter sets the distance from the target floor that is considered level (dead zone) following a run. A value of 3 counts is recommended.

**WARNING:** Setting this number too large will cause the car to stop further away from floor level and could result in a tripping hazard.

**RE- LEVEL DIST. (COUNTS)** - The number of counts away from the floor required to initiate a re-level. At 16 counts per inch a value of 8 will result in a 1/2” re-level zone. A value of 7 is recommended.

**WARNING:** Setting this number too large will cause the car not to re-level into the floor and could result in a tripping hazard.

**FFA/FFB SPEED (FPM) ACCEL 000 DECEL 000** – These parameters control the output for motor field weakening. Not used on SCR drive installations, but are used on MG jobs. The values entered for ACCEL and DECEL will control the speeds at which the field-weakening signal is turned off after the car begins a run, and turned on when the car begins to decelerate. Set to contract speed for SCR and AC drives.

**OVERSPEED TRIP SPEED (FPM) 0000** - Actual car speed that will cause an internal shutdown due to an overspeed condition. Set this to a value about 10% greater than contract speed. If the actual speed is greater than the value set in this parameter, the microprocessor will cause the car to slow down at the next available floor. A value of 9999 will disable the feature.

**SCR / REG. RESTART TIME SEC 00** is the time period, in seconds, that the controller will wait to reset the regulator after a regulator trip. It is recommended that this value not be set lower than 10 seconds.

**DRIVE TYPE** - This parameter sets what kind of drive is used to control the motor.

**MOTOR PRETORQUE ENABLED** - This parameter sets whether or not pretorque is enabled. Setting this to “Yes” requires an input from the load sensor. If the sensor is not present substantial roll back will be introduced into the ride of the car.

Return to the main menu by pressing the ‘0’ key when the cursor is on “RETURN TO MAIN MENU”. You can leave the parameter entry screen without saving your data at any time and return
Microflite Ultra 2000

to the main menu by pressing the reset button (S1 button on CPU card). Values entered are not permanently stored in memory until the “WRITE VALUES TO NON-VOLATILE MEMORY” option is selected.
11.7.2 Hoistway Device and Brake Parameters Menu

**BRAKE SWITCH NORMALLY OPEN? Y/N** - When set to “Yes” the BKR input goes high when brake is lifted. When set to “No” the BKR input turns off when the brake is lifted.

**BRAKE RELEASE FAILURE TIME (.1 SEC) 00** - An adjustable time in tenths of a second to allow the brake released input to reflect that the brake has lifted, before the car will shut down on a brake release failure. The range is 0.1 to 5 seconds, with a default of 2 seconds. This parameter should never be set to less than 10 (1 second). A value of 30 (3 seconds) is recommended.

**BRAKE RELEASE DELAY (0.1 SEC)** - The time delay, in tenths of a second, between the start of the speed reference and the command to lift the brake. This parameter is generally set to zero unless the motor response is sluggish.

**NOTE:** *On pre-torque jobs this parameter must be set to zero.*

**BRAKE DROP DELAY (0.1 SEC)** - The amount of time to hold car at zero speed before the Processor demands the motion outputs to turn off. A value of 02 is recommended.

**CAR RUN THROUGH BRAKE TIME (SEC)** - The amount of time (in seconds) the car will run before faulting if BKR input does not change state. Only active if pretorque is disabled. If the “Motor Pretorque” parameter is set to “Yes” the car will not move from the floor and the “Brake Release” fault will occur.

**OSPD CONTACT NORM CLOSED? Y/N** - This parameter sets the normal (non-tripped) position of the overspeed switch on the governor. If no over speed switch is installed set this parameter to “No”.

**RING DOWN HALL LANTERN AND GONG ONCE? Y/N** - Set to “Yes” for single gong, and set to “No” for two-gong operation.

**NOTE:** *If the gongs are electronic then this parameter is generally set to “Yes”. The electronic gongs will perform the double stroke automatically. Setting the software to enable the double stroke usually results in three chimes instead of two.*

**RING DOWN HALL LANTERNS AND GONGS ONCE?** - If set to “Yes” the hall lantern and car lantern will turn on and stay on until the door closes. If set to NO the lanterns will ring once, turn off, and then turn on and stay on.

**DNG/DDG/DNGR/DDGR DOUBLE CHIME TIMES (.5 SEC): FIRST ON ____** - The amount of time the first stroke of the double stroke of the chimes will stay on for (in .5 second increments).

**BETWEEN CHIMES ____** - The amount of time between the first stroke and the second stroke of the chimes (in .5 second increments).

**RING HALL LANTERNS FOR CAR CALLS? Y/N** - Setting this parameter to a “Yes” enables the hall lanterns to ring when arriving at a landing to answer a car call.

**UPG/DNG ON FOR LAST TERM. CAR CALLS? Y/N** - Set to “Yes” to ring the hall and/or car traveling lantern for terminal floor car calls.

**HALL LANTERN TIMEOUT (SEC) 00 [99 = NO TIMEOUT]** - The amount of time the hall lantern will stay illuminated before turning off. Typically only used on freight door applications to prevent the hall lantern bulbs from burning out if the doors remain open for a prolonged time.
ADVANCED PI’S AND HALL LANTERNS? Y/N - If set to “Yes” the position indicators will advance out to the internal position of the microprocessor and hall lanterns will ring in advance of the car decelerating into the floor. It is recommended that this feature be enabled, as it provides additional time on the hall lanterns.

MIN TIME ON FOR ADVANCE PI MSEC 000 - On higher speed cars, the position indicator outputs from the CPU may change too quickly to allow some electronic position indicator fixtures to respond consistently to the change in position. If erratic position indicator displays are seen during acceleration, this parameter adjusts the minimum length of time each position indicator output will remain on while advancing the car’s position. Measured in milliseconds (500 = 500 milliseconds or .5 seconds).

LRN (LOBBY RETURN FLOOR) - Sets the floor the car will return to when the Lobby Return input (LRN) is turned on.

CANCEL CAR CALLS BEFORE LRN SHUTDOWN? Y/N - If set to “Yes” all car calls will cancel when the LRN (Lobby Return) input is activated. If set to “NO”, the car will answer all existing and stop accepting new car calls before returning to the lobby.

LMGS RETURN FLOOR / DOOR: __F/R - Sets the floor number and front or rear door that the lobby MG switch (LMGS input) returns the car to.

NOTE: The floor number, starting with one equal to the lowest floor, must be used (not the floor name).

CANCEL CAR CALLS BEFORE LMGS SHUTDOWN? Y/N - If set to “Yes” all car calls will cancel and the car will proceed to the lobby when the LMGS (Lobby Motor Generator Shutdown) input is activated. After the car reaches the lobby the doors will cycle and the car will shut the generator off. If set to “No”, the car will answer all existing car calls and stop accepting new calls before returning to the lobby.

LMGS CYCLES DOOR UPON LOBBY ARRIVAL? Y/N - If set to “Yes” the doors will open and close when the car arrives at the lobby when the LMGS (Lobby Motor Generator Shutdown) input is activated. If set to “No” the doors will not open when the car arrives at the lobby.

LMGS DOOR OPEN BUTTON ENABLED? Y/N - If set to “Yes” the door open button will be functional when the car is in the lobby and the doors are closed after the LMGS (Lobby Motor Generator Shutdown) input is activated. If set to “No” the door open button will not function when the car is in the lobby and the doors are closed after the LMGS input is activated.

Return to the main menu by pressing the ‘0’ key when the cursor is on “RETURN TO MAIN MENU”. You can leave the parameter entry screen without saving your data at any time and return to the main menu by pressing the reset button (S1 button on CPU card). Values entered are not permanently stored in memory until the “WRITE VALUES TO NON-VOLATILE MEMORY” option is selected.
11.7.3 Car Operating Devices Parameters Menu

**BINARY PI START AT 0 OR 1** - A zero (0) will set all binary position indicator outputs off for the first floor. A one (1) will set binary position indicator output one (1) on, and all other position outputs off for the first floor. This is only useful if binary position indicators have been provided.

**RING DOWN CAR LANTERN AND GONG ONCE? Y/N** Set to “Yes” for single gong; set to “No” or two-gong operation.

**FLOOR PASSING CHIME (FPC) 1 DOWN? Y/N** - Set to “Yes” for single gong; set to “No” for two-gong operation.

**DISABLED CODE (FPC) LATCHED Y/N** - If set to “Yes” the Floor Passing Chime will work for all types of runs for automatic and Attendant Services. If set to NO, the BZI input must be a normally closed input. Momentarily turning BZI OFF, through a signal button on the car station, will cause FPC (the floor passing chime) to operate until a reversal of direction occurs (single trip).

**BZI NORM CLOSED? Y/N** - Default is “Yes”. Sets the polarity of the “S” (Audible Signal) button. When set to “Yes” the floor-passing chime will operate when the button is pressed and released. FPC output will be enabled until car changes direction.

**DOES BUZZER REPLACE FPC? Y/N** - If set to “Yes” the buzzer output is turned on simultaneously with the floor passing chime output.

**CAR CALLS LATCH BEHIND CAR? Y/N** N - If set to NO, the car calls will not latch behind the current car position.

**PIEZO-ELECTRICAL CAR BUTTONS Y/N** N - This parameter is used to allow for non-constant pressure on buttons on jobs that have piezo-electric car buttons. Setting this parameter to “Yes” will allow car calls to latch and the Door Close button to close the door on Independent Service.

**BYPASS CAR CALL LOCKS ON INDEPENDENT? Y/N** - If set to “Yes” and the car is on independent operation the car call locks are going to be bypassed.

**BYPASS CAR CALL LOCKS ON ATTENDANT? Y/N** - If set to “Yes” and the car is on attendant operation the car call locks are going to be bypassed.

**EE ANTI-NUISANCE ACTIVE? Y/N** If enabled (set to “Yes”) will cancel all car calls if the car makes x consecutive stops for car calls (as set in the following parameters), without breaking the electric eye. After canceling the car calls, the electric eye must be broken to re-enable this feature. Hall stops do not increment the anti-nuisance counter.

**NUM STOPS BEFORE CC CANCEL / SEQUENCE** 0 - number of consecutive stops, to trigger anti-nuisance, that a car must make for car calls without breaking the electric eye.

**NUM SEQ. BEFORE ANTI-NUISANCE DISABLE** 0 - number of sequences to disable anti-nuisance if Electric Eye is not seen by the system. Anti-nuisance can only be re-enabled again by resetting the CPU after this has occurred.

**MAXIMUM CAR CALLS PER 10% LOADING** - (Used on Pre-torque jobs only). This parameter tells the system how many car calls to allow based on the amount of weight in the car. If the number of calls exceeds this value based on the load, all calls will cancel. Typically set to allow 1 call per 100 pounds of load. For example, if the car capacity is 3000 pounds, set this value to 3 to allow 3 calls with 300 pounds (10%) of load.
% FULL LOAD WEIGHT DISP 000 - (Used on Pre-torque jobs only). Enter the weight at which the selected car should dispatch from the lobby only.

BYP 000 - (Used on Pre-torque jobs only). Enter the percentage load at which the car should bypass hall calls as measured by the strain gauge on the crosshead. Both of these values should be set to 101 if pre-torquing is not being used (no strain gauge mounted to the cross head).

Return to the main menu by pressing the ‘0’ key when the cursor is on “RETURN TO MAIN MENU”. You can leave the parameter entry screen without saving your data at any time and return to the main menu by pressing the reset button (S1 button on CPU card). Values entered are not permanently stored in memory until the “WRITE VALUES TO NON-VOLATILE MEMORY” option is selected.
11.7.4 Door Parameters Menu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOOR TIME (0.1 SEC)</td>
<td>CAR CALL 000</td>
<td>HALL CALL 000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NUDGING 0000</td>
<td>FREIGHT 000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>REOPEN 000</td>
<td>RECYCLE 000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LOBBY 000</td>
<td>LOBBY AFTER CALL 000</td>
<td></td>
</tr>
</tbody>
</table>

**DOOR TIME - CAR CALL** - is the door open dwell time when answering a car call only. If the electric eye is broken, the door time is reduced to the parameter value, **DOOR REOPEN TIME**.

**DOOR TIME - HALL CALL** - is the door open dwell time when answering a hall call. If the electric eye is broken or the safety edge or the door open button is triggered, the door time is the remaining door open time or the **DOOR REOPEN TIME**, whichever is greater.

**DOOR TIME - NUDGING** - is the door open dwell time that will trigger door nudging. Time starts when doors start to open.

**DOOR TIME - FREIGHT** - is the door open dwell time after the Freight Door Time input is activated and shut off. This feature will only work if the FDT input is present or if FDTF or FDTR (front and rear) are present.

**DOOR TIME - REOPEN** - is the time the doors will remain open after SE, EE, or DOB operate.

**DOOR TIME - RECYCLE** - is the time the lock and gate contacts have to make. If they do not make within this time, the doors will reopen. The timing starts when close cycle is initiated.

**DOOR TIME - LOBBY** - this time applies to a car at the lobby floor that is NOT designated as this car up (TCU).

**DOOR TIME - LOBBY AFTER CALL** - this time applies to a car, at the lobby floor, that is NOT designated this car up (TCU) and it is the time the door will stay open, in the lobby, after a car call is entered or a hall call assignment is registered.

**SE/EE/DOB CHANGES DOOR TIME TO REOPEN TIME FOR CAR CALLS? Y/N** - If set to “Yes” the door time will be reduced to the time entered into the **DOOR TIME - REOPEN** parameter when the SE, EE or DOB inputs are activated.

**CLOSE BUTTON FUNCTIONAL IN LOBBY Y/N** - Enables or disables the door close button when the car is in the lobby.

**DOOR RECYCLE ON DIRECTION CHANGE?** - Refers to double direction hall calls on the floor, at which the car is standing. “Yes” will allow a full door cycle before the car will change direction. No, will allow the car to switch direction, after the door dwell time expires.

**DOORS OPEN SIMULTANEOUSLY ON AUTO? Y/N** - Applies to double door cars on Automatic Service only. Both doors will open simultaneously and, if both calls are present, both calls will be unlatched. **This parameter must be set to the same value on the dispatcher as well.** This parameter must be set to “No” on single or non-selective door cars.

**DOOR CLOSE MOTOR PROTECTION? Y/N** - Automatic interruption of door recycling in case of door close / door gate failure takes place if parameter is set to “Yes” otherwise the door is recycled till DCL and / or DG make. This is typically set to “Yes”.
DCL / DOL CLOSED AT LIMITS? Y/N - “Yes” = DCL input is energized when doors are fully closed and door open limit is energized when doors are fully open. “No” = DCL input is de-energized when doors are fully closed and door open limit is de-energized when doors are fully open. This parameter is used in the event of reverse door limit logic to prevent the user from needing to install additional relays on the car to reverse the limit logic.

NOTE: Based on this parameter setting, the display will be adjusted on the screen such that when the doors are fully closed, the DCL input on the screen will be highlighted, regardless of the actual status of the input.

NUDGING: SE REOPEN Y/N EE BYPASS Y/N - If SE is set to “No” the door will stall in the position it has at the time of activating Safety Edge rather than fully reopening. Set to “No” for infrared edges. (SE not wired with infrared door edges.) EE BYPASS - If parameter is set to “Yes” the door is going to close after the nudging time has expired even if EE is still active. If set to “No” the door will continue to stay open on nudging.

EE NORM OPEN? Y/N - If this parameter is set to “Yes” the electric eye contact feeding the input (EE) is normally open. If set to NO, the electric eye contact feeding the input (EE) is normally close. On screen (EE) will be highlighted when triggered.

SE NORM OPEN? Y/N - If parameter is set to “Yes” the safe edge contact feeding the input (SE) is normally open. If set to NO, the safe edge contact feeding the input (SE) is normally close. On screen (SE) will be highlighted when triggered.

ELECTRIC EYE ENABLED ON ATT/IND? - If set to “Yes” the doors will be re-opened while closing if the EE input is activated while the car is on Independent or Attendant service.

PEELE DOOR AUTO OPEN / CLOSE? Y/N - If parameter is set to “Yes” and the car has freight doors, the doors will open and close automatically. If parameter is set to NO, the doors will not open and close automatically.

AUTO PEELE DOOR OPEN TIMEOUT (SEC) - Sets the time, in seconds, before an opening time out will occur on a freight door.

ANSI-1996 REQUIRED? - If set to “Yes” the car will not be allowed to move if the DCL input indicates that the doors are not fully closed. Required for ANSI/ASME A17.1 1996 Code.

Return to the main menu by pressing the ‘0’ key when the cursor is on “RETURN TO MAIN MENU”. You can leave the parameter entry screen without saving your data at any time and return to the main menu by pressing the reset button (S1 button on CPU card). Values entered are not permanently stored in memory until the “WRITE VALUES TO NON-VOLATILE MEMORY” option is selected.
11.7.5 Fire and Emergency Power Parameters Menu

FIRE CODE – Selects the proper fire code operation. Pressing the ‘0’ key toggles between the available options. Options are:

- CHICAGO
- NATIONAL
- WHITE PLAINS
- CALIFORNIA
- CANADA
- NEW YORK CITY
- AUSTRALIA
- NEW ZEALAND

NYC/WHITE PLAINS GATE/DOOR CONTACT FAULTS DETECTED:
AT ALL TIMES, AT NO TIMES, EXCEPT ON FIRE SERVICE

This parameter controls whether the system will check for a fault or jumper in the door lock and gate circuitry. If the Door Open Limit (DOL) indicates that the car door is fully open but the gate switch and/or the door locks are closed the car will remain standing at the floor with the doors open when this parameter is set to “AT ALL TIMES”. When set to “EXCEPT ON FIRE SERVICE” the proving is disabled when the car is on Fire Service. When the parameter is set to “AT NO TIMES” this proving is completely disabled.

NOTE: This feature can only be disabled when the “Fire Code” parameter is set to “New York City” or “White Plains”. This feature is a requirement in the National (ASME) code.

FIRE DOOR CLOSE ON NUDGING Y/N

When set to “Yes” the doors will close at reduced torque (CXXP output) on Phase I Fire Service only. When set to “No” the doors will close at normal speed (CXP output) under Fire Service Phase I. If no mechanical SE is used (only the EE input) this parameter must be set to “Yes” to meet Fire Code.

FIRE OVERRIDES - MGS? Y/N

When set to “Yes” Fire Phase I and Phase II will override the input. When set to “No” the input will override Fire Phase I and II only if it was triggered before Fire Recall.

FIRE OVERRIDES - LMGS? Y/N

When set to “Yes” Fire Phase I and Phase II will override the input. When set to “No” the input will override Fire Phase I and II only if it was triggered before Fire Recall.

FIRE OVERRIDES - LRN? Y/N

When set to “Yes” Fire Phase I and Phase II will override the input. When set to “No” the input will override Fire Phase I and II only if it was triggered before Fire Recall.

FIRE RECALL FLOORS AND DOORS:

Main __ F/R
Detect A __ F/R
Detect B __ F/R
Detect C __ F/R

Main sets the recall floor when the REC input (Lobby Phase I key switch) is activated. Detector A, B, and C inputs select the floor and door when the AREC, BREC, and CREC inputs respectively are activated.

FBY/FRST (ANSI 2000 ONLY) OPERATION:

- FBY DISABLED (AREC - CREC NOT LATCHED)
- FBY ENABLED (AREC - CREC LATCHED)
- FRST-FIRE RECALL RESET (ANSI 2000 ONLY)

For jobs with the 1996 or earlier National Fire Code the FBY input will be present. Setting this parameter to “FBY ENABLED (AREC - CREC LATCHED)” will cause the cars to remain on Fire Recall after the AREC, BREC, or CREC inputs are reset. The Lobby key must be turned to “BYPASS” (FBY input) before the cars can be returned to service. For New York City and other locations where there is no “BYPASS” position on the Lobby key switch set this parameter to “FBY DISABLED (AREC - CREC NOT LATCHED)”. The FBY input is still present, but the cars will be allowed to return to service when the AREC, BREC, or CREC inputs turn off. For jobs where the
ANSI/ASME 2000 Code required the FBY input will not be present, but will be replaced by FRST. This input acts similar to the FBY input in that it will allow the cars to return to service if the AREC, BREC, or CREC inputs are off, but if any of them are on the cars will remain on Fire Recall.

**AREC/BREC/CREC INPUTS NORMALLY OPEN?**
This parameter sets the polarity of the smoke detector inputs.

**FIRE PH2: REOPENING DOOR WILL WAIT FOR DOL OR BEFORE DCB CAUSES CLOSING?** If set to “No” the door will immediately reverse and close if the door close button is released and pressed again before the door is fully open. If set to “Yes” the doors will reopen until the DOL indicates the doors are fully open before the door close button will allow the doors to close.

**KEEP DR OPEN AFTER EM PW PH 1? Y/N** - If parameter is set to “Yes” the cars that have completed the phase 1 return will remain with their doors open after they are shut down. This must be set to “Yes” to comply with the code for Canadian jobs. The default value is NO.

**RETURN IND/ATT CARS ON EM PWR PH 1** - If attendant or independent operated cars are leveled with a floor and parameter is set to “No” they are not going to be returned to the emergency power recall floor on emergency power recall. This parameter should be set to match the same parameter on the dispatcher’s parameter screen.

**SPEED REDUCE FACTOR 99% MAX SPEED** - Set this to the percentage of maximum speed that you want the car to run when a High Wind input (RSP) is activated. The cars will also run at this speed during emergency power.

**NOTE:** The speed will only reset back to full speed if the transition back to normal power occurs where the NPWR input is high prior to the transfer.

**EMG SWITCH NORMALLY OPEN** - If set to “Yes” the car will be Emergency Power when the EMG input is turned on. If set to “No” the car will be on Emergency Power when the EMG input is turned off.

**EM POWER TOTAL # BANKS: ___** - This parameter is used only on simplex cars when the car is setup for multi-bank / split feeder Emergency Power operation. This parameter should be set to the total number of banks that will share the Emergency Power busses. This parameter effects the bus selection timing. It is identical to the dispatcher’s Emergency Power split feeder parameter of the same name.

**THIS BANK #: ___** - This parameter is used only on simplex cars when the car is setup for multi-bank / split feeder emergency power operation. It is used to identify which number bank this car is in the building. Each dispatcher or simplex car that is tied to the same Emergency Power generator(s) in the building must have a unique number. This parameter affects the bus selection timing and because of this the parameter will also control the order banks put cars on automatic Phase 2 service.
11.7.6 VIP, Medical, Earthquake Parameters Menu

VIP SERVICE ENABLED - When set to "Yes" the car will treat medical calls from the dispatcher as VIP calls. Upon assignment of a VIP call the car will be removed from group service, complete answering any car calls and then proceeds to the VIP call floor. It will remain at the floor until a car call is entered or the "MED EMG / VIP" door time expires. When set to "No" the car will treat medical call assignments from the dispatcher as a medical call.

ALLOW NEW CAR CALLS BEFORE VIP PHASE 1 - When a VIP hall call is entered the car is removed from group operation and will answer all of its car calls before going to the VIP hall call’s floor. When set to “Yes” new car calls can be entered while the car is responding to its existing car calls. When set to “No” no new car calls can be entered while the car is responding to existing car calls.

MULTIPLE CAR CALLS DURING VIP PHASE 2 - When set to “Yes” will allow multiple car calls during VIP Phase 2 service. The car will not return to normal service until all car calls have been answered and the VIP/Medical Phase II door time has expired. When set to “No” will allow single car call after VIP Phase 1 has completed. The car will return to normal service once when the car call has been answered.

VIP/CAR RISER MED PHASE1 DOOR TIME - When the parameter "VIP service enabled" is set to “No” and the car is answering a medical call that is mapped to the car controller, this parameter will control the amount of time the car will wait at the medical emergency floor before returning to normal service.

NOTE 1: If the car is answering a medical call that is mapped to a dispatcher this parameter will have no effect. When the parameter "VIP service enabled" is set to “Yes” this parameter will control the amount of time the car will wait at the VIP recall floor before returning to normal service.

NOTE 2: This parameter is effective for both dispatcher mapped and car mapped VIP calls.

VIP/MEDICAL PHASE2 DOOR TIME (.1SEC) - When the parameter "VIP SERVICE ENABLED" is set to NO, this parameter will control the door time during medical phase 2. When the parameter "VIP SERVICE ENABLED" is set to “Yes” and the parameter "MULTIPLE CAR CALLS DURING VIP PHASE 2" is set to “Yes” this parameter will control the door time during VIP phase 2.

MEDICAL PHASE 2 OPENS BOTH DOORS:
When set to “Yes” the car will open both front and rear door simultaneously on Medical Emergency Phase II.

MEDICAL PHASE 2 OPENS DOOR VIA DOB?
When set to “Yes” the door open button is required to open the doors on Medical Emergency Phase II.

GROUP CAR AUTOMATIC MEDICAL EMERGENCY?
If set to “Yes” the car is capable of responding to automatic Medical Emergency calls from the group. Set to “No” if this car cannot answer group Medical Emergency calls.

RETURN IND: Y/N ATT: Y/N CAR ON MED PHASE1?
If parameter is set to “Yes” independent or attendant operated cars may be considered for medical recall assignments. They will, however, will only be assigned the Medical Emergency if no automatic cars are available. This parameter should be set to match the same parameter on the dispatcher’s parameter screen.
MED BUZZ REMAINS ON UNTIL CME ENABLED?
When set to “Yes” the in-car buzzer will remain on until the car is placed on Medical Emergency Phase II or the car is removed from Medical Emergency Phase I.

FLASH MED EMERGENCY LIGHT (MEL/MELC)?
When set to “Yes” the in-car Medical Emergency light will flash. When set to “No” the light will stay illuminated.

BYPASS IN CAR STOP SWITCH ON MED RECALL?
When set to “Yes” the in-car stop switch will be disabled when the car is on Medical Emergency Phase I. When set to “No” the stop switch remains active.

MED PH2 OVERRIDES FIRE PH: NEVER, IF TRIGG 1ST, WHEN DR OPEN
When the car is on Medical Emergency Phase II it will respond to the Fire recall if this parameter is set to “NEVER”. If the parameter is set to “IF TRIGG 1st” the car will not respond to the Fire Recall if the car was on Medical Emergency Phase II at the time of the Recall. If the parameter is set to “WHEN DR OPEN” it will respond to the recall when it is at a floor with the door open.

MED PH2 IMMEDIATE DOOR CLOSE W/CALL?
If set to “Yes” the doors will close immediately when a car call is registered on Medical Emergency Phase II. If set to “No” the door close button is required.

TURN CAR OFF MED AT RECALL FLOOR ONLY?
If set to “Yes” the car must return to the Medical Emergency recall floor before it is returned to normal service.

MED1 OVERRIDES FIRE1 IF TRIGGERED 1ST?
If set to “Yes” the car will remain on Medical Emergency operation even if Fire Recall operation is activated.

BYPASS CAR CALL LOCKS ON MEDICAL PH 2?
If set to “Yes” the car call lockouts will be ignored on Medical Emergency Phase II.

SEISMIC RUN ALLOWED WITH MOMENTARY CWL?
This parameter sets whether the cars will be allowed to run at reduced speed after a counterweight derailment switch activation. The cars will be run at 120 FPM and will remain at that speed until the SRES (seismic reset switch) in the controller is activated.

FIRE PHASE 1 KEY-SWITCH OVERRIDES CWL?
If set to “Yes” the cars will respond to the Lobby Fire recall switch even with an active counterweight derailment switch (CWL input).

CWL/CWSW INPUTS NORMALLY OPEN?
This parameter sets the polarity of the CWL (counterweight derailment switch) and CWSW (seismic activity switch) inputs.

REDUCE SPEED ON CWSW/SASW ACTIVATION?
This parameter sets whether the cars will immediately run at reduced speed after seismic switch activation. The cars will be run at 120 FPM and will remain at that speed until the SRES (seismic reset switch) in the controller is activated.

COUNTERWEIGHT ZONE 00000 - A value used for earthquake operation (the car must move away from the counterweights). It should be set to the encoder value where the crossheads of the car and counterweight meet. This feature works in conjunction with the earthquake inputs.
Return to the main menu by pressing the ‘0’ key when the cursor is on “RETURN TO MAIN MENU”. You can leave the parameter entry screen without saving your data at any time and return to the main menu by pressing the reset button (S1 button on CPU card). Values entered are not permanently stored in memory until the “WRITE VALUES TO NON-VOLATILE MEMORY” option is selected.
11.7.7 Miscellaneous Parameters Menu

SECURITY CODE ENTRY TIMEOUT SEC
Applies to jobs with security lock out feature only. It sets the allowable time to enter the following sequence: start of code button, desired floor button, up to a maximum of 8 code buttons and the end of code button.

ALARM STATUS TRIGGER TIME SEC
This parameter sets the time in which an alarm status can trigger the Building Management System to generate an alarm status fault. It is used to de-bounce the feature.

FAN OUTPUT NORMALLY OPEN?
When set to “Yes” the FAN output (if present) will turn on when the controller desires the car fan to turn off.

GEN./FAN SHUTDOWN TIME SEC
Generator / Fan timeout time after all car and hall assignments have extinguished. A typical entry is 180 seconds. The Fan output is only supplied when requested at the time of order.

ALTERNATE ODD AND EVEN CAR CALLS FOR HALL BUTTON OR DISPATCHER COMM FAILURE?
If set to “Yes” the car will alternate between stopping at odd and even floors when communication to the dispatcher is lost.

STOP AT FLOOR 00 IN UP DIRECTION? Y/N  DOWN? Y/N
If set to “Yes” the car with automatically stop at the floor number entered in the parameter. The floor number, starting from one equaling the lowest floor, must be used (not the floor name).

MAXIMUM SPEED DIFFERENTIAL
This parameter sets the maximum allowable difference between the demanded speed and the actual car speed. If the difference between speeds equals or exceeds the value set by this parameter for greater than one second a “Speed Differential Fault” is declared and the car will stop at the next available floor.

DISTANCE RC TO DROP BEFORE THE FLOOR
This parameter sets the distance (in encoder counts) that the retiring cam output will be turned off when approaching a floor.

LOBBY / TOP FLR HOLIDAY DR TIME (.1 SEC)
Min: 10 Max: 3000  Default: 100  Units: tenths of seconds
This parameter controls the door open time when a car on holiday service reaches the lobby or the top unlocked floor.

HOLIDAY OPERATION BASED ON TIME AND DAY
<table>
<thead>
<tr>
<th>TIME:</th>
<th>ON</th>
<th>OFF</th>
<th>S</th>
<th>M</th>
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</table>
This parameter allows the holiday service to be activated based on the time and day of the week. Time must be entered in military time.

INSPECTION SPEED (FPM)
This parameter sets the demanded inspection speed of the car.
**GATE/DOOR LOCK BYPASS PERMISSIVE?**
This parameter sets if the gate and door lock bypass switches are present.

**MAIN CONTACTOR HOLD TIME (0.1 SEC)**
This parameter sets the amount of time (in 1/10th of a second) that the main contactor will remain picked after the brake contactors are dropped.

**MG START/RUN TRANSFER TIME (SEC)**
This parameter sets the amount of time (in seconds) that the “Start” output for the MG set will stay on before transferring to “Run”.

Return to the main menu by pressing the ‘0’ key when the cursor is on “RETURN TO MAIN MENU”. You can leave the parameter entry screen without saving your data at any time and return to the main menu by pressing the reset button (S1 button on CPU card). Values entered are not permanently stored in memory until the “WRITE VALUES TO NON-VOLATILE MEMORY” option is selected.
11.7.8 Simplex / Inconspicuous Riser Parameters Menu

NOTE: These parameters are for simplex cars only. On group cars they are not accessible.

DOOR OPEN TIME LOBBY - SEC 00 - Lobby door open time for a simplex or inconspicuous riser car.

PARK FLOOR / DOOR (0 = NO PARK) 00 - Determines whether the car will return to the lobby, or another floor, to park, if the car is a simplex or running on an inconspicuous riser. On group installations this parameter is not used. A zero will disable parking. The floor number, starting from one equaling the lowest floor, must be used (not the floor name).

KEEP LOBBY DOOR OPEN AFTER PARKING? Y/N - Determines whether a simplex car or a car running on inconspicuous riser will park in the lobby with its doors open.

REOPEN DOOR WITH HALL CALL? Y/N - Determines whether a simplex car will reopen its door with a hall call at the floor.

EMERG. PWR. PH 1 TO NEXT GRP TIMEOUT (SEC) 000 - Sets the time, in seconds, one dispatcher will wait for a signal from others dispatchers before timing out when dispatchers are tied together for emergency power phase I.

EMERG. PWR. PH 2 TO NEXT GRP TIMEOUT (SEC) 000 - Sets the time, in seconds, one dispatcher will wait for a signal from others dispatchers before timing out when dispatchers are tied together for emergency power phase II.

AUTO INCONSPICUOUS RISER/? Y/N TIMEOUT (SEC) 000 - If set to “Yes” the car has automatic inconspicuous riser. Also, sets the time, in seconds, (if set to “Yes”) before riser will switch back to automatic. Generally set to 30 seconds.

HALL LANTERN ENABLE INCONSP. RISER Y/N - If set to “Yes” the hall lanterns will be enabled during inconspicuous riser (ALD input on).

SHUTTLE FLR 1 (0 = NONE) - First floor to be serviced by car when running on express service (shuttle between two floors). The express service input, LKS, must be present an ON for this parameter to operate.

SHUTTLE FLR 2 (0 = NONE) - Second floor to be serviced by car when running on express service. The express service input, LKS, must be present an ON for this parameter to operate.

LOBBY 1 FLOOR F / R 00 ON 00:00 OFF 00:00 - Simplex car time-triggered lobby floor 1. Times ON and OFF must be entered in 24-hour clock. This allows two lobby floors to be programmed for different times of the day using this parameter in conjunction with the LOBBY 2 FLOOR parameter.

SIMPLEX ENERGY STATUS BASED ON TIME AND DAY:
0 HIGH PERFORMANCE 1 ENERGY CONSERVATION

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<th>T</th>
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To **MANUALLY** use the energy conservation feature, select the days for which you would like the feature to be active, by entering a **Y** for the day. Set the time period for the feature to be active, in military format, and set a **0** to keep the system on high performance and a **1** to switch to energy conservation.

**AMOUNT HALL AND CAR CALLS BEFORE SWITCHING TO HIGH PERFORMANCE 00.** This will be used for dynamic transfer between high performance and energy conservation.

Return to the main menu by pressing the ‘0’ key when the cursor is on **“RETURN TO MAIN MENU”**. You can leave the parameter entry screen without saving your data at any time and return to the main menu by pressing the reset button (S1 button on CPU card). Values entered are not permanently stored in memory until the **“WRITE VALUES TO NON-VOLATILE MEMORY”** option is selected.

### 11.7.9 CE Voice Annunciator Messages

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<td>43</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>00</td>
<td>14</td>
<td>29</td>
<td>44</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>00</td>
<td>15</td>
<td>30</td>
<td>45</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

**DESCR:**

This menu allows the user to enter the message that will be sent to the optional CE Voice Annunciator unit for each landing and for each event.

The first column of information sets the CE slot data number that will be sent to the CE Voice unit when the controller event condition that is shown at the bottom of the screen next to **“DESCR:”** occurs. For example, if the controller event assigned to the first output is described as “Fire Recall to Lobby” under **“DESCR:”** when the car is being recalled to the Lobby for Fire Service this slot data number will be sent to the CE Voice unit. Referring to the CE Voice unit documentation for a list of available messages, select the message that you would like the unit to play when the car is being recalled to the Lobby for Fire Service. Scroll down through the rest of the **“MSG#”** column to set the appropriate CE Voice message for the described events.

The next set of columns sets the message to be played at each floor. The left column sets the building position (the bottom floor that the car can go to is always 1 regardless of floor name) and the right column sets the CE Voice message number. Again referring to the CE Voice unit documentation for a list of available messages, select the message that you would like the unit to play when the car is at that particular floor.
11.7.10 Event Disable Parameters Menu

This menu allows the user to disable certain events from registering in the event log. The controller will still behave the same way if the event occur, but the event will not be noted in the event log. This is helpful if there are certain events that occur frequently on a particular job that you do not wish to log. To view what each event is use the cursor to move to the event number. The event description will be shown at the bottom of the screen.

11.7.11 Car Call Lock Entry Menu

This menu allows you to lock out car calls for specific floors. These locks are not able to be overridden by any hardware locks, but are overridden for Fire Service operation. This menu is helpful if there is a particular floor in the building that is not in use and the customer wants that floor locked out until a later time.

11.7.12 Up Hall Lock Entry (Simplex / IR only) Menu

This menu acts the same as the car call lock entry menu. It is only accessible on simplex cars or cars with inconspicuous risers.

11.7.13 Down Hall Lock Entry (Simplex / IR only) Menu

This menu acts the same as the car call lock entry menu. It is only accessible on simplex cars or cars with inconspicuous risers.

11.7.14 Floor Landing Value Menu

This menu is where the floor locations for the system are located. After a learn trip is completed the menu item "PRESS ENTER TO GET FLOOR VALS FROM THE INCREMENTAL ENCODER" is selected. This retrieves the values from the encoder that were observed on the learn trip. It may be desirable to ‘touch up’ some of the floor values after the learn trip. To do this use the key pad on the display card and manually change the value for a particular floor to that which will allow the car to stop exactly floor level.

NOTE: It is recommended that the values only be changed by a maximum of 4 counts. If the value needs to be changed more then it is necessary to remove the magnet and re-install it in the correct position. After this is done another learn trip will need to be completed. FOR VALUES TO TAKE EFFECT, RETURN TO MAIN MENU AND WRITE THEM TO NON-VOLATILE MEMORY.

Return to the main menu by pressing the ‘0’ key when the cursor is on “RETURN TO MAIN MENU”. You can leave the parameter entry screen without saving your data at any time and return to the main menu by pressing the reset button (S1 button on CPU card). Values entered are not permanently stored in memory until the “WRITE VALUES TO NON-VOLATILE MEMORY” option is selected.
11.7.15 Binary PI Outputs Menu

This screen sets binary position indicator output that will be sent for each floor the car serves. The first column “LD” sets the floor position in the building. Position 1 will always be the lowest landing that this car serves. The second column “PI#” sets the binary output for that floor.

11.7.16 Learn Trip, Floor Names, Pretorque Menus

This menu item allows the user to access the Learn Trip, Floor Names, and Pretorque sub-menus. When this item is selected a sub-menu will appear with each of these items. Moving the cursor to the desired menu and pressing the ‘0’ key will access that menu.

11.7.16.1 Learn Trip Menu

This menu item allows the microprocessor to start the car on an automatic learn trip up the hoistway to learn the position of all floor magnets.

NOTE: The car must be on Automatic operation and level with the bottom floor before the learn trip is initiated.

Once the Learn Trip has been completed it is necessary to go to the “Floor Landing Values” menu and select the menu item "PRESS ENTER TO GET FLOOR VALS FROM THE INCREMENTAL ENCODER". This retrieves the values from the encoder that were observed on the learn trip.
11.7.16.2 Floor Names Entry Menu

<table>
<thead>
<tr>
<th>LD#</th>
<th>NAME</th>
<th>LD#</th>
<th>NAME</th>
<th>LD#</th>
<th>NAME</th>
<th>LD#</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>__</td>
<td>17</td>
<td>__</td>
<td>33</td>
<td>__</td>
<td>49</td>
<td>__</td>
</tr>
<tr>
<td>2</td>
<td>__</td>
<td>18</td>
<td>__</td>
<td>34</td>
<td>__</td>
<td>50</td>
<td>__</td>
</tr>
<tr>
<td>3</td>
<td>__</td>
<td>19</td>
<td>__</td>
<td>35</td>
<td>__</td>
<td>51</td>
<td>__</td>
</tr>
<tr>
<td>4</td>
<td>__</td>
<td>20</td>
<td>__</td>
<td>36</td>
<td>__</td>
<td>52</td>
<td>__</td>
</tr>
<tr>
<td>5</td>
<td>__</td>
<td>21</td>
<td>__</td>
<td>37</td>
<td>__</td>
<td>53</td>
<td>__</td>
</tr>
<tr>
<td>6</td>
<td>__</td>
<td>22</td>
<td>__</td>
<td>38</td>
<td>__</td>
<td>54</td>
<td>__</td>
</tr>
<tr>
<td>7</td>
<td>__</td>
<td>23</td>
<td>__</td>
<td>39</td>
<td>__</td>
<td>55</td>
<td>__</td>
</tr>
<tr>
<td>8</td>
<td>__</td>
<td>24</td>
<td>__</td>
<td>40</td>
<td>__</td>
<td>56</td>
<td>__</td>
</tr>
<tr>
<td>9</td>
<td>__</td>
<td>25</td>
<td>__</td>
<td>41</td>
<td>__</td>
<td>57</td>
<td>__</td>
</tr>
<tr>
<td>10</td>
<td>__</td>
<td>26</td>
<td>__</td>
<td>42</td>
<td>__</td>
<td>58</td>
<td>__</td>
</tr>
<tr>
<td>11</td>
<td>__</td>
<td>27</td>
<td>__</td>
<td>43</td>
<td>__</td>
<td>59</td>
<td>__</td>
</tr>
<tr>
<td>12</td>
<td>__</td>
<td>28</td>
<td>__</td>
<td>44</td>
<td>__</td>
<td>60</td>
<td>__</td>
</tr>
<tr>
<td>13</td>
<td>__</td>
<td>29</td>
<td>__</td>
<td>45</td>
<td>__</td>
<td>61</td>
<td>__</td>
</tr>
<tr>
<td>14</td>
<td>__</td>
<td>30</td>
<td>__</td>
<td>46</td>
<td>__</td>
<td>62</td>
<td>__</td>
</tr>
<tr>
<td>15</td>
<td>__</td>
<td>31</td>
<td>__</td>
<td>47</td>
<td>__</td>
<td>63</td>
<td>__</td>
</tr>
<tr>
<td>16</td>
<td>__</td>
<td>32</td>
<td>__</td>
<td>48</td>
<td>__</td>
<td>64</td>
<td>__</td>
</tr>
</tbody>
</table>

This screen allows the user to enter ASCII characters to output to the CE Electronics position indicator.

11.7.16.3 Pretorque Set Up Menu

This menu sets up the controller’s pretorque system. It is only accessible if the parameter on the motion parameters menu is set to allow pretorque. The screen looks something like this:

```
RELEAS BRAKE AND CHECK FOR ROLLBACK
DR CLSD:N   POWER:N   BRAKE:N
ENCODER:    PRESENT 000000   TOP 00000000
            BOTTOM 00000000
PULSE HEIGHT: +/-_____ (MAX 3200 OR 4800)
TURN ON STRAIN GAGE CALIBRATION-CAL:OFF

------------------------------------
PULSE HEIGHT:  BOTTOM EMPTY +/-_____  TOP EMPTY +/-_____  TOP FULL LOAD +/-_____  
WEIGHT VALUE:  BOTTOM EMPTY        TOP EMPTY        TOP FULL LOAD        
WEIGHT OF LOAD(LBS)  ______
PRESENT WEIGHT VALUE  000
```

Refer to Chapter 13 of this manual for the complete set up procedure. Some initial settings are:

```
PULSE HEIGHT:  BOTTOM EMPTY  -1000  
              TOP EMPTY  -1200  
              TOP FULL LOAD  +2000
WEIGHT VALUE:  BOTTOM EMPTY  022  
               TOP EMPTY  060  
               TOP FULL LOAD  225
```
11.7.17 Modem Parameters Menu

MODEM PARAMETER ENTRY

PHONE # ______________

JOB ID # ____________

CONNECT VOLUME (0=Off  3=Loudest)
### Section 12 Dispatch

#### 12.1 Dispatcher Diagnostic Screen

Shown below in Figure 12.1 is an example of a typical dispatcher diagnostic screen. The numbers at the left are for reference only, and would not be visible on the screen.

![Dispatcher Diagnostic Screen](image)

At line 1 the time and date and will be shown. There will also be a cursor blinking somewhere on the top line. The cursor can be moved to change the date or time and can be placed in the right corner of the screen to gain access to the menu.

Line 2 shows the building name or address.

Line 3 is the first group of hall calls to the dispatcher. Like on the car diagnostic screen, the cursor can be moved and placed next to call to register that call. When the call is registered that call will be highlighted or shown in reverse video. In the example above the 3rd floor up, 4th floor down, and the 6th floor down hall calls are registered.

Line 6 above shows the first group of input connected to the dispatcher. The only one used in this example is the last one, SASW. The input is turned off so it is not highlighted.

Lines 7 and 8 show the remaining inputs to the dispatcher. The HBF, or hall button failure input is highlighted because it is on. If this input were off it would indicate to the dispatcher that there is no power to the hall call push buttons. This would cause the dispatcher to tell the cars to run continuously and stop at every other floor in the down direction to provide service to the building until power can be restored to the hall call pushbuttons.

Lines 9 and 10 are blank. Additional inputs or outputs would be shown if more were required based on the job configuration.

Line 11 shows the car numbers for the group. In this group there are four cars, numbered 9, 10, 11 and 12.

Line 12 shows the dispatcher demands to each car in the group. Note that Car 9 is assigned the 3rd floor up hall call, Car 11 is assigned the 6th floor down hall call, and Car 12 is assigned the 4th floor down hall call.
Line 13 shows the status of the cars in the group. Cars 9, 11, and 12 show a status of “NOR”. This indicates that they are on normal operation. Car 10 shows a status of “MLF”. This indicates that the car is malfunctioning and the dispatcher cannot communicate with it. Other status messages are shown below.

<table>
<thead>
<tr>
<th>Status Message</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATT</td>
<td>Car is on Attendant operation.</td>
</tr>
<tr>
<td>BYP</td>
<td>Hall call bypass operation. Usually triggered by the load weigh or WTB input.</td>
</tr>
<tr>
<td>CMR</td>
<td>Car is on Emergency Medical operation.</td>
</tr>
<tr>
<td>EMG</td>
<td>Car is on Emergency Power operation.</td>
</tr>
<tr>
<td>FIR</td>
<td>Car is on Fire Service operation.</td>
</tr>
<tr>
<td>FLT</td>
<td>The car has faulted. The Dispatcher will not give the car any assignments until it leaves the floor. Check the car’s event log for the cause.</td>
</tr>
<tr>
<td>HBF</td>
<td>Hall Button Failure operation. Dispatcher HBF input is off. Car will run continuously and stop at every other floor in the down direction.</td>
</tr>
<tr>
<td>IND</td>
<td>Car is on Independent Service operation.</td>
</tr>
<tr>
<td>INS</td>
<td>Initialization operation. Generally seen after controller power up until the car is ready to run.</td>
</tr>
<tr>
<td>MLF</td>
<td>Malfunction. The Dispatcher cannot communicate with the car.</td>
</tr>
<tr>
<td>NOR</td>
<td>Normal operation. The car is in service and capable of accepting Dispatcher assignments.</td>
</tr>
<tr>
<td>REC</td>
<td>Fire Recall (Phase I) operation.</td>
</tr>
<tr>
<td>RSY</td>
<td>Re-synchronization. The car needs to do or is presently doing a re-synchronization.</td>
</tr>
<tr>
<td>SAF</td>
<td>Safety circuit open.</td>
</tr>
<tr>
<td>SES</td>
<td>The car is on Seismic operation.</td>
</tr>
<tr>
<td>WTD</td>
<td>The car is on Weight Dispatch operation.</td>
</tr>
</tbody>
</table>

Line 14 shows the present position of the car and its direction of travel.

### 12.2 Car-Dispatcher Communication / Hall Button Failure

If the communication link fails between the car and dispatcher the car’s status will be shown as malfunction (MLF). If the car is on normal operation and capable of running it will register its highest unlocked car call. After arriving at the top floor, it will enter all odd car calls and stop at the floors in the down direction. It will then go back to the highest floor and register all even car calls and stop at these floors in the down direction. This ‘block operation’ will maintain service to hall calls. When the communication link is restored the car will be placed back on normal (NOR) status.

If the HBF input to the dispatcher goes off this indicates a loss of power to the hall call push buttons. The cars will be sent the HBF status by the dispatcher and will operate the same as a loss of dispatcher communication.

If any hall call cannot be answered by the cars in the group that are currently in service and not showing an FLT status that hall call will be canceled. This is done to alert passengers that their hall call request will not be answered in a timely fashion.

### 12.3 Inputs to the Dispatcher

The following is a list of typical inputs for the dispatcher.

- **AREC** First (A) smoke detector
- **AUTO** Automatic emergency power
- **BREC** Second (B) smoke detector
CREC Third (C) smoke detector
nD or nDF Front down hall calls (F is shown only if there are any rear calls in the system)
nDR Rear down hall calls
EC Energy conservation
EMG Emergency power input
EPn Emergency power manual car select switch (followed by car number)
FBY Fire bypass switch
FRST Fire reset switch (ANSI/ASME 2000 Code only)
HBF Hall button failure
HP High performance
nIDF Alternate riser front down hall call
nIDR Alternate riser rear down hall call
IRn Inconspicuous riser car
nIUF Alternate riser front up hall call
nIUR Alternate riser rear up hall call
nLF nLK nL Front up and down hall call lock
LKO Lock all non-lobby car calls on all cars
nMF Front medical emergency hall calls
nMR Rear medical emergency hall calls
NPWR Emergency Power - Return to Normal Power
OFFL Canadian hall fire recall switch lobby off
OFFR Canadian hall fire recall switch remote off
PTS Pre-Transfer Switch on Emergency Power
REC Lobby fire recall switch
RECL Canadian hall fire recall switch lobby on
RECR Canadian hall fire recall switch remote on
RET1 Linked dispatcher has completed Emergency Power Phase 1
RET2 Linked dispatcher has completed Emergency Power Phase 2
SASW Seismic activity switch
SEC Security
nU or nUF Font up hall calls
nUR Rear up hall calls

12.4 Outputs from the Dispatcher

The following is a list of typical outputs for the dispatcher.

OP Off peak light
UPP Up peak light
DNP Down peak light
nUC...nUC Up cross cancellation front outputs
nDC...nDC Down cross cancellation front outputs
nUX...nUX Up cross cancellation rear outputs
nDX...nDX Down cross cancellation rear outputs
nUA...nUA Up annunciator light front outputs
nDA...nDA Down annunciator light front outputs
nUY...nUY Up annunciator light rear outputs
nUX...nDX Down annunciator light rear outputs
DF Dispatcher failure light
HF Hall button failure light
RET1 Linked dispatcher has completed Emergency Power Phase 1
RET2 Linked dispatcher has completed Emergency Power Phase 2
LMAN Canadian car Fire Phase I
LAUT Canadian car when smoke detector activates Fire Phase I
12.5 Dispatcher Programming

12.5.1 Entering & Saving Parameters

Just as with the car display card, the bottom three buttons on the dispatch display card are used to move the cursor around the screen and change parameters. To move the cursor to the left, press the “*” key. To move the cursor to the right, press the “#” key. The “0” is used as an enter key, a toggle key, and a numeric key when used in a numeric parameter. After setting all of the parameters "WRITE VALUES TO NON-VOLATILE MEMORY". DO NOT RESET THE CPU BEFORE SAVING YOUR PARAMETERS or they will be lost!
12.6 Dispatcher Parameters

12.6.1 Parameter Menu One Description

LONG WAIT PRIORITY: This should be set to a value that is at least twice as large as the average wait time. When a call has been in longer than the long wait time, it will be given priority by the dispatcher. Any long wait calls will be assigned before regular hall calls. This may cause the system to bypass a call in order to give the long wait call priority. If hall calls are being bypassed continually or you would rather not use this feature, adjust your Long Wait Priority Time to a higher number. Valid entries range from 45 to 999 seconds, with 120 seconds being the default.

PEAK DURATION TIME: There is a built in delay of approximately thirty seconds before dropping a peak to avoid volatility in the system. This can be adjusted using the peak duration setting. The peak duration time can be set from 1 to 999 seconds, with a 30 second default.

UP and DOWN PEAK: Two up and two down peak intervals can be set. Military time should be used to enter the times (0 - 23 hour, 0 - 59 minutes).

HALL CALL IMBALANCE UP PEAK - the difference in the amount of up calls and down calls that will trigger an up peak. This should be set from "0" to "30" and has a default value of "8".

HALL CALL IMBALANCE DOWN PEAK - the difference in the amount of down calls and up calls that will trigger a down peak. This should be set from "0" to "30" and has a default value of "8".

If an up and down peak are set to occur at the same time, the down peak will have precedence. If an imbalance of calls occurs which would cause a system peak, it will have precedence over a time-generated peak. When the imbalance ceases the system will return to the time generated peak.

FIRE / EMERGENCY POWER RECALL FLOORS:
MAIN: ___ DET. A: ___ DET. B: ___ DET. C: ___
The main and alternate recall floors must be entered here. The lowest floor in the building is floor one. The value entered into the "MAIN" location sets where the cars will go when the Lobby recall switch is turned on. It also sets the floor the cars will be returned to on Emergency Power Phase I. The "DET. A" through "DET. C" inputs set where the cars will be returned to when the AREC, BREC, and CREC inputs are activated respectively.

FBY/FRST (ANSI 2000 ONLY) OPERATION:
FBY DISABLED (AREC - CREC NOT LATCHED)
FBY ENABLED (AREC - CREC LATCHED)
FRST-FIRE RECALL RESET (ANSI 2000 ONLY)
For jobs with the 1996 or earlier National Fire Code the FBY input will be present. Setting this parameter to "FBY ENABLED (AREC - CREC LATCHED)" will cause the cars to remain on Fire Recall after the AREC, BREC, or CREC inputs are reset. The Lobby key must be turned to "BYPASS" (FBY input) before the cars can be returned to service. For New York City and other locations where there is no "BYPASS" position on the Lobby key switch set this parameter to "FBY DISABLED (AREC - CREC NOT LATCHED)". The FBY input is still present, but the cars will be allowed to return to service when the AREC, BREC, or CREC inputs turn off. For jobs where the ANSI/ASME 2000 Code required the FBY input will not be present, but will be replaced by FRST. This input acts similar to the FBY input in that it will allow the cars to return to service if the AREC, BREC, or CREC inputs are off, but if any of them are on the cars will remain on Fire Recall.
12.6.2 Parameter Menu Two Description

PENALTIES:
GENERATOR OFF:
This value is a disadvantage given to a car that is parked with its MG set turned off when the
dispatcher is assigning hall calls. This should be set to "0" for SCR drive systems. In general, the
more cars that are available to dispatch the higher this penalty should be set (less need to turn on
the generator in a car with its generator off). For generator systems, multiply the number of cars by
two for a good starting point value. Valid entries range from 0 to 10, with a default value of 5.

THIS CAR UP:
This is a disadvantage given to the lobby car when calculating the best car to assign to a call.
Larger values will cause the lobby car to remain in the lobby and another car in the system to be
assigned hall calls. Valid entries range from 0 to 5, with a default value of 1.

NEXT CAR UP:
A disadvantage given to the next car up when calculating the best car to assign a hall call to. Valid
entries range from 0 to 5, with a default value of 2.

HALTED TIME:
The amount of time required for a car to halt (decelerate) and open and close its doors. Valid
entries range from 5 to 30, with a default value of 10. A system with slow door operators should be
set to a larger value.

ADVANTAGES:
IN LINE CALL:
An advantage given to a car that must pass a hall call in its present direction of travel. Valid entries
range from 0 to 10, with a default value of 5. Set this value higher if you would like to ensure that
the cars will stop rather than pass a hall call.

CALL COINCIDENCE:
An advantage given to a car that has a car call at the floor for which a hall call is registered. Valid
entries range from 0 to 5, with a default value of 5.

DOORS OPEN SIMULTANEOUSLY Y/N.
This effects cars on Automatic Operation only. Set to “Yes” to have both front and rear doors open
together.

NOTE: This parameter and the parameter in the car’s parameter screen must both be set to “Yes”
to have both front and rear doors open simultaneously.

DOOR OPEN TIME LOBBY UP
This can be set from 1 second to 98 seconds. A value of 99 seconds will cause the door to remain
open constantly when it is assigned the “This Car Up” status. The default is 10 seconds.

DOOR OPEN TIME IN LOBBY AFTER A CAR CALL
This can be set from 1 second to 98 seconds and is used to shorten the lobby door time after a car
call is entered or after the car receives an assignment. The default is 5 seconds.

DOOR TIME MED EM RECALL SEC:
This parameter sets the amount of time (in seconds) that the door will remain open before going on
Phase II of Medical Emergency. When it expires the car will close its door, go off Medical Phase I
and rejoin the group (the Phase II key switch was not turned on before the time expired).

MED PH 1 OVERRIDES FIRE PH 1 IF TRIG 1ST
This parameter tells the dispatcher whether cars on Medical Emergency Phase I should respond to
the Fire Recall (Phase I) operation. Setting this to a “Yes” will cause cars on Medical Emergency Phase I to remain standing at the floor even though the has been a Fire Recall initiated.

RET ATT/IND CARS ON MEDICAL RECALL:
If this parameter is set to “No” all cars on attendant or independent will not be assigned medical recall (code blue) calls. The setting of this parameter must match the parameter set in the car parameters menu.

AUTO CAR CALL LOCKS BY TIME:
All car calls (except for the lobby call) on all cars will lock and unlock automatically at these set times. Three time options can be set (Monday to Friday, Saturday Only and Sunday Only).
12.6.3 Parameter Screen Three Description

ENERGY CONSERV STATUS BASED ON TIME 
AND DAY: 0-HIGH PERFORM 1-ENERGY CONSERV 
TIME:ON OFF STATUS S M T W T F S

To use this feature, enter a time for the system to go on energy conservation mode and a time for it to return to high performance mode. The status should be set to 0 for high performance and 1 for energy conservation. The day of the week should be set to a yes or no. The default is 0, or high performance. For the energy conservation feature to change by date and time, the EC and HP inputs must be off and the cars must be set for dynamic energy conservation.

HALL CALL LONG WAIT TIME BEFORE SWITCHING TO HIGH PERFORM.:

This should be set to the number of seconds a hall call can be in, before switching a car off of 'Energy Conservation' and back to 'High Performance' mode. The default is 120 seconds, and the range is 0 to 999 seconds. This will work only if EC and HP inputs are OFF and no time settings are ON and the cars are set to Dynamically change.

REOPEN DOOR WITH HALL CALL?

If set to “Yes” the hall button will act similarly to the door open button, in that a closing door will reopen and can be held open by pressing the hall button. The hall button will not hold the door beyond a preset time ‘BYPASS HALL CALL TIME’ unless it has no car calls registered and no hall assignment. This is to prevent a stuck button from holding the car at a floor indefinitely. If set to a value of “No” the car will not reopen its doors if it has another hall assignment or car call registered. The default is “No”.

BYPASS HALL CALL TIME (SEC.)

The number of seconds that a hall call button can be used to keep the car door open at a floor. After this amount of time the hall button is considered stuck and the car will be released. The timing starts when the car first stops to answer the hall call. The timer increments only if the car has a hall assignment or car call, at another floor. The range is 0 to 999 seconds with a default of 30 seconds.

CAR FAULT TIMEOUT (SEC)

This parameter sets the amount of time that the car will be allowed to stand at the floor before the dispatcher puts it into “FLT” (fault) status. The timer starts when the car arrives at the floor and the doors start to open. Setting the time too short will cause a car to go into fault mode too quickly for common problems like someone holding the doors, and setting it too short will interfere with service in the building. A value of 30 seconds is recommended.

INTERNAL USE ONLY - DO NOT SET ___

This parameter is used only for O. Thompson development personnel. The only purpose that could be used outside of O. Thompson’s development lab would be to re-set all parameters to their default values. Entering “721” sets all dispatcher parameters to their default values.

WARNING: Setting all parameters to their default values will result in loss of saved data. Do not restore default values unless you are sure that is what you want to do. All parameters will need to be edited and re-saved for the dispatcher to operate properly after restoring defaults.

MODEM PARAMETERS:

Ph#:              ID #:

Only used when the dispatcher is communicating with a Central Station. These parameters set the phone and identification number for the modem. Enter the phone number to call (Full Number with...
prefixes). The Central Station will need to identify this caller with an ID (each node calling the Central Station needs a unique ID).

12.6.4 Parameter Menu Four Description

**LOBBY FLOOR:**
This parameter sets the floor the dispatcher will consider to be the Lobby floor for dispatching and zoning.

**NOTE:** This floor does not have any effect on the Fire Recall Lobby floor. The floor the will return to on Fire Recall operation is set in the first menu page of the dispatcher parameter.

**ZONING RETARDATION (SECONDS):**
This parameter sets the amount of time (in seconds) that the dispatcher will wait to give a car a parking assignment. The larger the number the longer the dispatcher will wait after the car becomes available. Setting the number too short will cause the cars to start unnecessarily, and setting it too large will adversely effect the service in the building. It is recommended that a value of 20 – 30 seconds be used to start, and modified if necessary.

**ZONE TO FULLY LOCKED FLOORS?**
If set to “No” the dispatcher will not give the cars a parking assignment at a floor that has the car calls and its up and down call calls locked out. Typically set to “No”.

**PRIORITY PARK FLRS (0 NONE ZONE)**

<table>
<thead>
<tr>
<th>FLR</th>
<th>CAR TIME</th>
<th>ON:HR:MN</th>
<th>OFF:HR:MN</th>
</tr>
</thead>
<tbody>
<tr>
<td>_ _</td>
<td>ON :__</td>
<td>OFF :__</td>
<td></td>
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<tr>
<td>_ _</td>
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<td>_ _</td>
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</tr>
<tr>
<td>_ _</td>
<td>ON :__</td>
<td>OFF :__</td>
<td></td>
</tr>
</tbody>
</table>

This group of parameters sets up priority parking floors for the building. The assignments can be adjusted so that at a prescribed time a car will be assigned to park at the desired floor. Military time should be used to set the start and end times. If “0” is set for the floor, no priority parking will occur (lobby service and zoning will be unaffected). If the car is set to “0” the first available car will park at the floor. If a specific car number is entered then only that car will park (if and when it becomes available). There are four priority parking floor slots available.

**NOTE:** Lobby parking assignments have priority over the “Priority Parking” assignments. The “Priority Parking” assignments have priority over zoning assignments. **DO NOT ENABLE THIS FEATURE UNLESS ABSOLUTELY NECESSARY, AS IT WILL ADVERSELY EFFECT SERVICE TO OTHER FLOORS.**

**GROUPS FOR LOBBY COVERAGE**

**GROUP 1:** _ _ _ _ _ _ _ _ _ _

**GROUP 2:** _ _ _ _ _ _ _ _ _ _

This group of parameters is used to assign different cars for Lobby Parking. You can split the group into two different groups for lobby coverage. If the group is split you can have two “This Car Up” cars. This is useful if you wish a specific car to be the Lobby car or if the group has two types of service (high and low rise, for example) and you want one car from each group to park in the Lobby. Enter a “Yes” for each car you wish to have in group one and a “No” for all others. Enter a “Yes” for each car you wish to have in group two and a “No” for all others. If you wish to set the group of for normal lobby service put all cars in group one and enter “No” for all cars in group two.
CARS LBY OFF PK: GP1: __ GP2: __
CARS LBY UP PK: GP1: __ GP2: __
CARS LBY DN PK: GP1: __ GP2: __

These parameters set the number of cars to park in the Lobby during each mode of service. These can be set from 0 to 10 and group one has a default value of 0 for DOWN PEAK, 1 for UP PEAK, and 1 for OFF PEAK. Group two has default values of 0 for all modes of service.
12.6.5 Parameter Menu Five Description

**EMERGENCY POWER:**
**RET ATT/IND CARS EM PWR PH I**
This only applies to cars that are on attendant or independent at a floor with their doors open when the Emergency Power signal is activated. If the door is not open the car will do a Phase I recall to the recall floor. If you wish to bring cars on attendant or independent down for an Emergency Power Phase I Recall in all situations set this to “Yes”. If you set this to “Yes” the door will close and the car will be brought to the recall floor in the order assigned. If set to “No” the car will not return. If the car is selected to run on phase II it will return to service from the present floor. This parameter should be set to match the parameter in the car’s parameter menu.

**EM PWR: AMT CARS MANUAL SELECT**
This parameter sets the maximum number of cars that can be manually selected to run on Emergency Power Phase II.

**TIMEOUT: EM POW RET**
This parameter sets the amount of time the dispatcher will attempt to run each car on Phase I Emergency Power Return. If the car does not move in this amount of time the dispatcher will go to the next car and attempt to run it. After all other cars have returned the dispatcher will go back and re-attempt to run any failed cars. If they again fail to move in the amount of time specified in this parameter the dispatcher will fail the car and not attempt to run it again.

**EMG PWR PH2 AUTO SELECT PRIORITY GROUPS**
1: __ __ __ __ __ __ __ __ __ __
2: __ __ __ __ __ __ __ __ __ __
These parameters allow the user to select the recall order the dispatcher will select the cars for Phase II when the AUTO input is on. On most dispatchers group 2 parameters are not used.

**AMOUNT CARS GROUP1: __ GROUP2: __**
The amount of cars allowed back in service on Emergency Power When Phase II AUTO is selected. The range is 1 - 10 with default of 1.

**ADD NO. CARS GROUP1 TO GROUP2 IF GROUP1 CARS CAN'T RETURN?**
If set to “Yes” the dispatcher will add the number of cars specified in the previous parameters together and recall that amount if you are using two groups and the maximum amount of cars in group 1 can’t return to service. Set this to “No” if you do not want extra cars in group 2 to return if group 1 cars are unable to return.

**PHASE2 EMERGENCY POWER RETURN TO SERVICE ATT/IND CARS AFTER AUTO CARS?**
Set this to “Yes” if you prefer to return cars on Automatic before cars on Attendant or Independent service on Phase II Emergency Power.

**INTERDISP EM PWR TIMES:PH I __ PH II __**
If the dispatcher is not linked with any other dispatchers for Emergency Power operation these parameters have no effect. If the dispatcher is linked together with other dispatcher see Section 16.6 for a description of Emergency Power operation with linked dispatchers.

**PHASE 1 RECALL ORDER (ENTER CAR # 1-10)**
**PH1 ORDER: __ __ __ __ __ __ __ __ __ __**
This parameter sets the order in which the cars will be recalled on Phase I Emergency Power Recall.

**MAX NUMBER CARS TO RUN ON PHASE 1:** __
This parameter sets the maximum number of cars the dispatcher will allow to run on Phase I Emergency Power Recall.
EMG SWITCH NORMALLY OPEN:
This parameter sets the polarity of the EMG input.

12.6.6 Lock Screens

After the dispatcher parameter menus there are additional screens to allow hall calls to be locked and unlocked for each car by floor and direction. Car calls can be locked and unlocked through these screens on the dispatcher for each car.

NOTE: These locks will not unlock floors that have been locked through hardware lockouts. If you are using a remote locking system you will NOT be able to unlock these locks with the remote system.

When setting up the dispatcher enter “Y” next to the floor to lock the floor for the up or down hall call. If you wish to lock the car call for a particular floor then enter a “Y” in the car call column. There is a screen for each car in the group.

After entering your selections save them to non-volatile memory by selecting the item on the main parameter menu.

12.7 Multiple Dispatchers Linked for Emergency Power

If two or more simplexes or groups of cars are required to be inter-locked for Emergency Power operation the inter-lock is accomplished via two inputs and two outputs per each simplex or group. Below is a description of the inputs, outputs, and parameters that are used to link the dispatchers together.

12.7.1 Description of Phase I Operation

The RET1 inputs and outputs are used to link the groups for Emergency Power Phase I. Each dispatcher has an RET1 input and output. When going on Emergency Power it is assumed that all the groups will receive the “EMG” signal simultaneously. The master dispatcher starts recalling its cars one at a time. When the Phase I Recall is finished the dispatcher will turn on its RET1 output. This output is wired to the RET1 input of the next dispatcher in the chain. When the next dispatcher receives the RET1 input it will recall all of its cars. After the recall is complete it will turn on its RET1 output. This scenario will repeat itself until all the simplex cars and groups have completed the Phase I Recall.

The last group or simplex car in the chain has its RET1 output wired to the Master dispatcher’s RET1 input. When it completes the Phase I Recall it turns on its RET1 output, turning on the RET1 input on the Master dispatcher. This will indicate to the Master dispatcher that all groups have completed the Phase I Recall.

If a group is unable to complete the Phase I Recall it will be bypassed by turning on its RET1 output after a user enterable amount of time as entered in the “INTERDISP EM PWR TIMES: PH I” parameter. Losing the RET1 input after going on Emergency Power Phase I has no effect on either the master or any subsequent dispatchers.

12.7.2 Description of Phase II Operation for the Master Dispatcher

Once the Master dispatcher sees its RET1 input turn on it will allow its cars to go back in service on Emergency Power Phase II. It will only place a car in service if its RET2 input and output are off. If the Master is able to place a car on Emergency Power Phase II it will turn its RET2 output off. If it is not able to place a car in service it will turn on the RET2 output after one minute. Once the RET2 output is on the Master starts monitoring the RET2 input. If the input does not turn on in the amount of time set via the parameter “INTERDISP EM PWR TIMERS: PH2”, the Master turns off its
RET2 output. This will allow the master to again try to place its car(s) in service. There will only be one re-try attempt.

If the RET2 input does go from on to off the master will go on Emergency Power Phase I. Losing the RET1 input during Emergency Power Phase II has no effect.

If, while on Emergency Power Phase II, a selected car is de-selected, the car will first finish answering its current hall and car call assignments before returning to the recall floor. The status of the RET1 output does not change, meaning RET1 will continue to stay on. RET2 will be turned on and then off if no cars in the group are any longer on Emergency Power Phase II.

### 12.7.3 Description of Phase II Operation for Subsequent Dispatchers

Any subsequent dispatchers will only place their car(s) in service if their RET2 input is turned on. If it succeeds in placing a car(s) in service the dispatcher will turn on its RET2 output.

If the RET2 input goes from on to off the dispatcher will go on Emergency Power Phase I. Losing the RET1 input during emergency power phase 2 has no effect.

If, while on Emergency Power Phase II, a selected car is de-selected, the car will first finish answering its current hall and car call assignments before returning to the recall floor. The status of the RET1 output does not change, meaning RET1 will continue to stay on. RET2 will be turned off if no cars in the group are on Emergency Power Phase II.
Section 13  Sequence of Operation & Troubleshooting

13.1  Car Controller

Distributed Processor Control

The car controller is a distributed microprocessor-based system. The primary advantages of a distributed microprocessor system are a reduction in traveling cable wires and redundant processors working together to decrease processing time. This reduction in processing time provides quicker overall system response to car and dispatching decisions.

The processors are located in the car controller, on the car top, and in the car station (optional car top mounting is available). Each processor is totally dedicated to processing inputs and outputs at its location and reporting the status to the main processor located in the controller for system management and speed curve generation.

The remote processors communicate over the LonWorks™ neuron network. The neuron network communicates between processors at 78 kilobaud to provide high speed data transmission to the main processor. The communication between the processors is done over two twisted shielded wires, connected in a “daisy chain” fashion from the MPU, or Main Processor Unit, to the Car Top Encoder Board, and then to the Intelligent Car Station Board. The shields on the cables must only be connected on one end, as shown in the figure below.

*NOTE: It is important to connect the communication network as shown to prevent erroneous communication faults from occurring.*

![Diagram of communication network](image)

The main processor is a Motorola 68306 32 bit processor that processes the information sent by the remote processors and sends signals to the remote processors to turn on devices connected at the remote locations. The main processor also generates a digital pattern that is sent to the motor drive system to control the acceleration, deceleration, and stopping of the car.
13.1.1 Relay Board

The relay board is connected to the MPU board via two 50 pin ribbon cables. Inputs are sent to the MPU via the left hand ribbon cable, and outputs are connected through the right hand cable.

Redundant relay circuitry is provided to comply with all applicable codes. Configuration jumpers are provided to allow the relay board to be configured for various motor drive options, codes, and special features.

The relay circuits are required to:

1. Select between inspection and automatic operation.
2. Run the car on inspection. Car is fully operational on inspection mode without any of the processors.
3. Interface the microprocessor's outputs to the “relay” circuitry.
4. Interface high voltage wiring to the microprocessor's inputs.
5. Meet code requirements.

**Relay Board Switch Functions**

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**NOTE:**

*The Relay Board is designed to have the car operate on Automatic when all switches are in the “UP” position.*

**MPU Sw.** This switch disconnects the 18 VAC power supply to the MPU board. During installation, this switch should be left in the off position until the processor is needed. Placing this switch in the up position turns the processor on.

**DDS Sw.** This switch serves to activate the DDSH input on the controller. When the switch is placed in the down, or ON position, the car will be on door disconnect service. Placing the car on Door Disconnect Service will cause the car to do the following, and in this order:

1. Be removed from Group Service.
2. Answer all remaining car calls.
3. Close its doors after the last car call has been answered.
4. Keep the doors disabled until the switch is returned to the off position.
5. The door open button remains active while the car is on Door Disconnect Service in case any passengers entered and did not register a car call.

**INSP Sw** This two way switch places the car on inspection. Placing this switch in the up position places the car on automatic service. Placing it in the down position places the car on inspection and enables the inspection UP/DN switch on the relay board.
The inspection UP/DN switch allows the car to be moved at inspection speed from the controller. This switch is overridden by In Car and Top of Car Inspection.

This switch should normally be in UP, or RESET position to allow the car microprocessor to reset the motor drive system in the event of a fault. This switch can be moved to the NON position for troubleshooting purposes to capture drive faults.

CAUTION: The NON/RESET switch should always be placed in the RESET position when you leave the machine room. If this switch is left in the NON position and a drive fault occurs, passenger entrapments may occur.

This switch is used on generator applications to shut down the motor generator set when desired.

Emergency door open switch. It may be necessary in an emergency situation to open the car doors to remove entrapped passengers. In this case, the car can be moved to a floor on inspection, and this switch can be thrown to send a signal down to the Car Station board to open the doors. The microprocessor will only open the doors if the car is on inspection and the car is in the door zone.

**13.1.2 The MPU**

The car controller's MPU, or Main Processor Unit, is responsible for all automatic operations, and inspection door operation. The MPU receives standard inputs from the relay board through the left hand ribbon cable that connects the relay board to the MPU board. For example, standard inputs to the system are: safety circuit, door gate, door zone, brake switch, etc. Additional inputs specific to the job can be wired to the spare inputs provided on the relay board, or to an optional I/O expansion board that plugs into the left hand side of the MPU board. All MPU inputs are socketed, opto-isolators. In the event of a failure, they can be easily removed and replaced.

Standard system outputs from the MPU are also optically isolated. They are sent out to the relay board through the right hand ribbon cable, and pick up a relay on the board to perform the desired function. Additional outputs specific to the job can be wired to spare relays provided on the relay board, or to an optional I/O expansion board that plugs into the left hand side of the MPU board.

**Network Channels**

The MPU board has three LON network channels located at the top of the board. A plug in LON board is added for each network channel, as needed.

The first network channel is used for the high priority car network. The Intelligent Car Station board and The Car Top Encoder communicate with the MPU through this channel. This network has the highest level priority in the car software.

The second network channel is the dedicated dispatching network. This is the network that ties the cars to each other, and then to the dispatcher. This network has the second highest level of priority.

A third LON channel is provided for future use.
**Microflite Ultra 2000**

**Speed Curve Generation**

The MPU handles the digital speed pattern generation. It takes in information from the remote processors and then outputs an analog speed demand to the motor drive system.

**D/A Ports**

Two D/A (Digital to Analog Converter) ports are provided on the MPU board. The first D/A port is used to output an analog pattern to the motor drive system. The second D/A port is the Pretorque Signal Output for the MagneTek Drive. It is internally adjusted during the pretorque setup. The D/A ports provide electrical isolation between the motor control section and the controller's microprocessor.

The first D/A port outputs a voltage proportional to the desired car speed. This voltage is updated continuously by the main processor, and is dependent upon the user-entered speed curve parameters, the target floor, the present speed and position of the car. All car speed outputs are based on feedback from the Car Top Encoder, and are initiated through hoistway slow down devices.

High speed pattern to the drive system is adjusted for 7 volts at contract speed, positive in the up direction and negative in the down direction. The maximum speed attained on any run is determined by the user-entered speed curve parameter settings, floor to floor distances and the motor control system. Final speed (leveling) is a user entered speed curve parameter setting.

During the slowdown portion of each run, the ideal "S" curve (calculated using the user entered speed curve parameters) is altered based on actual car position and speed information. This "curve correction" will provide the same ride on all runs, providing that the overall system response is rapid enough.

**Serial Communication Ports**

Four (4) serial communication ports are provided on the MPU board. The J13 & J14 serial ports can be used to allow the new Ultra 2000 car to communicate with an existing MicroFlite dispatching system. The P1 & P2 serial ports are reserved for communicating with Building Management Systems & Lobby Display computers.

**Video Port**

The standard composite video port drives the in controller monitor. This signal is a standard video output. It allows the user the flexibility of plugging a VCR in to record the I/O screen to determine the cause of intermittent failures.

**Expansion Port**

An expansion port has been provided to allow for expanding the standard 45 inputs and 40 outputs that are contained on the relay board. The expansion port can accommodate a large number of additional I/O, making the system adaptable to virtually any necessary configuration.

**13.1.3 Intelligent Car Station Board**

All inputs and outputs inside the cab are controlled by the Intelligent Car Station board. This board can be mounted inside the car station, in the toe guard, or on the car top. The board can take up to 48 inputs and 48 outputs. If more than 48 inputs or outputs are needed in the car, expansion boards
can be plugged into the car station board to give up to 112 inputs and 112 outputs in the cab. The expansion boards plug into the intelligent car station board with a 26 pin ribbon cable and multiple boards can be plugged together to accommodate a wide variety of inputs and outputs at the car. Any car function that would normally be wired to the car controller can now be wired at the car and the information passed on the neuron network through a combination of the Intelligent Car Station board and Expansion I/O boards. Examples of functions that can now be done remotely, and therefore eliminate traveling cable wiring, are:

1. Car Calls
2. Car Call Lockout inputs
3. Position Indicator outputs
4. Door Operator and Door Device Wiring

An optional car top mounting kit can be purchased if the Intelligent Car Station board and / or expansion boards will not fit in the car station. The optional car top box will contain the Intelligent Car Station board and the Car Top Encoder. Additional terminal strips are provided inside the box to serve as a car top junction box. This optional mounting box must be ordered when the job is engineered due to the re-configuration of the encoder electronics assembly and differences in assemblies.

The car station board contains a LonWorks™ processor board that sends and receives information from the main processor via the car’s high priority network. Additionally, power is supplied to the board through a 110 VAC to 18 VAC - 25 VA transformer mounted inside the car station (can be optionally mounted on the car top or the toe guard when the car station board is mounted in these locations). The power is wired to CJ14 connector on the car station board.

As previously stated, the Intelligent car station board can accept up to 48 inputs and can drive up to 48 outputs. The first 24 inputs on the board and the first 24 outputs on the board can be tied together via a header jumper for each input and output. This allows the user to wire the car calls with 1 wire instead of using 1 wire for the input, and a second wire for the acknowledgment light. This can only be done when the input commons and the acknowledgment light commons are from the same power supply.

If more than 24 input and outputs are required, the inputs and outputs must be tied together externally.

**NOTE:**
*If single wire car call wiring is performed, it is best to wire the car call wire on the output side of the board (the side with the relays).*
**Inputs**

The inputs are wired to the side of the board that does not have the blue relays. Inputs can be either 24 VDC or 110 VAC. The inputs use a current limiting resistor in conjunction with bi-directional optocouplers so AC or DC inputs can be used on the same board. All opto-couplers are socketed so in the event of an over-voltage, the components can be replaced instead of the entire board.

The first 18 pin connector on the board is typically reserved for car calls. On the 18 pin connector (CJ8) pins 16 - 9 will typically be the first 8 car calls with pins 17 and 18 being the common for the car calls. Pins 8 - 1 will typically be the next group of 8 car calls, again with pins 17 and 18 being the common. After the first two groups of eight, the remaining inputs are arranged in groups of 8 with the 9th pin on the connector being the common for those eight inputs. Every job will come with a sheet on the prints that will show the correct wiring of the devices on the board.

**Outputs**

The outputs are wired to the side of the board that has the blue relays. The outputs are dry contacts of these relays and can drive signals up to 110 VAC at 5 amps.

The outputs are arranged exactly like the inputs. The first 18 pin connector is typically reserved for car call acknowledgment lights. Pins 16 - 9 will typically be the first 8 car call acknowledgment lights with the common for the light being hooked to pins 17 and 18. Pins 8 - 1 will typically be the next group of 8 call acknowledgment lights, again with pins 17 and 18 being the common. After the first two groups of outputs, the remaining outputs are arranged in groups of 8 with the 9th pin being the common for those eight outputs.

**13.1.4 Car Top Encoder**

The car positioning system includes a 2" wide perforated steel tape mounted from the top of the hoistway to the bottom. Holes are spaced precisely every 3/4" on center and read by a position feedback encoder mounted on top of the car. The optical sensors are mounted in a unit referred to as “the stick” and are set up so car position can be obtained within ± 1/16". In other words, the main processor always knows where the car is in the hoistway within 1/16". The position information is processed by a processor located on the car top and sent to the main processor via the two wire LON network.

The encoder will allow the car to run with two out of the six sets of sensors disabled. When the car arrives at a particular floor and the actual encoder value varies from the stored floor landing value by more than 5 counts, an “Excess Encoder Deviation” fault message will appear on the car’s diagnostic monitor. When the first set of sensors becomes disabled (normally through dirt accumulation), an “Encoder Sensor Failure” message will appear on the car’s diagnostic monitor. Two additional sensors are provided to sense guide wear on the stick. When these sensors detect the guides are worn, an “Encoder Excess Guide Wear” message will appear on the car’s diagnostic monitor.

An magnet mounted at each floor allows the correct position information to be updated to the microprocessor in case of position loss. The magnet is encoded by length. The lowest floor magnet is 6 ½" inches in length, the next floor magnet above that is 7", and the next floor magnet above that is 7 ½", a continuing in ½" increments. If you had a forty story building, the magnet for that floor would be around 26" long.

The encoder electronics will stay energized for up to twenty seconds after the main power to the controller has been removed. This allows the encoder to store the exact car position, even if the car is
sliding through the brake in the event of a sudden power loss. When normal power is restored, in this case, there is no need for the encoder to re-synchronize to a floor because the car position is known within 1/16”.

A learn trip is necessary during the set up of the controller. During the learn trip, the exact length and location of each magnet in the hoistway is learned. The count is stored on an EEPROM (U5 chip on the encoder electronics board) inside the encoder electronics, and is also stored on an EEPROM on the car controller. The learn trip is performed when the car is originally installed, and should never need to be done again. Even in the event of board replacement, the U5 EEPROM can be transferred from the defective board onto the new board to retain the exact floor positions. If this is done, a new learn trip will not need to be done when replacing the encoder electronics board.

On jobs where pre-torquing is provided, a 1 - 9 volt analog signal will be sent from a load transducer on the car top to the Pre-Torque Board mounted beneath the encoder electronics board. The Pre-torque board is also the power supply board for the encoder. The load signal that is received on the Pre-torque board is then sent to the encoder electronics board to be converted to a digital value. The encoder electronics board will convert the analog load signal to a digital number and transmit the load information to the main processor on same car network as the intelligent car station.

13.1.4.1 Encoder Diagnostics

Four push button switches (only three are currently used) have been provided to diagnose problems with encoder sensors or with communication. In addition, a diagnostic LED has been provided to indicate the various faults. When a fault occurs on the encoder board, diagnostic LED D8 will indicate the nature of the fault by flashing on and off. When the diagnostic LED is on continuously it indicates normal operation.

There are five blinking patterns to indicate abnormal conditions:

1. Continuous blinking indicates that the encoder is in learn mode.
2. One blink then a pause indicates that a light sensor on the sensor board is bad.
3. Two blinks indicate the encoder has detected an excessive error fault while arriving at a floor.
4. Three blinks indicate that the encoder has been restarted and it must be re-synchronized.
5. If the LED is on and blink off indicates that the fault indicated has been cleared. Pressing the acknowledge button will restore the LED to continuously on.

The four push button switches operate as follows:

1. The first switch (S1) is used to acknowledge alarm conditions that have been cleared.
2. The second switch (S2) is used to check on the operation of the stick sensors.
3. The third switch (S3) is used to reset the electronics.
4. The fourth switch (S4) is currently not in use.

Normally, LED’s D1, D2, D5, D6, D9, & D10 indicate the state of the terminal slowdowns and door zone sensors:

D1 - When on, indicates the bottom door zone sensor is on.
D2 - When on, indicates the top door zone sensor is on.
D5 - When on, indicates the top terminal slowdown contact has been broken.
D6 - When on, indicates the bottom terminal slowdown contact has been broken.
D9 - When on, indicates the top terminal slowdown contact is closed.
D10 - When on, indicates the bottom terminal slowdown contact is closed.

Pressing and holding switch two (S2) causes the state of the six encoder sensors to be displayed on LED's D1-D6. If the car is moved at a slow inspection speed it is possible to see these LED's sequentially blink on and off. If the LED associated with a sensor does not blink when the car is moved, it means that the sensor associated with it is bad and the sensor board must be replaced.

13.1.5 Digital Speed Profile with “Curve Correction”

The MicroFlite Ultra 2000 develops an ideal pattern that is continuously corrected throughout the duration of the run. The curve is corrected based on the encoder feedback received and plotted over time to give the microprocessor a speed feedback of its own. The car stops based solely on the encoder position, and does not need to transfer to an approach or leveling curve based on a leveling magnet as with most other systems.

The speed curve profile, door time, and many other things are programmed on a per car basis, and are adjusted at the car controller. Each car is also equipped with its own monitor for troubleshooting.

13.1.6 O. Thompson Pretorqueing

Pretorquing is an optional feature supplied normally on gearless elevators. It is used to improve ride quality and floor to floor performance times. This is done by accurately measuring the load in the car through the use of a strain gauge mounted to the cross head. As the doors close for a run, the weight value is locked and sent to the main processor to develop a pre-torque signal to prevent the car from moving when the brake is released. The motor drive system is enabled prior to the brake being energized. When the motor drive system is enabled, a pre-toque signal is sent to the motor drive processor to provide a specific amount of motor current prior to the brake lifting. When the brake lifts, the motor will have sufficient torque to hold zero speed prior to acceleration. This results in a smooth acceleration and will actually improve floor to floor performance due to the improved tracking characteristics of the motor drive system.
13.2 Inspection Sequence of Operation

The system will run on inspection without the microprocessor circuitry or any associated electronic devices being active. It is suggested that the MPU switch be left in the "off" position during construction. The dispatcher power supply should also remain "off" until the car is ready for automatic operation.

Note: There are two minor functions of inspection that are controlled by the MPU and will not be functional if the MPU switch is turned off during start up:

1. If the MPU switch is left off, there will be no power door operation while running the car on inspection. This is an MPU function.

2. If the MPU switch is left off, the drive cannot automatically reset when it has tripped. This is an MPU function.

The IUP and IDN inputs on the processor will be lit any time the car is run from anywhere except via the access switches on inspection. When the IUP or IDN inputs are on, the MPU will turn on the “CXP” output to put closing power on the door operator while the car is running on inspection.

An up and down switch is provided on the controller to run the car in the inspection mode. This switch is disabled when the car is in any other mode.

WARNING: All safety circuits and door devices should be operational to operate the elevator from the controller.

WARNING: All inspection interlocking circuits must be functional prior to beginning work on the controller or in the hoistway. If the car is on car top inspection, the car should not be able to run from the controller, the access switches, or from in the car. Serious injury or DEATH could occur if these circuits are not verified prior to beginning any further installation work.

13.2.1 Inspection Operation - Magnetek DSD 412

The following procedure is a sequence of operations for inspection mode. It is for applications using the Magnetek DSD 412 drive. MG and Magnetek HPV900 applications are different. Refer to the MG and Hpv900 Inspection Sequence of Operations.

1. Place car on inspection on controller, try to run car up and down using toggle switch on relay board. Does the car run? If so, go to Automatic Operation troubleshooting procedure, Section 13.3.

2. SAF, SAFX and RX relays picked?
   - Check for blown AC2 fuse or open in safety circuit, line 40.

3. CG and CGX picked?
   - Check for open gate switch, line 48.

4. DG and DGX picked?
   - Check for open door lock contact, line 47.

5. Hold Up/Dn toggle switch: IUP or IDN pick?
   - Check for blown 24VDC fuse, line 60, or open in inspection circuit, line 60.

6. Hold Up/Dn toggle switch: U and UX or D and DX relays pick?
7. **Does PX relay pick?**
   - Check for open directional limit contact, line 55 & 58, faulty relay or contact failure in direction circuit.

8. **Does BKX relay pick?**
   - Check for faulty relay or contact failure in BKX circuit, line 56.

9. **Does M relay pick?**
   - Check for faulty relay or contact failure in M circuit, line 71.

10. **Does SR relay pick?**
    - Check for faulty relay or contact failure in SR circuit, line 102.

11. **Does the drive enable signal (TB1-8) turn on?**
    - Check for contact failure in drive enable circuit, line 102.

12. **Does LPR relay pick?**
    - Check for faulty relay or contact failure in LPR circuit, line 117.
    - Check for 110 VAC at drive terminal TB3-6 to AC1 at line 117. If missing, check for contact failure on RX and/or SR relay. If present, check drive terminal TB3-5 to AC1 at line 117. If voltage is missing, drive not enabling. Reset drive and retry. If drive still not enabling, possible bad drive. Contact O. Thompson Technical Support. If voltage is present at TB3-5 then LPR relay is faulty.

13. **Does the MA contactor pick?**
    - Check for faulty relay or contact failure in MA circuit, line 79.

14. **Does P relay pick?**
    - Check for faulty relay or contact failure in P circuit, line 77.

15. **Does MB relay pick?**
    - Check for faulty relay or contact failure in MB circuit, line 73.

16. **Does BK relay pick?**
    - Check for faulty relay or contact failure in BK circuit, line 76.

17. **Does the brake lift?**
    - Check brake regulator at line 92. Is V/I-1, V/I-2 or V/I-3 LED on?
      - If not, check signaling at line 92. V/I-1 is brake pick voltage, V/I-2 is hold voltage, V/I-3 is re-leveling voltage.
      - If LED is on, check regulator output DC voltage at terminals F+ to F-.

18. **Does the car start to move slowly?**
    - Check for proper drive signaling.
      - Is contact auxiliary signal to drive at TB1-7 on?
        - Check for contact failure on MB relay, line 104.
      - Is speed reference signal to drive present at terminals TB1-68 to TB1-63?
        - Check for contact failure or faulty relay board component in pattern generation circuit, line 105.

19. **Does the car start moving faster after about 1.5 seconds?**
    - Does BKA relay drop about 1.5 seconds after BKX picks?
      - Check for contact failure or faulty relay in BKA circuit, line 131.

20. **The car is running on inspection.**
13.2.2 Inspection Operation - Amicon Generator Shunt Field Regulator

On MG jobs, the EMGI switch can be turned off and the generator can be excited through a rectifier / resistor circuit provided on the controller if the generator field regulator continually trips on start up. This is also useful when setting up the generator field regulator for the first time to insure the feedback signals are of the proper polarity and amplitude. The EMGI switch is for test and initial start up purposes only. If you suspect trouble with the Amicon regulator, the EMGI mode will allow you to move the car without the Amicon regulator.

**CAUTION:**

*Extreme differences in speed will occur due to lack of generator field regulation while operating the car under EMGI mode. The car will travel much faster in the direction of the load and much slower when lifting a load. (i.e. a car with only one or two people in it will travel at approximately 120 fpm in the up direction, but only 40 fpm in the down direction).*

When the up inspection button is pushed, the IUX relay will pick along with the normal up direction relays. This will cause the generator shunt field to be excited in a positive polarity. When the down inspection button is pushed, the IDX relay will pick along with the normal down direction relays and the generator shunt field will be excited in the negative direction to cause the car to move down.

The following procedure is a sequence of operations for inspection mode. It is for applications using the Amicon Generator Shunt Field Regulator. Drive applications, both AC and DC, are different. Refer to the Magnetek Inspection Sequence of Operations, Section 13.2.1 for further information on these devices.

**NOTE:**

*This procedure assumes that the EMGI mode is off, and the Amicon Regulator is working correctly.*

1. **Place car on inspection on controller, try to run car up and down using toggle switch on relay board. Does the car run? If so, go to Automatic Operation troubleshooting procedure, Section 13.3.**
2. **SAF, SAFX and RX relays picked?**
   - Check for blown AC2 fuse or open in safety circuit, line 40.
3. **CG and CGX picked?**
   - Check for open gate switch, line 48.
4. **DG and DGX picked?**
   - Check for open door lock contact, line 47.
5. **Hold Up/Dn toggle switch: IUP or IDN pick?**
   - Check for blown 24VDC fuse, line 60, or open in inspection circuit, line 60.
6. **Hold Up/Dn toggle switch: U and UX or D and DX relays pick?**
   - Check for open directional limit contact, line 55 & 58, faulty relay or contact failure in direction circuit, line 50 -59.
7. **Does PX relay pick?**
   - Check for faulty relay or contact failure in direction circuit, line 56.
8. **Does BKX relay pick?**
   - Check for faulty relay or contact failure in BKX circuit, line 73.
9. **Does M relay pick?**
   - Check for faulty relay or contact failure in M circuit, line 71.
10. **Do P and PS relays pick?**
    - Check for faulty relay or contact failure in P and PS circuit, line 78.
11. **Does the regulator “RUN” signal (Amicon pin 21) turn on?**  
   - Check for contact failure in regulator RUN circuit, line 101.

12. **Does the Regulator 208 VAC Supply turn on?**  
   - Check for power at terminals U & V, line 118. Regulator will trip on an “SCR” fault if voltage is not present.

13. **Does BK relay pick?**  
   - Check for faulty relay or contact failure in BK circuit, line 76.

14. **Does the brake lift?**  
   - Check brake regulator at line 92. Is V/I-1, V/I-2 or V/I-3 LED on?  
     - If not, check signaling at line 92. V/I-1 is brake pick voltage, V/I-2 is hold voltage, V/I-3 is re-leveling voltage.  
     - If LED is on, check regulator output DC voltage at terminals F+ to F-. If missing possible bad regulator. If present check for contact failure in brake circuit at line 97.

15. **Does the car start to move slowly?**  
   - Check for proper regulator signaling.  
     - Is speed reference signal to drive present at terminals 7 & 5?  
     - Check for contact failure or faulty relay board component in pattern generation circuit, line 106.

16. **Does the car start moving faster after about 1.5 seconds?**  
   - Does BKA relay drop about 1.5 seconds after BKX picks?  
     - Check for contact failure or faulty relay in BKA circuit, line 131.

17. **The car is running on inspection.**
13.2.3 Inspection Operation - Magnetek HPV 900

The following procedure is a sequence of operations for inspection mode. It is for applications using the Magnetek HPV 900 drive. MG and Magnetek DSD 412 applications are different. Refer to the MG Inspection Sequence of Operations, Section 13.2.2 and Magnetek DSD 412 Inspection Sequence of Operations, Section 13.2.1.

1. **Place car on inspection on controller, try to run car up and down using toggle switch on relay board. Does the car run?** If so, go to Automatic Operation troubleshooting procedure, Section 13.3.
2. **SAF, SAFX and RX relays picked?**
   - Check for blown AC2 fuse or open in safety circuit, line 40.
3. **CG and CGX picked?**
   - Check for open gate switch, line 48.
4. **DG and DGX picked?**
   - Check for open door lock contact, line 47.
5. **Hold Up/Dn toggle switch: IUP or IDN pick?**
   - Check for blown 24VDC fuse, line 60, or open in inspection circuit, line 60.
6. **Hold Up/Dn toggle switch: U and UX or D and DX relays pick?**
   - Check for open directional limit contact, line 55 & 58, faulty relay or contact failure in direction circuit.
7. **Does PX relay pick?**
   - Check for faulty relay or contact failure in direction circuit, line 56.
8. **Does BXX relay pick?**
   - Check for faulty relay or contact failure in BXX circuit, line 73.
9. **Does M relay pick?**
   - Check for faulty relay or contact failure in M circuit, line 71.
10. **Does SR relay pick?**
    - Check for faulty relay or contact failure in SR circuit, line 102.
11. **Does the drive run signal (TB1-2) turn on?**
    - Check for contact failure in drive run circuit, line 102.
12. **Does LPR relay pick?**
    - Check for 110 VAC at drive terminal TB2-54 to AC1 at line 117. If missing, check for contact failure on SR relay. If present, check drive terminal TB2-55 to AC1 at line 117. If voltage is missing, drive is not enabling. Reset drive and retry. If the drive still not enabling, possible bad drive. Contact O. Thompson Technical Support. If voltage is present at TB2-55 then LPR relay is faulty.
13. **Does the MA contactor pick?**
    - Check for faulty relay or contact failure in MA circuit, line 79.
14. **Does MB relay pick?**
    - Check for faulty relay or contact failure in MB circuit, line 78.
15. **Does P relay pick?**
    - Check for faulty relay or contact failure in P circuit, line 77.
16. **Does BK relay pick?**
    - Check for faulty relay or contact failure in BK circuit, line 76.
17. **Does the brake lift?**
    - Check brake regulator at line 92. Is V/I-1, V/I-2 or V/I-3 LED on?
      - If not, check signaling at line 92. V/I-1 is brake pick voltage, V/I-2 is hold voltage, V/I-3 is re-leveling voltage.
      - If LED is on, check regulator output DC voltage at terminals F+ to F-. If missing possible bad regulator. If present check for contact failure in brake circuit at line 97.
18. **Does the car start to move slowly?**
   - Check for proper drive signaling.
     - Is contact auxiliary signal to drive at TB1-9 on?
     - Check for contact failure on MB relay, line 104.
     - Is speed reference signal to drive present at terminals TB1-28 to TB1-27?
       - Check for contact failure or faulty relay board component in pattern generation circuit, line 105.

19. **Does the car start moving faster after about 1.5 seconds?**
   - Does BKA relay drop about 1.5 seconds after BKX picks?
     - Check for contact failure or faulty relay in BKA circuit, line 131.

20. **The car is running on inspection.**
13.3 High Speed Troubleshooting / Sequence of Operations

At this time it will be necessary to run the microprocessor.

The status of inputs represented on the screen typically coincide with the status of the redundant relay associated with it. In other words, if the DG relay is energized, the DG input is highlighted on the screen. Some inputs on the screen are purposely done in reverse video for safety reasons. The SAF (safety circuit verification), INSP (inspection operation), REG (Regulator/Drive Trip), MGS (MG start), LIM (Limit Board Trip). It is important to note the following about these inputs:

- When the SAF input is lit on the screen, the safety string is open.
- When the DCL input is lit on the screen, the doors are fully closed.
- When the DOL input is lit on the screen, the doors are fully open.
- When the INSP input is lit on the screen, the car is on inspection.
- When the LIM input is lit on the screen, the limit board is tripped.
- When the REG input is lit on the screen, the Motor Drive system is faulted.

Note:
Inputs DCL, DOL and EE can be seen reversed by the processor. There are parameters which allow you to change the polarity of the input, either normally open or normally closed. Refer to the parameter explanations in section 11.7 for more details.

MG Jobs Only
- When the MGSH input is lit on the screen, the MG switch is off.
- When the GIN input is lit, the generator has transferred to the delta, or run mode.

IMPORTANT NOTE: The following procedure assumes that the car runs on inspection operation as outlined in the inspection troubleshooting procedure. Car should be on inspection on the controller with the door disable switch to the disable position.

1. Check the fault log on the controller.
   - Any faults which are causing the car not to run? If in doubt, reset MPU and see if car runs.
2. Run the car on inspection using the up/dn toggle switch. Does BKR input on monitor change state when the brake lifts?
   - Faulty brake switch contact, line 145.
   - Faulty BKR input opto-isolator at line 145.
3. Does the encoder present value on the monitor increase as the car runs up and decrease as the car runs down?
   - Faulty encoder or stick assembly, line 211.
4. Does the actual car speed as shown on the monitor agree with the observed speed of the hoist motor?
   - Faulty encoder sensor at line 218.
5. Does the DZ relay pick when passing a door zone?
   - Faulty encoder sensor at line 218.
   - Missing door zone magnets.
   - Faulty encoder board at line 211.
6. Does the DZ input on the monitor turn on when the DZ relay picks?
   - Faulty DZ input opto-isolator at line 136.
7. Is the DCL input on the monitor turned on?
   - DCL input signal not functioning correctly.
   - Faulty DCL input opto-isolator at line 231.

8. Is the DOL input on the monitor turned off?
   - DOL input signal not functioning correctly.
   - Faulty DOL input opto-isolator at line 231.

9. Is the CG input on the monitor turned on?
   - Faulty CG opto-isolator at line 49.

10. Is the DG input on the monitor turned on?
    - Faulty DG opto-isolator at line 46.

11. Is the SAF input on the monitor turned off?
    - Faulty SAF relay contact at line 148.

12. Is the REG input on the monitor turned off?
    - Faulty REG relay contact at line 149.

13. Is the LIM input on the monitor turned off?
    - Faulty LIM relay contact at line 147.

14. Stop the car in a door zone at any floor. Turn the inspection switch to the up, or automatic position. Does the INS input on the monitor turn off?
    - Check the I, IX, and IY relays at line 64. If the relays are not picked then the car is on inspection. Check for open switch or open inspection circuit at line 61.
    - If I, IX, and IY are picked then IX contact at line 148 is faulty.

15. Does APW output on the monitor turn on?
    - Reset MPU and retry.
    - If APW still does not turn on run the car to another door zone and retry. If APW again does not turn on improperly programmed parameter values. Check all parameters and adjust as necessary.

16. Does the MA contactor pick?
    - Faulty output in M circuit, line 71. Troubleshoot relay board and MPU to relay board J2 connector.

17. Does PWA input on?
    - Check for contact failure or faulty opto-isolator in PWA circuit at line 146.

18. Does UP or DWN output on the monitor turn on?
    - Improperly programmed parameter values. Check all parameters and adjust as necessary.

19. Does U and UX or D and DX relays pick?
    - Faulty output in UP or DN circuit, line 55 and/or 58. Troubleshoot relay board and MPU to relay board J2 connector.

20. Does RBK output turn on?
    - Improperly programmed parameter values. Check all parameters and adjust as necessary.

21. Does the brake lift?
    - Faulty output in BKX circuit, line 73. Troubleshoot relay board and MPU to relay board J2 connector.

22. Does BKR input change state?
    - Faulty brake switch contact, line 145.
    - Faulty BKR input opto-isolator at line 145.
23. **Does the car start to move toward the floor?**
   - Improper speed reference signal.
   - Check speed reference output from MPU at MJ7-1 and MJ7-2. If speed reference present at MPU, check speed reference at drive or regulator terminals. Faulty IY contact at line 107.
   - Check monitor for speed demand and if present replace MPU.
   - If speed demand not present then improperly programmed parameter values. Check all parameters and adjust as necessary.

24. **After car gets to floor, UP or DN, RBK, and APW turn off?**
   - Improperly programmed parameter values. Check all parameters and adjust as necessary.

25. **Does BKR change state and PWA turn off on the monitor within 2.5 seconds?**
   - PXT pot on relay board set too long. Turn counter-clockwise until PX relay drops out within 2 seconds of U or D relay dropping.

26. **Using the keypad, place a car call. Does it remain latched?**
   - Improperly programmed parameter values. Check all parameters and adjust as necessary.
   - Fatal error detected by MPU. Check fault log. Reset MPU to clear.

27. **Does the car accelerate to the desired speed, initiate deceleration and leveling with the actual speed closely matching the desired speed?**
   - Car speed parameters not set correctly. Check all parameters and adjust as necessary.
   - Drive problem. Check speed reference signal to drive and confirm it agrees with desired speed as shown on the monitor.

28. **Does car level into floor and stop level?**
   - Encoder counts not correct.
   - Erroneous floor landing values. Perform learn trip.
   - Faulty encoder or encoder sensor.

29. **Place car call. While car is in motion, turn Door Disable Switch to the enable (Up) position. Does the OXP output turn on when it arrives at the floor?**
   - Improperly programmed parameter values. Check all parameters and adjust as necessary.
   - Improper DOL and/or DCL signal. Check door limits.

30. **Do the doors open?**
   - Faulty door operator.
   - Faulty OXP output at line 231.

31. **Do CG, DG and DCL inputs on the monitor turn off when the doors open?**
   - Faulty door system.
   - Jumper on door locks and/or gate switch.
   - Faulty door close limit.

32. **Does DOL input turn on when doors are fully open?**
   - Faulty door open limit.
   - Faulty DOL input opto-isolator at line 231.

33. **Does CXP output turn on after several seconds?**
   - EE input turned on. Check electric eye signal.
   - SE input turned on. Check safe edge signal.

34. **Return car to service.**
Section A1 – Blank Parameter Sheets

A1.1 Blank Car Parameter Sheets

Parameter Entry Menu Selection Screen:

1–Motion Parameters
2–Brake and Hoistway Devices Parameters
3–Car operating devices Parameters
4–Door parameters
5–Fire, Emergency Power Parameters:
6–VIP, Medical, Earthquake Parameters
7–Miscellaneous Parameters
8–Simplex/Inc Riser Parameters
9–CE Voice Annunciator Messages
10–Event Disable Parameters
11–Car Call Lock Entry
12–Up Hall Lock Entry (Simplex/IR only)
13–Down Hall Lock Entry (Simplex/IR only)
14–Floor Landing Values, PI Outputs
15–Learn Trip, Floor Names, Pretorque
16–Modem Parameters
17–Password/Job Config/Time/Clear Events
18–Write Values to Non Volatile Memory

To save new parameters, press ‘ENTER’
while the cursor is blinking on no. 18.
**PARAMETER MENU 1:**

**Motions Parameters:**
- Speed (fpm) Relevel: __ Max:____ Min:____
- Energy conserv switch: **HIGH PERFORMANCE,** **ENERGY CONSERVATION,** **DYNAMIC**

**SPEED CURVES:** HP-High Performance
- L-Long S-Short Runs EC-Energy Conserve

Max floor distance for HPS (counts): 00000

- HPL HPS EC

**Init jerk rate (ft/s3):** __ __ __
**Accl rate (ft/s2):** __ __ __
**Jerk rate (ft/s3):** __ __ __
**Response time (1/100 sec):** __ __ __
**Final jerk rate (ft/s3):** __ __ __
**Final jerk Dist. (in):** __ __ __
**Advance (counts):** __ __ __
**Pre-open (counts):** __ __ __
**Plateau length (in):** __
**Add. plat. length (ft):** __ Speed: __

**Dist. (counts) level:** __ Relevel: __
**FFA/FFB speed (fpm) accel:** __ decel: __
**Overspeed trip speed:** (fpm) __
**SCR/REG restart time:** (sec) __

**Drive Type:** **MG Set**
- Magnetek AC / DC
- Baldor AC
- Other DC / AC

**Motor Pretorque Enabled:** Y N

**PARAMETER MENU 2:**

**HOISTWAY DEVICES AND BRAKE PARAMETERS:**
- Brake switch normally open Y N
- Brake release failure time (0.1 sec) __
- Brake release delay (0.1 sec) __
- Brake drop delay (0.1 sec) __
- Car run through brake time (sec) __
- OSPD contact norm closed? Y N
- Ring down hall lantern and gong once? Y N
- DNG/DDG/DNGR/DDGR double chime times (.5 sec): first on ___ between chimes ___
- Ring hall lanterns for car calls? Y N
- UPG/DNG on for last term. car calls? Y N
- Hall lantern timeout (99 = no timeout) __
- Advanced pi's and hall lanterns? Y N
- Min time on for advanced pi (msec) __
- LRN return floor: __
- Cancel car calls before LRN shutdown? Y N
- LMGS return floor / door: __ F R
- Cancel car calls before LMGS shutdown? Y N
- LMGS cycles door upon lobby arrival? Y N
- LMGS door open button enabled? Y N
- LMGS overrides IND and ATT? Y N
PARAMETER MENU 3:

CAR OPERATING DEVICES PARAMETERS:
Binary pi start at 0 or 1? __  *
Ring down car lantern and gong once? Y N
Car lantern timeout(99 = no timeout) __
Floor pass chime(FPC) 1 down? Y N
Disabled code -(FPC) latched? Y N
BZI norm closed? Y N
Does buzzer replace FPC? Y N
Car calls latch behind car? Y N
Piezo-electrical car buttons Y N
Bypass car call locks on independent? Y N
Bypass car call locks on attendant? Y N
LKO input normally open? Y N
Lockout inputs normally open? Y N
IND ignores alt/norm car call config? Y N
EE Antinuisance Enabled? Y N
Num stops before cc cancel/sequence _
Num seq. before antinuisance disable _
Maximum car calls per 10% loading __
% Full load weight disp: ___ byp: ___
(Enter 101% above if no strain gauge)

* Must set to ‘1’ if the CE electronics display type requires the “slot ID” format (for examples: half-moon, scrolling, dot matrix)

PARAMETER MENU 4:

DOOR PARAMETERS:
Door times (0.1 sec):
   Car call: ___  Hall call: ___
   Nudging: ___  Freight: ___
   Reopen: ___  Recycle: ___
   Group: Lobby: ___  Lobby after call: ___
Disable power door operation on insp.? Y N
SE/EE/DOB changes door time to reopen
time for car calls? Y N for hall calls? Y N
Close button functional in lobby? Y N
Door recycle on direction change? Y N
Doors open simultaneously auto? Y N
Door close motor protection? Y N
DCL/DOL closed at limits? Y N
ANSI-1996 DCL required at startup? Y N
Nudging: SE reopen? Y N  EE bypass? Y N
Normally open inputs -EE:Y N SE:Y N DOB:Y N
Electric eye enabled on Att/Ind? Y N
Peelle door auto open/close? Y N
Auto Peelle door open timeout (sec) __
DOB ignores alt/norm car call config? Y N
DOB ignores car call locks? Y N
PARAMETER MENU 5:

FIRE and EMERGENCY POWER PARAMETERS:
Fire code: CHICAGO, NATIONAL, WHITE PLAINS, CALIFORNIA, CANADA, NEW YORK CITY, AUSTRALIA, NEW ZEALAND
NYC/White Plains Gate/Door contact faults detected AT ALL TIMES, AT NO TIMES, EXCEPT ON FIRE SERVICE
Fire door close nudging? Y N
Fire overrides: MGS? Y N LMGS? Y N LRN? Y N
Fire recall floors and doors: Main:___F R
Detect A:___F R Detect B:___F R Detect C:___F R
FBY/FRST (ANSI 2000 only) operation:
FBY disabled (AREC – CREC not latched)
FBY enabled (AREC – CREC latched)
FRST-Fire recall reset (ANSI 2000 only)
AREC/BREC/CREC inputs normally open? Y N
Fire ph2: Reopening door will wait for DOL before DCB causes closing? Y N
Keep door open after emg. pwr. ph1? Y N
Return IND/ATT cars on emg. pwr. ph1? Y N
Speed reduce factor 99% max spd
EMG switch normally open: Y N
Em Pwr total # of banks: ___ this bank #: ___

PARAMETER MENU 6:

VIP, MEDICAL EARTHQUAKE PARAMETERS:
VIP service enabled: Y N
Allow new car calls before VIP phase 1: Y N
Multiple car calls during VIP phase 2: Y N
VIP/car riser med phase1 dr time(sec) ___
VIP//medical phase2 door time(.1sec): ___
Medical phase 2 opens both doors: Y N
Medical phase 2 opens door via DOB? Y N
Group car automatic medical emergency? Y N
Return IND: Y N ATT: Y N car on med phase1?
Return ATT cars on medical emergency? Y N
Med buzz remains on until CME enabled? Y N
Flash med emergency light (MEL/MELC)? Y N
Bypass in car stop switch on med recall? Y N
Med ph2 overrides fire ph: NEVER
IF TRIGG 1ST
WHEN DR OPEN
Med ph2 immediate door close w/call? Y N
Turn car off med at recall floor only? Y N
Med1 overrides fire1 if triggered 1st? Y N
Bypass car call locks on medical ph 2? Y N
Seismic run allowed with momentary CWL? Y N
Fire phase 1 key-switch overrides CWL? Y N
CWL/CWSW inputs normally open? Y N
Reduce speed on CWSW/SASW activation? Y N
Counter weight zone ___
**Microflite Ultra 2000**

**PARAMETER MENU 7:**

**MISCELLANEOUS PARAMETERS:**
- Security code entry timeout (sec) __
- Alarm status trigger time (sec) __
- FAN output normally open? Y N
- Gen / fan shutdown time (sec) __
- Alternate odd and even car calls for hall button or dispatcher comm failure Y N
- Stop at floor 00 in up dir.? Y N Down? Y N
- Maximum allowed speed differential ___
- Distance RC to drop before the floor ___
- Lobby/top flr holiday dr time(.1 sec) ___
- Holiday operation based on time and day:
  - Time: on off S M T W T F S
  - ___:__ ___:__ __________
  - ___:__ ___:__ __________
  - ___:__ ___:__ __________
  - ___:__ ___:__ __________

**PARAMETER MENU 8:**

**SIMPLEX/INCONSPICUOUS RISER PARAMETERS:**
- Door open/Car dir lobby time (0.1 sec) ___
- Park floor / door (0 = no park) ___F R
- Keep lobby door open after parking? Y N
- Reopen door with hall call? Y N
- Emerg. pwr. ph 1 to next grp timeout ___
- Emerg. pwr. ph 2 to next grp timeout ___
- Auto inconspicuous riser? Y N Timeout ___
- Hall lanterns enabled inconsp. riser? Y N
- Shuttle floor1: ___F R B Floor2: ___F R B (0 = none)
- Lobby 1 flr/door ___F R on ___:__ off ___:__
- Lobby 2 flr/door ___F R on ___:__ off ___:__
- Energy status based on time/day
  - Time: on off Status S M T W T F S
  - ___:__ ___:__ __________
  - ___:__ ___:__ __________
  - ___:__ ___:__ __________
  - ___:__ ___:__ __________
- Amount of hall and car calls before switch to high performance ___
- Emerg pwr control: MASTER
  - SLAVE
  - STAND ALONE
**Microflite Ultra 2000**

**CE VOICE ANNUNCIATOR MESSAGES:**

See message description at the bottom.

<table>
<thead>
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<th>LD#</th>
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**Descri:**

**EVENT DISABLE PARAMETERS:**

See event description at the bottom of this screen.

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</table>
CAR CALL LOCK ENTRY:

CAR CALL LOCKS FRONT AND REAR:

________     ________     ________     ________     ________
________     ________     ________     ________     ________
________     ________     ________     ________     ________
________     ________     ________     ________     ________
________     ________     ________     ________     ________
________     ________     ________     ________     ________
________     ________     ________     ________     ________
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UP HALL LOCK ENTRY (SIMPLEX/IR ONLY):

SIMPLEX UP HALL CALL LOCKS:

________     ________     ________     ________     ________
________     ________     ________     ________     ________
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DOWN HALL LOCK ENTRY (SIMPLEX/IR ONLY):

SIMPLEX DOWN HALL CALL LOCKS:

________     ________     ________     ________     ________
________     ________     ________     ________     ________
________     ________     ________     ________     ________
________     ________     ________     ________     ________
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________     ________     ________     ________     ________

________     ________     ________     ________     ________
FLOOR LANDING VALUES:

| ______ | ______ | ______ | ______ | ______ |
| ______ | ______ | ______ | ______ | ______ |
| ______ | ______ | ______ | ______ | ______ |
| ______ | ______ | ______ | ______ | ______ |
| ______ | ______ | ______ | ______ | ______ |
| ______ | ______ | ______ | ______ | ______ |
| ______ | ______ | ______ | ______ | ______ |

BINARY PI OUTPUTS:

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PRETORQUE SETUP:

RELEASE BRAKE AND CHECK FOR ROLLBACK

DR CLSD:N MG:N POWER:N PULSE:OFF BRAKE:N (MG=)
o

DR CLSD:N POWER:N BRAKE:N (non MG=)

Encoder: Present 000000 Top 000000

Bottom 000000

Pulse height: +/-_____ (max 3200 or 4800)

TURN ON STRAIN GAGE CALIBRATION-CAL:OFF

Pulse height: Bottom empty +/-_____

Top empty +/-_____

Top full load +/-_____

Weight value: Bottom empty _____

Top empty _____

Top full load _____

Weight of load(lbs) _____

Present weight value 000
FLOOR NAME ENTRY SCREEN:

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MODEM PARAMETERS:

MODEM PARAMETER ENTRY

Phone #___________
Job id #___________
Init #_________________________

Connect volume(0=off 3=loudest): _

PASSWORD/JOB CONFIG/TIME/CLEAR EVENTS PARAMETERS:

Parameter password protection enabled: Y N

- Change password

Dispatcher communication via:

Simplex
Car MPU SIO1 RS-232 port
Car MPU LON NET B to disp MPU LON NET B
Car MPU SIO2 optically isolated port (Set Jumpers: JP4 1-2, JP3 1-3 & 2-4)
Other

TIME __:__  __/__/__
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY

Clear event memory
A1.2 Blank Dispatcher Parameter Sheets

MAIN MENU:

- RETURN TO DISPATCHER SCREEN
- EDIT PARAMETERS
- CHANGE / DISABLE PASSWORD
- WRITE PARAMETERS TO EEPROM

PASSWORD MENU:

PARAMETER PASSWORD PROTECTION ENABLED: Y N
CHANGE PASSWORD

INTERNAL USE ONLY - DO NOT SET ___

PARAMETER MENU 1:

LONG WAIT PRIORITY (seconds): ___
PEAK DURATION TIME (seconds): ___

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<th>START</th>
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<td><strong>:</strong></td>
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<td>UP PK 6</td>
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<tr>
<td>DN PK 1</td>
<td><strong>:</strong></td>
<td><strong>:</strong></td>
<td>DN PK 2</td>
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</table>

HALL CALL IMBALANCE UP PEAK: ___
HALL CALL IMBALANCE DN PEAK: ___
STALL TIMEOUT: ___

FIRE CODE: CANADA, USA/SOUTH AFRICA, AUSTRALIA, NEW ZEALAND
FIRE / EMERGENCY POWER RECALL FLOORS:
MAIN: __ DET.A: __ DET.B: __ DET.C: __
FBY/FRST (ANSY 2000 ONLY) OPERATION:
  FBY DISABLED (AREC – CREC NOT LATCHED)
  FBY ENABLED (AREC – CREC LATCHED)
  FRST-FIRE RECALL RESET (ANSI 2000 ONLY)
AREC/BREC/CREC INPUTS NORMALLY OPEN: Y N
SASW INPUT NORMALLY OPEN: Y N
PARAMETER MENU 2:

PENALTIES:
GENERATOR OFF __ THIS CAR UP __
NEXT CAR UP __ HALTED TIME __
ADVANTAGES: IN LINE CALL __
CALL COINCIDENCE __
DOORS OPEN SIMULTANEOUSLY __
DOOR OPEN TIME LOBBY UP SEC __
(99 DOOR OPEN ALL THE TIME)
DOOR OPEN TIME LOBBY AFTER CAR CALL __
DOOR TIME MED EM RECALL SEC __
MED PH 1 OVERRIDES FIRE PH 1 IF TRIG 1ST Y N
RETURN IND CARS ON MEDICAL RECALL? Y N
RETURN ATT CARS ON MEDICAL RECALL? Y N

LOCKOUT CAR CALLS W/HARDWARE HALL LOCK? Y N
DROP GROUP HALL CALLS FOR IR CARS? Y N
HLOF INPUT NORMALLY OPEN: Y N
LOCKOUT CAR CALLS WITH ALT RISER? Y N
AUTO CAR CALL LOCKS BY TIME
MON TO FRI ON __:__ OFF __:__
SAT ONLY ON __:__ OFF __:__
SUN ONLY ON __:__ OFF __:__

PARAMETER MENU 3:

ENERGY CONSERV STATUS BASED ON TIME
AND DAY: 0-HIGH PERFORM 1-ENERGY CONSERV
TIME:ON OFF STATUS S M T W T F S
__:__ __:__ __:__ __:__ __:__ __:__ __:__ __:__ __:__ __:__ __:__ __:__ __:__
HALL CALL LONG WAIT TIME BEFORE
SWITCHING TO HIGH PERFORM. ___
REOPEN DOOR WITH HALL CALL? Y N
BYPASS HALL CALL TIME SEC. ___
CAR FAULT TIMEOUT (sec) ___
DOES THIS DISPATCHER HAVE A BACKUP? Y N
IS THIS DISPATCHER THE BACKUP? Y N
MAIN DISP FAILURE TIMEOUT (.1 sec) ___
CROSS CANCELLATION ENABLED? Y N
CROSS CANCEL TIME (.1 sec) ON:__ OFF:__
CROSS REGISTRATION ETA (SEC) ___
CROSS REGISTRATION ON TIME (.1 SEC) ___
MAXIMUM SPEED (FPM) ___
PARAMETER MENU 4:

LOBBY FLOOR
ZONING RETARDATION (seconds): ___
ZONE TO FULLY LOCKED FLOORS? Y N
PRIORITY PARK FLRS (0 NONE ZONE)
FLR CAR TIME ON:HR:MN OFF:HR:MN
__ ___ ON ___:__ OFF ___:__
__ ___ ON ___:__ OFF ___:__
__ ___ ON ___:__ OFF ___:__
GROUPS FOR LOBBY COVERAGE
GROUP 1:_____________________
GROUP 2:_____________________
CARS LBY OFF PK: GP1: ___ GP2: ___
CARS LBY UP PK: GP1: ___ GP2: ___
CARS LBY DN PK: GP1: ___ GP2: ___

Modem Parameters: Vol(0 - 3):
Ph#: ID #
Init: ATZ0

PARAMETER MENU 5:

EMERGENCY POWER: STAND ALONE, MASTER, SLAVE
RET ATT/IND CARS EM PWR PH I ___
EM PWR: AMT CARS MANUAL SELECT ___
TIMEOUT: EM PWR RET ___
EM PWR PH2 AUTO SELECT PRIORITY GROUPS
1: __ __ __ __ __ __ __ __ __
2: __ __ __ __ __ __ __ __ __
AMOUNT CARS GROUP1: ___ GROUP2: ___
ADD NO. CARS GROUP1 TO GROUP2 IF
GROUP1 CARS CAN'T RETURN ? Y N
PHASE 2 EMERGENCY POWER RETURN TO SERVICE
ATT/IND CARS AFTER AUTO CARS ? Y N
INTERDISP EM PWR TIMES: PH I ___ PH II ___
PHASE 1 RECALL ORDER (ENTER CAR # 1-10)
PH1 ORDER: __ __ __ __ __ __ __ __ __
MAX NUMBER CARS TO RUN ON PHASE 1: ___
EMG SWITCH NORMALLY OPEN: Y N
## Microflite Ultra 2000

### Section A2 - Controller Event Descriptions

While all of the faults listed below refer to Ultra 2000 cars, some of them may not be detected, depending on the job's hardware configuration.

The following is a list of events detected by the car and/or the Building Management System. The events consist of faults, status changes or a need for elevator maintenance. See the columns marked A & B in the table below for additional information:

A - Detected by Ultra 2000
R = Recoverable event
U = Unrecoverable event needs manual car or encoder MPU reset to be cleared.

B - Fault Board:
Y = Fault board required for event detection
N = Event is not displayed if fault board present (replaced by event(s) detected via the fault board).

<table>
<thead>
<tr>
<th>#</th>
<th>Event Name</th>
<th>Event Conditions</th>
<th>A</th>
<th>B</th>
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<tr>
<td>1</td>
<td>Safety Circuit Opened</td>
<td>Safety circuit opened.</td>
<td>R</td>
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<tr>
<td>2</td>
<td>Car Door Failed to Open - n floor</td>
<td>Door open motor on for 12 sec and door open limit did not make.</td>
<td>R</td>
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<td>3</td>
<td>Door Close Limit Failure</td>
<td>Door close limit fails to make after 10 consecutive cycles.</td>
<td>R</td>
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<tr>
<td>4</td>
<td>Electric Eye Failure</td>
<td>Electric Eye not broken after 10 consecutive car calls.</td>
<td>R</td>
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<td>Safety Edge Failure</td>
<td>Safety Edge on more than 30 sec after nudging time has expired.</td>
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<td>Weighing Device Failure</td>
<td>Input from load weighing device is on while the door is closed and the car is parked for more than 3 seconds.</td>
<td>R</td>
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<td>7</td>
<td>Stuck Car Call Button: n floor</td>
<td>Car call is on continuously for a full door open cycle.</td>
<td>R</td>
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<td>8</td>
<td>Stuck Hall Call Button - n floor</td>
<td>Hall call at car's floor with car's direction is on continuously for a full door open cycle.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>PWA Missing at Start / Start Control Failure</td>
<td>Apply power output is on for 6 sec with no power applied feed back input.</td>
<td>R</td>
<td></td>
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<tr>
<td>10</td>
<td>Drive Time Supervision</td>
<td>During a run the car speed is under the minimum speed for 10 seconds.</td>
<td>R</td>
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<td>11</td>
<td>Door Lock Failure</td>
<td>Door locks fail to make after 10 consecutive cycles.</td>
<td>R</td>
<td>N</td>
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<tr>
<td>12</td>
<td>Brake Release Failure Shutdown</td>
<td>3 consecutive occurrences of event no. 103 or event no. 92 without the car changing direction or run through brake time expires.</td>
<td>U</td>
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<tr>
<td>13</td>
<td>Overspeed shutdown</td>
<td>Overspeed input on or speed exceeded overspeed parameter value.</td>
<td>U</td>
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</tr>
<tr>
<td>14</td>
<td>Generator Failed to Start</td>
<td>Generator run output on for 25 sec with no generator input on.</td>
<td>R</td>
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<tr>
<td>15</td>
<td>Generator Failed to Shut Off</td>
<td>Generator run output off for 10 sec with generator input on.</td>
<td>R</td>
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<tr>
<td>16</td>
<td>Brake Set Failure</td>
<td>Release brake output is off for 1.5 sec and the brake fails to set.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Dispatcher Communication Failure</td>
<td>Car or dispatcher hasn't received valid data from this car for more than 15 seconds.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Event Name</td>
<td>Event Conditions</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>----</td>
<td>-----------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>18</td>
<td>Door Lock Open out of Door Zone</td>
<td>Door Lock(s) open while car is in motion and out of the door zone (Clipped Door Lock).</td>
<td>R</td>
<td>N</td>
</tr>
<tr>
<td>19</td>
<td>Door Close Limit Open out of Door Zone</td>
<td>Door close limit open while car is in motion and out of the door zone.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Tripped SCR / Regulator.</td>
<td>SCR / Regulator tripped 5 times in 2 minutes or reset attempt failed.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Direction Fault</td>
<td>Actual car direction differs from desired direction.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Normal Up Limit</td>
<td>Normal up limit input on while the door locks are made, the safety circuit is made and the car is moving in the up direction.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Normal Down Limit</td>
<td>Normal down input on while the door locks are made, the safety circuit is made and the car is moving in the down direction.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Alarm Status</td>
<td>Alarm bell has been on for more than 2 seconds in a 1 minute period.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Door Closed Limit Open in DZ</td>
<td>Door close limit fails to make after 3 consecutive door cycles.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Door Lock Open in Door Zone</td>
<td>Door locks fails to make after 3 consecutive door cycles.</td>
<td>R</td>
<td>N</td>
</tr>
<tr>
<td>27</td>
<td>Motor Generator / SCR Off</td>
<td>Motor Generator / SCR shutdown via keyswitch in machine room, car or hallway.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Stuck Pawl Magnet</td>
<td>Car missed target floor due to mechanical bind of pawl magnet on selector.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Control Fuse</td>
<td>Safety Circuit Line Fuse open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>30</td>
<td>Loop Overload</td>
<td>Loop overload is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>31</td>
<td>Tripped SCR / Regulator</td>
<td>SCR or Regulator has tripped.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>32</td>
<td>Governor Switch</td>
<td>Governor switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>33</td>
<td>Top Final Limit</td>
<td>Top final limit switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>34</td>
<td>Bottom Final Limit</td>
<td>Bottom final limit switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>35</td>
<td>Pit Stop Switch</td>
<td>Pit stop switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>36</td>
<td>Compensation Cable Switch</td>
<td>Compensation cable switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>37</td>
<td>Safety Plank Switch</td>
<td>Safety plank switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>38</td>
<td>Broken Tape Switch</td>
<td>Broken tape switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>39</td>
<td>Top of Car Stop Switch</td>
<td>Top of car stop switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>40</td>
<td>In Car Stop Switch</td>
<td>In car stop switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>41</td>
<td>Side Exit Door</td>
<td>Side exit door switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>42</td>
<td>Escape Hatch</td>
<td>Escape hatch switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>43</td>
<td>Limit Board</td>
<td>Limit board has tripped.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>#</td>
<td>Event Name</td>
<td>Event Conditions</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>----</td>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>44</td>
<td>Controller Stop Switch</td>
<td>Controller stop switch is open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>53</td>
<td>Hoist Motor Field</td>
<td>Hoist motor field loss open.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>54</td>
<td>Door Operator Overload</td>
<td>Door operator overload input on.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>55</td>
<td>Spare</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>Rear Door Locks Open in DZ</td>
<td>Rear door locks fail to make after 3 consecutive door cycles, with car in the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>57</td>
<td>Front Door Locks Open in DZ</td>
<td>Front door locks fail to make after 3 consecutive door cycles, with car in the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>58</td>
<td>Rear Gate Switch Open in DZ</td>
<td>Rear gate switch fails to make after 3 consecutive door cycles, with car in the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>59</td>
<td>Front Gate Switch Open in DZ</td>
<td>Front gate switch fails to make after 3 consecutive door cycles, with car in the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>61</td>
<td>Rear Door Locks Failure</td>
<td>Rear door locks fail to make after 10 consecutive door cycles, with car in the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>62</td>
<td>Front Door Locks Failure</td>
<td>Front door locks fail to make after 10 consecutive door cycles, with car in the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>63</td>
<td>Rear Gate Switch Failure in DZ</td>
<td>Rear gate switch fails to make after 10 consecutive door cycles, with car in the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>64</td>
<td>Front Gate Switch Failure in DZ</td>
<td>Front gate switch fails to make after 10 consecutive door cycles, with car in the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>65</td>
<td>Rear Door Locks Open Out of DZ</td>
<td>Rear door locks are open, with car out of the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>66</td>
<td>Front Door Locks Open Out of DZ</td>
<td>Front door locks are open, with car out of the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>67</td>
<td>Rear Gate Switch Open Out of DZ</td>
<td>Rear gate switch is open, with car out of the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>68</td>
<td>Front Gate Switch Open Out of DZ</td>
<td>Front gate switch is open, with car out of the door zone.</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>69</td>
<td>Counterweight Switch</td>
<td>Counterweight (CWSW) switch was activated momentarily. Input CWL is on for 65 sec.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>Possible Counterweight Derailment</td>
<td>Counterweight switch (CWSW) is on for 65 seconds.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>71</td>
<td>SCR Overheat</td>
<td>SCR Overheat (Input OH activated).</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Event Name</td>
<td>Event Conditions</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>----</td>
<td>------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>72</td>
<td>Simplex/IR Hall Button Failure</td>
<td>Simplex or Inconspicuous Riser’s hall button fuse or communication to hall station lost causing the HBF input to be off for 15 seconds. If this fault occurs while the car is on simplex or inconspicuous riser service the car will begin “wild call” emergency dispatcher service.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>Gate Contact Fault</td>
<td>Car gate and door open limit input on at the same time.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>74</td>
<td>Encoder Frozen / No Car Motion</td>
<td>Car is moving but encoder count has not changed in 1.5 seconds. Could also caused by “P” contact failure on motor generator jobs.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>Broken Tape/ Disconnected Cable</td>
<td>Encoder has detected a broken tape or has lost communication with the encoder sensor box.</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>Encoder Com Fail Shutdown</td>
<td>Indicates an interruption in the serial communication between the car and encoder board.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>Encoder Excess Deviation</td>
<td>Indicates that the deviation between the encoder value and the expected position, from the floor magnet sensor, is greater than ten counts, when the car is slowing down to a floor.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>78</td>
<td>Encoder Sensor Failure</td>
<td>One of the optical sensors becomes inoperative. The car is still capable of running with decreased resolution. Diagnostics are provided on the car mounted encoder electronics that will help determine which sensor is inoperative.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>79</td>
<td>Encoder Excess Guide Wear</td>
<td>The encoder tape guides have worn approximately 1/8 inch. They should be replaced as soon as possible.</td>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>

80 - 90 See Below

<table>
<thead>
<tr>
<th>#</th>
<th>Event Name</th>
<th>Event Conditions</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>91</td>
<td>24V Line to I/Os Lost</td>
<td>Loss of the voltage monitor (VM) input indicating no 24V to I/Os.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>92</td>
<td>Brake Dropped During Run</td>
<td>Brake input was unexpectedly lost while car was in motion.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>93</td>
<td>Door Limit Contact Fault</td>
<td>CG and DOL input on at the same time.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>94</td>
<td>Tripped SCR/ Regulator Shutdown</td>
<td>SCR Tripped and cleared without reset attempt 5 times in 2 minutes. (Ultra Only)</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>95</td>
<td>Car Gate Open in Door Zone</td>
<td>Car Gate failed to close after 3 consecutive door cycles with car in the door zone.</td>
<td>R</td>
<td>N</td>
</tr>
<tr>
<td>96</td>
<td>Car Gate Open out of Door Zone</td>
<td>Car Gate open while car is in motion and out of the door zone.</td>
<td>R</td>
<td>N</td>
</tr>
<tr>
<td>97</td>
<td>PWA Not Dropping at Stop / Power Applied Fault</td>
<td>Power Applied input on for 4.5 seconds after the apply power output has dropped.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>98</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>99</td>
<td>Landing Door Not Open</td>
<td>Door lock and door open limit on at the same time.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>Landing Door Contact Fault</td>
<td>Door lock and door open limit on at the same time.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>101</td>
<td>Multi Sensor Failure</td>
<td>Two out of three encoder sensors have failed. Must reset encoder to recover.</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Direction Preference Fault</td>
<td>Up preference and down preference inputs are simultaneously on for 5 sec with the door closed.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>103</td>
<td>Brake/Direction Did Not Pick</td>
<td>Brake fails to lift for longer than the Brake Release Failure Time. May be caused by failure in the direction circuit as well.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>#</td>
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<td>Event Conditions</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
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<td>---</td>
</tr>
<tr>
<td>104</td>
<td>Spare</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>Invalid Door Zone Magnet</td>
<td>Encoder reading indicates car is in door zone but the door zone input from the magnet is not seen.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>106</td>
<td>Slowdown Failure</td>
<td>Unexpected slowdown limit open. Event is not detected until the car doors have opened.</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>107</td>
<td>Weight overload</td>
<td>Weighing device indicates overload condition. (OL input on).</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>108</td>
<td>Stuck In leveling</td>
<td>Car cannot respond to call due to leveling input. (Australia Only).</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>109 - 145</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>146</td>
<td>Brake Set Failure Shutdown</td>
<td>5 consecutive occurrences of event no. 16 have occurred.</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>147</td>
<td>Car Gate Failure</td>
<td>No car gate after 10 consecutive door cycling attempts.</td>
<td>R</td>
<td>N</td>
</tr>
<tr>
<td>148</td>
<td>Door Close Limit Relaxed</td>
<td>Door close limit of a parked car does not remake after applying power on the door for 60 seconds.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>149</td>
<td>PWA Lost During Motion</td>
<td>Power applied input lost while car was in motion.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>PWA Failure - Two Min. Shutdown</td>
<td>Fault no 9 has occurred three times without clearing or fault no. 149 has occurred three times with car running in the same direction. Car will retry moving after two minutes.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>151</td>
<td>Strain Gage Did Not Set to Zero</td>
<td>Percent full load of an empty car not equal to zero after a strain gage calibration was completed.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>152</td>
<td>Speed Differential Fault.</td>
<td>Actual speed is 150 fpm more or less than the desired speed for more than one second.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>153</td>
<td>Seismic Switch Activated</td>
<td>The seismic switch was activated.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>154</td>
<td>SCR/Regulator Tripped</td>
<td>SAF and REG inputs are on simultaneously for 300 ms.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>155</td>
<td>Limit Board Tripped</td>
<td>SAF, LIM and REG inputs are on simultaneously for 300 ms.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>156</td>
<td>Car station communication fault</td>
<td>No communication between the car and the car station for 10 seconds.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>157</td>
<td>Lobby Button Fuse Car Open</td>
<td>Lobby hall button fuse open on local riser.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>158</td>
<td>Hall Call Buttons Car Fuse Open</td>
<td>Hall call button fuse open on local riser.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>159</td>
<td>Hall Call Button Ack. Lights Car Fuse Open</td>
<td>Hall call buttons acknowledgment light fuse open on local riser.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>Car Call Buttons Fuse Open</td>
<td>Car call buttons fuse open.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>161</td>
<td>Car Call Ack. Lights Fuse Open</td>
<td>Car call buttons acknowledgment light fuse open.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>162</td>
<td>Door Zone Monitor Fault</td>
<td>DZ input does not go off when the car is more than 3&quot; from the floor for 100ms Canada only.</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>163</td>
<td>Redundancy Failure</td>
<td>Failure of one or more of the redundant relays required by Canada B44 Code to pick or drop as demanded.</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>164</td>
<td>Stop Switch Redundancy Failure</td>
<td>Failure of one or more of the redundant outputs around the in car stop switch required by Canada B44 Code to drop as demanded.</td>
<td>U</td>
<td></td>
</tr>
</tbody>
</table>
### Event Conditions

<table>
<thead>
<tr>
<th>#</th>
<th>Event Name</th>
<th>Event Conditions</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>165</td>
<td>Lobby Button Fuse Disp. Open</td>
<td>Lobby hall button fuse open on group riser.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>166</td>
<td>Hall Call Buttons Disp. Fuse Open</td>
<td>Hall call button fuse open on group riser.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>167</td>
<td>Hall Call Button Ack. Lights Disp.</td>
<td>Hall call buttons acknowledgment light fuse open on group riser.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>168</td>
<td>Up Slowdown Limit</td>
<td>Up slowdown limit jumped.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>169</td>
<td>Down Slowdown Limit</td>
<td>Down slowdown limit jumped.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>170</td>
<td>Car Out Of Door Zone</td>
<td>Car stopped between floors.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>171</td>
<td>Swing Door Primary Door Lock</td>
<td>Swing door primary door lock lost in flight.</td>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>

The following events are detected when the controller or dispatcher is connected to the Building Management System or Central Station:

<table>
<thead>
<tr>
<th>#</th>
<th>Event Name</th>
<th>Event Conditions</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>Independent Service</td>
<td>Car is running on independent service.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>81</td>
<td>Inspection Service</td>
<td>Car is on inspection service.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>82</td>
<td>Fire Service Phase I</td>
<td>Car is on fire phase I operation.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>83</td>
<td>Fire Service Phase II</td>
<td>Car is on fire phase II operation.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>84</td>
<td>Encoder Re-synchronization</td>
<td>Car is moving at low speed to determine its position in the shaft.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>Car MPU Reset</td>
<td>The car MPU reset either via manually pushing the reset button on the board, a power up, or due to a watchdog timer generated reset.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>86</td>
<td>Seismic Activity Switch</td>
<td>Seismic activity switch dispatcher input or counterweight switch car input is ON.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>87</td>
<td>Hall Button Failure</td>
<td>Simplex or Dispatcher hall button fuse is blown.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>Emergency Power Operation</td>
<td>The system is running on the emergency generator rather than on normal power.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>89</td>
<td>Service Mode</td>
<td>BMS generated car status used for diagnostic purposes.</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>Car Not Responding</td>
<td>Car not responding to dispatcher assignments.</td>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>
FAULTS DETECTED VIA THE FAULT BOARD
The following table shows the faults detected via the fault board with the associated combination of binary inputs SA0 - SA4, the fault board input number, and the fault number being displayed on the Ultra 2000 car screen:

<table>
<thead>
<tr>
<th>FAULT#</th>
<th>INPUT#</th>
<th>FAULT NAME</th>
<th>SA0</th>
<th>SA1</th>
<th>SA2</th>
<th>SA3</th>
<th>SA4</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>2</td>
<td>LOOP OVERLOAD</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>44</td>
<td>3</td>
<td>CONTROLLER STOP SWITCH</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>32</td>
<td>4</td>
<td>GOVERNOR SWITCH</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>33</td>
<td>5</td>
<td>TOP FINAL LIMIT</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>34</td>
<td>6</td>
<td>BOTTOM FINAL LIMIT</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>35</td>
<td>7</td>
<td>PIT STOP SWITCH</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>36</td>
<td>8</td>
<td>COMPENSATION CABLE SWITCH</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>37</td>
<td>9</td>
<td>SAFETY PLANK SWITCH</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>38</td>
<td>10</td>
<td>BROKEN TAPE SWITCH</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>39</td>
<td>11</td>
<td>TOP OF CAR STOP SWITCH</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>40</td>
<td>12</td>
<td>IN CAR STOP SWITCH</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>41</td>
<td>13</td>
<td>SIDE EXIT DOOR</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>42</td>
<td>14</td>
<td>ESCAPE HATCH</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>43</td>
<td>15</td>
<td>LIMIT BOARD</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>31</td>
<td>16</td>
<td>TRIPPED SCR / REGULATOR</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>53</td>
<td>17</td>
<td>HOIST MOTOR FIELD</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>54</td>
<td>18</td>
<td>Spare</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>55</td>
<td>19</td>
<td>Spare</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>56</td>
<td>20</td>
<td>REAR DOOR LOCKS OPEN IN DZ</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>61</td>
<td>20</td>
<td>REAR DOOR LOCKS FAILURE</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>65</td>
<td>20</td>
<td>REAR DOOR LOCKS OPEN OUT OF DZ</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>57</td>
<td>21</td>
<td>FRONT DOOR LOCKS OPEN IN DZ</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>62</td>
<td>21</td>
<td>FRONT DOOR LOCKS FAILURE</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>66</td>
<td>21</td>
<td>FRONT DOOR LOCKS OPEN OUT OF DZ</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>58</td>
<td>22</td>
<td>REAR GATE SWITCH OPEN IN DZ</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>63</td>
<td>22</td>
<td>REAR GATE SWITCH FAILURE</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>FAULT#</td>
<td>INPUT#</td>
<td>FAULT NAME</td>
<td>SA0</td>
<td>SA1</td>
<td>SA2</td>
<td>SA3</td>
<td>SA4</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>--------------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>67</td>
<td>22</td>
<td>REAR GATE SWITCH OPEN OUT OF DZ</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>59</td>
<td>23</td>
<td>FRONT GATE SWITCH OPEN IN DZ</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>64</td>
<td>23</td>
<td>FRONT GATE SWITCH FAILURE</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>68</td>
<td>23</td>
<td>FRONT GATE SWITCH OPEN OUT OF DZ</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>NO FAULTS DETECTED VIA FAULT BOARD</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

SA0 - SA4 inputs are not considered valid unless the same combination is seen for at least 5 loop times.

Faults 30 - 53 can occur only if SAF input is up on the car screen. They are prioritized in reverse order with fault 30 having the highest priority. Any fault that causes the safety circuit to be broken will mask a fault having a lower priority than its own (a higher fault number).

When a fault is cleared, the safety circuit is either closed or a fault having a lower priority will be reported. The SAF input is a pre-condition for reporting any of these faults; but it is not a condition for clearing them.

The SAF input is also looked at in order to determine the occurrence of faults 61 - 68. The pre-conditions for reporting one of these faults are a closed safety circuit (since the DG circuit is broken any time the safety circuit is open) and a broken DG.

These faults indicate that there is a clipped door lock/gate; or that the door failed to close; or that a door lock/gate condition exists that is causing the car to be taken out of group. In order to detect these faults we have to check for the pre-requisite conditions that we always check for the door gate faults even when there is no fault board present. The same mechanism of fault prioritization and clearing as described above is used for the door lock/gate faults.

When a fault board is present in the system, some faults detected without the fault board being present are disabled to eliminate redundancies.