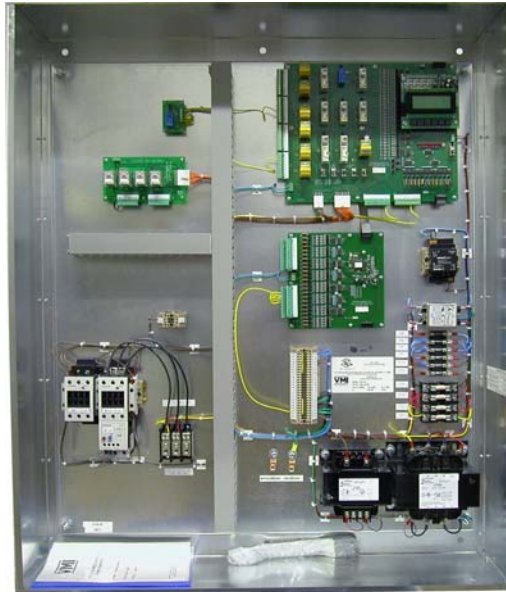


VHC-102 HYDRAULIC
CONTROLLERS

Vertitron Midwest, Inc.



VHC-102

Hydraulic Control

Specifications

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1. Display, Keypad & LED's

1.1. **The 4 X 20-character display allows the mechanic to see all of the following information at the same time.**

- Elevator Mode of Operation
- Elevator Position and Motion Status
- Door Status
- Fault Messages
- Time / Date

1.2. **Time Clock – Displays the time and date. Is used to log date and time of errors.**

1.2.1. Error Messages – See VMI manual.

1.2.2. Parameter / Timer programming (see list below)

1.2.3. The following status LED's shall be provided.

- ⊙ EMG (emergency safety devices) ON = the safety circuit is in running condition up to the door locks
- ⊙ HCK (hall lock check) ON = the hall lock circuit is made
- ⊙ GCK (car gate check) ON = the car gate circuit is made
- ⊙ DCC (door closed condition) ON = the car and hoistway door closed contacts are made
- ⊙ UTL (up terminal limit) ON = the elevator up terminal limit switch is not activated
- ⊙ USL (up speed limit) ON = the elevator up speed limit switch is not activated (elevator is not at the highest level)
- ⊙ DTL (down terminal limit) ON = the elevator down terminal limit switch is not activated
- ⊙ DSL (down speed limit) ON = the elevator down speed limit switch is not activated (elevator is not at lowest level)
- ⊙ HTB (heart beat) = The main relay board along with the call and expansion boards shall each be provided with a heartbeat status LED to indicate the board is communicating with the main CPU.

2. Control Environment Range

2.1. **Temperature:** 0 to 40 degrees C
32 to 104 degrees F

2.2. **Humidity:** 0% to 85% (non-condensing)

3. Standard Control Features

3.1. Inspection operation

3.1.1. The control system shall be provided with the following inspections operations per ANSI A17.1 code.

- 3.1.1.1. Machine Room Inspection
- 3.1.1.2. In Car Inspection

3.1.1.3. Top of Car Inspection

3.2. Test Switch (located on relay I/O board) -

- 3.2.1. The control system shall provide with a "Test" operation that is activated by a switch labeled "test" that is located on the control panel. With the TEST switch in the ON position the elevator door opening sequence and all hall calls shall be disabled. Car calls shall remain operational. The elevator doors can only be opened with constant pressure on the door open button. This enables a technician to run the controller floor to floor using car calls without having to worry about people entering the elevator. Fire Service operation shall override the TEST mode immediately.

3.3. Shunt Trip Breaker

- 3.3.1. The Shunt Trip breaker shall send a signal to the controller when an over heat condition occurs at the breaker. The elevator shall stop at the next available landing, open the doors and shut down. An elevator that is stopped at a landing shall open the doors and shut down. Once the elevator has been taken out of service the controller sends a signal to the shunt trip breaker. The breaker then removes power from the control panel. The intention is to stop the elevator and remove power before the sprinkler system is activated. The shunt trip feature should override all other operations including Fire Service.

3.4. Leveling System

- 3.4.1. Provide automatic 2-way leveling device to maintain platform within 3/8' of landing regardless of the load up to the rated capacity. The Leveling device shall function when doors and gates are open or closed.

3.5. Fireman Operation

- 3.5.1. Fireman Operation shall meet the requirements of the ASME A17.1d-2000 code section 211.

3.6. Hoistway / Car Door Bypass Switches

- 3.6.1. Controller shall be provided with Hoistway and Car Door Bypass Switches. When either or both of the switches are in the "BYPASS" position, all means of operation shall be made inoperative except top-of-car and in-car inspection operation. A warning sign shall be adjacent to the "BYPASS" switches stating, "Jumpers shall not be used to bypass hoistway-door or car-door electric contacts."

3.7. Simplex Selective Collective Operation

- 3.7.1. The momentary pressing on one or more car buttons shall send the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. During this operation, the car shall answer calls from the landings which are in the prevailing direction of travel and each call shall be cancelled when answered.
- 3.7.2. With the momentary pressing of a hall button above the car, the car shall start up and answer any "up" calls as they are reached by the car irrespective of the sequence in which the buttons are pressed. The car shall not stop at floors where "down" buttons only are pressed. Similarly, the car shall start down to answer calls below the car and shall not stop where "up" calls only are registered. When traveling "up," the car shall reverse at the

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highest call and proceed to answer calls below it, Similarly, when traveling “down,” the car shall reverse at the lowest call and answer calls above it.

- 3.7.3. Should both an “up” or “down” call be registered at an intermediate landing, only the call corresponding to the direction in which the car is traveling shall be canceled upon the stopping of the car at that landing.

3.8. Independent Service

- 3.8.1. The Independent Service operation is activated with a key switch located in the elevator. Once placed on independent service all current car and hall calls on a simplex system shall be erased and the elevator will park with the doors open. If the elevator is in motion when the key switch is activated stop the elevator at the next available landing and park with the doors open. Car and hall Lantern outputs are not operational. The elevator will respond only to car calls. Automatic doors shall close only constant pressure on the door close push button until the doors are fully closed. If the elevator is on independent service and a fire service signal is activated the light and buzzer shall immediately be activated. Doors that are fully open will wait 15 – 60 seconds to close and transfer from independent service to fireman operation.

3.9. Buzzer Output

- 3.9.1. Nudging, Fireman Service, and EMT shall share the buzzer output. This is possible because nudging is disabled during Fireman Operation.

3.10. Car Direction Lanterns

- 3.10.1. The car direction lanterns and gong shall be activated when the elevator is stopping at a floor and the car has a future direction demand or the elevator is answering a hall call. This sequence should start after the doors have started to open. This allows the passenger standing outside the elevator to see the direction lantern sequence. The up lantern output shall be activated once if the future direction is up and the down lantern twice if the future direction is down. The gong sequence will match the lanterns (once for up and twice for down). The gong output is a pulse. The UP lantern should stay lit until the doors have fully closed.

3.11. Low Oil Operation

- 3.11.1. A sensor located in the oil reservoir shall activate low oil operation. The controller will activate the low oil output and the elevator shall return to the lowest landing and be placed out of service. The door open button shall remain operational. Calls and position indicator signals shall be inoperative.

3.12. Negative Pressure

- 3.12.1. A sensor located in the oil pressure line activates the negative pressure input. The control system disables the down high speed and down leveling outputs. Leveling in the up direction (anti-creep) is still operational. If pressure is lost in the system and the elevator is not at the lowest landing it is assumed that the elevator is physically stuck. The door operation should be disabled and the elevator should be taken out of service. An elevator that is at the lowest landing when the negative pressure input is activated is assumed to be on the buffer springs. In this condition the elevator shall be taken out of service with the door open button still operational.

3.13. Nudging

- 3.13.1. Blocking the elevator proximity device or photo eye for more than 30 seconds (programmable timer) while there are registered calls in the system the controller shall activate the nudging operation. The nudging output combined with the door close output will cause the doors to close in slow speed. If the safety edge input is activated while the doors are closing in nudging operation the doors shall stop. Closing will continue after the safety edge signal is removed. The nudging buzzer output will be active until the doors are fully closed.
- 3.13.2. The door open button shall reopen the doors and cancel nudging operation. The doors will then re-close in normal operation after the reopen timer has expired.

3.14. Pump Run Timer

- 3.14.1. If the controller does not see a USL (Up Speed Limit) or HSU (High Speed Up slowdown) input while trying to move in the up direction the Pump Run Timer shall expire causing the elevator to be placed in the "Pump Run Timer" operation. The controller shall cancel all calls and descend to the lowest landing and be taken out of service. The door open button shall remain operational. Cycling the power to the control panel will reset the controller to normal operation.

3.15. Down Valve limit timer

- 3.15.1. If any of the down valve outputs are activated for more than 30 seconds without the controller inputs DSL (Down Speed Limit) or HSD (High Speed Down) being activated it is assumed that the elevator has stalled while moving in the down direction. The controller shall cancel all calls and be taken out of service. Cycling the power to the control panel will reset the controller to normal operation

3.16. Homing

- 3.16.1. Homing is an optional feature that can be turned on or off by accessing the parameter programming. If the homing feature is disabled the elevator will park at the last floor served when no calls are registered in the system. Enabling the homing feature will allow the customer to choose the homing floor along with the amount of time (1-45 minutes) before the elevator returns to the home floor. The homing timer will start when the elevator doors have closed and there are no calls in the system. The elevator shall proceed to the programmed home floor and park with the doors closed. Any call registered while the car is traveling to the home landing shall cause the controller to cancel the homing function and respond to that call. If the elevator was traveling away from the landing for which the call is registered, it shall stop at the next available landing and reverse its direction.

3.17. Medical EMT Operation

- 3.17.1. See ANSI Code for description.

4. Optional Control Features

4.1. Duplex Operation

- 4.1.1. The operation of each elevator from within the car shall be such that the momentary pressing of one or more buttons shall send the car to the designated landings. Stops shall be made in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. During this operation, the car shall also answer calls from

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the landings, but only one car shall respond to any one call, and it shall be the car nearest the call and set for the direction of the hall button pressed. The control shall be arranged so that, normally, one car shall be parked at the main lower terminal and the other free car, parked at the landing it last served to be available to answer subsequent hall calls. Should both cars happen to finish their calls at the main lower terminal, the car which arrived there first shall become a free car to answer subsequent hall calls.

4.1.2. An idle free car shall answer any hall call either above or below the floor where it is standing, except hall calls at or below the main lower terminal floor. These calls shall be answered by the car parked at the main lower terminal. When the free car is clearing calls, the other car shall automatically start to answer hall calls under any of the following conditions:

4.1.2.1. Registration of an “up” hall call below the “up” traveling free car.

4.1.2.2. Registration of an “up” or “down” hall call above the “down” traveling free car.

4.1.2.3. The free car is delayed beyond a predetermined time interval.

4.2. Hall Direction Lanterns

4.2.1. The hall direction lanterns and gong shall be activated when the elevator is stopping at a floor and the car has a future direction demand or the elevator is answering a hall call. This sequence shall start when the elevator initiates a slowdown to stop at a floor and there is a future direction demand or the elevator is answering a hall call. The up lantern output shall be activated once if the future direction is up and the down lantern twice if the future direction is down. The gong sequence will match the lanterns (once for up and twice for down). The gong output is a pulse. The DOWN lantern should flash twice and stay lit after the second flash until the doors have fully closed.

4.3. Emergency Battery Lowering

4.3.1. An automatic emergency lowering feature shall be incorporated into the control system. In the event of the loss of normal power the elevator shall return to the lowest landing and open the doors. The door open push button shall remain active. Upon the resumption of normal power the elevator shall return to normal operation.

4.4. Emergency Power Logic

4.4.1. The control system shall be provided with the following “Emergency Power” operation.

4.4.2. A Pre- Emergency Power test signal shall be provided. Upon activation of the Pre-signal the elevator shall stop at the next available landing and open the doors. After 15 seconds the doors shall close and the car will be taken out of service. The door open button shall remain operational.

4.4.3. An Emergency Power On signal shall be provided to indicate that the elevator is currently operating on “Emergency Power”.

4.4.4. Upon activation of the “Emergency Power On” signal all elevators that are in automatic operation and located above the designated emergency power lobby shall immediately return to the designated emergency power lobby and open the doors. After 15 seconds the doors shall close and the car will be taken out of service. The door open button shall remain operational.

4.4.5. An elevator currently at or below the designated lobby when the “Emergency Power On” signal is activated shall remain at that location and open the doors. After 15 seconds the

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doors shall close and the car will be taken out of service. The door open button shall remain operational.

- 4.4.6. A selector switch shall be provided to send a signal to allow an elevator to run while on emergency power.
- 4.4.7. An elevator that is selected to run when the Emergency Power is activated shall continue to run without delay.
- 4.4.8. A 30 second delay shall be provided on the “Emergency Power Car Enable” signal to allow a previously selected car to reach the next available landing before returning to the designated lobby.

4.5. Load Weighing Phase I & II

- 4.5.1. Load Weighing Phase I - When the Load Weighing Phase I input is activated the controller shall prevent the car from moving keep automatic-closing doors open, and activate the load weighing output (used to drive an indicator and/or buzzer).
- 4.5.2. Load Weighing Phase II – When the Load Weighing Phase II input is continually monitored. When this input is activated the car shall stop only at landings where a car call has been registered. The hall calls registered at those landings at which the elevator did not stop shall remain in the system.
- 4.5.3. Deactivating either of the load weighing inputs will immediately remove the elevator from the load weighing operation.

4.6. Viscosity

- 4.6.1. A temperature sensor (provided by VMI) must be wired to the temperature sensor input located on the main relay board before the Hot Oil or Viscosity features can be activated. To verify that the sensor is installed and working properly access the Monitor / Volts & Temp screen from the Main Menu section on the controller diagnostic display and verify that current oil temperature value is displayed.
- 4.6.2. The VISCOSITY feature parameter must be set to YES in the feature set-up menu to activate Viscosity feature.

VISCOSITY = ON
 OFF

Once the Viscosity operation is enabled the Viscosity temperature must be set.

VIS ON TEMP = _ _ _ (range between 70 degrees F and 120 degrees F)

(The current oil temperature is displayed at the bottom of the VISCOSITY setup screen)

- 4.6.3. Once the VIS ON TEMP is reached the elevator will return to the lowest floor and the motor will run with the valves de-energized until the oil reaches temperature 3 degrees warmer than the VIS ON TEMP setting. The Viscosity feature has a maximum run time of 5 minutes. Any demand on the elevator will disable the viscosity operation.
- 4.6.4. If the temperature sensor is “OPEN” or “SHORTED” the VISCOSITY feature is disabled.

4.7. Hot Oil Shutdown

4.7.1. A temperature sensor (provided by VMI) must be wired to the temperature sensor input located on the main relay board before the HOT OIL SHUTDOWN feature can be activated. To verify that the sensor is installed and working properly access the Monitor / Volts & Temp screen from the Main Menu section on the controller diagnostic display and verify that current oil temperature value is displayed.

4.7.2. The Hot Oil feature parameter must be set to ON in the feature set-up menu to activate HOT OIL SHUTDOWN feature.

HOT OIL SHUTDOWN = ON
OFF

Once the HOT OIL SHUTDOWN is enabled the HOT ON TEMP must be set.

HOT ON TEMP = _ _ _ (range between 125 degrees F and 170 degrees F)

(The current oil temperature is displayed at the bottom of the HOT OIL SHUTDOWN setup screen)

4.7.3. Once the HOT ON TEMP is reached and there are no car calls in the system the elevator shall return to the lowest floor and park with the doors closed. The Door Open button shall remain active. Call demands shall be ignored until the oil temperature has been reduced by 5 degrees.

4.7.4. If the temperature sensor is "OPEN" or "SHORTED" the HOT OIL SHUTDOWN feature is disabled.

4.8. Out of Service

4.8.1. The Out of Service output shall be activated any time the elevator is not in automatic operation with the ability to answer both car and hall calls. This output can be wired to an indicator in a lobby panel.

4.9. Telescopic Resynch

4.9.1. Telescopic Resynch operation is a sequence that takes less than 5 min to complete. The intention is to bring the elevator to the lowest landing and then proceed to bypass the terminal limits and run in leveling speed for a predetermined amount of time to allow the elevator to land on the buffer springs. By doing this the telescopic cylinders will be allowed to resynch. All door function will be disabled during this operation. The controller can be field programmed to initiate the resynch operation based on an internal trip counter. The counter monitors the number of starter outputs. .

4.10. Car to Lobby

4.10.1. Activating the car to lobby input shall cause the elevator to cancel all current calls and return to the lobby floor (programmable) and park with the doors open. If the car to lobby input is removed the elevator will return to normal operation after it has reached the lobby floor.

4.11. Car Capture Feature

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4.11.1. The intention of the Car Capture feature is to secure the elevator at the “car capture” programmed floor with the doors closed. Once the Car Capture Security input is removed the elevator doors shall open and the elevator shall return to automatic operation.

4.11.2. Car Capture input is activated:

- Cancel all calls
- Disable door open button
- Return elevator nonstop to car capture floor (field programmable)
- Park with the doors closed while the Car Capture input is active

4.11.3. An elevator that is traveling away from the designated floor shall stop at the next available landing and reverse direction and return nonstop to the designated floor.

4.11.4. Doors that have started opening shall reverse direction and close. The door open button shall be disabled. Door safety protection devices (photo eye, safety edge, and proximity device) shall remain operational.

4.11.5. An elevator that is at the “car capture” floor with the doors open shall close the doors and remain at the landing with the doors closed while the “car capture” input is active. The doors will only open when the “car capture” input is removed.

4.12. Security Interface

4.12.1. VMI will provide a dedicated output that can be used to bypass a security key switch or card reader device when the elevator is placed on Fireman operation. Custom security features will be available with the operation and cost based on a written specification.

5. Field Programmable Parameters / Timers

5.1. The control system shall be provided with but not be limited to the following field programmable parameters and timers.

5.1.1. Parameters

- # Stops
- Fire Lobby
- Alternate Lobby
- Machine Room Location
- Home Floor
- Starter Type
- Fire Code
- Down Lantern output (1 or 2 pulse)
- Inspection Speed
- Car Lanterns / Hall Lanterns / Car and Hall Lanterns

5.1.2. Timers

- Door Open (T1, T2, T3)
- Nudging
- Starter Y-Delta
- Door Fail
- Homing
- Gong Pulse
- PI (position indicator) shut off timer

5.1.3. **Fire Service**

- Main Lobby
- Alt Lobby
- MR at Lobby (Yes or No)
- Hoist Detector (Top or Bottom)
- Fire Code
- Fire Edition (1998 or 2000)