



OPERATOR'S MANUAL

HWH COMPUTER-CONTROLLED LEVELING SYSTEM 2000 SERIES

FEATURING:

*BI-AXIS® Hydraulic Leveling
Straight-Acting Jacks
Multiple Room Extensions
Hydraulic Joey Beds*

HWH CORPORATION
(On I-80, Exit 267 South)
2096 Moscow Road | Moscow, Iowa 52760
Ph: 800/321-3494 (or) 563/724-3396 | Fax: 563/724-3408
www.hwh.com

OPERATING MANUAL

WARNING !

READ THE ENTIRE OPERATOR'S MANUAL BEFORE OPERATING.

BLOCK FRAME AND TIRES SECURELY BEFORE CRAWLING UNDER VEHICLE. DO NOT USE LEVELING JACKS OR AIR SUSPENSION TO SUPPORT VEHICLE WHILE UNDER VEHICLE OR CHANGING TIRES. VEHICLE MAY DROP AND/OR MOVE FORWARD OR BACKWARD WITHOUT WARNING CAUSING INJURY OR DEATH.

KEEP ALL PEOPLE CLEAR OF VEHICLE WHILE LEVELING SYSTEM, ROOM EXTENSIONS AND OTHER MOVABLE MECHANISMS ARE BEING OPERATED.

NEVER PLACE HANDS OR OTHER PARTS OF THE BODY NEAR HYDRAULIC LEAKS. OIL MAY PENETRATE SKIN CAUSING INJURY OR DEATH.

WEAR SAFETY GLASSES WHEN INSPECTING OR SERVICING THE SYSTEM TO PROTECT EYES FROM DIRT, METAL CHIPS, OIL LEAKS, ETC. FOLLOW ALL OTHER APPLICABLE SHOP SAFETY PRACTICES.

IMPORTANT: IF COACH IS EQUIPPED WITH A ROOM EXTENSION, READ ROOM EXTENSION SECTION BEFORE OPERATING LEVELING SYSTEM.

HOW TO OBTAIN WARRANTY SERVICE

THIS IS NOT TO BE INTERPRETED AS A STATEMENT OF WARRANTY

HWH CORPORATION strives to maintain the highest level of customer satisfaction. Therefore, if you discover a defect or problem, please do the following:

FIRST: Notify the dealership where you purchased the vehicle or had the leveling system installed. Dealership management people are in the best position to resolve the problem quickly. If the dealer has difficulty solving the problem, he should immediately contact the Customer Service Department, at HWH CORPORATION.

SECOND: If your dealer cannot or will not solve the problem, notify the Customer Service Department:
HWH CORPORATION 2096 Moscow Rd. Moscow IA. 52760
(563) 724-3396 OR (800) 321-3494. Give your name and address, coach manufacturer and model year, date the coach was purchased, or the date of system installation,

description of the problem, and where you can be reached during business hours (8:00 a.m. till 5:00 p.m. c.s.t.). HWH CORPORATION personnel will contact you to determine whether or not your claim is valid. If it is, HWH CORPORATION will authorize repair or replacement of the defective part, either by appointment at the factory or by the authorization of an independent service facility, to be determined by HWH CORPORATION. All warranty repairs must be performed by an independent service facility authorized by HWH CORPORATION, or at the HWH CORPORATION factory, unless prior written approval has been obtained from proper HWH CORPORATION personnel.

CONTROL IDENTIFICATION

PUMP RUN TIME

PUMP RUN TIME

Pump motors used with HWH leveling systems and room extension systems come in 3 different diameters; 3", 3.7" and 4.5". Contact the vehicle manufacturer or HWH for help with identifying the motor size. **It is important that any time the pump runs for more than three minutes with a 3" motor; or six minutes with a 3.7" or 4.5" motor that the motor is allowed to cool for thirty minutes before continuing. Continuous operation of the pump motor without allowing the motor to cool can damage the motor.** For cold weather information see "COLD WEATHER OPERATIONS" below.

The HWH systems with a computer processor monitor the pump run time and will turn the pump off if the run time exceeds a specified time. This time can vary with different systems. Due to available electronics or system design, the pump run time programs will also vary. Leveling systems and room extensions that are not controlled by a system processor have no pump run time protection. **DO NOT run the pump more than three or six minutes without allowing the pump motor to cool for thirty minutes.**

SYSTEM VARIATIONS FOR PUMP RUN TIME

Some systems with rooms run the rooms separate from the system processor. These systems do not monitor pump run time when operating the rooms. **DO NOT run the pump more than three or six minutes without allowing the pump motor to cool for thirty minutes.**

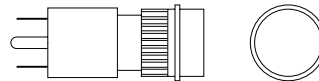
Some systems can be turned back on immediately after the processor turns the pump off. **DO NOT turn the system back on or run the pump without allowing the pump motor to cool for thirty minutes.**

When operating some leveling systems manually or operating the room extensions, the pump will turn off and back on while pushing the control button when the pump run time has been exceeded. **DO NOT continue without allowing the pump motor to cool for thirty minutes.**

With some systems, when the processor has turned the pump off because the run time has been exceeded, power to the HWH system must be turned off and back on before the system will operate. With motorized vehicles, turn the ignition off and back on. With non-motorized vehicles, turn the master power switch for the HWH system off and back on. **DO NOT continue without allowing the pump motor to cool for thirty minutes.**

Some HWH systems are equipped with a lighted reset switch. If the processor turns the pump off because the run time has been exceeded, the light in the reset switch will turn on. The system will not operate until the reset switch is pushed.

DO NOT continue without allowing the pump motor to cool for thirty minutes.



LIGHTED RESET SWITCH

No matter what HWH system is on the vehicle, the pump should not be ran for more than three minutes (3" motors) or six minutes (3.7" or 4.5" motors) without allowing the pump motor to cool for thirty minutes. Continuous operation of the pump motor without allowing the motor to cool can damage the pump motor.

Contact HWH corporation to get specific information about the system in this vehicle.

COLD WEATHER OPERATIONS

HWH leveling and room extension systems are designed to function in cold weather down to 0 degrees Fahrenheit. Below freezing (32 degrees Fahrenheit) the jacks or rooms will operate slower than usual.

For operation in temperatures dropping below -20 degrees Fahrenheit, it is necessary that the system is equipped with oil designed for extreme cold weather application such as a synthetic oil. (Contact HWH for recommendations.)

DO NOT run the pump motor continuously. It is important that any time the pump runs for more than three minutes with a 3" motor; or six minutes with a 3.7" or 4.5" motor that the motor is allowed to cool for thirty minutes before continuing. Continuous operation of the pump motor without allowing the motor to cool can damage the motor. Continuous operation of the pump with slow moving jacks or rooms in cold weather, without allowing the pump motor to cool will cause the pump motor to burn up and damage the pump assembly.

APEX SYSTEM

OPERATING PROCEDURES

GENERAL INSTRUCTIONS

Maintain adequate clearance in all directions for vehicle, room extensions, awnings, doors, steps, etc. Vehicle may move in any direction due to jacks extending or retracting, settling of the jacks or the vehicle, equipment malfunction, etc..

If parking on soft ground or asphalt paving, a wood block or pad should be placed under each jack.

The main controls for the leveling system and room extensions are supplied by the vehicle manufacturer. Refer to the vehicle manufacturer for leveling system and room extension control instructions.

Any time a hydraulic leveling process is interrupted, retract the jacks according to the JACK RETRACTION Section and then restart the leveling process.

CAUTION: DO NOT MOVE THE VEHICLE IF ONE OR MORE JACKS ARE EXTENDED TO THE GROUND.

The park brake must be set to use the leveling system, room extensions and joey beds.

PREPARATION FOR TRAVEL

MASTER JACKS DOWN WARNING LIGHT: The Master Jacks Down Warning light is on the auxiliary switch panel below the HWH Reset Switch.

Any room extension, jacks, joey beds or generator slides should be fully retracted before traveling.

CAUTION: DO NOT MOVE THE VEHICLE WHILE THE LEVELING JACKS ARE STILL IN CONTACT WITH THE GROUND OR IN THE EXTEND POSITION. THIS VEHICLE IS EQUIPPED WITH STRAIGHT-ACTING JACKS. MOVING THE VEHICLE WITH THE LEVELING JACKS EXTENDED CAN CAUSE SEVERE DAMAGE TO THE JACKS AND OR THE VEHICLE AND CREATE A DRIVING

HAZARD. DO NOT RELY SOLELY UPON WARNING INDICATORS. IT IS THE OPERATOR'S RESPONSIBILITY TO CHECK THAT ALL JACKS ARE FULLY RETRACTED INTO THE STORE/TRAVEL POSITION.

If the jacks cannot be retracted according to the JACK RETRACTION Section, retract the jacks according to the MANUAL JACK RETRACTION Section. The system should then be checked.

NOTE: If the vehicle is parked or stored with the jacks extended for an extended period of time and the jacks fail to retract completely, extend the jacks back down to the ground then retract the jacks again.

HWH LIGHTED RESET SWITCH

The HWH lighted reset switch is located on the auxiliary switch panel in the hydraulic pump compartment. If there is a failure at any time in the HWH CAN network, the network will shut down. The leveling system and all room extensions will not operate. If the ignition is off, no indicator lights will come on. If the ignition is in the "ON" position, the lighted reset switch and the MASTER WARNING Light will come on.

If the lighted reset switch is on, the switch must be pushed before any room or the leveling system can be operated.

Excessive operation of the hydraulic pump can shut the HWH CAN network down. The lighted reset switch will be on if the ignition is on. The reset button must be pushed before any operation can continue. Allow the pump to cool before continuing hydraulic operations.

A network problem with one room will not inhibit the use of the other rooms or leveling system after the reset switch is pushed.

A network problem with the leveling system will not inhibit the use of the room extensions after the reset switch is pushed.

If the lighted reset switch will not go out when pushed, there is a problem with the central control module of the network system. No rooms or the Leveling System will operate. The vehicle suspension will return to the travel mode if the ignition key is in the "ON" position.

CAUTION: IF THE IGNITION IS IN THE "ON" POSITION AND THE LIGHTED RESET SWITCH IS ON, THE VEHICLE CAN RETURN TO RIDE HEIGHT WITHOUT RELEASING THE PARK BRAKE.

APEX SYSTEM

OPERATING PROCEDURES

AUTOMATIC HYDRAULIC LEVELING

Place transmission in the recommended position for parking the vehicle and set parking brake. Turn the coach engine off. Turn the ignition to the "ACCESSORY" position.

At this time, the operator may want to check the jacks and place a pad under each jack if the ground will not support the vehicle.

Refer to the vehicle manufacturer for leveling system operating instructions.

AUTO LEVEL SEQUENCE: During the automatic leveling sequence, after the system has extended the appropriate jacks to level the vehicle, the system will then stabilize the vehicle. Stabilizing the vehicle is accomplished by extending any jacks to the ground that were not used to level the vehicle. This is done by monitoring a pressure switch on each jack. Any jack used to stabilize the vehicle will lift the vehicle approximately one (1) inch. This "bumps" the vehicle up slightly when stabilizing.

Turn the ignition switch to the "OFF" position.

APEX SYSTEM

OPERATING PROCEDURES

JACK RETRACTION

WARNING: THE OPERATOR MUST BE SURE THAT THERE ARE NO OBJECTS UNDER THE VEHICLE AND THAT ALL PEOPLE ARE CLEAR OF THE VEHICLE.

NOTE: When the jacks are stored with the ignition in the ON position, the warning buzzer will sound until the jacks have retracted to the STORE position. If desired, the jacks can be stored with the ignition key in the accessory position. This will eliminate the warning buzzer while the jacks are retracting.

Refer to the vehicle manufacturer for leveling system operating instructions.

1. Start the "AUTO STORE" function. The front jacks will retract for 2 seconds before the rear jacks will begin to retract. The system will automatically shut down six minutes after the four jacks are fully retracted.

NOTE: When traveling thermal expansion may cause a jack to extend slightly. When the "AUTO STORE" button has been used to retract the jacks, the system will automatically retract any jack that extends due to thermal expansion.

IMPORTANT: If power to the system is interrupted after starting a store procedure, the store procedure should be reinitiated and the jacks should be completely retracted.

CAUTION: DO NOT MOVE THE VEHICLE WHILE THE LEVELING JACKS ARE STILL IN CONTACT WITH THE GROUND OR IN THE EXTEND POSITION. THIS VEHICLE IS EQUIPPED WITH STRAIGHT-ACTING JACKS. MOVING THE VEHICLE WITH THE LEVELING JACKS EXTENDED CAN CAUSE SEVERE DAMAGE TO THE JACKS AND OR THE VEHICLE AND CREATE A DRIVING HAZARD. DO NOT RELY SOLELY UPON WARNING INDICATORS. IT IS THE OPERATOR'S RESPONSIBILITY TO CHECK THAT ALL JACKS ARE FULLY RETRACTED INTO THE STORE/TRAVEL POSITION.

2. The vehicle can be moved as soon as the jacks are in the STORE/TRAVEL position.

IMPORTANT: If a red warning light and buzzer come on while traveling, the jacks should be checked as soon as a safe parking location is found.

3. If jacks cannot be retracted by the above procedure see MANUAL JACK RETRACTION Section.

APEX SYSTEM

OPERATING PROCEDURES

MANUAL JACK RETRACTION

The solenoid valves on the power unit valve assembly are equipped with a manual valve release. The large valves have a valve release T-Handle. The small valves have a valve release nut. Use the manual valve release for retracting only if the "AUTO STORE" button on the control panel will not retract the jacks for travel.

NOTE: Some assemblies have 4 large valves, some have 4 small valves and some will have 2 large valves in the outer positions and 2 small valves in the center positions.

CAUTION: KEEP AWAY FROM THE WHEELS, DO NOT CRAWL UNDER THE VEHICLE, KEEP A SAFE DISTANCE IN FRONT AND REAR OF THE VEHICLE. THE VEHICLE MAY DROP AND/OR MOVE FORWARD OR BACKWARD WITHOUT WARNING AS THE VALVE RELEASE IS OPERATED.

1. Locate the manual valve release on each solenoid valve. The solenoid valves are located on the power unit/valve assembly.

2. Allow clearance for the vehicle to lower.

IMPORTANT: Only open the valves enough to retract the jacks. DO NOT turn valve release nuts more than 4 and 1/2 turns. Turning the nuts more could damage the valves.

Valve release T-Handles will turn several turns easily. As the valve starts to open, the T-Handles will turn harder. Make sure the valves have been opened far enough to allow the jacks to retract.

3. Retract the front jacks by opening the two center valves. Slowly turn the manual valve releases counter clockwise until the jacks start to retract.

4. Repeat the process for the rear jacks by opening the two outer valves.

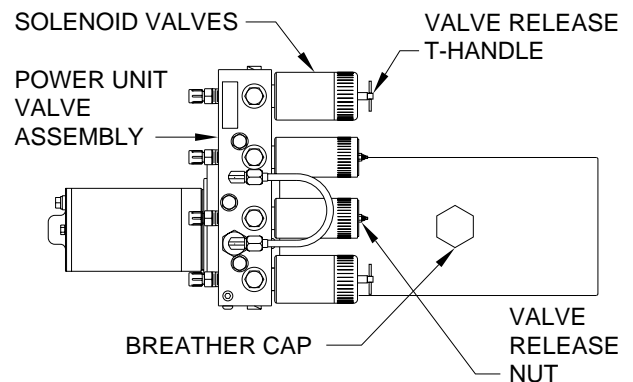
NOTE: Prior to APRIL 2002 a 1/4" Nut Driver was sent with the Operators Manual. As of APRIL 2002 the 1/4" Nut Driver has been incorporated into the Breather Cap. See the back page of this manual for further info.

5. Check that all four jacks are now retracted.

6. Close the valves by turning the manual valve releases clockwise.

IMPORTANT: Once the manual valve release is snug, DO NOT tighten the manual valve release past this point as internal damage may occur to the solenoid.

7. The system should now be repaired before using again.



APEX SYSTEM

OPERATING PROCEDURES

ROOM EXTEND PROCEDURE

NOTE: The park brake must be set before a room can be extended or retracted.

WARNING: OPERATING A ROOM WITH ANY ROOM LOCKING, CLAMPING OR MANUAL RETRACTING DEVICES ATTACHED OR ENGAGED CAN CAUSE PERSONAL INJURY AND VEHICLE DAMAGE. IT IS THE OPERATOR'S RESPONSIBILITY TO ENSURE THAT ALL ROOM LOCKING, CLAMPING OR MANUAL RETRACTING DEVICES ARE DETACHED OR DISENGAGED BEFORE OPERATING THE ROOM.

Refer to vehicle manufacturer for proper sequence of room extension and leveling system operation.

Unlock all room-locking devices.

NOTE: If the MANUAL RETRACT WINCH is attached to the room remove it before extending the room.

WARNING: KEEP PEOPLE AND OBSTRUCTIONS CLEAR OF ROOM WHEN OPERATING.

NOTE: Make sure there is adequate clearance to fully extend the room.

The room controls are supplied by the vehicle manufacturer. Refer to the vehicle manufacturer for room control operating instructions.

NOTE: Hold the room control to "EXTEND" three or four seconds after the room is fully extended. This assures proper pressurization of the cylinders. **During normal operation of the room, do not reverse direction of the room until the room is fully extended. If necessary, the direction of the room may be reversed, but watch for binding of the room. If the direction of the room has been reversed, DO NOT re-extend the room until the room has been fully retracted.**

IMPORTANT: Do not hold the ROOM CONTROL in the "EXTEND" position for more than ten seconds after the room is fully extended or stops moving. **If either side of the room stops moving, release the room control immediately. DO NOT force the room. DO NOT reverse direction of the room, contact HWH Customer Service for assistance 1-800-321-3494.**

NOTE: Releasing the ROOM CONTROL will halt the operation of the room.

ROOM RETRACT PROCEDURE

NOTE: The park brake must be set before a room can be extended or retracted.

WARNING: KEEP PEOPLE AND OBSTRUCTIONS CLEAR OF ROOM WHEN OPERATING.

Refer to vehicle manufacturer for proper sequence of room extension and leveling system operation.

The room controls are supplied by the vehicle manufacturer. Refer to the vehicle manufacturer for room control operating instructions.

NOTE: Hold the room control to "RETRACT" three or four seconds after the room is fully retracted. This assures proper pressurization of the cylinders. **During normal operation of the room, do not reverse direction of the room until the room is fully retracted. If necessary, the direction of the room may be reversed, but watch for binding of the room. If the direction of the room has been reversed, DO NOT retract the room until the room has been fully extended.**

IMPORTANT: Do not hold the ROOM CONTROL in the "EXTEND" position for more than ten seconds after the room is fully extended or stops moving. **If either side of the room stops moving, release the room control immediately. DO NOT force the room. DO NOT reverse direction of the room, contact HWH Customer Service for assistance 1-800-321-3494.**

NOTE: Releasing the ROOM CONTROL will halt the operation of the room.

1. Engage all room-locking devices.
2. If the room will not retract see the MANUAL ROOM RETRACT PROCEDURE.

IMPORTANT: Room-locking devices should be locked while traveling.

APEX SYSTEM

OPERATING PROCEDURES

AUXILIARY ROOM CONTROL SWITCHES

The vehicle is equipped with auxiliary room control switches. The auxiliary switch panel is in the passenger side front compartment with the hydraulic pump assembly.

IMPORTANT: REFER TO "ROOM EXTEND PROCEDURE" FOR ROOM OPERATION INFORMATION.

The park brake must be set to use the auxiliary room control switches.

The auxiliary switch panel has a master power switch that must be on to use the auxiliary room switches.

IMPORTANT: SOMEONE MUST WATCH THE ROOMS WHEN USING THE AUXILIARY ROOM CONTROL SWITCHES.

JOEY BED OPERATION

WARNING: KEEP PEOPLE AND OBSTRUCTIONS CLEAR OF JOEY BEDS WHEN OPERATING.

NOTE: Make sure there is adequate clearance to fully extend the Joey beds.

Joey bed switches are on the outside of the vehicle on the drivers side and passengers side front rooms.

The storage compartment light switch must be on to use the outside Joey bed switches.

The park brake switch must be set to use the Joey bed.

IMPORTANT: DO NOT TRY TO FORCE THE JOEY BEDS IF THE PUMP IS RUNNING AND THE JOEY BEDS DO NOT MOVE. DO NOT HOLD THE MAIN OR AUXILIARY JOEY BED SWITCHES FOR MORE THAN 10 SECONDS IF THE JOEY BEDS ARE NOT MOVING.

The auxiliary switch panel in the hydraulic pump compartment has auxiliary Joey bed switches.

The Master Power switch on the auxiliary switch panel must be on to use the auxiliary Joey bed control switches.

AUXILIARY PUMP OPERATION

The vehicle is equipped with an auxiliary hydraulic pump for the leveling system, room extensions and the Joey beds.

The hydraulic pump assembly is in the passenger side front compartment. There are two toggle switches; one labeled "PRIMARY / AUXILIARY", the other is "MANUAL RUN".

The MANUAL RUN switch is a momentary switch that can be used to run either the primary or auxiliary pump from the pump compartment.

IMPORTANT: DO NOT RUN THE PUMP FOR MORE THAN 10 SECONDS IF THE JACKS, ROOMS OR JOEY BEDS ARE NOT MOVING.

The PRIMARY / AUXILIARY switch chooses which pump is being used. The switch should remain in the PRIMARY position unless the primary pump is not working.

NOTE: It is a good idea to occasionally exercise the auxiliary pump.

MANUAL ROOM AND GENERATOR SLIDE RETRACT PROCEDURE

(USE ONLY WHEN THE ROOM WILL NOT RETRACT WITH THE ROOM CONTROL SWITCH)

OVERVIEW

The room can be retracted manually if a hydraulic or electric failure prevents the room from being retracted using the CONTROL SWITCH. For normal retract sequence see the ROOM SLIDE RETRACT PROCEDURES. Refer to the vehicle manufacturer for storage location of the retract device and information for connecting the device to the room.

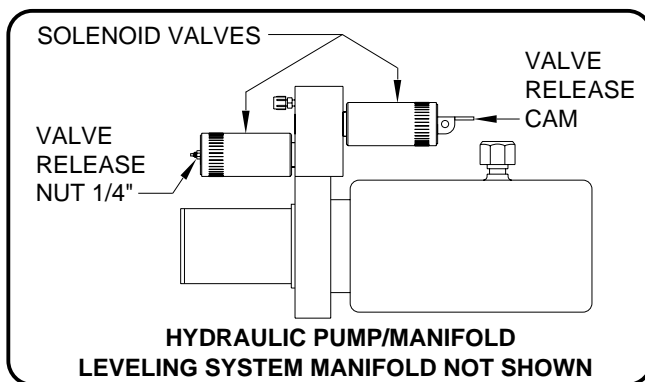
IMPORTANT: If the vehicle is not equipped with a winch, DO NOT use other pulling devices to retract the room. Follow steps 2 and 3 and try pushing the room in. Contact the vehicle manufacturer or HWH Customer Service at 1-800-321-3494 or 563-724-3396 for assistance.

WARNING: A MANUAL RETRACT WINCH PROVIDED BY HWH IS EQUIPPED FOR MANUALLY RETRACTING THE ROOM ONLY. IT IS NOT TO BE USED FOR LIFTING OR ANY OTHER APPLICATION. HIGH FORCES ARE CREATED WHEN USING A WINCH, CREATING POTENTIAL SAFETY HAZARDS. FAILURE TO FOLLOW ALL WARNINGS AND INSTRUCTIONS MAY CAUSE FAILURE OF THE MANUAL RETRACT WINCH OR CONNECTIONS RESULTING IN DAMAGE OR PERSONAL INJURY. MAINTAIN A FIRM GRIP ON THE WINCH HANDLE AT ALL TIMES. NEVER RELEASE THE HANDLE WHEN RATCHET LEVER IS IN THE OFF POSITION AND THE WINCH IS LOADED. THE WINCH HANDLE COULD SPIN VIOLENTLY AND CAUSE PERSONAL INJURY. CHECK THE WINCH AND STRAPS FOR DAMAGE OR WEAR, AND CHECK FOR PROPER RATCHET OPERATION ON EACH USE OF THE WINCH. DO NOT USE IF DAMAGED OR WORN.

1. Retract jacks following the LEVELING SYSTEM RETRACT PROCEDURE.

NOTE : When manually retracting the room, it is recommended the jacks are retracted before retracting the room.

2. Locate the HYDRAULIC PUMP and/or MANIFOLD unit. Some systems may have a remote manifold.



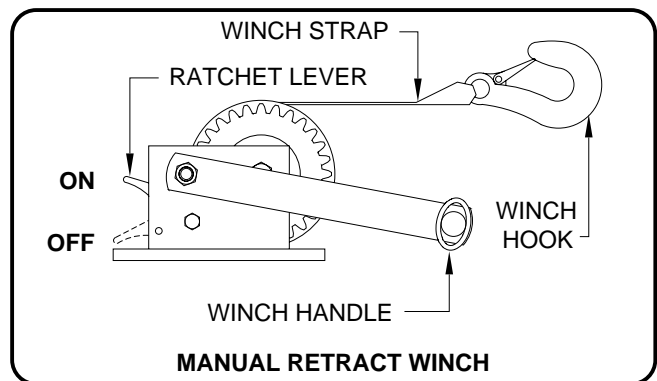
3. Open Nut Style Solenoid Valves by slowly turning the valve release nut counter clockwise using a 1/4" nut driver.

IMPORTANT: Only open the valves enough to retract the room. DO NOT turn the release nuts more than 4 and 1/2 turns. Turning the nuts more could damage the valves.

Open Cam Style Solenoid Valves by following the instructions located on the last page of this manual MP84.9999.

NOTE: The room may move slightly as the SOLENOID VALVES are opened and internal pressure is released.

4. Locate the MANUAL RETRACT DEVICE and connect it to the room according to the vehicle manufacturer's instructions. To extend a WINCH STRAP firmly grasp WINCH HANDLE, place RATCHET LEVER in its OFF position, and slowly rotate the WINCH HANDLE counter clockwise, keeping a firm grip on the handle. When enough WINCH STRAP is extended, place the RATCHET LEVER in its ON position and slowly rotate the WINCH HANDLE clockwise until the RATCHET LEVER locks.



5. Slowly winch the room in by turning the WINCH HANDLE clockwise. The RATCHET LEVER should produce a loud, sharp, clicking noise.

NOTE: Winching the room in quickly will raise pressure in the hydraulic fluid and make winching more difficult.

WARNING: OPERATE THE MANUAL RETRACT WINCH BY HAND POWER ONLY. IF THE WINCH CANNOT BE CRANKED EASILY WITH ONE HAND IT IS PROBABLY OVERLOADED. IF WINCHING BECOMES TO DIFFICULT STOP AND CHECK FOR OBSTRUCTIONS/RESTRICTIONS ON THE ROOM AND ROOM EXTENSION MECHANISM.

6. When the room is fully retracted, engage the room locking devices. Leave the retract winch engaged and the solenoid valves open.

WARNING: THE ROOM EXTENSION SOLENOID VALVE RELEASE MUST BE IN THE OPEN POSITION WHEN THE MANUAL RETRACT WINCH IS ENGAGED.

7. The system should be repaired before using again.

NOTE: After repairs are made, when closing the VALVE RELEASE NUTS, do not over tighten the nuts.

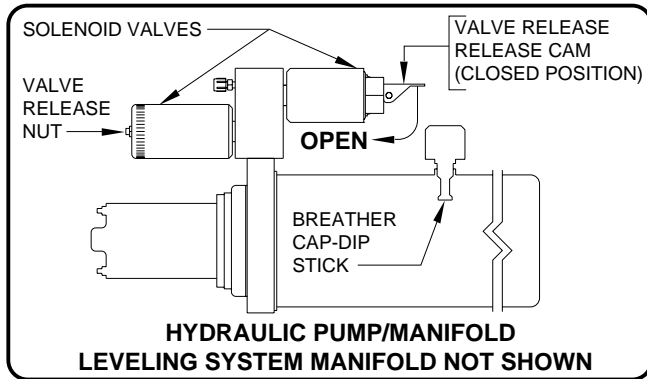
OPERATING PROCEDURES

"UNIVERSAL STRAIGHT OUT" ROOM EXTENSION MECHANISM

MANUAL ROOM RETRACTION PROCEDURES

1. Determine which extend and retract solenoid valves are assigned to the room. Manually open the valve release nuts for the extend and retract solenoid valves by turning the 1/4" release nuts counter clockwise 4 and 1/2 turns. Turning the nuts more could damage the valves. If equipped with valve release cams, move the cams to the OPEN position.

NOTE: The breather cap dip stick is also a 1/4" nut driver.



2. Start both threaded rods until resistance is met, one for the front and one for the rear mechanism should be provided.

NOTE: For location of the threaded rods and to access the threaded blocks refer to vehicle manufacturer.

3. **Do Not use an impact wrench.** Using wrench provided, a personal wrench or a tire iron with a 1-1/8" opening rotate either mechanism's threaded rod clockwise 6 complete turns.

4. Move to the other room extension mechanism, rotate the threaded rod clockwise 12 complete turns.

5. Return to the first room extension mechanism and rotate the threaded rod clockwise 12 complete turns.

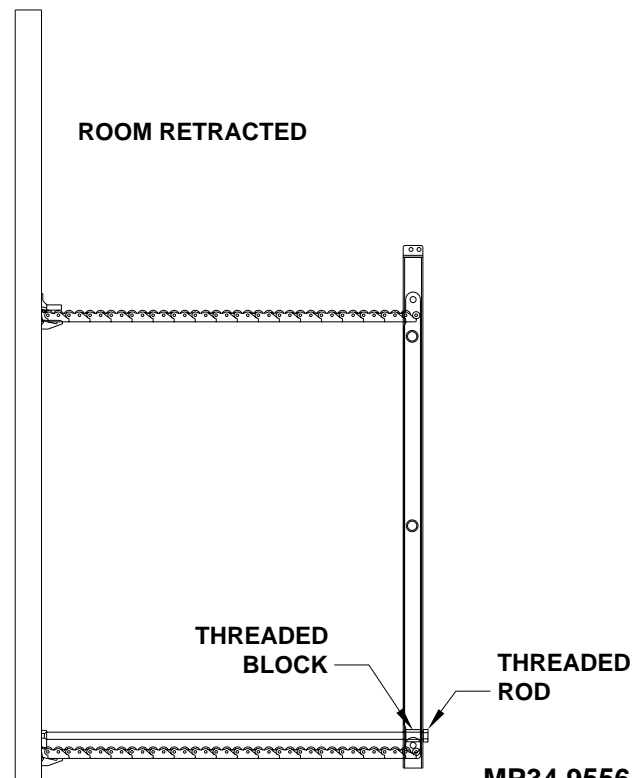
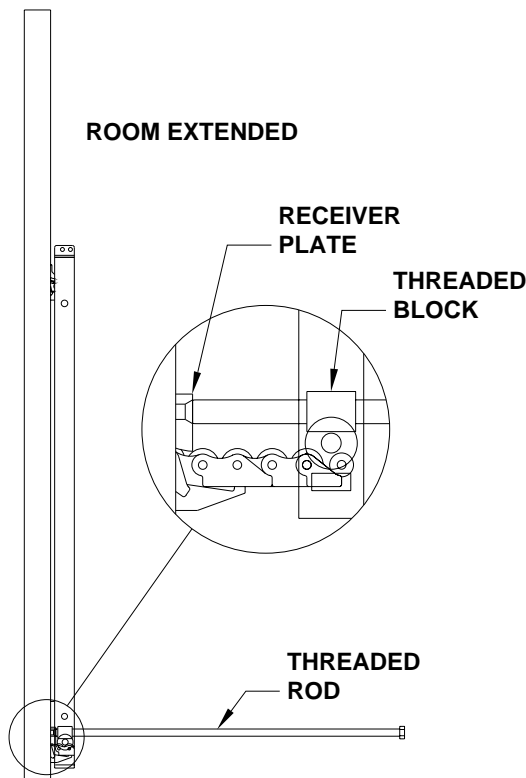
6. Repeat steps 4 and 5 alternating from mechanism to mechanism rotating each threaded rod 12 complete turns until room is sealed. (DO NOT exceed 15 ft.lbs) Make sure the room does not bind.

IMPORTANT: If at any stage something is not understood or if the room begins to bind DO NOT force the room, contact HWH Customer Service for assistance 1-800-321-3494.

NOTE: Leave the solenoid valves open and the threaded rods in place until the room has been serviced.

IMPORTANT: DO NOT EXTEND THE ROOM UNTIL THE ROOM HAS BEEN SERVICED. ANY SOLENOID VALVES LEFT OPEN SHOULD BE CLOSED AND THE THREADED RODS SHOULD BE COMPLETELY REMOVED.

NOTE: If there is not enough room to remove both threaded rods completely, alternate backing the threaded rods out and slightly extending the room. Be careful to not extend the room so far that the threaded rods impact the coach wall or the mechanism.



OPERATING PROCEDURES

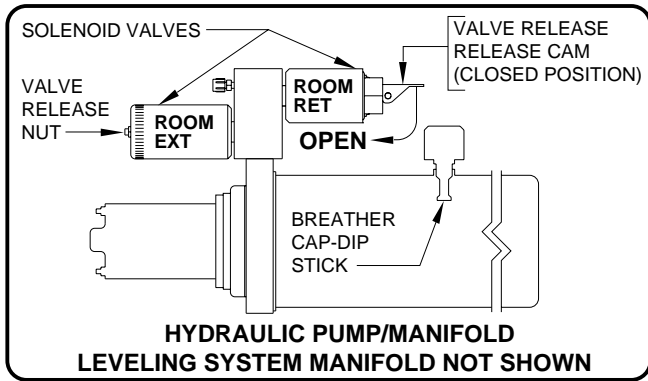
"UNIVERSAL LEVEL OUT" ROOM EXTENSION MECHANISM

MANUAL ROOM LIFT PROCEDURES

NOTE: Manual room lift procedures must be done before manual room retraction procedures.

1. Determine which extend and retract solenoid valves are assigned to the room. Manually open the valve release nuts for the extend and retract solenoid valves by turning the 1/4" release nuts counter clockwise 4 and 1/2 turns. Turning the nuts more could damage the valves. If equipped with valve release cams, move the cams to the OPEN position.

NOTE: The breather cap dip stick is also a 1/4" nut driver.



If this manifold is equipped with an auxiliary hand pump, you may be able to retract the room by opening only the room retract valve and operating the hand pump, refer to the AUXILIARY HAND PUMP OPERATION page for

instruction on the use of the hand pump and valves equipped with a release cam. If the room cannot be retracted with the hand pump, it will be necessary to use the lift bolts and room retract screws.

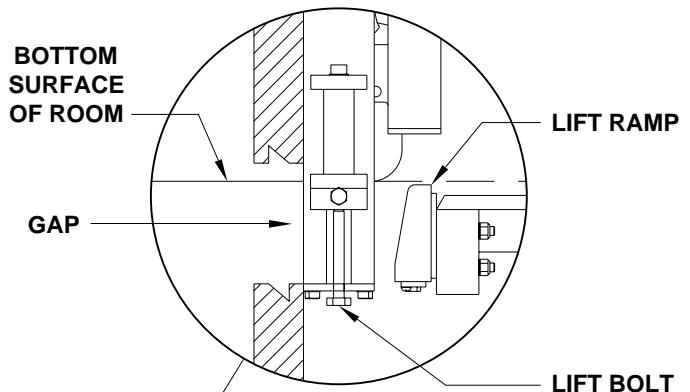
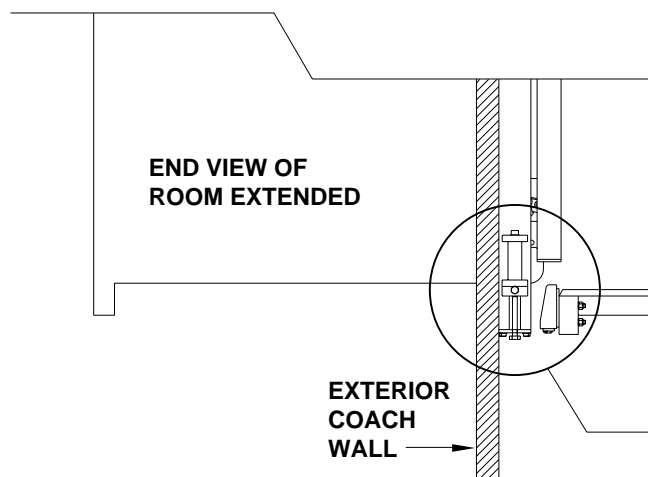
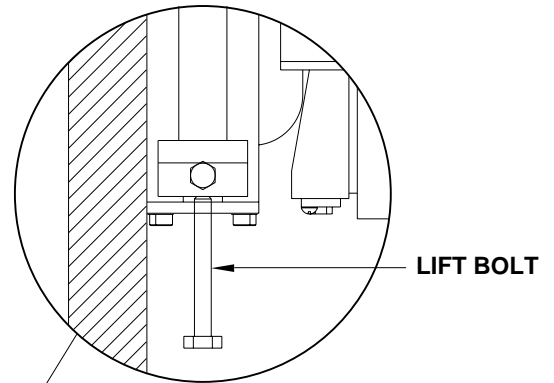
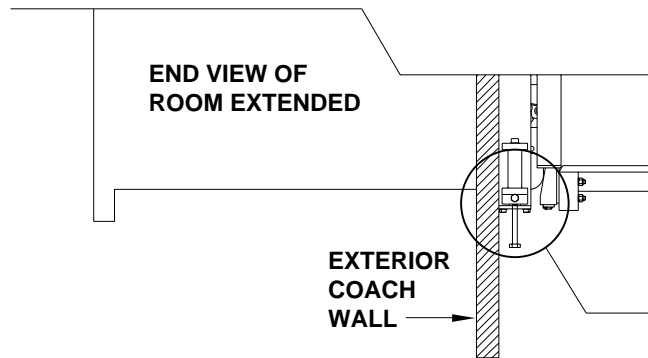
2. Start both room lift bolts until resistance is met, one for the front and one for the rear mechanism should be provided.

NOTE: To locate the room lift access holes and bolts refer to vehicle manufacturer.

3. **Do Not use an impact wrench.** Using a 9/16 wrench alternate between lift bolts turning each 4 full turns each time. Lift the room only as far as is needed to clear the bottom surface of the room over the lift ramps. **As the room is lifted a gap should develop allowing you to view the lift ramps more clearly.**

4. Follow MANUAL ROOM RETRACT PROCEDURES.

IMPORTANT: If at any stage something is not understood or if the room begins to bind DO NOT force the room, contact HWH Customer Service for assistance 1-800-321-3494.



MAINTENANCE

OIL LEVEL

All maintenance should be done as part of the normal servicing of the coach.

The oil level should be checked when the vehicle is first purchased and then once every two years. More often if there is an oil leak in the system.

Any HWH hydraulic equipment, including jacks, slide-outs and steps should be fully retracted before checking fluid level. The oil reservoir is part of the pump / manifold assembly. The oil level is checked and filled through the breather cap. Clear any dirt away from the breather / filler cap before removing.

The oil level should be within one inch of the top of the reservoir. Most breather caps have a dipstick. Fluid level should be between the bottom of the dipstick and the center mark.

NOTE: Overfilling the tank can cause leakage of oil through the breather cap.

FLUID: HWH Specialty Hydraulic Oil is recommended. In an emergency Dexron automatic transmission fluid can be used. **NOTE:** Dexron automatic transmission fluid contains red dye and can cause staining should a leak occur. **DO NOT USE** brake fluid or hydraulic jack fluid. Use of these can damage seals.

ELECTRICAL SYSTEM

The batteries should be in good condition and fully charged. Weak batteries can cause erratic operation. Battery cable terminals and battery posts and connections should be kept clean.

All electrical connections, especially ground connections, should be clean, tight, free from corrosion and protected from weathering.

JACKS

There are very few user serviceable parts on the jacks. The jacks require very little maintenance. If the jacks are extremely dirty with caked on mud they should be washed.

The jack rods should NOT be wiped and do not need to be oiled or sprayed with anything.

ROOM EXTENSIONS

The HWH room mechanisms need no maintenance. DO NOT grease or lubricate any parts of the HWH mechanism.

Any visible mechanism can be kept clean by washing with water. Refer to the vehicle manufacturer for correct maintenance of the room seals.

VISUAL INSPECTION

Periodically inspect the system for oil leaks and damaged or missing parts, such as pivot bolts or springs. Check the hydraulic lines and wiring for damage and wear. Check that the jacks do not interfere with any parts of the vehicle when they are in the "STORE" position.

The system will operate better if kept clean and free from caked on mud or ice.

OPERATIONAL CHECK

Review the OPERATOR MANUAL. Run the system according to the SYSTEM OPERATION Section. Note any abnormal operation.

Review the "JACK RETRACTION" Section. Make sure the jacks will fully retract to the "STORE" position. Jacks should not interfere with any of the coach when in the "STORE" position.

Check that any jack down warning light or buzzer works. Master jacks down warning indicators should be on if any jack is extended (1) or more inches and the ignition is in the "ON" position.

MAINTENANCE

WINTER WEATHER DRIVING

Anti-icing / deicing agents when splashed on your vehicle, continue to absorb moisture from the air even after they have dried. This can facilitate corrosion of metallic components, such as HWH jacks.

To help reduce the corrosion of jacks after exposure to anti-icing / deicing agents, thoroughly wash jacks with warm soapy water.

SENSING UNIT MAINTENANCE/SERVICE

SENSING UNIT ADJUSTMENT

Level the vehicle by placing a bubble level in the center of the freezer floor or upon whichever surface within the vehicle that is to be level. Using the Leveling System and the bubble level, ignoring the yellow LEVEL lights on the Touch Panel, level the vehicle until the bubble is centered.

With the vehicle level according to the bubble level, if there are no yellow lights lit on the Touch Panel, the sensing unit is properly adjusted. If there are yellow LEVEL lights lit on the Touch Panel, manual adjustments to the Sensing Unit are needed. A Phillips screw driver or sockets w/driver or box end wrenches of 7/8, 3/4, 1/2, 5/16 or 1/4 sizes will be needed.

The Sensing Unit is mounted inside the Control Box. The Control Box is mounted to the power unit/valve assembly.

There are four LED's on the Sensing Unit, A,B,C and D. Refer to the drawing below. The Sensing Unit is adjusted by turning the adjustment nut to turn out LED's B and D. The adjustment screw will turn out LED's A and C. If the adjustment nut has to be turned more than 1/2 flat or the adjustment screw has to be turned more than 3/4 turn to turn the LED out, there may be a problem with the Sensing Unit or the mounting of the Control Box. If two LED's are on, it is best to make the B-D adjustments first, then hold the adjustment nut from moving while making the A-C adjustment.

NOTE: If opposing LED's are lit, there is a problem with the Sensing Unit.

If LED (A) is lit: Turn the adjustment screw **COUNTER CLOCKWISE** until the LED is off.

If LED (C) is lit: Turn the adjustment screw **CLOCKWISE** until the LED is off.

If LED (B) is lit: Turn the adjustment nut **COUNTER CLOCKWISE** until the LED is off.

If LED (D) is lit: Turn the adjustment nut **CLOCKWISE** until the LED is off.

IMPORTANT: When all 4 LED's are off, move the vehicle to an unlevel position so one or two yellow lights are on. Level the vehicle according to the yellow LEVEL lights. Recheck the level. If more adjustment is needed, **DO NOT** try to adjust the sensing unit until the yellow level lights go out, instead just "tweak" the sensing unit, ignoring the LED's on the sensing unit.

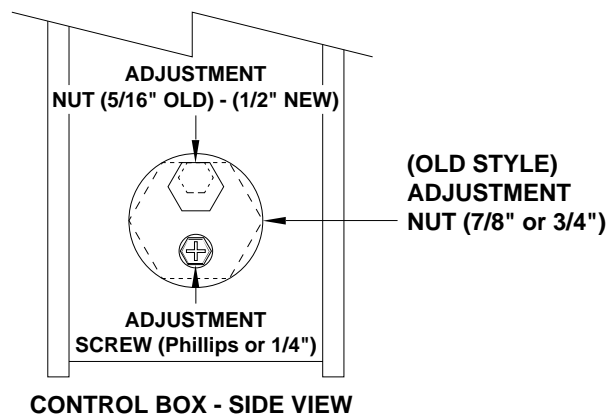
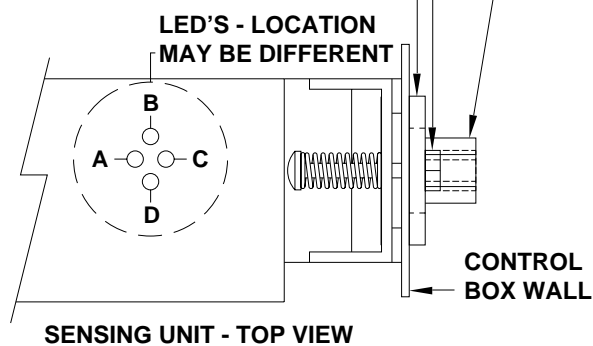
Example: After the initial adjustment and releveling the vehicle, the front is still low. This means the front yellow level light is turning off too soon. Determine which sensing unit light is the front light, A-B-C or D. Move the adjustment for that light very, very, slightly in the **OPPOSITE** direction that is given in the above instructions for LED's A, B, C, and D. This will allow

the front yellow light to stay on slightly longer to bring the front up more. Again, unlevel the vehicle then relevel the vehicle using the yellow level lights on the touch panel. Recheck with a level. Repeat the "tweaking" process until the system levels the vehicle properly.

ADJUSTMENT NUT (5/16" OLD) - (1/2" NEW)

ADJUSTMENT SCREW (Phillips or 1/4") (OLD STYLE)

ADJUSTMENT NUT (7/8" or 3/4")



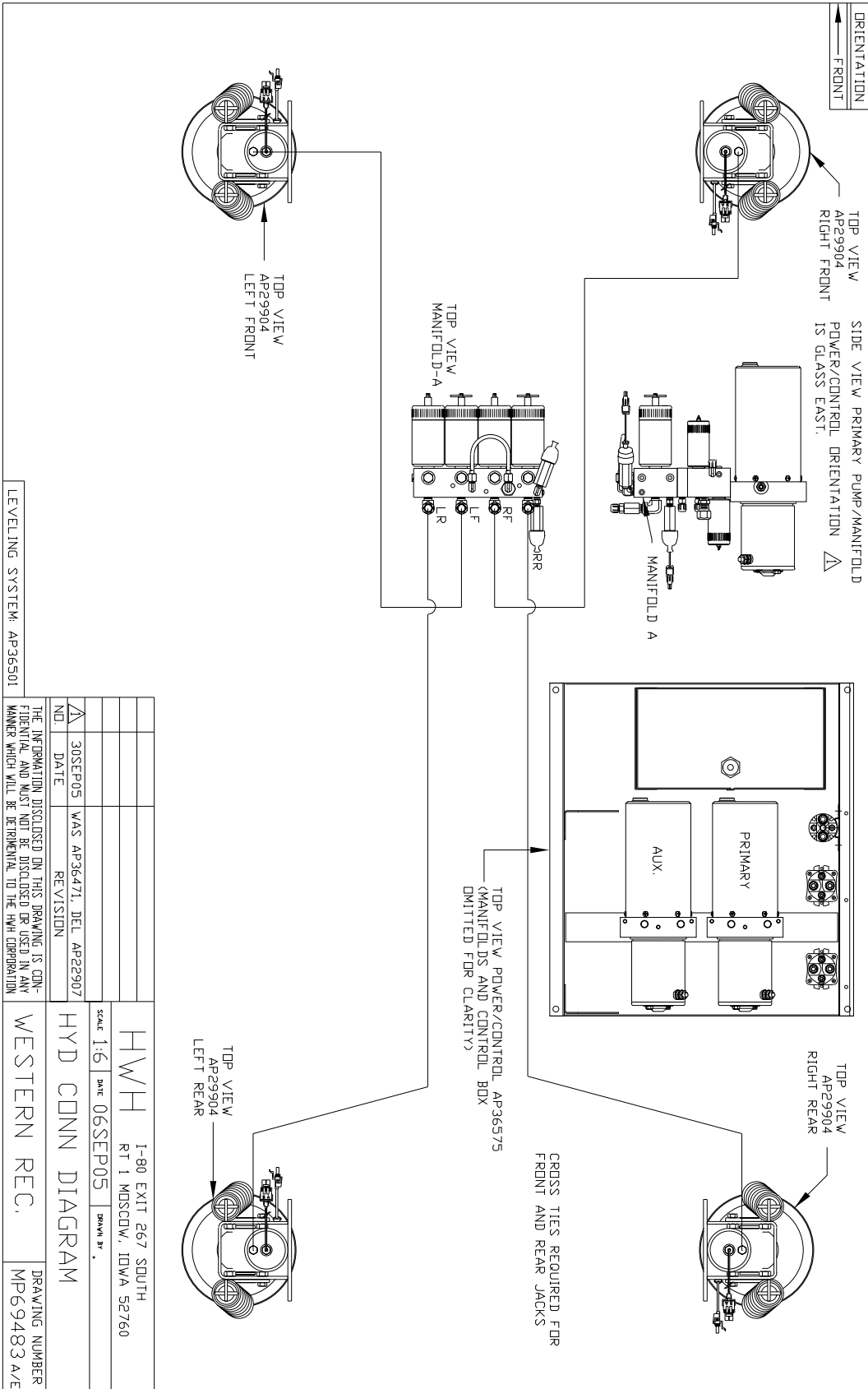
NOT IN PARK/BRAKE CHECK

CAUTION: WHEN MAKING THIS CHECK, BLOCK THE COACH WHEELS SECURELY SO THE COACH CANNOT ROLL FORWARD OR BACKWARD.

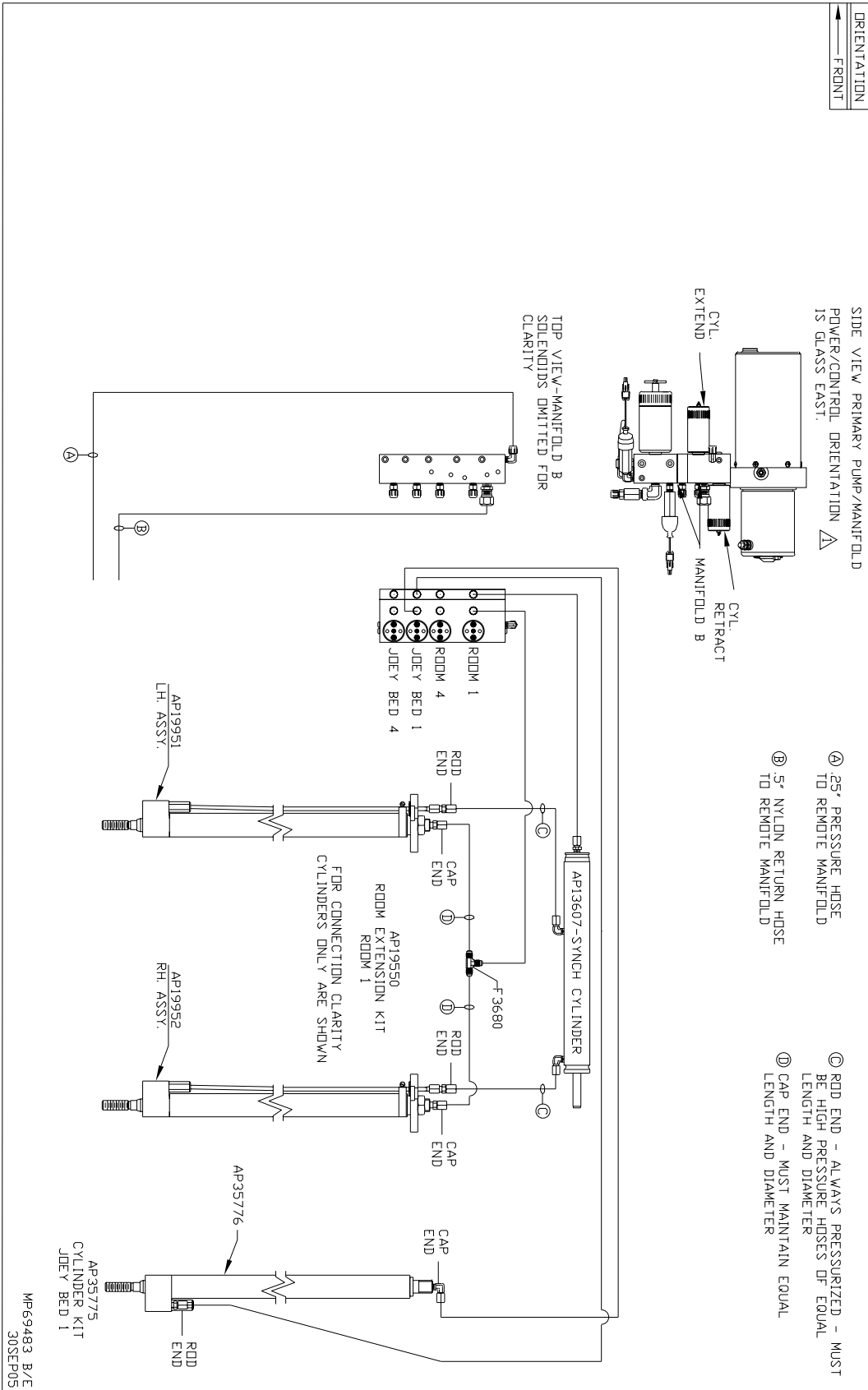
Set the park/brake. Switch the ignition to the "ACC" or "ON" position. Push the "ON/OFF" switch toward "ON". Release the parking brake and confirm that the "PARK" indicator light comes on. Reset the parking brake. The "PARK" indicator light should go out. Switch the ignition to "OFF".

If any of the above checks or inspections reveal a problem or if there are other problems or questions, consult a qualified RV repair center, your vehicle or coach manufacturer, or HWH CORPORATION for service or repair.

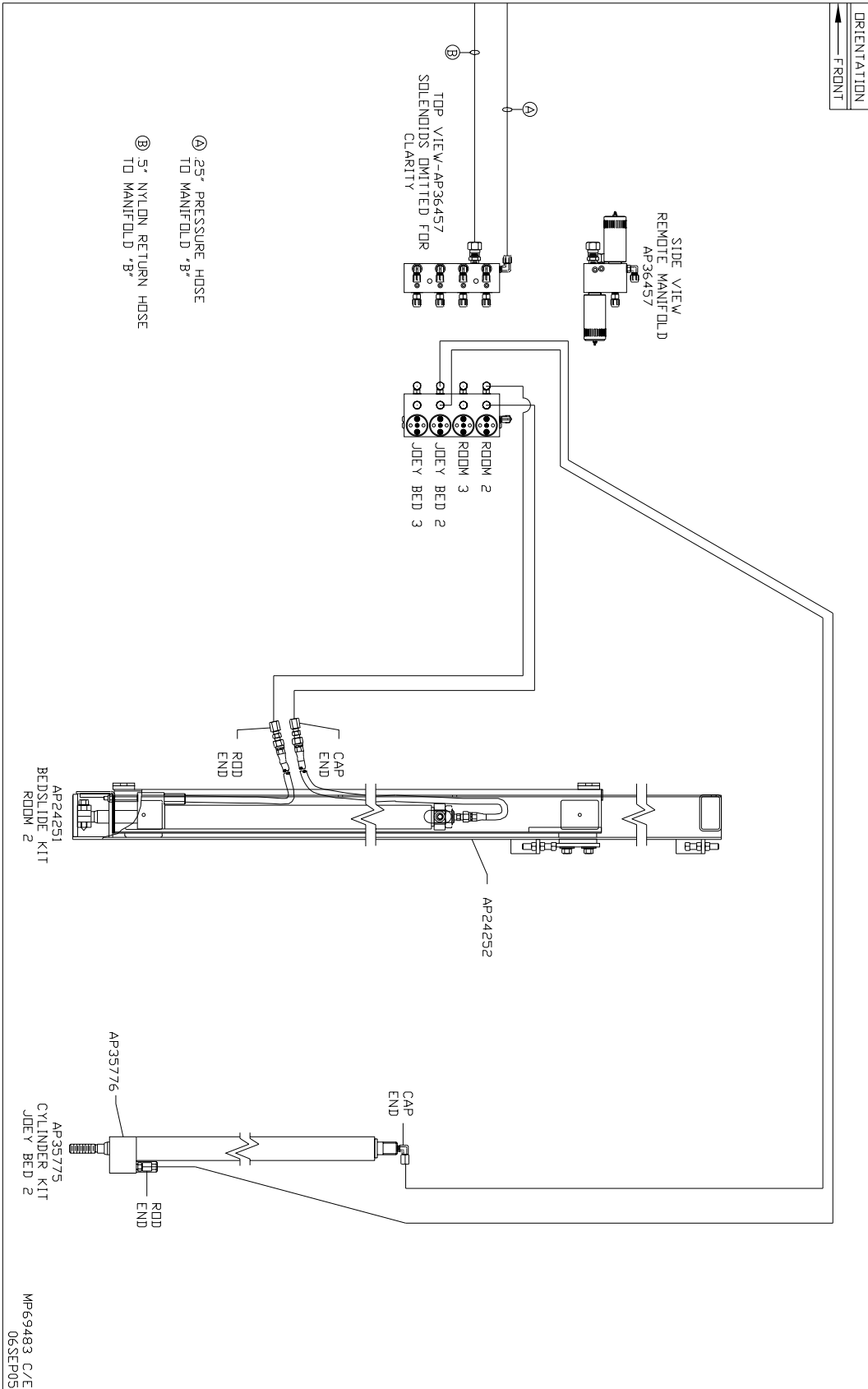
APEX SYSTEM HYDRAULIC CONNECTION DIAGRAM



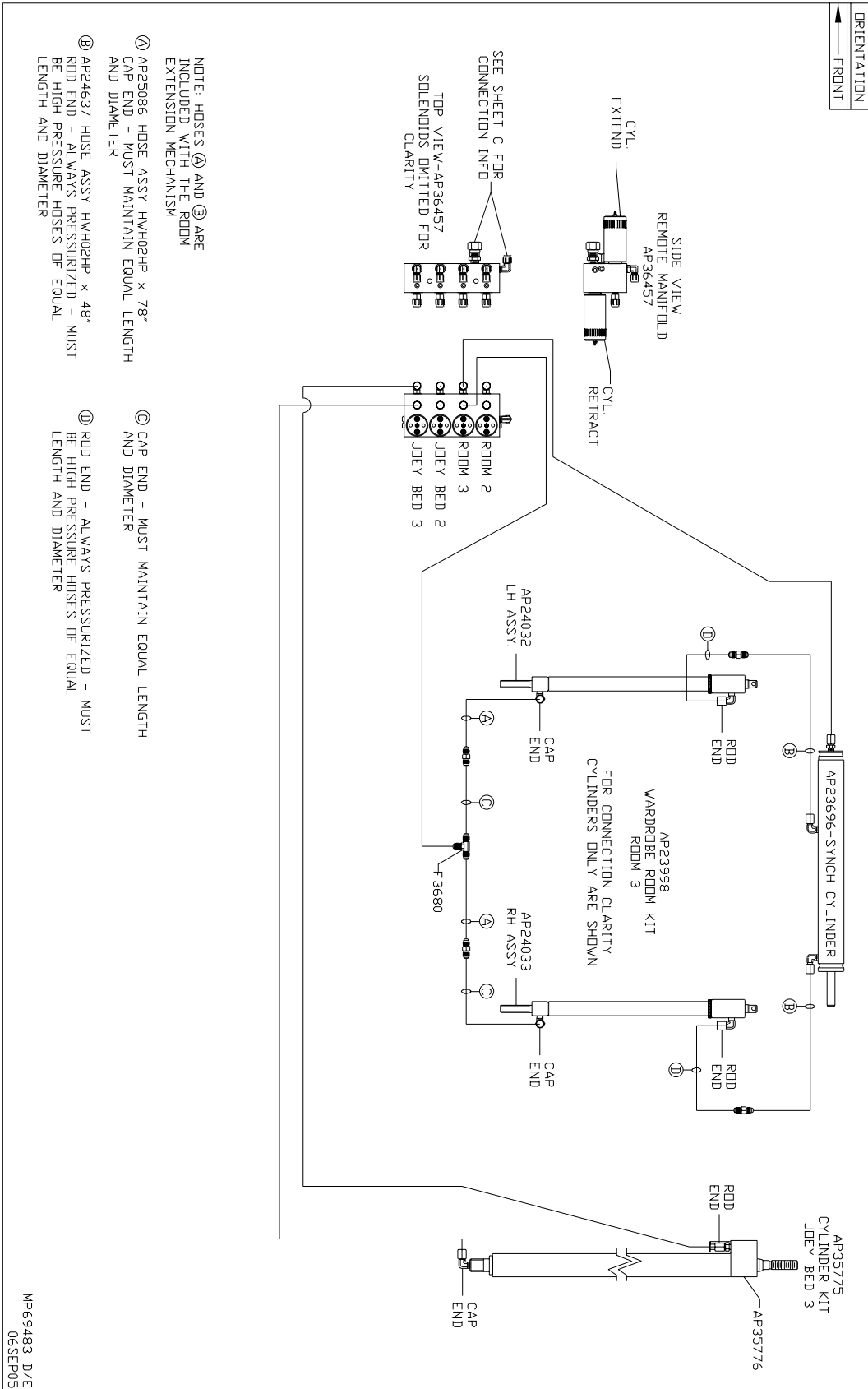
APEX SYSTEM HYDRAULIC CONNECTION DIAGRAM



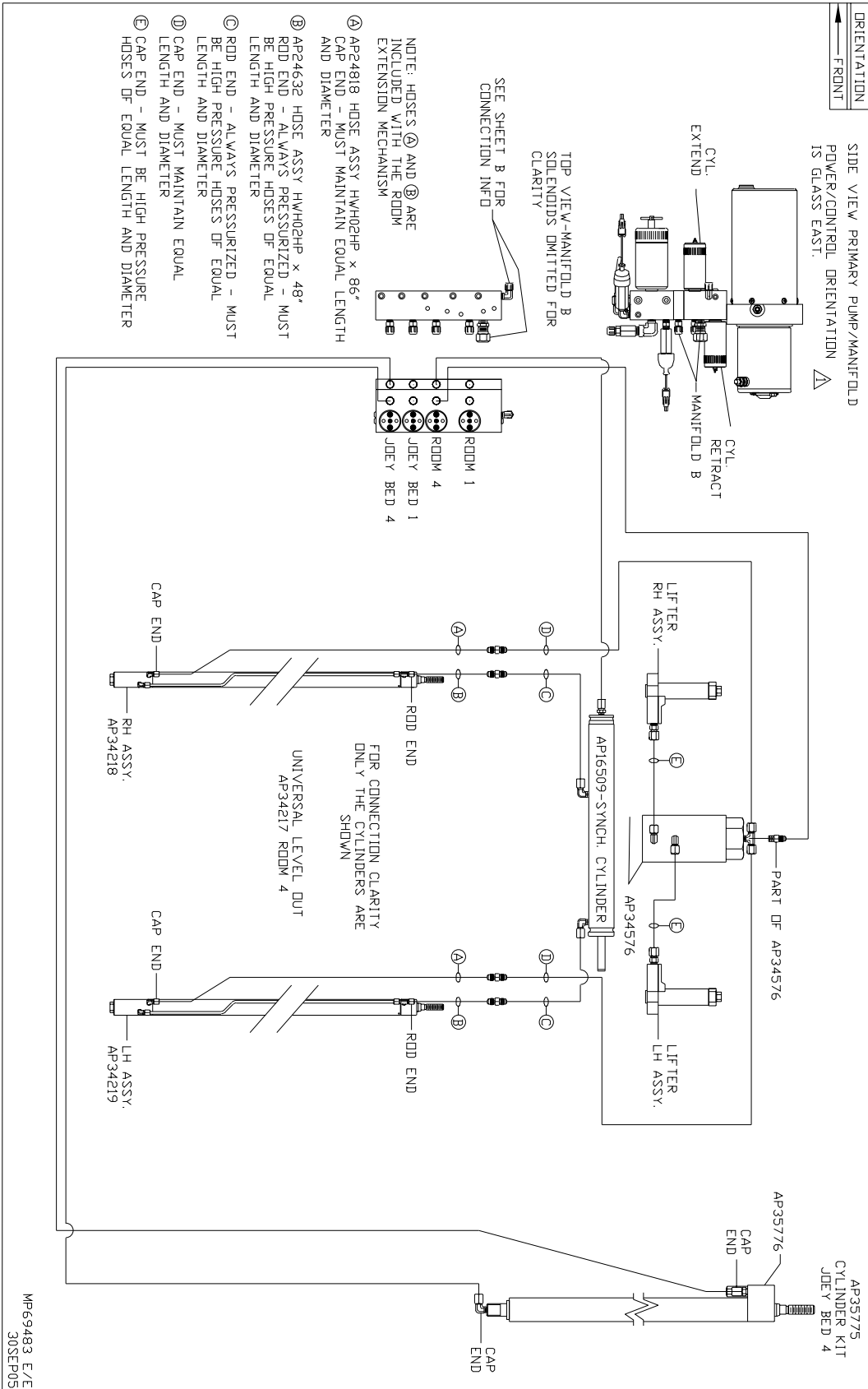
APEX SYSTEM HYDRAULIC CONNECTION DIAGRAM



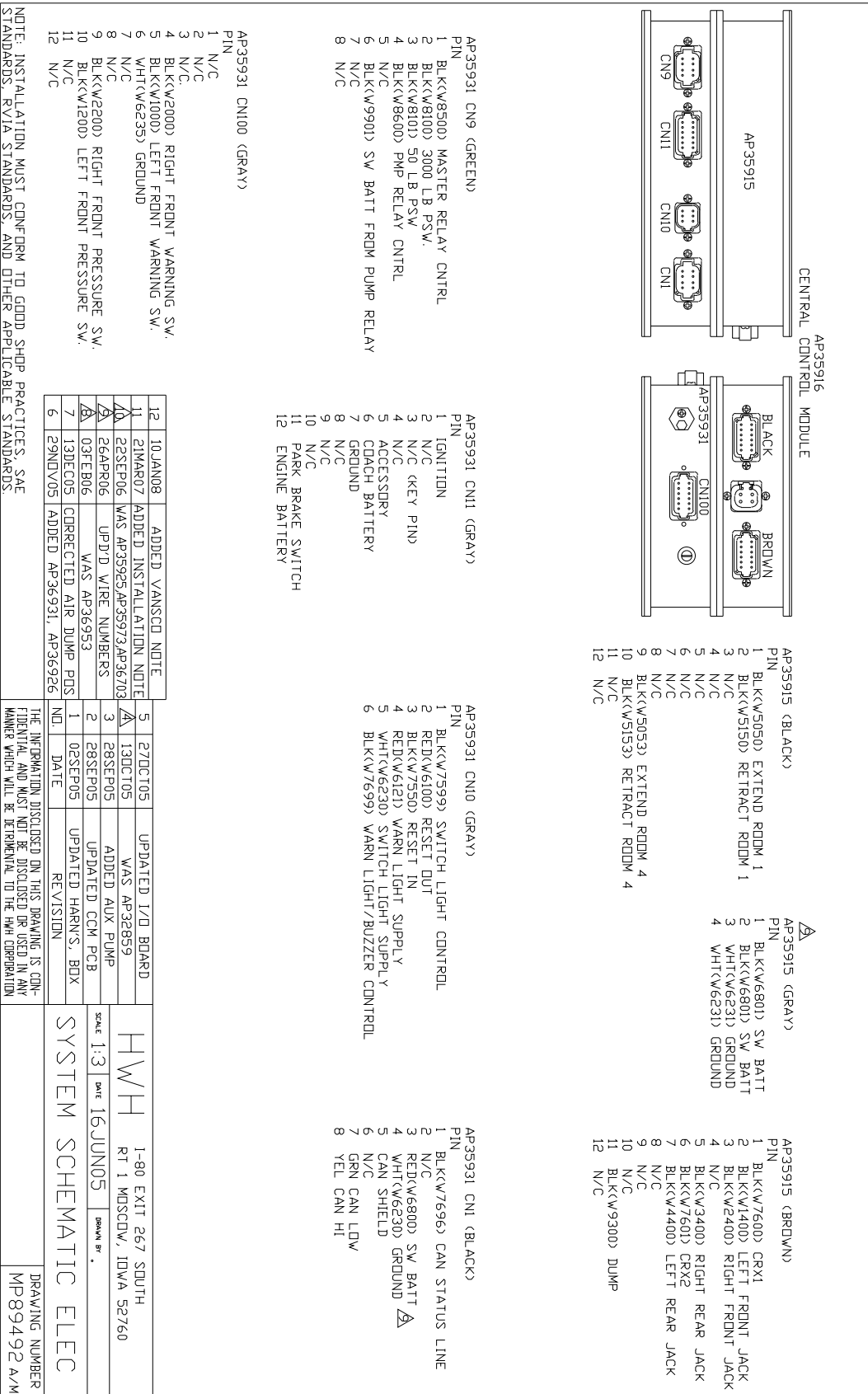
APEX SYSTEM HYDRAULIC CONNECTION DIAGRAM



APEX SYSTEM HYDRAULIC CONNECTION DIAGRAM



APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL

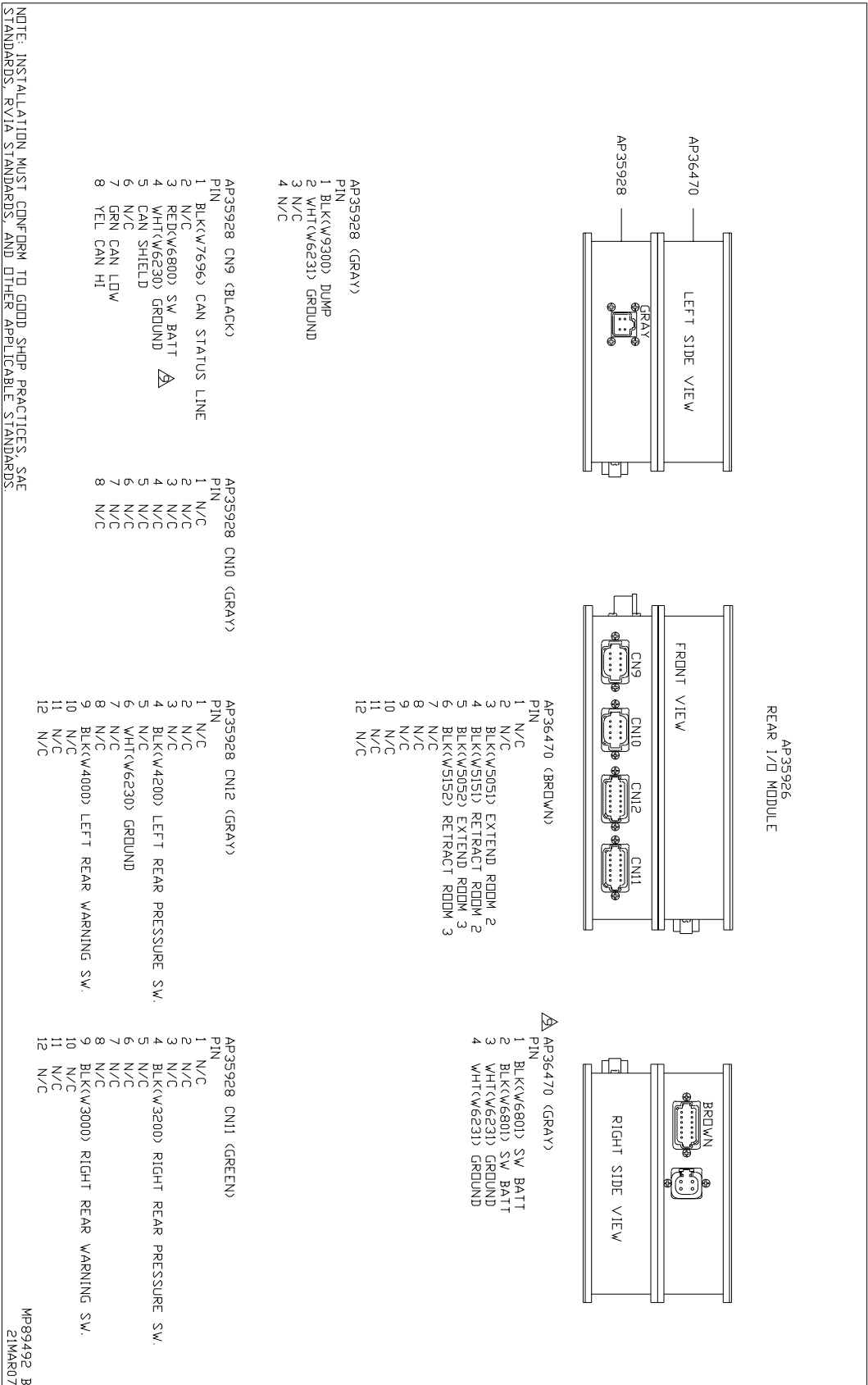


NOTE: INSTALLATION MUST CONFORM TO GOOD SHIP PRACTICES, SAE STANDARDS, RVIA STANDARDS, AND OTHER APPLICABLE STANDARDS.

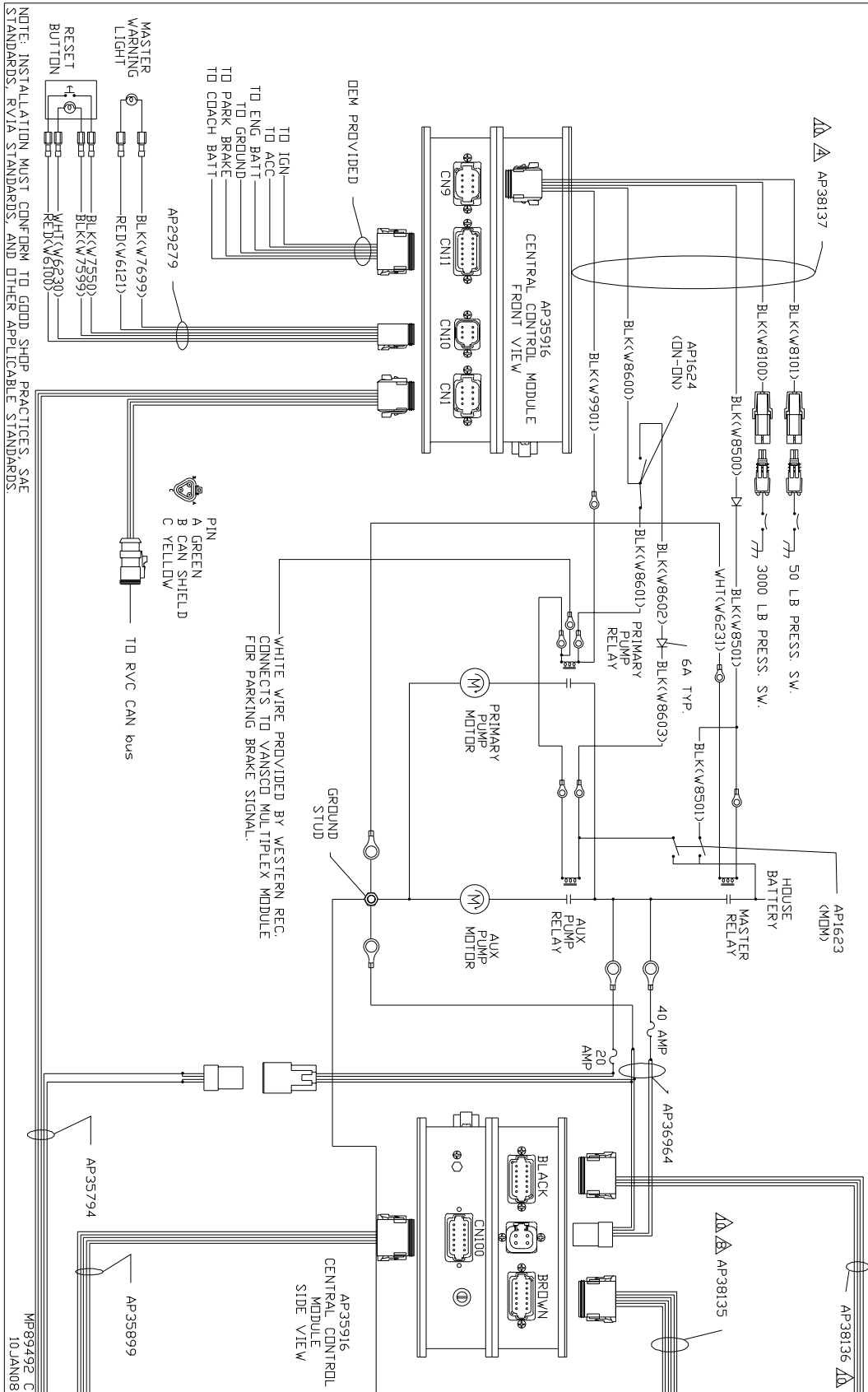
NO.	DATE	REVISION	DESCRIPTION
1	02SEP05	1	UPDATED HARN'S. BOX
2	28SEP05	2	UPDATED CCM PCB
3	28SEP05	3	ADDED AUX PUMP
4	28SEP05	4	ADDED I/O BOARD
5	27OCT05	5	UPDATED I/O BOARD
6	29NOV05	6	ADDED AP36931, AP36926
7	13DEC05	7	CORRECTED AIR DUMP POS
8	03FEB06	8	WAS AP36933
9	26APR06	9	UPD'D WIRE NUMBERS
10	22SEP06	10	WAS AP35925, AP35973, AP36703
11	21MAR07	11	ADDED INSTALLATION NOTE
12	10JAN09	12	ADDED VANSQD NOTE

SCALE 1:3	DATE 16JUN05	DRAWN BY	
HWH			1-80 EXIT 267 SOUTH RT 1 MSCDOW, IDWA 52760
SYSTEM SCHEMATIC ELEC			DRAWING NUMBER MP89492 A/W

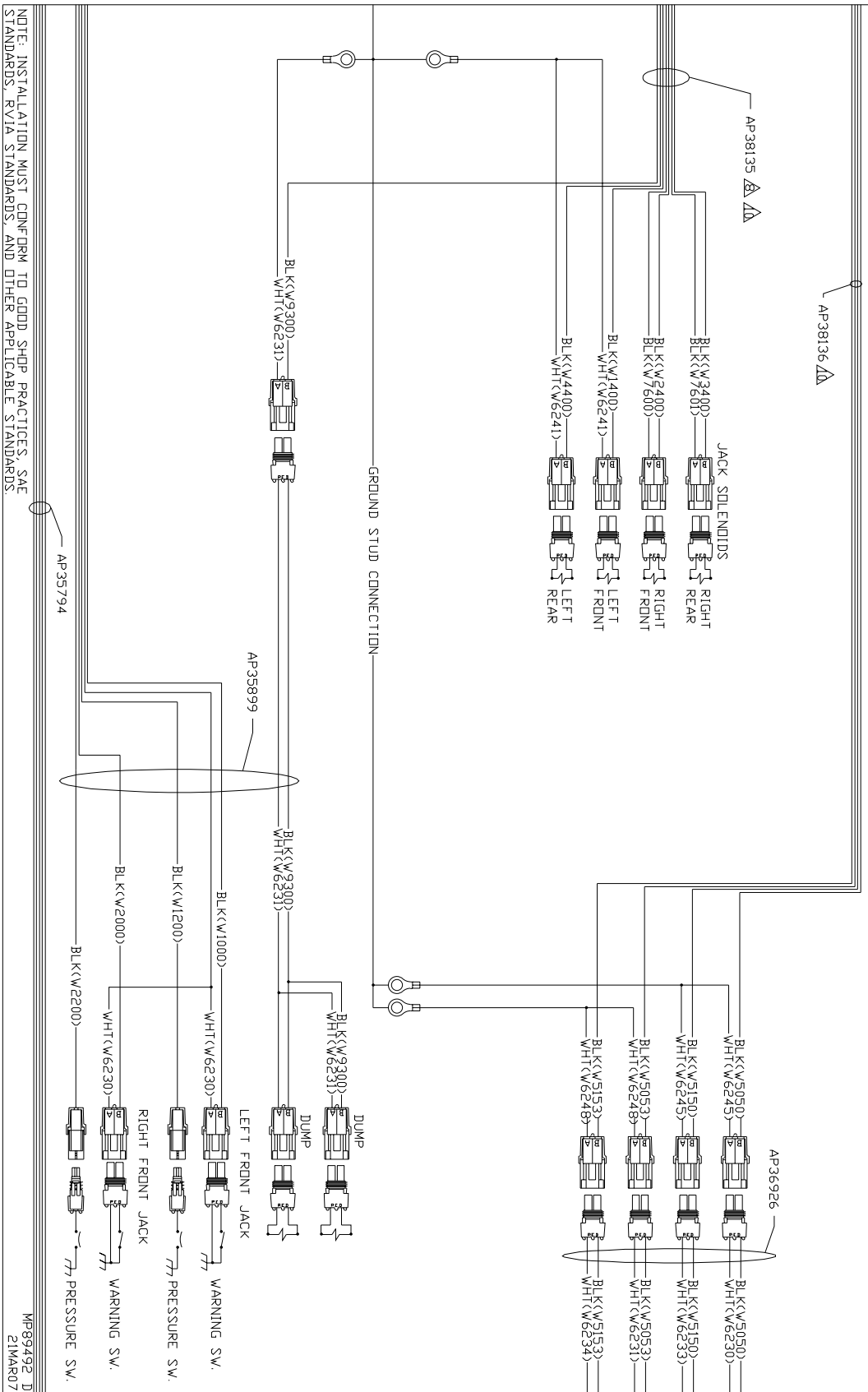
APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



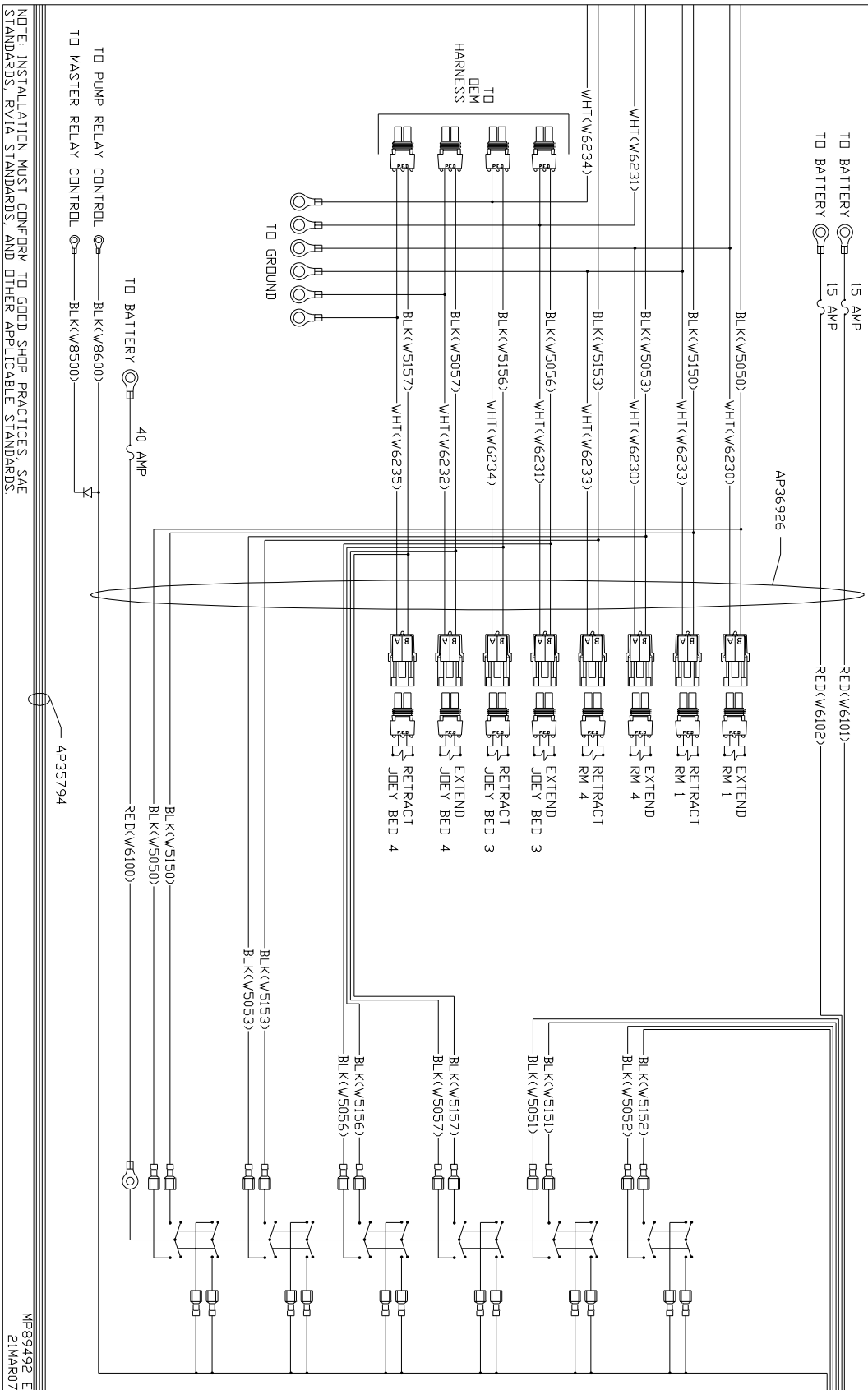
APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



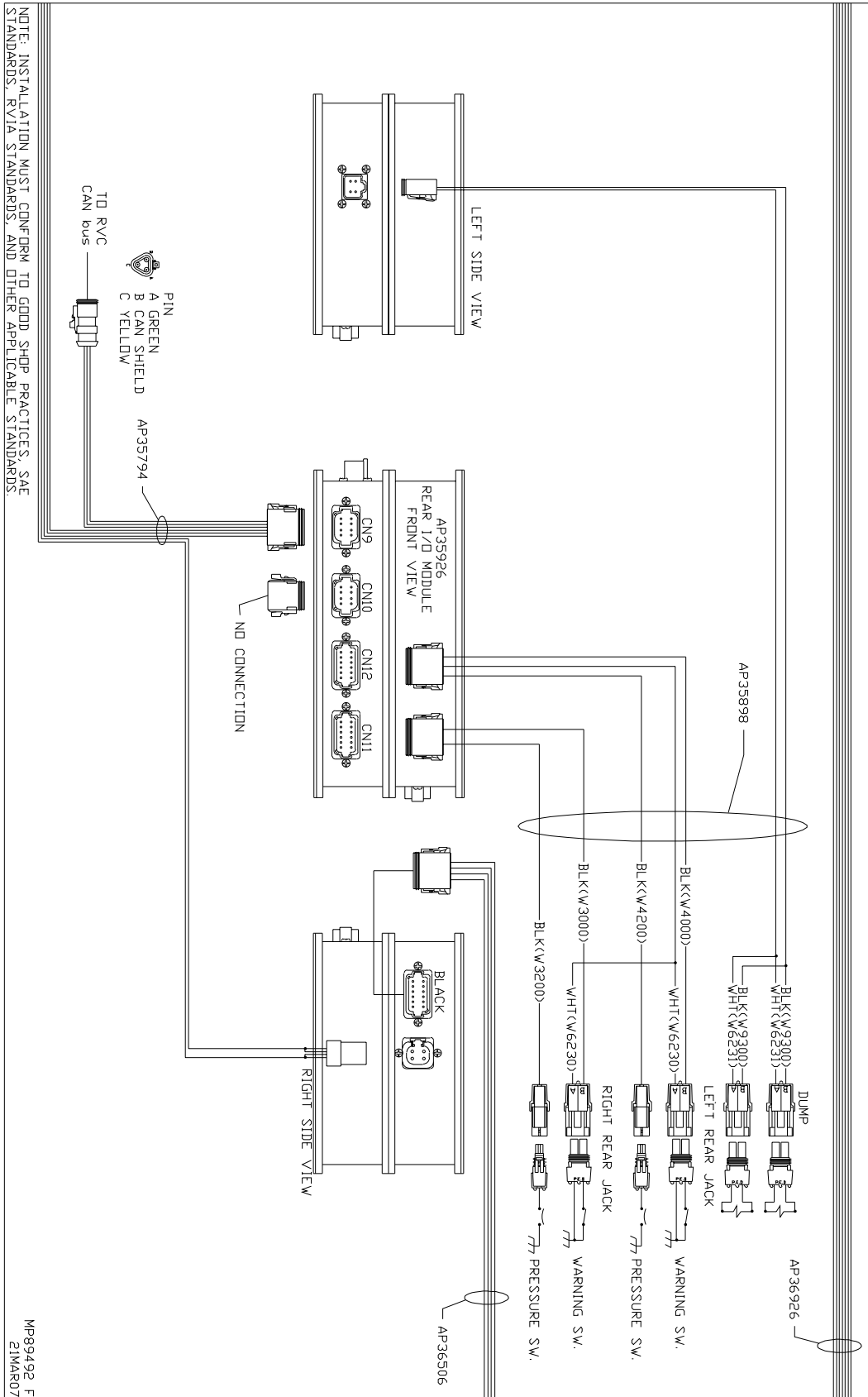
APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



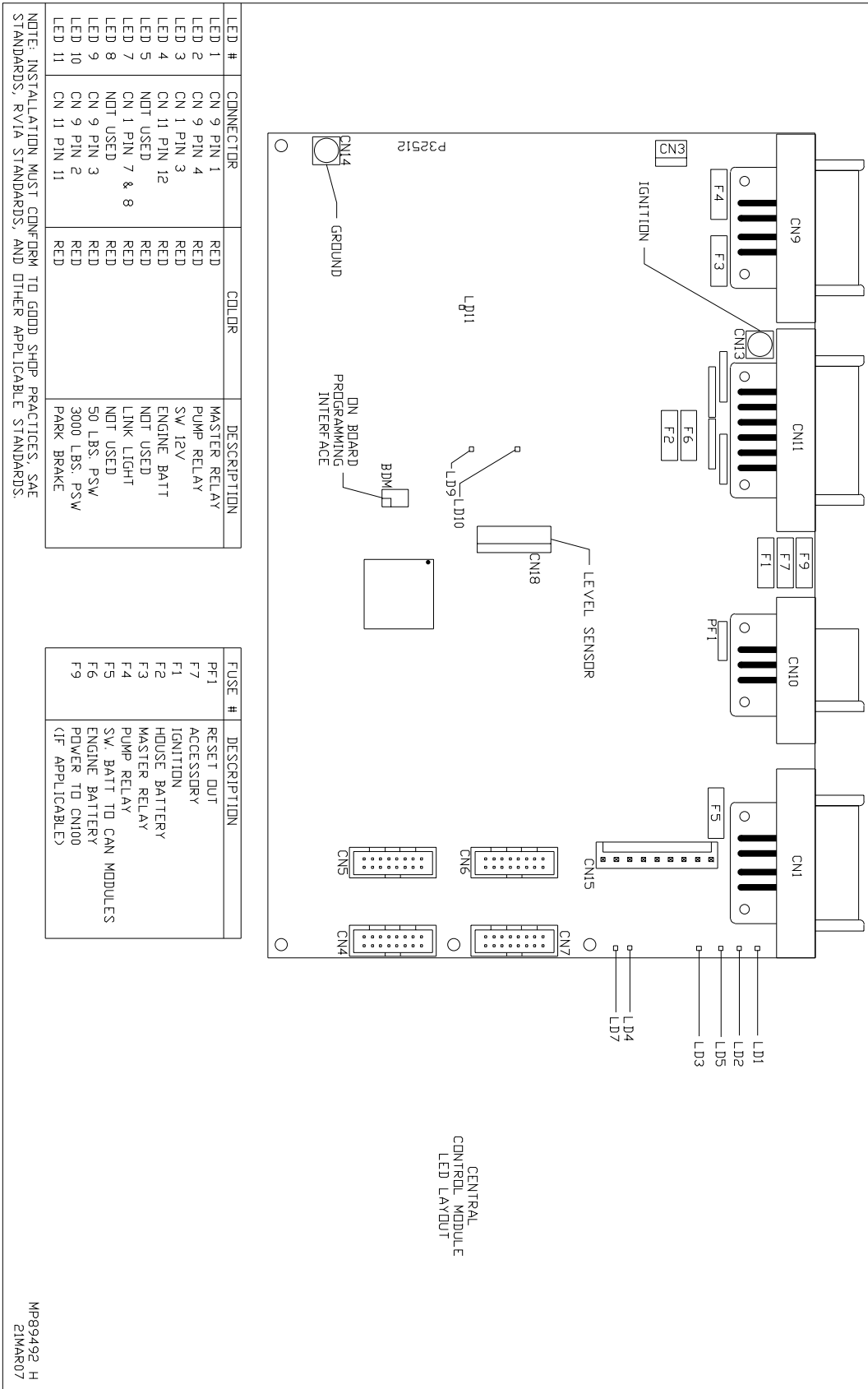
APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



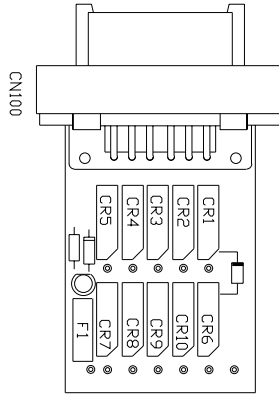
APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



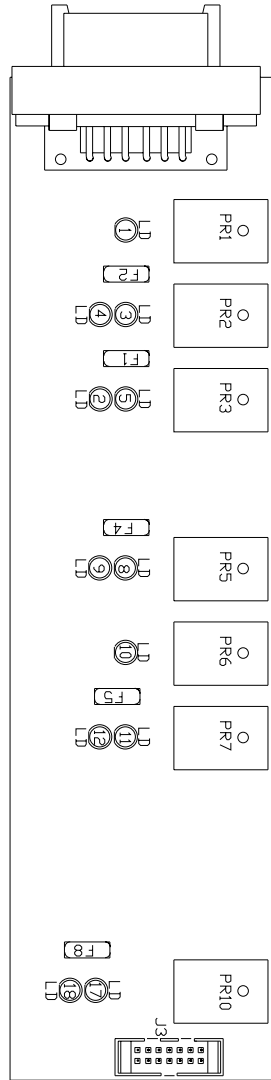
CONNECTOR	REED SWITCH	DESCRIPTION
CN 100 PIN 1	---	NOT USED
CN 100 PIN 2	---	NOT USED
CN 100 PIN 3	---	NOT USED
CN 100 PIN 4	CR4	RF WARNING
CN 100 PIN 5	CR5	LF WARNING
CN 100 PIN 6	CR6	GROUND

CONNECTOR	REED SWITCH	DESCRIPTION
CN 100 PIN 7	---	NOT USED
CN 100 PIN 8	---	NOT USED
CN 100 PIN 9	CR9	HYD RF PSW
CN 100 PIN 10	CR10	HYD LF PSW
CN 100 PIN 11	---	NOT USED
CN 100 PIN 12	---	NOT USED

NOTE: INSTALLATION MUST CONFORM TO GOOD SHOP PRACTICES, SAE STANDARDS, RVIA STANDARDS, AND OTHER APPLICABLE STANDARDS.

MP89492 1
21MAR07

APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL

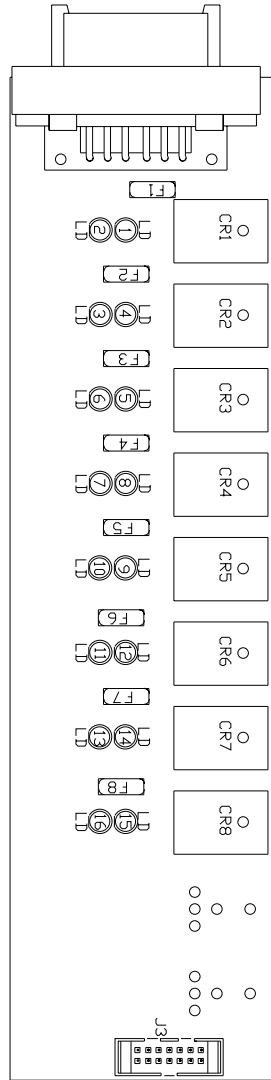


LED #	COLOR	INPUT J3	FUSE #	OUTPUT	RELAY #	DESCRIPTION
LED1	YELLOW	PIN 13	---	PIN 1	PR1	CRX1 (COIL)
LED2	RED	PIN 11	F1	PIN 3	PR3	RF JACK (CONTACT)
LED3	YELLOW	PIN 12	---	---	PR2	LF JACK (COIL)
LED4	RED	---	F2	PIN 2	PR2	LF JACK (CONTACT)
LED5	YELLOW	PIN 11	---	---	PR3	RF JACK (COIL)
LED8	YELLOW	PIN 9	---	---	PR5	RR JACK (CONTACT)
LED9	RED	---	F4	PIN 5	PR5	RR JACK (CONTACT)
LED10	YELLOW	PIN 8	---	PIN 6	PR6	CRX2 (COIL)
LED11	YELLOW	PIN 7	---	---	PR7	LR JACK (COIL)
LED12	RED	---	F5	PIN 7	PR7	LR JACK (CONTACT)
LED17	YELLOW	PIN 4	---	---	PR10	DUMP (COIL)
LED18	RED	---	F8	PIN 11	PR10	DUMP (CONTACT)

NOTE: INSTALLATION MUST CONFORM TO GOOD SHOP PRACTICES, SAE STANDARDS, RVIA STANDARDS, AND OTHER APPLICABLE STANDARDS.

MP89492 J
21MAR07

APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



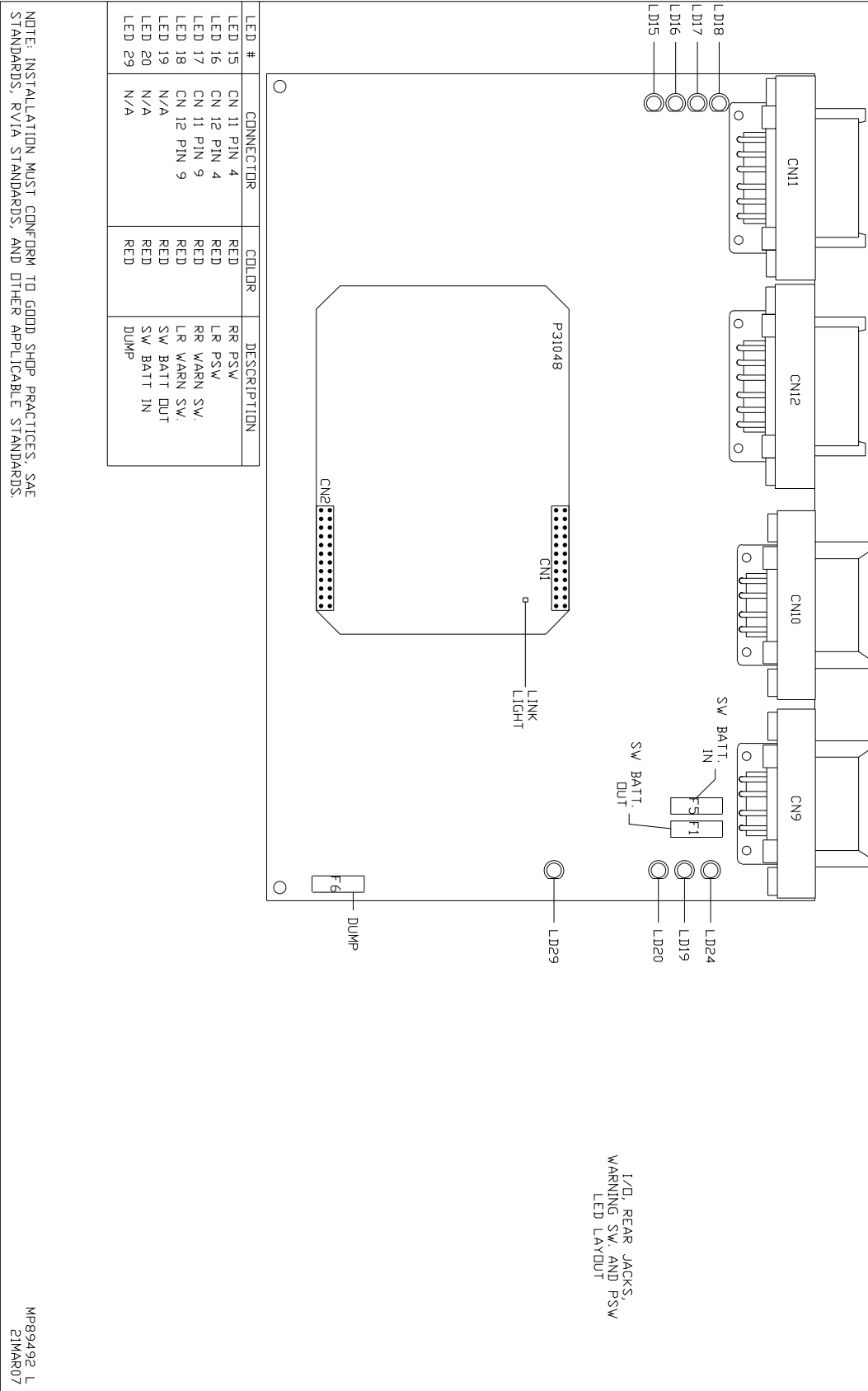
ROOM 1/ROOM 4
LED LAYOUT

LED #	COLOR	INPUT J3	FUSE #	OUTPUT	RELAY #	DESCRIPTION
LED1	YELLOW	PIN 13	---	---	CR1	CYL EXTEND 1 (COIL)
LED2	RED	---	FUSE 1	PIN 1	CR1	CYL EXTEND 1 (CONTACT)
LED3	RED	---	FUSE 2	PIN 2	CR2	CYL RETRACT 1 (CONTACT)
LED4	YELLOW	PIN 12	---	---	CR2	CYL RETRACT 1 (COIL)
LED5	YELLOW	PIN 11	---	---	CR3	NOT USED
LED6	RED	---	FUSE 3	PIN 3	CR3	NOT USED
LED7	RED	---	FUSE 4	PIN 4	CR4	NOT USED
LED8	YELLOW	PIN 10	---	---	CR4	NOT USED
LED9	YELLOW	PIN 9	---	---	CR5	NOT USED
LED10	RED	---	FUSE 5	PIN 5	CR5	NOT USED
LED11	RED	---	FUSE 6	PIN 6	CR6	NOT USED
LED12	YELLOW	PIN 8	---	---	CR6	NOT USED
LED13	RED	---	FUSE 7	PIN 10	CR7	CYL EXTEND 4 (CONTACT)
LED14	YELLOW	PIN 7	---	---	CR7	CYL EXTEND 4 (COIL)
LED15	YELLOW	PIN 6	---	---	CR8	CYL RETRACT 4 (COIL)
LED16	RED	---	FUSE 8	PIN 9	CR8	CYL RETRACT 4 (CONTACT)

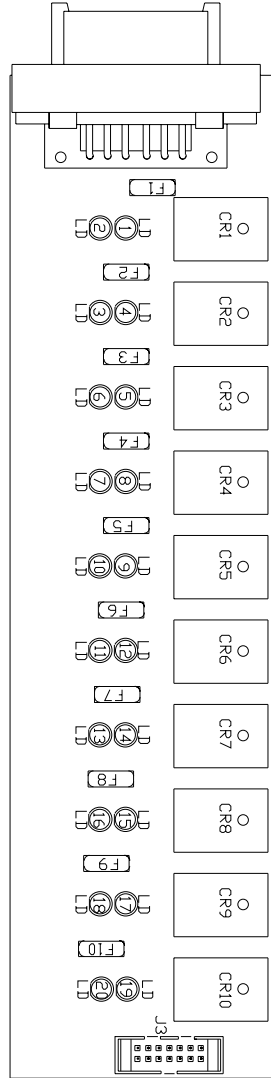
NOTE: INSTALLATION MUST CONFORM TO GOOD SHOP PRACTICES, SAE STANDARDS, RVIA STANDARDS, AND OTHER APPLICABLE STANDARDS.

MP99492 K
21MAR07

APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



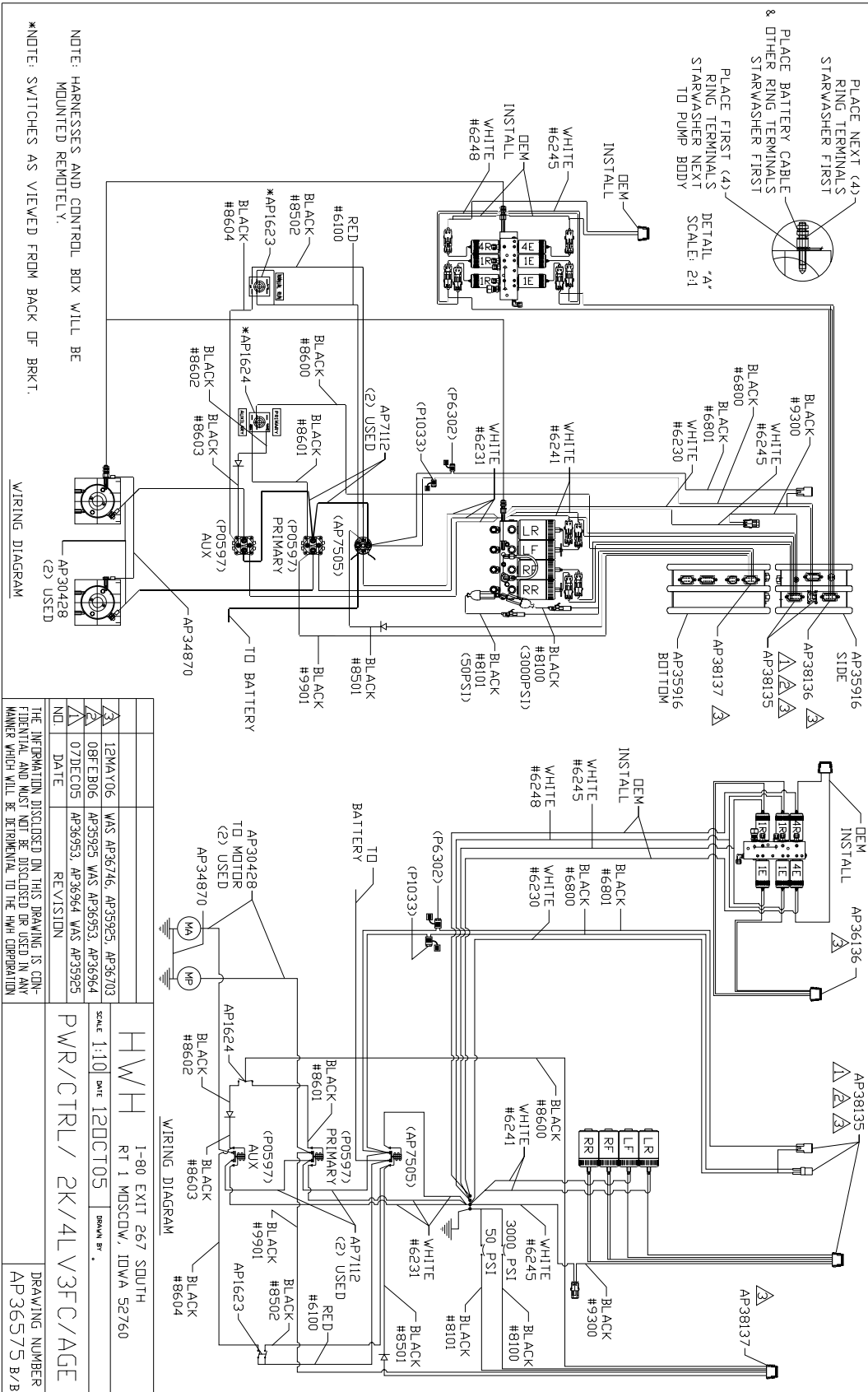
ROOM 2/ROOM 3
LED LAYOUT

LED #	COLOR	INPUT J3	FUSE #	OUTPUT RELAY #	DESCRIPTION
LED1	YELLOW	PIN 13	---	CR1	NOT USED
LED2	RED	---	FUSE 1	CR1	NOT USED
LED3	RED	---	FUSE 2	CR2	NOT USED
LED4	YELLOW	PIN 12	---	CR2	NOT USED
LED5	YELLOW	PIN 11	---	CR3	CYL 2 EXTEND (COIL)
LED6	RED	---	FUSE 3	CR3	CYL 2 EXTEND (CONTACT)
LED7	RED	---	FUSE 4	CR4	CYL 2 RETRACT (CONTACT)
LED8	YELLOW	PIN 10	---	CR4	CYL 2 RETRACT (COIL)
LED9	YELLOW	PIN 9	---	CR5	CYL EXTEND 3 (COIL)
LED10	RED	---	FUSE 5	CR5	CYL EXTEND 3 (CONTACT)
LED11	RED	---	FUSE 6	CR6	CYL RETRACT 3 (CONTACT)
LED12	YELLOW	PIN 8	---	CR6	CYL RETRACT 3 (COIL)
LED13	RED	---	FUSE 7	CR7	NOT USED
LED14	YELLOW	PIN 7	---	CR7	NOT USED
LED15	YELLOW	PIN 6	---	CR8	NOT USED
LED16	RED	---	FUSE 8	CR8	NOT USED
LED17	YELLOW	PIN 5	---	CR9	NOT USED
LED18	RED	---	FUSE 9	CR9	NOT USED
LED19	YELLOW	PIN 4	---	CR10	NOT USED
LED20	RED	---	FUSE 10	CR10	NOT USED

NOTE: INSTALLATION MUST CONFORM TO GOOD SHOP PRACTICES, SAE STANDARDS, RVIA STANDARDS, AND OTHER APPLICABLE STANDARDS.

MP99492 M
21MAR07

APEX SYSTEM SYSTEM SCHEMATIC ELECTRICAL



3	12MAY06	WAS AP36746, AP35925, AP36703							
2	08FEB06	AP35925 WAS AP36953, AP36964							
1	07DEC05	AP36953, AP36964 WAS AP35925							
NO.	DATE	REVISION							

	HWH	1-80 EXIT 267 SOUTH			
	SCALE 1:100	DATE 12OCT05	DRAWN BY		
		RT 1 MSCDOW, IDWA 52760			
		PWR/CTRL/ 2K/4LV3FC/AGE			
		DRAWING NUMBER AP36575 B/B			

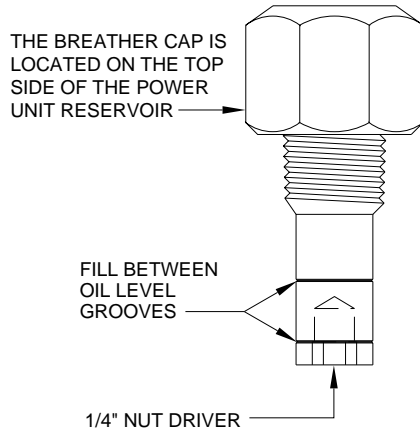
INFORMATION/INSTRUCTION SHEET

HYDRAULIC SOLENOID VALVE

IDENTIFICATION - MANUAL OPERATIONS - REPLACEMENT

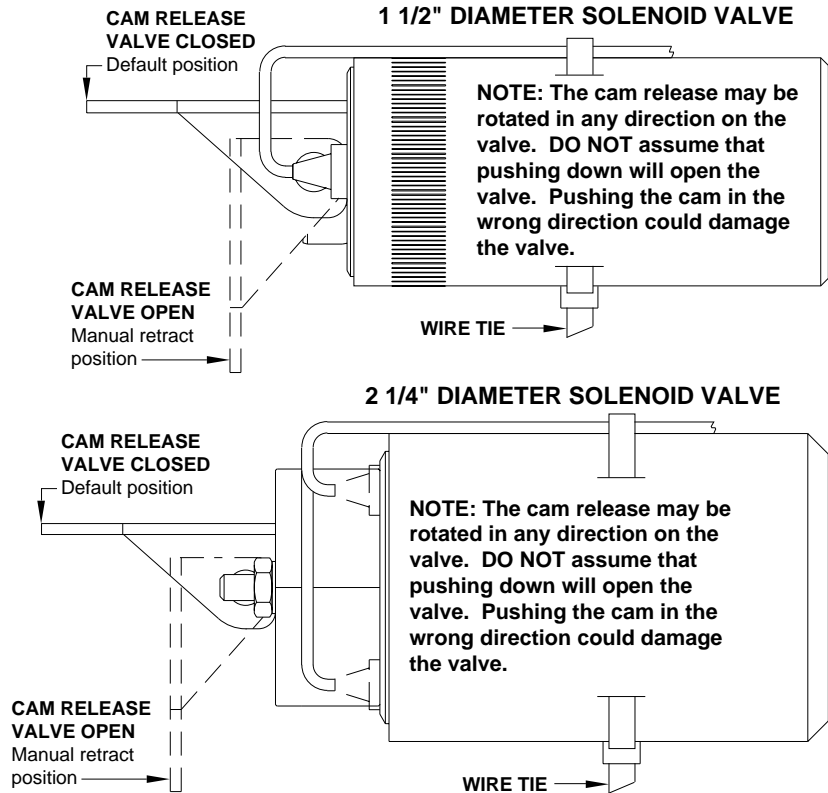
REPLACEMENT VALVES WILL HAVE A VALVE RELEASE CAM

BREATHER CAP W/NUT DRIVER

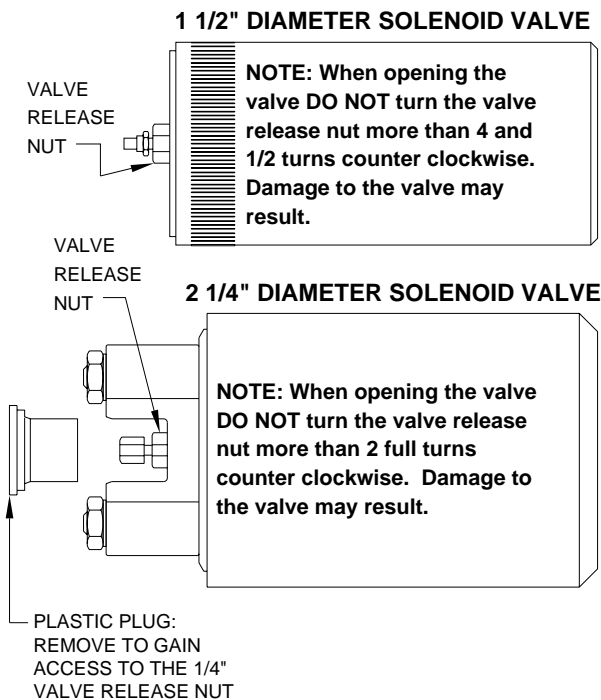


IMPORTANT: PRIOR TO REMOVING THE BREATHER CAP, EITHER TO CHECK THE OIL LEVEL OR TO USE 1/4" NUT DRIVER, CLEAN ANY DEBRIS FROM THE TOP OF THE RESERVOIR. BEFORE RETURNING THE BREATHER CAP TO THE RESERVOIR, REMOVE ANY PAINT CHIPS OR OTHER DEBRIS FROM THE DIPSTICK INCLUDING DEBRIS INSIDE THE 1/4" NUT DRIVER.

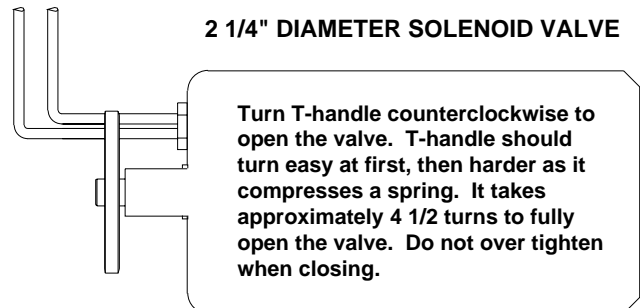
SOLENOID VALVES WITH CAM RELEASE



SOLENOID VALVES WITH 1/4" NUT RELEASE



SOLENOID VALVES WITH T-HANDLE RELEASE



NOTE: OLD STYLE HEX SHAPED SOLENOID VALVES HAVE NO MANUAL VALVE RELEASE.