3900 Dental Chair **Service Manual**



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08-08-11 Rev.- 0097-381

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TRADEMARKS

FOREST LOGOS ARE REGISTERED TRADEMARKS IN THE U.S. PATENT AND TRADEMARK OFFICE.

WELCOME

WELCOME TO THE 2011 EDITION OF THE *FOREST 3900 DENTAL CHAIR PARTS AND SERVICE MANUAL*. THIS MANUAL IS AN EASY TO USE SOURCE OF TECHNICAL INFORMATION FOR SERVICING THE FOREST MODEL 3900 DENTAL CHAIR.

INTENDED AUDIENCE

THIS MANUAL IS INTENDED FOR NEWLY TRAINED AND EXPERIENCED DENTAL EQUIPMENT REPAIR TECHNICIANS. WE ASSUME YOU UNDERSTAND THE OPERATION OF DENTAL EQUIPMENT AND CAN FOLLOW FLOW DIAGRAMS.

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Model 3900 Dental Chair

OVERVIEW

The Forest Model 3900 Dental Chair is an electronically controlled, hydraulically powered chair. The Touchpad and Footswitch are used to position the chair and program auto-positioning functions into the chair. The chair hydraulic system is controlled by the electronics using electro-mechanical relays and electrically powered solenoid valves.

This section provides information related to locating the chair model/serial number, servicing the chair, troubleshooting, and adjustments that can be made to the chair.

Service and Support

Given the proper care, the Forest Model 3900 Dental Chair will provide years of trouble-free service. If something does go wrong with the chair and you are unable to correct the problem, call Forest Dental Products Customer Service 800.423.3555. When you call, be prepared to provide the following:

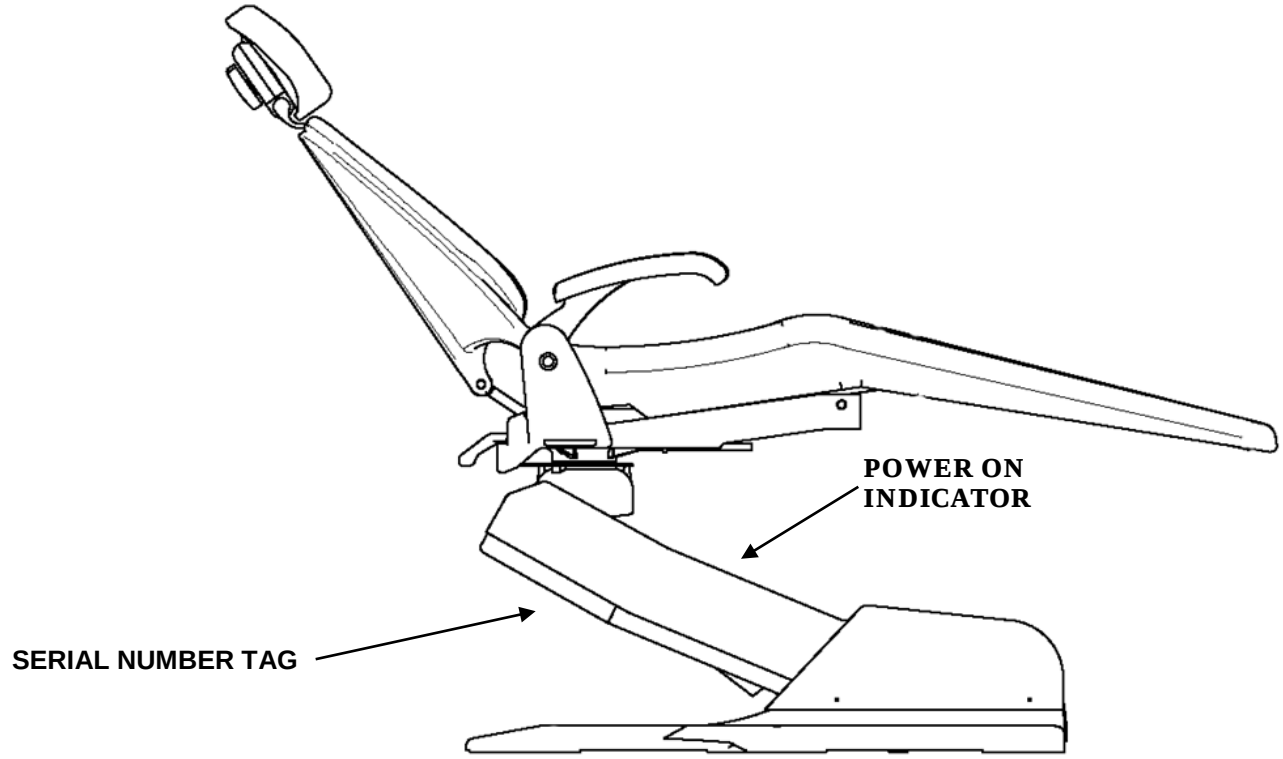
1. Serial number and, if known, the approximate date the chair was purchased.
2. Symptoms of the problem.
3. What steps you have taken towards correcting the problem.

Locating the Model/Serial Number

Power ON Indicator

The model/serial number tag identifies the chair as being manufactured by Forest Dental Products and allows Customer Service to determine when the chair was manufactured. The date of manufacture is very important in determining the chair warranty status as well as the engineering revision.

The Power ON Indicator, when illuminated, indicates that the chair has mains electrical power available.



Removing and Installing Chair Covers

The Forest 3900 chair motor pump, small arm cover and safety plate covers are removed as follows:

Motor Pump Cover

Using a 5/32” hex key, remove the two button head screws from each side of the cover and lift it.

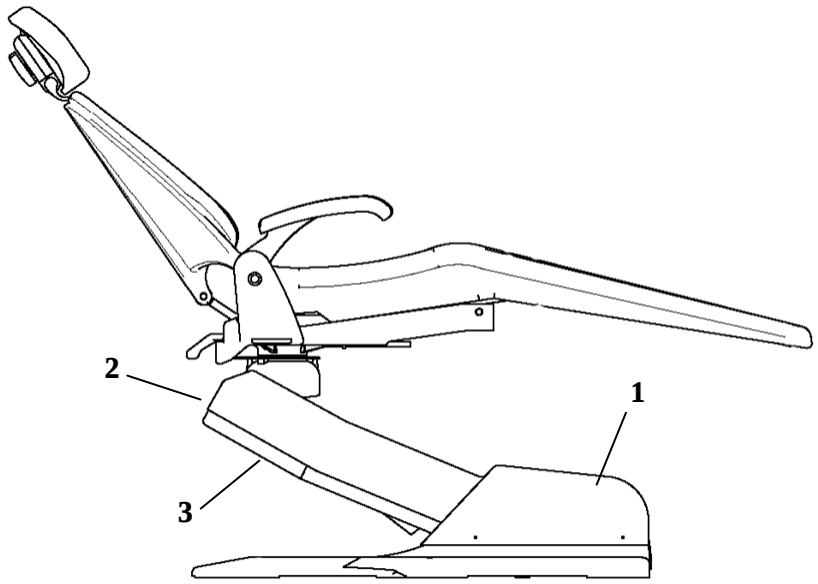
Small Arm Cover

Using a 7/64” hex key, remove the four button head screws from the cover.

Safety Plate

Using a flat tip screwdriver, remove the single screw from the safety plate. The Safety Plate will drop when the screw is removed.

Item	Part Number	Description
1	3912-030-G	Motor Pump Cover, Gray
	3912-030-SH	Motor Pump Cover, Shadow
	3912-011	Screw, Pump Cover
2	3910-028-G	Small Arm Cover, Gray
	3910-028-SH	Small Arm Cover, Shadow
	3910-029-G	Small Arm Cover, Gray, 1-1/4” Hole for 1090 Umbilical
	3910-029-SH	Small Arm Cover, Shadow, 1-1/4” Hole for 1090 Umbilical
	3910-030-G	Small Arm Cover, Gray, 2” Hole for 1590 Umbilical
2	3910-030-SH	Small Arm Cover, Shadow, 2” Hole for 1590 Umbilical
3	3912-031-G	Safety Plate, Gray, includes item 4
	3912-031-SH	Safety Plate, Shadow, includes item 4
4		Safety Plate Retaining Screw



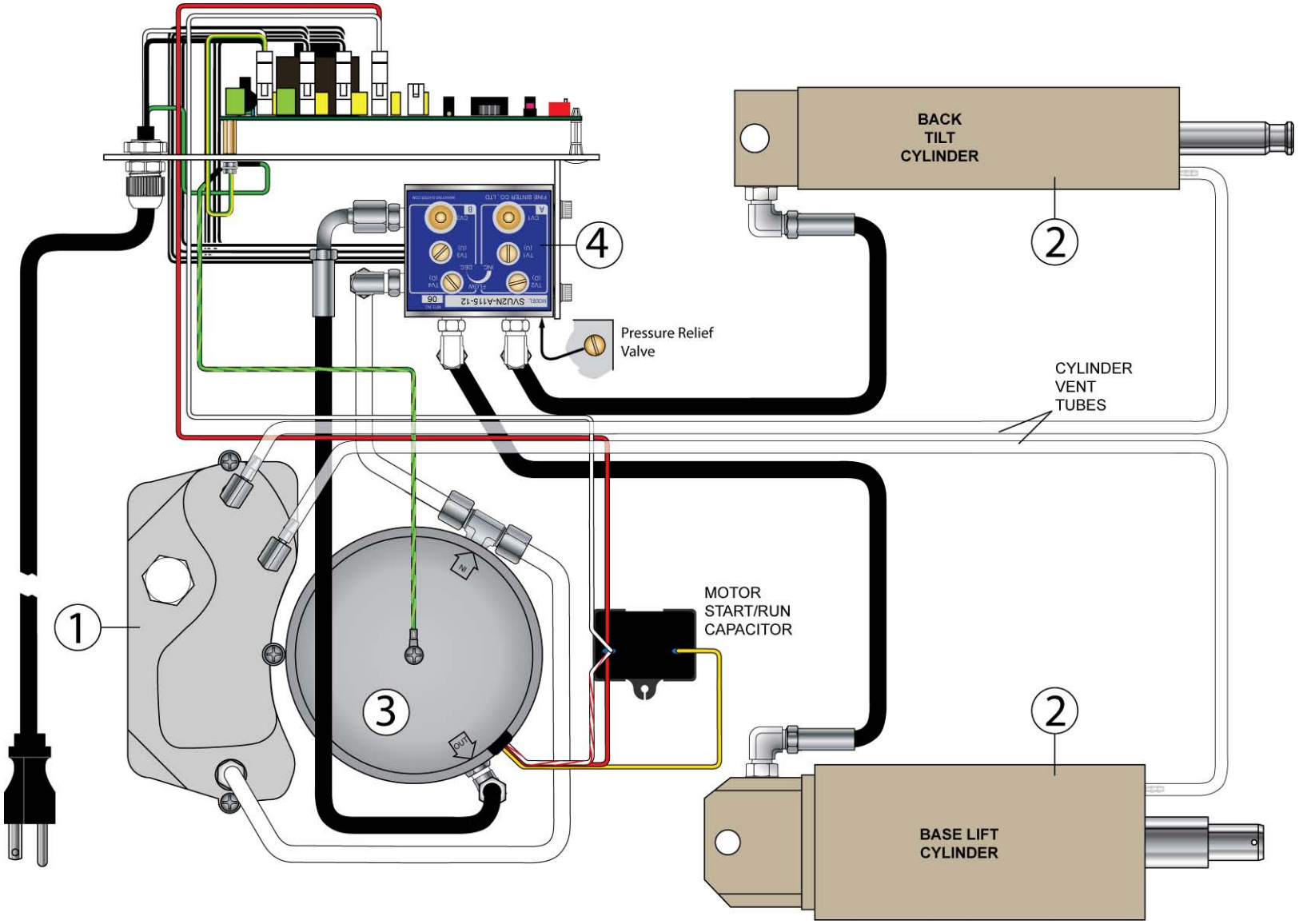
THE HYDRAULIC SYSTEM

The hydraulic system consists of:

Item	Description
1	A hydraulic fluid reservoir or tank that performs a number of functions in the dental chair hydraulic system: • Fluid storage • Separation of air from fluid • Dissipation of heat • Settling of contaminants The fluid level in the reservoir can be seen through the sides of the reservoir; the reservoir is serviced via a top fill cap.
2	Hydraulic cylinders that convert hydraulic fluid pressure to mechanical movement lifting the chair base and back. Springs and gravity retract the cylinder rods for down movements.
3	A chair hydraulic pump that is driven by a thermally protected electric motor. The pump provides fluid, under pressure, to the cylinders.

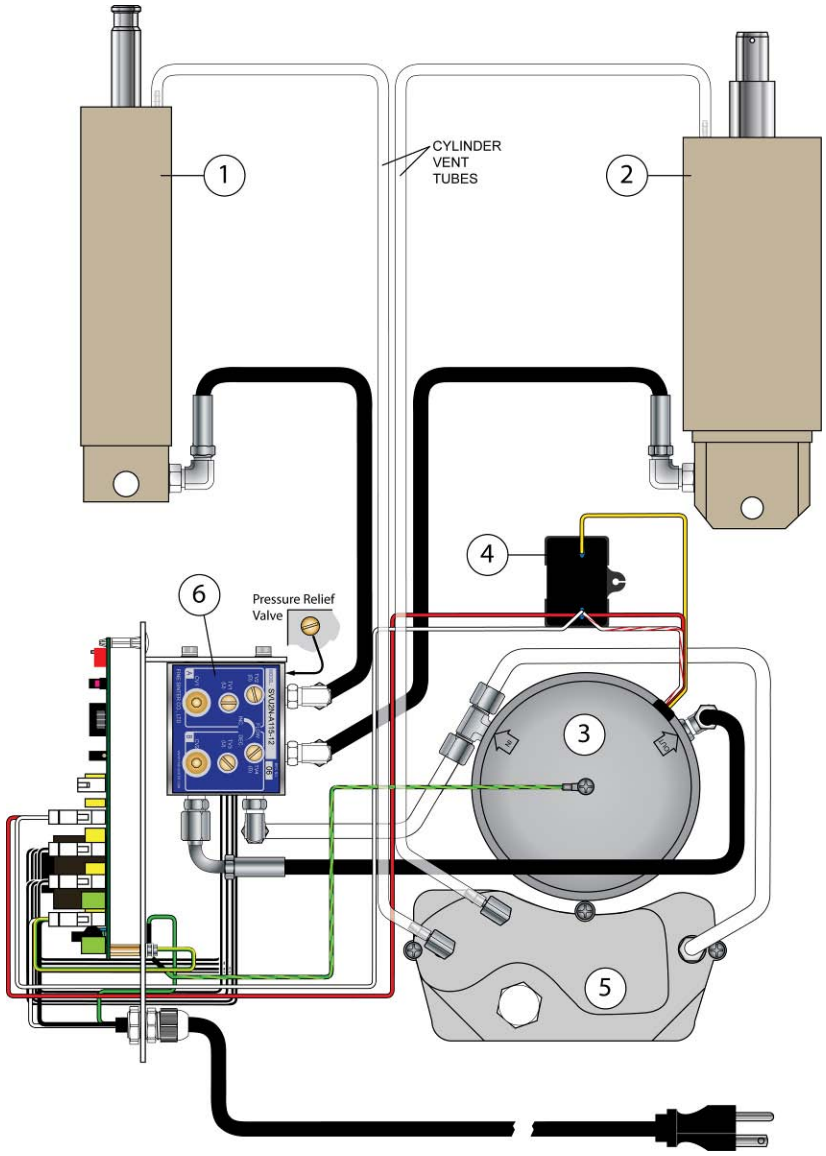
Item	Description
4	A solenoid manifold assembly that controls the flow of hydraulic fluid to and from the chair cylinders using electrically operated valves. The assembly includes four speed control valves used to restrict the flow of fluid to and from the cylinders controlling the chair's rate of travel up and down. The assembly also includes an adjustable pressure relief valve and two check valves.

Flow Diagram



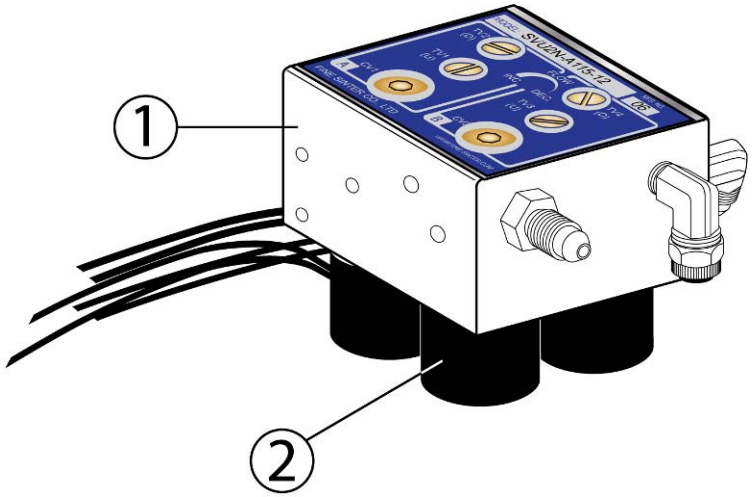
Service Parts

Item	Part Number	Description
1	3910-021	Back Tilt Cylinder, 3900 Chair
2	3910-020	Base Lift Cylinder, 3900 Chair
3	3912-026	Hydraulic Motor Pump, 3900 Chair, 110VAC
	3912-027	Hydraulic Motor Pump, 3900 Chair, 230VAC
4	3912-028	Motor Start Run Capacitor, 45uf, 110VAC
	3912-029	Motor Start Run Capacitor, 14uf, 230VAC
5	3910-001	Hydraulic Fluid Reservoir, 3900 Chair
	3910-002	Hydraulic Fluid Reservoir, 3900 Chair with 16 oz. Hydraulic Fluid
6	3914-047	Solenoid Manifold Assy, 110VAC
	3914-050	Solenoid, Single, 3900, 110VAC
	3914-049	Solenoid Manifold Assy, 230VAC
	3914-051	Solenoid, Single, 3900, 230VAC
7		Elbow Fitting, Hydraulic Cylinder



Solenoid Manifold Assembly

Item	Part Number	Description
1	3914-047	Solenoid Manifold Assy, 110VAC, complete with 4 solenoids
	3914-049	Solenoid Manifold Assy, 230VAC, complete with 4 solenoids
2	3914-050	Solenoid, Single, 3900, 110VAC
	3914-051	Solenoid, Single, 3900, 230VAC



Removing a Faulty Solenoid

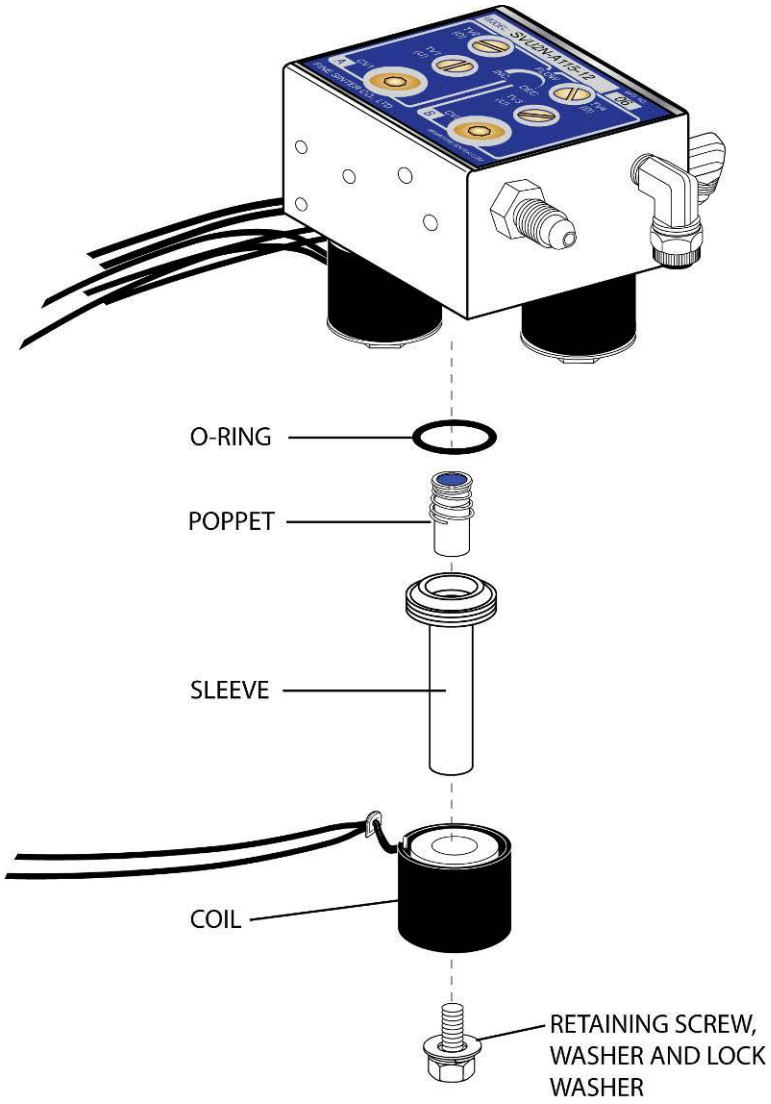
The following steps will guide you through the process of removing a faulty solenoid.

WARNING

The solenoids are powered by mains voltage (120 or 240 VAC). Failing to unplug the chair from mains voltage may result in serious injury from electrical shock.

Task	Procedure
1	To depressurize the chair hydraulic system, lower the base and back to full down. Remove the motor pump cover and unplug the chair.
2	Remove the two screws that secure the manifold to the chair hydraulic tray. Turn the manifold to access the solenoids.
3	Using a Philips screwdriver, remove the faulty solenoid coil.
4	Cut the faulty solenoid wires approximately 4” from the solenoid. Discard the faulty solenoid.
5	Remove the solenoid stem and o-ring from the manifold cavity.

Refer to page 12 for installation instructions.



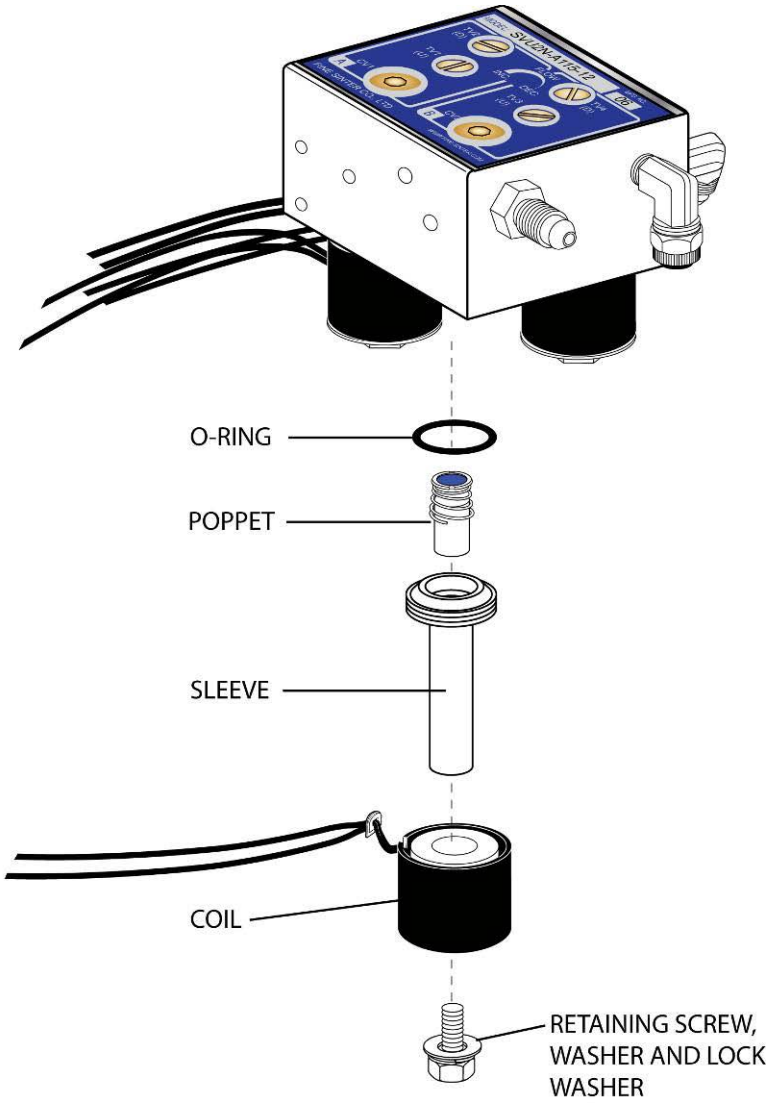
Installing a New Solenoid

The following steps will guide you through the process of installing a new solenoid.

WARNING

The solenoids are powered by mains voltage (120 or 240 VAC). Failing to unplug the chair from mains voltage may result in serious injury from electrical shock.

Task	Procedure
1	Install the new solenoid o-ring and stem in the manifold cavity.
2	Using a Philips screwdriver, install the new solenoid coil.
3	Connect the stripped wires from the new solenoid to the stripped wires from the chair circuit board with the two wire nuts provided.
4	Reinstall the manifold assembly to the chair hydraulic tray.
5	Plug in the chair and test all chair functions.
6	Carefully inspect the manifold for any hydraulic oil leakage, if none is found, reinstall the motor pump cover.



Adjustments

Adjusting the Rate of Travel

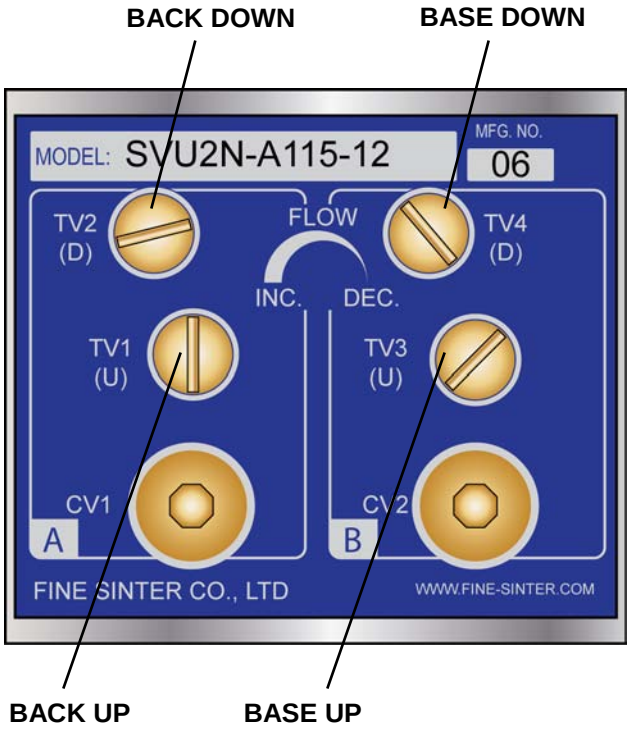
The hydraulic manifold assembly includes four speed control Throttle Valves (TV1, TV2, TV3 and TV4). Each TV function meters the flow of hydraulic fluid to and from the hydraulic cylinders.

Never completely close a Throttle Valve, the motor pump may overheat, possibly damaging the pump motor. Do not completely remove a Throttle Valve from the manifold.

Task	Procedure
Adjust Base Up Speed	Turn the Base TV3: Clockwise to decrease speed Counterclockwise to increase speed
Adjust Base Down Speed	Turn the Base TV4: Clockwise to decrease speed Counterclockwise to increase speed
Adjust Back Down Speed	Turn the Back TV2: Clockwise to decrease speed Counterclockwise to increase speed
Adjust Back Up Speed	Turn the Back TV1: Clockwise to decrease speed Counterclockwise to increase speed

CV1 and CV2 Check Valves

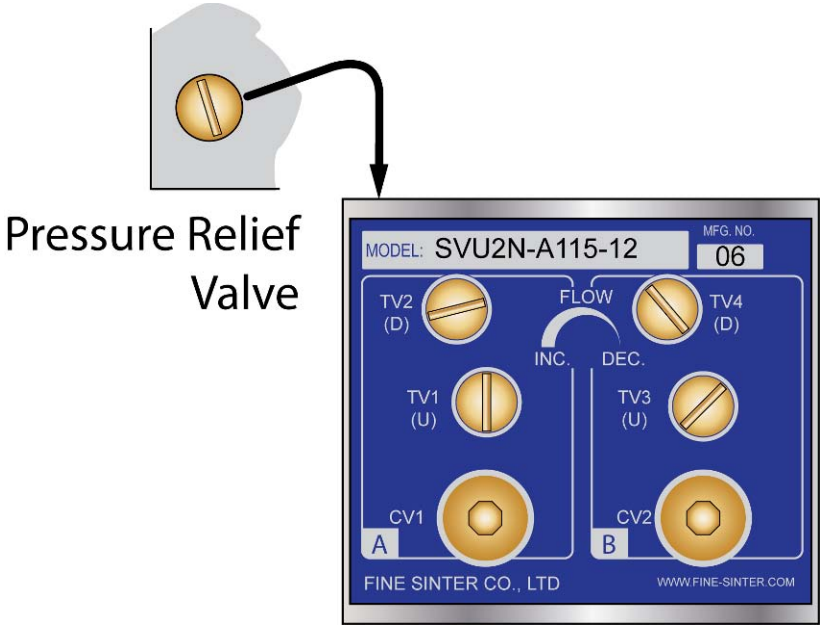
When the chair base or back are positioned up, the CV1 and CV2 check valves will prevent the chair base or back from drifting down until a down solenoid is opened.



Adjusting the Pressure Relief Valve

The pressure relief valve is a spring operated/loaded safety device that relieves hydraulic fluid overpressure in the chair hydraulic system. If excessive pressure develops in the chair hydraulic system, the pressure relief valve will open routing fluid to the reservoir. An incorrectly adjusted pressure relief valve may result in a condition known as “hydrostatic lock” or the chair not being able to lift the patient.

To adjust the valve, turn it clockwise until it seats then counterclockwise 1-1/2 turns.



Chair Electrical System

Circuit Board

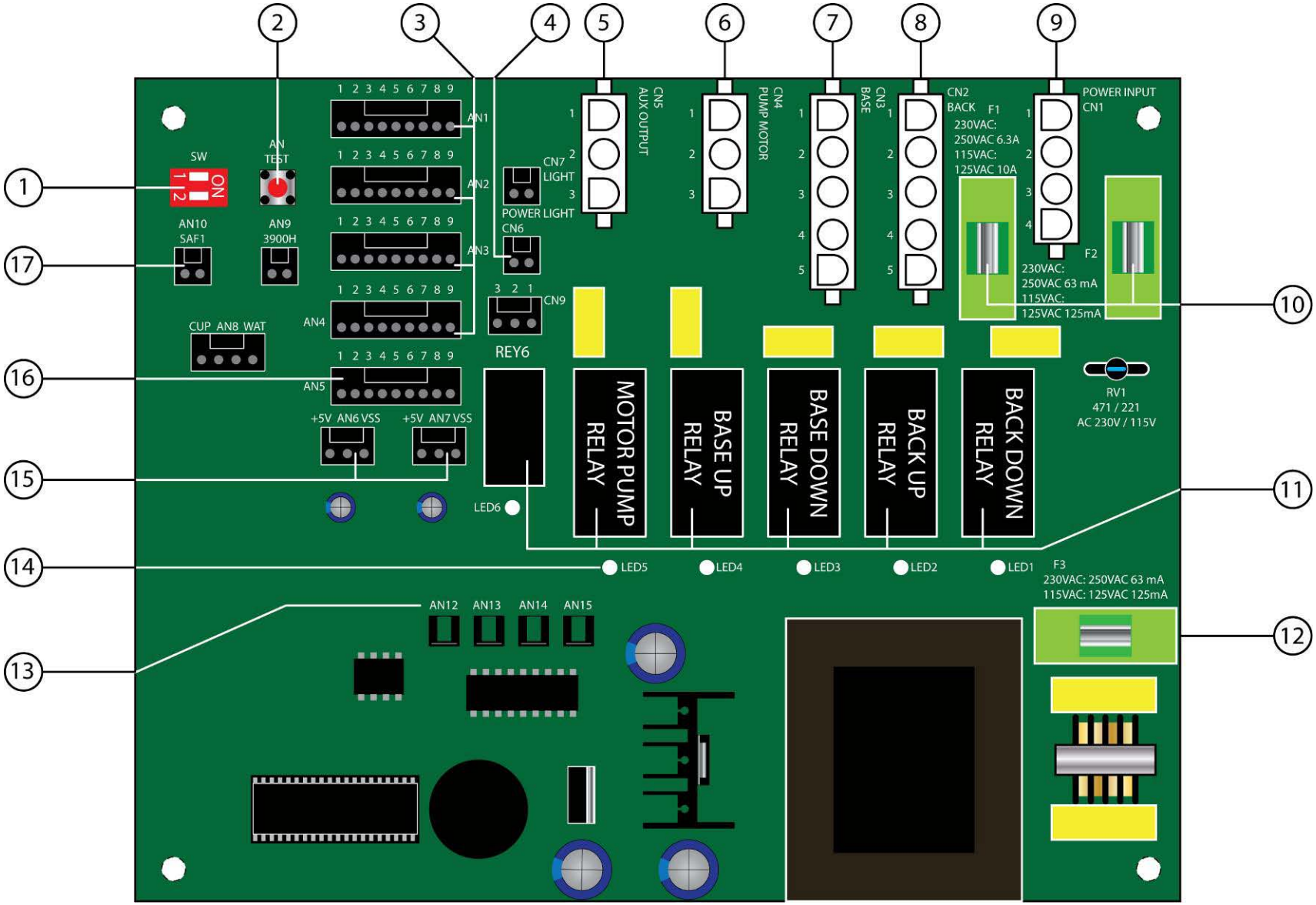
The Forest Model 3900 Dental Chair circuit board has the relays necessary for controlling the chair motor pump and solenoids. The circuit board is also equipped with a test function that allows verification of the chair functions without a foot switch or a touchpad.

To access the chair circuit board, remove the motor pump cover.

NOTE: Any circuit board components not identified are not being used or are non-functional.

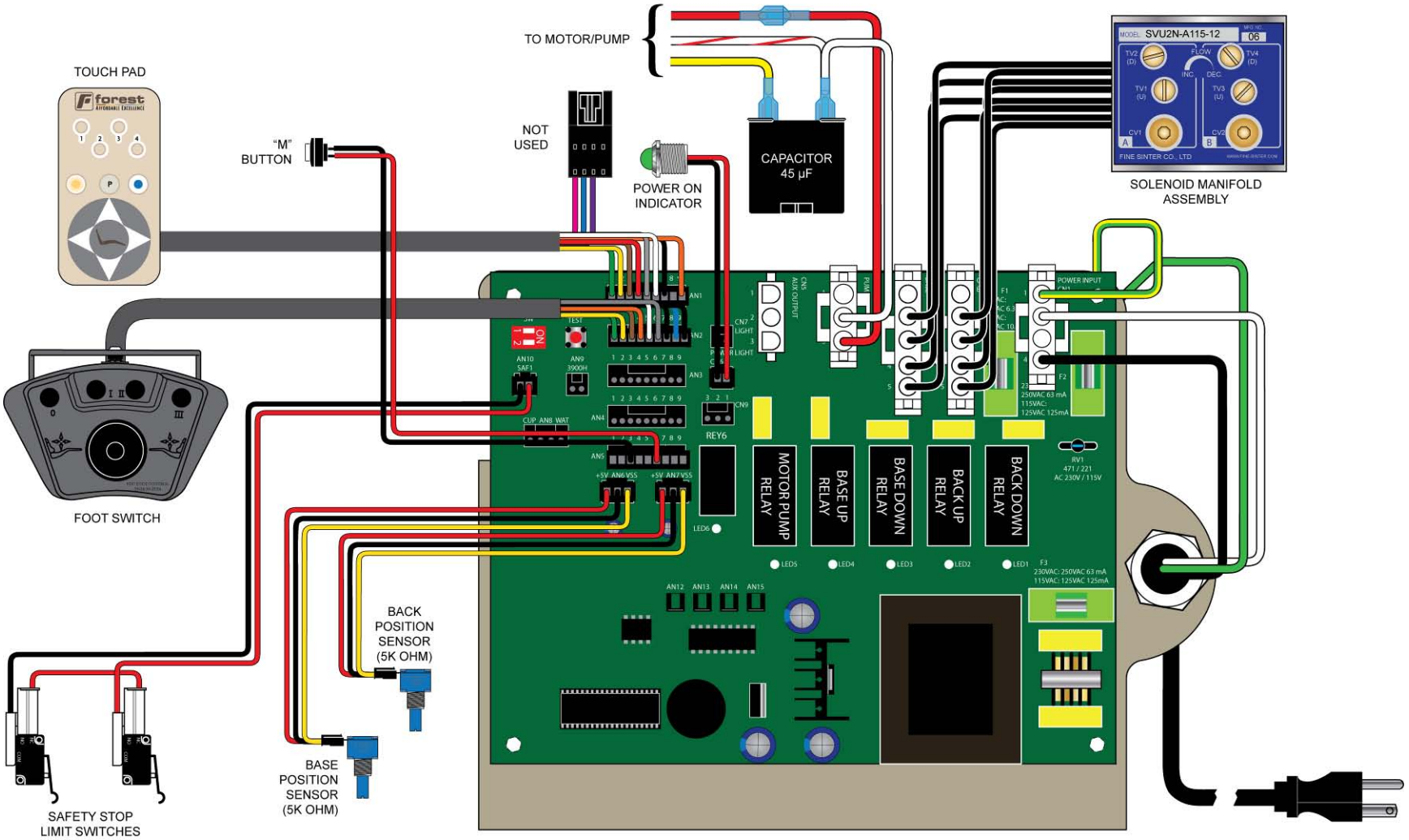
Item	Description
1	SW, Dual switch DIP, used to: • Enable programming the chair hard limits. • Enable initiation of the chair self test. Normally both switches are OFF.
2	Self Test Button.
3	AN1-AN4, Touch Pads and Footswitches.
4	Power indicator LED.
5	Mains Aux Power Out, 7 Amps maximum.
6	Motor Pump Power Out, 3 Amps.
7	Base Up/Down Solenoids Out.
8	Back Up/Down Solenoids Out.
9	Mains Power In, 115VAC-125V, 50-60Hz.
10	Fuse, F1 and F2, 115V, 10A, 5x20mm. Fuse, F1 and F2, 230V, 6.3A, 5x20mm.
11	Motor Pump and Solenoid Relays.
12	Fuse, F3, 115V, 125mA, 5x20mm. Fuse, F3, 230V, 63mA, 5x20mm.
13	AN12-AN15, Jumpers installed, do not remove.
14	LED1-LED5, Illuminate when associated relay is energized.
15	Base and Back Position Sensors AN6: Back Position Sensor AN7: Base Position Sensor
16	AN4, “M” Button (Program and Override Safety Plate function).
17	AN10, Safety Plate Switches.
	AN10 Test Jumper, P/N 0014-287. Used to short AN10.

Model 3900 Dental Chair



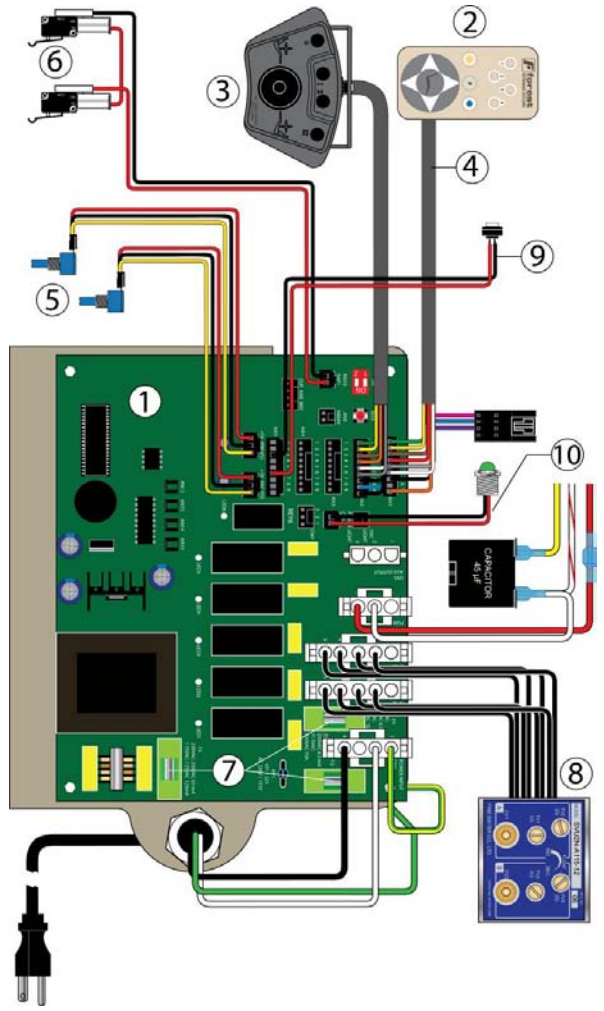
Model 3900 Dental Chair

Diagram



Service Parts

Item	Part Number	Description
1	3914-011	Command Control Board 3900 Chair, 110V
	3914-012	Command Control Board 3900 Chair, 220V
2	3914-015	Membrane Switch, Touch Pad, 3900
3	3914-010-G/SH	Foot Switch, 3900 Chair, specify color
4	3914-032	Cable, Touch Pad, Lower Unit, 96" long, 3900
	3914-031	Cable, Touch Pad, Upper Unit, 132" long, 3900
	3914-030	Cable, Touch Pad, Chair Mounted Touch Pad, 60" long
	0014-331	Harness, Remote Touch Pad, 25' long
5	3914-042	Potentiometer, 3900 Chair Position Sensor, Base or Back
	3912-018	Wiring Harness, Back Pos Sensor
	3912-017	Wiring Harness, Base Pos Sensor
	3914-044	Base Potentiometer Assy, 3900
	3914-043	Base Potentiometer Gear, Small
6	3912-025	Switch, Safety Plate, 3900
	3912-016	Wiring Harness, Safety Plate
7	3914-040	115VAC Fuse Kit, 5x20mm, includes two 250V,10A fuses and one 250V, 125mA fuse
	3914-035	230V Fuse Kit, 5x20mm, includes two 250VAC, 6.3A fuses and one 230V, 63mA fuse
8	3914-047	Solenoid Manifold Assy, 3900,110VAC
	3914-050	Solenoid, Single, 3900, 110VAC
	3914-049	Solenoid Manifold Assy, 3900, 230VAC
	3914-051	Solenoid, Single, 3900, 230VAC
9	3912-015	Wire Harness with Switch
10	3914-014	Wire Harness, Light

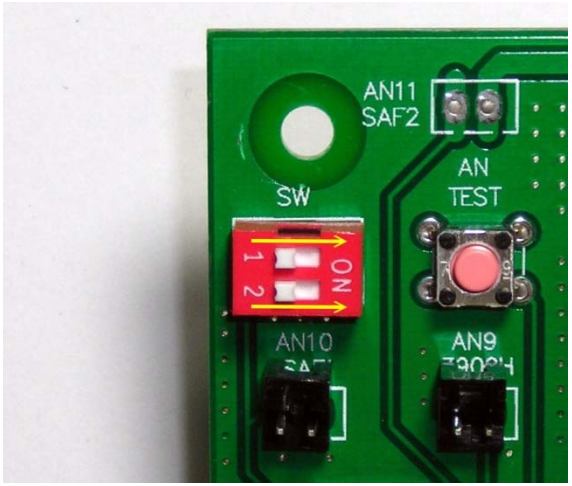


Testing and Programming the Chair

Setting Hard Limits

This programming operation should be performed by a qualified service technician or authorized Forest representative. Each travel limit can be set individually.

1. Remove the motor pump cover to access chair circuit board.
2. Locate the DIP switches on the top left hand corner of the circuit board.
    a. This is a small red block labeled “SW” with two white switches.
3. Move both DIP switches to the “**ON**” position.



Using a Touch Pad to set the Hard Limits

1. Locate the **P (program)** button on the touchpad.

2. Press and **HOLD** the **P** button. Two beeps will be heard.

3. With the **P** button **STILL HELD DOWN** use the manual BASE UP function to position chair base to the desired base up limit.
4. Once the desired base up position has been reached **RELEASE** all control buttons.
5. Press and release the Program button, you should hear two beeps.

6. Press Button 1, you will hear three beeps.

7. Repeat steps 1 – 6 for Base Down, Back Up and Back Down. For step 6, substitute the appropriate numbered button for the function travel limit being programmed;
    a. **Base Up** - **Press 1.**
    b. **Base Down** – **Press 2.**
    c. **Back Up** – **Press 3.**
    d. **Back Down** – **Press 4.**

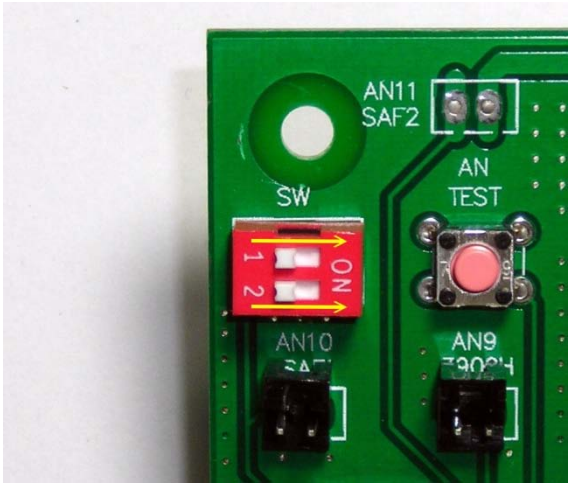
NOTE

These sequences should be done within 1 second of each other. If multiple beeps are heard, the programming was not accepted. Beginning with step 1, try programming the travel limit again.

8. Once programming is complete, return the dip switches to the "**OFF**" position
9. Manually operate the chair base up/down, back up/down to confirm the limits were programmed.
10. Reinstall motor-pump cover on the chair.

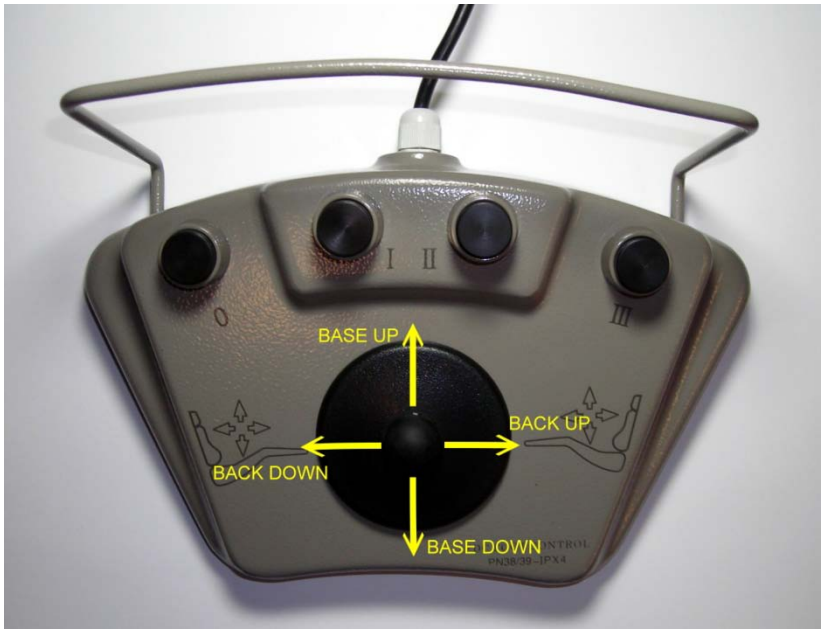
Using a Footswitch to set the Hard Limits

1. Remove the motor pump cover to access chair circuit board.
2. Locate the DIP switches on the top left hand corner of the circuit board.
    a. This is a small red block labeled “SW” with two white switches.
3. Move both DIP switches to the “**ON**” position.



4. Locate the “**M**” button on the top of the rear cantilever cover.

5. Press and **HOLD** the **M** button. Two beeps will be heard.
6. With the **M** button **STILL HELD DOWN,** use the foot switch BASE UP function to position the chair base to the desired base up limit.



7. Once the desired base up position has been reached **RELEASE** the control buttons.
8. Press button 0, and you will hear three beeps.
9. Press and release the **M** button, you will hear two beeps.
10. Repeat steps 1 – 6 for Base Down, Back Up and Back Down. For step 6, substitute the appropriate foot switch button for the function travel limit being programmed;
    e. **Base Up** - **Press 0.**
    f. **Base Down** – **Press I.**
    g. **Back Up** – **Press II.**
    h. **Back Down** – **Press III.**

NOTE

These sequences should be done within 1 second of each other. If multiple beeps are heard, the programming was not accepted. Beginning with step 1, try programming the travel limit again.

11. Once programming is complete, return the circuit board dip switches to the "**OFF**" position.
12. Manually operate the chair base up/down, back up/down to confirm the limits were programmed.
13. Reinstall motor-pump cover on the chair.

Using the Touchpad to Program the Chair Auto-positioning Functions

To position the chair to a user programmed operating position, press any one of buttons 1-4 on the Touchpad. The chair will automatically position its base and back to the programmed base and back positions assigned to that button.

To change the programmed position assigned to a button:

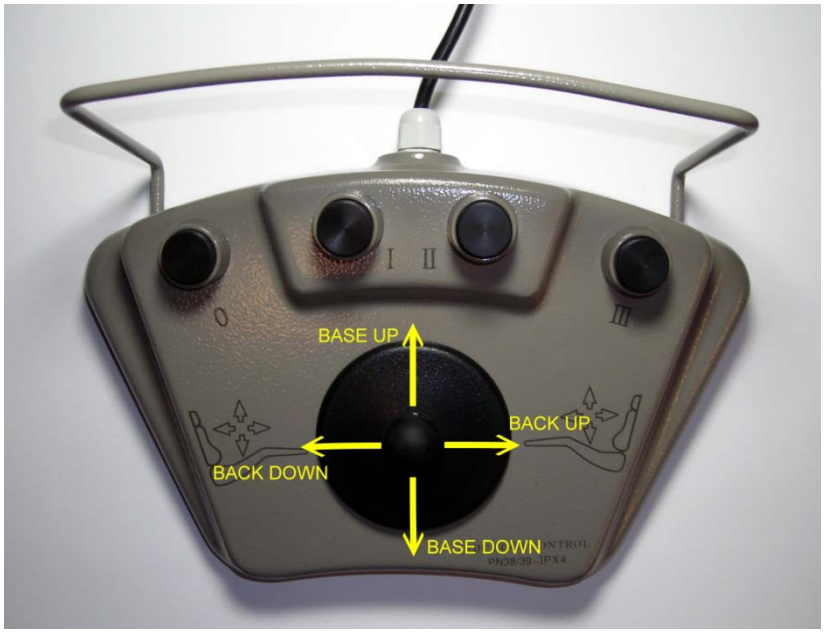
1. Locate the Program button on the Touchpad.
2. Using the manual positioning buttons on the Touchpad, position the chair base and back to the new position.
3. Press then release the Program button, you will hear two beeps. Within 1 second, press the button (1, 2, 3, or 4) you want to assign the position to. You will hear three beeps confirming the new position for that button has been accepted.
4. Check the new programmed position by manually moving the chair base and back to another position. Press the button you just assigned a new position to. The chair should move to the new position programmed in step 3.

Using the Footswitch to Program the Chair Auto-positioning Functions

To position the chair to a user programmed operating position, press any one of buttons 0-III on the Footswitch. The chair will automatically position its base and back to the programmed base and back positions assigned to that button.

To change the programmed position assigned to a button:

1. Locate the "**M**" button on the chair.
2. Using the manual positioning buttons on the Footswitch, position the chair base and back to the new position.
3. Press and release the "**M**" button, you will hear two beeps. Within 1 second, press the button (**0**, **I**, **II**, or **III**) you want to assign the position to. You will hear three beeps confirming the new position for that button has been accepted.
4. Check the new programmed position by manually moving the chair base and back to another position. Press the button you just assigned a new position to and the chair should move to the new position programmed in step 3.



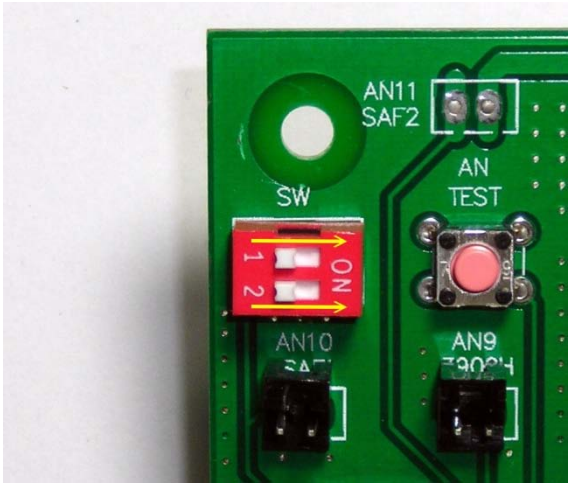
Running the Self Test

The chair Self Test will cycle the chair base and back up/down. If the chair stops (either the base or back) and beeps once, the test has detected a fault that will require diagnosis and adjustment or repair.

The test cycles the chair until a full base up, full back down to full base down, full back up cycle is achieved. If the test was successful, the chair will beep three times.

To run the test:

1. Remove the motor pump cover to access the chair circuit board.
2. Locate the DIP switches on the top left hand corner of the circuit board.
    i. This is a small red DIP switch labeled “SW” with two white switches.



3. Move both DIP switches to the “**ON**” position.

> **WARNING**
>
> The chair will move base up/down, back up/down during this test. To avoid personal injury or damage to other equipment, remove all possible obstructions from the area of the chair and keep a safe distance from the chair. To force the test to stop, press any button on a foot switch or touch pad. You may also activate the safety stop plate to stop the self test.

4. Press the **AN TEST** button next to the DIP switch on the chair circuit board.

    While the test is running, the chair will beep once every second.
5. If the test stops and the chair beeps once, refer to the troubleshooting section.
6. When the test completes successfully, the chair will beep three times.

    Return the DIP switch switches to the “**OFF**” position and reinstall the motor-pump cover.

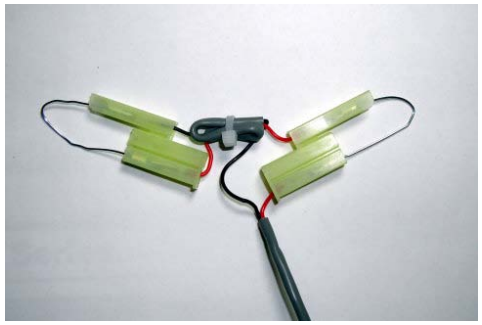
Troubleshooting

These tables contain tests and procedures for troubleshooting the most common chair problems. These tables are not intended to cover every situation, but do include the most common problems you will encounter.

To effectively diagnose and repair a chair problem you must define the problem as precisely as possible. What are the symptoms of the problem? Is it a problem with the chair hydraulics, electronics or is it user-related?

Table 1 – Chair Troubleshooting

Problem	Possible Cause	Procedure
Chair is inoperative, office has power.	The chair is unplugged.	1. Verify power is available at the outlet. 2. Connect the chair to the power outlet.
	F1, F2 or F3 fuse on the chair circuit board has failed. **WARNING** The fuses have mains power present at the fuse holders; **unplug the chair before removing or installing fuses**.	1. Check the fuses and replace if blown (refer to pages 16 and 18 for the location of the fuses). 2. If the fuse fails again: a. Disconnect all connections from the board with the exception of power (CN1) b. Install a known good fuse, if the fuse fails replace the chair circuit board. c. If the fuse does not fail, there is a short in the chair wiring. d. Isolate the problem by plugging one connector at a time back into the board until the fuse fails again. e. Repair or replace the chair wiring or components as needed.

Problem	Possible Cause	Procedure
Chair is inoperative, office has power.	The safety plate wiring or switches are faulty.	1. Disconnect the safety plate wiring harness from the chair circuit board at AN10. 2. Using a test jumper (P/N 0014-287), short the two pins of AN10 on the circuit board. a. If the chair now functions normally, with the exception of the safety plate function, the safety plate wiring is faulty or one of the switches is faulty. 3. Disconnect the safety plate wiring harness from the two switches in the chair lift arm, using paper clips bent into a “U” shape; short the wiring harness switch connections.  4. Reconnect the wiring harness to AN10 on the circuit board. a. If the chair now functions normally, one of the switches is faulty. Isolate the faulty switch by reconnecting one of the switches to the harness. If the chair does not function, the switch connected to the harness is faulty, if the chair functions, the switch that is not connected is faulty. b. If the chair does not function, the wiring harness is faulty. Replace the safety plate wiring harness.

Problem	Possible Cause	Procedure
The chair base and back UP functions do not work. The pump-motor relay clicks, LEDs 2, 4 and 5 illuminate. The chair base and back DOWN functions work.	Disconnected or faulty motor-pump start/run capacitor.	1. Verify the back and base UP relays click and LEDs 2 and 4 illuminate. **WARNING** The motor-pump start/run capacitor may have mains power present at its connections, **unplug the chair before proceeding**. Discharge the capacitor with an insulated screw driver placed across the capacitor terminals before disconnecting or connecting the terminals. 2. Check the motor-pump start run capacitor for loose or broken connections. Replace or repair any faulty connections. 3. Replace the capacitor with one of the correct specifications.
	Over-heated hydraulic pump motor.	The hydraulic pump motor is equipped with an auto-resetting thermal limiter; the limiters function is to protect the motor from damage if the motors duty cycle is exceeded. To check for an over heated pump, carefully place your hand on the top of the pump. The pump should only be warm not hot. Alternatively, you can wait 20-30 minutes for the pump to cool and resume working. If, after cooling down, the pump starts running on its own, the motor-pump relay has failed, remove and replace the chair circuit board.

Problem	Possible Cause	Procedure
Base or back DOWN function inoperative.	Faulty base or back down solenoid.	1. Verify that the resistance of the solenoid coil is: a. 100 – 120 VAC, ~200Ω b. 220 – 240 VAC, ~464Ω 2. Replace the base or back down solenoid assembly. **WARNING** Depressurize the chair hydraulic system before removing the solenoid. Switch the working down solenoid coil with the faulty solenoid coil to position the chair full base/back down.

Problem	Possible Cause	Procedure
	Faulty foot switch or touch pad.	1. Try using the touch pad or footswitch connector, AN1 – AN4, pins on the circuit board to test the chair manual functions as follows:

PINS	FUNCTION
1 to 6	BASE UP
1 to 7	BACK UP
2 to 7	BACK DOWN
4 to 7	BASE DOWN

2. If the manual functions work, the foot switch, touch pad or wiring harness is faulty.
3. If the chair is equipped with multiple foot switches, touch pads or a combination of them, try connecting one at a time until you isolate the faulty one.

Problem	Possible Cause	Procedure
When using a touchpad, the chair will not move.	Faulty touchpad.	1. Disconnect the touchpad wiring harness from the back of the touchpad. a. To access the touchpad wiring harness to switch membrane connection in the touchpad housing, remove the four Phillips head screws from the back of the housing. 2. Short the wires on the wiring harness connector as indicated in the table above to test the chair manual functions. 3. If the manual functions work, the touch pad is faulty, if the manual functions do not work, the wiring harness is faulty.

WIRE COLOR	FUNCTION
Black to Brown	BASE UP
Black to Green	BACK UP
Black to Yellow	BACK DOWN
Black to Red	BASE DOWN

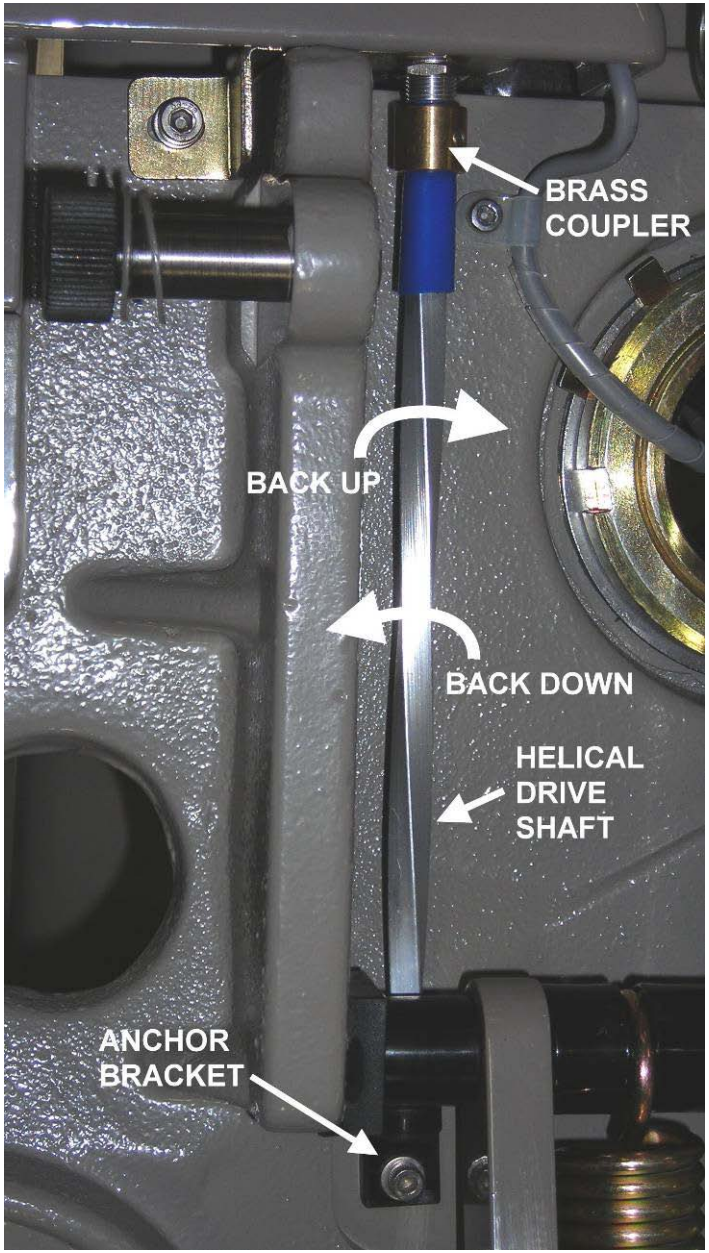
Problem	Possible Cause	Procedure
Base up/down is inoperative or back up/down is inoperative.	The position sensing potentiometer for that movement is disconnected.	1. Check the potentiometer connections, AN6 and AN7, on the circuit board and the connections at the potentiometer. 2. Reconnect the potentiometers found to be disconnected.
	The position sensing potentiometer wiring or connections are faulty.	Visually examine the wiring and connectors for damage.
	The position sensing potentiometer for that movement has failed.	1. Across pins 1 – 3, check the resistance of the potentiometer. a. 5K Ohm, +/- 20% 2. Additional measurements of potentiometer resistance can be made as follows: a. Measure the resistance across pins 1 – 2, write down your results. b. Measure the resistance across pins 2 – 3, write down your results. c. Total your results, the sum should equal 5K Ohm, +/- 20% 3. If any of the results are not within specifications, replace the potentiometer.

Problem	Possible Cause	Procedure
	The position sensing potentiometer for that movement is not turning.	BASE POSITION SENSOR: Ensure that the small gear is secure on the shaft of the potentiometer and that the large gear is secure on the head of the lift arm shoulder bolt. BACK POSITION SENSOR: Ensure that the blue connecting tubing is secure on the shaft of the potentiometer and the helical drive shaft. If the position sensing potentiometer drive is secure, refer to *Adjusting the position sensing potentiometers*.
Base down is pressed, back moves or back down is pressed, base moves.	The back and base solenoid connectors are switched at their connections on the chair circuit board.	Switch the position of the solenoid connectors, CN2 and CN3, on the chair circuit board.
Chair pump is noisy for Base or Back Up functions.	The hydraulic system is low on hydraulic fluid.	1. Remove the motor pump cover. 2. Check the hydraulic fluid level with the chair base and back down. You'll be able to see the fluid level through the side of the reservoir. 3. Add fluid to the reservoir to about 1-inch from the top of the reservoir.
	Supply tubing from the reservoir to the pump is kinked or pinched.	Check all the hydraulic tubings and hoses making sure none are pinched or kinked at any chair position.
	Debris in the pump or the pump is damaged.	Replace the motor-pump assembly.
Chair base or back drifts down slowly.	Faulty down solenoid.	Replace the faulty solenoid.
	Faulty solenoid manifold assembly check valve.	Replace the faulty check valve.

Adjusting the Position Sensing Potentiometers

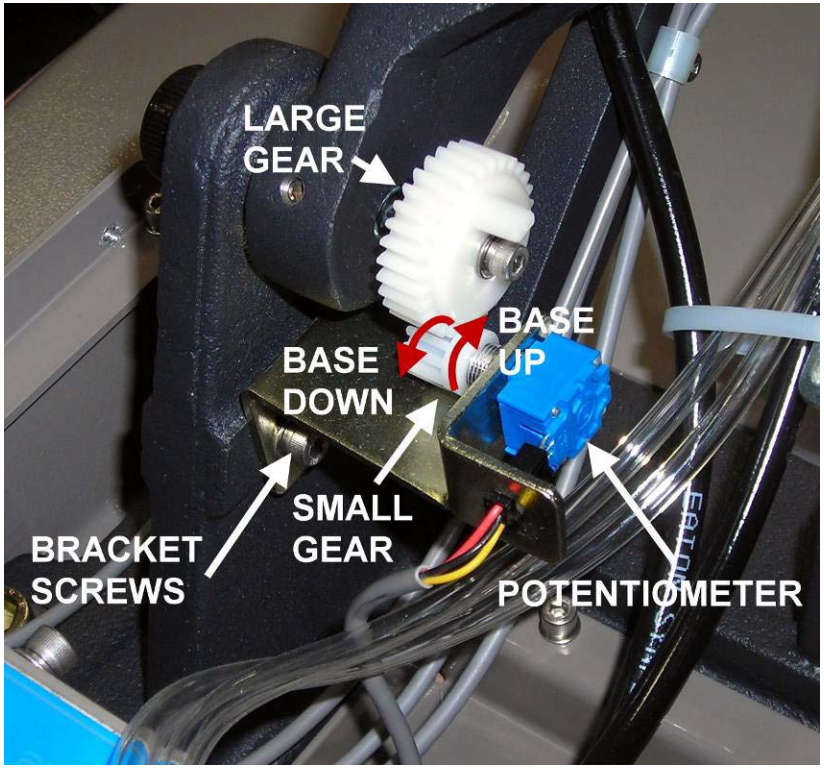
Back Position Sensor

Task	Procedure
1	Position the chair back fully down then remove the seat upholstery from the chair.
2	Using a 1.5mm hex key, loosen the brass helical drive shaft to pot shaft coupler setscrew then move the chair back up/down to expose the second coupler setscrew and loosen it as well.
3	Position the chair back fully up.
4	Using a 3mm hex key, remove the helical drive shaft anchor bracket.
5	Carefully pull the helical drive shaft, blue tube and brass coupler off the pot shaft.
6	Turn the pot shaft clockwise until it stops then counterclockwise 1/8 of a turn.
7	Carefully push the helical drive shaft, blue tube and brass coupler onto the pot shaft.
8	Using a 1.5mm hex key, tighten the brass coupler setscrew. Then move the chair back up/down to expose the second coupler setscrew and tighten it as well.
9	Using a 3mm hex key, reinstall the helical drive shaft anchor bracket.
10	Reinstall the seat upholstery on the chair.
11	Refer to *Setting Hard Limits*.



Base Position Sensor

Task	Procedure
1	Remove the motor pump cover from the chair.
2	Position the chair base full base down.
3	Loosen the bracket screws until you are able to disengage the gears.
4	Turn the small gear on the pot shaft in the base down direction until it stops. Then turn in the base up direction three teeth on the small gear relative to one tooth on the big gear.
5	Engage the gears and tighten the bracket screws.
6	Refer to *Setting Hard Limits*.



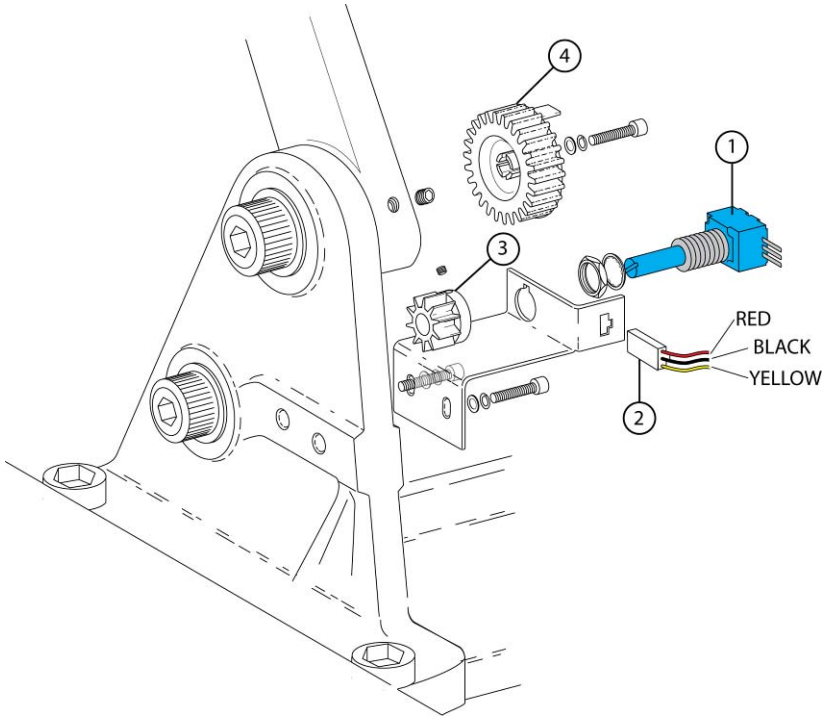
NOTE: The front lift arm cover is removed for clarity and it is not necessary to remove the cover to complete this procedure.

Model 3900 Dental Chair

Parts Breakdown

Base Positioning Sensor and Drive

Item	Part Number	Description
1	3914-042	Potentiometer, 3900 Chair Position Sensor, Base or Back
2	3912-017	Wiring Harness, Base Pos Sensor
3	3914-043	Base Potentiometer Gear, Small
4	3914-037	Base Potentiometer Gear, Large
	3914-044	Base Potentiometer Assy, 3900 (includes items 1 and 3)

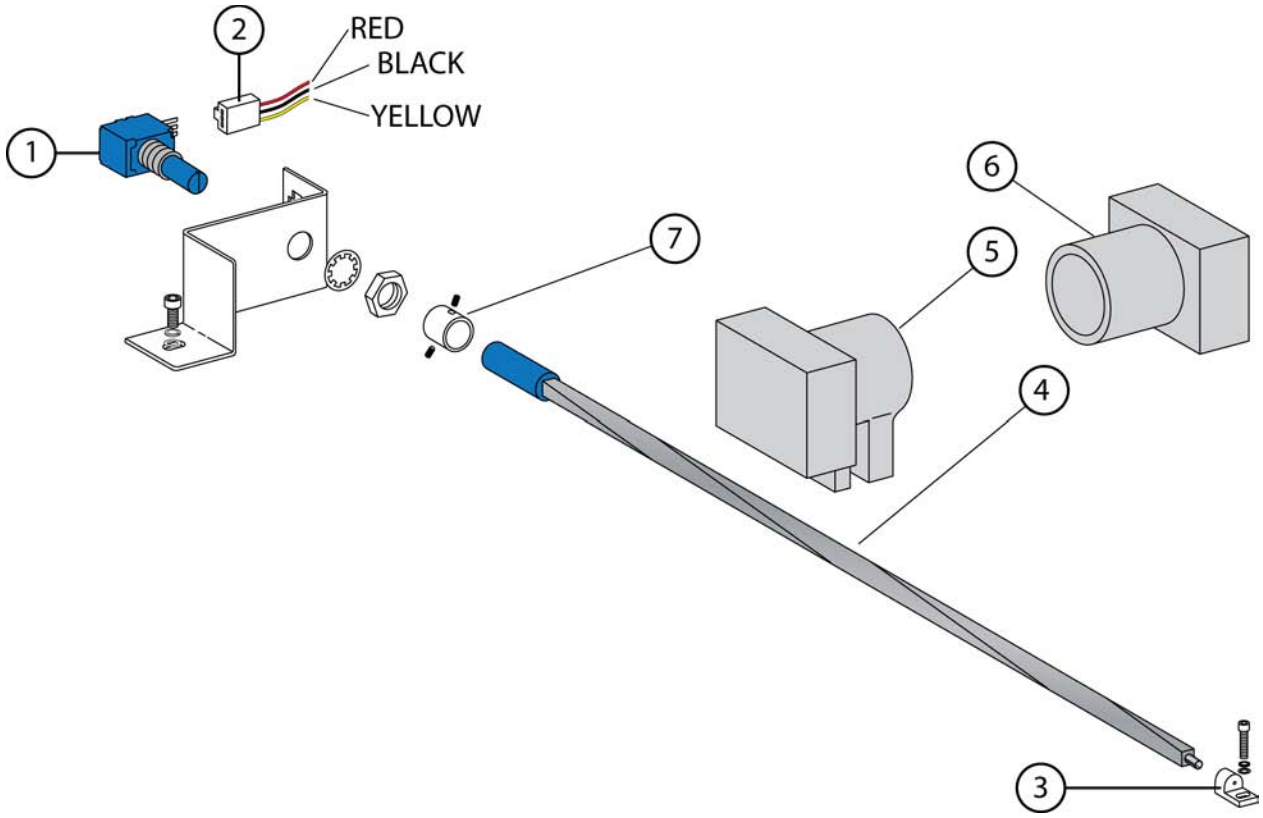


Wiring Harnesses

Part Number	Description
3912-016	Wiring Harness, Safety Switches
3912-015	Wiring Harness, with Switch, Manual Override
3912-014	Wiring Harness, Indicator Light

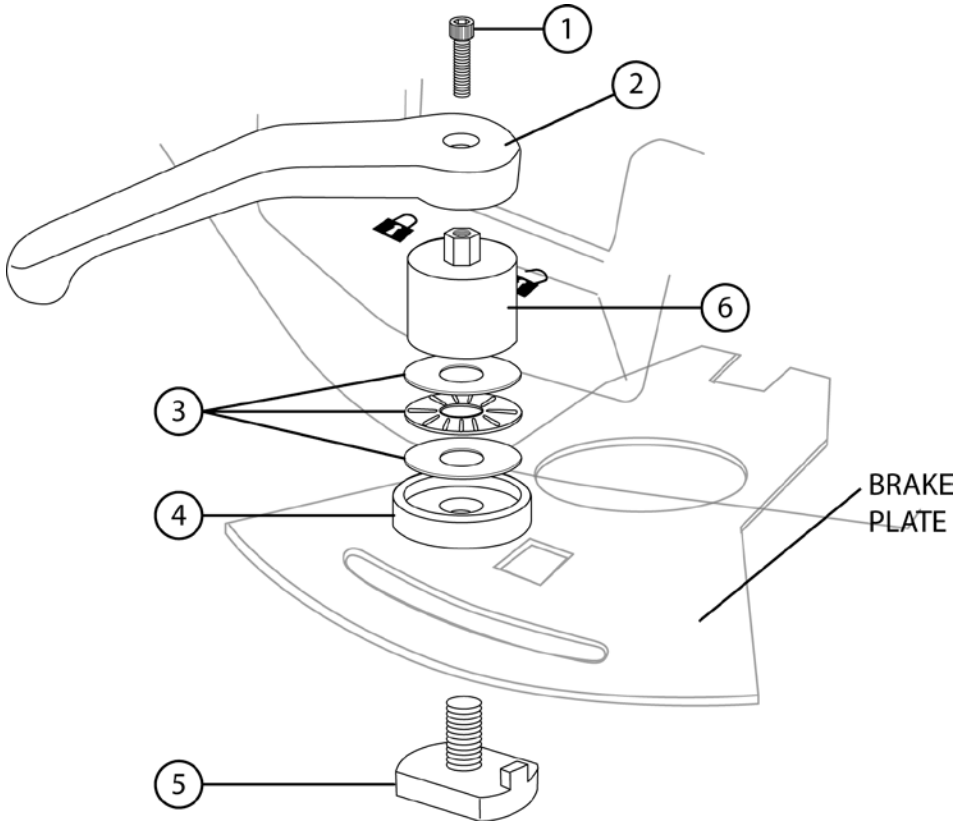
Back Positioning Sensor and Drive

Item	Part Number	Description
1	3914-042	Potentiometer, 3900 Chair Position Sensor, Base or Back
2	3912-018	Wiring Harness, Back Pos Sensor
	3912-040	Back Potentiometer Drive Kit, 3900, includes items 3, 4 and 7
3		Anchor Bracket
4		Potentiometer Shaft
	3910-023	Yoke Block Kit, Left and Right, 3900, includes items 5 and 6.
5		Yoke Block, Right Side
6		Yoke Block, Left Side
7		Potentiometer Coupler

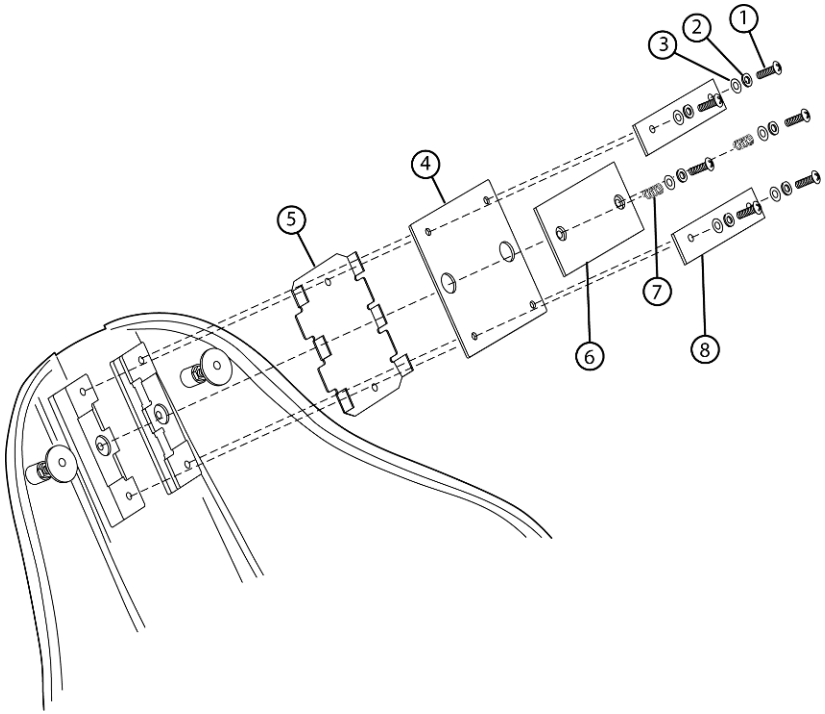


Swivel Brake

Item	Part Number	Description
	3912-019	Swivel Brake Kit, 3900, includes items 1-6
1		Brake Handle Cap Screw
2		Brake Handle
3		Roller Bearing and Races
4		Bearing Cup/Upper Brake Pad
5		Lower Brake Pad
6		Stop Lock



Headrest Glide Bar Friction Mechanism



Item	Part Number	Description
	3912-032	Headrest Glide Bar Friction Kit, includes items 1-7.
1		Screws, 6 each
2		Lock Washer, 6 each
3		Flat Washer, 6 each
4	3910-025	Headrest Slide Kit Contains 1 friction pad and two spacers.
5		Friction Pad Pressure Plate
6		Pressure Plate Spring, 2 each
7		Glide Bar Plate, 2 each

Model 3900 Dental Chair

Specifications

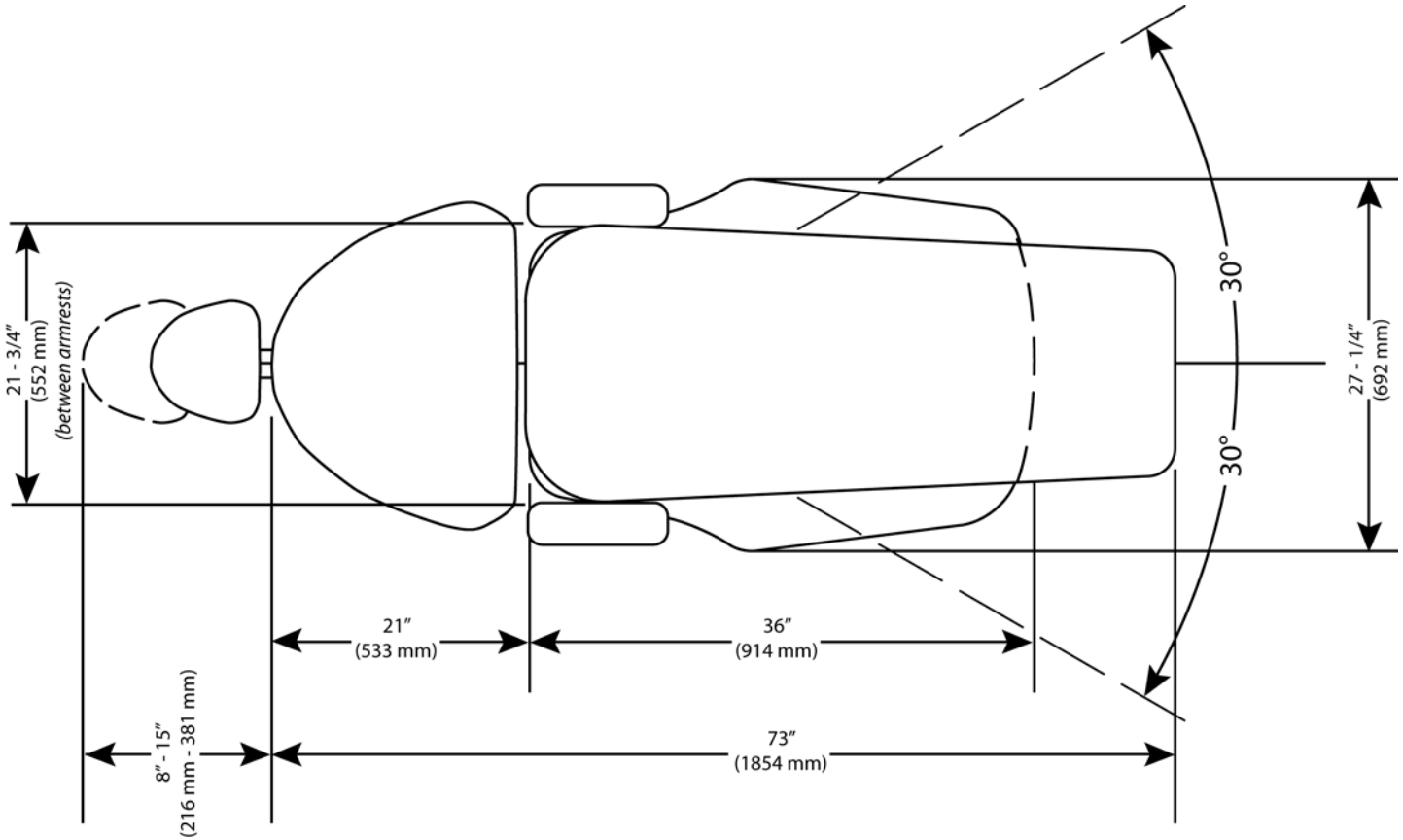
ELECTRICAL

Classification	Class 1, Type B
Operation Mode (Duty Cycle)	Intermittent 25 sec ON _ 300 sec OFF
Supply Voltage	115VAC ±10%, 4.8A, 50/60 Hz
	230VAC ±10%, 2.0A, 50/60 Hz
Fuses Type M	115VAC, F1/F2 – 10A, F3 – 100mA
	230VAC, F1/F2 – 6.3A, F3 – 63mA
Control Voltage	5VDC
Controls	Touchpad
	Foot Switch
Certifications	UL60601-1, CAN/CSA-C22.2 No.601.1
	EN60601-1, EN60601-2, & ISO 6875:1997

MECHANICAL

Minimum installation space	10 ft x 10 ft (3m x 3m)
Base plate footprint	35” x 25” (90cm x 65cm)
Total lift capacity	450lbs (225kg)
Maximum patient weight	300lbs (136kg)
Delivery system capacity	125lbs (57kg)
Weight (chair alone)	300lbs (136kg)
Shipping weight	396lbs (160kg)
Shipping package dimensions	57”L x 32”H x 34”W 145cm x 81cm x 86cm)

DIMENSIONS


21 - 3/4"
(552 mm)
(between armrests)
30°
30°
27 - 1/4"
(692 mm)
21"
(533 mm)
36"
(914 mm)
8" - 15"
(216 mm - 381 mm)
73"
(1854 mm)

DIMENSIONS