

Mfg: DORON Precision Sys.  
R101: SR2-V Simulator

**SR2-V  
OWNER'S  
GUIDE**

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**DORON PRECISION SYSTEMS, INC.  
P.O. BOX 400  
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## ABOUT THIS OWNER'S GUIDE

This Guide is provided to ensure that the owner/operating attendant understands the operating procedures, safety procedures, and maintenance requirements for operating the SR2-V safely, reliably, and efficiently. The guide assumes that while the operating attendant need not be a technician, s/he should be able to understand the basic operating principles of the SR2-V.

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## WELCOME!

You have just purchased an SR2-V Entertainment Simulator from Doron Precision Systems, Inc., the company that introduced the first commercially available entertainment simulator in 1977 *and continues to lead the way with hundreds of installations worldwide.*

Doron's library of simulation experiences has continually expanded, providing a wide range of thrilling experiences, including famous roller coasters, race car driving, and voyages to the outer limits of the galaxy. Millions of people the world over have experienced the fun, fantasy, and magical excitement of Doron's entertainment simulators.

**ALWAYS CHECK WITH APPROPRIATE OFFICIALS FOR LICENSING AND SAFETY REQUIREMENTS SPECIFIC TO THE STATE, COUNTY, OR MUNICIPALITY IN WHICH THE SR2-V WILL BE OPERATED.**

**SR2-V SPECIFICATIONS**

Size:	Capsule	172" long x 88" high x 88" wide in docked position, excluding ramps/steps (96" high when on transportation casters)
	Console	42" tall, 23.6" wide, 19.3" deep
Weight:	Capsule	Approximately 3,900 lbs., excluding passengers
	Console	Approximately 100 lbs.
Floor Space Required:		16' x 18', 300 sq. ft. (Minimum)
Ceiling Height Required:		10' 6" (Minimum)
Seating:		12 seats in 3 rows of 4, each seat fitted with a lap restraint

**MOTION DYNAMICS**

Horizontal Roll:	$\pm 18$ degrees, maximum
Longitudinal Pitch:	$\pm 18$ degrees, maximum
Roll Rate:	35 degrees per second, maximum
Pitch Rate:	30 degrees per second, maximum
Vertical Translation:	23" Front, 11" Rear

**MOTION SYSTEM**

Fluid Capacity:	13 gallons
Hydraulic Cylinders:	Front - 2.5" Bore x 14" Stroke(1) Rear - 2" Bore x 14" Stroke(2)
Motor:	7.5 HP, 50/60 Hz, 1725/1425 RPM, 3 phase 208-230/460 volts @ 60 Hz, 190-208/380-415 volts @ 50 Hz; Other voltages optional.
Pump:	Variable volume piston type 7.2 gpm at 60Hz, 1725 RPM
System Pressure:	1,250 psi
Accumulator:	5 gallon, bladder-type

Reservoir:	10 gallon capacity
Valves:	Three Servo Control Valves
Filters:	Two 3-micron filters (High and Low Pressure)
Noise Level:	Pump rated at 62 DbA, motor rate at 62 DbA @ 60 Hz.
Packaging:	Hydraulic power unit packaged in modular, removable assembly.

#### AUDIO/VISUAL

Projector:	NTSC LCD Video
------------	----------------

**NOTE:** The projector houses an expensive projector lamp which is automatically protected if power to the SR2-V is lost. If power to the system is interrupted, in any way, battery operated fans automatically cool the lamp, and circuitry inhibits the SR2-V from being switched on again for approximately two minutes.

**NOTE:** On power up, the projector has a warm up period. The word "STANDBY" will appear on the screen together with countdown seconds from 30 to 0 and no videodisc picture will be seen. When 0 is reached the projector will be sufficiently warmed up and be ready for correct operation.

Video Source:	Laser videodisc/30 Frames per second
Sound System:	160 watt, 2-channel amplifier, four full range speakers, one 40 watt sub-woofer.
Audio Source	Laser Videodisc Stereo
Software:	Ride Program/laser videodisc and program module

#### GENERAL CONDITIONS

Operational Environment:	The SR2-V is intended for indoor operation at normal temperatures and humidity. 60-90 degrees F, 20-80% Relative Humidity (R.H.).
Storage:	The SR2-V must be protected from moisture, dust, and excessive humidity - 90% R.H., maximum, not-condensing, 0 degrees F. to 110 degrees F.

## SAFETY FEATURES

The SR2-V includes many safety features:

1. Interior emergency door releases allow passengers to open the doors from the inside.
2. "Door Open" interlocks will automatically shut off the hydraulic pressure to the SR2-V if a "Door Open" position is sensed.
3. Velocity limiting and cylinder end-of-stroke cushions which will limit the danger to passengers in the event of any system malfunction or component failure.
4. When the SR2-V is docked, the system hydraulic pressure is released from the valves that drive the cylinders, thereby removing any possibility that the SR2-V could move while passengers are boarding/exiting.
5. A large, highly visible, and easy to reach emergency stop switch is provided at the Console so that the operating attendant can shut down the SR2-V instantaneously, if necessary.
6. An intercom system allows the operating attendant to listen to the cabin's interior sounds, and communicate with the passengers.
7. An optional safety mat interlock is offered as means of protecting the public outside the SR2-V while it is in operation. This safety feature incorporates a sensing mat that closes a set of contacts when sufficient pressure is applied, causing the SR2-V to "freeze" in its current position. Thus, a small child approaching the SR2-V from an unobserved position would not be harmed by a moving SR2-V.

Doron recommends that the owner or operating attendant either procure sufficient safety mat material for guarding the area around the SR2-V or make the SR2-V inaccessible by erecting a wall or other protective structure that does not require close attention while the SR2-V is being operated. Any fencing used should adhere to applicable safety regulations for the state in which you are operating.

Recommended types of mat are the Heavy Duty CPR Switch Carpet or the All-Weather Heavy Duty Style CKP Switch Mat, with standard ramped edging, manufactured by Tapeswitch Corporation of America, 320 Broad Hollow Road, Farmingdale, New York 11735 (or equivalent). The mat is also available from Doron.

**WARNING:** NEVER get under the SR2-V to perform any checks or work while the hydraulic pump is on. Turn off the pump by pressing EMERG STOP.

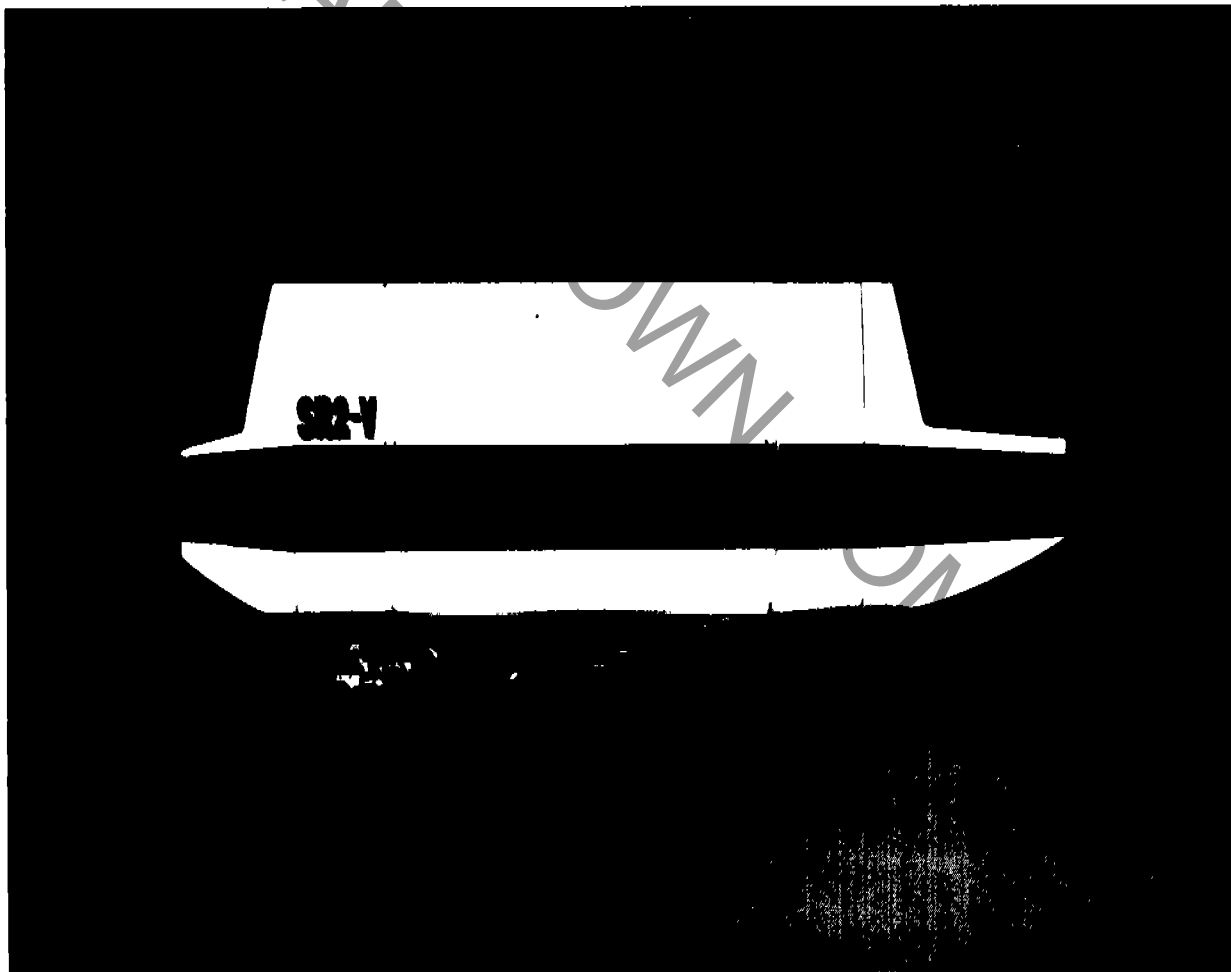
**OPERATING ATTENDANT'S RESPONSIBILITY**

The operating attendant's courtesy, alertness, and safety consciousness will determine to a great extent whether the SR2-V experience is exciting and enjoyable to the passengers, and profitable to the owner. The operating attendant's responsibilities may include collecting the money or tickets, boarding and instructing the passengers, starting the SR2-V, monitoring safe and proper operation, providing crowd control in the immediate area, stopping the SR2-V if unsafe situations develop, and supervising the exiting of the passengers at the end of each program. The presence of a qualified and responsible operating attendant is critical to a safe and successful SR2-V experience.

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**COMPONENTS****SR2-V CAPSULE**

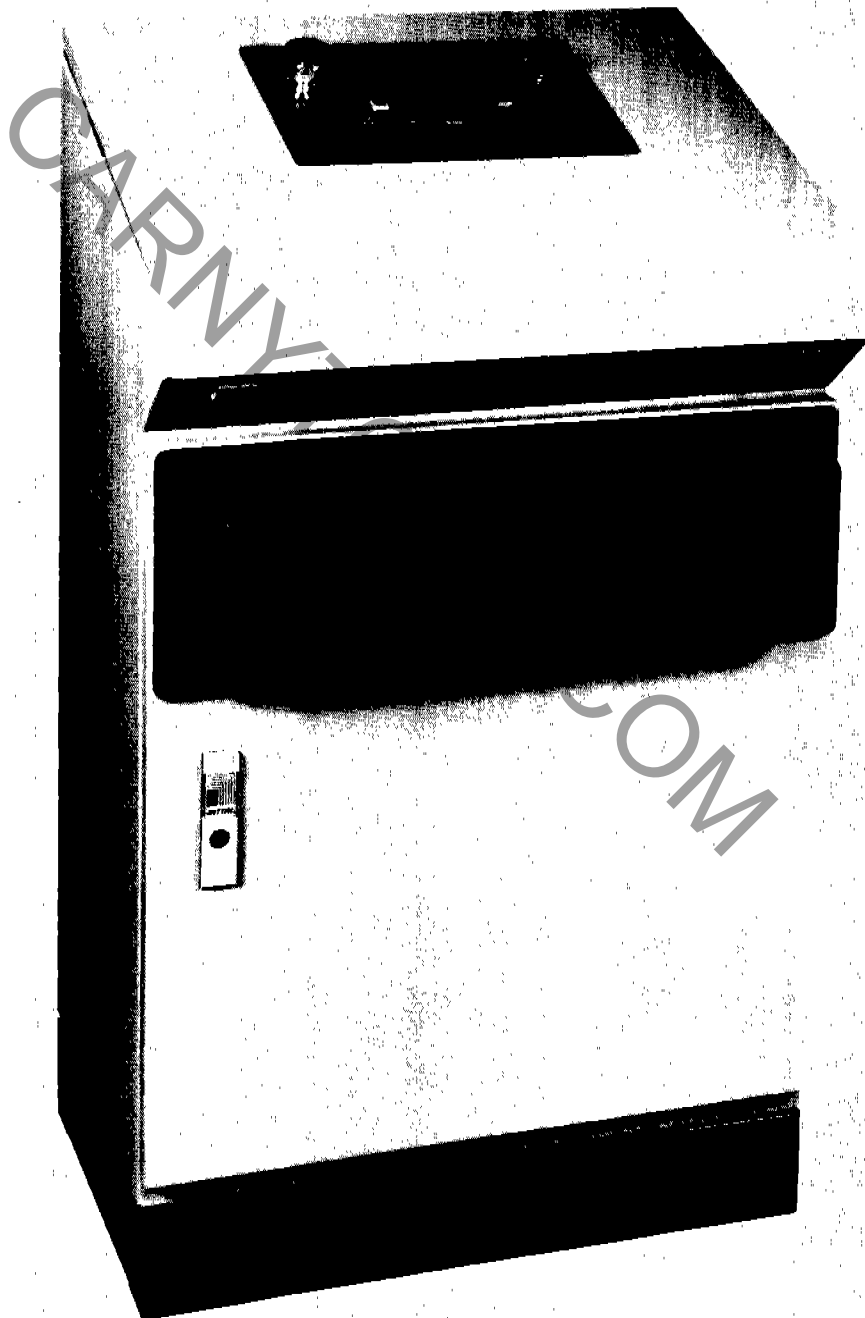
The SR2-V capsule can hold 12 passengers. It has three rows of 4 seats, each seat is fitted with a lap restraint for the safety and comfort of the passengers. Two Gull-wing doors, one on each side, also serve as emergency exits and can be released from the inside or the outside of the capsule. A large screen for viewing the SR2-V visual, and blowers for wind effect and circulation of fresh air are also included.

**SR2-V Capsule**

**CONTROL CONSOLE**

The Console houses the operator control panel, the laser videodisc player, the volume control for the speakers inside the capsule, and the Main PC Board.

A special key is provided to unlock the top cover or the front door on the Console . The Console has three locks -- two locks to open the control panel door and one lock on the door to gain access to the videodisc player .

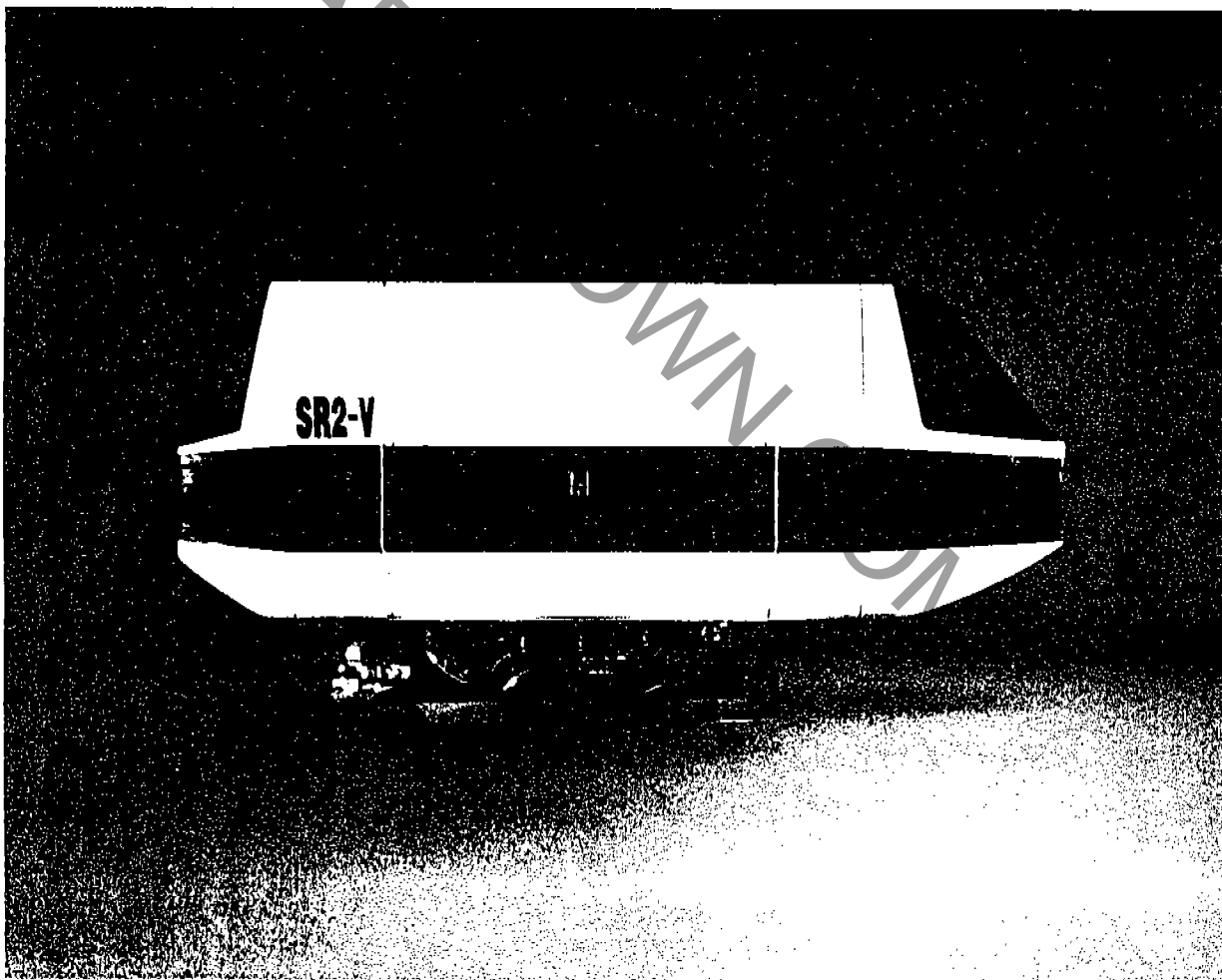
**Control Console**

**COMPONENTS****SR2-V CAPSULE**

The SR2-V capsule can hold 12 passengers. It has three rows of 4 seats, each seat is fitted with a lap restraint for the safety and comfort of the passengers. Two Gull-wing doors, one on each side, also serve as emergency exits and can be released from the inside or the outside of the capsule. A large screen for viewing the SR2-V visual, and blowers for wind effect and circulation of fresh air are also included.

**SR2-V Capsule****APPROVED MODIFICATIONS BY SPEVCO INC. AS FOLLOWS:**

When SR2-V's and/or SR-V's are trailer mounted, only one door is designated as "Entrance" and "Exit", therefore requiring only one set of steps.



### LASER VIDEODISC PLAYER

The laser videodisc player is permanently mounted on a shelf inside the Control Console. Storage space is provided in the Console for the videodiscs and program modules.

A volume control is located to the left of the videodisc player.

**NOTE:** It is recommended that the volume be adjusted to a comfortable and safe level for passengers. The higher volumes can be used when no one is on board and the operating attendant is trying to attract foot traffic.

### PROGRAM MATERIALS

Each SR2-V program consists of a laser videodisc and a program module that must be inserted before operation of the SR2-V can begin. See the operation procedures for information on the laser videodisc and changing the videodisc program in the section Operating the SR2-V in the Automatic mode.

The videodisc is stored in its own jacket. Care should be taken when removing the disc.

The program module is keyed so that the label is on the right side when the module is inserted into the PC board.

### Program Materials



**MODE OF OPERATION**

The SR2-V has two modes of operation:

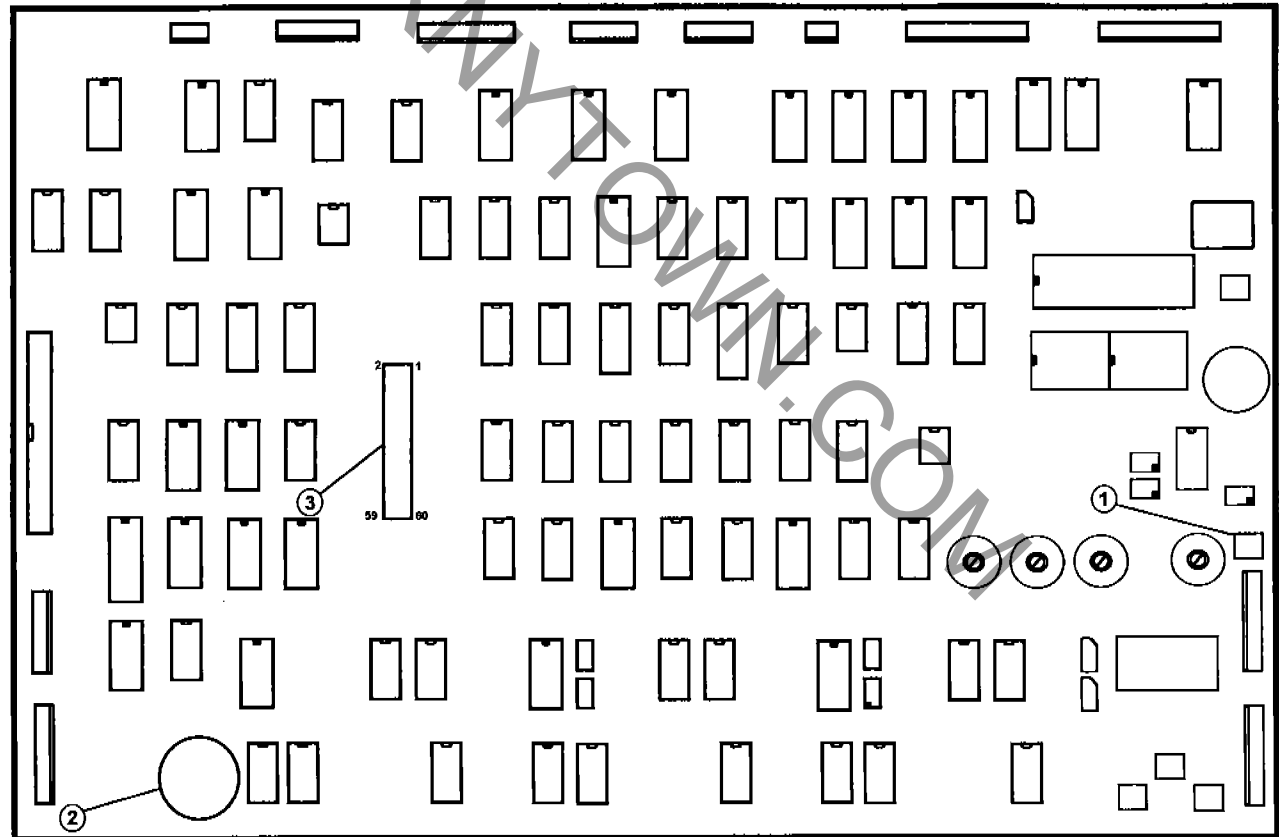
**AUTOMATIC MODE** - For use by the operating attendant when operating the SR2-V.

**MANUAL MODE** - For use by Maintenance Personnel to test the SR2-V functions.

**NOTE:** The mode selection is on the Main PC board, inside the Console, and should only be switched over by a service technician.

**WARNING:** NEVER get under the SR2-V to perform any checks or maintenance while the hydraulic pump is on. Turn off the pump by pressing EMERG STOP.

**Main Circuit PC Board**



1. Automatic/Manual Mode Switch      2. Gain Control Smoothing Switch      3. Program Module

**1. MODE SWITCH**

This switch has two positions: **AUTOMATIC** and **MANUAL**. The switch should be in the **AUTOMATIC** position for normal operation of the SR2-V and in the **MANUAL** position when testing the functions of the SR2-V.

When in the AUTOMATIC MODE, and RIDE START is activated, all cues for start, stop, and motion originate from the program module. Operation of the AUTOMATIC MODE is described in the Operation in the Automatic Mode section.

When in the MANUAL MODE, the RIDE START and SYS RESET switches are used to initiate and stop the motion control; actual control of position is performed by the four manual position controls found on the PC board. This mode is only to be used for maintenance purposes.

**NOTE:** The mode switch must never be changed during operation. Violent movement can result. Maintenance personnel should change the mode switch only when the SR2-V is in the docked position.

## 2. GAIN CONTROL SMOOTHING SWITCH (S4)

This dial switch (S4) has four positions and is used to vary the responsiveness of the SR2-V. Turn the switch counterclockwise for the slowest movement, and fully clockwise for the fastest.

**NOTE:** The Gain Control switch should only be changed with the SR2-V in the docked position.

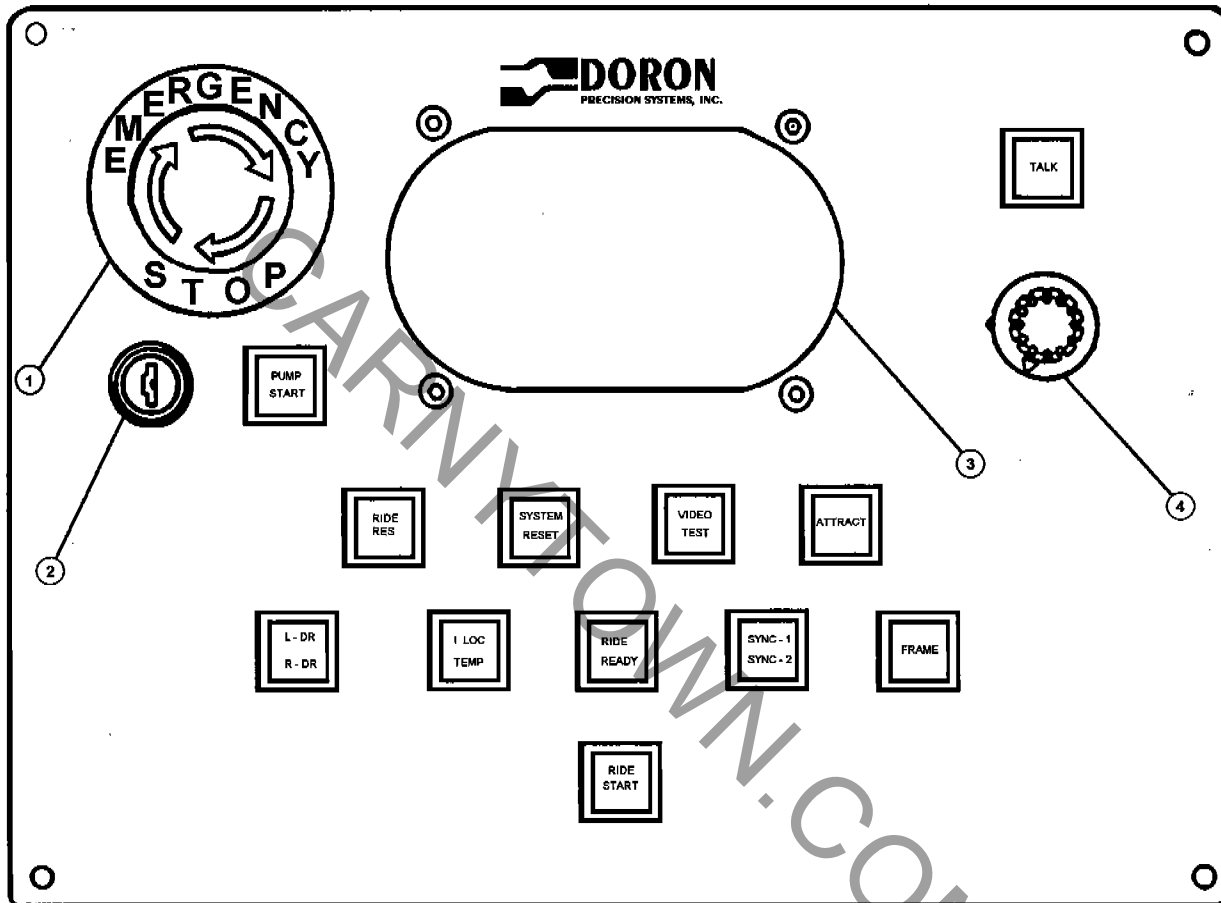
## 3. PROGRAM MODULE

Each program has a program module. The module is plugged into the connector on the main board, its label side facing to the right.

**WARNING:** NEVER change the program module with the power on.

**CONSOLE CONTROL PANEL****CONTROL PANEL**

This panel contains the controls and indicators used when operating the SR2-V and program. Since operation is semi-automatic, only a few controls are required.

**Console Control Panel**

- |                           |                 |                   |
|---------------------------|-----------------|-------------------|
| 1. EMERG STOP             | 5. Pump Start   | 11. L-DR/R-DR     |
| 2. Power On/Off Keyswitch | 6. Talk         | 12. I-LOC/Temp    |
| 3. Speaker                | 7. Ride Resume  | 13. Ride Ready    |
| 4. Intercom Volume Knob   | 8. System Reset | 14. SYNC 1/SYNC 2 |
|                           | 9. Video Test   | 15. Frame         |
|                           | 10. Attract     | 16. Ride Start    |

**1. EMERG STOP (Red)**

This large red mushroom-type push-button switch terminates the program in progress and de-energizes the motion system and hydraulic pump motor. It is used in emergency situations.

## 2. POWER ON/OFF KEYSWITCH

The keyswitch turns SR2-V power ON (clockwise) and OFF (counterclockwise) and supplies power to activate the switches and indicators. When the keyswitch is activated, all control buttons illuminate for five seconds and then extinguish.

**NOTE:** The Main Power Source must be turned on before the keyswitch is turned on.

**NOTE:** The projector houses an expensive projector lamp which is automatically protected if power to the SR2-V is lost. If power to the system is interrupted, in any way, battery operated fans automatically cool the lamp, **and circuitry inhibits the SR2-V from being switched on again for approximately two minutes.**

## 3. SPEAKER (Black)

A small speaker is provided at the Console for the intercom, allowing the operating attendant to monitor passenger activity in the SR2-V.

## 4. INTERCOM VOLUME KNOB (Black)

This rotary volume control knob allows the operating attendant to adjust the volume of the intercom audio received at the Console

## 5. PUMP START (Green)

A green push button, when depressed, illuminates and starts the hydraulic pump motor. The button will remain illuminated as long as the pump is running.

## 6. TALK (Orange)

A built-in intercom feature acts as a microphone when this non-illuminated orange push button is depressed. This allows the operating attendant to talk to the passengers in the SR2-V.

## 7. RIDE RESUME (Yellow)

This yellow push button illuminates when depressed and restarts the program from the point at which it was interrupted. This button allows the operating attendant to resume the program if it was stopped while in progress. The motion system will energize and "catch up" to the program; when the system is synchronized, or "caught up", the program will continue as it normally would from that point forward.

## 8. SYS RESET (Red)

This red system reset push button illuminates when activated. It resets the video projector and removes hydraulic pressure from the motion system, but it does not shut the pump motor off. It resets the motion and effects program to the beginning.

**9. VIDEO TEST (Blue)**

This blue push button illuminates when depressed and commands the laser videodisc player and video projector to start without activating the motion system. All of the audio and effects will operate during this function .

**10. ATTRACT (Orange)**

This orange push button illuminates when depressed and is used both to initiate and terminate the ATTRACT feature. The ATTRACT feature allows the SR2-V motion to function without the visual presentation (motion/no projection). This feature is used to attract passengers when no one is in the SR2-V.

**11. L-DR/R-DR (Red)**

This split display indicator illuminates to indicate when the left door (top) or right door (bottom) has been opened. If a door is opened either continuously or momentarily, the display will steadily illuminate. When the door is closed, the display will remain illuminated until the SYS RESET is pushed, or the program is started. If a door is still open, the display will flash.

**12. I-LOC/TEMP (Red)**

This is a split display indicator. The top half will flash when the safety mat interlock is triggered, and will remain illuminated until the SYS RESET is pushed or the SR2-V is restarted. The bottom half will flash if the hydraulic reservoir fluid temperature sensor reaches approximately 145 degrees F. If this indicator does flash, the hydraulic pump should be turned off by pressing the EMERG STOP button at the earliest convenient moment. Power to the SR2-V should be left on to allow the cabin ventilation blowers to provide cooling air to the hydraulics unit. Operation can resume when the light goes off.

**13. RIDE READY (Orange)**

This orange indicator signals that the program is ready to be activated.

**14. SYNC 1 / SYNC 2 (Green)**

This is a split display indicator. The bottom half of the indicator (SYNC 2) flashes ON momentarily when the Console is turned on, and also when it receives a synchronized signal that the video program is being reset to start.

The top half (SYNC 1) illuminates when the RIDE START or the ATTRACT button is activated. It flashes ON for approximately one second when the Console receives a synchronizing signal at the beginning of the disc responding to the start of the programmed motion and effects.

**15. FRAME (Blue)**

This indicator illuminates and flashes while the laser videodisc program is running.

**16. RIDE START (Green)**

This green push button illuminates and starts the SR2-V laser videodisc player. The button remains illuminated as long as the program is in progress.

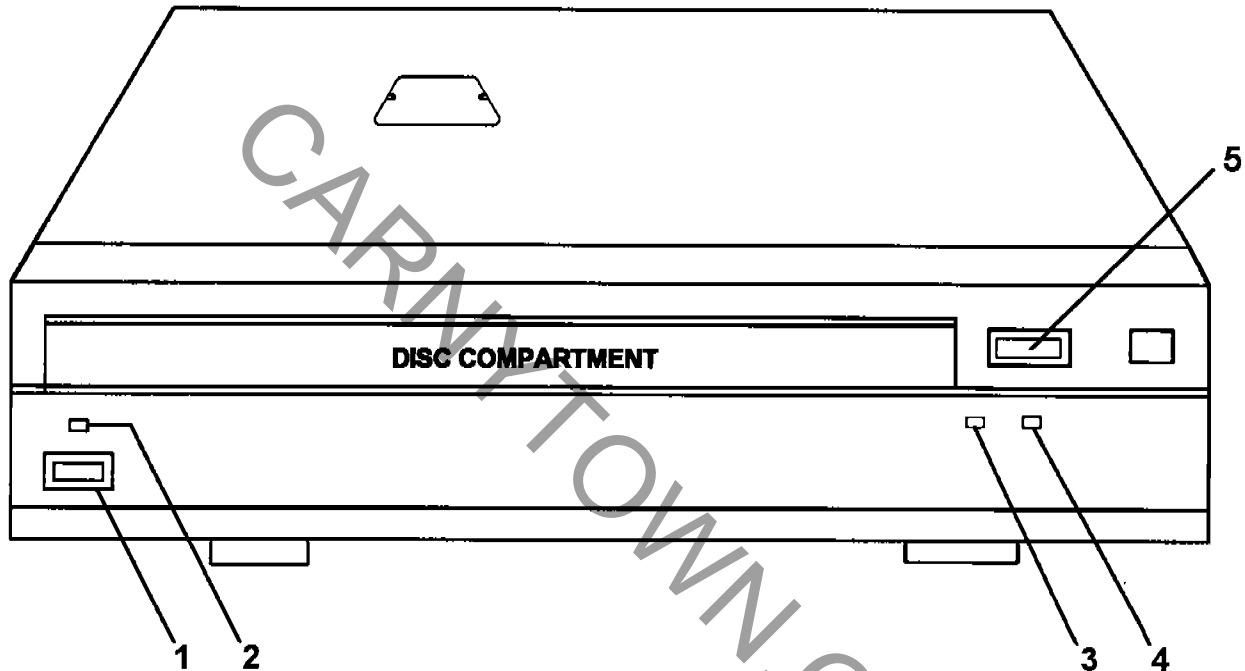
## VIDEODISC PLAYER

A high quality industrial videodisc player with rapid frame search is provided. It is located on a shelf in the Console, accessible through the hinged door.

The two components of the program include the videodisc and a program module.

The videodisc is stored in its own jacket. Care should be taken when removing the disc. The program module is keyed so that the label is on the right side when the module is inserted into the PC board.

### Videodisc Player



- 1. Power Switch
- 2. Power Indicator
- 3. EXT CPU Indicator

- 4. In Use Indicator
- 5. Open/Close Button

### CONTROLS AND INDICATORS

#### 1. POWER SWITCH

Located on the lower left front of the videodisc player. The videodisc player is automatically activated when the power is turned on at the Console.

**NOTE:** The power switch should be left in the ON position enabling the videodisc player to come on when the system main power switch is turned on.

**2. POWER INDICATOR**

Located above the power switch, the indicator will illuminate when the player is on.

**3. EXT CPU INDICATOR**

Located on the lower right front of the videodisc player, this indicator will illuminate when the player is controlled by an external computer.

**4. IN USE INDICATOR**

Located on the lower right front of the videodisc player, this indicator will blink when a disc is being loaded or unloaded, or illuminates when a disc is being played back within the player.

**NOTE:** This indicator will not be illuminated if a disc is not loaded on the player even when the power to the player is ON.

**5. OPEN/CLOSE BUTTON**

Located on the upper right front of the videodisc player, this button is pressed to open the disc compartment, and pressed again to close it. The compartment will also close automatically when it is pushed lightly. Push the center of the compartment for correct operation of the player.

**LOADING A VIDEODISC**

1. Turn the SR2-V power keyswitch on.

**NOTE:** This supplies power to the videodisc player if the player's power switch was left in the on position. If the power indicator light is not on, press the power on switch. The power switch should be left in the on position.

2. Unlock the door of the Console to gain access to the videodisc player.
3. Press the OPEN/CLOSE button to open the disc compartment.
4. Place the disc in the compartment. The disc will indicate "THIS SIDE DOWN".
5. Press the OPEN/CLOSE button again. The compartment will close and the IN USE indicator will blink for a few seconds. The videodisc player is now loaded and is ready for SR2-V controlled operation.

## OPERATING THE SR2-V IN THE AUTOMATIC MODE

To operate the SR2-V in the AUTOMATIC MODE, follow the sequence below.

### 1. AUTOMATIC CONTROL SWITCH

Make sure the switch control is in the "Auto" position on the Main PC board inside the Console.

### 2. PROGRAM SELECTION

Select the desired program (laser videodisc and program module). Insert the program module into the Console with the keyswitch off. Make sure that the module is fully seated with its connector properly mated.

### 3. START UP

Turn the Main Power Source on.

Next, turn the keyswitch POWER ON and depress PUMP START.

**NOTE:** On power up, the projector has a warm up period. The word "STANDBY" will appear on the screen together with countdown seconds from 30 to 0 and no videodisc picture will be seen. When 0 is reached the projector will be sufficiently warmed up and be ready for correct operation.

### 4. VIDEODISC

Open the laser videodisc player and load the videodisc into the player.

Make sure that the disc is placed in the player correctly, with the marked side, "THIS SIDE DOWN", inserted down. When a new program is selected, conduct a video test and adjust the volume to achieve the desired level.

### 5. OPEN THE SR2-V CAPSULE DOOR

To open the SR2-V compartment follow this procedure:

- Unlock and lift the door's latch.
- Hold the bottom of the Gull-wing door and raise it up. The door will lock in place, allowing the door to be released and remain open.

**WARNING:** Both doors must be unlocked to allow for emergency operation from inside and outside of the SR2-V.

## 6. BOARDING PASSENGERS

Before passengers board, make sure that all previous passengers have exited.

Do not allow passengers to carry drinks, food, or lighted smoking materials into the SR2-V.

**NOTE:** WARN PASSENGERS TO WATCH THEIR STEP WHILE ENTERING AND EXITING.  
MAKE SURE THE BOARDING PLATFORM IS SECURELY IN PLACE.

When all passengers are seated, the following instructions must be given in a clear, loud voice:

- "Passengers are to remain seated at all times during the program."
- "Drinks, food, and smoking are prohibited inside the SR2-V."
- "Emergency Exit handles are located at each door. To open the door in an emergency, push down on the release knob in the center of the door and push out."
- "Fasten seat belts for safety and comfort".

## 7. CHECKS BEFORE STARTING THE PROGRAM

When the passengers are seated, lower the door. Hold the raised door with both hands, spreading the hands as far as possible to each side of the door, and gently push down, so that the door lock is released.

After closing the door, make sure that the door has latched on both sides.

## 8. STARTING THE PROGRAM

The program may be started only if both doors are closed. If safety mats are provided around the SR2-V, no one should be standing on the mat. The RIDE START push button on the Console initiates the program. When RIDE START is pressed, the video starts immediately.

## 9. OPERATION CHECKS DURING THE PROGRAM

While the SR2-V is operating, the operating attendant must visually monitor the operation of the SR2-V and the area immediately adjacent to it. During operation, all waiting passengers must be kept behind the crowd control barriers, away from the SR2-V. The large red EMERG STOP push button must be used to stop the SR2-V if any unsafe conditions are noted, such as a small child adjacent to the SR2-V, or erratic or unsynchronized motion of the SR2-V.

## 10. PROGRAM COMPLETED

After the program cycle is completed and the SR2-V is in the docked position, the laser videodisc player and the program module will automatically reset and the RIDE READY indicator on the control panel will illuminate.

The door may be opened at this time. If the operating attendant fails to open the door within several seconds, a "ride-over" tone will sound as a reminder to open the door.

The door should only be opened AFTER THE MOTION HAS COMPLETELY STOPPED. To open the door, unlatch the handle and slowly push the door all the way up to the detent in the end of the track; in this position, the door will remain open under spring tension. The passengers can now exit and the sequence of boarding passengers and starting the program can be repeated.

## 11. CHECKING FOR MALFUNCTIONS

In the AUTOMATIC MODE, the SR2-V may stop automatically if an internal malfunction is detected, or it may be stopped manually by pressing the EMERG STOP push button if the operating attendant notices an unsafe condition or unusual behavior, such as abnormal motion, loud mechanical noises or hydraulic leaks. In both cases, the SR2-V settles to the docked position.

The operating attendant should shut off the power, exit the passengers, and call Maintenance Personnel.

**NOTE:** IF THE SR2-V SHUTS DOWN IN THE AUTOMATIC MODE, THE OPERATING ATTENDANT SHOULD NOT ATTEMPT TO RESTART IT WITH PASSENGERS INSIDE.

Malfunctions of the SR2-V video projector will rarely occur. However, the operating attendant must learn to recognize the symptoms of malfunction and alert Maintenance Personnel when necessary.

**MAINTENANCE CHECKS BY OPERATING ATTENDANT**

The operating attendant is responsible for making a series of checks at the beginning of each day and each week to insure that the SR2-V is operating properly. It is recommended that a checklist be provided to the operating attendant to identify which checks should be made and also to serve as a reminder to perform the checks. Sample checklists that may be copied are provided in this section.

**WARNING:** DO NOT get under the SR2-V to perform any checks or maintenance while the hydraulic pump is on. Turn off the pump by pressing EMERG STOP.

**CHECKS BEFORE AND DURING THE SR2-V OPERATION**

Certain operating checks should be conducted at the beginning of, during, and at the end of each day or shift.

1. Check the boarding platform to be sure it has not moved out of place.
2. Verify the Control Panel Lights, making sure that
  - all lights flash on initially;
  - the door indicators go out and stay out; and
  - the temperature light is not on.
3. Check to see that nothing has been left inside the cabin .

**DAILY CHECKS**

These checks should be performed by the operating attendant on a daily basis.

1. General cleanliness of the SR2-V should be checked, and any necessary housekeeping performed on the floor covering, the seats, the screen and the video projector shroud inside the SR2-V, the door guides, the areas around the base of the cylinders, the hydraulic package, and the cabin shell.

The area around the bottom of the cylinders should be kept clean to insure the reliability of the attaching bearings. The hydraulic components (valves, accumulator, and reservoir, especially) must be kept free of debris and any accumulations of dirt or dust for proper cooling of the hydraulic fluid.

2. Check the platform for stability. Inspect the steps for needed repairs.
3. The clarity of the picture and convergence of the projector can be checked by pressing the VIDEO TEST switch on the Console. If the projected image is out of focus, report it to the technician.

If changes in the audio level occur, adjust the volume with the control in the Control Console.

4. The hydraulic system pressure, as read on the pressure gauge, should be checked when the SR2-V is in the docked position. It should be 0 psi. When the motion system is energized at the beginning of the cycle the pressure should be approximately 1,250 psi. If not, it should be adjusted by Maintenance Personnel. The pressure will vary during a program, but should be 0 and 1,250 psi at these two specific times.
5. The floor area under the SR2-V should be checked for any signs of leaking hydraulic fluid. Hydraulic fluid is red. If a leak is apparent, the hoses, couplings, and component fittings should be checked by Maintenance Personnel to locate the source of the leak and repaired as necessary.
6. The temperature of the hydraulic fluid should be checked each day by reading the thermometer mounted on the reservoir. The temperature will slowly rise during long periods of operation.

The temperature reading on the gauge should not exceed 140 degrees. If it does, supplemental cooling or a reduced duty cycle may be required.

7. The wind effect must be checked by a second person while the operating attendant is operating the SR2-V. The blower speed should increase during the program and most of the ventilating air should come from the upper vents in the front bulkhead, with a lesser amount coming from the lower vents to create the "wind" effect. At the end of the program, the air flow will increase and will come primarily from the upper vents for general ventilation. Wind speed is controlled by program software.

8. The interior lights – the white lights in the ceiling and the red safety lights mounted on the seat bases - should be checked. If a lamp is not illuminated, the bulb should be changed, or the electrical circuit checked by Maintenance Personnel.

Bulbs and fuses must be replaced with the proper type, as substitutes may cause the lamp drivers to fail.

9. The SR2-V should be monitored during the course of the day for generally smooth operation. The program should be the same each time, so the operating attendant should be alert for any unusual or abnormally hesitant or abrupt movement. Any unusual sounds which develop should also be noted and reported immediately to Maintenance Personnel, particularly clunking noises, or squeaks and squawks from the gimbals.

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DAILY CHECKS	Dates:						
1. General Cleanliness							
2. Condition of Steps/Platform							
3. Video Test							
4. Audio Test							
5. Hydraulic Pressure							
6. Gunner Locked							
7. RPM 250 when operating							
8. Hydraulic Leaks							
9. Hydraulic Fluid Temperature							
10. Wind Effect							
11. Lights (Ceiling & Floor)							
12. Gunner Operation							
13. Gimbals/Pins							
14. Bearing Blocks							
15. A-Frame							

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**WEEKLY CHECKS**

1. The hydraulic fluid level should be checked. With the SR2-V operating, fluid should be visible in the reservoir sight glass, one-half to one-third of the way up. With the SR2-V off (pump not running), the fluid should be near or over the top of the sight glass. If not, add Dexron II Automatic Transmission Fluid ONLY, as necessary.
2. The hydraulic filter indicators indicate the degree of contamination of the filter elements. Both filter indicators must be read when fluid is flowing through the filter, (with the SR2-V operating) using an inspection mirror or a mirror on the end of a rod. If the pointer moves into the red area, Maintenance Personnel should change the filter element.
3. The condition of the hoses should be checked with the pump off and the SR2-V at rest. With a suitable inspection light, check the hoses for signs of abrasion, interference, or deterioration. Check the hose fittings for signs of leakage. Report any problems noted to Maintenance Personnel.
4. The filler cap should be removed from the top of the reservoir and the filter screen checked for any contamination. Report any contamination to Maintenance Personnel.
5. The air filters under the "nose" of the SR2-V should be checked. Access is gained by loosening the three fasteners holding the access door and lowering the door on its hinge, exposing the filters. If necessary, the filters should be washed in a mild detergent solution or replaced.

**WARNING:** The access door is heavy. After the final fastener is loosened, lower the door carefully. The SR2-V must not be operated with the access door open.

6. The cleanliness of the lower projection mirror can be checked when the projector is running with the lamp on. Loose dust on the mirror can be removed with an aerosol can of dry air.
7. The projector should be cleaned at least once a week. A light dusting with clean soft cloth is all that is needed. Consult Maintenance Personnel if any adjustments are necessary on the projector.

**WARNING:** Do not touch projector lenses with hands or fingers. Do not use any cleaning fluid, cloth, or paper on the lenses.

8. Check the doors for smooth operation. Check the rollers for signs of wear. Check hinges and latches for loose fasteners or bearings. Check that the emergency release knob will operate properly from inside the SR2-V. Report any problems to Maintenance Personnel.
9. Check the gimbals and pins for unusual noises or movements. NO squeaks, squawks or clunks should occur during motion. If black dust is observed under the gimbals or pins, report it to Maintenance Personnel immediately, as continued operation may be unsafe.
10. Check the bearing blocks at the bottom of each cylinder. Check to see if the pillow blocks remain stationary during an active program. If any unusual movement or noises are observed, report them to Maintenance Personnel immediately.

11. Observe the SR2-V while it is in motion. Particularly note the movement of the fittings connecting the large "A" frame to the base, and to other points. Any evidence of loose fit, such as movement or noise, should be reported to Maintenance Personnel.
12. Remove and clean the hydraulic power unit heat exchanger filter.
13. Check the cylinders for signs of fluid leakage around the glands. Report any leakage or excessive cylinder movement to Maintenance Personnel.

All checks are suggested to insure that the SR2-V is maintained in a proper manner. Any problems noted should be reported immediately to Maintenance Personnel.

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WEEKLY CHECKLIST	Date Performed:
1. Fluid Level	
2. Filter Indicators	
3. Six Hoses/Condition	
4. Filter Cap	
5. Air Filters/Noise	
6. Lower Mirror Clean	
7. Clean Video/Projector Area	
8. Doors	
9. Gimbals	
10. Bearing Bolts	
11. 'A' Frame	
12. Power Unit Air Filter	
13. Cylinders/Port End/Pots	

**PRELIMINARY CHECKS TO AID MAINTENANCE PERSONNEL****VISUAL INSPECTION**

1. Immediately after receiving the SR2-V, the shipping cover should be removed and set aside.

Should any damage be evident, immediately contact the Doron Sales or Service Representative, or Doron Precision Systems, Inc., PO Box 400, Binghamton, New York, 13902: (607) 772-1610.

2. Visually check all cables, connectors, circuit board connectors, and other electrical connections for secure connections, adequate clearance between adjacent terminals (to prevent electrical shorts), frayed or worn insulation, cut wires, etc. The Maintenance Personnel should tighten any loose connections and replace any cut, broken, or frayed cables or connectors.

The Maintenance Personnel should also check for and tighten any loose fasteners.

3. Visually check the hydraulic reservoir.

This reservoir is shipped full, with a sealing-type cap on the filler opening instead of a breather cap. The Maintenance Personnel should remove the sealing cap and replace it with the breather cap.

**WARNING:** This sealing cap must be replaced with the breather cap before the unit is run or malfunction may result.

The fluid in the reservoir should be "topped off", if necessary, to replace any lost in shipping. The tank should be full, with the fluid level approximately one inch from the top of the tank. Overheating can result if the SR2-V is operated with inadequate fluid. The Maintenance Personnel should use a wrench to check the hydraulic cylinder and pump hose connections.

No air leaks are permissible. The hydraulic unit and mechanical system should be checked by Maintenance Personnel for contamination, obstruction or missing attachment parts.

The mechanical fastenings of the motor-pump, accumulator, reservoir, tube mounts, and manifolds should also be checked. It may be necessary to roll the hydraulic power unit out, at least partially, for access to components that appear to be loose.

**SEE TECHNICAL SUPPORT GUIDE  
FOR FURTHER INFORMATION**

## INSTALLATION

The following tips are offered to assist installation personnel in selecting and preparing a suitable site to install the SR2-V and to ensure proper operation after installation.

### SITE SELECTION AND PREPARATION

1. The site should be enclosed to protect the SR2-V from adverse weather conditions.
2. A firm base such as concrete or asphalt should be available for the SR2-V. The surface should be fairly level, since the SR2-V must be leveled upon installation. Leveling pads for the SR2-V are provided and should always be used.
3. The atmosphere should be fairly clean and free of dust, sand, or dirt particles, in order to prevent contamination of air filters, bearing surfaces, hydraulic components, and optical components. The degree of contamination in the atmosphere will determine how often these items must be cleaned or replaced.
4. The temperature and humidity of the site should normally be in the 60 to 90 degrees F range, with 20 to 80 percent relative non-condensing humidity.
5. The minimum surface area for the SR2-V is 16' x 18'. This minimum assumes that only one door is used for normal boarding and exiting of passengers. An optimum-sized area, allowing the use of both doors and clearance for maintenance, would be 24' x 22'. The ceiling must be at least 10' 6" high.
6. Proper power connections to a fused switch box should be available: 208 volts AC, 3 phase, Wye-configured, 30 amp, 5 wire service for US operation.
7. A platform adjacent to the doors must be provided on each side of the unit, for use by passengers boarding and exiting. The platform should be approximately 10" high, with a 4' x 7' platform surface. A bracket of 2" x 10" board should be used to maintain a minimum distance of 9" between the platform and the centers of the SR2-V leveling pads, and thus insure that the SR2-V body will not hit the platform when in an extreme roll and pitch position.
8. The Console, normally located near the door on one side of the SR2-V, should be positioned so that the control panel faces away from foot traffic.

### LEVELING

The SR2-V is moved into its final position on a set of casters. The base frame is jacked up and the casters are replaced with adjustable leveling pads. These leveling pads are provided with the system.

Once the SR2-V is resting in the final operating position, the Maintenance Personnel should check the base frame to insure it is in a level position.

**NOTE:** Failure to level the SR2-V could result in unreliable operation and equipment damage.

If leveling is necessary, the Maintenance Personnel should loosen the leveling pad locknut and turn the threaded stud until the proper height is achieved. Each pad can adjust upward about 3/4 of an inch.

## INITIAL POWER-UP AND SYSTEM CHECKS

### POWER SERVICE

#### 1. Power Requirements

The standard factory configuration of the SR2-V requires 208 volt 60 Hz 30 Amp 3 Phase Wye power. Three phase is needed because the motor is three phase 60 Hz. Two hundred eight volts in the Wye configuration is the voltage required, because exactly 120 volts is available between any leg and neutral for single phase loads. The motor power cable must be wired to appropriate voltage lugs at the motor.

**WARNING:** DO NOT ATTEMPT TO OPERATE THE SR2-V ON 230 OR 240 VOLTS THREE PHASE, OR ON DELTA CONFIGURATION. CONSULT DORON FOR SPECIAL POWER REQUIREMENTS.

#### 2. Power Connections

For U.S. operation, the facility should provide a 3-pole, 30 amp switch, with a disconnect rated at 250 volts or more.

This device, which may be either a three pole circuit breaker or a fused safety switch, must be located within easy reach of the SR2-V operating attendant during normal operation.

The SR2-V may be connected to the disconnect device by conduit or five wire 10 AWG type SO cord. The choice will depend upon the permanence of the installation and local codes. Electrical wiring in the SR2-V is to a five pole terminal block in the power box, located at the front of the base frame. The three top terminals are for the three hot phases, the next down for the neutral terminal, and the bottom terminal for safety, chassis, or earth ground.

### PREPARATION FOR POWER-UP

#### 1. Electrical Tasks

With the power off, inspect the Power Box for electrical integrity. Check for loose connections and terminals, and for loose relays in their sockets. Tighten all loose hardware and terminals.

Check the electrical plugs for security at the feedback pots, servo valves, solenoid valves, and the motor cord. These connections need only be "finger tight", but should not be loose or sloppy.

Open both covers on the Console and inspect it for loose hardware and electrical connectors.

Connect the two cables between the MS connectors at the rear base on the Console and their destinations on the SR2-V frame connector. These cables can only be connected in one direction due to the types of connectors used.

Using the green and yellow wire provided, connect the grounding lug on the Console to the same lug on the SR2-V at the frame connector. Make sure these lugs are screwed down tight on the stripped wire.

## 2. Power-Up

Two circuit breakers in the Power Box power-up the SR2-V.

- The left breaker, viewed facing the power box, controls low voltage AC sources and the video projector.
- The right breaker controls only the cabin ventilation blowers.
- The left breaker must be on for power-up. The right breaker may be left off temporarily if desired, but must be turned on before operating the hydraulic system since the rear ventilation blowers provide cooling air to the hydraulic unit.

Make a final check of the hydraulic power unit, particularly the fluid level. The fluid should be at the top of the sight glass, or above it.

Make sure the power keyswitch is in the off position (oriented vertically) on the Console.

Turn on three phase facility power.

Turn the Console power keyswitch to the ON position.

**SEE TECHNICAL SUPPORT GUIDE  
FOR FURTHER INFORMATION**

**SAFETY REQUIREMENTS****REMINDERS FOR THE OPERATING ATTENDANT**

- Completely inspect and test run the entire SR2-V before each operating period.
- Assist passengers on and off when necessary.
- Intoxicated persons must be not allowed on SR2-V.
- Instruct passengers to fasten their seat belts, assist where necessary.
- Be cautious and ready for the unexpected where children are involved. Under aged children must be accompanied by an adult.
- Remind passengers to remain seated during the program. No standing or changing seats is allowed once the doors are closed.
- If passengers misbehave, shut the operation down until the condition is corrected.
- Smoking by passengers is not permitted.
- If any unusual noise or condition develops on the SR2-V, stop the operation and notify Maintenance Personnel.
- Passengers waiting for the next program must be kept outside of the barrier and away from the moving SR2-V.
- Be alert when the SR2-V is operating and be prepared to stop the SR2-V if an emergency or malfunction should occur.
- Take pride in operating the SR2-V safely.

**BARRIERS**

State requirements differ, but most States have some regulations that require a crowd control barrier positioned around the SR2-V. The barrier should meet at least the minimum guidelines below.

- The barrier should be approximately 36" to 42" high.
- The bottom rail of the fence should not be more than 6" to 8" from the ground.
- The pickets should not be more than 4" apart.

**ALWAYS CHECK WITH APPROPRIATE OFFICIALS FOR LICENSING AND SAFETY REQUIREMENTS SPECIFIC TO THE STATE, COUNTY, OR MUNICIPALITY IN WHICH THE SR2-V WILL BE OPERATED.**

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May 28, 1997

A.C. Littleton, Jr., P.E.  
Field Administrator  
Bureau of Fair Rides Inspection  
Florida Dept. of Agriculture & Consumer Services  
3125 Conner Blvd., Bldg. #4  
Tallahassee, Florida 32399-1650

Dear Mr. Littleton:

Doron Precision Systems, Inc. has revised Section 1.2.6, "Operational Environment" and Section 1.2.7 "Storage" of the SR2/SRV Simulator Manual to permit outdoor operation. Attached for your records is a copy of the new text that will replace these sections.

Doron does not prohibit operation in the open air. However, deterioration of the equipment due to environmental factors is a possibility for any amusement ride. Therefore, Doron notifies its customers, through these manual sections, that it is their responsibility to protect certain parts of the ride from the elements in order to maintain warranty coverage.

Please review the attached revised sections and inform me if this revision is adequate to allow our customers to operate in the open (when they have provisions to protect the power/relay box if extreme weather is possible). Note that the power/relay box (under the nose) is not necessarily going to ingest water during a light rainstorm; it is up to the owner/operator to provide protection, if needed, and to take proper remedial action if an unprotected unit is subjected to violent weather.

Sincerely,

A handwritten signature in cursive script that reads "Fred White".

Fred White

FWW:jmq  
FWW:97-33

## Replacement Paragraphs 1.2.6 and 1.2.7

### 1.2.6 Operational Environment

The system must be protected from the elements during operation, transport or storage in order to assure optimum life and system reliability. Optimum operating conditions are in the range of 55° to 100° F, 35% to 98% relative humidity, non-condensing. Precautions should be taken to protect the system from dust, dirt and moisture from precipitation, condensation or any source. The electrical box under the nose, the console and all other electrical components must be protected from getting wet. It is the owner's/operator's responsibility to maintain operating conditions that are neither detrimental to the equipment nor unsafe.

### 1.2.7 Storage Environment

The ride should be protected from moisture, dust and dirt. The environmental limits for storage are; relative humidity 98% maximum, non-condensing; temperature extremes 0° to 110°F.