The Power Saver is a compact, low profile coil/controller combination for use with switching solenoid valves. The Power Saver controls current to the coil to minimize power consumption. Bright LED indicators on the unit provide an overview of the operating status. Setup is accomplished through a convenient Hand Held Programmer (HHP). There is no cover to remove and no tiny pots to set. Once configured, the settings are stored in permanent memory within the unit. The Power Saver is intended for use on continuous duty applications (minimum switches between on and off).

- Easily configured using Sun's hand held interface
- LED indication of Status and Output Current
- Deutsch DT04-6P Connector, IP69K rated
- Adjustable current limited output with short circuit protection
- All output limits are independently adjustable
- Microprocessor controlled for consistent, reliable performance
- CE approved – Emissions Test: EN55011, Immunity Test: EN61326

Operating Specifications:

Supply Voltage	Equals coil voltage within ±10%
Supply Current	I_{SOL} + 20 mA
Output Current for 6 seconds	2000 mA maximum
Output Current for holding	1600 mA maximum
Analog Input Impedance	13 K Ω
Operating Temperature Range	-4° F to 158° F (-20° C to 70° C)
Enclosure	Glass filled nylon with Lexan light pipes, polyurethane potting compound

Physical Description

The Embedded Electronics Power Saver is shown at the right. There are two indicator lamps labeled STATUS and ACTIVE. The STATUS lamp will light green whenever power is applied to the unit and is within the specified voltage range. The STATUS light will flash red when a fault has occurred. The type of fault is indicated by the number of successive flashes. It will continue to flash until the power has been cycled. The amber lamp labeled ACTIVE provides an indication of the current being supplied to the solenoid outputs.

Communication with the Power Saver takes place through two infrared communication windows. These windows allow for configuration and monitoring of the operating parameters, and therefore must remain free from any obstruction such as paint or other material. The infrared adapter cable clips onto the Embedded Amplifier in the notches located between the coil housing and amplifier section.

Infrared Communication Windows

3.00 inch (76,2 mm)

1.49 inch (37,8 mm)

2.50 inch (63,5 mm)

User Interface

The Embedded Electronics Power Saver has a number of internal settings which allow each unit to be configured for the application in which it is to be used. These settings are accomplished using Sun's Hand Held Programmer (Sun p/n 991-700). The Hand Held Programmer is a stand alone unit. Because it is fully self-contained, the Programmer and Infrared Cable Adapter (Sun p/n 991-702) are all that is required.

Parameter List

The following table outlines the parameter list for the Power Saver. Along with the name of the parameter and its type, the table lists the limits and units for each item.

Parameter	Type	Limits	Default Settings	Units
790-4E**V	FIXED			Version #
START TIME	VARIABLE	0 TO 6.0	1.0	s
START CURRENT	VARIABLE	0 to 2.0	1.2	A
HOLD CURRENT	VARIABLE	0 to 1.2	0.6	A
OUTPUT CURRENT	MONITOR			A
SUPPLY VOLTAGE	MONITOR			A
FAULT STATUS	MONITOR			FAULT

790-4E**V – This is the title parameter. The model number of the unit and the firmware version are displayed. The title parameter is fixed.

START TIME – The start time represents the time in seconds that the start current is applied to the solenoid coil. The start time is variable and adjusts in 0.15 increments.

START CURRENT – The start current represents the shift current in Amps applied to the solenoid coil. The start current is variable and adjusts in 0.02 A increments. For optimum coil life, the START CURRENT and START TIME should be minimized to values necessary to shift the valve. High START CURRENTs applied to long START TIMEs will reduce coil life.

HOLD CURRENT - The HOLD CURRENT represents the reduced current applied to the coil to hold the valve in the shifted position. HOLD CURRENT is a variable and adjusts in 0.02 A increments. The maximum recommended value with 24 volts is 590 mA and 1150 mA with 12 volts.
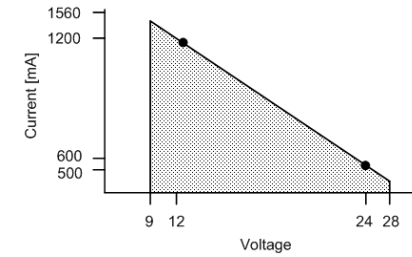
Maximum HOLD CURRENT should fall below the curve in the shaded region in order to achieve optimum coil life. The curve represents the temperature stabilized power of 14 watts.

OUTPUT CURRENT - Output Current displays the nominal current being supplied to the output. The Output Current parameter is a monitor type.

SUPPLY VOLTAGE - The Supply Voltage parameter displays the module's power supply voltage. This value is included as an aid to troubleshooting. The Supply Voltage parameter is a monitor type.

FAULT STATUS - The Fault Status parameter displays the current fault code when a fault exists as shown in the table below. The Fault Status parameter is a monitor type. In addition to the on-screen fault status, the STATUS light will flash red indicating a problem. The light will flash a number of times periodically corresponding to the fault codes below.

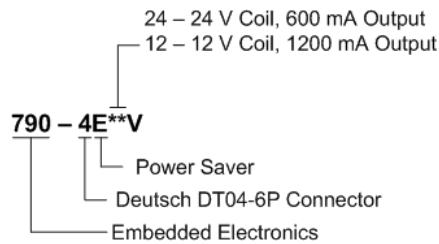| Code	Fault	RED LED Flashes
1	Over Current	☼
2	Open Output	☼ ☼
3	Output Shorted	☼ ☼ ☼

Configuration

All the Hand Held Programmer operations are accomplished with the use of 4 buttons. These buttons are Lock, Unlock, Up, and Down. The Programmer represents these in graphical form as padlocks and arrows.

The Hand Held Programmer has a two-line LCD display. The up and down arrows are used to navigate through the parameter list. When either button is pressed, the display will be updated with the next parameter in the list. The parameter name will appear on the first line and the associated setting will appear on the second line. The list is accessed in a circular fashion, stepping down from the last parameter to the first and vise-versa.

To change the setting of a variable parameter, the user must press the unlock button to place the system in edit mode. While in edit mode, the display will show the Up and Down arrows together at the beginning of the second line. In edit mode, the up and down buttons are used to change the value of the parameter. For parameters which contain both variable and monitor data, the monitor data is shown surrounded by square brackets. Once the desired setting is displayed, pressing the lock button will save the parameter and end the edit mode.

Ordering Information

The following is a breakdown of the 790-4E**V part numbering system:

24 – 24 V Coil, 600 mA Output
12 – 12 V Coil, 1200 mA Output

790 – 4E**V

Power Saver
Deutsch DT04-6P Connector
Embedded Electronics

Wiring

Wiring functions are listed in the table below. Following the table are wiring examples for various modes of operation.

Notes:

- To establish the infrared communications link, it is essential that the infrared communication windows remain free from any obstruction such as paint or other material.
- For acceptable EMC immunity, a shielded cable should be used. Shield drain should be attached to earth ground.

Terminal	Function
1	+V Supply
2	No connection
3	Supply common
4	No connection
5	No connection
6	No connection

DT04-6P Connector
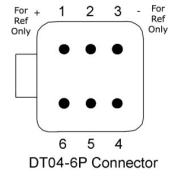
Single Solenoid

The Amplifier can be controlled as shown.
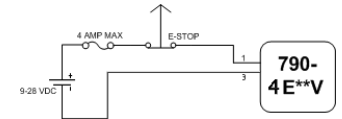
Setup Procedure

Note: Changing parameter settings may cause sudden and unexpected machine movements. Care must be taken to prevent injury, death, or damage of equipment.

1. Install the infrared Cable Adapter to the Embedded Amplifier paying particular attention to the orientation of the Adapter—the logo side should face away from the coil and towards the embedded amplifier. The 9 pin connector must be connected to the serial port on the HHP.
2. Power must be applied to the Embedded Amplifier. Turn on the HHP by briefly pressing the yellow power button marked with the international power symbol I|0. The title screen for the HHP should appear.
3. Parameter definition should be set in the descending order as shown in the parameter table above to avoid a common mistake.
4. Pressing the green Unlock button when a variable parameter is displayed puts the amplifier into the edit mode.
5. Press the DOWN arrow to display the START TIME parameter. The number shown on the second line is the setting value that is a variable. Pressing the UNLOCK button enters the edit mode. The START TIME setting can be changed by pressing the UP arrow to increase the value or the DOWN arrow to decrease the setting. Once the value has been selected, pressing the red LOCK button commits the change to memory and exits the edit mode.
6. Press the DOWN arrow to display the START CURRENT parameter. The first number shown on the second line is the setting value and it is variable. The second number shown in square brackets is the monitored value currently present. Pressing the UNLOCK button allows the value to be edited either by increasing as the UP arrow is pressed or decreasing as the DOWN arrow is pressed. Once the value has been selected, pressing the red LOCK button commits the change to memory. The START CURRENT value should be determined by the minimum current to shift the valve, but above the HOLD CURRENT setting.
7. Press the Down arrow to display the HOLD CURRENT parameter. The first number shown on the second line of the display is the setting value, while the number in square brackets is the monitored value currently present. Pressing the green UNLOCK button enters the edit mode to allow for the setting to be changed. Press the UP arrow to increase the value and the DOWN arrow to decrease the value. The value selected should not exceed the recommended value for the coil being used. Exceeding the value will dramatically shorten the life of the coil by producing excessive heat. Refer to the graph above for recommended maximum values. The value selected should allow for the valve to be held in the shifted position. Once the value has been selected, pressing the red LOCK button commits the change to memory and exits the edit mode.