# DCS – Professional Advanced Computerized Irrigation Controllers
Operating and Installation Instructions

Main Features:

* Independent Valve Programming
* Weekly or Cyclical Programming
* Up to 4 Operations Daily In Weekly Program Mode
* Irrigation Window in Cyclical Program Mode
* Irrigation period: From 5 seconds to 12 hours
* Irrigation Cycles in Cyclical program mode: From Once a minute to Once a Month
* Withstands Harsh Climatic Conditions
* WP only – Water-resistant
* Simple, Four-Button Programming
* Single Valve (DC1s) to 4 Valve (DC4s) Capacity
* Optional Manual Operation
* Operates On Two 9V Alkaline Batteries
* Valve type compatibility:
  Galcon 2-way (blue panel), Galcon 3-way or other 3-way hydraulic valves with a command valve (orange panel)
* Program lockout sensor option; individual valve association to sensor
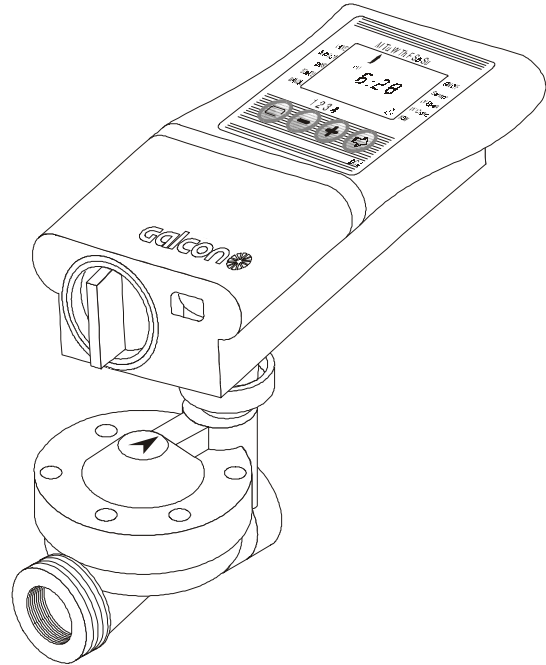
Note: This user manual covers models operating both 2-way and 3-way valves.

Galcon
IRRIGATION CONTROL EQUIPMENT

CE

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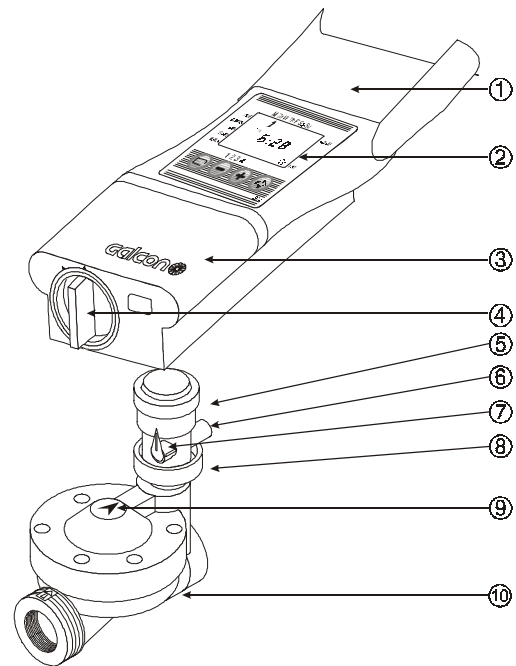
Figure 1

Before installation: make sure a filter is installed upstream to the valve. (See list of additional accessories page 27.)

2.   Setting Up the Irrigation Controller

2. 1. Valve and Solenoid Assembly

1. Shut the main irrigation system valve.

2. Before installing the hydraulic valve [5] in the irrigation system, remove the solenoid [1] from the valve with a 90° counter-clockwise turn. Be careful not to loose the seal (O-ring) [3].

3. Install the hydraulic valve in the irrigation system, paying attention to the correct water flow direction, as indicated by the arrow [4] on the valve cover.

Figure 2

5. After installing the hydraulic valve [5], assemble the solenoid with a 90° clockwise turn. Be sure to place the seal (O-ring) [3] in its proper location.

Note: A small amount of water is expelled from the drainage opening on the solenoid during valve activation (manual or automatic).

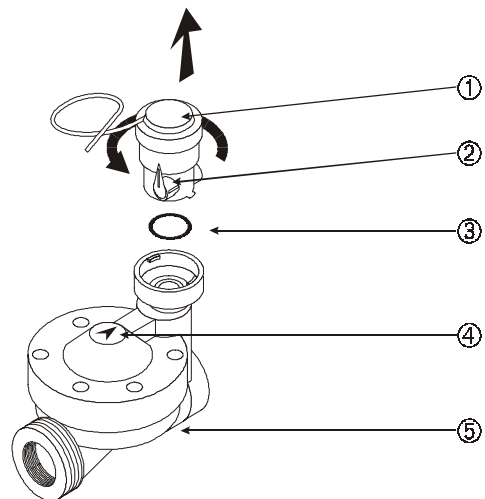## 2. 2. Manual-Mechanical Operation

The irrigation valve can be opened and closed independent of controller operation. Manual operation is useful when immediate irrigation is required, without the delay of controller programming.

The 3-position valve handle [A] is located on the solenoid Manual valve, and functions as follows: Closed [1], Automatic Operation [AUTO], Open [2]. Note that the Open and Closed positions in 2-Way and 3-Way valves are reversed (see drawing below).
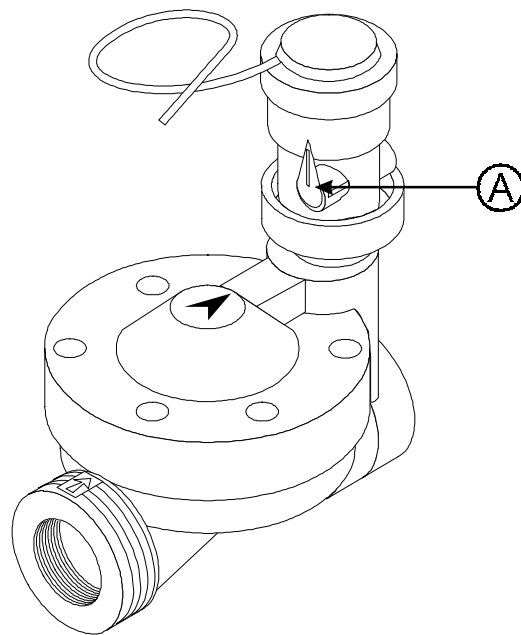
Figure 3

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*
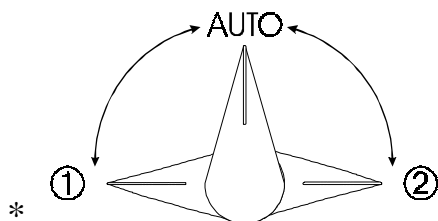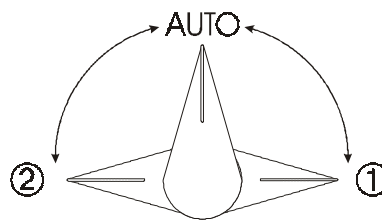
2-Way Valve   **3-Way Valve**

Important! For automatic irrigation operation, the valve handle must be in the middle (AUTO) position.

2. 3. Battery Installation

Rotate the battery compartment cover handle to the 11 o'clock position to remove the cover. Insert batteries (see drawing). All controller display elements will briefly appear on the display, followed by the blinking time "12:00". The controller is now ready to be programmed.
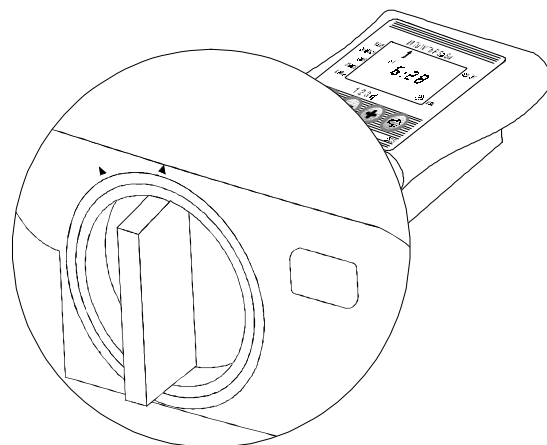
Important! Make sure to replace the battery compartment cover with its handle in the 11 o'clock position to **avoid possible cover guide pin breakage**.

2. 4. Installing the Controller In the Irrigation System

If the mounting plate [2] is attached
to the controller, remove it.

1. Insert the mounting coupling [1]
   into the mounting plate, aligning
   the words "TOP", which are
   stamped on both the coupling,
   and the plate (see Fig. 4).

2. Press the mounting plate, with
   the mounting coupling inserted,
   against the irrigation controller
   back.

* The controller mounting plate [2]
   can be mounted on a wall using
   two screws, in which case
   mounting coupling [1] is not
   used. The distance between the
   controller and the solenoid is
   limited by the length of their
   connecting cable.
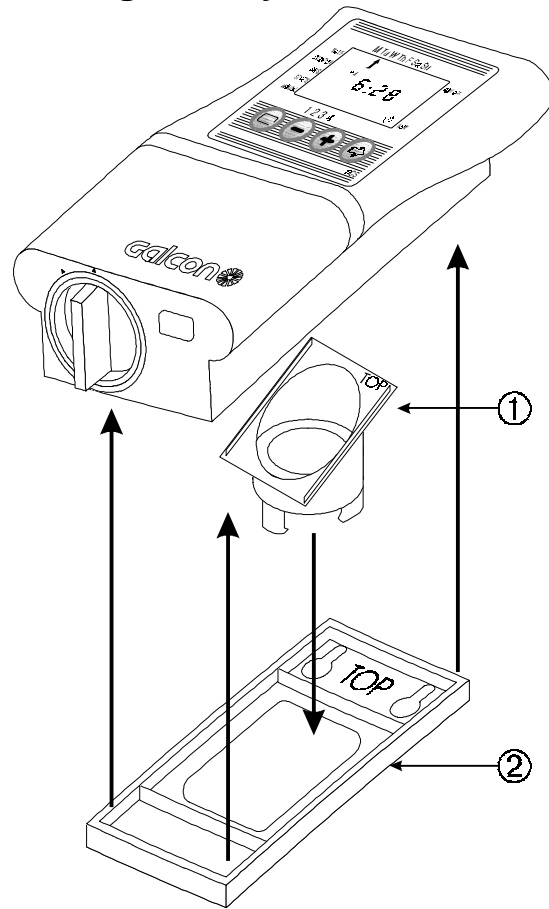
Figure 4

2. 5. Wiring the Solenoid and the Sensor

2. 5. 1. Model DC1S–6051 WP

solenoid wires are permanently connected to the irrigation controller. This model includes no connection block nor sensor option.

2. 5. 2. Models DC1S–6051 SN, DC4S–6054 SN
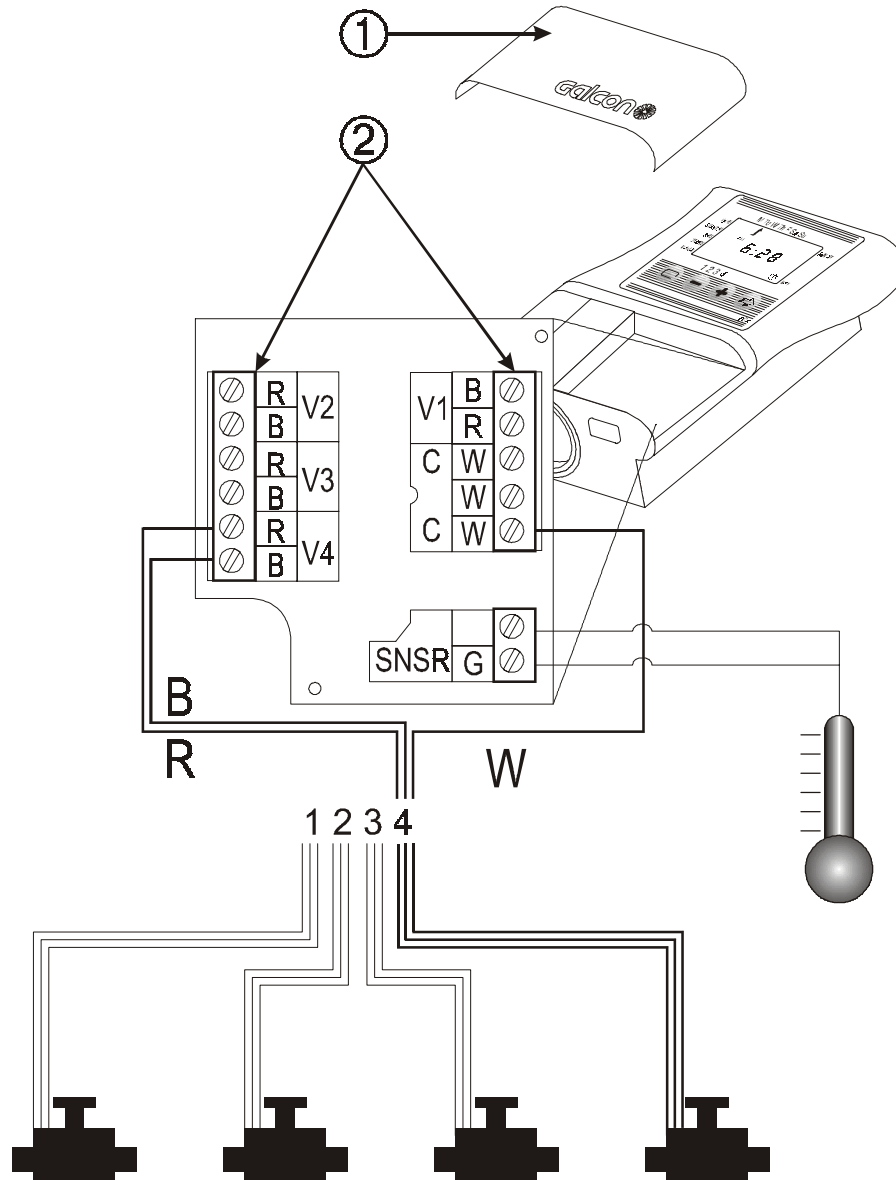
1. Remove the bottom cover [1] from the irrigation controller.

2. Connect the solenoid cables to the connection block [2]:
   A three-wire cable (white, red and black) emerges from each solenoid.
   Connect the White solenoid wire leads (W) to connection "C" on the connection block.

3. Connect the Red and Black wire leads from each individual solenoid to its corresponding valve position on the connection block (R=Red wire, B=Black wire), where each Red and Black wire pair is connected to

the valve number marked. Valve numbers are marked: V1 = first valve, V2 = second valve, etc.

4. Connect the program lockout sensor (option): Connect the sensor wires to the connection block positions marked SNSR [3] in any order.

2. 5. 3. Models DC4S–6054 WP, DC1S–6051 WP SN, DC4S–6054 WP
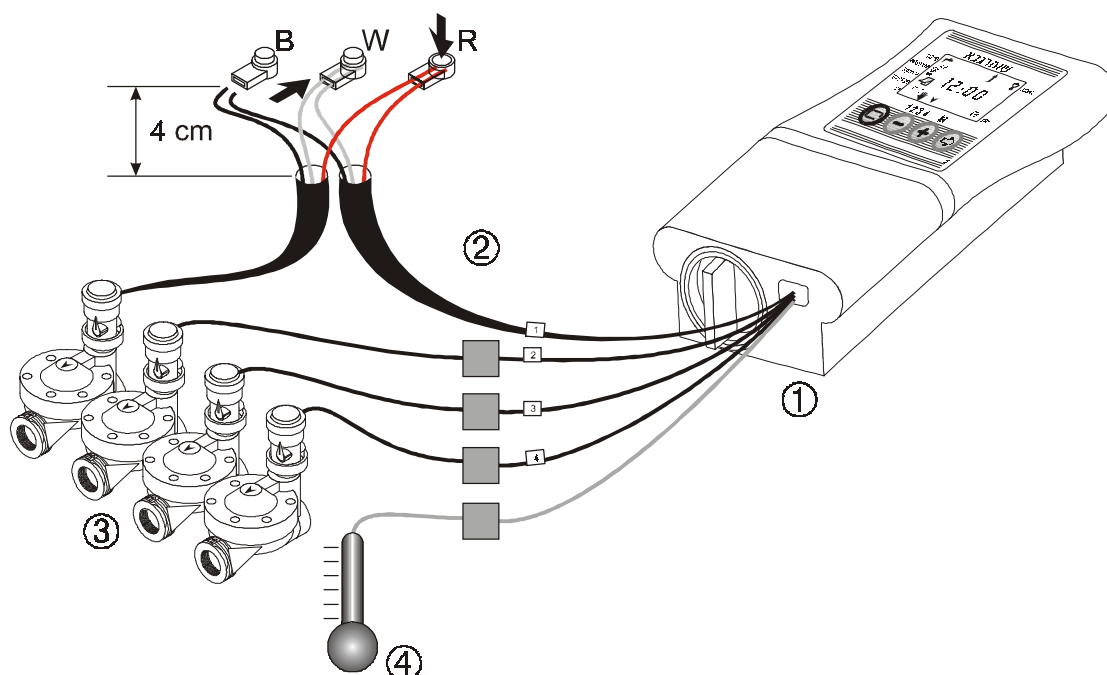
Four of the cables exiting from the controller(1) are the same color and are marked 1 through 4 . The fifth cable is not marked. The end of each cable is protected by a plastic covering that must be removed prior to connection. Cables 1 through 4 should be connected to the four electrically operated valves (3) and the fifth cable, to the sensor (4).

The controller and its connections are waterproof. In order to maintain the waterproofing, it is important to ensure the following:

* Do not remove protective coverings from cables that are not connected to a valve. Exposed cable ends can short-circuit between themselves or with other conductors.
* The controller cable connections to the valve cables (3) are made using special waterproof connectors (2) which are included with the product. See illustration.

1. Cut the plastic protective covering from the controller cables (1) near the point of their connection. The solenoid cables have three wires: white, red and black. Strip 3-4 cm of the outer insulation. Do NOT strip the wires themselves. If the wires' leads are exposed, cut them to the colored insulation. METAL LEADS SHOULD NOT BE INSERTED INTO THE WATERPROOF CONNECTOR.

2. Connect each of the wires to the waterproof connector (2).

3. Three wires exit from each of the solenoids: white, red and black. Connect the white wire of the solenoid to the connector to which you connected the white wire from the controller. Press the center disc firmly towards the wires until its surface aligns with the connector's perimeter. Connect the red and black wires according to the same principle. Refer to the diagram.

4. Connect the remaining controller cables to the solenoid cables according to the number of valves in the system. Make sure that the valve numbers correspond with the numbers on the cables from the controller.

Sensor connection (optional): The sensor is connected to the additional, unmarked cable. This cable contains only two wires and should be connected using a waterproof connection, as described.

Important: Do not program a valve which is not in use or is not connected using a waterproof connection.

3.   **Programming the Irrigation Controller**

This section details programming steps for a simple irrigation program.
The following section deals with more advanced irrigation controller
applications.

The Computerized Irrigation Controller is programmed with the aid of 4
buttons:

☺   Programming Step Selector - used to select the desired programming
mode
(e.g., clock setting mode)

☻   Parameter Selection Button - used to select the parameter to be
changed (e.g.,
hour, minute, etc.). Only a blinking parameter can be changed.

⊕   Data Increment Button (Increase) - raises the value of the selected
parameter
(e.g., when hours selected, from 06:00 to 07:00).

⊖   Data Decrement Button (Decrease) - lowers the value of the
selected
parameter (e.g., when hours selected, from 06:00 to 05:00).

3. 1. Setting the Current Time and Day of the Week

To enable the irrigation controller to operate the irrigation system at the desired times, the current time and day of the week must be set. The following steps explain how to set the day and time, as well as installing the irrigation controller and its accessories in the irrigation system.
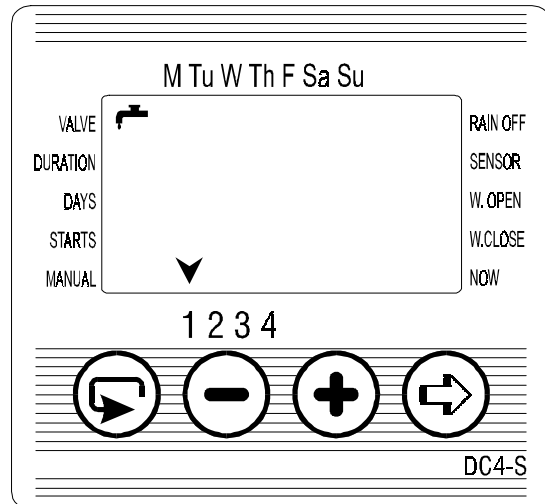

1. Press ⊖ a few times until ⊕ appears.

2. Press ⇨. The hour digits blink. Set the current hour with the aid of ⊕ and ⊖
   (Note: AM and PM designations appear to the left of the hour digits).

3. Press ⇨. The minute digits blink. Set the minutes with the aid of ⊕ and ⊖

4. Press ⇨. A blinking up arrow appears at the top of the display. Set the current day of the week by pressing ⊕ or ⊖.

* Display digits will stop blinking after 10 seconds. If the last data item has stopped blinking, press ⇨ to continue the programming process.
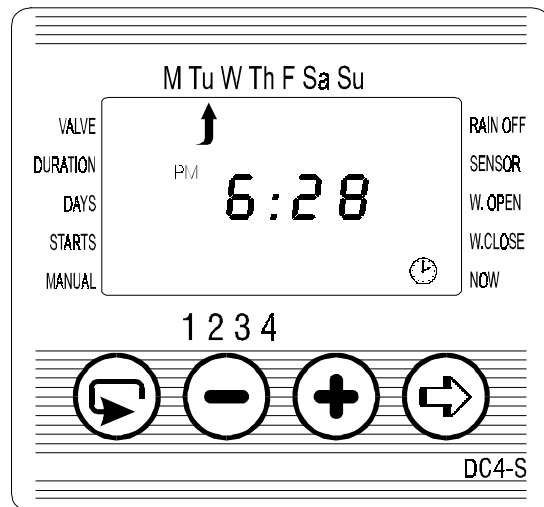
3. 2. Valve Selection (Model DC4S only)

This model operates from 1-4 valves, each independently programmed. Select the desired valve, then continue with the irrigation program as detailed.

1. Press ⊖ until ⌐ appears.

2. Press ⊕. A blinking arrow appears at the bottom of the display.

3. Move the arrow to select the desired valve number by pressing ⊕ or ⊖.

4. Press ⊖ to go to the next step.

3. 3. Setting the Irrigation Period

This setting determines the length of time that the valve will remain open.

1. Press ⊖ until ⧗ appears.

2. Press ⊕. The hour digits blink.
   Press ⊕ again - the minute digits blink.
   Press ⊕ again - the seconds digits blink.
   Set the desired irrigation period by pressing ⊕ and ⊖.

3. Press ⊖ to go to the next step.

* **Note**: The irrigation period seconds display increases/decreases in 5 second increments.
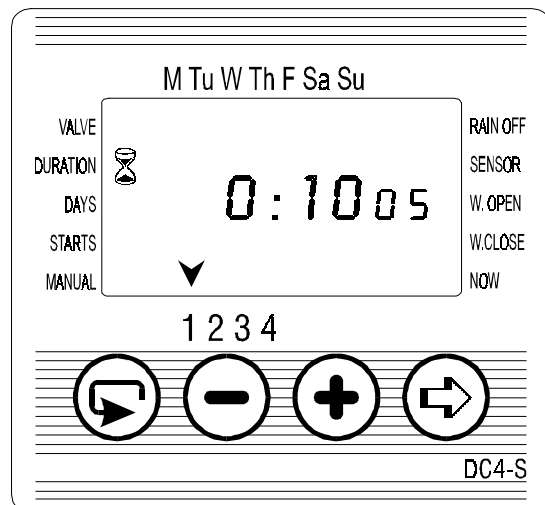
3. 4. Selecting Irrigation Days of the Week

This setting determines on which days of the week the irrigation controller will operate the valve being programmed.

1. Press ☺ until ⬚ appears.

2. Press ⊕. A blinking ⬆ appears at the top of the display, under Monday.

3. Select the desired day of the week by pressing ⊕.
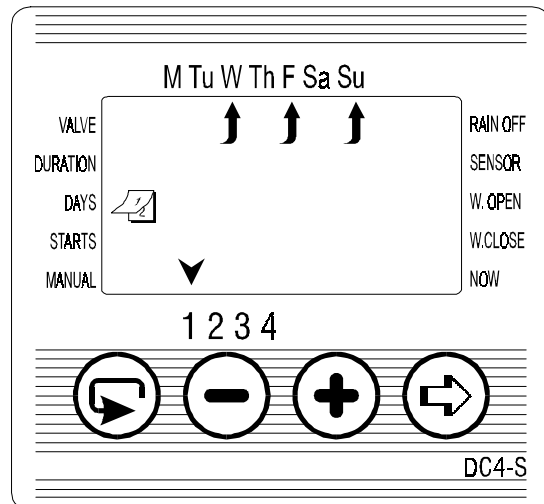
4. **Selecting/adding irrigation days**:
   Press ⊕. The arrow under the selected day will stop blinking. The blinking arrow will move one position to the right, to appear at the next day of the week. Select additional days of the week in the same manner.

5. **Canceling Scheduled Irrigation Days**:
   Press ⊖. The arrow under the selected day will disappear. The blinking arrow will move one position to the right, to appear at the next day of the week. Cancel additional scheduled irrigation days in the same manner.

6. Press ☺ to go to the next step.

* When the blinking arrow is under Sunday, the next pressing of ⊕ shows 0 n C E in the center, and a ⬌ symbol at the right top corner, of the display. To return to "Selecting/adding irrigation days" mode, press ⊕ again.

	M Tu W Th F Sa Su	
VALVE	⬆ ⬆ ⬆	RAIN OFF
DURATION		SENSOR
DAYS	⬚	W. OPEN
STARTS		W.CLOSE
MANUAL	▼	NOW

1 2 3 4

DC4-S

3. 5. Setting Irrigation Start Times

In this step, up to 4 separate irrigation start times can be programmed during the selected day for the valve being programmed. The selected valve will open at each of the start times set, for the irrigation period as set in Section 3.3.

M Tu W Th F Sa Su

VALVE
DURATION   PM
DAYS   7:28
STARTS   [1]
MANUAL

RAIN OFF
SENSOR
W. OPEN
W.CLOSE
NOW

1 2 3 4

DC4-S

1. Press .⊖ until [1] appears. The word *Off* or the last operation time entered will appear on the display.

2. Press ⊕. The displayed data will blink (*Off* or last operation time entered).

3. Set the desired start with the aid of
   ⊕ and ⊖. (Note: AM and PM designation appears to the left of the hour digits). Repeat this process to set start times 2, 3 and 4, as required.

4. To cancel a given start time, select it by pressing ⊖. Next, press ⊕. The hour digits will blink.

5. Press ⊕ or ⊖ until the word *Off* appears on the display. Go to step 7.

6. Models DC4 only:
   Press ⊖ until ↰ appears. Select another valve according to Section 3.2, "Valve Selection" and repeat steps 1-3 to program operation times for the valves selected.

7. Press ⊖ to go to the next step (Section 4.5, "Manual" Irrigation System Operation". Press ⊖ 3 times to return to the main screen (clock).
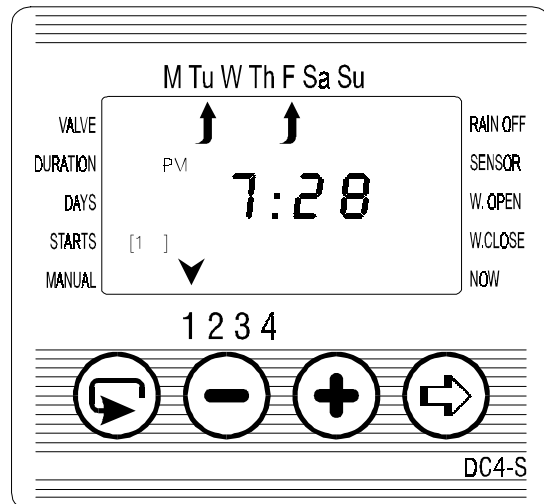
3. 6. Example: Programming A Weekly Irrigation Schedule

Let's assume that we want to program the irrigation controller to water three times a day:
at 8:00 AM, 1:00 PM and 7:00 PM, for 2½ hours each time, on Monday and Thursday.

If you are using a Model DC1s irrigation controller, go to step 4.

1. Press ⊖ until ⌐ appears.

2. Press ⊕. A blinking arrow will appear at the bottom of the display.

3. Press ⊕ or ⊖ to move the arrow to select the number of valve to be programmed.

4. Press ⊖ until ⌛ appears.

5. Press ⊕. The hour digits blink. Press ⊕ or ⊖ until the hour digit displays 2.
   Press ⊕ . The minutes digits blink.
   Press ⊕ or ⊖ until the minutes digits display 30.

6. Press ⊖. ◪ will appear.

7. Press ⊕. A blinking ⬆ appears at the top of the display, under Sunday.
   Press ⊕ until the blinking arrow appears under Monday, then press ⊕.
   The arrow under Monday will stop blinking and will move one position to the right, to Tuesday.
   Press ⊕ twice to bring the arrow to Thursday, then press ⊕.

8. Press ⊖. (Start time) [1   ] appears.
   Press ⊕. The hours digits blink.

9. Set the start time to 8:00 AM by pressing ⊕ or ⊖.
   (Note: AM and PM designations appear to the left of the hour digits.)
   Repeat this step to set start time [2] to 1:00 PM and start time [3] to 7:00 PM.

10. Press ⊖. (Start time) [4] appears.
    Press ⊕. The hours digits blink.

11. Press ⊕ or ⊖ until 0FF appears. Start time 4 is canceled.

4.   Additional Programming Options

4. 1. One-Time Irrigation

This option is used to program the irrigation controller to operate the irrigation system **one time only**, for the irrigation period as set in Section 3.3.

1. Press ⊖ until ⬛ appears.

2. Press ⊕ a number of times (for all the days of the week) until 🔄 appears, and ⦿nℂⅇ blinks on the display.

3. Go to Section 4.3 to set the start time day and time.
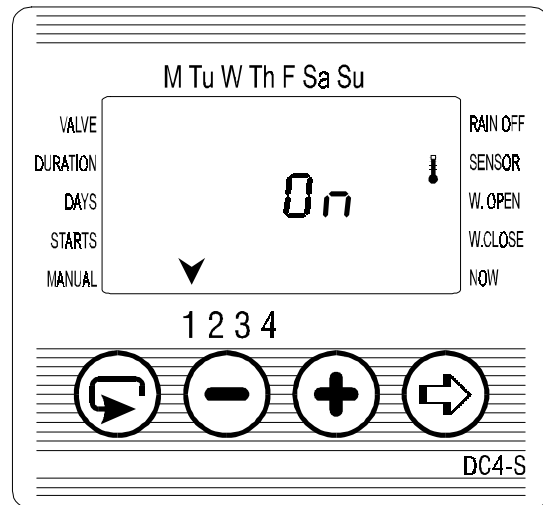
4. 2. Cyclical Irrigation

This option is used to program the irrigation controller to operate the irrigation system in a cyclical manner, once every *x* minutes, hours or days, for the irrigation period as set in Section 3.3.

1. Press ⊖ until ⬛ appears.

2. Press ⊕ a number of times (for all the days of the week) until 🔄 appears, and ⦿nℂⅇ blinks on the display.

3. With the display blinking, press ⊕ or ⊖. The word "every" appears on the display. The number of hours and minutes in the cycle period appear below the word "enter".

4. Set the desired irrigation operation frequency in minutes, hours or days by pressing ⊕ or ⊖ -first minutes, next hours and then days.
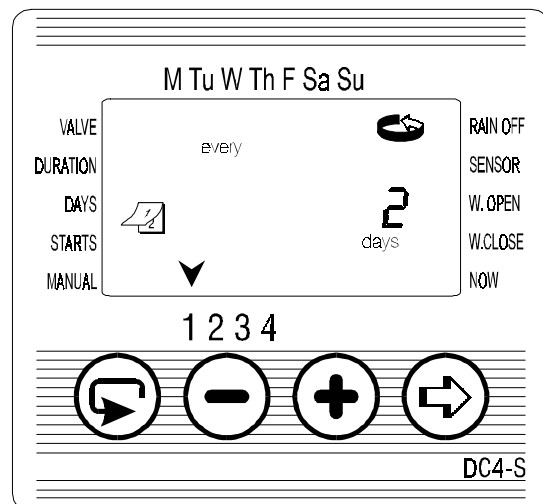
* When the irrigation operation frequency exceeds 23 hours, the word "days" appears, above which the number of days between irrigation operations appears. For example, if the irrigation operation frequency is 2 days, irrigation will take place once every two days, for the set irrigation period.

4. 3. Setting Day of the Week and Time For Cyclical and One-Time Irrigation

These options are used to pre-set the valve opening time. The number of days until valve opening appears on the display, to the right of the irrigation start time (above the word "days"). 0 days = program starts today; where 1 = program starts tomorrow, etc. (up to 30 days).

1. Press ⊖ until [1] appears. The last opening time entered appears on the display.

2. Press ⊕. The hours digits blink.

3. Set the desired opening time by pressing ⊕ or ⊖ (Note: AM and PM designations appear to the left of the hour digits.)

4. Press ⊕ until the digit to the right of the opening time blinks (The digit above the word "days").

5. Set the number of days until valve opening by pressing ⊕ or ⊖.

6. Press ⊖ 3 times to return to the main screen (clock).

* Valve openings 2, 3 and 4 are canceled in this mode.
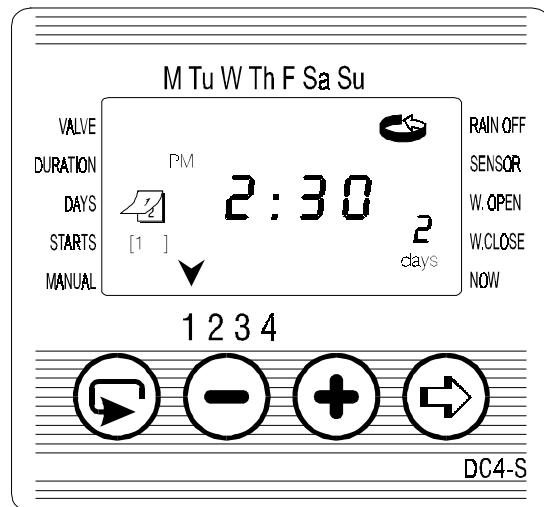
4. 4. Example: Programming A Cyclical Irrigation Schedule

Let's assume that we want to program the irrigation controller to open the valve at 12:45 PM, for a period of one hour, once every 5 days.

1. Set the irrigation period as in Section 3.3, Setting the Irrigation Period (Press ⊖ until ⌛ appears, then set the desired irrigation period by pressing ⊕ and ⊖).

2. Press ⊖⊖ until *44* appears.

3. Press ⊕⊕ a number of times (for all the days of the week) until *OnCE OnCE* appears, blinking on the display.

4. While the display blinks, press ⊕ or ⊖⊕⊖. The display reads every X:XY, where X:XY is the irrigation operation frequency in hours and minutes.

5. Press ⊕⊕ until the hours and minutes displays disappear, and the word "days" appears with a number above. Press ⊕ until the number of days changes to 5.

6. ⊖Press ⊖. [1   ] appears.

7. Press ⊕. The hours digits blink.

8. Press ⊕ until the hours digits change to 12 (PM).

9. Press ⊕. The minutes digits blink.

10.Press ⊖ until the minutes digits change to 45.

4. 5. "Manual" Irrigation System Operation Via the Irrigation Controller

This option operates the selected valve for the defined irrigation period. The valve will automatically close at the end of the irrigation period. Note that the originally programmed irrigation schedule continues to function at the times set.

1. DC4S models only: Press ⊖ until ⌐ appears. Select one or more valves according to Section 3.2, "Valve Selection".

2. Press ⊖ until ♥ appears.

3. Press ⊕ to open the valve. The word On
   is displayed.

4. Press ⊖ to close the valve.
   OFF appears on the display.
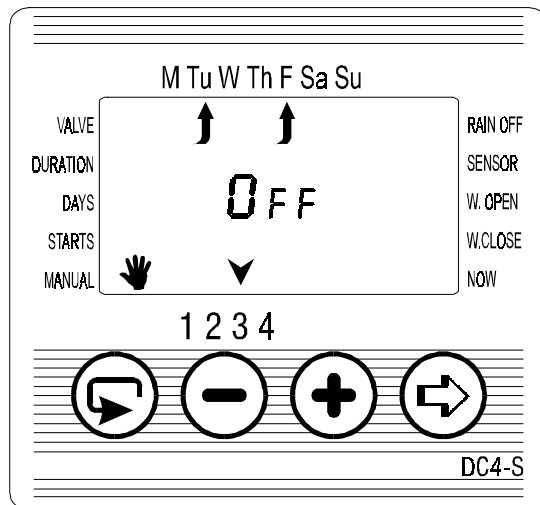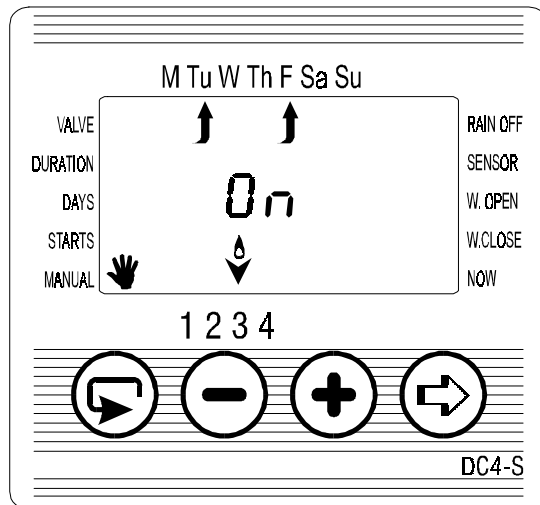
4. 6. Irrigation Controller Suspension

This option is used to temporarily
suspend irrigation controller
operation. For example, while it is
raining. The irrigation operation
schedule remains in the controller
memory, but is not implemented
until the suspension is canceled. The
suspension option disables ALL
valves connected to the irrigation
controller.
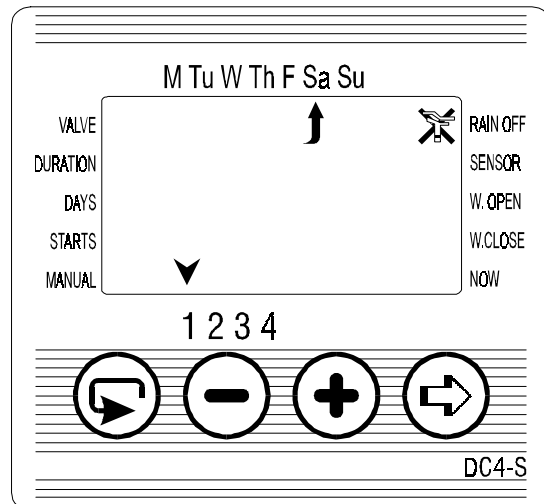
1. Press ☺ until ⚡ appears.

2. Press ⊕. ✗ appears and replaces
   the water sprinkler symbol in
   paragraph 1, above.
   Press ⊖ to return irrigation
   system control to the irrigation
   controller.
   ✗ disappears and the water
   sprinkler symbol reappears.

* The word "rAin" will appear on
   the display if an attempt is made
   to operate a previously
   scheduled valve opening while
   the irrigation controller is
   suspended.

4. 7. Program Lockout Sensor

(This option is not included in model DC1S–6051 WP)

An advanced feature of the Irrigation Controller enables irrigation
monitoring using a lockout sensor. The lockout sensor contacts remained
closed as long as the pre-defined conditions do not exist. For example, if a
rain sensor is connected to the irrigation controller, irrigation takes place
as long as the sensor remains dry. If rain falls, the sensor prevents all valve
openings.

Each individual valve can be operated in conjunction with the sensor. To
associate the sensor to a particular valve(s), select the desired valve(s) and
activate the sensor (see the explanation below).

(**To connect the sensor to the connection block** - see Section 2.5, "Wiring the Solenoid and the Sensor")

1. Select the valve to which the sensor is to be associated (Models DC4S only).

2. Press ⊖ until 🌡 appears next to SENSOR.

3. Press ⊕ to activate the sensor in the irrigation program for the selected valve.
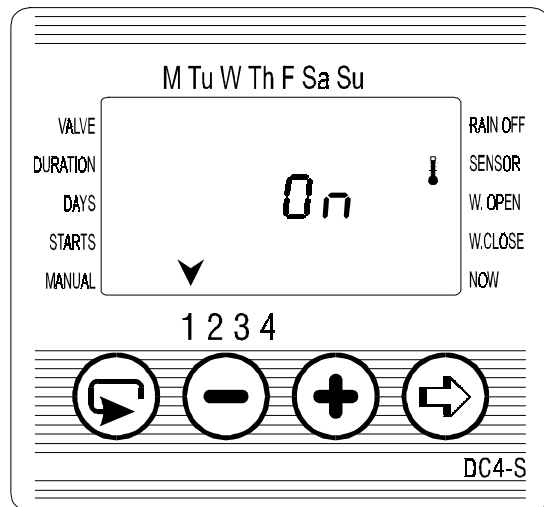
* With the sensor circuit closed (i.e., the sensor detects the existence of a defined program lockout condition) the symbol 🌡 blinks on the display. In this situation, irrigation will not take place through valves associated with the sensor.
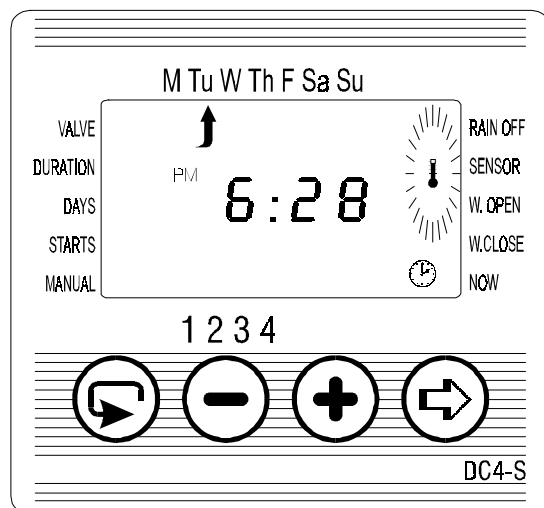
4. Press ⊖ to disable the sensor. The word "OFF" appears on the display.
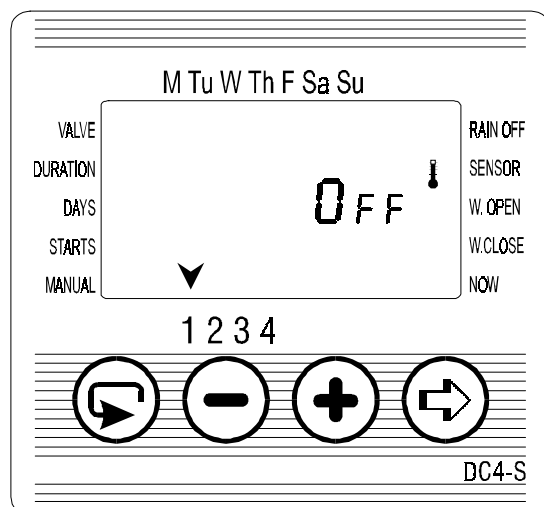
4. 8. Irrigation Window In the Cyclical Program Mode

The irrigation window is an advanced feature which enables cyclical irrigation program operations (see Section 4.2) to take place only during a defined part of the day (window). The irrigation windows is defined a part of a day (up to 23 hours), in the cyclical irrigation mode only (see Section 4.2).

This function is useful when, for example, irrigation is only required during the hot hours of the day.

Make sure that ⬬ appears on the display (see Section 4.2).

1. Press ⊖ until ⛩ appears on the display next to W. OPEN, with the word OFF or the last OPEN WINDOW time setting displayed.

2. Press ⊕. The word OFF blinks on the display.

3. Press ⊕ and ⊖ to set the desired OPEN WINDOW time (pay attention to the AM/ PM designation).
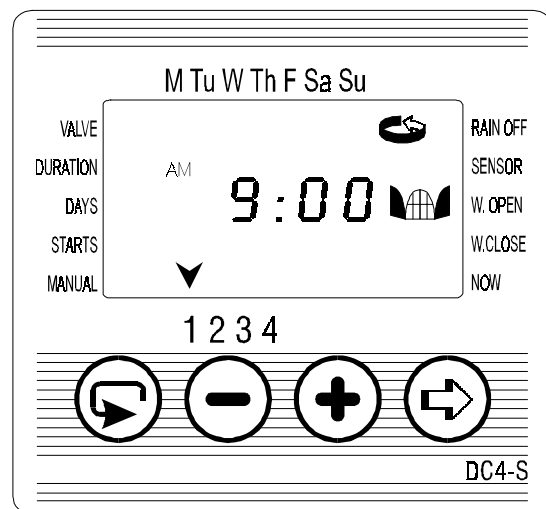
1. Press ⊖ until 🔒 appears, with 12:00 PM or the last CLOSE WINDOW time setting displayed.

2. Press ⊕ and ⊖ to set the desired CLOSE WINDOW time (pay attention to the AM/ PM designation).

* If an irrigation cycle exceeding 24 hours has been programmed, the irrigation window function is disabled
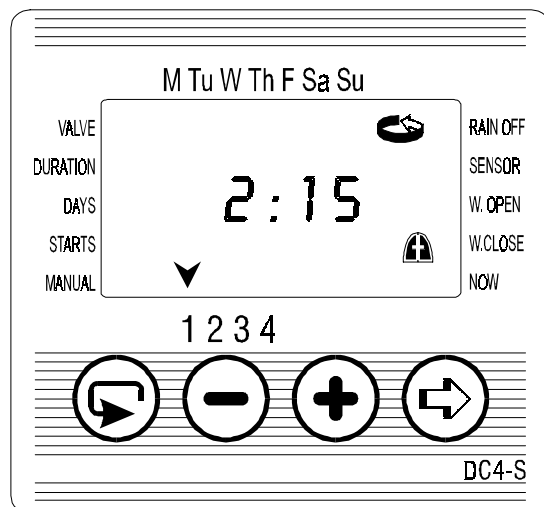
To disable the irrigation window function

1. Press ⊖ until 🏛 appears next to OPEN WINDOW, with the last OPEN WINDOW time setting displayed.

2. Press ⊖. The irrigation window open time blinks on the display.

3. Press ⊖ until Off appears next to 🏛.
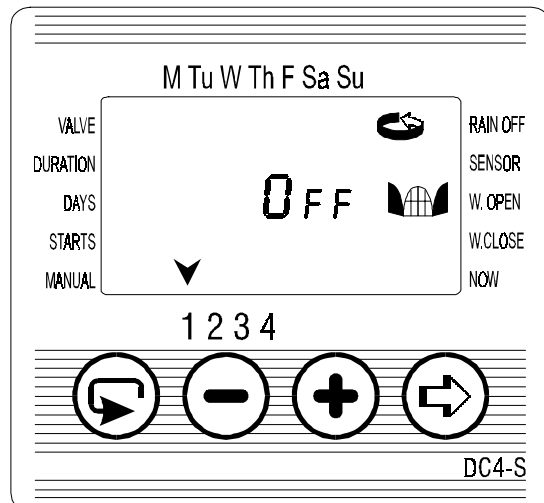
5. Additional Displays

5. 1. Valve Wait Mode (Models DC4S only)

When two valves are currently open, and a third valve is scheduled to open, the third valve will enter into a wait mode. A blinking ⏾ will appear above the number of the valve which is on wait.

During "manual" irrigation system operation via the irrigation controller the letter "W" (Wait) appears on the display. The valve will open when another valve closes.
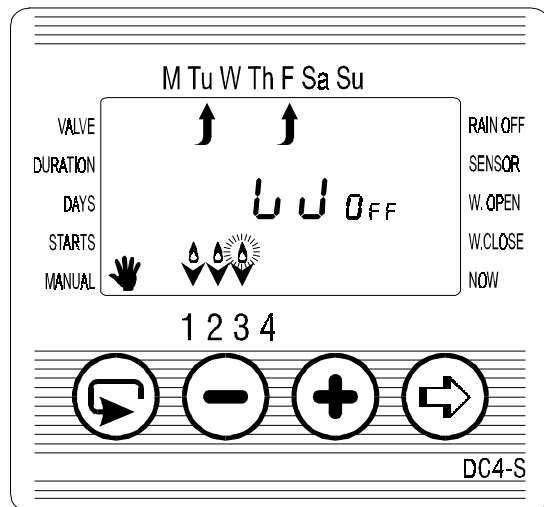
5. 2. Blinking Low Battery Warning

A blinking battery icon appears on the display when the batteries are weak. In this state, a limited amount of energy still remains in the batteries for valve operation, and they should be promptly replaced.

Press any button after replacing the batteries to resume irrigation controller activity.

Program data will be retained for approximately 15 seconds during battery changing.
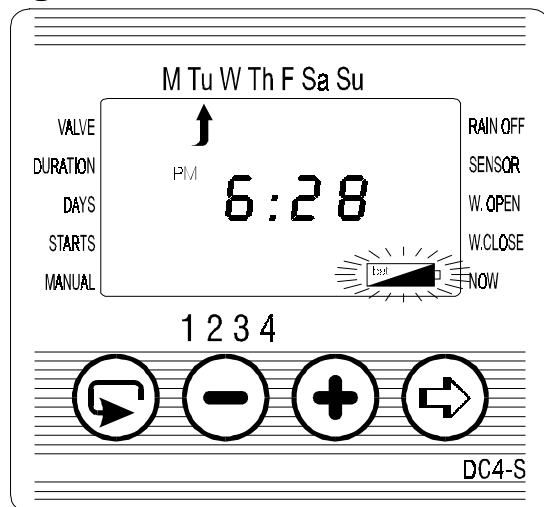
5. 3. Constant Low Battery Warning

When weakened batteries are not replaced in a timely manner, the battery icon appears constantly. All other display elements disappear and **all valves are closed**.

Replace batteries promptly, then press any button to resume irrigation controller activity.

Program data will be retained for approximately 15 seconds during battery changing.
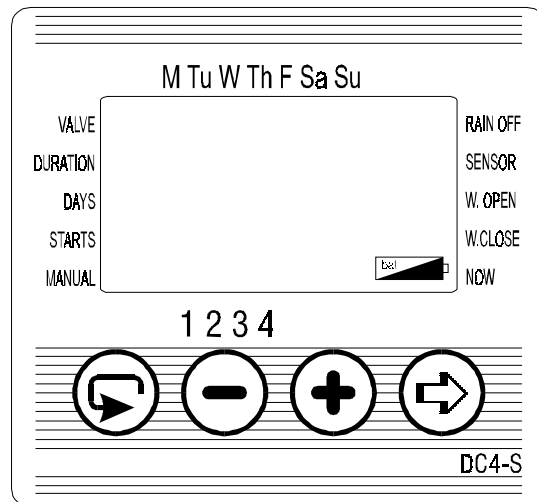
5. 4. Missing Program Data

During "manual" irrigation system operation via the irrigation controller n o P r o 9 appears on the display – see Section 4.5, "Manual Irrigation System Operation", meaning that no irrigation period has been set for the current valve. In this case the irrigation controller "does not know" when to close the valve.
In this situation valve opening is disabled.
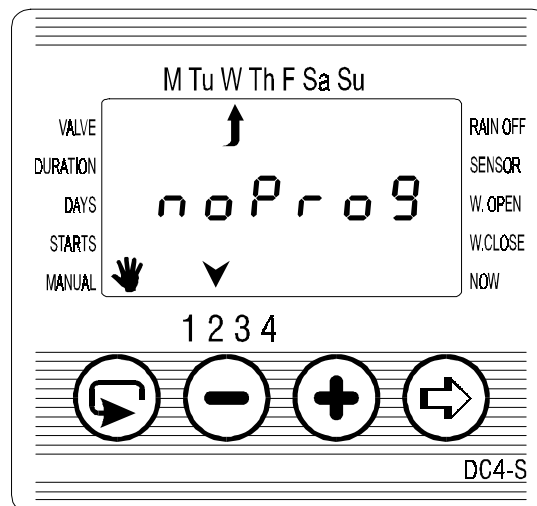
5. 5. Sensor Lockout of the "Manual" Irrigation Program

"S Off" appears on the display only in "Manual" operation via the irrigation controller, indicating that the sensor is activated (see Section 4.7), and is currently inhibiting "Manual" irrigation via the controller (see Section 4.5).

In this situation ♦ blinks on the display.

The irrigation program continues normally when the sensor lockout conditions expire.
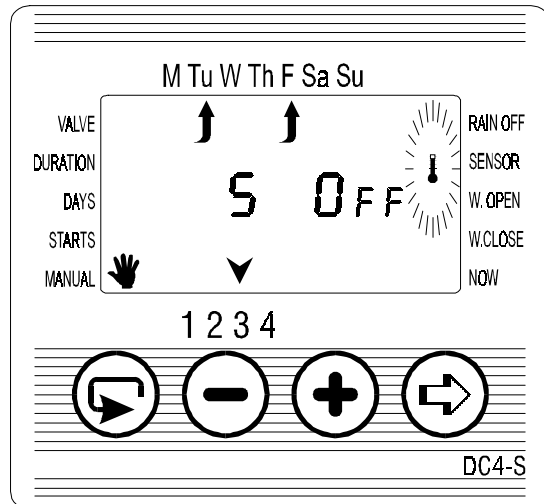
6.   Maintenance

- Batteries should be removed if the irrigation controller will not be operated for a prolonged period.

- A filter must be installed upstream to the solenoid valve. Clean the filter once every few months. A clogged filter can be the source of system malfunctions.

- Under normal usage, batteries (Alkaline) will last for at least one year.

- Do not run water through a line unless the solenoid is fitted on the hydraulic valve.

- Recommended water pressure range: 1-8 ATM (bar).

7.   Troubleshooting and Solutions Table

Problem/Event	Cause	Solution
Valve does not open during Automatic operation or during "Manual" operation via irrigation controller.	Valve Handle not in AUTO position.	Place Valve Handle in AUTO position.
	Weak batteries.	Replace batteries.
Sensor icon constantly flashes on display and valve does not open.	Sensor is shorted.	Replace sensor or repair sensor connection.
No display.	Weak batteries.	Replace batteries.
Valve does not close, despite clicks heard during activation.	Valve Handle not in AUTO position.	Place Valve Handle in AUTO position.
Water leak from the solenoid-valve coupling connection.	20 mm seal (O-Ring) is missing (See Figure 2, Item 3).	Install a new seal (O-Ring).

8. Additional Accessories

Accessory

Lockable Protective Housing

Line Filter, BSP ¾″

Line Filter, BSP 1″

Spare Parts Kit

¾″ Valve + Solenoid

1″ Valve + Solenoid

1½″ Valve + Solenoid

2″ Valve + Solenoid

Solenoid Only

¾″ Valve + Bayonet

1″ Valve + Bayonet

1½″ Valve + Bayonet

2″ Valve + Bayonet

Temperature Sensor

galcon

IRRIGATION CONTROL EQUIPMENT

B412.06

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