

# Installation & Operation Manual



## **BEC PM1 Controller** Time/Flow/Volume Controller

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# Introduction

This document provides installation and operation instructions for the BEC PM1 controller as it is used with BERMAD's control valves in Waterworks and Irrigation Applications.

## Very Important:

Chapter #1 of this document provides general installation and operation instructions which are common to all the applications' types while the rest of the chapters are organized by application type.

Therefore before installing and operating this controller please read carefully chapter #1 and then jump to the chapter related to your specific application:

## Pressure Management Applications:

Optimizing water supply and reducing non revenue water by using the BEC PM1 controller is done by connecting it to BERMAD's two step pressure reducing valve installed at the entry point of a district metering area.

### *Chapter #2*

## Pressure management according to flow rate:

For switching between the two pre-set pressure regimes of the PRV according to high or low flow demand at the controlled district please refer to chapter #2 of this document.

### *Chapter #3*

## Pressure management according to time intervals:

For switching between the two pre-set pressure regimes of the PRV according to time settings please refer to chapter #3 of this

document.

#### *Chapter #4*

### **On/Off Control:**

The BEC PM1 enables a volumetric control of BERMAD's On/Off control valves that are used for purging pipe's dead ends, refreshing reservoirs and other such On/Off applications. Please refer to chapter #4 if your specific application is of an On/Off type.

#### *Chapter #5*

### **Irrigation Control:**

The BEC PM1 controller can be used as a single station irrigation controller for agriculture or gardening. Please refer to chapter #5 if your specific application is of an irrigation type.

## Chapter #1

# Technical Data and I/O Connections

The following I/Os are used for BERMAD's waterworks and Irrigation Applications:

### DC Solenoid:

Connect the solenoid's wires to the cable coming out of the controller's first station port. Connect the solenoid's RED wire to the controller's RED wire and the BLACK wire to the controller's BLACK wire.

### Power supply:

Open the battery's compartment lid and connect a good-quality 9 Volt alkaline battery, then firmly close the lid.

When the battery is first connected, the controller performs a self-test, closes the DC solenoid and displays the first settings screen. Under normal use, the battery should last for at least one season.

### Hydrometer or Water Meter:

BERMAD's 900 series Hydrometer, or a water meter with dry contact pulse output, is used in applications such as the following:

- Pressure management with flow rate reference applications where switching to the high pressure setting is done in case of a high demand for water.
- Pipes' dead-end purging applications where the purged-out water is measured by volume and not by time.
- In cases of fire protection or volumetric irrigation applications.

Connect the two water meter pulse wires to the two controller's RED wires. Please note that there is no polarity significance in this connection.

## Flow Switch/Rain Sensor:

Flow switch can be used with the time controlled pressure management application for switching to the high pressure setting in case of a high demand for water, i.e. in case of fire.

## Wiring Table:

The controller is supplied with the following wires connected to its terminal strip:

Wire Color	Task	Remarks
<b>DC type solenoid - 9V-12V DC Latch - for pressure management according to flow-rate</b>		
RED	To be connected to the solenoid's RED wire	This wire is joint together with the solenoid's RED wire in the controller's black cable
BLACK	To be connected to the solenoid's BLACK wire	This wire is joint together with the solenoid's BLACK wire in the controller's black cable
<b>DC type solenoid - 9V-12V DC Latch - for pressure management according to time interval</b>		
RED	To be connected to the solenoid's BLACK wire	This wire is joint together with the solenoid's BLACK wire in the controller's black cable
BLACK	To be connected to the solenoid's red wire	This wire is joint together with the solenoid's RED wire in the controller's black cable
<b>Water meter</b>		
RED	Connect one of the water-meter's pulse wires to one of the controller's RED wires	There is no polarity significance in this connection
RED	Connect the other water-meter's pulse wires to one of the controller's RED wires	There is no polarity significance in this connection
<b>Flow switch (or rain sensor for irrigation applications)</b>		
YELLOW	Cut the YELLOW loop and connect one of the flow switch wires to one of the controller's yellow wires.	There is no polarity significance in this connection
YELLOW	Connect the other flow switch wire to one of the controller's YELLOW wires.	There is no polarity significance in this connection

## Switching the Controller's Operation Modes

The BEC PM1 controller has two distinctive operation modes:

**Irr mode** - this is the default operation mode of the controller which is used for Irrigation, Time Intervals Pressure Management and On/off applications.

**Pr mode** - this mode is used for the Pressure Management according to Flow-rate application only.

Switching between these two operation modes is done by simultaneously pressing the  and  keyboard buttons.

**For example:**

**Changing from "Irr" to "Pr" mode:**

Press the  and  buttons simultaneously for 5 second, the system displays the mode name and starts switching to the Pr mode. Continue pressing the buttons for additional 3 seconds until the software version appears on screen (in a form of a number) then release the buttons. The controller is now on its "Pr" mode.

**Please note** that changing the controller's mode requires about 10 seconds of continuous buttons pressing time in total.

**Changing from "Pr" to "Irr" mode:**

Keep pressing the  and  buttons for another 3 second, the system displays the new mode name and switches back to the Irr mode.

**Important!** Before operation the controller for the first time make sure that it is set to the correct operation mode for your specific application.

## Chapter #2

# Pressure Management according to Flow-rate Application

### Background

This application enables the user to set a flow rate SET POINT in number of pulses per hour. The application automatically changes the control state of the Two Step Pressure Reducing Valve which is controlled by the BEC PM1 controller according to the actual real-time flow-rate reading.

When the actual flow rate reading crosses the SET POINT, the controller starts counting a stabilization time delay parameter for ensuring that the flow-rate crossing of the set-point is not a temporary pressure fluctuation.

If by the end of the delay counting the flow-rate reading remains beyond the set point the solenoid state changes.

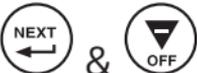
There are two delay time parameters: One for LOW to HIGH flow crossing of the set-point and the other for HIGH to LOW flow crossing.

#### **This application has four screens:**

The first three screens are used for setting the SET POINT flow reference [SP:PH] and the two values of the delay timers [SP:tH] & [SP:tL].

The fourth screen is the automatic operation screen ("AUTO") that is used for monitoring the application operation.

## The Control Panel

Button	Name	Usage
	NEXT	Next Step button - used to advance to the next screen
	SHIFT	Shift button - Not in use in this application
	ON +	Used for increasing a numeric value
	OFF -	Used for switching between the "Pr" and "Irr" operation modes
		Switch between Pressure Management by Flow ("Pr") and Pressure Management by Time ("Irr") Applications

## Display Icons

The following icons may appear on the screen during programming or operation modes:

Icon Symbol	Pressure Management by Flow Description
<b>PM</b>	Pressure Management indication
	Setting Mode
	The last measured flow rate is higher than the set point threshold [Pulses/Hour]
	The last measured flow rate is lower than the set point threshold [Pulses/Hour]
<b>AUTO</b>	Automatic operation screen. Used for monitoring the system operation

# Programming Steps

## Basic Settings:

### Setting Flow Reference Set-point

Upon entering to this screen the display shows the [SP:PH] (Set Point : Pulses per Hour) title.

Use the  or the  buttons to set the flow-rate value by number of pulses per hour. This is the flow-rate that distinguishes between high and low pressure conditions.

#### Please note:

The flow reference entry ranges between 0 and 9999 pulses/hour.

The factory default value is 50 pulses per hour.

Press the  button to move to the next screen.



Fig.1 - Flow set-point

### Setting the Low to High flow stabilization delay timer

Upon entering to this screen the display shows the [ SP:TH ] (Set Point : High flow timer) title.

Use the  or the  buttons to set the required delay time parameter which is used for verifying that the change from LOW flow to HIGH flow is stable.

#### Please note:

The timer values range between 0 and 60 minutes in 1 minute steps.

The factory default value is 1 minute.

Press the  button to move to the next screen.



Fig.2 - High flow timer

## Setting the High to Low flow stabilization delay timer

Upon entering to this screen the display shows the [ SP:TL ]

(Set Point : Low flow timer) title.

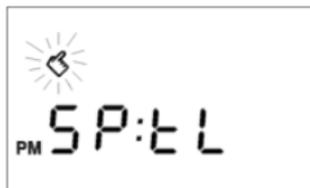
Use the  or the  buttons to set the required delay time parameter which is used for verifying that the change from High flow to Low flow is stable.

### **Please note:**

The timer values range between 0 and 180 minutes in 1 minute steps.

The factory default value is 20 minutes.

Press the  button to move to the next screen.



**Fig.3** - Low flow timer

### Monitoring

When no button is pressed in the controller's keyboard for 3 minutes, the controller moves to the main monitoring screen indicated by the word AUTO in the middle of the screen. The AUTO screen displays the following data items:

- The "AUTO" icon indicates that the automatic Pressure Management operation is active.
- The Display shows the current reading of the system's flow-rate.
- The Up arrow  indicates that the current flow-rate is higher than the SET POINT flow parameter.



High flow reading

#### High flow reading

- The DOWN arrow  indicates that the current flow-rate is lower than the SET POINT flow parameter.



Low flow measurement

- ✓ When the solenoid status is ON the  Icon appears on the screen.
- ✓ When the solenoid status is OFF the  Icon disappears.

## Chapter #3

# Pressure Management according to Time Intervals Application

### The Control Panel

The BEC PM1 Human-Machine Interface consists of a graphical display screen and a four keys keyboard:



NEXT STEP button - Used to advance to the next screen or programming step



SHIFT button - Used to sequentially change the focus between the items of the current screen



PLUS / ON button - Used to increase numeric data, set on operation days and start manual operation



MINUS / OFF button - Used to decrease numeric data, set off operation days and stop manual operation

## Display Icons

The following icons may appear on the display screen during programming or operation modes:

	Setting Mode		High Flow [seconds]
	Set Time / Time Mode		Operation Days
	Volumetric Mode		Manual Operation
	Operation Time		Uncontrolled Water Meter [minutes]
<b>AUTO</b>	Automatic Operation		Station Number
<b>%</b>	Seasonal Adjustment		Flow OFF
	Stopped by Flow Switch	<b>AL:bt</b>	Low Battery

## Programming Steps

This chapter describes the required programming steps of the controller and it is divided into three sections: Basic Settings, Pressure management settings, and end of line flushing settings.

### Basic Settings:

#### First Basic Settings Screen

The basic controller setting should be done once the controller is wired to the system and the power is connected, or after a total reset operation is performed. The first setting screen appears displaying 3 optional settings:

##### 1. Solenoid Type:

Upon initial start-up the connected solenoid type is checked by the controller; it must be a DC latch solenoid.

##### 2. Clock Mode:

Press the  button and set the system clock to 12 or 24 hour clock. Factory default - 24h.

##### 3. Time / Volume Operation:

Press the  button and select the required operation mode. Select TIME for BERMAD's pressure management by time application.

Note the icons change according to your selection: the icon should be selected for time operation. Factory default - Time.

Press the  button to move to the next basic settings screen.

#### Second Basic Settings Screen

In the second setting screen the operator can set the Flow Switch usage mode. Please note that a flow switch can be used only for BERMAD's pressure management by time intervals application.

## Flow switch mode:

Press the  button to enable or disable the flow switch operation. When a flow switch is enabled the  icon appears on screen. Factory default - flow switch enabled.

Press the  button to move to the next basic settings screen

## Third Basic Settings Screen

The third setting screen is used for setting the system time and day of the week.

### System Time:

Use the  and the  buttons to set the system time. Hold the button pressed to quickly advance the digits. Press both buttons simultaneously to reset the time and day to the factory default setting.

### Day of the week:

Use the  button to scroll through the days of the week and set the current day.

Press the  button to exit the basic settings screens and move to the operation programming screens.

## Pressure Management Application Settings

BERMAD's pressure management by time application is based on BERMAD control valve equipped with two pressure reducing pilots: one for high pressure setting and the other for low pressure setting. Normally the high pressure pilot controls the valve, while the low pressure pilot is on standby mode. A BEC PM1 controller with a DC solenoid can switch the high pressure pilot with the low pressure pilot according to a pre-defined time based operation regime. Such arrangement can switch the system to low pressure settings during night, while maintaining high pressure during day time.

The system is also equipped with a high flow switch that can stop the low pressure regime when higher demand for water is detected, such as in case of fire.

The following chapter describes the programming steps required for setting-up this application:

### Programming the Pressure Management by Time Intervals Application

The BEC PM1 operation programs consist of three parameters per each valve program: Operation Time, Operation Days, and Start Time.

For controlling BERMAD's Pressure Management by Time Interval Application the controller is supplied with a single solenoid (valve), operated by time with up to three start times a day, and with a flow switch.

In municipal water systems the demand for water in residential neighborhoods is high during the mornings and evenings and low during the night and mid-day hours; therefore, the control valve is set for the high pressure during high demand hours.

Operating the valve with the BEC PM1 controller reduces the otherwise too high pressure settings during the low demand hours.

For example, in typical municipal pressure regime, the day low pressure hours are between 10:00 AM and 06:00 PM and the night low pressure hours are between 10:00 PM and 06:00 AM, during the high demand hours the valve maintains the high pressure setting.

Therefore, the three required program parameters of the controller are: Operation Time - 8 hours, Operation Days - 7 days and two Start Times one at 10:00 AM and the other at 10:00 PM.

### 1. Operation Time:

Use the  button to move to the Operation Time programming screen, this is the screen with the blinking  icon, the blinking triangle with the digit 1 in it, and the  icon. Use the  buttons to set the required operation time (8:00 hours in our example).

Press the  button to move to the next programming screen which is the Operation Days screen.

### 2. Operation Days:

Use the  button to set a particular day as an operation day, or use the  button to skip the day, the cursor will advance to the next day. In our example set all 7 week days for operation.

Press the  button to move to the next programming screen which is the Start Times screen.

### 3. Start Times:

Use the  and the  buttons to set the first required Start Time (10:00 AM in our example).

Press the  button to move to the second Start Time and set it as required (10:00 PM in our example).

The controller is now set for automatically operating the Pressure Management by Time Intervals Application.

The BEC PM1 enables a volumetric or time based control of BERMAD's On/Off control valves that are used for purging pipe's dead ends, refreshing reservoirs and other such On/Off applications. This chapter describes the Dead-end Pipes Purging Application Settings.

## Dead-end Pipes Purging Application Settings

Due to operational conditions, in some municipal and industrial water systems, there is a need for periodic purging of the systems dead-ends of pipes for refreshing the water supply. BERMAD's control valves equipped with BEC PM1 controllers can be installed in these systems. BERMAD's Dead-end Pipes Purging Application accounts for the purging out of the system. This task is automatically performed based on three major parameters:

1. Purging interval - set at specific days of the week or as day intervals
2. Amount of purged water - set by operation time or by volume
3. Start time - set for the operation day (with up to three start times per such day)

The following examples depict three typical scenarios:

## A. Purging interval by Days of the Week and purging amount by operation time:

In this example the pipe needs to be purged for 5 minutes every Monday and Friday at 08:00 AM. Therefore, the three required program parameters of the controller are: Operation Time - 5 Minutes, Operation Days - Monday and Friday, and Start Time at 08:00 AM.

### 1. Operation Time:

Use the  button to move to the Operation Time programming screen - this is the screen with the blinking  icon, the blinking triangle with the digit 1 in it and the  icon.

Use the  and the  buttons to set the required operation time (00:05 minutes in our example).

Press the  button to move to the next programming screen which is the Operation Days screen.

### 2. Operation Days:

Use the  button to set a particular day as an operation day, the cursor will advance to the next day. In our example set Monday and Friday for operation.

Press the  button to move to the next programming screen which is the Start Times screen.

### 3. Start Time:

Use the  and the  buttons to set the required Start Time (08:00 in our example).

The controller is now set for automatically operating this Dead end Pipes Purging Application.

## B. Purging interval by Days Interval and purging amount by operation time:

In this example the pipe needs to be purged for 5 minutes every 10 days at 08:00 AM. Therefore the three required program parameters of the controller are: Operation Time - 5 Minutes, Operation Interval - 10 days and Start Time at 08:00 AM.

### 1. Operation Time:

Use the  button to move to the Operation Time programming screen - this is the screen with the blinking  icon, the blinking triangle with the digit 1 in it and the  icon. Use the  and the  buttons to set the required operation time (00:05 minutes in our example).

Press the  button to move to the next programming screen which is the Operation Days screen.

### 2. Operation Interval:

On the days of the week screen press the  button 7 times for skipping the operation by days of the week and advancing the cursor to the Days Cycle line. Two numbers appear on this line: the right number presents the program's Days Interval and the left number display the number of days left till the next operation day. Note that during the first setup of this program the number of day till next operation number is zero.

Use the  and the  buttons to set the required Days Interval (10 days in our example). Note that the maximal interval is 30 days.

Press the  button to move to the next programming screen which is the Start Times screen.

### 3. Start Time:

Use the  and the  buttons to set the required Start Time (08:00 in our example).

The controller is now set for automatically operating this Dead-end Pipes Purging Application.

## C. Purging interval by days of the week and purging amount by Water Volume:

In this example the pipe needs to be purged for 50 water meter pulses every Monday and Friday at 08:00 AM. Therefore, the three required program parameters of the controller are: Operation Volume - 50 pulses, Operation Days - Monday and Friday, and Start Time at 08:00 AM.

In order to operate this application the BEC-PM1 controller should be connected to BERMAD's 900 Series Hydrometer or to another BERMAD control valve and to a water meter. The BEC PM1 controller should be also set to volumetric operation, which can be done only at the initial setup process of the controller (when power is connected or when the controller's reset operation is performed).

### 1. Operation Volume:

Make sure that the controller is configured for Volume operation as described in the BASIC SETTINGS chapter early in this document.

Once a Volumetric operation is set on the first setup screen, press the  icon to move to the next water meter setting screen. This screen allows the user to set the following water meter parameters:

High Flow Rate (H.F.R.) - indicated by the on-screen  icon. This parameter defines the minimal allowed time between two water meter pulses. When pulses are received in shorter interval than this parameter a High Flow indication is presented by the controller

and the operation stops. (See the fault messages paragraph in the monitoring chapter of this document.) The factory default is 60 seconds; use the  and the  buttons to set the required H.F.R. parameter.

Press the  button to move to the next water meter setup parameter.

Timer Override (T.O.R.) - indicated by the on-screen  icon. This parameter defines the maximal allowed time between two water meter pulses. When pulses are received in longer interval than this parameter a water meter malfunction indication is presented by the controller and the operation stops. (See the fault messages paragraph in the monitoring chapter of this document.) The factory default is 10 minutes; use the  and the  buttons to set the required T.O.R. parameter.

Press the  button to move to the next water meter setup parameter.

Fill-Up Time (F.U.T.) - indicated by the on-screen  icon.

This parameter defines the time it takes to fill-up the system pipes at the beginning of the valve operation. During this time the system does not enter to High Flow fault. In purging systems where the purged water is released by open-end pipe to the atmospheric pressure, the flow rate can be high. Make sure that the F.U.T. and the H.F.R. parameters are correctly set for your system requirements. The F.U.T. factory default value is 6 minutes and it can be changed by the  and  buttons.

Press the  button to move to the next programming screen.

Move to the Operation length programming screen, this is the screen with the blinking  icon, the blinking triangle with the digit 1 in it, and the XX icon. Use the XX and the  icon. Use the  buttons to

set the required operation volume (050 pulses in our example).

Press the  button to move to the next programming screen which is the Operation Days screen.

## 2. Operation Days:

Use the  button to set a particular day as an operation day, the cursor advances to the next day. In our example set Monday and Friday for operation.

Press the  button to move to the next programming screen which is the Start Times screen.

## 3. Start Time:

Use the  and the  buttons to set the required Start Time (08:00 in our example).

The controller is now set for automatically operating this Dead-end Pipes Purging Application.

# Chapter #5

## Irrigation Application

### Display icons

	Setting Mode	<b>AUTO</b>	Automatic Operation
	Set Time / Time Mode	<b>%</b>	Seasonal Adjustment
	Watering Volume / Volumetric Mode		Rain OFF - No Watering [static]
	Watering Time		Stopped by Rain Sensor
	Operation Days		High Flow [seconds]
	Manual Operation		Uncontrolled Water Meter Operation [minutes]
	System Fill up time		Station Number Icon
		<b>AL:bt</b>	Low Battery

## Programming Steps

This chapter describes the required programming steps of the controller and it is divided into two: Basic Settings and Irrigation management settings.

### **Basic Settings:**

#### First Basic Settings Screen

The basic controller setting should be done once the controller is wired to the system and the power is connected, or after a total reset operation is performed. The basic settings consist of the following:

#### Solenoid Type:

Upon initial start-up the connected solenoid type is checked by the controller; it must be a DC latch solenoid.

## Factory Default - DC Solenoid



88:24

88:12

### Clock Mode:

**NOTE:** This value can be set only after power-up or full unit reset.

Factory default - 24h.

Press  button and set the system clock to 12 or 24 hour clock.

### Time / Volume Operation:

**NOTE:** This value can be set only after power-up or full unit reset.



Press the  button and select the required operation mode. Select between TIME and Volume and note the icons change according to your selection.

Factory Default:

TIME

The selected method indication (time/volume) is shown on the controller's operational screens.

Press the  button to move to the next basic settings screen.

## Second Basic Settings Screen

### Rain Sensor Mode:

Press the  button to enable or disable the rain sensor operation.

Press the  button to move to the next basic settings screen.



Factory Default:

Rain Sensor

Enabled

## Third Basic Settings Screen

### Set the current Time and Day of the Week:



#### System Time:

Use the  and the  buttons to set the system time. Hold the button pressed to quickly advance the digits. Press both buttons simultaneously to reset the time and day to the factory default setting.

Factory Default:

06:00 AM

Sunday

Press the  button to move to the day of the week settings.

#### Day of the Week:

Use the  button to scroll through the days of the week and set the current day.

Press the  button to exit the basic settings screens and move to the Irrigation programming screens.

## Irrigation Program Settings:

### General Notes

Each irrigation program consists of three parameters for each station:

1. Watering by Time / Volume
2. Watering Days
3. Program / Station Start Time

Use the  button to move through the programming steps, note that the "pointing hand" icon blinks throughout the programming process.

NOTE: Volumetric irrigation requires setting of additional three parameters: H.F.R., T.O.R. and F.U.T.

# Volumetric Irrigation Program parameters

## Volumetric Mode Only

**NOTE:** Setting "OFF" one of the flow limit parameters may end with an un-controlled watering in case of burst pipes or wire disconnection. It is NOT recommended to set "OFF" any of these limit parameters.

### Setting the High Flow-Rate Limit (H.F.R.)

This parameter defines the minimal allowed time between two water meter pulses. When pulses are received in shorter interval than this parameter a High Flow indication is presented by the controller and the irrigation stops.



Factory Default:  
60 Seconds

Use the  and  buttons in order to set the H.F.R. value.  
Press the  button in order to move to the T.O.R. setting.

### Setting the Timer Override Limit (T.O.R.)

This parameter defines the maximal allowed time between two water meter pulses. When pulses are received in longer interval than this parameter a water meter malfunction indication is presented by the controller and the irrigation stops.



Factory Default:  
10 minutes

Use the  and  buttons in order to set the T.O.R. value.  
Press the  button in order to move to the F.U.T. setting.

## Setting the Fill-Up Time (F.U.T.)

This parameter defines the time it takes to fill-up the system pipes at the beginning of the valve operation. During this time the system does not enter to High Flow fault.

Use the  and  buttons in order to set the F.U.T. value. In order to return to the H.F.R. settings press the  button.

Press the  button in order to move to next settings screen.



Factory Default:  
6 minutes

## Irrigation Program Common Parameters

### Used for all Irrigation Modes

#### 1 Watering by Time/Volume

**NOTE:** It is necessary to set the Time/Volume parameter other than "OFF" in order for the controller to operate automatically.

Use the  button to increase the watering

Time/Volume parameter or use the  button to decrease the Time/Volume.

Press the  button to program the watering days.



Factory Default:  
OFF  
(No watering)

## 2 Watering Days

**NOTE:** It is necessary to set at least one watering day in order for the controller to operate automatically.



Factory Default:  
All days are  
"OFF"

### First Screen - Days of the Week:

Press the  button to set a particular day as irrigation day or the  to skip that day. The cursor advances to the next day.

To set irrigation by days cycle, press the  button till the screen shows "0 0".

### Second Screen - Days Cycle:

Press the  button to increase the cycle by a single day or press the  to decrease the cycle by a day.

**Note** that the cycle interval range is between 1 to 30 days.

On the right side of the screen the cycle length is shown and the remaining days till the next irrigation day are shown on the screen's left side. Press the  button in order to program the watering start times.

## 3 Start Time

**NOTE:** It is necessary to set at least one Start Time in order for the controller to operate automatically. Up to 3 start times per irrigation day can be set to each station (MP) or for each program (SP). Press on the  button to increase or the  button to decrease the Start Time setting. Press the  button to move to the operational screens



Factory Default:  
All start times  
are "OFF"

## Operational Screens

### Manual Mode Manual Watering Screens



**NOTE:** to switch to the MANUAL screens press and hold the NEXT button for at least 2 seconds at any stage.

Single station  
Start

Common to both screens:

- Press the  or the  buttons to switch the valve ON or OFF. A Switched ON Station Icon appears on the screen together with the remaining irrigation countdown.
- If the station is left ON it will shut off automatically according to its programmed time/volume watering setting.
- If no time/volume is set for the station it will shut off automatically after two minutes/pulses irrigation.
- A Switched OFF Station Icon blinks and the current time is displayed.
- The controller returns to the AUTO screen after 3 minutes with no activity on the MANUAL screen.

Press the  button in order to move to the AUTO screen.

### Auto Mode - Auto screen

When no button is pressed in the controller's keyboard for 3 minutes, the controller moves to the main monitoring screen indicated by the word AUTO in the middle of the screen. The AUTO screen displays the following data items:

- The current time and day
- The remaining irrigation time or volume
- The display shows the current reading of the system's flow-rate.

**NOTE** that any active alert message overrides this screen's regular data. To cancel an alert press the  and  buttons simultaneously. Press both  and  in order to cancel an alert. In order to stop irrigation (Rain-OFF) or to resume it,

press both  & . Press the  button in order to move to the WATER BUDGET screen.

### 【AUTO】

Automatic  
Operation

## Water Budget - Seasonal Adjustment

[ % ]

Percentage scaling adjustment can be used in order to increase or decrease the Watering Time/Volume for all the irrigation stations.

Factory Default:  
100%

This method is useful when the watering Time/Volume needs to be changed due to seasonal or weather reasons.

Watering scaling ranges within 10% - 200% in 10% steps.

Press the  button in order to move to the Settings Screens.

## Alerts

### Common to all Alerts:

- “Sticky” alert screen – During active alert the controller displays the alert type message. As long as the alert is active the message is “Sticky” on the screen foreground. Blinking icons are shown when trying to leave the screen. In order to move to another screen it is necessary first to cancel the alert.
- Canceling alert is done by pressing the  and  buttons simultaneously.
- **NOTE:** Watering does not take place as long as the alert exists; cancel the alert in order to resume operation.
- Simultaneous Alerts - in cases where more than a single alert exists in the system, the controller alternates the alert type messages on screen.

## Fault Messages Table

Type	Display	Operation stopped at:	Remarks	
Low Battery	"AL:bt"	All Valves (!)		"OFF" icon is lit
Too High Current Usage	"AL:Cr"	The faulty valve only		The valve's number icon is lit
High Flow	"AL:HF"	The faulty valve only		The valve's number icon is lit
Timer Override	"AL:tr"	All Valves (!)	Automatically canceled at midnight	

## Buttons

Buttons Combination	Function	Remarks
 Short press	Go to Next Screen	Cyclic Activity
 2 sec. press	Go to MANUAL Screen	Quick Jump
 10 sec. press	Unit RESET	Programmed data will be lost
 & 	Rain-OFF In/Out	2 sec. press at AUTO-Run screen
 & 	Set Factory Default Value	In all Setting Screens
 & 	Cancel an Alert	2 sec. press during active alert

# General Information for all Irr Applications

## Monitoring

When no button is pressed in the controller's keyboard for 3 minutes, the controller moves to the main monitoring screen indicated by the word AUTO in the middle of the screen.

The AUTO screen displays the current status of the controller, which includes the current time and day, as well as the switched ON valve indication and its remaining operation time or volume.

During a fault or malfunction mode the relevant fault message overrides the AUTO screen data, see the "Fault Messages Table" on page .

To cancel the fault check the system for the cause of the fault, repair the necessary components and then press the  and the  buttons simultaneously for 2 seconds.

### Please note:

- When a fault message is displayed on the AUTO screen moving to the other screens is not possible.
- In case the controller has more than one fault, this screen alternates the current fault messages every few seconds.

# Manual Operation

The operator may manually start / stop the operation of the valve at the manual operation screen.

Move to the manual operation screen by pressing the  button at any screen for 2 seconds. The  icon appears.

Use the  and the  buttons to start or stop the operation of the valve. Please note that when manually started, the valve operates for the duration of its programmed operation time or operation volume.

## Disclaimer

The BEC PM1 is a general purpose controller supplied as an electronic device controlling BERMAD valves. Therefore this document is limited to BERMAD's applications only.



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