

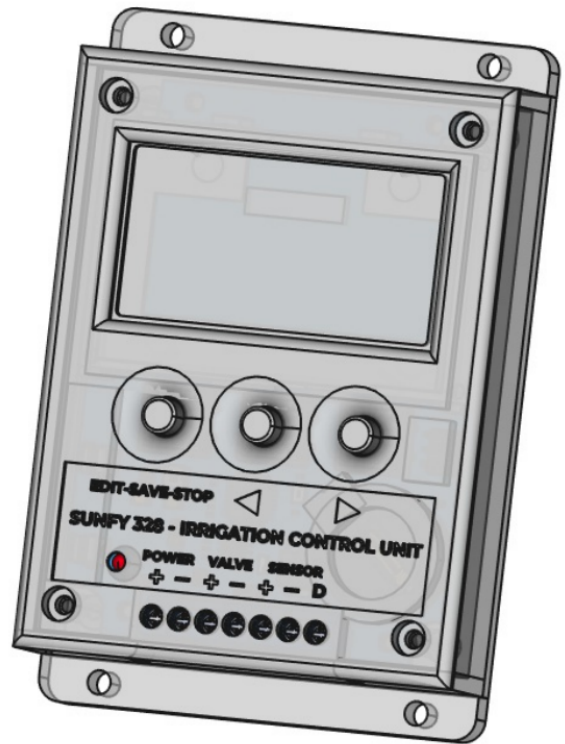
Picapot 328 - Irrigation Controller

User's Manual

Version 3.2 rev. 5 Sep 2026

Features

- Picapot 328 can control one 12 V DC load (such as a solenoid valve, water pump, or relay) with a maximum continuous power consumption of 30 W.
- Real-time clock with optional automatic daylight saving, geolocation-based sunrise/sunset, fractional timezone support, leap year handling, calibration, and CR2032 battery backup.
- Four watering modes: Fixed time, sunrise/sunset-automatic, sunrise/sunset-advanced, and fixed interval. Base duration can range from 15 seconds to 1 hour; seasonal compensation and Heat Boost can extend automatic watering.
- Optional automatic seasonal adjustment of duration and watering interval.¹
- Boost watering during heatwaves.
- Frost protection: skip watering when the temperature is below 5 degrees to safeguard plants and the valve.
- Manual watering with a timer for immediate valve control.
- Skip watering based on soil moisture (requires an external soil moisture sensor).
- Event history for the six most recent automatic waterings, manual waterings, and skipped waterings.
- Automatic fallback to the internal temperature sensor if the selected external sensor is unavailable.
- Low power consumption, ideal for off-grid systems.

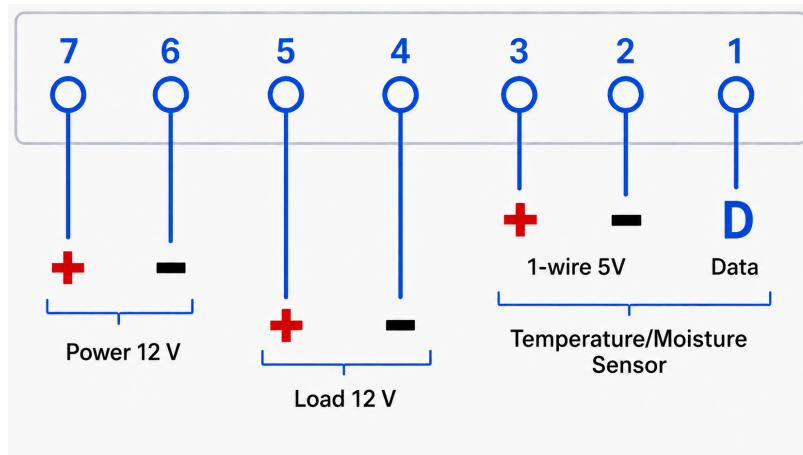


Installation

The control unit is **not waterproof** and must be enclosed in a waterproof box if installed outdoors.

The connector block has seven terminals. Connect them as described below.

Important - first start: power up the controller for the first time with only the internal DS18B20 connected. The controller stores the first detected sensor as the internal sensor. Connect the external sensor only after this initial registration has completed.



Picapot 328 terminal layout

Terminal	Description
7, 6	Connect these two terminals to a 12 V power source. The power source must provide at least 0.25 A to supply the control unit and the sensor, in addition to the load current. The total current drawn by the system is limited by a 3 A fuse. The unit is protected against reverse polarity. 7) Positive (+12 V) 6) Negative
5, 4	Connect these two terminals to the load, which must operate at the same voltage as the power source. Irrigation systems typically use a solenoid valve and/or a water pump. Solenoid valves are not polarity-sensitive, so the wires can be connected either way. Water pumps, however, must be connected with the correct polarity. The maximum continuous load power is 30 W at 12 V DC. Motor starting currents must also be considered. For higher-power loads, use an external relay rated for the load and its starting current, driven by the Picapot controller. 5) Positive (+12 V) 4) Negative

Terminal	Description
3, 2, 1	Connect these three terminals to the optional external sensor. The sensor can be a DS18B20, which provides temperature, or the Picapot PS100, which provides both temperature and soil moisture. The controller supports one internal sensor and one external sensor. 3) Positive (+5 V) 2) Negative 1) Data line

Operation

The controller provides seven screens.

No.	Screen	Modes	Description
1	Date/Time	View/Edit	The main screen shows the date, time, and sensor data.
2	Schedule	View/Edit	Configuration of the waterings.
3	Location	View/Edit	Unit geolocation, timezone, and daylight saving.
4	Options	View/Edit	Remaining controller options.
5	Events	View	History of automatic, manual, and skipped watering events.
6	Sensor	View	Minimum and maximum temperatures and moisture levels of the day.
7	Manual	View/Edit	Immediate watering.

Screens can be managed using three buttons:

Button	Position	Functions
1	Left	Enter/exit edit mode when pressed for more than 2 seconds. In edit mode, move to the next edit cell. Stop watering when pressed for more than 2 seconds from the Date/Time screen.
2	Middle	In view mode, move to the previous screen. In edit mode, decrease the edit cell by one unit.
3	Right	In view mode, move to the next screen. In edit mode, increase the edit cell by one unit.

Use buttons 2 and 3 to navigate between screens.

To change values, enter edit mode by pressing and holding button 1 for more than 2 seconds. Then use buttons 2 and 3 to set the current field's value. Press button 1 to move to the next field.

When all values have been set, press and hold button 1 for more than 2 seconds to exit edit mode.

The monitor is turned off after 60 seconds of inactivity. To wake it up, press one of the buttons. You can change the timeout from the Options screen.

The system will notify you when the RTC battery (CR2032) needs replacement.

When powered from USB through the ISP port at approximately 4.5 V, the DS1307 real-time clock (RTC) integrated circuit operates at the lower limit of its specified supply range, which may cause system instability and unexpected resets; therefore, powering the controller from a 12 V supply is always recommended, including during programming.

Screen 1 - Date/Time

This is the main screen that appears after the system reboots or wakes from sleep mode.

This screen shows the following information:

Ord.	Name	Description
1	Weekday	
2	Day	
3	Month	The transition from February to March on leap years is automatically managed.
4	Year	
5	Hour	Time is shown in 24H format. When a Daylight Saving rule is selected on the Location screen, the displayed time is automatically adjusted according to that regional rule.
6	Minute	
7	Second	
8	Temperature and Moisture	Temperature from the selected sensor. If a selected external sensor is unavailable, the internal DS18B20 is used as a fallback. Soil moisture is shown only when a valid external PS100 is available.
9	RTC Battery	Estimated charge level of the RTC backup battery, shown as a percentage.
10	Last Watering	Date, time, and duration of the last automatic watering.

During watering, this screen displays a blinking **WATERING** message and a timer showing the remaining time. You can stop watering at any time by pressing and holding button 1 for more than 2 seconds.

Screen 2 - Schedule

This screen allows you to view and edit the watering settings.

Ord.	Name	Description
1	Mode	The working mode of the watering. It can be one of the following options: OFF: Scheduled watering disabled; manual watering remains available. FIXED TIME: The user can specify two exact times of the day for watering. Each watering can be disabled. AUTO DUSK2DAWN: Watering is performed 3 hours after dawn and 3 hours before dusk. The user can only change the duration; the rest of the screen settings are set to AUTO mode. ADVANCED DUSK2DAWN: Watering is performed after dawn and before dusk, with a time offset specified by the setting D2D. All the screen settings can be configured by the user. FIXED INTERVAL: Watering is performed at user-defined regular intervals, starting from a specified time. The interval can be 5, 10, 15, or 30 minutes, or 1, 2, 4, 8, 12, or 24 hours. An optional end time can be set for the same day; if the end time is OFF, watering runs continuously for 24 hours. If defined, the end time must be later than the start time on the same day.
2	Duration	Base watering duration can be set between 15 seconds and 1 hour. Seasonal compensation and Heat Boost apply to automatic watering and can increase the effective duration.
3	Season Compensation	The maximum increase applied to the alarm duration based on the current season. The longer the daylight period, the greater the increase. For example, if the duration is 5 minutes and the Season Compensation is set to 100%, the effective duration will be 5 minutes on the shortest day of the year and 10 minutes on the longest day of the year. OFF: No adjustment applied to the duration. AUTO: It is equal to 150% when mode = AUTO DUSK2DAWN. Alternatively, select a maximum increase between +50% and +400%.

Ord.	Name	Description
4	Skip Watering Days	Number of days to skip between two waterings. OFF: Never skip watering days. AUTO: Uses the read-only Season value on the Location screen: • 0–24%: Every 3 days, at most one watering. • 25–44%: Every 2 days, at most one watering. • 45–62%: Daily; WT2 is eligible if today's maximum temperature reaches 35°C (95°F), or no valid temperature is available. • 63–100%: Both WT1 and WT2 are eligible daily. Other watering skip conditions still apply. Alternatively, select a value between 1 and 6.
5	Dusk to Dawn (D2D)	Time offset when Watering Mode is set to ADVANCED DUSK2DAWN. DAWN+1H DUSK-1H DAWN+2H DUSK-2H DAWN+3H DUSK-3H DAWN+4H DUSK-4H

Scheduled waterings do not start while settings are being edited or another watering is active. Missed starts are not queued.

Screen 3 - Location

Use this screen to enter the controller's geolocation.

Using this information, the controller can schedule watering at dawn and dusk, adjust the watering duration based on day length, and skip watering days when the option is set to AUTO.

Ord.	Name	Description
1	Timezone	Timezone where the unit is located. It can be a value between -12 and +14 with 15-minute increments.
2	Daylight Saving ²	Select the regional daylight saving rule. The controller automatically adds one hour during the applicable period. OFF: No daylight saving adjustment. EU: European Union rule. US: United States rule. AU: Australian rule. NZ: New Zealand rule.
3	Latitude	Latitude of the unit. It can be a value between -90 and +90.
4	Longitude	Longitude of the unit. It can be a value between -180 and +180.
5	Season	Read-only seasonal level. The value ranges from 0% to 100%, indicating where the current daylight length falls between the shortest and longest days of the year at the configured location. It is used by seasonal compensation and automatic day-skipping rules.

Screen 4 - Options

With this screen, you can view/edit the remaining options.

Ord.	Name	Description
1	Sensor	Select the temperature and moisture source. INTERNAL: Internal DS18B20 temperature sensor. DS18B20: External DS18B20 temperature sensor. PS100: External Picapot temperature/moisture sensor. After connecting or disconnecting a sensor, enter and exit edit mode on the Options screen to trigger an immediate rescan of the 1-Wire network, or wait 30-40 seconds for the automatic rescan.
2	Temperature Unit	The measurement unit of temperature. CELSIUS FAHRENHEIT
3	Heat Boost	When the day's maximum recorded temperature is equal to or greater than the specified value, the watering duration is increased by the specified percentage. OFF: Never adjust the watering duration due to high temperature. Alternatively, select a temperature between +30 and +55 Celsius (+86 and +131 Fahrenheit) and a percentage between 10% and 90%.
4	Moisture Limit	When the moisture level is equal to or greater than the specified value, skip the watering. OFF: Never skip watering due to the moisture level. Alternatively, select a moisture value between 1% and 99%.
5	Clock Calibration	The number of seconds of calibration applied every day to the clock. For example, if the clock loses one second every 24 hours, insert +1 to compensate for the loss. Select a value between -240 and +240 seconds.
6	Screen Timeout	The screen turns off after a period of user inactivity defined by the specified timeout. Select a value between 1 and 60 minutes.

When an external sensor is selected but is not available, the controller falls back to the internal DS18B20 for temperature. Soil moisture display and moisture-based watering skips are disabled during fallback. After 10 consecutive failed readings (approximately 20 seconds), the controller clears the previous samples and rescans the sensor bus. Once operating with the internal fallback sensor, it checks once per minute for an available external sensor.

The internal sensor address is registered during the first start and retained separately in EEPROM, even after a settings reset. A replacement internal sensor with a different address is therefore not registered automatically.

Screen 5 - Events

This screen displays the six most recent automatic waterings, manual waterings, and skipped watering attempts. Each entry contains the date, time, and either a duration or an event code.

Display	Meaning
Duration	Completed or started automatic watering.
M- followed by a duration	Manual watering.
Skip-D	Watering skipped by the Skip Watering Days setting.
Skip-M	Watering skipped because the moisture limit was reached.
Skip-I	Watering skipped by frost protection.
Skip-R	Repeated fixed-time or dusk/dawn trigger suppressed.
Skip-E	Second daily watering suppressed by the automatic seasonal/temperature rule.

If an automatic or manual watering is stopped from the Date/Time screen, its Events entry is updated with the actual elapsed duration. The Last Watering value shown on Screen 1 is updated only for automatic watering.

Only the most recent event is retained in battery-backed RTC memory and survives a normal controller restart. The other five entries are held in working memory and are cleared by a restart.

Screen 6 - Sensor

This screen displays the current temperature and soil moisture level, along with the minimum and maximum values recorded for the current day. Moisture values are available only from a valid external PS100. Daily minimum and maximum values are also reset when the controller restarts.

Screen 7 - Manual

With this screen, you can manually open the valve for the specified duration.

Press and hold the **LEFT** button for more than 2 seconds to enter edit mode. Select the desired watering duration, then press and hold the **LEFT** button again for more than 2 seconds to start watering.

You can stop watering by pressing and holding the **LEFT** button on the Date/Time screen for more than 2 seconds.

Ord.	Name	Description
1	Duration	Watering duration can be set to a value from 15 seconds to 1 hour.

Manual watering is added to the Events screen. The Last Watering value on the Date/Time screen continues to show the last automatic watering. Manual watering does not affect the Skip Watering Days function, which counts days from the last automatic watering.

Manual duration is not increased by seasonal compensation or Heat Boost. Manual watering also bypasses automatic frost and moisture skips.

Settings Backup and Recovery

Current settings, watering state, the last automatic watering, and the most recent event are stored in the battery-backed RAM of the RTC. Routine watering activity and event updates do not write to the microcontroller EEPROM.

An EEPROM backup snapshot is refreshed when edit mode is exited from the Schedule, Location, or Options screen. Editing only the date and time does not update this EEPROM backup.

If the RTC memory becomes invalid (for example, due to an RTC battery replacement) and a valid EEPROM backup is available, the standard firmware restores that backup automatically and restarts. The date and time must then be checked and set again before relying on the watering schedule. If no valid backup is available, default settings are loaded.

The registered address of the internal temperature sensor is stored in a separate EEPROM area. It is not erased by a normal settings reset, allowing the controller to distinguish the internal and external sensors after an RTC battery failure.

User Assessment Disclaimer

Users must assess the suitability of the sensor and select irrigation settings according to their installation, plants, soil, water, and environmental conditions.

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1. The season is calculated as a function of the length of the day. This works well in most countries, but not those very close to the equator or the poles. [↩](#)
 2. The RTC stores standard time. The selected regional rule is applied to the displayed time and to watering calculations. Select OFF where daylight saving is not observed or where none of the available regional rules applies. [↩](#)