analytical

Monocon Controller

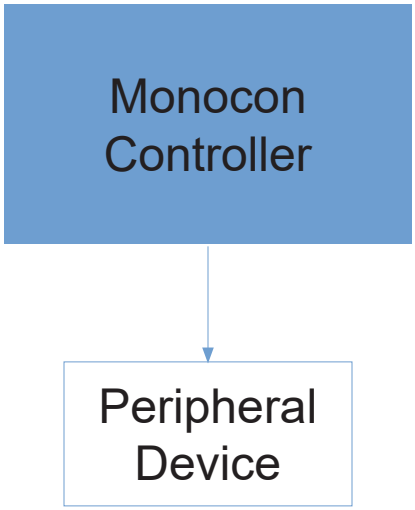
Operating Manual

Revision 1d - 10/13/2023

Description and Intended Use

This document was written for the purpose of guiding scientists and other technical users in the operation of the Monocon Controller from Analytical Sales and Services.

The Analytical Sales and Services Monocon Controller is a device which was developed to enable the control of a single temperature device. The unit is operated via a touchscreen GUI. Connectors on the rear allow the user to chain other Monocons together using Modbus RS485 and potentially control up to 31 separate temperature control devices.



I. Safety and Precautions

This sticker indicates that the device it is adhered to can reach high temperatures. Do not touch the device while the device is turned on.

1. Warning: The Monocon Controller allows some connected devices to reach a high temperature. Touching them while the device is in operation may result in injury.
2. Warning: Do not open the device, there are no user-serviceable parts inside. In case of troubleshooting, replacement parts are only to be examined and supplied by Analytical Sales.
3. Warning: Do not cover the vents on the case of the device, the device may fail to function as intended.
4. Warning: Do not use the Monocon in a manner other than intended and/or specified by the manufacturer. Doing so may impair the protection provided by the equipment and/or possibly damage the equipment.
5. Warning: Ensure that the Monocon is powered-down before attaching a device.
6. Warning: Only connect devices manufactured or sold by Analytical Sales. Use of 3rd party devices may result in damage to the controller.
7. Warning: Do not position the equipment so that is it difficult to operate the attached devices. Always ensure there is adequate space around the perimeter of the controller.
8. Warning: Do not replace the original power cord with an inadequately rated cord.
9. Warning: This device is fuse-protected. Do not tamper with the fuse. Doing so may result in device malfunction. Use only the type and rating fuse described in this manual.
10. Warning: Never operate a heater without a load. Smoke or damage may occur.

Device Operation

II. Connecting/Removing a Device

Connection

1. Set up the peripheral device as needed, i.e., placed around HPLC columns or capillary tubes.
2. Ensure that the Monocon is powered-down before attaching a device.
3. On the rear of the controller, plug a device into the receptacle labeled “Device”. Turn the connector housing in order to lock the plug in place.

4. Once the required device is plugged into the controller, the controller unit is ready to be powered on. **Important:** Adding a different peripheral device will not work while the Monocon is running. The peripherals are not “hot-swappable”. The controller must be powered-down before adding a different device.

Removal

5. Ensure that the Monocon is powered-down before attempting to remove a device. **Caution:** Removing a device with the power on may result in damage to the peripheral device’s electronics.
6. Ensure that the peripheral device has reached a safe handling temperature before attempting to remove it. Failing to do so may result in injury to the user. Standard operation will never allow the Monocon controller to reach a temperature high enough to harm to the user.

III. Powering-Up

1. Place the unit on a flat surface where there is no danger of fall, fluid ingress, or blocked vents.
2. Ensure that the required peripheral is connected to the controller before powering up. **Important:** devices cannot be connected or disconnected while the controller is powered-up.
3. Ensure that the power cord is plugged into the appropriate receptacle on the bottom right rear of the device. There should be enough clearance between the receptacle and the wall for the cord to be removed easily. The power cord should be able to handle a minimum of 12A if used with 115V and 8A if used with 230V.

4. Turn on the unit using the power switch on the left rear of the machine.

- Please note: Do not rapidly power cycle the controller. Wait at least 20 seconds after powering down before turning back on.

IV. Powering-Down

1. Ensure that the required peripheral remains connected to the controller. Devices cannot be connected or disconnected while the controller is powered-up.
2. Turn off the unit using the power switch on the left rear of the machine. The peripheral can now be removed.

V. Starting a Device

Devices can be started from either the temperature screen, timer screen, relay screen or remotely from a PC.

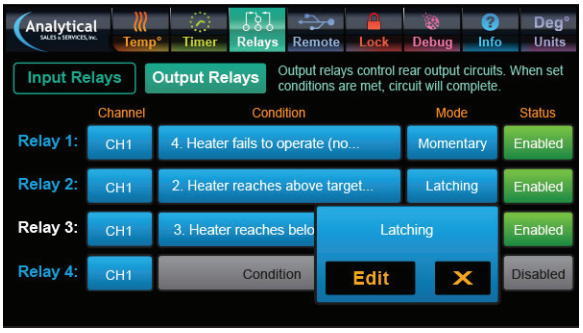
Temperature Screen Operation

1. The temperature panel can be accessed by pressing the “Temp” icon on the top toolbar.
2. The temperature can be set in two ways: incrementing using the arrows to the side of the number or tapping the displayed value itself to access a finer control setting. The temperature can be set as high as 130.0ºC and as low as 30.0ºC. Please note that these are the absolute MAX and MIN that the firmware is programmed to. Other MAX and MIN values can be set on a per-heater basis.
3. Once a temperature has been set, the device can be enabled or a timer can be set. If enabled without setting a countdown timer, the device will record the time elapsed on a read-out below the temperature. Enabling after setting a time will start the countdown timer.

Timer Screen Operation

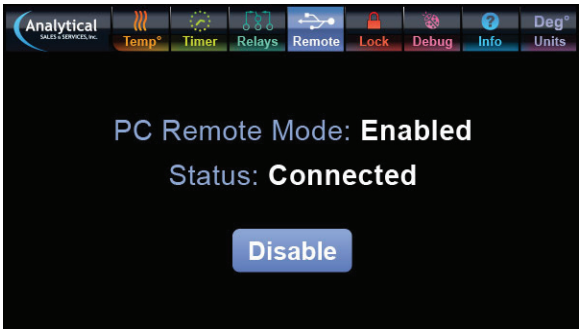
1. Access the timer panel by pressing the “Timer” icon on the top toolbar. The timer can be set by incrementing using the arrows above the number. The timer can be set as high as 999:99:99 or as low as 1 second. **Any set time will take precedence over the elapsed time on the temperature setting screen and will display a countdown.**
2. To start a heater in countdown mode, return to the temperature screen after setting a time, and enable the heater. You should see the countdown begin.
3. To clear the timer and revert to elapsed timer mode, return to the timer screen, press “clear” and now return to the temperature screen.

Relay Screen Operation



1. Access the relay panel by pressing the “Relay” icon on the top toolbar. This section allows for relay options to be set.
2. Input relay settings can be accessed from the “Input Relay” button near the top of the screen. This allows for a heater to be triggered by an external relay.
3. Output relay settings can be accessed from the “Output Relay” button on the screen. This allows the heater to trigger an external relay based on the status of the attached temperature control device. There are options within this setting which allow for context-sensitive control of up to four relays.

Remote Screen Operation



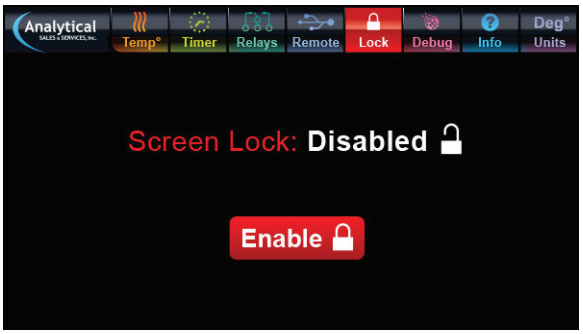
1. Access the remote panel by pressing the “Remote” icon on the top toolbar. This will allow the operator to toggle PC based control.

VI. Device Information

There are further control and information options available for the connected device.

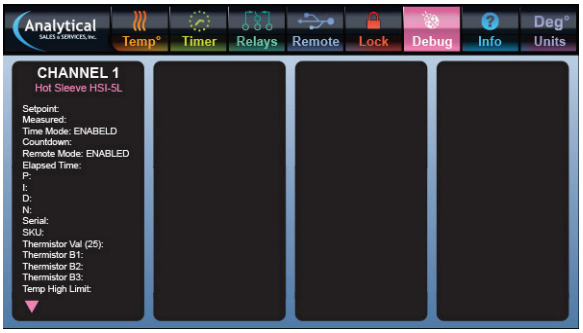
Lock Screen Operation

Access the lock panel by pressing the “Lock” icon on the top toolbar. This allows the operator to lock the screen and protect against any accidental button presses. A message regarding lock status will be displayed if anything aside from the toolbar or Disable Lock button is pressed.



Debug Screen Operation

Access the debug panel by pressing the “Debug” icon on the top toolbar. This will provide detailed information about the connected device, including PID data and serial number.

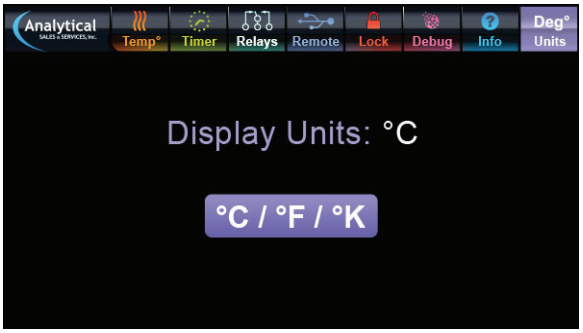


Info Screen Operation

Access the information panel by pressing the “Info” icon on the top toolbar. This page displays information about the company, as well as model number and serial number for the controller.

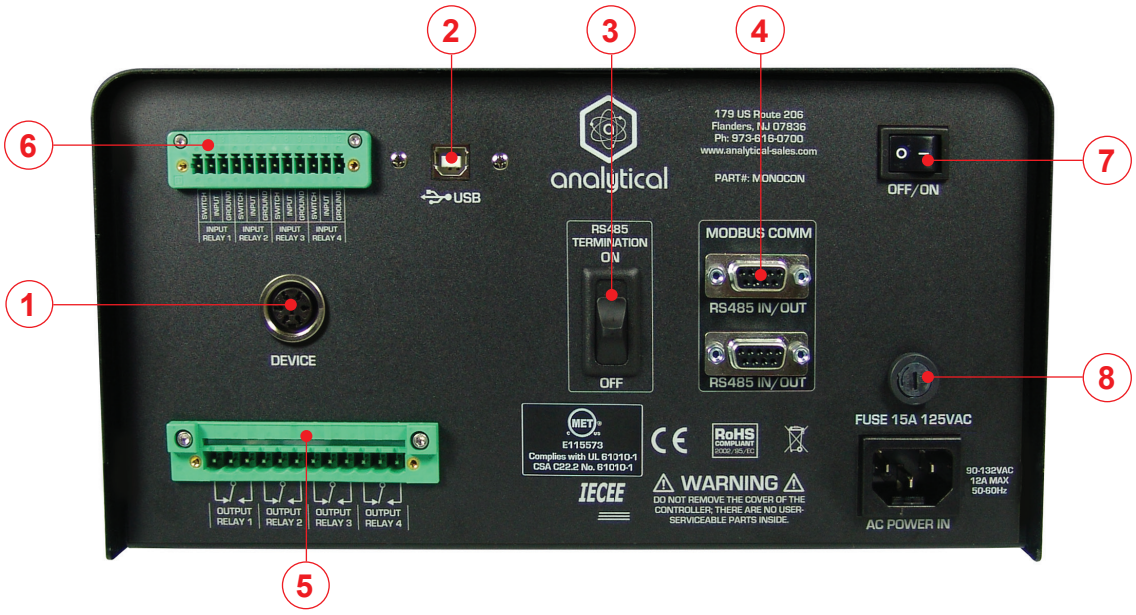
Units Screen Operation

Access the temperature units panel by pressing the “Units” icon on the top toolbar. This allows the operator to switch between Celsius, Fahrenheit, and Kelvin.



VII. Features on Back of Controller

1. The Device Input allows the peripheral device to be connected to the Monocon. This input is threaded, allowing the operator to be secure in the connection of their device.
2. The USB Connection on the rear of the device allows advanced users to directly connect the controller to a computer and edit the parameters of its connected peripheral device.
3. The Modbus RS485 Termination switch on the back will allow the device to be marked as the terminal node in a Modbus RS485 chain.
4. The Modbus RS485 Comm ports allow the controller to be connected as part of a Modbus RS485 chain. This allows up to 31 controllers to be used simultaneously.
5. The Output Relays allow for additional external devices to be controlled by the measured status of a connected peripheral device. The additional external devices connected to the Output Relays can be activated or deactivated in various ways depending on the status of the connected peripheral device.
6. The Input Relays allow for the connected peripheral device to be controlled by the status of an additional external device.
7. The OFF/ON Switch allows the user to control the activation status of the Monocon.
8. The Fuse Holder holds a user-replaceable 15A 125VAC fuse (8A 250VAC for models built for 230V regions).



VIII. Fuse Replacement

Rating: See Technical Specification & Equipment Ratings on page 6.

Replacement: The fuse can be replaced by using a Flathead screwdriver to turn the fuse holder 90°. The spring-loaded holder will then eject. Replace the old fuse with a new one. Slide the fuse holder back into the housing. Turn back 90° with Flathead screwdriver to close and lock into place.

IX. Cleaning and Maintenance

Use only static-free and lint-free microfiber cloths to clean the Monocon controller. Do not use any chemical cleaners, and never use water as doing so may cause permanent damage to the unit. Do not submerge unit in water or any other liquid.

Do not remove the cover of the controller; there are no user-serviceable parts located within.

For troubleshooting, maintenance, and service, technical assistance can be obtained by contacting Analytical Sales. Our technical staff will be happy to assist.

Technical Specification & Equipment Ratings

Specified Environmental Operating Conditions	
Temperature Range	0ºC to 70ºC
Humidity Range	20% to 90% RH non-condensing
Atmospheric Pressure	30-110 kPa
Cabling and Earthing	Provided
Indoor/Outdoor Use	Indoor
Pollution Degree	Pollution Degree 2

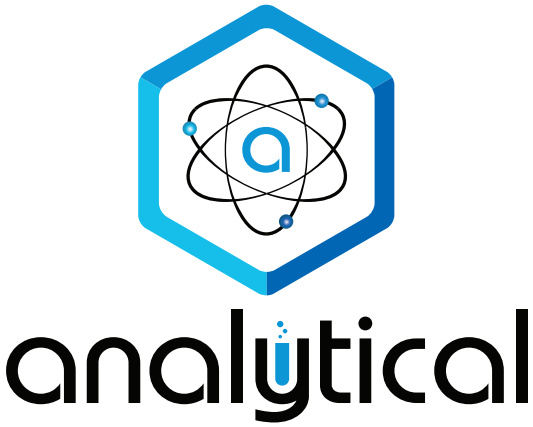
Electrical Specifications	
Voltage (output)	36VDC
Power (output)	252W
Phases	1
Current (output)	7A
Voltage Frequency (input)	50-60Hz
Voltage (input)	90-264VAC
Current (input)	12A at 115VAC 7.5A at 230VAC

Physical Description	
Device Arrangement	Table Top
Size (HxWxD) inches	9.0 x 11.0 x 6.0
Weight (lbs)	6.44

Ports and Connections	
AC POWER IN	For AC power
USB	For Serial Interface
DEVICE OUT	For connection to peripherals
INPUT RELAYS	For external 5V accessories
OUTPUT RELAYS	For external 5V accessories
MODBUS RS485 PORTS	For distributed control

Other Information	
Highest Internal Frequency (MHz)	400 MHz
Magnetic Sensitivity	

Fuse	
Rating	15A 125VAC (8A 250VAC for 230V regions)
Characteristic	5mm x 20mm



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