

# TrolMaster

## TCS-1

### Tent-X Control System



## OVERVIEW

Congratulations on purchasing the all in 1, state-of-the-art control system, the Tent-X. Designed for single-zone grow tents, this device is capable of satisfying all your grow tent's environmental and irrigation needs. The Tent-X is the brain that unites all your climate control devices into one being, allowing your devices to work together in order to create the optimal growth environment for your plants.

The TENT-X allows users to monitor and control both their environment and the fertigation within their grow tent, using one simple-to-use and cost-effective controller. The function of the Tent-X controller consists of maintaining a tent at constant temperature and humidity, with the ability to switch between Day and Night settings. It is also an irrigation tool, allowing you to automatically keep the medium of the plants' at your desired settings.

## COMPONENTS

- Tent-X Controller
- Backplate(Bracket)
- 4ft RJ12 Cable
- Y-Shaped splitter
- 12DC Power supply
- 3-in-1 MBS-TH sensor
- 16ft RJ12 Cable

## INSTRUCTIONS

Install the Tent-X on a wall using the included back plate that comes in the package with the controller. It is a simple fixed wall bracket. Simply release the controller from the bracket by pulling the controller from the bracket, then mount the bracket on the wall using screws. You can then place the controller back into the bracket by simply pushing the controller into the bracket. It will lock itself into place.

Install the MBS-TH sensor by plugging the sensor using the RJ12 cable attached to the MBS-TH, into the sensor port on the Tent-X. Make sure that the sensor is properly placed in the tent, perpendicular to the plants and the grow lights. The MBS-TH is a 3-in-1 sensor that can detect temperature, humidity, and light. In order to detect the PPF levels of the light being emitted, the MBS-PAR sensor has to be purchased separately.

It is recommended to install the controller in a clean and dry environment. Do not allow the Tent-X to be exposed to water or excessive heat. Do not open or attempt to open the Tent-X to repair or disassemble the controller, as there are no user-serviceable parts inside. Opening the controller will void the warranty. If you'd like to clean the surface of the controller, wipe it with a damp cloth. The Tent-X operates under natural ventilation conditions and is suitable to receive power from a conventional household outlet.

**\*Reminder:** The interconnecting RJ12 communication cables come in various lengths. It's crucial to choose the right length that suits your application. When purchasing the TCS-1 TENT-X Control System, you'll receive a 4ft and 16ft cable as part of the package. However, if you need longer cables, we also offer them in 25ft and 50ft lengths. Please ensure that you select the appropriate cable length for your specific requirements.

## BUTTONS ON THE TENT-X CONTROLLER

There are 6 buttons used for navigation on the controller:

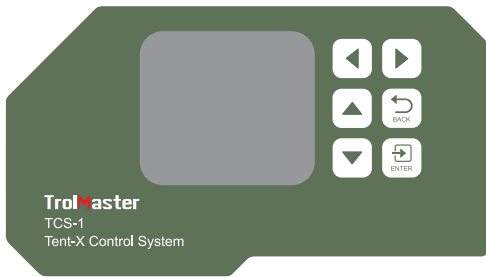
**Up/Down:** Use the UP or DOWN button to navigate upwards or downwards for any item on the LCD screen.

**Left/Right:** The LEFT and RIGHT buttons can either be used to navigate across different pages or to select an item on the LCD screen

**Enter:** The ENTER button is used to open settings menu and to confirm any selection that you've made.

**Back:** The BACK button is used to navigate back to previous pages.

The TENT-X controller comes with 5 rj12 ports, with each port having a designated task.



## 1. Sensor Connections

All the sensors used with the TENT-X will be connected to the RJ12 port labeled SENSORS, at the bottom of the unit. First, connect an RJ12 cable to the port, then connect the other end to either a Y-splitter or TrolMaster's splitter hub (SPH-1). If using the Y-splitter, you can connect the 3-in-1 MBS-TH sensor in one of the two ports and another sensor such as the AMP-3 to the second port, or connect another Y-splitter to the second port to create a daisy-chain connection in order to connect more sensors.

For your environmental sensors, the Tent-X comes with a 3-in-1 temperature, humidity, and light sensor called the MBS-TH. Users can daisy-chain the MBS-TH sensor with the CO2 sensor (MBS-S8), the full spectrum quantum sensor (MBS-PAR), and the smoke and water detectors called the MBS-SD and WD-1, into the Tent-X's SENSOR port.

In order to monitor your nutrients and grow medium data, connect the AMP-3 sensor board to the TENT-X. Next, connect water content, EC/temperature, and pH sensors, (WCS, PCT, and PPH sensors) to the sensor board.

Once the sensors are all connected to the SENSOR port on the TCS-1, press the small button on the sensors to link or "address" each sensor to the TCS-1 controller. The TENT-X controller will then automatically assigns an address to the sensors sequentially. Once the sensors are addressed, the addresses will be saved unless the user completes a factory or sensor reset within the system setting menu.

## 2. Light Connections

The TCS-1 can control most brands of LED or HID lights using the two built-in lighting control channels on the TCS-1. Each of the two can operate independently of each other to allow two different types or brands of lights to be controlled, or to be able to split a grow room's lighting into two separate "zones".

In order to control your lights, you must first plug in one of TrolMaster's Lighting Adapters into the RJ12 ports on the bottom of the controller, labeled Line 1 and Line 2. TrolMaster offers several types of lighting Adaptors for different brands and types of lights. If you have questions about which adapter is correct for your lights, contact Tech Support or go to TrolMaster's website at [www.trolmaster.com](http://www.trolmaster.com).

Since each of the two lighting control channels is independent, each line can be set up to have its own timer settings and dimming temperature setpoints as well as the dimming/power% that each group of lights will be operated at.

### 3. Device Module Connections

All of the device modules used with the TCS-1 will be connected to the RJ12 port at the bottom of the controller, labeled DEVICES. First, connect an RJ12 cable to the port, then connect the other end to either a Y-splitter or TrolMaster's splitter hub (SPH-1). If using the Y-splitter, a device module in one of the two ports and another device module to the second port, or connect another Y-splitter to the second port to create a daisy-chain connection in order to connect more device modules. Repeat the procedure to collect all of the device modules to the DEVICES RJ12 port. Once the devices are all connected, press the small button on the device modules to link or "address" each module to the TCS-1 controller. The TENT-X controller will then automatically assign an address to the device modules sequentially. Once the device modules are addressed, the addresses will be saved unless the user completes a factory or device reset in the system setting menu.

#### **EC Fans connection:**

In the Tent-X system, EC Fans can be controlled via the EFC-1 control adaptors. Using the EFC-1 control adaptors, you can control 0-10-volt or PWM-type EC fans, which you can select when first setting up the EFC-1. The EFC-1 control adaptors can control the speed of the exhaust fan and the intake fan, which as a result, can manipulate the temperature, humidity, and negative pressure inside the grow tent to suit the users' desired outcome.

First, plug in the Y-splitter that comes with your Tent-X. You then need to plug two EFC-1 adaptors into the Y splitter RJ12 ports. Next, plug your fans into the RJ12 port opening of the EFC-1 adaptors. Finally, address each fan on the adaptors and establish the designated Intake and Exhaust fans.

\*If you are using more than one device in your grow tent, you can plug in a Y-splitter into the device port and plug in a device into one of the ports on the Y-splitter and plug in another Y-splitter into the second port, you can keep repeating this procedure to create a daisy-chain connection to the Tent-X in order to connect multiple devices. If you'd like a "cleaner" setup, you can use TrolMaster's 8-port splitter hub (SPH1) to connect multiple devices to the Tent-X.

### 4. Internet Connection

You can connect your TENT-X to the internet in order to have access to remote monitoring, notifications, and control of your controller. To connect the controller to your internet, TrolMaster recommends using a hard-wired Cat 5/6 cable plugged into the Ethernet port on the bottom of the TCS-1. After you have connected your TENT-X to the internet, download TrolMaster's app, TM+ Pro on your smartphone.

You can then access real-time data through your smartphone and have remote control of the devices connected to the Tent-X, allowing freedom to travel and be away from your growing environment. TrolMaster users can also share their progress, interact with other growers, access historical data and have access to many useful functions in the app.

\*There is no built-in wifi on the TCS-1. Contact TrolMaster Tech Support for options related to using a wifi connection as most commercially available wifi range extenders (with Ethernet ports) are NOT compatible with TrolMaster controllers.

## MAIN INTERFACE

When you plug in the Tent-X for the first time, you will land on the homepage on the LCD display. This is where the sensor data for the grow tent is displayed. Press the "LEFT" and "RIGHT" arrows to switch between the climate parameter data, the nutrients and grow medium monitoring data, the device status page, and the alarm notification page. Each page provides specific information about the Tent-X.

The Tent-X will constantly monitor your climate, and nutrients and grow medium data in real-time:

### Temporary demonstration:

1 Photosynthetic photon reflux density  
 2 Temperature  
 3 Humidity  
 4 Parts Per Million  
 5 Night mode  
 6 Day mode  
 7 Alarm activated  
 8 Internet connected  
 9 Reservoir  
 10 Reservoir Electrical Conductivity  
 11 Reservoir temperature  
 12 Reservoir pH level  
 13 Grow Medium  
 14 Medium Electrical Conductivity  
 15 Medium temperature  
 16 Medium Water Content

The alarm symbol only appears when there's an alarm activated. The internet symbol only appears when there's internet connectivity.

## Alarm notifications

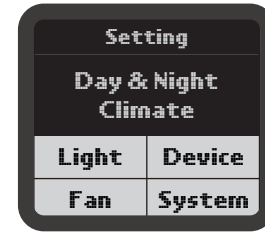
The alarm notification page is where all of your alarm notifications are consolidated. This is where you can check up on missed alarm notifications, and adjust your set-up accordingly.

## Device Status

The Device Status page is where you can view the status of all your devices connected to the TENT-X, whether it's climate control devices or timer-controlled devices for irrigation. If a device is not working in your grow tent, you can check the connectivity status on this page.

## Climate control

When you press ENTER on the Tent-X, you will enter a setting page consisting of five blocks, with each block serving a unique function for climate control. The "Day&Night Climate" tab is where you can set the climate parameters for the grow tent. The "Light", "Devices", and "Fans" tabs are where you assign devices that can alter the climate in the grow tent.



## Day&Night Climate

After pressing ENTER on the Day&Night Climate tab, you will land on a page where you can set the temperature, humidity, and CO2 in the grow tent, for both day and night times. After the climate parameters have been set, the climate devices connected to the Tent-X will automatically maintain that temperature. You can also set alarms for your climate parameters, in case the parameters are not within the set range.

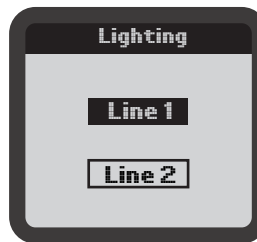
Go to the "Alarm Offset" tab and press ENTER. You will then see the value for every alarm setting displayed. After pressing ENTER on a parameter, the unit will blink. Use the UP and DOWN arrow to set the range for your alarm setting, and press ENTER again to confirm. When the temperature, humidity, and CO2 levels exceed or fall below the set range, you will get an alarm notification on your Tent-X and on our smartphone app TM+ PRO. When the temperature, humidity, and CO2 levels exceed the set range, you will get an alarm notification on your Tent-X and on our smartphone app, TM+ PRO.

Climate Setting			
		Day	Night
Temp	C	33	36
Humid	%	60	55
CO2	PPM	1200	500
Alarm Offset			

## Light

After pressing ENTER on the Light block, the screen will display Line 1 and Line 2. Use the UP and DOWN arrows to choose Line 1 or Line 2 and press ENTER to navigate to the page where you can make changes to the selected Line.

On this page, you can create your light settings. Use the UP and DOWN buttons to navigate the options on this page and press ENTER on an item to change it. When you see the item blinking, you can switch between the selections using the UP and DOWN arrows. When you have selected your item, press ENTER again to confirm the selection. Select whether you're using HID or LED lights. You can also select the On/Off time for your lights, the temperature at which the lights will dim, the Sunrise and Sunset time, and more.



Line 1 Lighting	
Mode	LED
Power	100%
On at	20:00
Off at	08:00
Dim at	84 °F
Stop at	89 °F
Sun R/S time	OFF

## Devices

The Devices tab is where you will set up your climate control devices. With the use of our plug-in DS modules, you can connect and control the devices via the controller. Each DS module has a designated function. The DST module can only control temperature devices, the DSH module can only control humidity devices, the DSC module can only control CO2 devices, and the DSP module is a multi-function module that works as a timer. TrolMaster's Tent-X controller allows up to 8 four plug-in modules to be connected to the Tent-X. Two of the 8 available slots are reserved for temperature control, 2 are for humidity control and 4 are for timer-controlled devices like pumps or solenoids. Users are free to connect whatever device they'd like to connect, whether it's more climate control devices or irrigation devices. Go to [trolmaster.com](http://trolmaster.com) for more information.

Press ENTER to access the device's settings. You can set up 2 climate control devices each for temperature, humidity, and CO2. You will then see 2 columns, with each column representing one of two devices for each climate parameter. You can also set 4 program devices, labeled from P1 to P4.

In the device setting menu, press ENTER on any of the climate devices and it will start blinking. You can then use the UP or DOWN arrows to select what kind of device is connected to the Tent-X. When you have finished selecting the device you've connected for each element, press ENTER again to confirm the selections.

The program device modules can be used to connect either more climate devices or timer-based irrigation devices like solenoids and pumps. If you want to connect irrigation devices to set up irrigation schedules, you can use the DSP modules to set up your preferred schedules.

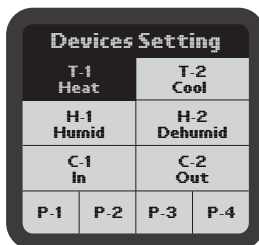
In order to program a device by schedule, press ENTER on any of the program tabs from P1 to P4. The LCD screen will then display 3 options, where you can set what kind of schedule you'd like to set.

If you choose the single schedule setting, there are only 2 inputs you'll have to do, where you simply input when the device turns on, and when it turns off.

If you choose the multi-schedule setting, you can set up to 12 individual On and Off times for each device to follow within a 24-hour "day".

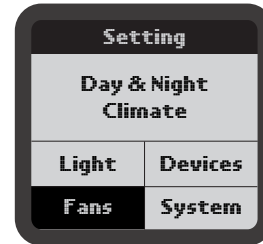
If you choose to use the recycle timer mode, you will be able to determine the On and Off time duration, and the recycle timer mode will then repeat that same On / Off duration schedule as many times as you'd like, working as a repeat-cycle timer. You will also be able to select the time of day for the repeat-cycle to begin, as well as be able to determine how many cycles will be repeated before the timers are shut off until the next day.

The Tent-X controller will handle the rest once you've set up your preferred irrigation schedule. Your timer-controlled devices will be controlled automatically with the TCS-1 according to the settings you specified.



## EC Fans

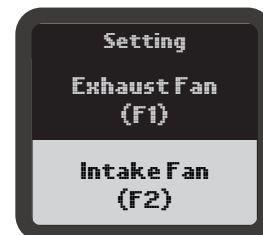
Users can control two EC fans at the same time, categorized as F1 and F2. The first fan, F1, can be used and controlled as an exhaust fan to control temperature and humidity. The second fan, F2, can be used and controlled as an intake fan to create the desired negative pressure in the grow tent.



**F1:** There are 4 modes for the F1 fan. These 4 modes include:

- Cool only mode: The exhaust fan is solely controlled by the temperature in the grow tent
- Dehu only mode: The exhaust fan is solely controlled by the humidity levels in the grow tent
- Cool priority mode: The exhaust fan is controlled by both temperature and humidity, however, it will prioritize temperature to be within the defined range if both can't be achieved.
- Dehu Priority mode: The exhaust fan is controlled by both temperature and humidity, however, it will prioritize humidity to be within the defined range if both can't be achieved.

Within the F1 setting page, you can also set the minimum and maximum fan speed the exhaust fan can operate at. Setting the minimum speed for the fan to operate will allow the user to ensure negative pressure even when the tent is not calling for cooling, and setting the maximum speed the fan can operate will allow the user to choose how fast and how loud the fan will operate at full speed.



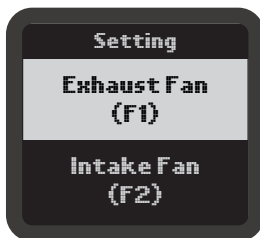
## CO2 Interlock

The CO2 interlock function is a powerful tool to preserve your CO2 supply. When the CO2 interlock function is toggled on, CO2 will not be injected into the grow tent when the fans are activated.

**F2:** The user can customize their intake fan settings within the F2 block. While a single exhaust fan can be used, we can control the amount of negative pressure within the tent by adding a separate intake fan and controlling it separately. With the F2 option, you can set the negative pressure in your tent by decreasing the speed of the intake air fan. Press ENTER on "Intake Fan(F2)" and you will land on the page where you can set the negative pressure you'd like in your grow tent. Press ENTER again and use the UP and DOWN arrows to select your number, press ENTER again to confirm the selection.

You also have the option to not let your intake fan activate when your temperature and/or humidity falls below the setpoints. This function will run in conjunction with the F1 settings and gives you the ability to choose whether you want to run the F2 fan at minimum speed % or turn the fan off completely. Press ENTER on the bottom square and it will start blinking. Use the UP or DOWN arrow to allow the check mark ✓ to appear on the screen, and press ENTER again to confirm the selection.

With the TENT-X, the fan is constantly monitoring the temperature and humidity inside the tent. Depending on how you set it up, the fans will then increase their speed as the temperature or humidity rises, and they will slow down as the temperature and humidity decrease. With the fans working together in an "open loop" control scheme, you will be able to accurately control the environment inside the tent using fresh air.



## System Settings

The "System" tab is where you will set your miscellaneous internal settings for your Tent-X Controller. This is where you can set what format you'd like your unit of measurements to be for temperature and EC, and your time settings.

You can also manually override your controller on this page if you'd like to test and make sure everything is connected and working properly with the controller, as well as scan the QR code to pair your smart device with the controller, or do a complete system reset if there's a need to do so.

In addition, you can calibrate the various sensors you are using inside the grow tent. Furthermore, on the System page, you can set your deadband setpoints that will be used with your connected DS modules. The deadband settings determine when each module will turn on, and turn off again.


Moreover, Set the ADJUSTABLE VARIABLE RANGE for your temperature and humidity in the EC Fan Settings tab. Its purpose is to allow the exhaust fan to start operating at the maximum speed set by the user in the F1 settings when the temperature or humidity exceeds five degrees Fahrenheit, three degrees Celsius, or 5% humidity of the user's original setpoints. As the temperature or humidity drops back to the climate setpoint, the fan will gradually resume to the minimum speed set by the user in a linear fashion.

Lastly, you can set your Water detectors in case of leakage or water confirmation, and your WD delay time. On the Alarm setting page, you can set your high and low limit alarm settings for your climate, nutrients, and grow medium. When the values exceed or drop below the defined Maximum and Minimum setpoint in the alarm settings, you will immediately be notified on the controller and through TrolMaster's app, TM+ Pro.




## SPECIFICATIONS

Input Voltage	100-240VAC, 50/60Hz
Certifications	ETL/FCC
MBS-TH (Temp / Humid / Light) :	max 1pc per set
MBS-S8 (CO2) :	max 1pc per set
MBS-PAR (PPFD) :	max 1pc per set
MBS-SD (Smoke Detector) :	max 1pc per set
AMP-3 (pH / EC / Temp) :	max 1pc per set
WCS-1/2 (WC / EC / Temp):	max 2pc per set
WD-1 (Water Detector)	max 2pc per set
Temperature Device Stations:	max 2pc per set
Humidity Device Stations:	max 2pc per set
CO2 Device Stations:	max 2pc per set
Timer Device Stations:	max 4pc per set
EC Fan Control Adpator:	max 2pc per set
Working Environments	Temperature 32-122°F, Humidity≤90%

 **WARNING:** DO NOT allow the TCS-1 Dry Contact Board to be exposed to water or excessive heat. DO NOT open or attempt to repair or disassemble the controller, as there are no user-serviceable parts inside. Opening the controller will void the warranty.

If the surface of TCS-1 Dry Contact Board is dirty, wipe it with a dry towel. The TCS-1 Dry Contact Board operates under natural ventilation conditions.

 **AVERTISSEMENT:** NE PAS exposer la carte de contact sec TCS-1 à l'eau ou à une chaleur excessive. NE PAS ouvrir ou tenter de réparer ou de démonter le contrôleur, car il ne contient aucune pièce réparable par l'utilisateur. L'ouverture du contrôleur annulera la garantie.

Si la surface de la carte de contact sec TCS-1 est sale, essuyez-la avec une serviette sèche. La carte de contact sec TCS-1 fonctionne dans des conditions de ventilation naturelle.