M 5465-24

Dry Gas Dehumidification System Operating Manual

Table of Contents

Products described in this manual are designed and assembled in the U.S.A. by

Electro-Tech Systems, Inc.

700 West Park Avenue

Perkasie, PA 18944

I. Important Safety Information

WARNING

This symbol accompanied by the word “WARNING” calls attention to an act or a condition which can lead to serious personal injury or death of operators and bystanders.

CAUTION

This symbol accompanied by the word “CAUTION” indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

The symbol without any warning text indicates potential damage to device when misused.

This symbol indicates the presence of hazardous AC or DC voltages constituting the risk of electric shock.

This symbol indicates a risk of fire due to improper handling or failure of device. For continued protection against risk of fire, when replacing fuses use only fuses of the specified type and current ratings.

This symbol indicates the danger of an electro-static discharge to which equipment may be sensitive.

Observe all precautions for handling electrostatic sensitive devices.

These symbols indicate extreme temperature which can cause burns or frostbite. Avoid contact with surface. Failure to follow precautions may result in moderate to severe injury.

SAFETY INSTRUCTIONS

The equipment described in this manual is designed and manufactured to operate within defined design limits. Any misuse may result in electric shock or fire. To prevent the equipment from being damaged, the following rules should be observed for installation, use and maintenance. **Read the following safety instructions before operating the instrument.**

POWER

POWER CORD: Use only the power cord specified for this equipment and certified for the country of use. If the power (mains) plug is replaced, follow the wiring connections specified for the country of use. When installing or removing the power plug, **hold the plug, not the cord.** The AC supply must be single phase, with RMS Voltage in range 90 – 264 VAC, alternating at a frequency in range 47 – 63 Hz.

OPERATION

CAUTION

DO NOT OPERATE WITH COVERS OR PANELS REMOVED. **Voltages inside the equipment consist of line operating at 24 VDC.**

DO NOT OPERATE WITH SUSPECTED EQUIPMENT FAILURES. If any odor or smoke becomes apparent turn off the equipment and unplug it immediately. Failure to do so may result in electrical shock, fire, or permanent damage to the equipment. Contact the factory for further instructions.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE. Operating the equipment in the presence of flammable gases or fumes **constitutes a definite safety hazard**. For equipment designed to operate in such environments the proper safety devices must be used such as dry air or inert gas purge, intrinsic safe barriers and/or explosion-proof enclosures.

DO NOT IMPEDE THE CHAMBER FROM VENTING EXCESS PRESSURE. Dehumidification system is an open loop system that pumps external air into the chamber. If the chamber is not allowed to vent, pressure can build up and cause serious damage to the chamber. A pressure monitoring system is highly recommended.

INLET AIR PRESSURE MUST BE LESS THAN 100 PSI (6.89 Bar) & INLET AIR TEMPERATURE MUST BE WITH RANGE OF 33° - 120° F (0.5° - 49° C) Serious injury could result.

APPROPRIATE FILTRATION OF COMPRESSED AIR IS RECOMMENDED. Build-up of contaminates can damage the desiccant towers & reduce their effectiveness in drying inlet air. **AIR PRESSURE MUST BE GREATER THAN 50 PSI (3.45 Bar)** For optimal system performance.

DO NOT USE IN ANY MANNER NOT SPECIFIED OR APPROVED BY THE MANUFACTURER. Unapproved use may result in damage to the equipment or present an electrical shock or fire hazard.

Informations Importantes d'inocuite

WARNING

Ce symbole accompagné du mot « AVERTISSEMENT »(WARNING) attire l'attention sur un acte ou une condition qui peut entraîner des blessures graves ou la mort des opérateurs et des passants.

CAUTION

Ce symbole accompagné du mot « ATTENTION » (CAUTION)indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, pourra entraîner des blessures mineures ou modérées. Le symbole sans texte d'avertissement indique des dommages potentiels à l'appareil en cas d'utilisation abusive.

Ce symbole indique la présence d'une climatisation dangereuse ou d'un courant continu constituant le risque de choc électrique.

Ce symbole indique un risque d'incendie dû à une mauvaise manipulation ou à une défaillance de l'appareil. Pour une protection continue contre les risques d'incendie, lors du remplacement des fusibles, utilisez uniquement des fusibles du type et des valeurs nominales spécifiés.

Ce symbole indique le danger d'une décharge électrostatique à laquelle l'équipement peut être sensible. Observez toutes les précautions à prendre pour manipuler les appareils sensibles a l'electicite statique.

Ces symboles indiquent une température extrême qui peut causer des brûlures ou des engelures. Éviter le contact avec la surface. Le non-respect des précautions peut entraîner des blessures modérées à graves.

CONSIGNES DE SÉCURITÉ

Lisez et comprenez bien le manuel de l'utilisateur avant d'utiliser cette machine. Le non-respect des instructions d'utilisation peut entraîner la mort ou des blessures graves

L'équipement décrit dans ce manuel est conçu et fabriqué pour fonctionner dans les limites de conception définies. Toute mauvaise utilisation peut entraîner un choc électrique ou un incendie. Pour éviter que l'équipement ne soit endommagé, les règles suivantes doivent être respectées pour

l'installation, l'utilisation et l'entretien. Lisez les consignes de sécurité suivantes avant d'utiliser l'instrument.

ALIMENTATION

CORDON D'ALIMENTATION : Utilisez uniquement le cordon d'alimentation spécifié pour cet équipement et certifié pour le pays d'utilisation. Si la fiche d'alimentation (secteur) est remplacée, suivez les connexions de câblage spécifiées pour le pays d'utilisation. Lors de l'installation ou du retrait de la fiche d'alimentation, **tenez la fiche, pas le fil.**

MISE À LA TERRE : Le cordon d'alimentation fourni est équipé d'une **fiche à 3 broches avec mise à la terre (une fiche avec une troisième broche de mise à la terre).** Il s'agit à la fois d'une fonction de sécurité pour éviter les chocs électriques et d'une exigence pour le bon fonctionnement de l'équipement. Si la prise à utiliser n'est pas compatible avec la fiche à 3 broches, changez la prise ou utilisez un adaptateur de mise à la terre.

FUSIBLES : Remplacez les fusibles uniquement par des fusibles ayant le courant nominal, la tension et le type spécifié tels que fusion normale, temporisation, etc. **N'UTILISEZ PAS** de fusibles de fortune ou ne court-circuitez pas le porte-fusible. Cela pourrait entraîner un risque d'électrocution ou d'incendie ou endommager gravement l'instrument.

OPÉRATION

PRUDENCE

NE PAS UTILISER AVEC LES COUVERCLES OU LES PANNEAUX RETIRÉS. **Les tensions à l'intérieur de l'équipement consistent en une ligne (secteur) pouvant aller de** 100 à 240 VAC.

NE PAS UTILISER AVEC DES PANNES D'ÉQUIPEMENT SUSPECTES. Si une odeur ou de la fumée se dégage, éteignez l'équipement et débranchez-le immédiatement. Le non-respect de cette consigne peut entraîner un choc électrique, un incendie ou des dommages permanents à l'équipement. Contactez l'usine pour plus d'instructions.

NE PAS UTILISER DANS UNE ATMOSPHÈRE EXPLOSIVE. L'utilisation de l'équipement en présence de gaz ou de fumées inflammables constitue un danger certain pour la sécurité. Pour les equipement concus pour fonctionnner dans de tels environnement, des dispositifs de sécurité appropriés doivent être utilisés, tels que la purge d'air sec ou de gaz inerte, les barrières de sécurité intrinsèque et/ou les enceintes antidéflagrantes..

NE PAS EMPÊCHER LA CHAMBRE D'ÉVACUER L'EXCÈS DE PRESSION. Les systèmes de déshumidification disponibles comprennent des systèmes en boucle ouverte qui pompent l'air extérieur dans la chambre. Si la chambre n'est pas autorisée à s'aérer, la pression peut s'accumuler et causer de graves dommages à la chambre.

UTILISEZ UNE SOURCE D'EAU DISTILLÉE OU DÉSIONISÉE POUR L'HUMIDIFICATION. L'accumulation de contaminants sur le transducteur causera des contraintes au transducteur et à l'électronique et entraînera une défaillance prématurée et invalidera la garantie.

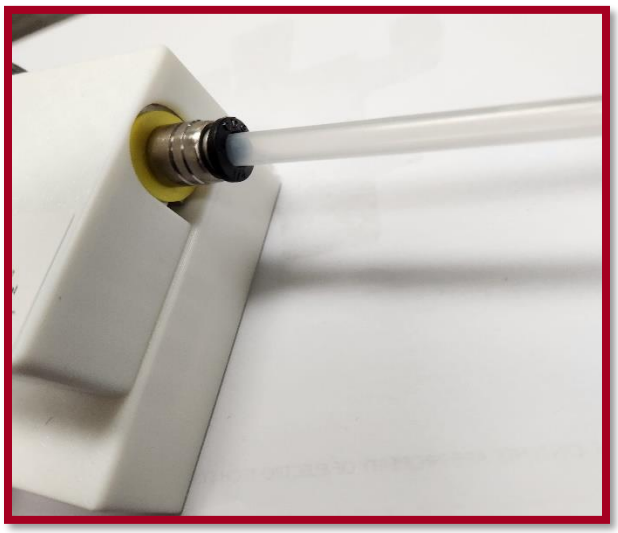
NE PAS UTILISER D'UNE MANIÈRE NON SPÉCIFIÉE OU APPROUVÉE PAR LE FABRICANT. Une utilisation non approuvée peut endommager l'équipement ou présenter un risque d'électrocution ou d'incendie.

II. Description of Contents

Item No.	Item	Qty.	Description
1	M 5465-24	1	Dry Gas Dehumidification System.
2	Power / Signal Cable Assembly	1	For use with ETS Controllers, your M 5465-24 will include the appropriate cable assembly to connect to: • M 5300 Series EnviroPro PLC
3	¼” Polyethylene Tubing	104”	Tubing required for connection of dry gas supply to the dry gas dehumidification system
4	¼” Polyethylene Tubing	16”	Tubing required to connect from dry gas dehumidification system to the chamber
5	¼” Tubing to ¼” MNPT Adapter	1	Fitting will already be installed if purchased with an ETS glovebox/chamber.

III. Set-Up Guide

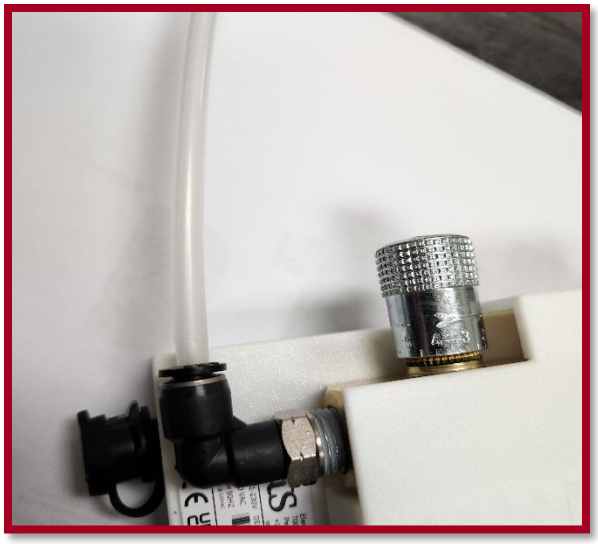
Set-Up Guide



Step 1. Install ¼" Tubing to Air Output

Firmly insert one end of the pre-cut 16-inch ¼" Polyethylene Tubing into the Fitting with the Yellow color-coded ring **AIR OUTPUT**.

Run the tube from the M 5465-24 to the ¼" Fitting with the matching Yellow color-coded on the Chamber.



Step 2. Install ¼" Tubing to Air Input

Run ¼" Polyethylene Tubing from a nearby Compressed Air or Dry Gas Source to the M 5465-24.

Firmly insert the ¼" Polyethylene Tubing into the other Elbow Fitting on the M 5465-24 **AIR INPUT**.

WARNING:
The Air Pressure from the Compressed Air Source must be in the range of 50 – 100 psi for safe & effective operation.

It is recommended the Compressed Air Source has a filter to protect the Dry Gas Dehumidification System from any contamination.

Set-Up with M 5300 Series EnviroPro PLC

Step 3. Identify Power / Signal Cable Assembly

The Power / Signal Cable is a single 4-wire cable with a quick disconnect connector on each end.

Step 4. Install Power / Signal Cable Assembly to M 5465-24

Plug the 4 Pin Connector into the 4 Pin Receptable labeled **DEHUMIDIFY** on the PLC and connect to the sole connector on the M 5465-24.

Step 5. Turn on Dehumidify Function

Using the ETS Controller, set the desired set point for the relative humidity in the chamber. Turn on the Controller's ability to decrease the relative humidity in the chamber.

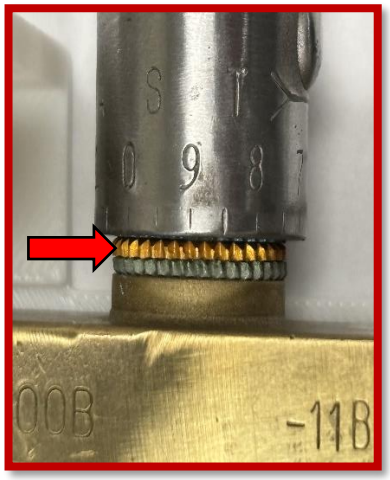
See the Operating Manual of the EnviroPro PLC if you have any questions regarding the functionality of the controller.

IV. Functionality

The M 5465-24 Dry Gas Dehumidification System is an open loop drying system consisting of a valve assembly that allows dry gas such as nitrogen, CO2 or dry air to purge the chamber until the humidity is lowered to the desired level. Humidity levels to <5% are achievable depending on the dry gas source.

- The system is factory set to operate optimally at 90 psi and a flow rate of 120 SCFH. If necessary, the flow control on M 5465-24 can be adjusted to increase or decrease the flow rate.

- To verify flow, use a flowmeter ¼ NPT male 18-180 SCFH

Adjust the Flow Rate	
	**Step 1. Verify Flow Control is in Correct Position** The indicating color band of the Flow Control Knob is set to the **gold** indicating band at the factory. If the band is not set to this position, adjust the flow control knob by rotating it clockwise or counterclockwise to the correct position (see Step 2.A, 2.B).

Step 2.A Unlocking Flow Control Knob

Unlocking the Knob

1. Tools: You will need a 5/64-inch hex key (also known as an Allen wrench).
2. Loosening: Insert the hex key into the knob's screw. Turn the hex key counterclockwise to loosen the screw.

Locking the Flow Control Knob

1. Tools: You will need a 5/64-inch hex key (also known as an Allen wrench).
2. Tightening: Insert the hex key into the screw on the flow control knob. Turn the hex key clockwise to tighten the screw.
3. Locked Knob: Once the screw is tightened, the flow control knob is locked. It will no longer rotate, preventing any further flow rate adjustments.

Step 2.B Adjusting the Flow Control Knob (After Unlocking)

1. Ensure Unlocked: Make sure the flow control knob is in the unlocked position (the screw should be slightly loosened by turning it counterclockwise with a 5/64-inch hex key).
2. Opening the Flow (Increased Flow Rate): Rotate the knob counterclockwise to incrementally open the valve and increase the flow rate.
3. Closing the Flow (Decreased Flow Rate): Rotate the knob clockwise to incrementally close the valve and decrease the flow rate.
4. Full Range of Motion:
    - Fully Open: When the knob is fully open, it will stop rotating counterclockwise. Do not force it.
    - Fully Closed: When the knob is fully closed, it will stop rotating clockwise. Do not force it.
5. Lock After Adjustment: Once you've achieved the desired flow rate, lock the flow control knob by tightening the screw clockwise with the 5/64-inch hex key (see Step 2.A from the previous instructions). This will prevent accidental changes to the flow rate.

V. Specifications

PERFORMANCE:
Output Flow Rate120 SCFH @ 90 psig.
MECHANICAL
External Dimensions: 5.5” W x 1.75” D x 4” H
Material: PLA outside cover
Weight: 0.8 lbs.
HARDWARE PORTS:
Two ¼ Inch Quick Connects
ELECTRICAL
Voltage: 24VDC
Max Power Consumption: 4.5W or 0.188A @24VDC
CONTROLLER COMPATIBILITY
M 5300 Series Controllers

VI. Repair and Maintenance

To return equipment to ETS for repair it is first necessary to obtain a RMA number, please call 215-887-2196 or email service@ets2.com.

Preventive Maintenance

The dry gas dehumidification system is maintenance free.

VII. Troubleshooting

Troubleshooting Guide

Problem	Possible Causes	Corrective Actions
No Power to Unit	Unit is not receiving power	Ensure power and signals cables are connected properly. (See Steps 3 – 4 in the Setup Guide).
Unit is not dehumidifying at all	Controller is not outputting Humidity Decrease Signal	Ensure that Controller Humidity Decrease Function is toggled on (See Step 5 in Set-up Guide).
	M 5465 Output is not connected to Chamber	Connect ¼" Tubing from M 5465 Output Fitting to Chamber Fitting (See Step 1 in Set-up Guide).
	Compressed Air Source is not connected to M 5465 Input	Connect ¼" Tubing from compressed air source to M 5465 Input Fitting (See Step 2 in Set-up Guide).
	Flow Control Knob is Fully Closed	Adjust the Flow Control Knob indicator to gold band (See Steps 2.A, 2.B in the Set-up Guide)
Poor performance	Compressed Air source	Check input for 90 psi output,
	Compressed Air source	Ensure compressed air supply is not contaminated with water/contaminates in the line. Empty/clean or incorporate filters in supply airline prior to M 5465.
Unit delivers wet air /water	Water/contaminates in compressed air supply line	Ensure compressed air supply is not contaminated with water in the line. Empty/clean or incorporate filters in supply airline prior to M 5465.
	Air flow is more than rated capacity	Verify incoming compressed air supply does not exceed 100 psi. The recommended value is 90 psi.

Problem	Possible Causes	Corrective Actions
Flow Control will not Adjust	Low inlet Pressure	Verify incoming compressed air supply is greater equal or greater than 50 psi. The recommended value is 90 psi.
	Flow Control is Locked	Disengage the Flow Control Lock (See Steps 2.A, 2B in the Set-up Guide).
	Flow Control is Fully Open	Flow Control will not rotate counterclockwise any further. The only allowable adjustment is to incrementally close the flow control by rotating clockwise (See Steps 2.A, 2.B in the Set-up Guide).
	Flow Control is Fully Closed	Flow Control will not rotate clockwise any further. The only allowable adjustment is to incrementally open the flow control by rotating counterclockwise (See Steps 2.A, 2.B in the Set-up Guide).

VIII. Warranty

Limited Warranties. Seller warrants that all goods manufactured and delivered hereunder shall (a) conform to any samples, drawings, specifications, or other written documents provided to Seller by Buyer or approved by Buyer to Seller and (b) be free from all defects in workmanship and material. Buyer's sole remedy against Seller for breach of either of the specifically mentioned warranty shall be the repair or replacement, at Seller's sole option, of the defective workmanship or material. Seller expressly disclaims all other warranties, express and/or implied, including but not limited to those of merchantability and fitness for a particular purpose. In no event shall Seller be liable, under either warranty or otherwise, to Buyer in excess of the purchase price of the products paid to Seller by Buyer. In no event shall Seller be liable for any loss or damage arising directly or indirectly from the use of the product or for consequential or incidental damages. Seller's specified warranties will expire and lapse (i) for renewable items (such as gloves, iris ports and desiccants), sixty (60) days from date of shipment and (ii) for all standard equipment and otherwise nonrenewable items, one year from date of shipment.