

Smart® NitroPlex™ System

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Your Comprehensive Equipment Source





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1. General Information

The Smart® NitroPlex™ system acts as a Smart® manifold for Terra Universal’s NitroPlex™ desiccator cabinets. It connects to individual NitroPlex™ humidity modules to log relative humidity, temperature, purge status and door open/close data of NitroPlex™ humidity modules in user programmable intervals, along with logging gas line in pressure for the controller and disconnect/connect of individual humidity modules. The Smart® NitroPlex™ also displays purge status and provides audible and visual alarms for the individual humidity modules’ alarm conditions. Beyond the Smart® features, the Smart® NitroPlex™ controller also simplifies service by including the gas manifold and solenoid valves in the controller’s enclosure rather than packaging them into the cabinet.

Note: This manual focuses on specific setup and operating instructions for the Smart® NitroPlex™ Control system. For installation instructions and general specifications for the NitroPlex™ system and the NitroPlex™ humidity modules products, please see the NitroPlex™ Desiccator Systems manual, Document #1800-30.



NitroPlex™ Controller



NitroPlex™ humidity module



1.1 Description

The Smart® NitroPlex™ interface includes four physical buttons (ESC, Up arrow, Down arrow, SET) to navigate and change settings with an eight character 14-segment LED display. The connections for the system are:

- Up to 10 NitroPlex™ Humidity Modules (depending on cabinet and controller model), one phone jack per module
- Gas out, one connection per chamber, 1/8" O.D. x 1/16" I.D. tubing
- Gas in, one connection, 1/4" tubing
- 12 volts DC power in, low voltage barrel jack connector

LED light status indicator shows data logging and transfer status:

- LED light is off: there is no activity.
- LED light is blinking red at the user defined interval: the system is logging data.
- LED light is rapidly flashing green: data is being transferred to the USB flash drive from an internal SD card.
- LED light is rapidly blinking blue: there is no space available on the USB flash drive.

1.2 Operation

The Smart® NitroPlex™ controller receives signals from the NitroPlex™ humidity modules and displays current purge status, door alarms, gas line in pressure alarm, and RH% set point alarms. The Smart® NitroPlex™ controller switches the solenoid valves for gas flow to individual chambers on and off based on signals received from the humidity modules inside each chamber of the NitroPlex™ desiccator cabinet. Humidity and door alarm set points are determined by the user settings inputted to the individual NitroPlex™ humidity modules.

1.3 Part Numbers Covered by this Manual

9500-11	Smart® NitroPlex™ Controller for 1-5 chamber Desiccators
9500-12	Smart® NitroPlex™ Controller for 6-10 chamber Desiccators
1911-31D	NitroPlex™ Humidity Module: Digital



2. Safety

Proprietary Notice

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Terra Universal makes no warranties applying to information contained in this manual or its suitability for any implied or inferred purpose. Terra Universal shall not be held liable for any errors this manual contains or for any damages that result from its use.

Safety Notice

A thorough familiarity with all operating guidelines is essential to safe operation of the product. Failure to observe safety precautions could result in poor performance, damage to the system or other property, or serious bodily injury or death. The following symbols are intended to call your attention to two levels of hazard involved in operation.



CAUTION

Cautions are used when failure to observe instructions could result in significant damage to equipment.



WARNING

Warnings are used when failure to observe instructions or precautions could result in injury or death.

The information presented here is subject to change without notice.

Critical Operating Conditions



- Because the humidity sensor is exposed to moisture during shipping, the system must generally operate for a couple of days in a dry Nitrogen environment before the sensor dries out and delivers completely accurate readings.
- Never use this equipment with gases that are non-compatible with the materials of the construction. This may cause damage to equipment or injury to personnel.
- This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation or other handling of internal circuit boards or devices.
- Do not release toxic or flammable gases in the vicinity of personnel. Be sure that venting and disposal methods are in accordance with Federal, State and local requirements.
- If toxic or flammable gases are used with this equipment, emergency equipment applicable to the gases in use should be available in the operating area.
- Sensors and controllers are designed to operate at the conditions specified. Attempts to operate them under conditions outside the product specifications may result in less than desirable performance or may cause the unit to fail to function.
- These controllers should only be used with inert gases like Nitrogen and Argon.





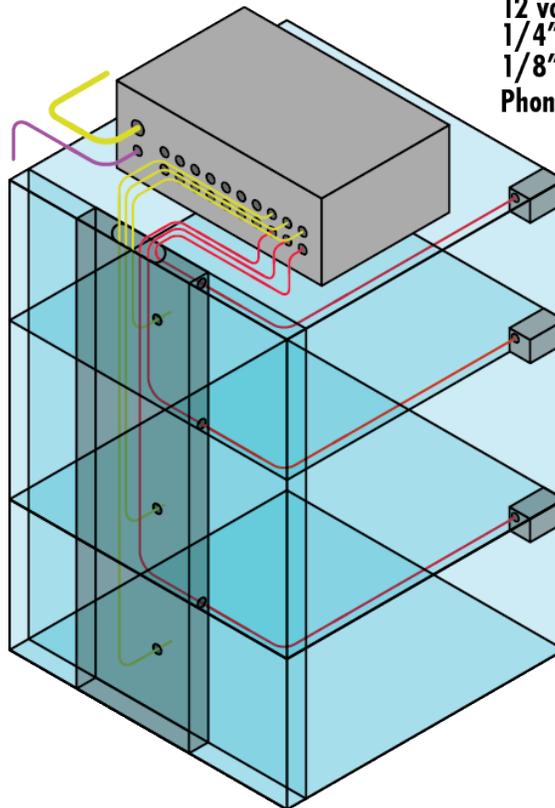
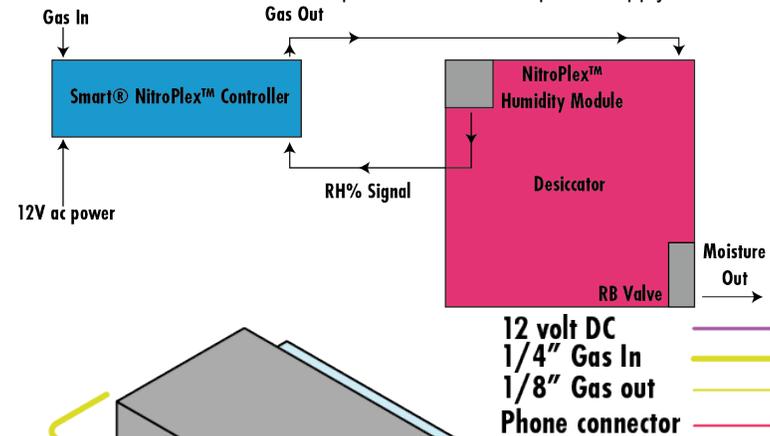
3. Start-Up

- The controller should be located in a clean dry atmosphere relatively free from shock and vibration.
- Leave sufficient room for access to the electrical components and install in a manner that permits easy removal if the instrument requires cleaning.
- Contamination or corrosion may occur when used with reactive gas, as a result of plumbing leaks or improper purging.
- These controllers should only be used with inert gases like Nitrogen and Argon.



3.1 Installation

1. Connect the 1/8" O.D. x 1/16" I.D. tubing from the cabinet to the respective bulkhead connectors of the Smart® NitroPlex™ controller.
2. Connect the low voltage phone cables from the cabinet to the respective phone jack connectors of the Smart® NitroPlex™ controller.
3. Connect the nitrogen supply to the Gas In port on the Smart® NitroPlex™ controller using 1/4" tubing.
4. Connect the Smart® NitroPlex™ controller to the provided 12 volt DC power supply.





3.2 Initial Programming

Note: When the system starts-up “TERRA UNIVERSAL - SMART® NITROPLEX™” will scroll across the display screen.

- Press and hold the SET button while turning on the system power to navigate to “System Configuration Mode.”

5455ETUP

- Press the **UP** or **DOWN** arrow to navigate through the system menu.
- Press the **SET** button to accept the values.
- Press the **ESC** button to clear the inputted value for the current menu item back to default and return to the previous menu item.
- System setup is complete.

3.2.1 System Configuration Menu

Display	Description	Function	Unit	Default	Active Keys
CHAMBERS	Number of chambers / humidity modules	The number of chambers (humidity modules) in the NitroPlex™ cabinet.	Number of chambers	10	UP/DWN to increment/decrement sub-menu values SET to accept values and jump back to main menu
RH ALARM	Gas purge alarm	Number of seconds a gas purge solenoid must remain on (open) before the alarm is sounded.	Seconds	10	UP/DWN to increment/decrement sub-menu values SET to accept values and jump back to main menu
BEEP	Beeper Used for Alarms	Alarm	X	ON	UP/DWN to toggle between ON/OFF
PSI SP	PSI Set Point	Gas line in pressure set point in PSI. A pressure reading equal to or below the set point value will trigger the system's low pressure alarm.	PSI	10	UP/DWN to increment/decrement sub-menu values SET to accept values and jump back to main menu
DATA LOG	Data Logging Interval (SD card logs humidity only and door open or closed events must be logged as they occur.)	The time interval at which data is logged to the system's memory. For example, data logging set at 10 means the data will be logged every 10 seconds.	30 SEC, 1 MIN, 5 MIN, 30 MIN, 1 HOUR	1 MIN	UP/DWN to navigate within sub-menu #1 SET to jump to sub-menu #2 UP/DWN to toggle between allowed values SET key to accept values and jump to main menu ESC to cancel action and jump back to sub-menu #1
DATE FMT	Date Format	The format in which date is inputted and logged in data logging.	DMY/MDY	MDY	UP/DWN to navigate within sub-menu #1 SET to jump to sub-menu #2 UP/DWN to toggle between allowed values SET to accept values and jump to main menu ESC to cancel action and jump to main menu
SET DATE	Input Date	The user inputs the current date, in the format selected from the date format menu option. Display will show “MM.DD.YYYY” as default. Underscore “_” indicates the current field selected for input i.e. “12_ .M.YYYY”	MM.DD.YYYY	MM.DD.YYYY	UP/DWN to navigate within sub-menu #1 SET to jump to sub-menu #2 UP/DWN to toggle between allowed values SET to move from one field to the next (i.e. MM to DD) SET to accept values after last field and jump to main menu ESC to cancel action and jump to main menu



SET TIME	<i>Input time in 24 hour format</i>	The user inputs the time in 24 hour format. Display will show “HH:MM” as default. Seconds are always assumed to be 00 when entering a time.	HH:MM	HH:MM	UP/DWN to navigate within sub-menu #1 SET to jump to sub-menu #2 UP/DWN to toggle between allowed values SET to move from one field to the next (i.e. HH to MM) SET to accept values after last field and jump back to main menu ESC to cancel action and jump to main menu
TEMP	<i>Temperature Units</i>	The units in which temperature is logged.	C/F	F	UP/DWN to navigate within sub-menu #1 SET to jump to sub-menu #2 UP/DWN to toggle between allowed values SET to accept values and jump to main menu ESC to cancel action and jump to main menu

3.3 Main Display

- The following will display if activated:
 - Purge Status
 - RH alarm
 - Door alarm
 - Line in pressure alarm
 - Humidity module disconnected alarm

Press SET button to see the line in pressure.

Note: Press ESC button to temporarily deactivate the alarm beeping sound. The screen will still show the alarm is active, but the sound will be muted.

Note: If a humidity modules disconnected during operation, the system will trigger the alarm sound and the chamber number and “NOT CONNECTED” will display on the screen.

3.4 Data Transfer

The data file size for the Smart® NitroPlex™ controller is approximately 4 MB. This is approximately one month of data when logging at a 1 minute interval. The Smart® NitroPlex™ logs the relative humidity, temperature, purge status, and door open/close data of NitroPlex™ humidity modules in user programmable intervals, along logging with gas line in pressure for the controller and disconnect/connect of individual humidity modules. When the system reaches the 4MB limit, the data will begin to wrap and overwrite the oldest data with the new data. Data can be saved onto a USB flash drive without third party software – follow the steps below to complete the transfer:

1. Plug in a USB drive – data is automatically copied over in CSV format. The LED status light will rapidly blink green during data transfer.
2. Do not remove the USB drive during data transfer.
3. Complete transfer of the 4 MB data file takes approximately 2.5 minutes. The LED status light will stop blinking green when data transfer is complete.
4. There will be a new file called EVENTLOG.CSV on the USB drive. If that file already exists on the USB drive, it will be overwritten.

The Smart® NitroPlex™ is compatible with most USB 1.0, 2.0, and 3.0 thumb drives.

Note: The system does not log data while transferring data to the USB drive.

Data Format

The data file from the Smart® NitroPlex™ Controller contains the following columns:

- A. Date
- B. Time
- C. Chamber number (offset by 1, e.g. chamber 1 = chamber 0 in data logging), or PSI for gas line in pressure



- D. % RH, or event name
- E. Temperature, or event status
- F. Temperature Units (C or F)

Example of data table

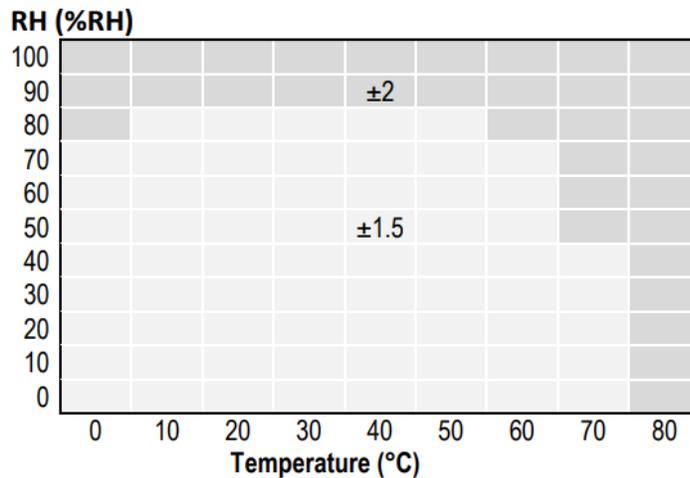
	A	B	C	D	E	F
104950	6/17/2024	4:26:58 PM	8	42.4	80 F	
104951	6/17/2024	4:26:58 PM	9	42.4	80 F	
104952	6/17/2024	4:27:28 PM	PSI	26.1		
104953	6/17/2024	4:27:28 PM	0	43	80.1 F	
104954	6/17/2024	4:27:28 PM	1	44.7	79.9 F	
104955	6/17/2024	4:27:28 PM	2	44.3	79.9 F	
104956	6/17/2024	4:27:28 PM	3	44.2	79.8 F	
104957	6/17/2024	4:27:28 PM	4	44	79.9 F	
104958	6/17/2024	4:27:28 PM	5	44.2	79.5 F	
104959	6/17/2024	4:27:28 PM	6	42.9	80.1 F	
104960	6/17/2024	4:27:28 PM	7	43.8	79.8 F	
104961	6/17/2024	4:27:28 PM	8	42.4	80 F	
104962	6/17/2024	4:27:28 PM	9	42.5	80 F	
104963	6/17/2024	4:27:34 PM	2 Door		open	
104964	6/17/2024	4:27:34 PM	2 Purge		on	
104965	6/17/2024	4:27:36 PM	2 Door		close	



4. Specifications

Specifications	
Smart® NitroPlex™ Controller Dimensions	12"W x 7.6"D x 3"H
Power Requirements	2 amps 12 VDC
Gas In	¼" tubing, maximum 80 PSI
Gas Out	⅝" O.D. x 1/16" I.D. tubing
Case material	304 Stainless Steel
Display	3½" Digit LED display
Electrical Connections	Barrel Plug, 2.1mm I.D. x 5.5mm O.D. x 9.5mm
Measuring Range	0-100% RH
Accuracy (at 20°C)	±1.5%RH
Display Resolution	± .1%RH

Sensor Accuracy: RH% vs. Temperature





5. Testing

The Humidity sensor should be tested and replaced as necessary (about every 5 years under normal use).

6. Trouble Shooting

Power Concerns

Problem: System Unresponsive

Possible Solutions:

1. Inspect power cable leading from the unit. Make sure that it is fully connected to the unit's power port.
2. Make sure that the power cord is plugged into a functioning outlet of appropriate voltage.
3. Replace if necessary.

RH Concerns

Problem: System stays in high-flow purge at all times

Possible Solutions:

1. Make sure that all access doors are closed and that all sensor switches are making contact.
 - a. Check door seals for leaks.
2. Make sure RH sensor is reading RH correctly.

Operation Concerns

Problem: System delivers an obviously incorrect humidity reading

Possible Solutions:

1. Disconnect and then reconnect the low-voltage cable connecting the humidity module to the Smart® NitroPlex™ controller.
2. Check the connection to the rear panel of the control module.
 - a. If the connection is good and the unit still fails to deliver an accurate reading, contact Terra Universal.

Data Logging

Problem: System does not transfer data to USB drive when USB drive is plugged in

Possible Solutions:

1. Remove and re-insert USB drive.
2. If LED status light flashes blue, there is not sufficient memory on the USB drive. Remove some data and try again.
3. The Smart® NitroPlex™ controller may not be compatible with your USB drive. Try a different make or model of USB drive.



7. Replacement Orders

Provide sales associate with pertinent information, such as serial number, model number and date, for replacement parts or a new NitroPlex™. The label is located on the bottom or side of the NitroPlex™ controller.



8. Replacement Parts

Polyurethane Tubing	PL01999	1/8" O.D. x 1/16" I.D.
Polyurethane Tubing	PL01307	1/4" O.D. x .17" I.D.
Cord Patch	PL01477	





Installation and Operating Guide

Smart® NitroPlex™ System

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9. Warranty

<https://www.terrauniversal.com/warranty>



*Thank you for ordering from
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