



**SuperSystems**  
incorporated

## **Model DPC3500**

Continuous Low Range  
Dew Point Analyzer

# **Operations Manual**

Please read, understand, and follow these instructions before operating this equipment. Super Systems, Inc. is not responsible for damages incurred due to a failure to comply with these instructions. If at any time there are questions regarding the proper use of this analyzer, please contact us at 513-772-0060 for assistance.

**Super Systems Inc.**

USA Office

*Corporate Headquarters:*

7205 Edington Drive

*Shipping Address:*

7245 Edington Drive

Cincinnati, OH 45249

Phone: (513) 772-0060

<http://www.supersystems.com>

**Super Systems Europe**

Unit E, Tyburn Trading Estate,

Ashold Farm Road, Birmingham

B24 9QG

UNITED KINGDOM

Phone: +44 (0) 121 306 5180

<http://www.supersystemseurope.com>

**Super Systems México**

Sistemas Superiores Integrales S de RL de CV

Acceso IV No. 31 Int. H Parque Industrial

Benito Juarez

C.P. 76120 Queretaro, Qro.

Phone: +52 442 210 2459

<http://www.supersystems.com.mx>

**Super Systems China**

No. 369 XianXia Road

Room 703

Shanghai, CHINA

200336

Phone: +86 21 5206 5701/2

<http://www.supersystems.cn>

**Super Systems India Pvt. Ltd.**

A-26 Mezzanine Floor, FIEE Complex,

Okhla Indl. Area, Phase - 2

New Delhi, India 110 020

Phone: +91 11 41050097

<http://www.supersystemsindia.com>

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## Introduction

Thank you for selecting Super Systems's DPC3500 as your Continuous Low Range Dew Point Analyzer. Please keep this manual in a secure place for future reference.

## Unpacking

Carefully unpack the unit. The shipment should contain the following components:

- 1 Model DPC3500 12" x 10" x 6" Enclosure
- 1 Low Range Dew Point Sensor
- 10-meter sensor wire
- 1 Product Manual

## General Description

The DPC3500 is designed to detect moisture content in gas samples from -148°F to +20°F (-100°C to -7°C) dew point. The readings are remotely displayed in either Fahrenheit or Celsius on the door of the enclosure. In addition to the visual display, the DPC3500 also provides 4-20mA and RS232 outputs for data collection.

The DPC3500 is designed to provide continuous readings. Response times are rapid as long as the sensor remains bathed in a sample gas stream that has a low dew point. If the sensor is allowed to reach ambient dew point (greater than 40°F or 4°C), it will take a considerable amount of time for it to achieve readings at the low level. When installed and operated properly, the Remote Mounting Assembly (supplied by SSi) will allow the sensor to be continuously exposed to a low-dew atmosphere, which will result in rapid response times.

It is important to note that this analyzer is designed to measure dew point in gases that are non-corrosive. Some gases that can cause damage or failure to the sensor are trace amounts of SO<sub>3</sub>, high concentrations of NH<sub>3</sub>, Chlorine, HCL, and any other gases that could cause corrosion.

If any of these components are missing or damaged, please contact SSi immediately at (513) 772-0060.

## Specifications

Measurement Range	-148°F to +20°F (-100°C to -7°C)
Outputs	4 to 20 mA
Display	°F or °C
Sensor Guard	80μ Sintered Metal Guard
Operating Pressure	Vacuum to 5,000 PSIG
Operating Temperature	-40°F to +140°F (-40°C to +60°C)
Sample Flow Rate	10-15 SCFH Recommended
Power Requirements	90 – 264 VAC

## Operation

The DPC3500's sensor is manufactured from a ceramic tile that is plated and vapor-deposited to form a surface that varies its electrical capacitance when exposed to small changes in water vapor pressure. This information, along with temperature readings from the tip of the sensor, is used by the microprocessor to determine dew point.

The dew point of the gas in the sample line is displayed on the front panel. A switch to the right of the display toggles between showing the readings in degrees Fahrenheit and degrees Celsius. An indicator light to the right of the display will indicate the display's operating mode.

## Startup

The DPC3500 was calibrated before it was shipped from Super Systems, Inc. After the unit is properly installed (see "Wiring Connections" and "Sample Cell Installation"), power can be applied immediately. The flow meter on the Remote Mounting Assembly should be adjusted to provide approximately 5 to 10 SCFH of sample gas to the sensor. The rate of sample flow does not have any impact on the measured dew point, but a higher flow rate will result in a faster response time.

At the time of installation, the sensor will be reading the ambient dew point. It will take between 3 and 6 hours of immersion in the sample stream for the unit to thoroughly "dry out" the sensor before it stabilizes at the correct readings. This delay is only at initial startup when the system is installed for the first time. The unit is intended to operate with a constant, steady stream of sample gas continuously bathing the sensor. This will prevent the sensor from absorbing moisture from ambient air, and will allow for continuous real-time monitoring of the sample stream.

## Sample Cell Installation



PN 13123  
Remote Mounting  
Assembly

For best results, the sensor should be mounted directly in the measured gas line. This will ensure that it remains in a low-dew atmosphere which will decrease the measurement response time. The sensor is fitted with 1/2" Male NPT threads. If the sensor is not going to be mounted directly in the gas stream, it should be installed in the Remote Mounting Assembly (SSi Part Number 13123), which can be purchased separately. Although this installation does allow for some design flexibility, it is important that only stainless steel tubing and fittings are used to carry the sample gas to the sensor. When installing the unit, verify that all fittings are tight, since any leaks will cause inaccurate readings.

During the operation of this unit, sample gas will constantly be flowing through the sensor and out of the vent. Depending upon the type of gas being sampled, appropriate safety precautions should be taken for proper venting of the sample gases after they exit the sampling assembly.

In the event that a sample pump is required, it should be mounted after the sensor to not contaminate the sample prior to measurement.

## Sample Tubing Materials

When determining the moisture content of gas samples, the materials used to transport the gas samples are extremely important. As the gas passes through tubing, the polarity of the moisture molecules will cause them to be attracted to the tubing. Any moisture that remains on the wall of the vessel does not have the opportunity to travel to the sensor, so it will reduce the sensor's response time. Also, some tubing materials (rubber, copper, PVC, etc.) are porous enough to allow for moisture penetration directly through the walls of the tubing, even in cases where there is considerable positive pressure.

Super Systems, Inc. recommends that only stainless steel is used as the tubing material for measuring low dew points (below  $-50^{\circ}\text{F}$ ). It is also important to note that to maintain the integrity of the entire sampling system, all of the necessary valves and fittings, should also be constructed of stainless steel. These material precautions do not need to be followed "downstream" (after the sensor), since the moisture content of the gas at this point is unimportant.

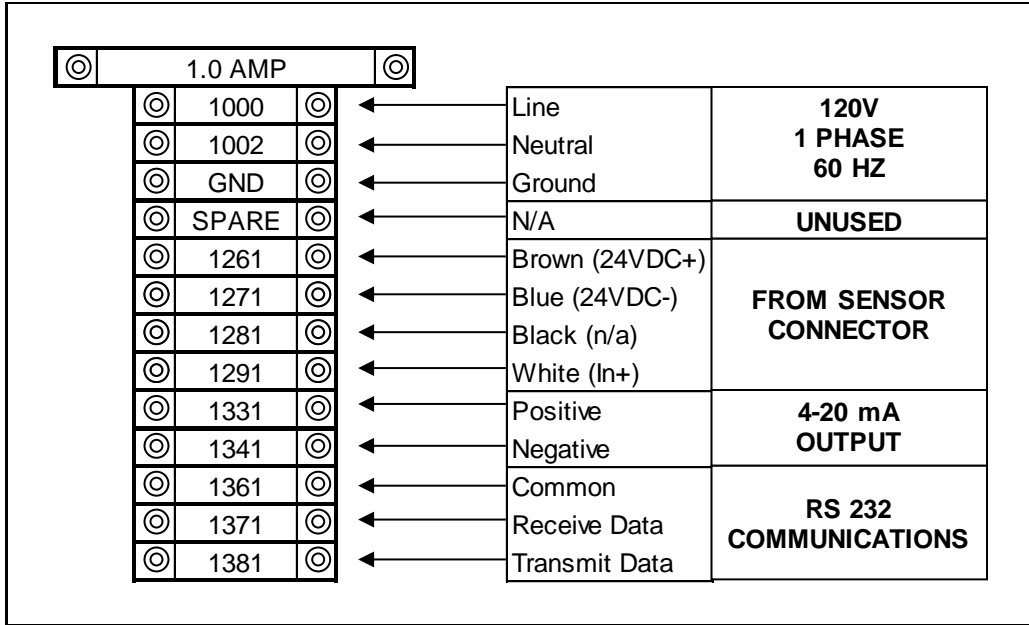
## Calibration

The calibration of the DPC3500 is traceable to National Institute of Standards and Technology (NIST) standards. Each sensor has a unique serial number, and the calibration data can be found on the Certification Sheet located at the back of this manual. Due to the sensitivity and complexity of the metalized ceramic moisture sensor, this unit cannot be user calibrated and must be returned to SSi for recalibration and recertification. It is recommended that the sensor be recalibrated every twelve months. Each sensor is interchangeable without the need for display recalibration, so only the sensor needs to be returned for recalibration, not the entire panel.

## Wiring Connections

10 meters of sensor wire are included with the unit; however, the unit is capable of operating over substantially longer distances if required.

When attaching the necessary wires to the terminal strip inside the panel, all connections should be made according to the following diagram:



### Communications

The 4-20 mA output correlates to a dew point range of -148°F to 32°F (-100°C to 0°C).

### Replacement Parts

The following items can be purchased as needed for the unit.

Part Number	Description
13122	Factory Calibration & Re-Certification
13123	Sample Tubing Assembly
31427	Low Dew Point Sensor
31705	+15 VDC Power Supply

## Warranty

### *Limited Warranty for Super Systems Products:*

The Limited Warranty applies to new Super Systems Inc. (SSI) products purchased direct from SSI or from an authorized SSI dealer by the original purchaser for normal use. SSI warrants that a covered product is free from defects in materials and workmanship, with the exceptions stated below.

The limited warranty does not cover damage resulting from commercial use, misuse, accident, modification or alteration to hardware or software, tampering, unsuitable physical or operating environment beyond product specifications, improper maintenance, or failure caused by a product for which SSI is not responsible. There is no warranty of uninterrupted or error-free operation. There is no warranty for loss of data—you must regularly back up the data stored on your product to a separate storage product. There is no warranty for product with removed or altered identification labels. SSI DOES NOT PROVIDE ANY OTHER WARRANTIES OF ANY KIND, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME JURISDICTIONS DO NOT ALLOW THE LIMITATION OF IMPLIED WARRANTIES, SO THIS LIMITATION MAY NOT APPLY TO YOU. SSI is not responsible for returning to you product which is not covered by this limited warranty.

If you are having trouble with a product, before seeking limited warranty service, first follow the troubleshooting procedures that SSI or your authorized SSI dealer provides.

SSI will replace the PRODUCT with a functionally equivalent replacement product, transportation prepaid after PRODUCT has been returned to SSI for testing and evaluation. SSI may replace your product with a product that was previously used, repaired and tested to meet SSI specifications. You receive title to the replaced product at delivery to carrier at SSI shipping point. You are responsible for importation of the replaced product, if applicable. SSI will not return the original product to you; therefore, you are responsible for moving data to another media before returning to SSI, if applicable. Data Recovery is not covered under this warranty and is not part of the warranty returns process. SSI warrants that the replaced products are covered for the remainder of the original product warranty or 90 days, whichever is greater.



## Revision History

Rev.	Description	Date	MCO#
-	Initial release	11-26-2001	
A	SSi address update, general update	04-14-2005	
B	Updated flow rate, fuse rating, and other modifications	11-14-2005	
C	Clarification to Sample Cell Installation Update to description for PN 13123	08-04-2015	2163
D	Adjusted flow rate and power requirements, added sample pump mounting information	01-24-2018	2228
E	Adjust wire length in Unpacking section	8-20-2018	2238
F	Updated replacement parts list	11/20/2019	2280
G	Updated specs chart	4/20/2020	2288
H	Updated sensor wire info, removed plug info, changed wiring diagram, changed threads info	8/13/2020	2299
I	Added wire references	1/27/2022	2318