

WARRANTY

Notwithstanding any provision of any agreement the following warranty is exclusive.

Ohmic Instruments COMPANY warrants each instrument it manufactures to be free from defects in material and workmanship under normal use and service for the period of 1-year from date of purchase. This warranty extends only to the original purchaser. This warranty shall not apply to fuses or any product or parts which have been subjected to misuse, neglect, accident, or abnormal conditions of operation.

In the event of failure of a product covered by this warranty, Ohmic Instruments Co. will repair and recalibrate an instrument returned within 1 year of the original purchase: provided the warrantor's examination discloses to its satisfaction that the product was defective. The warrantor may, at its option, replace the product in lieu of repair. With regard to any instrument returned within 1 year of the original purchase, said repairs or replacement will be made without charge. If the failure has been caused by misuse, neglect, accident, or abnormal conditions of operations, repairs will be billed at a nominal cost. In such case, an estimate will be submitted before work is started, if requested.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS, OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. OHMIC INSTRUMENTS COMPANY SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT, TORT, OR OTHERWISE.

If any failure occurs, the following steps should be taken:

1. Notify Ohmic Instruments Co. giving full details of the difficulty, and include the model, type, and serial numbers (where applicable). On receipt of this information, service data, or shipping instructions will be forwarded to you.

2. On receipt of shipping instructions, forward the instrument, transportation prepaid. Repairs will be made and the instrument returned, transportation prepaid.

SHIPPING TO MANUFACTURER FOR REPAIR OR ADJUSTMENT

All shipments of Ohmic Instruments Co. instruments should be made via United Parcel Service or "Best Way" prepaid. The instrument should be shipped in the original packing carton, or if it is not available, use any suitable container that is rigid and of adequate size. If a substitute container is used, the instrument should be wrapped in paper and surrounded with at least four inches of excelsior or similar shock absorbing material.

CLAIM FOR DAMAGE IN SHIPMENT TO ORIGINAL PURCHASER

The instrument should be thoroughly inspected immediately upon delivery to purchaser. All material in the shipping container should be checked against the enclosed packing list. The manufacturer will not be responsible for shortages against the packing sheet unless notified immediately. If the instrument is damaged in any way, a claim should be filed with the carrier immediately. (To obtain a quotation to repair shipment damage, contact Ohmic Instruments.) Final claim and negotiations with the carrier must be completed by the customer.

Ohmic Instruments Company will be pleased to answer all application or use questions, which will enhance your use of this instrument. Please address your requests or correspondence to: Ohmic Instruments Company, 508 August St., Easton, Maryland 21601, ATTN: Technical Support. Or call Ohmic Technical Support at 410-820-5111.

All rights reserved. This manual may not be reproduced in full or in part without written permission of Ohmic Instruments Company. Information contained within this manual is believed to be accurate and reliable. However, Ohmic Instruments Company assumes no liability for its use. Ohmic Instruments Company reserves the right to supply its instruments with design changes and/or component substitutions that may not be documented in this manual. Contact our engineering department for information on equipment revisions not covered in this manual.

ohmic instruments co.



ohmic instruments co.

508 August Street Easton, MD 21601

www.ohmicinstruments.com

FAX:
(410) 822-9633

VOICE:
(410) 820-5111

DEW POINT SIGNAL CONDITIONER KIT Model DPSC-35XR & DPSC-35XRL

OPERATING NOTES

LOGGING COMMANDS FOR LOGGER VERSION ONLY (DPSC-35XRL)

1. When the unit is powered up, the computer's screen will display the following:

Mm/dd/yy hh:mm:ss (RH%) (Temp) (Dew Point) (Set Point)

2. A maximum of 2383 readings can be stored; however, once the memory logging space has been filled, a wrap feature of the memory storing will cause the oldest data to be overwritten. Thus, when the memory is full, the logger will hold a "sliding window" spanning 2383 readings.

Uploading the logged data can be done at any point. The stored readings are transmitted chronologically, each line of the display corresponding to one scan of the sensors. For a full logger memory of 2383 readings, uploading takes approximately three minutes. Note, however, that a slow scrolling speed of the terminal screen might stretch this interval to about four and a half minutes.

Uploading will not clear the logger memory; this makes repeated uploading of the same data possible. Data will be stored in the nonvolatile memory incorporated into the logger, without having power applied to the unit, for as long as ten years.

3. The following commands apply to the logger version (DPSC-35XRL) only:

- | | |
|----------------------|--|
| S <Enter> | Transmits current settings of parameters: C#, L#, N#
(C is autotransmit data in seconds,
L is logging rate in seconds,
N is number of readings logged, 0 to 2383) |
| Ln <Enter> | Set logging rate to "n" seconds ("n" is 3 to 32767).
For n=0, 1, 2, logging is off. |
| E9090 <Enter> | Clear stored data. |
| U <Enter> | Upload stored data. Readings, including a time stamp,
are transmitted in chronological order, one line corresponding to one scan of the sensors. |
| H <Enter> | Halt the uploading of data. This command will work
only when uploading is in progress. |

When halted, only two commands are accepted:

- | | |
|------------------|--|
| Q <Enter> | Terminate the uploading in progress and resume the
measurement and logging functions. This command
will work only following the "halt" command (H). |
| U <Enter> | Resume loading. This command will work only following
the "halt" command (H). |

4. The unit will not log when power is turned off.

F/C-DP	V-out	I-out	F/C-DP	V-out	I-out	F/C-DP	V-out	I-out	F/C-DP	V-out	I-out
-45	0.000	4.000	-11	1.259	8.030	23	2.519	12.059	57	3.778	16.089
-44	0.037	4.119	-10	1.296	8.148	24	2.556	12.178	58	3.815	16.207
-43	0.074	4.237	-9	1.333	8.267	25	2.593	12.296	59	3.852	16.326
-42	0.111	4.356	-8	1.370	8.385	26	2.630	12.415	60	3.889	16.444
-41	0.148	4.474	-7	1.407	8.504	27	2.667	12.533	61	3.926	16.563
-40	0.185	4.593	-6	1.444	8.622	28	2.704	12.652	62	3.963	16.681
-39	0.222	4.711	-5	1.481	8.741	29	2.741	12.770	63	4.000	16.800
-38	0.259	4.830	-4	1.519	8.859	30	2.778	12.889	64	4.037	16.919
-37	0.296	4.948	-3	1.556	8.978	31	2.815	13.007	65	4.074	17.037
-36	0.333	5.067	-2	1.593	9.096	32	2.852	13.126	66	4.111	17.156
-35	0.370	5.185	-1	1.630	9.215	33	2.889	13.244	67	4.148	17.274
-34	0.407	5.304	0	1.667	9.333	34	2.926	13.363	68	4.185	17.393
-33	0.444	5.422	1	1.704	9.452	35	2.963	13.481	69	4.222	17.511
-32	0.481	5.541	2	1.741	9.570	36	3.000	13.600	70	4.259	17.630
-31	0.519	5.659	3	1.778	9.689	37	3.037	13.719	71	4.296	17.748
-30	0.556	5.778	4	1.815	9.807	38	3.074	13.837	72	4.333	17.867
-29	0.593	5.896	5	1.852	9.926	39	3.111	13.956	73	4.370	17.985
-28	0.630	6.015	6	1.889	10.044	40	3.148	14.074	74	4.407	18.104
-27	0.667	6.133	7	1.926	10.163	41	3.185	14.193	75	4.444	18.222
-26	0.704	6.252	8	1.963	10.281	42	3.222	14.311	76	4.481	18.341
-25	0.741	6.370	9	2.000	10.400	43	3.259	14.430	77	4.519	18.459
-24	0.778	6.489	10	2.037	10.519	44	3.296	14.548	78	4.556	18.578
-23	0.815	6.607	11	2.074	10.637	45	3.333	14.667	79	4.593	18.696
-22	0.852	6.726	12	2.111	10.756	46	3.370	14.785	80	4.630	18.815
-21	0.889	6.844	13	2.148	10.874	47	3.407	14.904	81	4.667	18.933
-20	0.926	6.963	14	2.185	10.993	48	3.444	15.022	82	4.704	19.052
-19	0.963	7.081	15	2.222	11.111	49	3.481	15.141	83	4.741	19.170
-18	1.000	7.200	16	2.259	11.230	50	3.519	15.259	84	4.778	19.289
-17	1.037	7.319	17	2.296	11.348	51	3.556	15.378	85	4.815	19.407
-16	1.074	7.437	18	2.333	11.467	52	3.593	15.496	86	4.852	19.526
-15	1.111	7.556	19	2.370	11.585	53	3.630	15.615	87	4.889	19.644
-14	1.148	7.674	20	2.407	11.704	54	3.667	15.733	88	4.926	19.763
-13	1.185	7.793	21	2.444	11.822	55	3.704	15.852	89	4.963	19.881
-12	1.222	7.911	22	2.481	11.941	56	3.741	15.970	90	5.000	20.000

Table 1—Analog Output Table

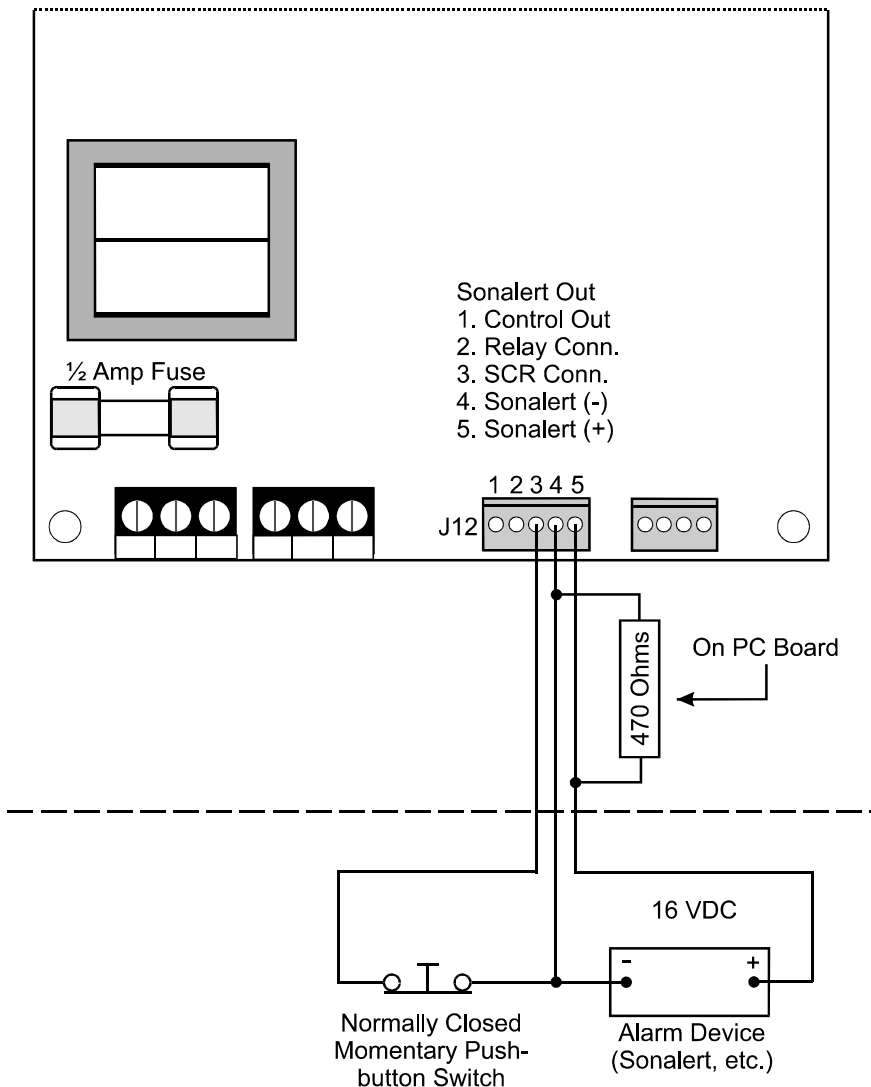


Figure 3

Alarm Reset Wiring

For user connection to reset an alarm device, see the illustration above. The 470 ohm resistor is on the PC board as shipped. Connect alarm (sonalert, etc.) to terminals 4 and 5. Connect a momentary normally closed pushbutton switch across terminals 3 and 4. Retain the supplied jumper across 1 and 2. Pressing the pushbutton switch will reset the system to a pre-alarm state.

INTRODUCTION

Ohmic's Dew Point Signal Conditioner Kit, Model DPSC-35XR (and DPSC-35XRL, the time-stamp logging version) is used to measure the water vapor content of compressed and process air. The kit may be used to install dew point measurement capability in electrical panels and enclosures. The kit's components consist of a microprocessor-based printed circuit card, remote probe (PDPS-610TH), LCD display and bezel. The probe consists of a thin film polymer IC humidity sensor and NTC thermistor assembled in a stainless steel 1/2" NPT fitting supplied with either a protective screen or manifold and a 6 ft. cable. The printed circuit board uses an EEPROM memory which stores calibration data for the individual sensor. ***The probes are not interchangeable as each probe has calibration data stored in an EEPROM on the circuit board.**

The circuit card converts the voltage output of the IC humidity sensor and the resistance of the thermistor to dew or frost point (frost point is displayed below 32°F) by utilizing an embedded proprietary program developed by OHMIC Instruments. The program utilizes psychrometric equations published by ASHRAE (American Society of Heating, Ventilation and Air Conditioning Engineers) and referenced to the *Hyland-Wexler* equations used by NIST. The DPSC-35XR provides rapid response to changes in the amount of water vapor with a high degree of repeatability and accuracy. Once installed with suitable filtration in compression and process air or gases, the unit will provide many years of dependable service. Each unit is calibrated to NIST traceable dew point standards.

FEATURES

The DPSC-35XR provides a direct digital display in either °F or °C dew/frost point temperature, linear analog outputs (0-5 VDC & 4-20mA) outputs, an alarm output (0.5A SPST relay) and an RS-232 computer interface which enables the measurements to be transmitted to a personal computer. Options include a 32 Kbyte data logger and time clock which enables dew/frost point and dry bulb temperature data to be field recorded at time stamped intervals and later uploaded to a PC. Information on this option is on Page 15. The unit has a range of -40° to +80°F dew/frost point.

The DPSC-35XR and DPSC-35XRL are identical, except for the inclusion of the aforementioned time-stamp logging function on the latter.

INSTALLATION

CAUTION: The DPSC-35XR is powered by 120 VAC. When powered, the unit has several live terminals exposed. The printed circuit card should be installed in a suitable electrical enclosure. All wiring should be performed with the power supply disconnected. Installation should be performed by qualified personnel.

Cut an opening in the electrical enclosure for the LCD display and bezel (see Fig. 1 on Page 10). Mount the printed circuit card in the enclosure using insulated standoffs to assure the printed circuit card does not contact metal or conductive surfaces. Connect power inputs to the screw terminals and the appropriate alarm, analog output and computer interfaces per Fig. 2 (Page 11). The probe is connected to the brown polarized connectors. Install the sensor fitting prior to connecting the probe's cable to the circuit card so as not to twist the cable. It is highly recommended that the main power to the unit be fused or wired to a circuit breaker, and the unit should have a chassis or earth ground connection.

The analog outputs are powered by the printed circuit card and do not require an additional power supply. They provide linear 0-5 VDC and 4-20mA outputs for chart recorders or other instrumentation. A table for the analog outputs is on Page 13. The analog signal wires and RS-232 interface cable should be routed away from and in a separate conduit as the power cable. The relay is normally open "dry" contact which closes when the dew point exceeds the set point.

Place selector switch **S2** in the desired position (see Figure 2) for either °C or °F operation. Whenever S2 is changed, the setting will not be implemented until the unit is reset by shutting off the power and reenergizing the circuit.

The 4 position DIP switch determines what the LCD module displays, as labeled on the microprocessor. **Do not remove the push-on jumper located near the microprocessor. This may cause the embedded program to be altered or erased, rendering the unit inoperable.**

The probe is equipped with a ½" male NPT stainless steel fitting. The ½" fitting may be installed directly in vessels, pipelines, or tees. An optional manifold that accommodates tubing may be ordered. Always use Teflon tape to form an air tight seal. Do not remove the protective screen from the fitting. The probe may be installed to pressures of 175 PSIG. For sampling air or gas that exceeds 185°F, the air should be sampled through at least 3 to 4 feet of uninsulated heat sink tubing (such as copper refrigeration tubing). A nominal flow rate of 5 SCFH through ¼" OD tubing is recommended. For air at atmospheric or low pressure a vac-

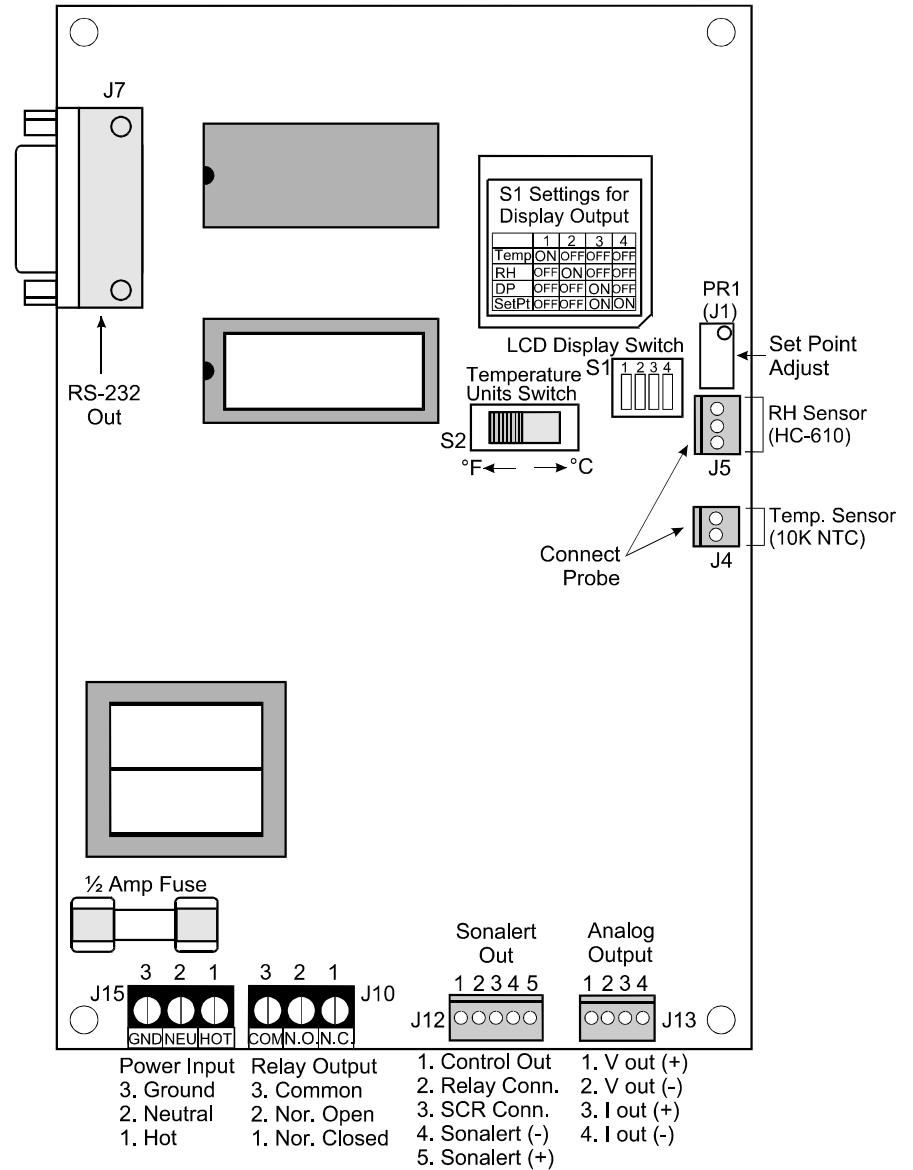


Figure 2

Card Wiring Diagram

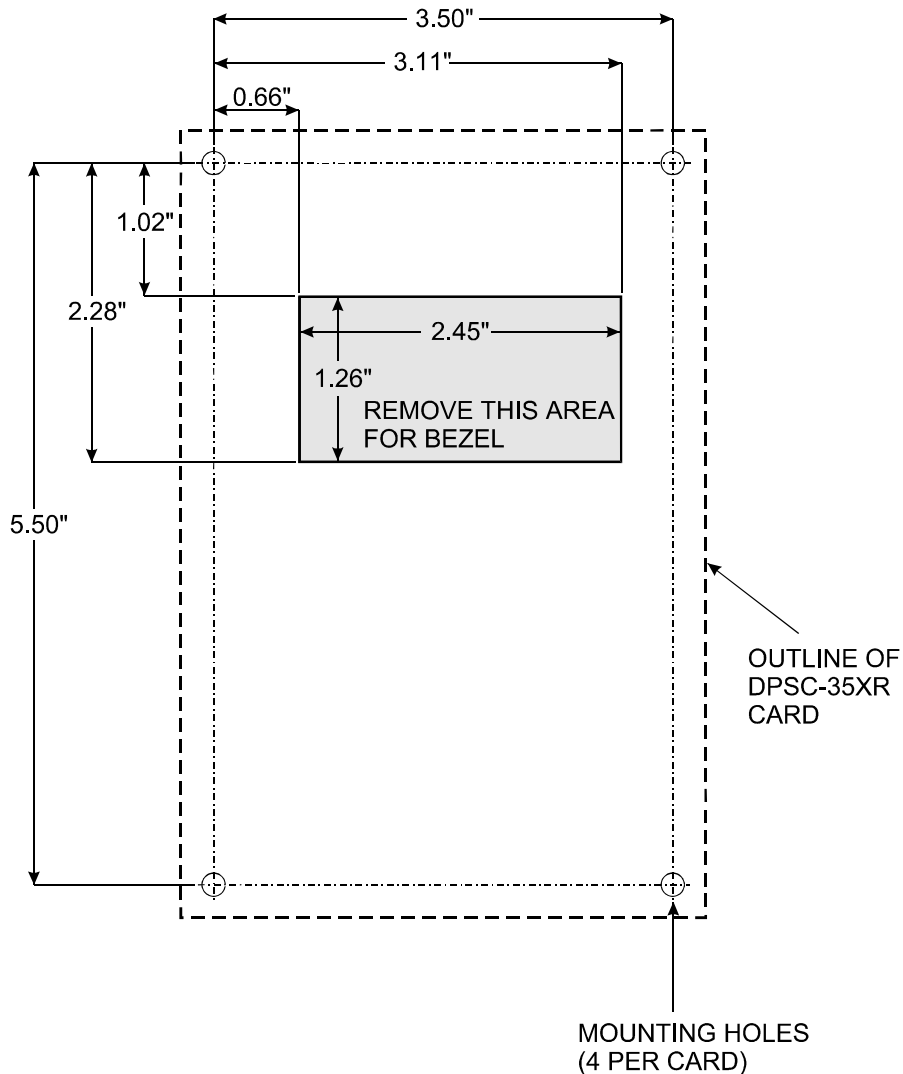


Figure 1

DPSC-35XR Mounting Template

(Template drawing is to be used on installation side of enclosure)

uum pump may be utilized. If you are sampling compressed air and venting to atmospheric pressure, the dew point of the air will decrease proportional to the pressure therefore a back pressure regulator or orifice should be used for “pressure dew point” readings.

While the sensor recovers from exposure to saturated water vapor, it is recommended that a coalescing 5µm filter be used as filters to remove liquid water, oil mist, and particulate. Oil mist forms a vapor barrier over the sensor which decreases the response time. (When used on a desiccant dryer, a filter should be used to prevent fines from accumulating on the probe.)

To adjust the set point, potentiometer **PR1 (J1)**, shown in Figure 2 (Page 11), must be adjusted. The set point is viewed via the RS-232 interface (see below) on a PC or on the display by setting the DIP switch. The alarm indicates when the dew point exceeds the set point value and automatically resets when the dew point is below the set point. The DPSC-35XR also has built in circuitry to latch the alarm requiring a momentary switch to reset; contact OHMIC for information on wiring for this feature.

OPERATION

Prior to operation recheck all wiring and make sure all pneumatic connections are leak free. When dry air is introduced to the sensor keep in mind that in order to register low readings such as -40°F, all moisture must be purged out of sampling lines. If a sensor has been stored in ambient humidity it may take longer to “dryout”, therefore sufficient time is required for stabilization. For most air drying systems 5 to 15 minute stabilization time is typical. Most probes exhibit negligible drift; however, as contaminants accumulate on the surface, the response time generally becomes slower.

RS-232 INTERFACE– Connecting the DPSC-35XR to your Computer

Connecting to a serial port The DPSC-35XR can be plugged into any 9-pin PC serial (COM) port using a 9-pin serial cable, available from most computer stores. If your computer has a 25-pin COM port, 25-pin to 9-pin serial adapters are also available from most computer stores and can be used with the cable [Serial data is transmitted using Pin 5 (ground), Pin 3 (transmit), and Pin 2 (receive)]. Some computer COM ports and serial adapters are not fully implemented (not all pins are used). If the DPSC-35XR is connected to a partially implemented serial port, functions may be erratic or the unit may fail to communicate. Please consult the owner’s manual for your computer if this occurs. Set up HyperTerminal as described next in Communications Programs.

Connecting to a USB port If your computer has USB ports you can get an optional RS-232 to USB adapter from Ohmic. Ohmic recommends using an RS-232 to USB adapter only with Windows XP® and Windows Vista®. Connect the DPSC-35XR using the RS-232 connector and RS-232 to USB adapter. Turn on your computer. When your computer recognizes the device click OK and follow the instructions for installing the driver software. Set up HyperTerminal as described next in Communications Programs.

Communications Programs

The DPSC-35XR transmits data via its RS-232 output as soon as it is powered up. In order to receive the data, a communications program must be running on your computer. In Windows 95® and later this will be *HyperTerminal*. To configure HyperTerminal to communicate with the DPSC-35XR, start the program; you will get a box asking for a name for the new connection. Type in a name, such as DPSC, select an icon and click OK. In the next window that comes up, go to the drop-down box and select the COM port you wish to use. Click on OK. You will then see a window where you can configure your connection. Select these items in the drop-down boxes: For Bits per Second, select 9600. For Data Bits, select 8. For Parity, select None. For Stop bits, select 1. For Flow Control, select Xon/Xoff. Now click on OK.

HyperTerminal is now ready to receive data from the DPSC-35XR. Make sure they are connected via the serial cable, and power up the DPSC-35XR. Introductory text will be displayed indicating the version of the imbedded program. The computer will then display four numbers: Relative Humidity, Dry Bulb Temperature, Dew Point, and Set Point. New readings will be displayed every few seconds.

* If the readings are not displayed, turn the DPSC-35XR off and disconnect HyperTerminal by clicking on the Phone icon in the task bar. Go to File/Properties. In this box change the "Connect using:" box to another COM port and try again. Once you get a working display remember to save those settings as described below.

To save your settings: Go to the menu bar, select File, then select Save. Then, next time you start HyperTerminal, simply cancel out of the New Connection window, then select Open from the File menu, click on the name you gave your settings, and click on Open. You can now use HyperTerminal to communicate without reconfiguring. For more convenience, you may want to drag the desired name from the Open dialog box to your desktop using the mouse; this will place an icon there that you can double-click to start your session.

Communications Commands

All commands are in upper-case characters (set your **CAPS LOCK** on). *n* indicates where a number must be entered:

Cn<Enter> Set auto data transmit interval for displayed readings to *n* seconds (*n* is an integer from 3 to 32767). For *n*=0, 1, and 2, automatic transmission is turned off. Default value is *n*=3 seconds.

D<Enter> Transmits the latest set of readings.

S<Enter> Transmit current settings of parameters.

Note: If the screen does not display what you are typing, go to the menu bar in HyperTerminal, click on File, select Properties, click on the Settings tab, click on the ASCII Setup button, and checkmark the "Echo typed characters locally" box.

RECALIBRATION

The DPSC-35XR is a microprocessor-based instrument. It has no user calibration adjustments. The unit can be recertified to NIST traceable standards by returning it to Ohmic Instruments. Certification is valid for one year and is recommended on a yearly basis. Calibration consists of a computer based system to program a 9-point calibration curve which is stored in the unit's EEPROM. The calibration is referenced to a NIST traceable chilled mirror.

***The DPSC-35XR and its accompanying sensor probe are calibrated as a system, due to slight variances between sensors. For this reason, the unit and its probe bear matching serial numbers and should be kept together if you have more than one set, to insure accuracy. When returning DPSC-35XR's for service and recalibration, be sure to include the corresponding probes.**

SPECIAL ORDER

For a nominal fee, the DPSC-35XR can be retrofitted by Ohmic with either or both of these options:

24 Volt: The DPSC-35XR can be modified so it will operate from a 24 volt DC source instead of AC.

Time Stamp Datalogging: Adds time stamp and logging functions to the unit's communication with your computer. This is standard on the DPSC-35XR.