# DP5000™ SERIES

## (DEWPOINT DUO™, HCD5000™, WDP5000)

### HYDROCARBON AND WATER DEWPOINT ANALYZERS

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# OPERATOR'S MANUAL

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### HYDROCARBON AND WATER DEWPOINT ANALYZERS

# OPERATOR'S MANUAL

DOC# M-5000D-0040

VERSION 4.0

## PRODUCT OF


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# DP5000™ SERIES

## (DEWPOINT DUO™ / HCD5000™/ WDP5000™)

## *OPERATOR'S MANUAL*

### *CONGRATULATIONS*

*You have purchased a ZEGAZ Instruments DP5000™ series analyzer (either Dewpoint Duo™, HCD5000™ or WDP5000™) the most advanced Water and Hydrocarbon Dew Point Analysis systems available in the world. They are based on breakthrough CEIRS™ infrared technology to accurately and unambiguously determine the dew points of hydrocarbon g*as streams at pressures up to 2000*psi. DEWPOINT DUO™ can distinguish between hydrocarbon dewpoints and water/glycol condensation.*

*The DP5000™ analyzers do not need field calibration and will retain its factory calibration under normal operating conditions. It also does not need any field adjustments as the measurements are done based on a very accurate detection of the condensation process and the nature of the condensate.*

*Please take the needed time to read this manual in its entirety. It will provide necessary and useful information about how you can optimize your use of this product.*

# TABLE OF CONTENTS

# LIST OF ABBREVIATIONS

| | |
|---|---|
| A | Amperes (unit of electrical current |
| AC | Alternating Current |
| AO | Analog output (typically 4-20 mA) |
| CEIRS™ | Chilled-Mirror Evanescent Infra Red Spectroscopy |
| °C | Degree Celsius (unit of temperature) |
| DC | Direct Current |
| DO | Digital output |
| DP | Dew Point |
| °F | Degree Fahrenheit (unit of temperature) |
| HCDP | Hydrocarbon Dew Point |
| Hz | Hertz (unit of frequency) |
| IR | Infra-Red |
| LCD | Liquid Crystal Display |
| LED | Light Emitting Diode |
| mA | mili-Amperes (unit of electrical current typically used in reference to analog outputs |
| psi | Pounds per Square Inch (unit of pressure) |
| psig | Pounds per Square Inch, gauge pressure |
| RMA | Return Material Authorization |
| RS-232 | Recommended Standard 232 (a standard for serial communications) |
| RS-485 | Recommended Standard 485 (a standard for serial communications) |
| SLM | Standard Liters per Minute (unit of flow) |
| TB | Terminal Block |
| V | Volt (unit of electrical potential) |
| VAC | Volts AC |
| VDC | Volts DC |
| WDP | Water Dew Point |

# 1- INTRODUCTION

DP5000™ analyzers are automated Water and Hydrocarbon Dew Point Measurement System. They use state-of-the-art infrared technology to accurately determine the dew points of hydrocarbon gas streams as well as characterizing the nature of the condensate.

In order to ensure that the analyzer performs as specified, it is important to pay close attention to the details of the installation and operation. This manual contains a comprehensive overview of the DP5000™ series of analyzers, as well as step-by-step instructions on:

- Connecting necessary power and signal cables.
- Powering the analyzer
- Operating the analyzer
- Using the Serial, Digital, and 4-20 mA communication ports
- Troubleshooting

## A- WHO SHOULD READ THIS MANUAL

This manual should be read and referenced by anyone installing, operating, or having contact with the analyzer. Take a moment to familiarize yourself with this Operator's Manual by reading the Table of Contents.

This manual has been written to address the most common options and accessories. Read each section in the manual carefully so you can quickly and easily install and operate the analyzer. The manual includes images, tables, and charts that provide a visual understanding of the analyzer and its functions. Special symbols are also used to make you aware of potential hazards, important information, and valuable tips. Pay close attention to this information.

## B- SPECIAL SYMBOLS USED IN THIS MANUAL

This manual uses the following symbols to represent potential hazards, caution alerts, and important information associated with the analyzer. Every symbol has significant meaning that should be heeded.

This icon denotes a warning statement. It indicates a potentially hazardous situation which, if not avoided, may result in serious injury or death.

Failure to follow the directions marked by this icon may result in damage or malfunction of the analyzer.

This icon denotes important information concerning installation and operation of the analyzer.

This icon represents the presence of a fuse. The rating of the fuse is 2.5A, 250V, for the AC version and 8A, 250V for the DC version.

## C- ABOUT ZEGAZ INSTRUMENTS

ZEGAZ Instruments, Inc. is an innovative technology company focusing on the development of next-generation diagnostics for the natural gas industry. We are located in Ijamsville, Maryland, United States of America.

ZEGAZ Instruments' products are sold worldwide through authorized representatives and distributors.

# 2-DP5000™ OVERVIEW

This analyzer uses advanced infrared absorption spectroscopy to accurately and unambiguously determine the dew point of water and hydrocarbon in natural gas streams at pressures up to 2000 psig. Each analyzer includes of a state-of-the-art core analyzer cell which encompasses multiple infrared sources and detectors. The analyzer core, including all electrical components, is housed in a certified explosion proof box, making the system suitable for installation in hazardous locations.

An appropriate sample conditioning system may also be included with the system that has been specifically designed to deliver an optimum sample stream that is representative of the process stream at the time of sampling. DP5000™ analyzer systems are configured for use at extractive natural gas sampling stations without dropping the pressure for the analysis. Therefore, DP5000™ reports the dew point at the actual pressure at the sampling point.

Before proceeding make sure you know which analyzer (DewPoint Duo™, HCD5000™, or WDP5000™ you have purchased. However, this manual applies to all three.

***It is important that the sample introduced into the system to be all vapor and devoid of any liquids. Appropriate sampling tools and membranes should be used to make sure that no liquids are introduced into the system. The gas probe used to sample the gas from the pipeline should be equipped with a membrane separator.***

***Heat tracing of the probes and sample lines is necessary to insure that the sampled gas remain completely in the vapor phase.***

# 3-SPECIFICATIONS (Analyzer Only)

## A- PERFORMANCE

| | |
|---|---|
| Dewpoint Measurement Range: | Up to 70 °C (126 °F) below ambient<br>*Cooling range can be impacted by several factors such as ambient temperature, flow rate, etc.* |
| Lowest Detectable Dewpoint | -40 °C (-40 °F) |
| Dewpoint Accuracy | ±0.5 °C (±0.9 °F) |
| Measurement Time | 2-15 minutes (depending on dewpoint) |

## B- APPLICATION CONDITION

| | |
|---|---|
| Operating Temperature | -20 °C to +60 °C (-4 °F to 140 °F) |
| Input Pressure | Up to 2000 psi (137 bar) |
| Output Pressure | ~20 psi (with standard sample system) |
| Storage Temperature | -20 °C to +60 °C (-4 °F to 140 °F) |
| Flow Rate | ~1 slm |

## C- ELECTRICAL

| | |
|---|---|
| Input Voltage | 108-264 VAC, (Optional 24 VDC available) |
| Power Usage | Average<30W (100W peak) |
| Communication | 4x 4-20mA, 3x DO, RS-232, RS-485, Ethernet |
| Protocol: | MODBUS Gould RTU, Daniel RTU |

## D- PHYSICAL

| | |
|---|---|
| Size (without sample system) | 14” x 14” x 8” (355 mm x 355 mm x 200 mm) |
| Weight (without sample system) | 40 lbs (18 kg) |

## E- PHYSICAL

| | |
|---|---|
| Certification | CSA Class I, Division 1, Groups B, C, and D<br>ATEX II 2 G Ex d IIB+H2 Gb (Cert: ITS16ATEX101262X)<br>IECEX Ex d IIB+H2 T6 (Cert: IECEx ETL 16.0037X) |

# 4- INSTALLATION

DP5000™ analyzers are housed in an explosion proof box.

The unit weighs 45lbs (~20Kg), without the sample conditioning system. Extreme care should be taken in handling, lifting, and installing the unit to prevent risk of injury or death. The unit should be mounted to a fixture capable of bearing the weight of the analyzer.

There is a smaller box inside the analyzer unit. This box does not contain any user serviceable items. It should never be opened by a user. Opening of this box will void the warranty on the system.

All appropriate safety conditions and schedule of limitations have to be followed, when installing and operating this unit

There is no intention for any adjustments or repair to be made on the flamepath joints.

**Your unit may be housed in ZEGAZ Instruments' Z-TCE-500™ temperature controlled enclosure or similar. If so, make sure you refer to Z-TCE-500™ manual, as the electrical and gas connections will be different.**

The unit should not be installed in direct sunlight. If it is installed outdoors, it should be installed under a canopy or other structures protecting it from direct sunlight.

The unit should not be installed in environments where the ambient temperature is not at least 10°C (18°F) above the highest expected dewpoint. In such cases, a heated enclosure will be necessary. Please consult the factory for details.

The analyzer box is usually installed in conjunction with a sample system. The sample system should be mounted directly under the analyzer. ZEGAZ Instruments recommends installation of Z-SCS-300™ sample system manufactured by ZEGAZ Instruments. Installation of any other sample systems may void the warranty on DewPoint Duo™. Please refer to the Z-SCS-300™ manual for complete details.

The analyzer box can be mounted using the mounting brackets on the analyzer. Make sure that it is mounted on a wall in upright direction. The wall should be capable of bearing the weight of the analyzer as well as the sample system.

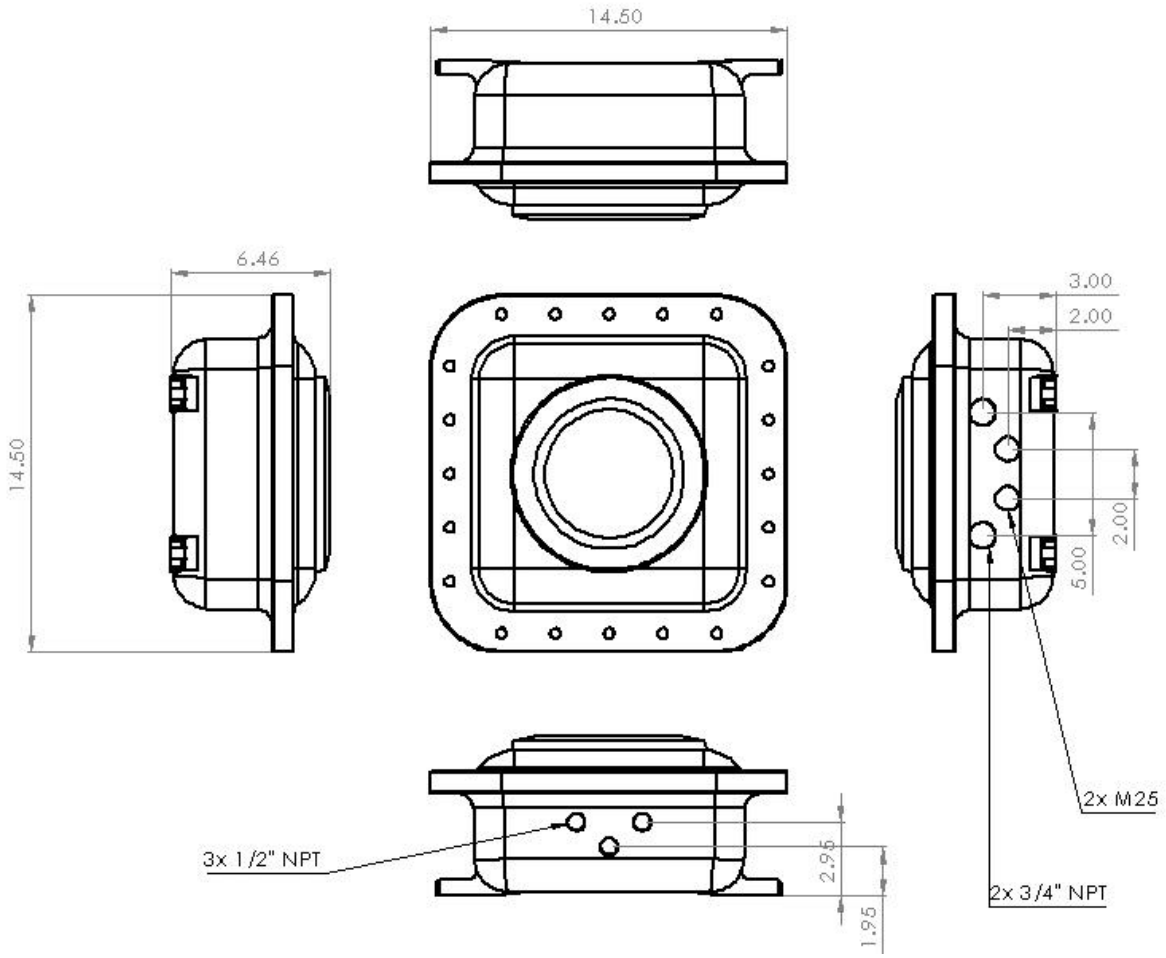



**Figure (A.1)- The analyzer box drawing (dimensions in inches)**

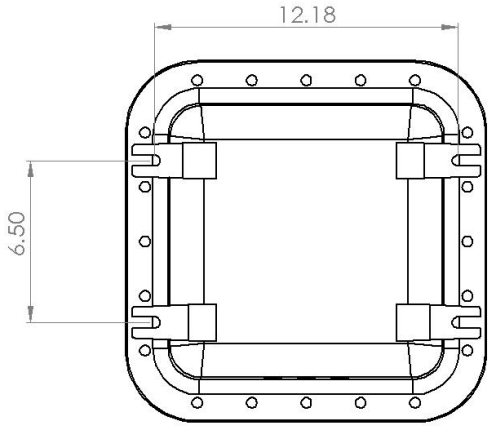



**Figure (A.2)- The analyzer box Mounting**

## A- GAS SAMPLING POINT

DP5000™ analyzers are designed to work at any pressure up to 2000 psi. **However, it is important that the sample introduced into the system to be all vapor and devoid of any liquids. Appropriate sampling tools and membranes should be used to make sure that no liquids are introduced into the system. The gas probe used to sample the gas from the pipeline should be equipped with a membrane separator.**

It is also recommended that a membrane separator with a liquid block be installed close to the system to block the introduction of liquids into the system. Heat-tracing the sample line is also needed.

**The process lines introducing sample to the system should also be configured so that there is no possibility of mixing air, or any oxygen containing gas into the process lines.**

## B- CONNECTING THE GAS INPUT AND OUTPUT

**It is very important to close off the gas output of the system before introducing pressure**. This is important because if there is a significant pressure drop upstream of the analyzer, the gas under analysis may turn into liquid due to JT effects and may damage the analyzer. After the system is pressurized the output valve can be opened to create flow within the specified guidelines.

### *B.1- THE STANDARD SAMPLE SYSTEM*

Your analyzer may have a standard sample system or one customized for your specific application. The standard sample system is shown in Figure (B.1). Your sample system may look different, but will have comparable components to the standard sample system. *In any case, the sample flow rate into the system must be limited to a maximum of 1 SLM.*

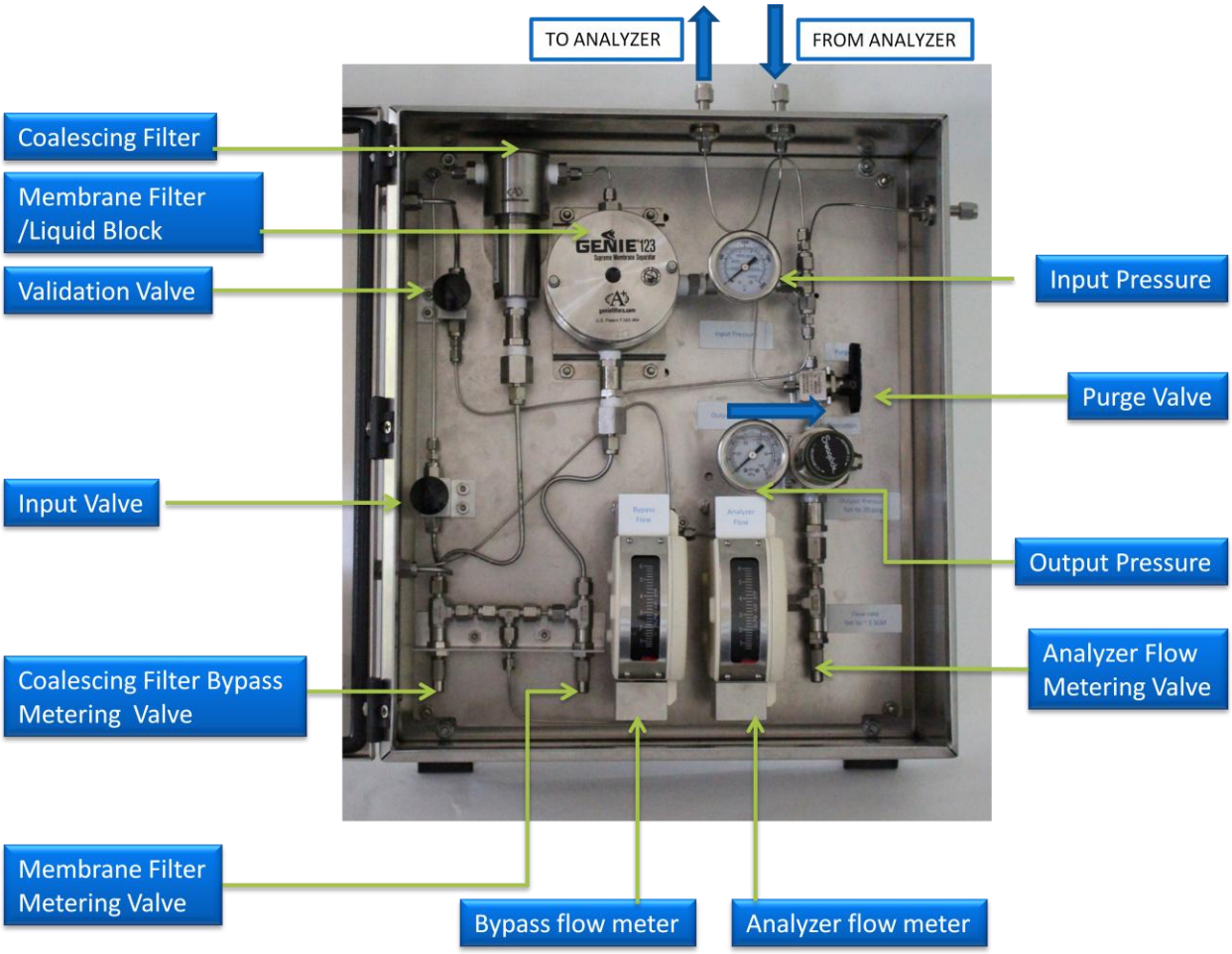



**Figure (B.1)- The Standard Sample System**

## *B.2- CONNECTING THE GAS LINES FROM THE SAMPLE SYSTEM TO THE ANALYZER BOX*

The sample system gas lines should be connected to the analyzer should be connected to the input/output ports on the analyzer main box. See figure (B.2) for the analyzer box gas input/output ports.

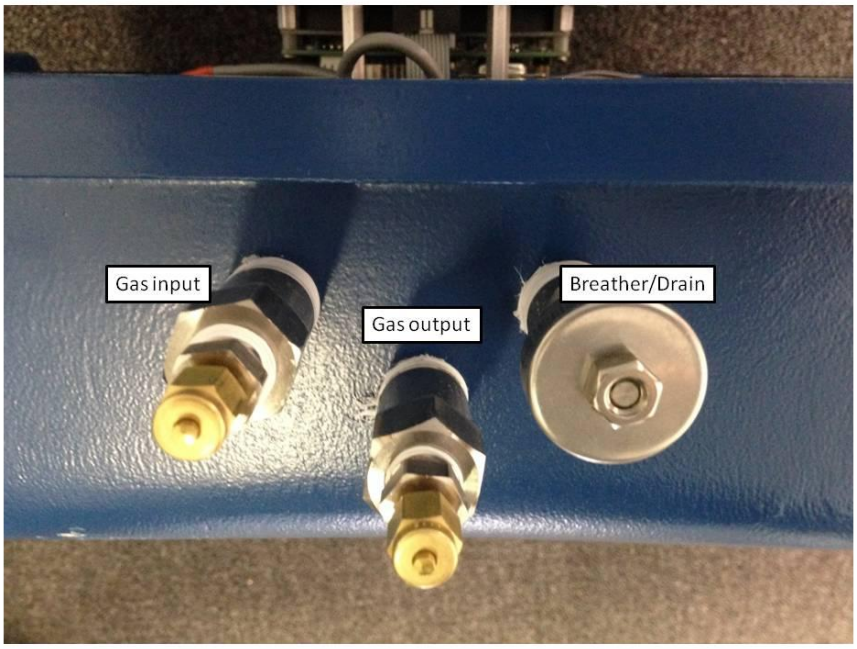



**Figure (B.2)- Connecting the Sample System to the Analyzer Box**

Gas connections should be made to the input and output of the standard sample system. (If you are using a different sample system, please consult your authorized factory representative or the factory for guidance). The output of the sample system should be regulated down to 20 psi and can be vented or used for other appropriate purposes.

*Make sure that the outputs of the system as well as the filter bypass are vented to a safe location according to applicable industry standards and regulations.*

*All the gas connections should be checked for leaks before proceeding any further.*

Sample flow rate is controlled by the flow meter valve in the sample system. This flow is set at the factory and does not need to be adjusted under normal operating conditions. The flow is usually set for ~1 SLM at 20 psig output pressure.

There are 4 entry points for the power and signal cables to the analyzer. These are located on the right-side of the analyzer (Figure A.1). Two of these are ¾" NPT connections, while the other two are M25 connections. Make sure that you plug any entry points that are not used with approved plugs.

DP5000™ analyzers are operated on AC (DC option available) power input. You can use either the ¾" NPT port or the M25 port. Make sure you use the lower entry point that lines up closer to the internal power connection terminal blocks. Appropriate cable sealing glands, or approved conduits need to be used in all cases to seal the cable entry points.

**AC Option**

Please verify that you have the AC or the DC version.

*It is **strongly recommended** that you use an uninterruptable Power Supply (UPS) to power the system. Doing so, will ensure that your analyzer will receive clean, consistent power. Power glitches/surges may temporarily or permanently damage the unit. Damage caused by power surges is not covered under factory warranty.*

*All field wiring should be in accordance with local and international codes. Make sure the instrument enclosure is properly grounded according to national and international standards.*

*AC current usage is peak of <2A at 110VAC and <1A at 220VAC. DC current usage is <8A at 24VDC. Appropriate gauge wiring should be used to power the analyzer*

Input for AC power should be 108-264 VAC 50/60 Hz. The input connections need to be made at the terminal blocks (see figure C.1). The ground wire should be connected to the green terminal block (TB). The ground wire should also be connected to the internal grounding nut inside the box. Please see the picture below for the location of the grounding nut inside the box.

The neutral connection needs to be connected to the white TB.

The line connection should be connected to the black, fused TB. The line TB contains a fuse (2.5A, 250V, fast-blow) that can be accessed by opening the flap on the side of the TB.

**Figure (C.1)- Power Terminal Blocks, AC Version**

**DC Option**

Please verify that you have the AC or the DC version.

If your unit uses a DC option, the terminal blocks have a different color. The DC input should be 12-28 VDC. Connect the (+) wire to the red terminal block. Connect the (-) wire to the Black terminal block. Please see Diagram (C.2) below. The red TB contains a fuse (10A, 250V, fast-blow) that can be accessed by opening the flap on the side of the terminal block.

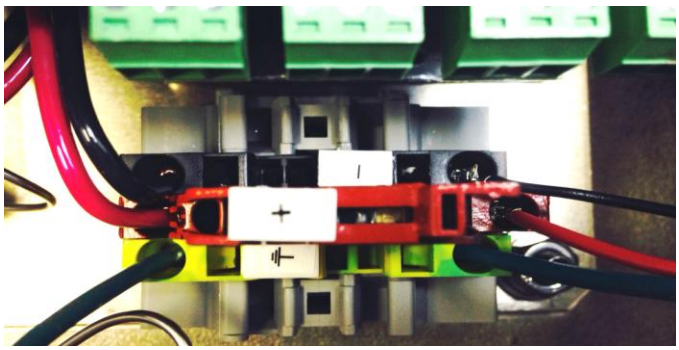


**Figure (C.2)- Power Terminal Blocks, DC Version**

## *C.1- EXTERNAL SWITCH OR CIRCUIT-BREAKER OVER-CURRENT PROTECTION*

- A switch or circuit-breaker shall be included in the building installation.
- It shall be in close proximity to the equipment and within easy reach of the OPERATOR.
- It shall be marked as the disconnecting device for the equipment.

## *C.2- CONNECTION OF 4-20MA OUTPUTS*

*Make sure that all the signal cables/wires (AOs, DOs and digital outputs) are routed through the top of the*

*unit in such a way that they would not make contact with power TBs if they are disconnected.*

The 4-20 mA current loops are sourced internally or externally. There is a jumper on top of every AO that will allow the user to choose between external and internal sourcing. Please check this jumper to make sure that it is placed appropriately. This is shown in Figure (C.3). If you choose internal sourcing (factory default) the jumper has to be between the left and the center pins. For external sourcing the jumper should be between the right and the center pins.

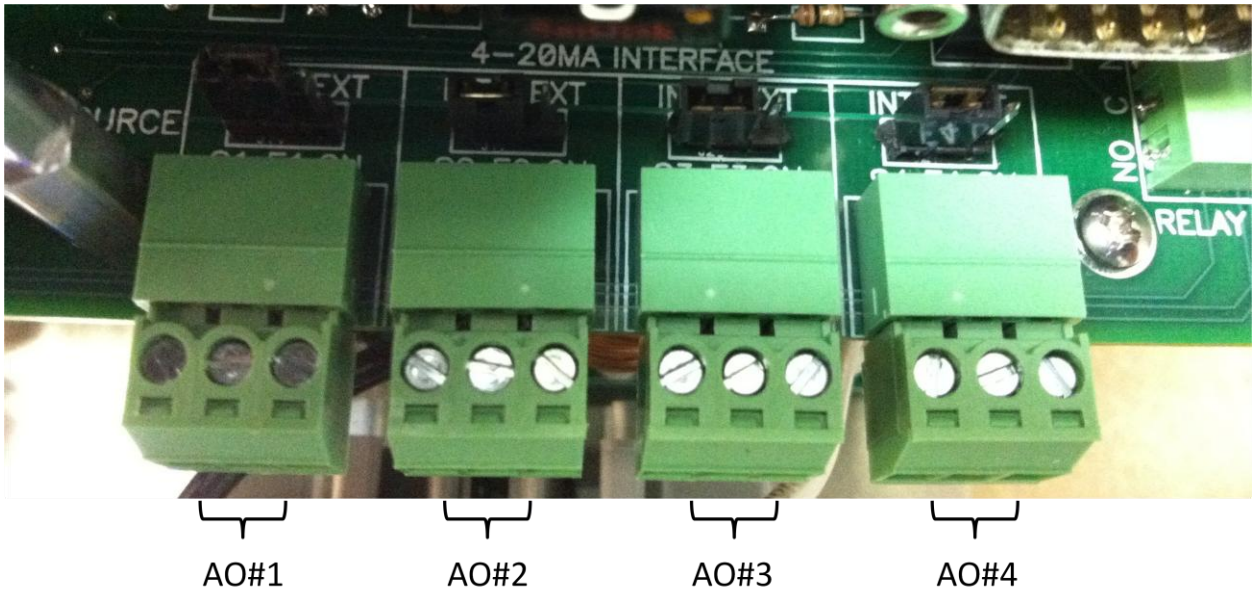



**FIGURE (C.3)- Connecting the 4-20mA analog and digital outputs**

The 4-20mA numbered 1-4 from left to right. If choosing the internal powered option, the output is 12-12.5 VDC between 4-20 mA.

**Internal Powering of Analog Outputs**

The jumper should be between the middle pin and the left pin. For each AO, connect the ground wire to the terminal marked GN and the signal wire to the terminal marked S*(where * is 1, 2, 3, or 4)

**External Powering of Analog Outputs**

The jumper should be moved to the middle and the right pins. You should use a power source voltage between 9-28 VDC.

The (+) pole of external power should be connected to the middle pin marked "E*" (where * is 1, 2, 3, or 4). The ground pole should be connected to the right pin marked (GN). The

output will be on the left pin marked “S*” (where * is 1, 2, 3, or 4) and the right pin marked (GN).

## *C.3- CONNECTION OF DIGITAL OUTPUTS (ALARMS)*

The system provides 3 Digital Outputs (DO) to be used as alarms. Please see figure (D).

The digital outputs should be powered with 9-24 VDC . The current rating for the contact should be 2A.

The three DOs can be passive (not powered) or active (powered). Exceeding these rating will result in permanent damage to the analyzer electronics.

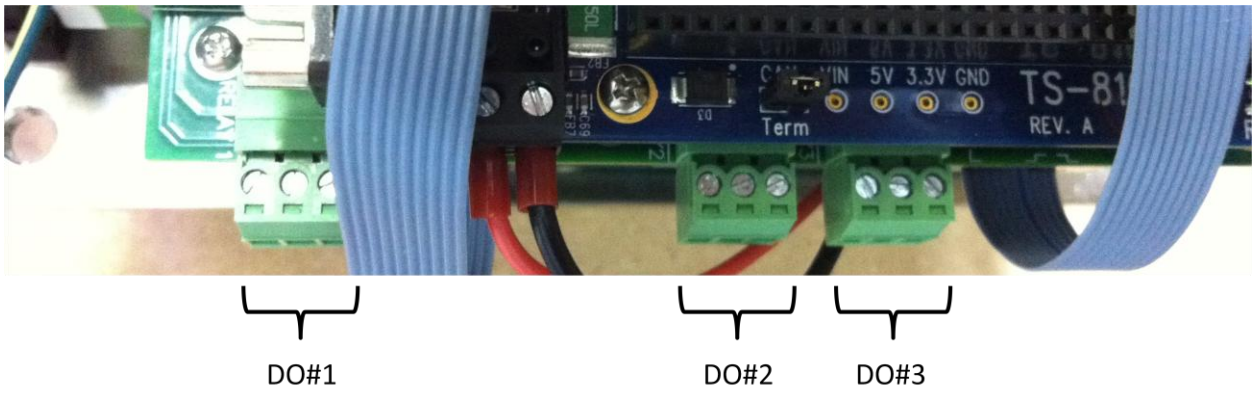



**FIGURE (D)- Connecting the digital outputs**

## *C.4- RS-232 WIRING CONNECTION TO THE ANALYZER*

### Point-to-Point Serial Connection

The DP5000™ controller has one RS-232 serial port which is labeled GN, TD, RD. It also has an RS-485. Both ports are MODBUS ports and can be connected to a MODBUS host.

ZCS™ (ZEGAZ Communications Software) uses Gould MODBUS RTU Protocol. It can be used with the RS-232. Please consult the ZCS™ manual for more information.

The connection should be made as follows:

1- Connect GN terminal to the green wire. The green wire is connected to pin #5 in the DB9 connector.
2- Connect TD terminal to the blue wire. The blue wire is connected to pin #2 in the DB9 connector.
3- Connect RD terminal to the white wire. The white wire is connected to pin #3 in the DB9 connector.

To connect using the RS-485 cable, follow the same protocol for the terminal labeled RS485 on the board.

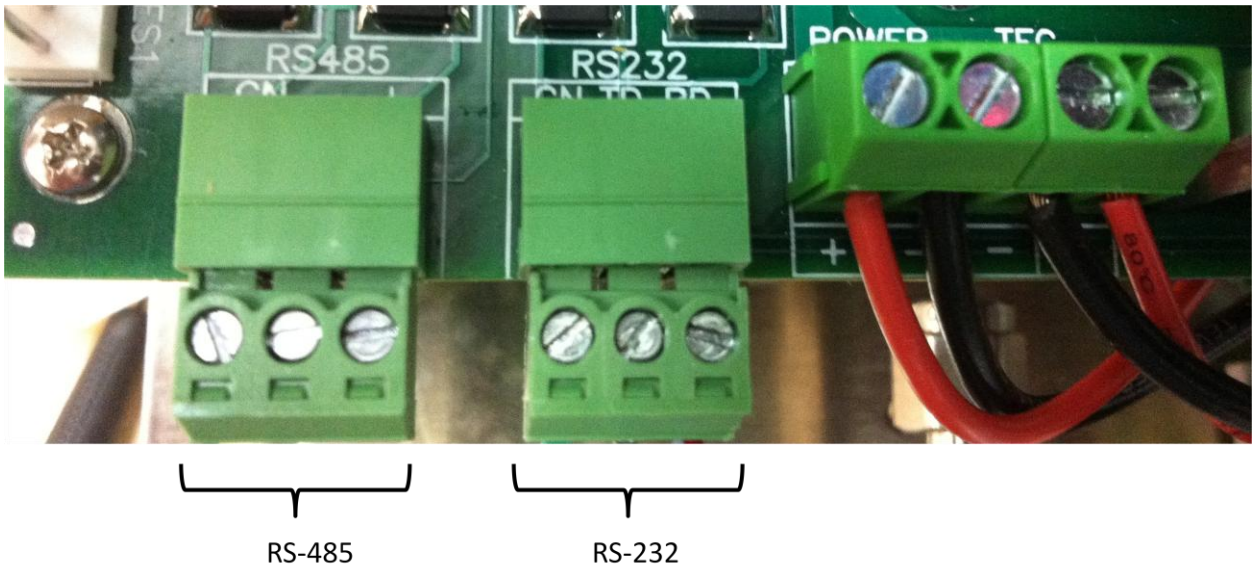



**Figure (E)- Making the Serial Connections**

**MODBUS over Ethernet**

Connect the Ethernet cable to the Ethernet port on the unit. The MODBUS map is the same whether communicating over Ethernet or the serial connections.

Please note that the Ethernet connection can also be used for communications with the analyzer through the ZCS™ software. For details, please refer to the ZCS™ manual.

## D- SEALING THE POWER AND SIGNAL PORTS

To maintain the safety designation of the system, appropriately certified sealing glands should be used to seal the power input and signal output ports on the explosion proof box. To prevent ignition of class I hazardous atmospheres, the conduit seals must be within 3 inches of enclosure. Please refer to the gland manufacturer's instructions on installing sealing glands.

### E- CLOSING THE LID

After all connections are made, the system door should be closed and bolted. Before closing the lid, check to make sure that all surfaces of the flange joint are clean and free of debris. When closing the door, make sure no wires are snagged between the door and the system.

Make sure any unused openings to the system are appropriately plugged with approved plugs.

Please ensure atmosphere is non-hazardous before opening enclosure.

## 5-POWERING THE SYSTEM

At this point, the system is ready for use. The operation of the system is completely automated.

There are no power switches on the DP5000™ systems. As soon as the external power switch or circuit breaker is turned on, the system will turn on and will go through an initialization sequence. The initialization process with take approximately 3-5 minutes. Do not disrupt power during this process.

**The use of an uninterruptible power supply or a surge protector is highly recommended**. Damage resulting from electrical surges is not covered by the warranty.

Only use approved power sources based on the specifications of the system. Connect the power input of the system to an approved AC(or DC for the systems with DC option) source. The display should turn on and indicate the system is going through initialization. Make sure the wiring used to power the system is capable of handling the required current and the voltage. See specifications.

There are no consumable materials in the use of this system. There is an electrical fuse, 2.5A, 250V, fast-blow (8A, 250V for DC versions) which may require replacement occasionally. Except the gas under analysis, there are no other gases involved in the operation of this system.

## 6-SENSOR SELF-DIAGNOSTICS

DP5000™ analyzers are equipped with state-of-the-art self-diagnostics system. Before a measurement cycle is initiated, the sensor will go through a set of self-diagnostics. A cycle will not start before the successful completion of the self-diagnostics routine.

Because of the technology used in DP 5000™ series, the unit can sense if the sensor element is clean will display the message “SENSOR CLEAN” before the start of a new measurement cycle.

# 7- EXPLANATION OF THE ANALYZER DISPLAY SCREENS

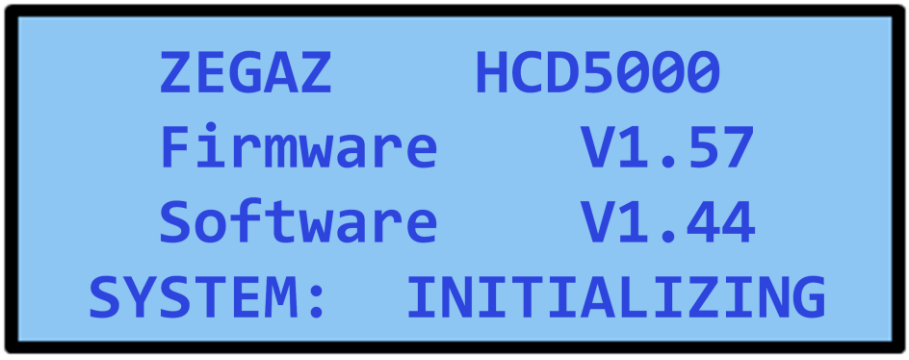
The LCD display has four lines which will be used to indicate the status of the system as well as recent dew point measurement results. The following is a brief description of information displayed at each stage of the analyzer’s operation.

## A- SYSTEM POWER UP

When the system is first turned on, the LCD display will momentarily display the following screen.

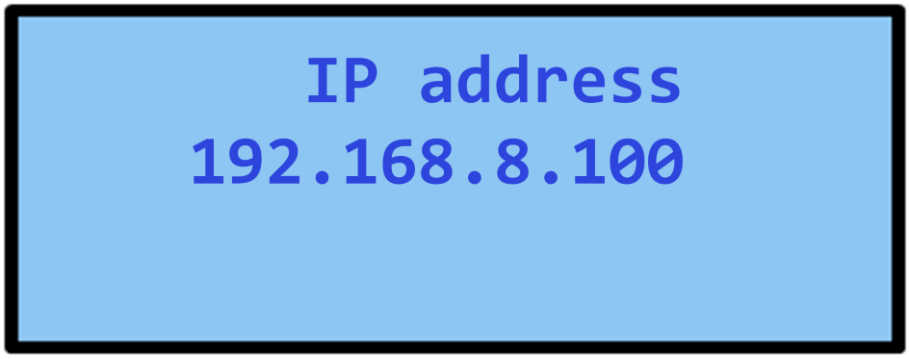

## B- SYSTEM INITIALIZATION AND SELF-DIAGNOSTICS

After system Power Up, the analyzer will immediately enter into an initialization phase. In this phase, the analyzer undergoes a self-diagnostic process where the integrity of each component is verified. In this phase the following screen will be displayed:



This screen also shows the firmware and software versions implemented on your particular unit.

Immediately afterwards, you will see the following screen:

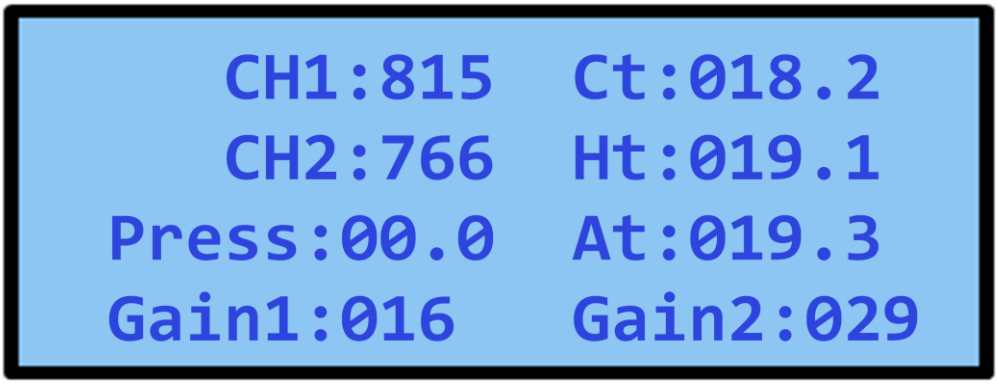



You can communicate with this analyzer in several ways. One way, is to plug it into an Ethernet network or a router, using an Ethernet cable. If the unit is plugged into a network, or a wireless router, the network or the router, will assign an IP address to the unit. Please note this IP address as you will need to use it to communicate with a unit using an external device such as a phone, a tablet, or a PC.

If the unit is not plugged in to a network via an Ethernet cable, the IP address will not appear.

## C- SYSTEM OPERATION

Following analyzer initialization and the IP screens, the unit will prepare for measurement cycles. The following screen will show you various parameters that are important. This is one of several screens that you will see during operation of the unit.



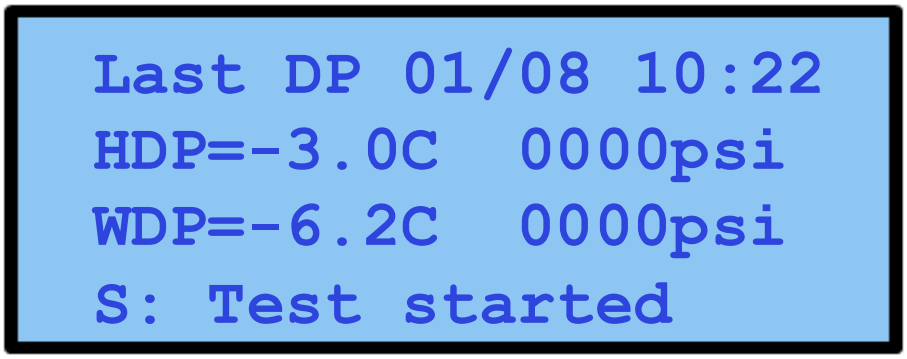

Where:

**CH1** is the scaled cumulative IR index #1,
**CH2** is the scaled cumulative IR index #2,
**Press** is the pressure inside the measurement cell,
**Ct** is the mirror temperature
**Ht** is the heatsink temperature,
**At** is the temperature inside the analyzer box,
**Gain1** is the scale factor #1.,
**Gain2** is the scale factor #2,

During the operation, you will see these parameters change according to the state of measurement. The parameter Ct, which is the mirror temperature, will decrease during the cooling cycle and it will increase during the off-cycles. The parameter Ht and At will also fluctuate during a measurement on a smaller scale, as they represent the heatsink and the system temperatures.

The parameter CH1 and CH2 will also undergo changes during the operation of the instrument.

Once a dewpoint measurement cycle is completed, the following screen will be visible periodically.




Where the first line shows the time and date stamp for the last completed measurement. The second line shows the value of the last measured hydrocarbon and water dewpoints, and the pressure at which it was measured.

If there any alarms or warnings, they will also be displayed on the LCD screen during the alarm or warning condition.

## 8-ANALOG AND DIGITAL OUTPUTS SUMMARY

This section covers the various measurement results and the status of each analog output (AO) and each digital output (DO).

## A- ANALOG OUTPUTS

The default setting for the analog outputs are as follows:

- #1- This signal reports the last HydroCarbon Dew Point (HCDP) dew point in .
- #2- This signal reports the pressure at which the last HCDP was measured at.
- #3- This signal reports the last Water Dew Point (WDP) dew point.
- #4- Not used.

Note that the AOs are programmable and the above assignment can be changed if needed.

## B- DIGITAL OUTPUTS (ALARMS)

**DO#1-** This alarm condition signifies the system **NOT** detecting a hydrocarbon dewpoint. If this alarm is set, then the value on AO#1 should be interpreted as a less or equal to the number reported. This alarm is set under one of the following conditions:

a) Reaching the minimum temperature of -22 °F (-30 °C) without finding a dewpoint. This signifies the HC dewpoint to be below -22°F (-30 °C) . In this case AO#1 is populated with the lowest temperature reached, if this temperature is lower than the previous HCDP found, and this alarmed will be turned on. A message on the system display will also alert the user to this condition until the next cycle is completed. If the lowest temperature reached Is not lower than the last HCDP found, the last HCDP value will be kept on AO#1.
b) Reaching the cooling rate limit of the system without finding a dewpoint. In this case AO#1 is populated with the lowest temperature reached if this temperature is lower than the previous HCDP found, and this alarmed will be turned on. A message on the system display will also alert the user to this condition until the next cycle is completed. If the lowest temperature reached Is not lower than the last HCDP found, the last HCDP value will be kept on AO#1.

**DO#2-** This is a caution alarm condition and it signifies a Hydrocarbon or water dewpoint above the levels set for the system by the user. This level can be changed by the user through the ZCS™ software. The system will continue operating as normal. If the dewpoints fall below the user set point, the alarm will be turned off again.

**DO#3-** This is a general fault alarm and signifies a condition that requires user attention. When this alarm is detected, the system display should be viewed for conditions that may have triggered the alarm. These conditions may be:

- The ambient temperatures are out of operating range. In this case, the system screen will display a message indicating this condition. The system will suspend measurement operations but will continue to monitor the temperature. If ambient temperatures go back to within the operating guidelines, the system will function again and the alarm will be turned off.
- The gas pressure supplied to the system is greater than 2000 psig. In this case, the system will display a message indicating this condition. The system will suspend measurement operations but will continue to monitor the pressure. If pressure goes back to below 2000 psig, the system will function again and the alarm will be turned off.
- There is a communication failure within the system. The system screen will display a message indicating this condition. This condition will require service.
- The detector element is fouled up and cannot recover. This condition will be indicated by the system screen. This condition will only be encountered under rare circumstances if the measurement cell is filled with liquid. Please consult the factory for service.

# 9- TROUBLESHOOTING

This section covers possible problems if the system does not turn on or does not operate properly.

## A- CONDITION: THE DISPLAY DOES NOT TURN ON

1- Check the SYSTEM, INFRARED, and STATUS LEDs above the LCD and see if they are turned on:

   a. The STATUS and INFRARED LEDs should be flashing. If these LEDs are working, then the system has power and the problem is with the LCD itself. In this case open the analyzer door. There is a cable with three wires (red, yellow, and black) that connect the main circuit board to the display. Make sure this cable has not come loose. If it has, you need to reconnect it. However, make sure that the system power is turned off before doing so.

   b. If the LEDs are not working, then the system is not getting power. Make sure you disconnect power and check the fuse. If the fuse is burnt, make sure that you replace with a factory supplied fuse. Do not use any other fuse.

   c. If the system is plugged into a live power connection and the LED lights are still out, then consult the factory.

2- If replacing the fuse does not correct the problem, consult your factory authorized dealer.

## B- CONDITION: 4-20MA SIGNALS ARE NOT WORKING

1- Open the system door.

   a. Make sure that the 4-20mA cable is properly inserted into the lower circuit board. Check for continuity.

2- If this step does not resolve the problem, consult the factory.

## C- CONDITION: THE PRESSURE SENSOR DOES NOT DISPLAY KNOWN PRESSURE

The pressure transducer used in this system is a durable high-quality component that should perform accurately for many years. However, under certain conditions it may cease to function. These conditions are:

1- When it is exposed to pressures above its proof pressure (2x of the maximum specified pressure). If the transducer is exposed to such pressures, it will be irreparably damaged and will need to be replaced by the factory, or a factory trained technician. Please consult the factory.

2- If the wires connecting the transducer to the circuit board gets disconnected. This should not happen during normal operation with the system door closed. When opening the system door for any reason, care should be taken so that the signal and power cables do not get damaged.

## D- CONDITION: THE DATA ON THE DISPLAY DOES NOT CHANGE

The sensor data on the display changes with time and system conditions. If the quantities CH1 and CH2 do not change at all and always show the same value, then there is an internal communication problem. This could be to a power glitch which may have disrupted the operation of the on-board computer. In most cases, the unit is capable of self-diagnosis of this condition and re-booting the computer. This will take 5-10 minutes. If this condition persists, the system should be reset by turning it off for 30 seconds, and turning it back on.

If the system does not re-boot and the condition remains, or if it does re-boot and runs into the same condition, the problem should be reported to the factory and service requested.

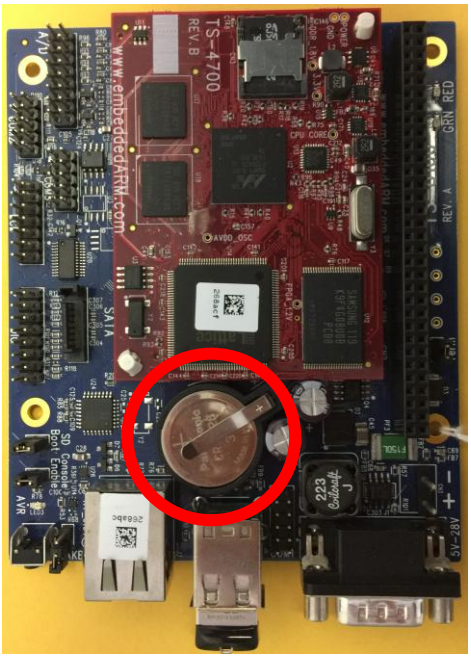
## E- CONDITION: THE SYSTEM DOES NOT KEEP CORRECT TIME

Once the time is set on the system, it will keep the time accurately. There is a button cell battery on the on-board computer which ensures correct time-keeping even if the system is turned off. If this battery is exhausted, the system will lose the correct time after a power interruption.

If this happens, the button cell battery needs to be replaced. Disconnect the power to the system. Make sure the atmosphere is non-hazardous. Open the system door. Locate the on-board computer which is on the upper section of the system. Locate the battery on the system. Replace this battery by one obtained from the factory. Reset to the correct time.

Battery Replacement Instructions:

Battery Orientation: Make sure the positive pole of the battery is up. Remove the clip holding the battery in. Remove the old battery. Place the new battery in, making sure that the positive pole (+) is up. Refer to below picture.




### F- ALL OTHER SYSTEM PROBLEMS

All other system problems should be referred to the factory.

## 10- SPARE PARTS

The **DP5000™** analyzers are designed for maintenance free operation. It has very few user replaceable spare parts. Please contact your authorized representative for replacement parts. If using the standard sample system Z-SCS-300, the filters in the sample system should be inspected and replaced as necessary.

# 11- MAINTENANCE

The DP5000™ analyzers do not require routine maintenance if operated properly and within the guidelines of this manual. If the system is equipped with the standard sample system, then the filter in the sample system should be inspected at least every 30 days and replaced as necessary. Please consult the manual for your sample system.

# 12- SERVICE CONTACT

If the troubleshooting solutions do not resolve the problem, contact your sales representative. If returning the unit is required, obtain a Return Materials Authorization (RMA) Number from your sales representative before returning the analyzer to the factory. Your sales representative can determine whether the analyzer can be serviced on-site or should be returned to the factory.

# 13- DISCLAIMER

ZEGAZ Instruments accepts no responsibility for consequential damages arising from the use of this equipment. Liability is limited to replacement and/or repair of defective components.



# 14- WARRANTY

The manufacturer warrants the items delivered shall be free from defects (latent and patent) in material and workmanship for a period of one year after delivery to the Buyer. The Buyer's sole and exclusive remedy under this warranty shall be limited to repair or replacement. Defective goods must be returned to the manufacturer and/or its distributor for valid warranty claims.

This warranty shall become inapplicable in instances where the items have been misused or otherwise subjected to negligence by the Buyer.

Notwithstanding any other provision of this contract, no other warranties, whether statutory or arising by operation of law, expressed or implied, including but not limited to those of merchantability or fitness for particular purpose, shall apply to the goods or services hereunder, other than the repair and replacement warranty above. Seller shall in no event be liable to Buyer or any third party for any damage, injury or loss, including loss of use or any direct or indirect incidental or consequential damages of any kind.