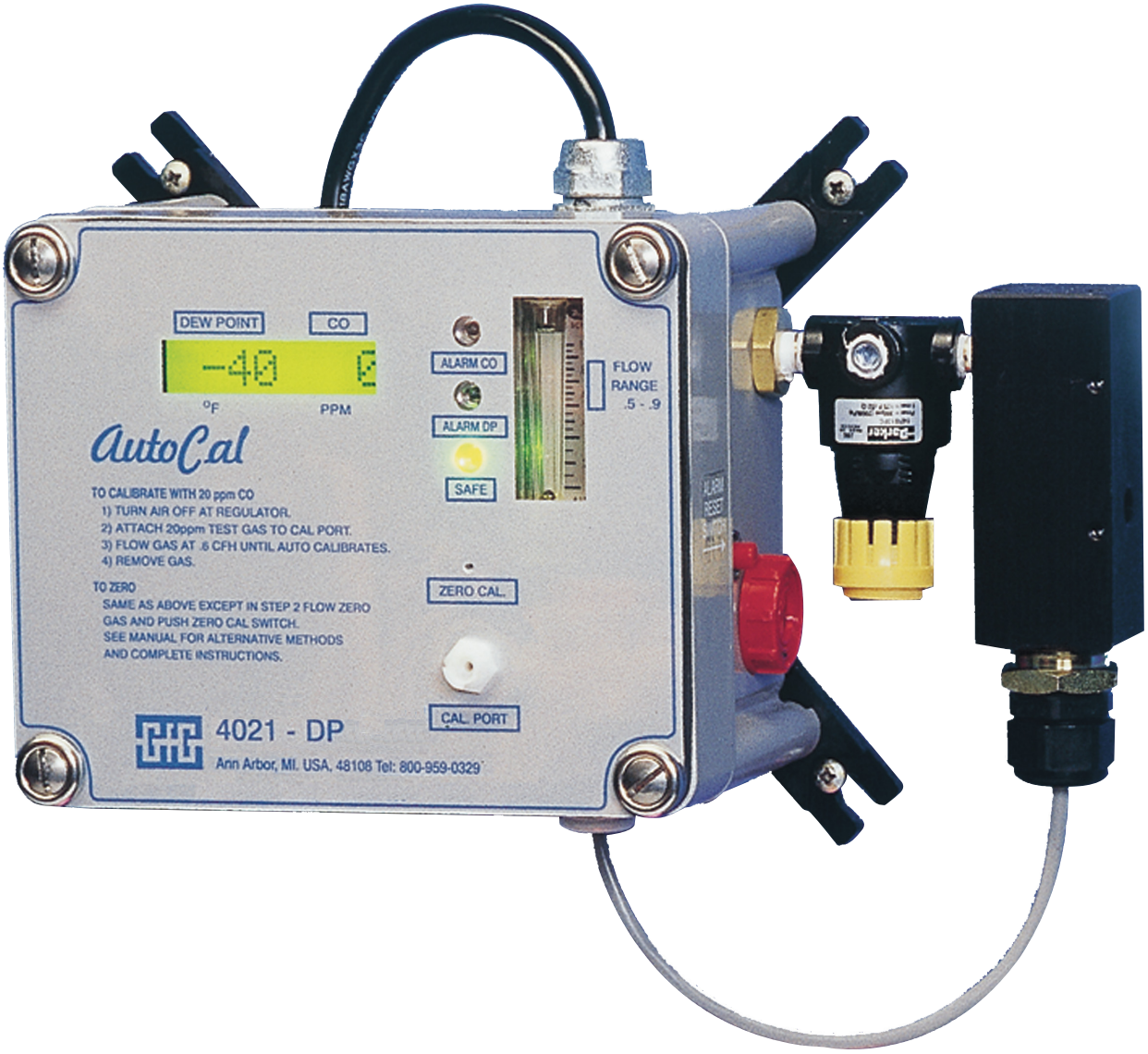
RAM 4021-DPX

Operation Manual



GfG Instrumentation

Worldwide Manufacturer of Gas Detection Solutions

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ABL 4021-DPX / RAM 4021-DPX

For Your Safety

Like any piece of complex equipment, the GfG Instrumentation ABL 4021 / RAM 4021 series will do the job it is designed to do only if it is used and serviced in accordance with the manufacturer's instructions. All individuals who have or will have the responsibility of servicing the equipment must carefully read this manual.

The warranties made by GfG Instrumentation with regards to this instrument are voided if the product is not used and serviced in accordance with the instructions in this manual. Please protect yourself and others who depend on this instrument by following these instructions. The above does not alter statements regarding GfG Instrumentation's warranties and conditions of sale and delivery.

Description

General

This unit is designed to provide continuous monitoring of carbon monoxide and dew point levels in breathing air.

The instrument's electronics are enclosed in a NEMA-4X polycarbonate case. The case is corrosion resistant, positively pressurized by the compressor supply line, and sealed except for a bleed hole (to release the compressor's air). The unit operates on 110 VAC power. It comes equipped with a case-mounted horn that can be disconnected if it is not required.

Calibration adjustment controls are not necessary since they are automatically performed by the microprocessor.

The carbon monoxide chemical cell has a life expectancy of two to three years with a recommended 30-day calibration check. The dew point sensor has an expected life of one year and requires no calibration due to its auto calibration feature.

Setup Mode

By briefly pressing the bottom button (see Figure 1) it is possible to cycle through the setup parameters. Each time the bottom button is pressed the display screen will identify the selected mode and will indicate the current setup. The top button will change the parameter.

The following paragraphs outline the setup modes and options available. In each mode it is possible to change the setup using the lower button.

Lights/Alarms

DPalm xx.x

- Dew point high relay setting (dryer failure alarm).

DLalm xx.x

- Dew point low relay setting (dryer control).

COalm xx

- The alarm point in parts per million is displayed.

CO XX

- The parts per million of carbon monoxide to be used for calibration is displayed (i.e. CO - 20).

NOTE: This setup must be identical to the ppm concentration of the carbon monoxide calibration gas (5-50 ppm CO).

The carbon monoxide test gas concentration may be set from 5 to 100 ppm and is factory set to 20 ppm. It is important to use the same test gas as the “CAL” setting, otherwise the calibration will fail due to the error protection feature.

CO rly

- The carbon monoxide alarm relay (remote) can be enabled (ON) or disabled (OFF) in this mode. Setting the relay ON or OFF permits any auxiliary device connected to the monitor to be shut off if it is not needed. During calibration it will automatically shut off.

DP rly

- Setting the relay ON or OFF permits any auxiliary device connected to the monitor to be shut off if it is not needed. Factory set to 10ºF (dryer failure relay).

DL rly

- Used for controlling a dryer to cycle on/off at the set point, factory set to -4ºF.

Test Mode Activates alarm LED's, horn, and solid squares on the LCD readout when the top button is pushed.

The alarm horn and relays may be tested by pressing and holding the top button while in alarm test setup mode. When testing an auxiliary horn, be sure the relay is turned ON.

Operation

Plug the unit into a 110 VAC outlet and the display will show introductory messages and a warm-up countdown. If the unit does not power up, check the electrical connections and try re-plugging in the unit. If start-up does not occur, call the factory.

After the warm-up countdown, the instrument will display CO and dew point readings. The air regulator may be adjusted at any time to set the flow level from 0.5 to 0.9 CFH. If the **low flow** indication shows on the display, increase the flow to 1 CFH and then drop the flow to the operational range of .5 to .8 CFH.

CAUTION: If the unit is reading a carbon monoxide gas level, do not make any adjustments for a few hours until the unit has settled in. If calibration is attempted within the first fifteen minutes, a **TOO SOON** message will occur on the display.

If the carbon monoxide gas readings remain high or below zero (-0), recalibration may be needed. We also recommend checking the compressor's air intake, which may be the cause of high readings. Outside air intake is recommended, but can easily be contaminated by furnace exhaust, building vents, parking lots, etc. Intakes within the building are to be avoided because they often contain low ppm levels of carbon monoxide.

Calibration

Calibration: Carbon Monoxide Sensor with CO Test Gas
(recommended every 30 days)

Although the unit is calibrated at the factory, it may require carbon monoxide recalibration due to handling. The only way to ensure that the sensor is operating properly is to test it with calibration gas.

To calibrate the unit with carbon monoxide test gas, shut off the air from the compressor supply line with the regulator and a **LOW FLOW** message will appear. Assemble the calibration kit and connect the tank of test gas to the calibration port connector on the instrument. Open the gas valve (use only the fixed flow regulator provided with the calibration kit). The display will read **CAL GAS DETECTED,** then **WAIT,** and then a 60 second countdown will begin.

If the compressor air supply line is not shut off, a message will appear: **SUPPLY OFF**. If such a message occurs, shut off the supplied air and then begin the calibration process again to activate the calibration port switch. After 60 seconds, a gas reading will appear. With 20 ppm of CO test gas applied the gas reading should be 20. The number will move around as it self-adjusts, then will automatically set.

After the unit auto calibrates, a message will appear: **CAL PASSED**, then **REMOVE CAL GAS**, indicating that the CO gain adjustment has been reset for 20 ppm. This prompts the calibrator to remove the test gas. Then a **LOW FLOW** message appears, prompting the calibrator to turn on the supplied air at the regulator.

If an incorrect gas concentration is used or the sensor and/or instrument is not properly functioning, the auto calibration process will not finish. If the instrument fails to complete the auto calibration process within 5-6 minutes, remove the calibration gas and a **CAL FAILED** message will appear. This affords improper calibration protection and an effort should be made to understand why it did not calibrate (see troubleshooting section for assistance).

Dew Point Sensor Calibration

The dew point sensor does not require external calibration and will self calibrate periodically or after a severe humidity change. During the dew point sensor auto-calibration, the dew point reading will remain constant on the display until auto calibration is complete. The auto calibration process will take 2-3 minutes.

"ZERO/CAL" Adjustment for Carbon Monoxide

The carbon monoxide read-out (ppm) will be "0" in the absence of carbon monoxide. This "0" can be calibrated by flowing clean air over the sensor and activating the ZERO/CAL switch.

The "ZERO/CAL" switch is activated through a small hole in the face of the unit using a bent paper clip, small wire, or suitable tool.

Two methods are available to check or set the carbon monoxide ZERO/CAL.

With normal flow through the unit from a clean air supply, depress the ZERO/CAL switch and the message "ZEROING" will appear. Hold until the "ZEROING" message disappears, immediately release the switch, and the instrument will self zero.

If the supply air is clean, the display will show a "0" reading for CO which indicates that a zero setting has been accepted and is now in use. If the supply line has more than a trace of carbon monoxide, the following message will appear: "ZERO CO," alternating with a flashing CO alarm light. The instrument is informing the user that it will not zero calibrate because of bad zero air, and it will use its previously zeroed calibration setting.

CAUTION: Be sure that the cylinder in use is "zero gas" impurity free air (standard air) when zeroing.

The other method to zero the unit is to supply zero test gas (impurity free air) to the calibration port in the same manner as described with calibration gas, and the unit will initiate its calibration gas routine. However, the unit expects that 20 ppm CO is being applied to the calibration port unless the zero switch is pushed. Check to see that the message now says "ZEROING" instead of "WAIT" as the 60 second countdown proceeds. At any time during the countdown the zero switch may be pushed to calibrate the unit with zero gas. If the switch is not pushed, the instrument will fail to calibrate. This is the error protection. After the zero switch is pressed, a ZEROING message appears. Release the zero switch and the instrument will self zero.

Maintenance (qualified technicians only)

NOTE: Except for the sensors, all internal parts are to be serviced only by the factory or its authorized agents.

Dew Point Sensor Replacement

The dew point sensor is shipped to you pre-calibrated, no user calibration is required. The dew point sensor will auto calibrate periodically during use. To replace the sensor, disconnect the power, unplug and remove the sensor from the dew point sensor chamber, replace the sensor, and reassemble the unit.

Carbon Monoxide Sensor Replacement

When CO test gas fails to show a gas response during calibration, or the instrument will not complete calibration, a new sensor is required. Most CO sensors will last from one and a half years to three years.

To replace the sensor, disconnect the power to the unit and remove the four corner screws and the electronics front cover. Next remove the three screws that hold the grey sensor block and unplug the CO sensor from its socket. Install a new sensor after **being sure that the shorting wire is removed** from the new sensor. Reassemble the unit and reconnect it to power. Let the new sensor settle in for at least an hour before calibrating.

A NEW CO SENSOR MUST BE ZEROED

When calibrating a new CO sensor, perform a zero operation prior to a gas calibration procedure. Caution needs to be taken that the air is free of carbon monoxide. If the supply line is not CO free, then obtain a tank of impurity free air test gas from GfG (stock number 7802-006).

After a successful zero operation is completed, supply 20 ppm calibration gas (or another value selected in the setup mode) and perform a gas calibration on the instrument (see calibration section).

Troubleshooting

The CO zero calibration will not set if the there is CO gas present, or if the sensor or electronics are bad. Also, the instrument will not calibrate if the incorrect concentration of CO gas is used, or if the sensor is bad or beyond its useable life.

With 20 ppm CO calibration gas the instrument will read close to 20 during calibration. If the computer cannot auto adjust the readout to 0 (zero) or 20 (calibration), the zero or calibration will fail.

Zero Fail During CO Zero Calibration

If a failure occurs during CO zero calibration, the zero air should be checked for CO content. Another zero operation with known good zero air should be performed. If the instrument still fails to zero, the unit is malfunctioning. Please call the factory for further instructions.

Calibration Gas Fail During CO Calibration

With 20 ppm CO gas supplied to the unit the reading should reach 20. If the reading does not reach 20, use the appropriate procedure:

1. If the gas reading does not show any increase when the gas is applied, the sensor is probably expired or the test gas has a concentration of zero CO. Check the hose connections to assure that gas is flowing into the sensor chamber.
2. If the reading is close to 20, a zero calibration procedure with known zero gas will probably correct the problem. If the unit was zeroed with more than 2 ppm of CO, the calibration will fail when 20 ppm test gas is applied.

Accessories and Field Replacement Parts

Accessories

Calibration kit (includes calibration connector and 20 ppm test gas 34 L)	7750-001
High pressure regulator (5,000 PSI)	2605-002
Regulator for 4021-DPX	2605-014
Remote horn – 110 VAC	1301-002

Replacement Parts

Calibration regulator	7750-004
Dew point sensor	1702-DPX
Sensor – chemical cell	5503-020
Test gas – 20 ppm carbon monoxide 34 L	7802-001
Test gas – impurity free air 34 L (zero gas)	7802-006

Equipment Technical Data

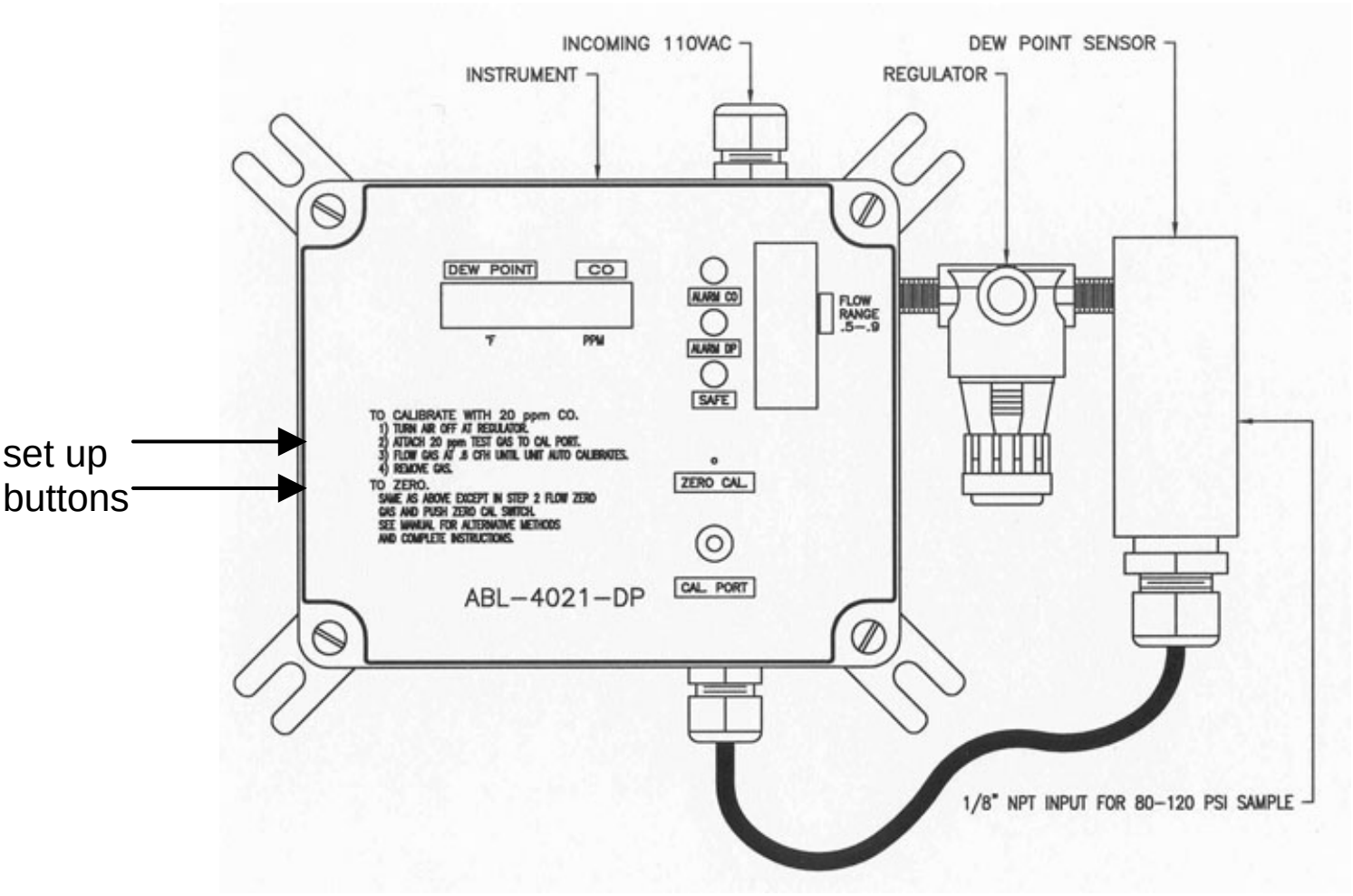
Gases Detected	**Carbon Monoxide**	**Dew Point**
Sensor	Electrochemical cell	Solid state Thin film type
Meter scale	0 to 100 ppm	-112 to +68°F
Response	90% maximum in 20 seconds	N/A
Accuracy	+/- 1ppm	+/- 3°F
Expected sensor life	3 years	2 years
Sensor warranty	1 year	1 year
Operating temperature range (sample air)	+32 to 105°F	
Factory set adjustable alarm points	10 ppm CO	(H) +10 °F(L) -4 °F
Standard inlet pressure	½” feed - 80 to 120 psig	
Sample flow rate	0.5 cubic feet of air per hour (scfh)	
Relays 1 – CO alarm 2 – dew point	250 VAC / 30 VDC @7 A	
Power source	110 VAC @ 1 A	
Dimensions	4x5.9x7.3 inches (101x150x185 mm) (HxWxD)	

Warranty

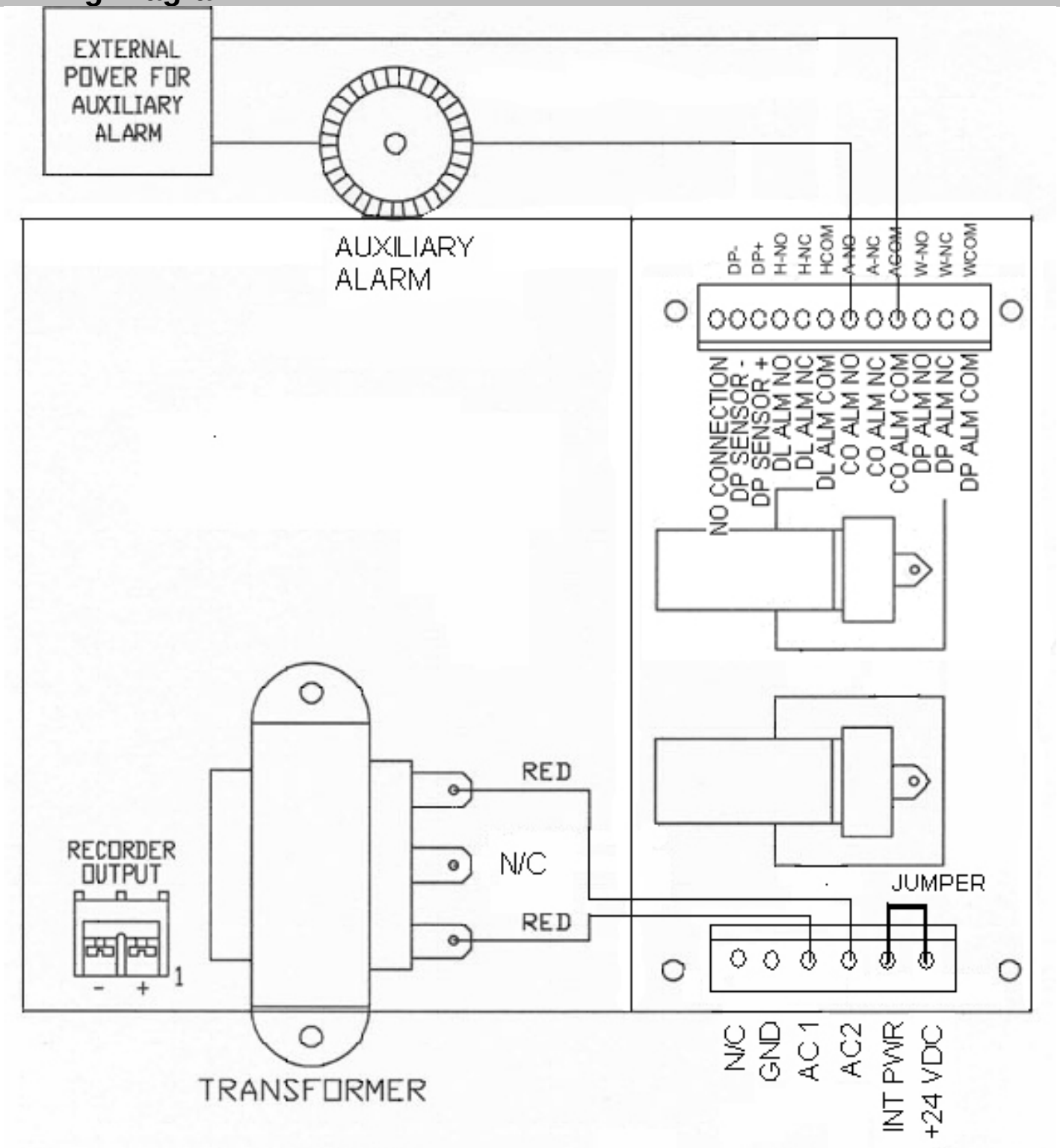
GfG Instrumentation warrants our products to be free from defects in material and workmanship when used for their intended purpose, and agrees to remedy any such defect or to furnish a new part (at the option of GfG Instrumentation) in exchange for any part of any product that we manufacture that under normal use is found to be defective; provided that the product is returned, by the purchaser, to GfG's factory, intact, for our examination, with all transportation costs prepaid, and provided that such examination reveals, in our judgment, that it is defective.

This warranty does not extend to any products that have been subjected to misuse, neglect, accident, or unauthorized modifications; nor does it extend to products used contrary to the instructions furnished by us or to products that have been repaired or altered outside of our factory. No agent or reseller of GfG Instrumentation may alter the above statements.

Figure 1
4021-DPX Diagram



Wiring Diagram



GfG Instrumentation

1194 Oak Valley Drive, Suite 20
Ann Arbor, Michigan 48108 USA

Phone: (800) 959-0329 or (734) 769-0573
Fax: (734) 769-1888
E-mail: info@gfg-inc.com
Web: www.gfg-inc.com

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