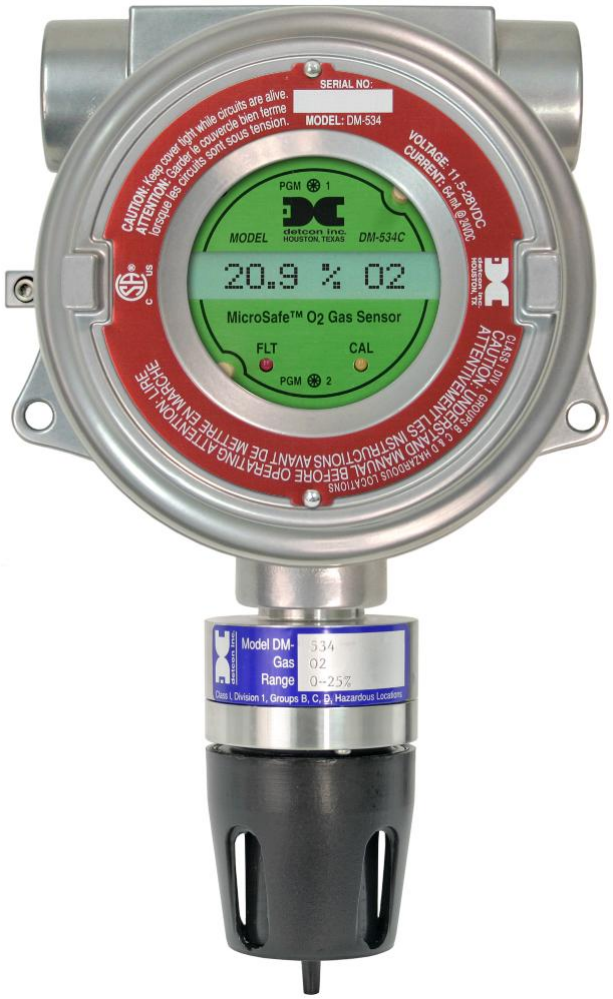
detcon inc.

Detcon MicroSafe™
Model DM-534C
Oxygen Deficiency Sensor (0-25% O2)



Operator's Installation and Instruction Manual

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1.0 DESCRIPTION

Detcon MicroSafe™ Model DM534C, oxygen deficiency sensors are non-intrusive “Smart” sensors designed to detect and monitor O2 in air over the range of 0-25%. One of the primary features of the sensor is its method of automatic calibration which guides the user through each step via instructions displayed on the backlit LCD. The sensor output is a standard 4-20 mA signal. The microprocessor-supervised electronics are packaged as a plug-in module that mates to a standard connector board. Both are housed in an explosion proof condulet that includes a glass lens. A 16 character alpha-numeric indicator is used to display sensor readings as well as the sensor’s menu driven features via a handheld programming magnet.

1.1 Sensor Technology

The sensor technology is of the two-electrode, galvanic metal air battery type cell, which is housed as a field replaceable plug–in module. The cell is diffusion limited and functions as a direct current generator proportional to the amount of oxygen adsorption. The sensors are temperature compensated and show good accuracy and stability over the operating temperature range -4° to +122° Fahrenheit. The sensor is warranted for two years and has an expected service life of up to three years in ambient air at 20.9% oxygen.

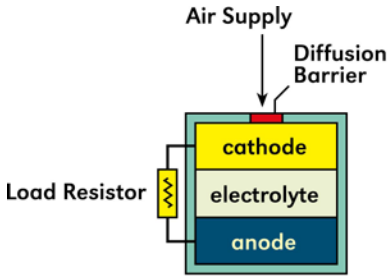


Figure 1 Construction of Galvanic Cell

The control circuit is microprocessor based and is packaged as a plug-in field replaceable module, facilitating easy replacement and minimum down time. Circuit functions include a basic sensor preamplifier, onboard power supplies, microprocessor, back lit alpha numeric display, calibration and fault status LED indicators, magnetic programming switches, and a linear 4-20 mA DC output.

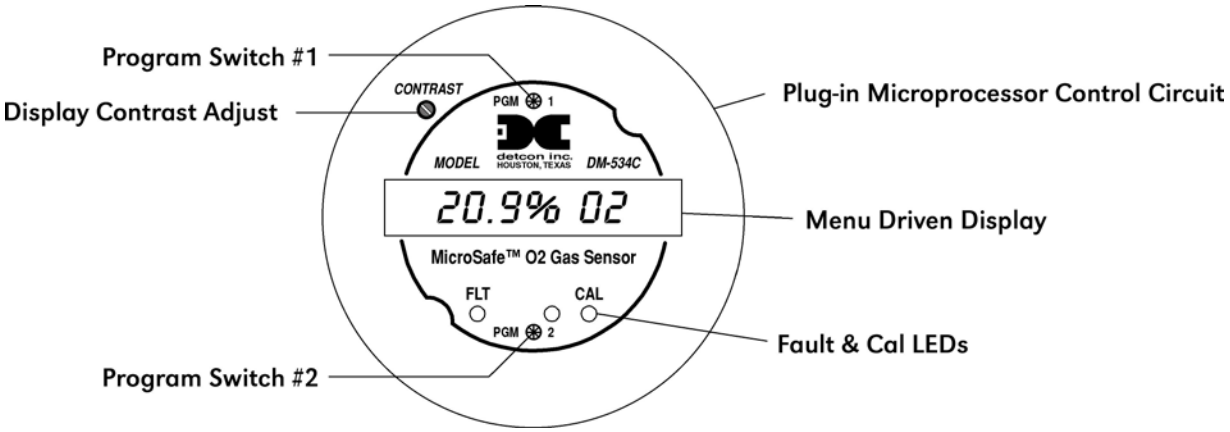


Figure 2 Microprocessor Control Circuit

1.2 Base Connector Board

The base connector board is mounted in the explosion proof enclosure and includes: the mating connector for the control circuit, reverse input and secondary transient suppression, input filter, and lugless terminals for field wiring.

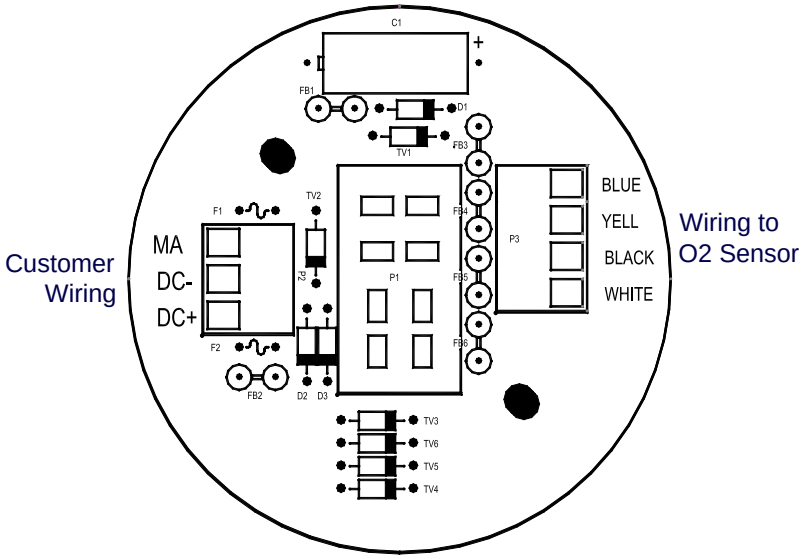


Figure 3 Base connector board

1.3 Explosion Proof Enclosure

The sensors are packaged in a cast metal explosion proof enclosure. The enclosure is fitted with a threaded cover that has a glass lens window. Magnetic program switches located behind the transmitter module face plate are activated through the lens window via a handheld magnetic programming tool allowing non-intrusive operator interface with the sensor. Calibration can be accomplished without removing the cover or declassifying the area. Electrical classification is Class I; Groups B, C, D; Division 1.

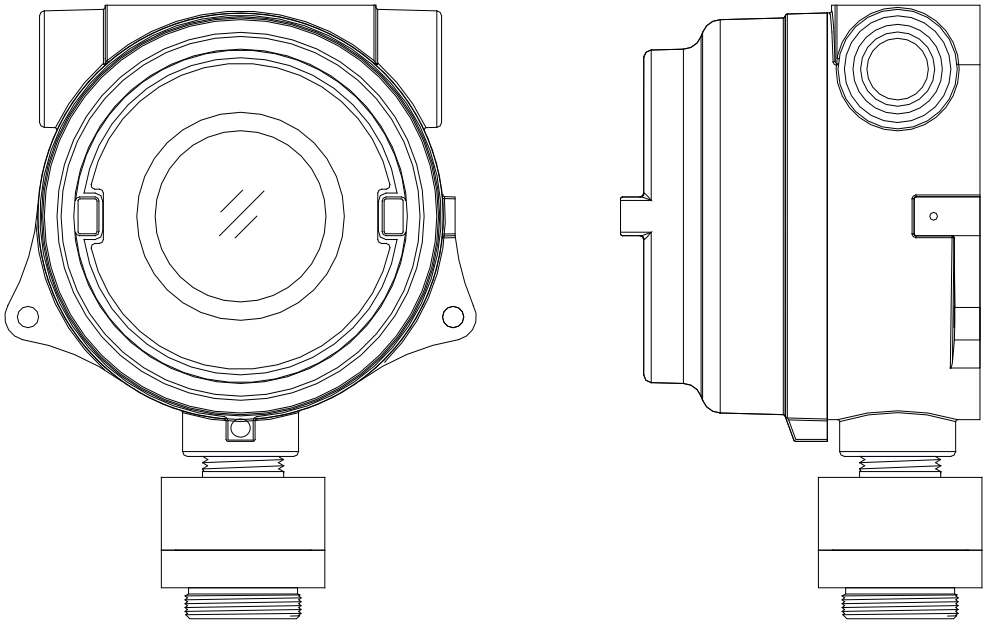


Figure 4 Explosion proof enclosures

2.0 PRINCIPLE OF OPERATION

Method of detection is by a controlled rate of diffusion. Air and gas diffuse through a sintered stainless steel filter and a diffusion barrier. As oxygen is adsorbed into the electrolyte solution a current is generated between the cathode and anode electrodes. This current output rises with increases in oxygen concentration and reverses with lower concentrations. The quick response of the cell results in continuous monitoring of ambient air conditions.

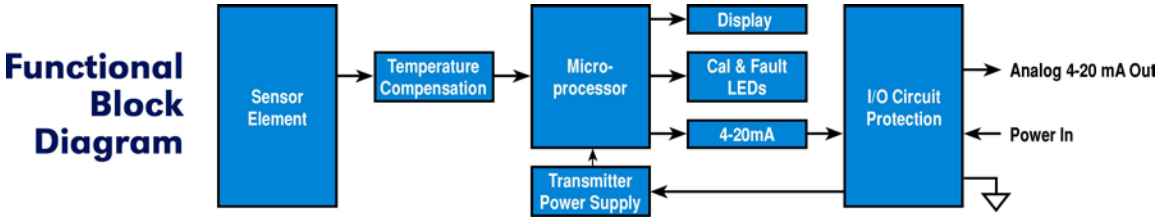


Figure 5 Functional Block Diagram

3.0 APPLICATION

Model DM-534C MicroSafe™ sensors are designed to detect and monitor oxygen deficiency in ambient air in the range of 0-25%. Minimum sensitivity and scale resolution is 0.1%. Operating temperature range is -4° F. to +122° F. While the sensor is capable of operating outside these temperatures, performance specifications are verified within the limit.

3.1 Sensor Placement/Mounting

Sensor location should be reviewed by facility engineering and safety personnel. Area leak sources and perimeter mounting are typically used to determine number and location of sensors. The sensors are generally located 2-4 feet above grade.

3.2 Interference Data

Table 1 Interference Data

Methane	100% = 0
Hydrocarbons	100% = 0
Hydrogen	100% = < 2%
Carbon Monoxide	20% = < 0.5%

4.0 SPECIFICATIONS

Method of Detection Air battery diffusion/adsorption

Electrical Classification Class I; Groups B, C, D; Div. 1.

Response Time (T90) T90 < 20 seconds

Clearing Time 90% < 20 seconds

Repeatability ± 2% FS

Range 0-25% O2

Operating Temperature -4° to +122° F

Accuracy ± 2% FS

Linearity ± 0.5% FS

Sensor Warranty 2 year conditional

Power Consumption 60 mA @ 24 VDC

Output Linear 4-20 mA DC

Input Voltage 11.5-28 VDC

5.0 OPERATING SOFTWARE

Operating software is menu listed with operator interface via the two magnetic program switches located under the face plate. The two switches are referred to as “PGM 1” and “PGM 2”. The menu list consists of 3 items which include submenus as indicated below. (Note: see the end of this manual for a complete software flow chart.)

1. Normal Operation
    a) Current Status
2. Calibration Mode
    a) Span
3. Program Menu
    a) Program Status
    b) Set Calibration Level

5.1 Normal Operation

In normal operation, the display tracks the current status of the sensor and gas concentration and appears as: "2**0.9 % O2**"" The mA current output corresponds to the monitoring level of 0-25% O2 = 4-20 mA.

5.2 Calibration Mode

Calibration mode allows for sensor zero and span adjustments. "**2 - SPAN**"

The default span adjustment is set at 20.9% which is the normal atmospheric concentration of O2. Span gas concentrations other than 20.9 % may be used. Refer to section 8.1 for details "**SPAN**"

5.3 Program Mode

The program mode provides a program status menu (View Program Status) to check operational parameters and allows for the selection of the calibration gas level setting.

5.3.1 Program Status

The program status scrolls through a menu that displays:
* The gas type, range of detection and software version number. The menu item appears as: "**O2 0-25 Vxxx**"
* The calibration gas level setting. The menu item appears as: **"CalLevel @ xx.x%"**
* The estimated remaining sensor life. The menu item appears as: "**SENSOR LIFE 100%**"

5.3.2 Calibration Level Adjustment

The Calibration level is adjustable from 15.0% to 25.0% O2. The menu item appears as: "**CalLevel @ # #%**". Factory default setting is 20.9%.

6.0 INSTALLATION

Optimum performance of ambient air/gas sensor devices is directly relative to proper location and installation practice.

6.1 Field Wiring Table (4-20 mA output)

Detcon MicroSafe™ O2 sensor assemblies require three conductor connection between power supplies and host electronic controllers. Wiring designators are **+** (DC), **-** (DC), and **mA** (sensor signal). Maximum single conductor resistance between sensor and controller is 10 ohms. Maximum wire size for termination in the sensor assembly terminal board is 14 AWG.

Table 2 Field wiring Table

AWG	Meters	Feet
20	240	800
18	360	1200
16	600	2000
14	900	3000

Note 1: This wiring table is based on stranded tinned copper wire and is designed to serve as a reference only.

Note 2: Shielded cable may be required in installations where cable trays or conduit runs include high voltage lines or other sources of induced interference.

The RS485 (if applicable) requires 24 gauge, two conductor, shielded, twisted pair cable between sensor and host PC. Use Belden part number 9841. Two sets of terminals are located on the connector board to facilitate serial loop wiring from sensor to sensor. Wiring designators are **A** & **B** (IN) and **A** & **B** (OUT).

6.2 Sensor Location

Selection of sensor location is critical to the overall safe performance of the product. Five factors play an important role in selection of sensor locations:

(1) Density of the gas to be detected
(2) Most probable leak sources within the industrial process
(3) Ventilation or prevailing wind conditions
(4) Personnel exposure
(5) Accessibility for routine maintenance

Density - Placement of sensors relative to the density of the target gas is such that sensors for the detection of heavier than air gases should be located within 2-4 feet of grade as these heavy gases will tend to settle in low lying areas. For gases lighter than air, sensor placement should be 4-8 feet above grade in open areas or in pitched areas of enclosed spaces.

Leak Sources - Most probable leak sources within an industrial process include flanges, valves, and tubing connections of the sealed type where seals may either fail or wear. Other leak sources are best determined by facility engineers with experience in similar processes.

Ventilation - Normal ventilation or prevailing wind conditions can dictate efficient location of gas sensors in a manner where the migration of gas clouds is quickly detected.

Personnel Exposure The undetected migration of gas clouds should not be allowed to approach concentrated personnel areas such as control rooms, maintenance or warehouse buildings. A more general and applicable thought toward selecting sensor location is combining leak source and perimeter protection in the best possible configuration.

Note: In all installations, the sensor points down relative to grade (Figure 6). Improper sensor orientation may result in false reading and permanent sensor damage.

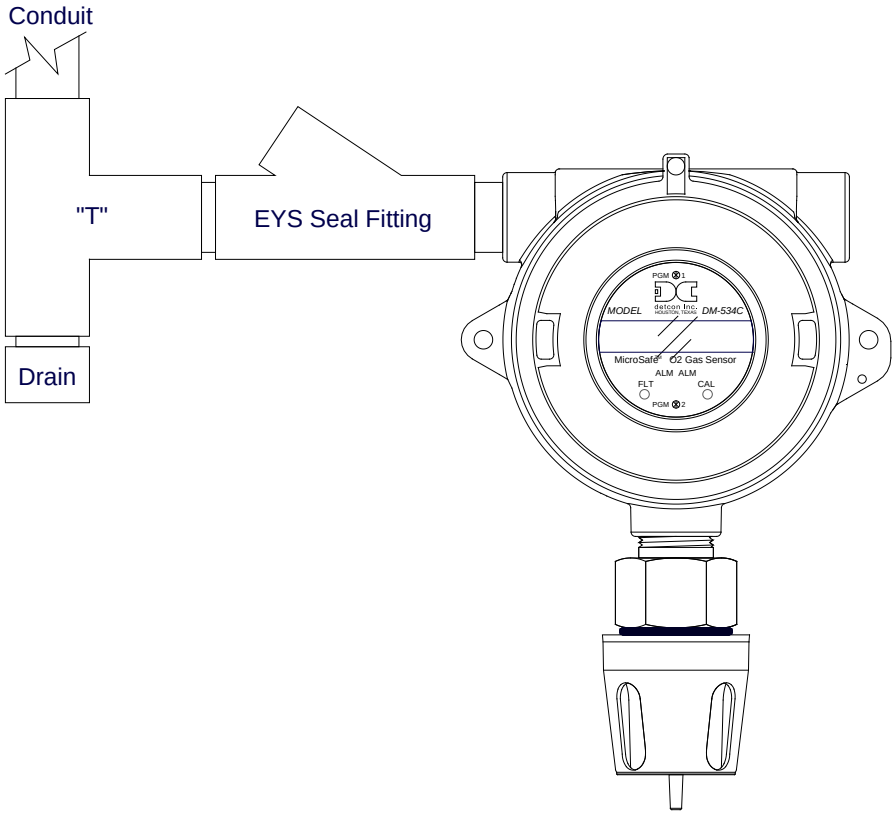


Figure 6 Typical Installation

6.3 Local Electrical Codes

Sensor and transmitter assemblies should be installed in accordance with all local electrical codes. Use appropriate conduit seals. Drains & breathers are recommended. The sensor assemblies are designed to meet NEC and CSA requirements for Class I; Groups B, C, D; Div. 1 environments.

6.4 Accessibility

Consideration should be given to easy access by maintenance personnel as well as the consequences of close proximity to contaminants that may foul the sensor prematurely.

NOTE: For products utilizing the aluminum junction box option, the conduit seal shall be placed at the entry to the junction box (see Figure 6 as an example). For products utilizing the stainless steel junction box option, the conduit seal shall be placed within 18" of the enclosure. Crouse Hinds type EYS2, EYD2 or equivalent are suitable for this purpose.

6.5 Installation Procedure

a) Remove the junction box cover and unplug the control circuit by grasping the two thumb screws and pulling outward.
b) Securely mount the sensor junction box in accordance with recommended practice. See dimensional drawing (Figure 7).

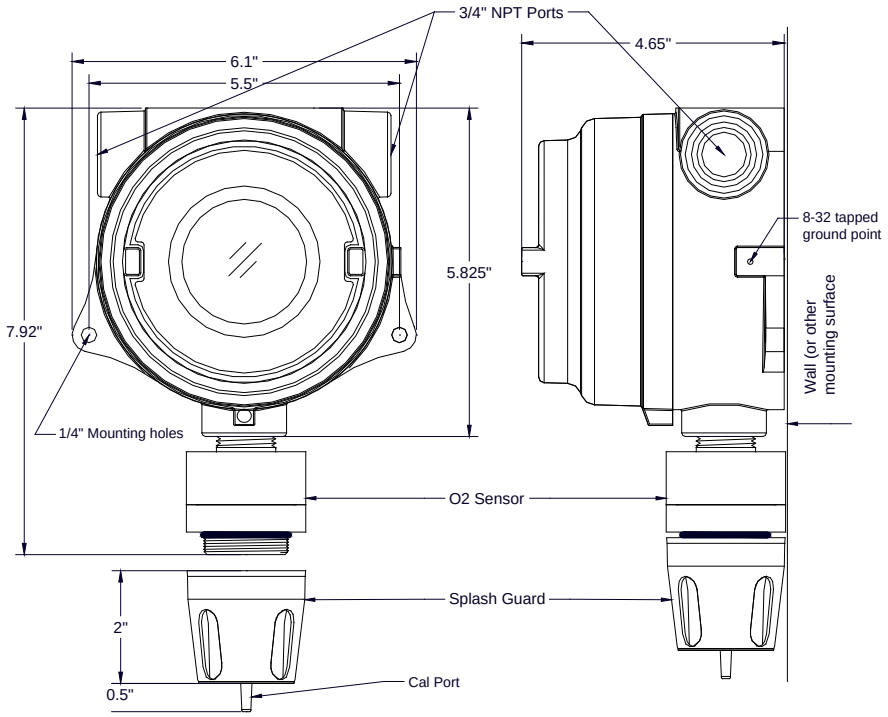


Figure 7 Typical Outline and Mounting Dimensions

c) Observing correct polarity, terminate 3-conductor field wiring to the sensor base connector board in accordance with the detail shown in Figure 8.
d) Replace the plug-in transmitter circuit and replace the junction box cover.

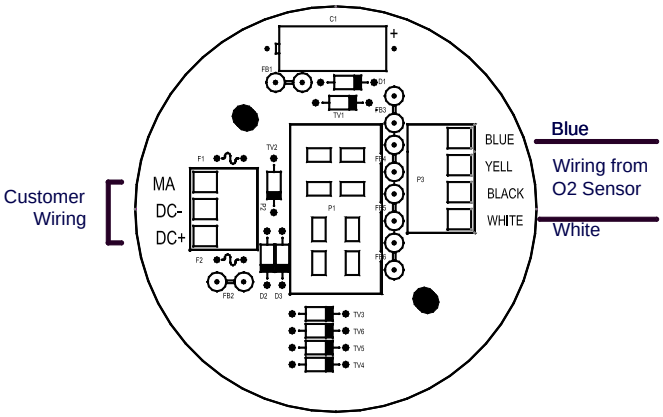


Figure 8 Sensor Connector PCB

6.6 Remote Mounting Applications

Some sensor mounting applications require that the gas sensor head be remotely mounted away from the sensor transmitter. This is usually true in instances where the gas sensor head must be mounted in a location that is difficult to access. Such a location creates problems for maintenance and calibration activities. Detcon provides the DM-534C sensor in a remote-mount configuration in which the sensor (Model DM-534C-RS) and the transmitter (Model DM-534C-RT) are provided in their own condulet housing and are interfaced together with a three conductor cable. Reference figure Figure 9 below for wiring diagram.

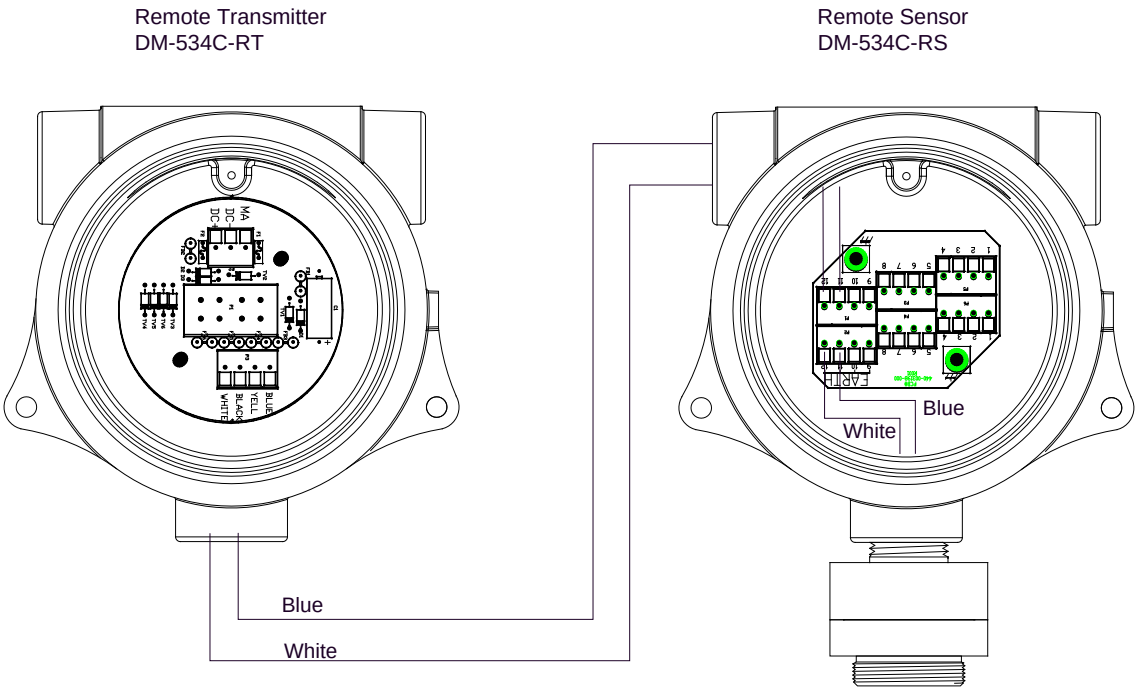


Figure 9 Remote mounting application

7.0 START UP

Upon completion of all mechanical mounting and termination of all field wiring, apply system power and observe the following normal conditions

a) "Fault" LED is off.
b) A temporary upscale reading may occur as the sensor powers up. This upscale reading will clear to about 20.9% within a few minutes of turn-on, assuming there is no oxygen deficient condition in the area of the sensor.

Note 1: If the display contrast needs adjustment, refer to section 8.7.

Initial Operational Tests
After a warm up period has been allowed for, the sensor should be checked to verify reliable sensitivity to O2 gas.

Material Requirements
-Detcon PN 327-000000-000 MicroSafe™ Programming Magnet
-Detcon PN 613-120000-000 Splash Guard with integral Cal Port -OR-
-Detcon PN 943-000006-132 Threaded Calibration Adapter
-Detcon PN 942-001123-000 Zero Air cal gas or use ambient air if no combustible gas is present.

a) Attach the calibration adapter to the threaded sensor housing. Apply the test gas at a controlled flow rate of 500 ml/m. Observe that the LCD display decreases to a level of 3% or less.
b) b) Remove the test gas and observe that the LCD display increases back to 20.9% ±2% of scale (0.5% O2).

c) Initial operational tests are complete. Detcon O2 gas sensors are pre-calibrated prior to shipment and will, in most cases, not require significant adjustment on start up. However, it is recommended that a complete calibration test and adjustment be performed within 24 hours of installation. Refer to calibration instructions in section 8.0.

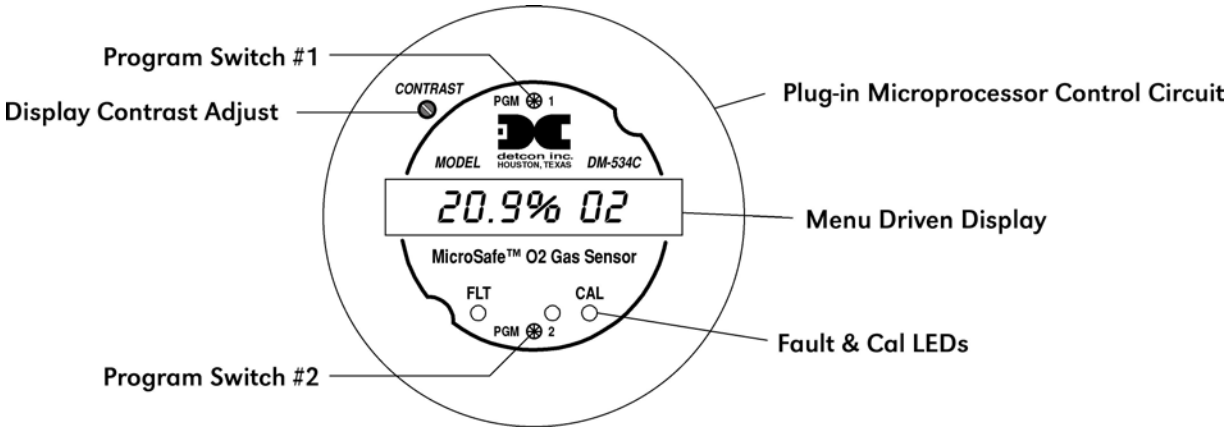
8.0 CALIBRATION

Material Requirements
-Detcon PN 327-000000-000 MicroSafe™ Programming Magnet
-Detcon PN 613-120000-000 Splash Guard with integral Cal Port -OR-
-Detcon PN 943-000006-132 Threaded Calibration Adapter
-Detcon PN 942-001123-000 Zero Air cal gas or use ambient air if no combustible gas is present.

Programming Magnet Operating Instructions
Operator interface to MicroSafe™ gas detection products is via magnetic switches located behind the transmitter face plate. DO NOT remove the glass lens cover to calibrate or change programming parameters. Two switches labeled "PGM 1" and "PGM 2" allow for complete calibration and alarm level programming without removing the enclosure cover, thereby eliminating the need for area declassification or the use of hot permits.

Figure 10 Magnetic Programming Tool

A magnetic programming tool (see Figure 10) is used to operate the switches. Switch action is defined as momentary contact, 3-second hold, and 30-second hold. In momentary contact use, the programming magnet is waved over a switch location. In 3 second hold, the programming magnet is held in place over a switch location for 3 or more seconds. In 30 second hold, the programming magnet is held in place over a switch location for 30 or more seconds. Three and thirty second hold is used to enter or exit calibration and program menus while momentary contact is used to make adjustments. The location of "PGM 1" and "PGM 2" are shown in figure 6.



NOTE: If, after entering the calibration or program menus, there is no interaction with the menu items for more than 30 seconds, the sensor will return to its normal operating condition.

8.1 Calibration Procedure - Span

NOTE 1: Before performing an ambient air O_2 span calibration, be sure there is no oxygen deficient condition present.

CAUTION: Verification of the correct calibration gas level setting and calibration span gas concentration is required before "span" calibration. These two numbers must be equal.

Calibration consists of entering the calibration function and following the menu-displayed instructions. The display will ask for the application of span gas in a specific concentration. This concentration must be equal to the calibration gas level setting. The factory default setting for span gas concentration is 20.9% O2 which is the normal atmospheric concentration. Other concentrations may be used as long as they fall within 15.0% to 25.0% O2. However, any alternate span gas concentration value must be programmed via the calibration gas level menu before proceeding with span calibration. Follow the instructions below for span calibration.

a) Verify the current calibration gas level setting as indicated by the programming status menu. To do this, follow the instructions in section 3.8 and make note of the setting found in listing number 12. The item appears as **"CalGas @ xx.x %".**
b) If the calibration gas level setting is equal to your calibration span gas concentration, proceed to item "f". If not, adjust the calibration gas level setting so that it is equal to your calibration span gas concentration, as instructed in items "c" through "e".
c) Enter the programming menu by holding the programming magnet stationary over "PGM 2" for 30 seconds until the display reads **"VIEW PROG STATUS"**, and then withdraw the magnet. At this point you can scroll through the programming menu by momentarily waving the programming magnet over "PGM 1" or "PGM 2". The menu options are: View Program Status, and Set Cal Level.
d) From the programming menu scroll to the calibration level listing. The menu item appears as: **"SET CAL LEVEL".** Enter the menu by holding the programming magnet stationary over "PGM 1" for 3 seconds until the display reads **"CalGas @ ## %"**, then withdraw the magnet. Use the programming magnet to make an adjustment to "PGM 1" to increase or "PGM 2" to decrease the display reading until the reading is equal to the desired calibration span gas concentration. Exit to the programming menu by holding the programming magnet over "PGM1" for 3 seconds.
e) Exit back to normal operation by holding the programming magnet over "PGM 2" for 3 seconds, or automatically return to normal operation in 30 seconds.
f) From the calibration menu **"2-SPAN"** proceed into the span adjust function by holding the programming magnet stationary over "PGM 2" for 3 seconds then withdraw the programming magnet. If no change of Span level is desired, wait 30 seconds for menu to return to normal operation. At this point the display will ask for the application of the target gas and concentration. The display reads **"APPLY xx.x %"** The xx.x here will indicate the actual concentration requested.
g) Apply the calibration test gas at a flow rate of 500 milliliters per minute. If the calibration gas level is set at 20.9% and ambient air is verified to be 20.9% (normal atmospheric concentration of O2) then do nothing at this point. The sensor will auto calibrate to ambient air O2 concentration. After 3 minutes the sensor will auto span to the correct reading and the display will change to **"REMOVE GAS"** then the display will return to the normal operating mode.

NOTE 1: If the circuitry is unable to adjust the span to the proper setting the sensor will enter into the calibration fault mode which will cause the display to alternate between the sensor's current status reading and the calibration fault screen which appears as: **"CAL FAULT"** (see section 3.7.3)..

8.2 Additional Notes

1. Upon entering the calibration menu, the 4-20 mA signal drops to 2 mA and is held at this level until you return to normal operation.

2. If during calibration the sensor circuitry is unable to attain the proper adjustment for span, the sensor will enter into the calibration fault mode and cause the display to alternate between the sensor's current status reading and the calibration fault screen which appears as: "**CAL FAULT**" If this occurs you may attempt to recalibrate by entering the calibration menu as described in section 3.7.1a. If the sensor fails again, defer to technical trouble shooting.

8.3 Calibration Frequency

In most applications, monthly to quarterly calibration intervals will assure reliable detection. However, industrial environments differ. Upon initial installation and commissioning, close frequency tests should be performed, weekly to monthly. Test results should be recorded and reviewed to determine a suitable calibration interval.

8.4 Calibration Gas Level

Calibration consists of entering the calibration function and following the menu-displayed instructions. The default calibration gas level is 20.9% O2. The sensor however can be programmed to other calibration gas levels as long as they fall within the range of 15.0% to 25.0%. If this is the case, during span calibration the display will ask for the application of span gas in the same concentration as the calibration gas level setting. Follow the instructions below for span calibration at settings other than 20.9%.

a) Verify the current calibration gas level setting as indicated by the programming status menu. To do this, follow the instructions in section 8.0 and make note of the setting found in listing number 2. The item appears as "**CalLevel @ xx.x%**"
b) If the calibration gas level setting is equal to your calibration span gas concentration, proceed to item "f". If not, adjust the calibration gas level setting so that it is equal to your calibration span gas concentration, as instructed in items "c" through "e".
c) Enter the programming menu by holding the programming magnet stationary over "PGM 2" for 30 seconds until the display reads **"VIEW PROG STATUS"**, and then withdraw the magnet. At this point you can scroll through the programming menu by momentarily waving the programming magnet over "PGM 1" or "PGM 2". The menu options are: View Program Status, and Set Cal Level.
d) From the programming menu scroll to the calibration level listing. The menu item appears as: " SET CAL LEVEL"
e) Enter the menu by holding the programming magnet stationary over "PGM 1" for 3 seconds until the display reads "**CalLevel @ xx.x%**", and then withdraw the magnet. Use the programming magnet to make an adjustment to "PGM 1" to increase or "PGM 2" to decrease the display reading until the reading is equal to the desired calibration span gas concentration. Exit to the programming menu by holding the programming magnet over "PGM1" for 3 seconds.
f) Exit back to normal operation by holding the programming magnet over "PGM 2" for 3 seconds, or automatically return to normal operation in 30 seconds.
g) From the calibration menu "**2- SPAN**" (section 8.1) proceed into the span adjust function by holding the programming magnet stationary over "PGM 2" for 3 seconds until the display reads "**APPLY xx.x% O2**" then withdraw the programming magnet. The x's here indicating the gas concentration requested.

h) Apply the calibration gas at a flow rate of 500 milliliters per minute. As the sensor signal changes, the display will change to "**SPAN xx.x%**". The "xx.x" part of the reading indicates the actual gas reading which will increase or decrease until the sensor stabilizes. When the sensor signal is stable it will auto span to the requested concentration and the display will change to "**SPAN COMPLETE**" for two seconds and then "**REMOVE GAS**". Remove the gas. As the signal level returns to ambient gas conditions, the display will return to the normal operation menu, "**20.9% O2**"

8.5 Status of Programming and Sensor Life

The programming menu has a programming status listing that allows the operator to view the gas, range, and software version number of the program, the calibration gas level setting, as well as the estimated remaining sensor life.

The following procedure is used to view the programming status of the sensor:

a) First, enter the programming menu by holding the programming magnet stationary over "PGM 2" for 30 seconds until the display reads "**VIEW PROG STATUS**", then withdraw the magnet. The menu options are: View Program Status, and Set Cal Level.

b) Next, scroll to the "**VIEW PROG STATUS**" listing and then hold the programming magnet over "PGM 1" for 3 seconds. The menu will then automatically scroll, at five second intervals, through the following information before returning back to the "" listing.

   1. The gas type, range of detection and software version number: The menu item appears as: "**O2 0-25 VX.XXX"** with the Xs indicating the current version of installed firmware**.**
   2. The calibration gas level setting: The menu item appears as: "**CalLevel @ xx.x%**".
   3. The estimated remaining sensor life: The menu item appears as: "**Sensor life 100%**".

c) Exit back to normal operations by holding the programming magnet over "PGM 2" for 3 seconds, or automatically return to normal operation in 30 seconds.

8.6 Program Features

Detcon MicroSafe™ toxic gas sensors incorporate a comprehensive program to accommodate easy operator interface and failsafe operation. Program features are detailed in this section. Each sensor is factory tested, programmed, and calibrated prior to shipment.

Over Range
When the sensor detects gas greater than 25.0% O2, it will cause the display to flash "**25% O2**" on and off.

Sensor Fault
If either of the wires connecting the sensor cell to the connector board should fail and cause an open circuit, the sensor will go into a fault condition. "**SENSOR FAULT**"

Calibration Fault
If during calibration the sensor circuitry is unable to attain the proper adjustment for zero or span, the sensor will enter into the calibration fault mode and cause the display to alternate between the sensor's current status reading and the calibration fault screen which appears as: "**CAL FAULT**"

Fail-safe/Fault Supervision
Detcon MicroSafe™ sensors are programmed for failsafe operation. Any of the following fault condition will illuminate the fault LED, and cause the display to read its corresponding fault condition: "**SENSOR FAULT**", or "**CAL FAULT**". A "Sensor Fault" will also cause the mA output to drop to zero (0) mA.

Sensor Life
The sensor life feature is a reference based on signal output from the sensor cell. When a sensor life of 25% or less remains; the sensor cell should be replaced within a reasonable maintenance schedule.

8.7 Display Contrast Adjust

Detcon MicroSafe™ sensors feature a 16-character backlit liquid crystal display. Like most LCDs, character contrast can be affected by viewing angle and temperature. Temperature compensation circuitry included in the MicroSafe™ design will compensate for this characteristic; however temperature extremes may still cause a shift in the contrast. Display contrast can be adjusted by the user if necessary. However, changing the contrast requires that the sensor housing be opened, thus declassification of the area is required.

To adjust the display contrast, remove the enclosure cover and use a jeweler's screwdriver to turn the contrast adjust screw located beneath the metallic face plate. The adjustment location is marked "CONTRAST". See Figure 2 for location.

9.0 TROUBLE SHOOTING

Memory or Error Reports
1. Reinitialize Sensor Unplug transmitter and replug transmitter then swipe magnet over PGM 1 in the first 3 seconds. This will clear the processor and recover from error state. Remember to put in all customer settings for range, alarm and cal gas level after re-initialization.

Non-readable Display
1. If display has blue background when hot, install sunshade to reduce temperature.
2. If poor contrast, adjust contrast pot accordingly.

Nothing Displayed – Transmitter not responding
1. Verify condulet has no accumulated water or abnormal corrosion.
2. Verify required DC power is applied to correct terminals.
3. Swap with a known good transmitter to determine if transmitter is faulty.

Bad 4-20 mA Output or RS485 Output
1. Check that wiring is connected to correct terminal outputs.
2. Swap with a known good transmitter to determine if transmitter is faulty.

10.0 SPARE PARTS LIST

600-610000-000	Sensor splash guard
943-000006-132	Calibration Adapter for FP, IR, DM and O2 Sensors
500-005065-007	Connector board
327-000000-000	Programming Magnet
897-850902-010	Detcon Alum Condulet w/Window Cover
960-202200-000	Condensation prevention packet (replace annually).
370-399100-000	Plug in replacement O2 sensor cell
925-345400-025	Plug in control circuit
399-200000000	Stainless steel sensor housing assembly (does not include plug in sensor

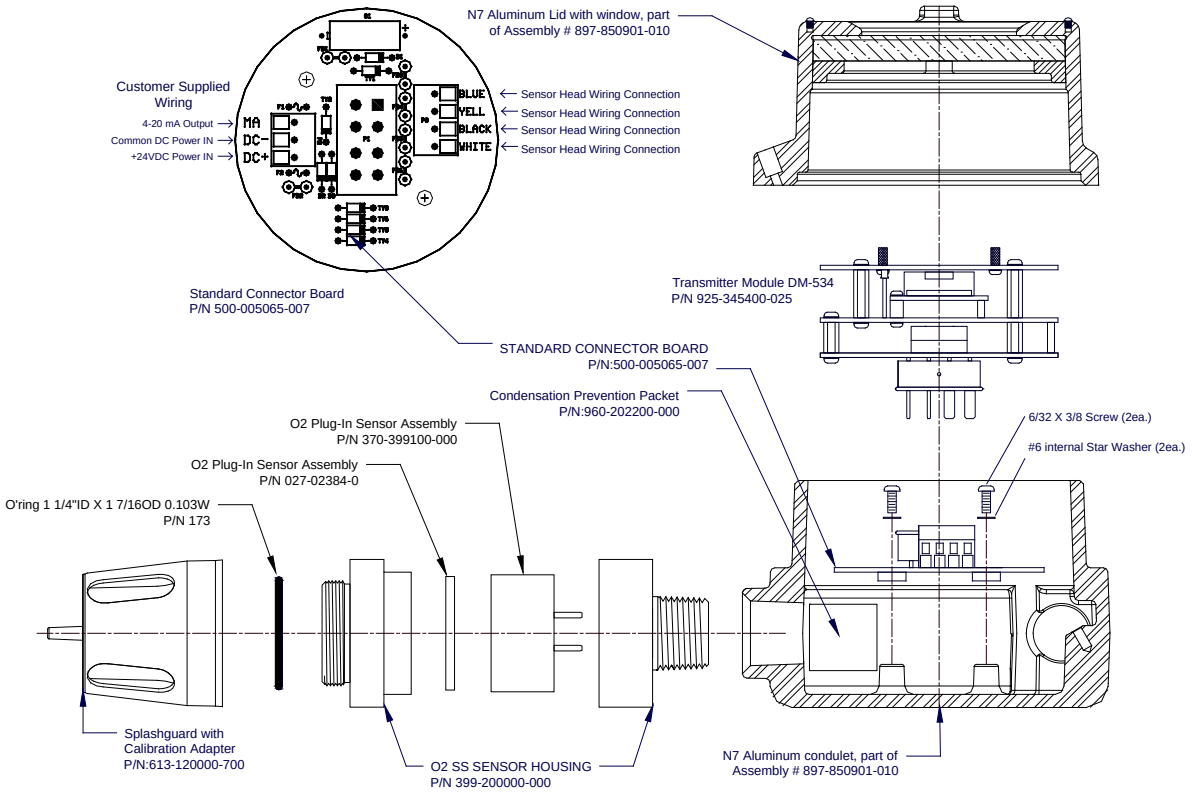


Figure 11 Spare parts diagram

11.0 WARRANTY

Detcon, Inc., as manufacturer, warrants each new plug-in O2 sensor cell (PN 370-399100-000), for a two year period under the conditions described as follows: The warranty period begins on the date of shipment to the original purchaser and ends two years thereafter. The sensor cell is warranted to be free from defects in material and workmanship. Should the sensor cell fail to perform in accordance with published specifications within the warranty period, return the defective part to Detcon, Inc. for necessary repair or replacement.

12.0 SERVICE POLICY

Detcon, Inc., as manufacturer, warrants under intended normal use each new MicroSafe™ plug-in control circuit to be free from defects in material and workmanship for a period of two years from the date of shipment to the original purchaser. Detcon, Inc., further provides for a five year fixed fee service policy covering the control circuit wherein any failed part shall be repaired for a fee of $55.00. The fixed fee service policy shall affect any necessary factory repair for the period following the two-year warranty period and shall end five years after expiration of the warranty. All warranties and service policies are FOB the Detcon facility located in The Woodlands, Texas.

13.0 SOFTWARE FLOWCHART

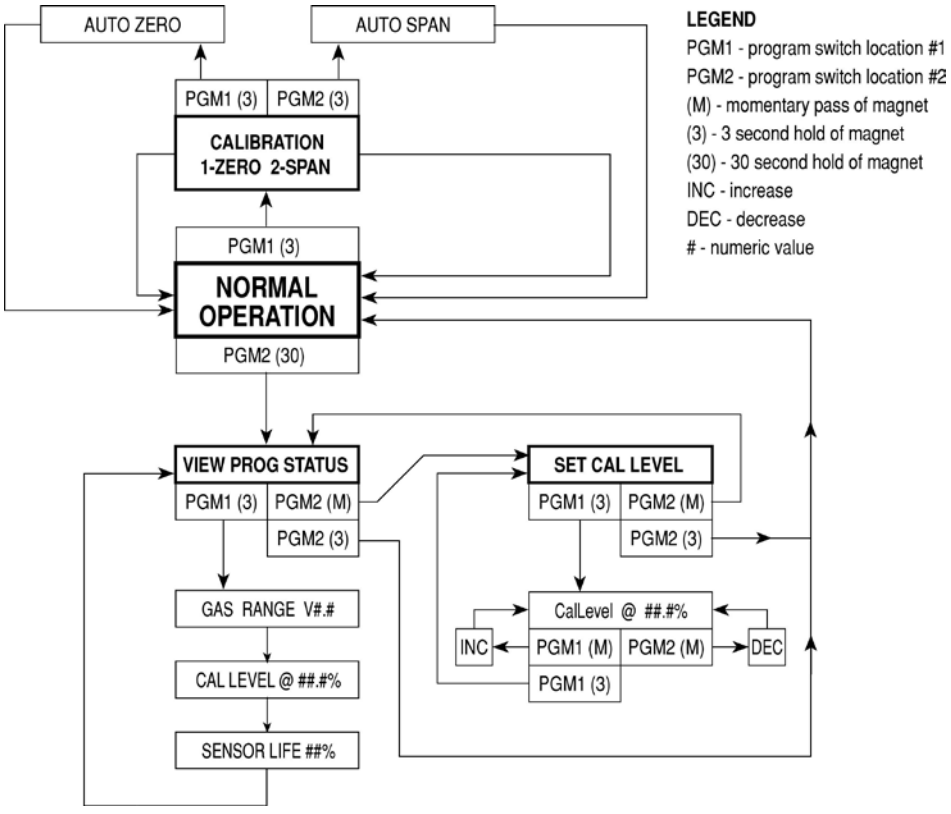


Figure 12 Software Flowchart

Appendix C

Revision History

Revision	Date	Changes made	Approvals
1.3	02/05/10	Last release	BM
1.4	02/21/12	Removed section Calibration- Zero Span. Corrected Spare Parts List (section 10.0). Added Revision history. Converted to Word format	BM
1.5	07/20/18	Updated Conduit Seal in Section 6.4	MM

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