Installation and Instructions Manual

Model SM95

Sensor Transmitters

FOR OXYGEN, CATALYTIC, ELECTROCHEMICAL
AND SOLID STATE SENSORS

INTERNATIONAL
SENSOR TECHNOLOGY

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IMPORTANT — READ FIRST!

This manual contains operating instructions for stationary gas monitoring instruments designed for area air quality and safety applications, and should be STUDIED CAREFULLY by all persons responsible for the operation and maintenance of the instruments. All International Sensor Technology (I.S.T.) equipment described herein is designed or manufactured for use only as set forth herein and by the labels affixed, or other literature accompanying the product.

Where WARNINGS or CAUTIONS are herein set forth, they must be followed. If I.S.T. equipment is used in a manner or under conditions not specifically authorized or prescribed by this manual, or by other materials or written instructions either accompanying the product or authorized by I.S.T. in writing, or if it is used or maintained by unqualified or improperly trained personnel, International Sensor Technology disclaims all responsibility of every kind for said equipment.

While basic connection installation instructions are included, all equipment must be installed by qualified electricians FOLLOWING ALL ASPECTS OF THE LOCAL CODE REQUIREMENTS. Also, the instruments must be calibrated and alarms tested periodically by trained personnel for proper functioning of the instruments.

CAUTION: The overall system, especially where gas monitoring sensors are used, must be CALIBRATED BY QUALIFIED PERSONNEL. Initial calibration should be performed after installation, then weekly for at least the first month of operation. Thereafter, a monthly calibration check is recommended to assure reliability and accuracy.

Please call the factory if any problems are encountered.

WARRANTY

IST sensors and instruments are designed for area air quality and safety applications. IST gas monitoring instruments are provided with a one year warranty (commencing on the shipment date from the factory). This warranty covers only defective parts or workmanship in normal use and service. Instruments which fail to function due to factory defect within one year of date of shipment are to be returned to International Sensor Technology for warranty repair.

IST will determine the nature and responsibility for the defect. In all cases the warranty is limited to the original cost of the equipment. Any misuse of equipment is the customers responsibility. IST will either repair or replace (at IST's option) returned instruments subject to the warranty, at no charge. No field service is included in this warranty. For field service requirements please contact IST.

In addition to the one year warranty on instruments, IST warrants the SENSOR ELEMENT itself against failure due to deterioration or defect, as follows:

1. Solid State Sensors — 3 years
2. Catalytic Sensors — 1 year
3. Electrochemical Sensors (including O2) — 1 year
4. Infrared (IR) — 1 year

This warranty is voided by:

1. Improper application of instrument.
2. Misuse of instrument.
3. Intentional or accidental damaging of instrument.
4. Not returning the sensor to factory for warranty validation.

For any queries regarding warranty repair or replacements, please include the instrument model and serial number in any transmittals to IST. All equipment returned to IST (including warranty repairs) must be accompanied by an RMA number.

IST instruments are supplied with operating and installation manuals and other literature. These are the only source of specific details regarding proper operation and maintenance of the equipment. These instructions must be carefully read and the precautions followed in detail. Instruments must be calibrated and alarms checked periodically to assure proper equipment operation. Please refer to the manual for details.

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SM95 SENSOR TRANSMITTERS

1. INTRODUCTION

This manual describes the installation and operating instructions for International Sensor Technology's (IST) Model SM95 sensor transmitter. These instructions cover the family of transmitters: Solid-State (SM95-S), Catalytic Bead (SM95-C), Electrochemical (SM95-E) and Oxygen (SM95-O). These transmitters can operate as "stand-alone" units or can be used in conjunction with a variety of controllers available from IST. They are housed in an explosion proof casing, operate on 14-24 VDC and produce a 4-20 mA linear output proportional to the gas concentration. The wide power supply variation allows placing the transmitters away from the power supply due to attenuation of the signal (voltage drop) over distance. Minimum voltage AT THE TRANSMITTER is 14 VDC. The transmitter has been calibrated at the factory and is ready to be used.

2. WIRING

Three-conductor cable is required for each sensor transmitter. These connections are made to terminals on the circuit board inside the sensor transmitter. The socket for this connection is included in the transmitter. The terminal's designations are as follows:

1) POWER: +14 to +24 VDC input
2) SIGNAL: Linear 4-20 mA output
3) GROUND

Figure 1 - The terminal block socket is provided within the transmitter

3. WIRE DISTANCES

The maximum distance that wires can be run for the SM95 sensor transmitter is dependent on both the wire size used as well as the power supply voltage. The SM95 can operate on any voltage between 14 and 24 VDC. When used in conjunction with IST's MP SERIES of controllers, these controllers provide 24 VDC to the sensor transmitters. Following are maximum wire distances vs. wire gauge for a 24 VDC power supply.

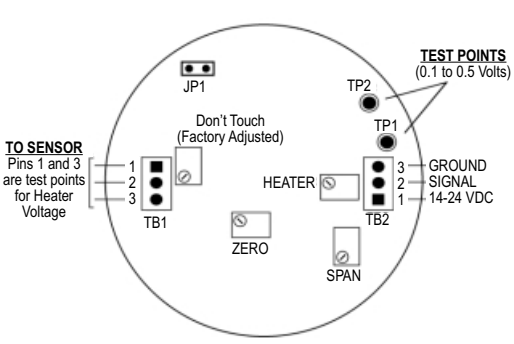
AWG	One- Way Distance (Feet)	One- Way Distance (Meters)
#18	2300	710
#16	3700	1100
#14	5900	1800
#12	9400	2800

Using an 18 VDC supply; the maximum one-way distances are approximately HALF of the above values. IST does not recommend using 14 VDC supplies unless the wiring distances are very short.

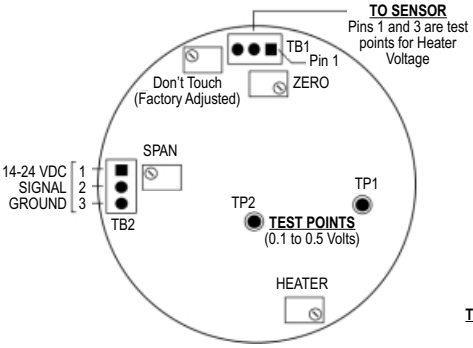
NOTE: If the installation is in an exceptionally noisy area with regard to electrical interference, the maximum practical line length may be less than that indicated.

4. CALIBRATION

The following applies to all sensors, with the exception of the oxygen sensor (SM95-O). See Section 1.5 for detailed instructions on calibration of oxygen sensors. Please note that for solid-state and catalytic sensors, all potentiometers are factory set. The only potentiometers that need periodic adjustments are the SPAN and ZERO potentiometers. **DO NOT ADJUST ANY POTENTIOMETERS COVERED WITH A PLASTIC CAP UNLESS INSTRUCTED TO DO SO BY IST**.



Solid-State Sensor



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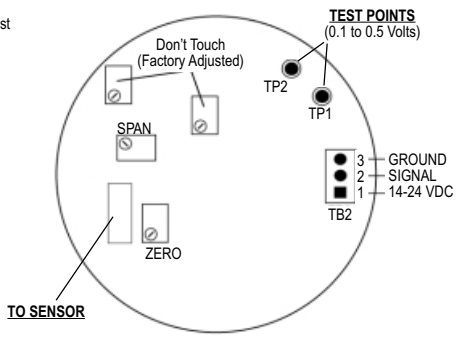


Type I & II Electrochemical Sensor

A) ADJUSTING THE 'ZERO' POINT. Unscrewing the top cover of the sensor transmitter will give you access to the calibration potentiometers and calibration testpoints. Using a voltmeter, insert the probes into testpoints TP1 and TP2. These testpoints indicate the output voltage of the transmitter. The voltage reading at these testpoints should read 0.1 volts at zero gas and 0.5 volts at full scale gas concentration. Thus, for the 4-20 mA output, a reading of 0.1 volts at TP1 and TP2 indicates an output of 4 mA, while a reading of 0.5 volts would indicate an output of 20 mA. In an environment of clean air, free of background gases, adjust the "ZERO" potentiometer so that the reading at testpoints TP1 and TP2 is 0.1V. (See Note: section 5, ZERO GASES).

B) ADJUSTING THE 'SPAN' POINT. With the voltmeter probes in testpoints TP1 and TP2, apply calibration gas to the sensor. Allow the reading at TP1 and TP2 to stabilize, then set the voltage at TP1 and TP2 to 0.5 volts using the "SPAN" potentiometer.

IMPORTANT NOTE:

If you are using the SM95 in conjunction with an MP series control unit, to allow automatic calibration, the SM95 "span" adjustment needs to be set so that the output at full scale is only 16 mA, rather than 20 mA. Thus, instead of adjusting full scale gas concentration to read 0.5 volts at TP1 and TP2, you should instead set it to 0.4 volts.

5. CALIBRATION GAS MIXTURES

Depending on type of gas and concentration, obtaining proper calibration gas mixtures to calibrate the sensors can be a very difficult task. The following are two of the easier ways to accomplish calibration (please see note below):

A) Calibration span gas can be applied using a premixed gas cylinder (available for certain gases, IST P/N 8000). This is the easiest and most efficient way to calibrate, if available.

B) You can also mix your own calibration samples using a container of known volume, pure gas, and a syringe: Using a canister of known volume with an access hole for the sensor (such as IST's P/N 9905, a 1 liter (1000 cc) canister), place the canister over the sensor. Then, using a syringe, measure an appropriate amount of pure gas to make the concentration you desire and inject this gas into the canister. For example, 1 cc of pure gas injected into a 1000 cc canister will produce a sample gas concentration of 1000 parts per million.

NOTE:

ZERO GASES. There is no general consensus as to what is "clean" air to ZERO a sensor. For solid-state sensors, it is important to use air compatible in humidity, oxygen content, and environmental conditions in which the sensor is in operation. Therefore, use of any highly pressurized air bottles or inert gases (such as nitrogen) will offset the zero point and create an unstable zero reading for solid-state sensors. If the environment the sensor is in is not free of background gas, it may be necessary to collect a canister or bag containing clean air. Place this clean air over the sensor head and let the sensor stabilize a few minutes in the clean air before setting the zero point. For oxygen and electrochemical sensors, the use of dry-air or nitrogen will zero the sensor properly.

SPAN GASES. For solid-state sensors, the calibration gas mixture needs to have a minimum of 12% oxygen. Calibration gas in inert gas backgrounds, such as nitrogen, cannot be used directly to calibrate solid-state sensors. Adding 50% of environmental air to the calibration mixture in the nitrogen background is needed to ensure a good calibration which will read as half of the actual concentration.

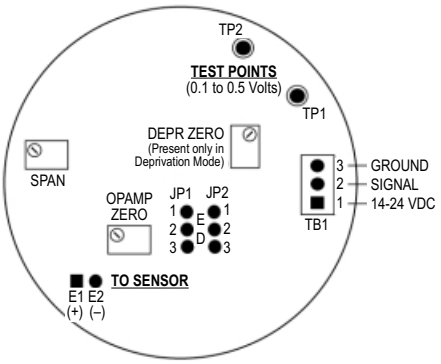
To ensure the reliability of the instrument, it is necessary to calibrate periodically. Calibration should be performed every two weeks during the first month or two. Thereafter, set your own calibration procedure and frequency. For more information visit IST's website at: http://www.intlsensor.com. On the website there is a calibration chapter and gas data excerpts from the book; "Hazardous Gas Monitors," which offers many useful calibration tips.

6. CALIBRATION OF OXYGEN SENSORS

The SM95-O can be configured to operate in one of two modes: enrichment or deprivation (controlled via jumpers JP1 and JP2). These jumpers are set during manufacturing and the type of operation should have been specified when the unit was ordered. (If no mode is specified, enrichment mode is standard.) The difference between the two modes is as follows:

ENRICHMENT MODE: 4 mA = 0% O_2, 20 mA = 25% O_2
(as measured between TB1-2 and TB1-3)
DEPRIVATION MODE: 4 mA = 25% O_2, 20 mA = 0% O_2
(as measured between TB1-2 and TB1-3)

To determine which mode your SM95-O has been set to: locate jumpers JP1 and JP2 (near the middle of the circuit board). If there is a jumper wire between JP1-1 and JP1-2, and there is also a jumper wire between JP2-1 and JP2-2, then the unit is set for enrichment mode. If there is a jumper wire between JP1-2 and JP1-3, and there is also a jumper wire between JP2-2 and JP2-3, then the unit is set for deprivation mode.



Oxygen Sensor

A) ADJUSTING THE "ZERO" POINT (0% O_2) ENRICHMENT MODE

Unscrewing the top cover of the sensor transmitter will give you access to the calibration potentiometers and calibration testpoints. Using a voltmeter, insert the probes into testpoints TP1 and TP2. These testpoints indicate the output voltage of the transmitter. In enrichment mode, the voltage reading at these testpoints should range between 0.1 volts at 0% O_2 up to 0.5 volts at 25% O_2. Thus, for the 4-20 mA output, a reading of 0.1 volts at TP1 and TP2 indicates an output of 4 mA, while a reading of 0.5 volts would indicate an output of 20 mA.

To zero the oxygen sensor, apply a pure nitrogen gas to the sensor and wait for the reading to decrease towards 0.1 volts. When the reading is stable, use the 'OPAMP ZERO' potentiometer to adjust the reading to 0.1 volts at TP1 and TP2. Remove the nitrogen gas.

B) ADJUSTING THE "SPAN" POINT (20.9% O_2) ENRICHMENT MODE

The SM95-O uses normal ambient air as its calibration standard (normal ambient air is 20.9% at sea level). Put the probes of the voltmeter into testpoints TP1 and TP2. Allow the reading at TP1 and TP2 to stabilize, then set the voltage at TP1 and TP2 to 0.434 volts using the "SPAN" potentiometer (since in enrichment mode 0.1 Volts = 0% O_2 and 0.5 Volts = 25% O_2.

IMPORTANT NOTE:

If you are using the **SM95** in conjunction with an MP series control unit, the SM95-O 'Span' adjustment needs to be set so that the output at full scale is only 16 mA rather than 20 mA (at 25% O_2). Thus, instead of adjusting full scale gas concentration to read 0.434 volts at TP1 and TP2 (in normal ambient oxygen), you should instead set it to 0.351 volts.

C) ADJUSTING THE AMBIENT POINT (20.9% O_2) DEPRIVATION MODE

Unscrewing the top cover of the sensor transmitter will give you access to the calibration potentiometers and calibration testpoints. Using a voltmeter, insert the probes into testpoints TP1 and TP2. These testpoints indicate the output voltage of the transmitter. In deprivation mode, the voltage reading at these testpoints should range between 0.1 volts at 25% O_2, up to 0.5 volts at 0% O_2. Thus, for the 4-20 mA output, a reading of 0.1 volts at TP1 and TP2 indicates an output of 4 mA, while a reading of 0.5 volts would indicate an output of 20 mA.

To set the ambient point (20.9 %) for the oxygen sensor in normal ambient air: wait for a stable reading on TP1 and TP2. When the reading is stable, use the "DEPR ZERO" potentiometer to adjust the reading to 0.166 volts between TP1 and TP2. If you are using an MP series controller: the O_2 sensor module should **not** be operated in deprivation mode. **It should be set to enrichment mode.**

D) ADJUSTING THE DEPRIVATION POINT (0% O_2) DEPRIVATION MODE

You will need pure nitrogen to set the oxygen sensor's deprivation point (0%). Put the probes of the voltmeter into testpoints TP1 and TP2. Apply the pure nitrogen to the sensor, and allow the reading at TP1 and TP2 to stabilize, then set the voltage at TP1 and TP2 to 0.5 volts using the "SPAN" potentiometer (since in deprivation mode 0.1 Volts = 25% O_2 and 0.5 Volts = 0% O_2. If you are using an MP series controller, the O_2 sensor module should **not** be operated in deprivation mode. **It should be set to enrichment mode.**

7. SM95-E Rev. E and Type II Electrochemical Sensors

To determine the type of electrochemical sensor you have, look at the actual sensor assembly on the sensor module. If the sensor assembly is a cylindrical (approx. 2.25" in diameter) assembly, then the sensor is a Type I sensor. If the sensor

assembly is hexagonal with a thumb- screw that allows you to remove the sensor, then the sensor is a Type II. If you have a Type I sensor, then the span and zero adjustments will be present on the sensor module circuit board as shown above**.** If you have a Type II sensor, then the span and zero adjustments will be on the sensor assembly (under the plate, near the thumb screw), the op-amp zero pot is on the circuit board, which is factory set only.

Figure 2: IST uses two types of electrochemical sensors: Type I (left) and Type II (right)

IMPORTANT NOTE:
You will need to periodically zero and calibrate the sensor in the field. Follow the zero and calibration instructions in the manual. If you have a Type II sensor, you will need to plug the special test cable (IST P/N SM95-E-TST) into the socket provided in the sensor assembly (near the span and zero potentiometers). This will provide equivalent TP1 and TP2 test points for Type II electrochemical sensors.

8. SENSOR HEATER VOLTAGE (SM95-S & SM95-C)

For both solid state and catalytic sensors, the sensor's heater voltage is the most critical adjustment and is factory set. **DO NOT ATTEMPT TO ADJUST THIS SETTING WITHOUT FIRST CONSULTING IST.** The heater voltage controls the sensor's operating characteristics and varies from one instrument to another, depending on the gas being monitored and its full scale range. A sensor's response and sensitivity will be affected if the heater voltage is improperly set. If you are instructed to do so, **MAKE SURE THAT THE HEATER VOLTAGE IS SET TO THE VALUE SPECIFIED FROM THE FACTORY**. The adjusting potentiometer is located inside the sensor transmitter. The heater voltage can be measured by using a voltmeter to measure the voltage between pins 1 and 3 on terminal TB1. If you are unable to locate information about the proper heater voltage setting of your unit, please contact IST.

9. OUTPUT VOLTAGE

Please note the following concerning the signal output of the SM95:

A) The maximum load for the 4-20 mA output is 850 ohms.
B) When used in conjunction with an MP Series Controller, the output should be calibrated to 16 mA at full scale instead of 20 mA. Thus, at TP1 and TP2, the voltage should be set to 0.4 VDC at full scale gas concentration.
C) When used in conjunction with an AG512 control unit, the output should be calibrated to 17 mA at full scale instead 20 mA. Thus, at TP1 and TP2, the voltage should be set to 0.425 VDC at full scale gas concentration

10. REPLACING A SENSOR

To replace a sensor, use the following steps:

A) Power off the instrument.
B) Loosen the setscrew located on one of the hex flats of the rain shield. Unscrew the sensor rain shield to expose the sensor.
C) Hold the sensor by the base and very carefully pull it out. On Solid-State and Catalytic Bead Sensors: be careful not to damage the delicate bead of the sensor that is suspended by the thin wires.
D) To install the new sensor: insert the sensor into the sensor socket by aligning the red line along the side of the sensor, or ring-mark, with Pin "D" of the sensor socket. This is true for Solid-State and Catalytic Bead Sensors. Electrochemical and oxygen sensors are keyed and do not have a red line on them.

11. INSTALLATION/LOCATION OF SENSOR TRANSMITTER

There are no set rules regarding where sensors must be located. However, the judgment of trained personnel and good common sense should always be used. Sensors that are properly installed can save hours of maintenance and provide trouble free operation. Following are some general guidelines to help you select the proper location:

A) Common sense is the key. What is appropriate for one installation may not be appropriate for another. As a general rule, sensors should be installed at the point(s) from which the gas is most likely to leak from and/or accumulate at. Generally, sensors should be located where they will indicate an average reading of the area that the sensor is to cover.
B) The number of sensors required for an application depends on a number of factors, including the plant layout, airflow pattern, type of gas to be monitored, and the degree of protection required. Choosing the proper number of sensors is a

matter of common sense. Gas sensors are similar to smoke detectors, meaning they will only detect gas that directly comes in contact with the sensor. Thus, the sensor relies on the dispersion of the gas in order to detect it.

C) Sensor transmitters should be pointed downward, not up at the sky or ceiling.

D) The sensor must not be exposed directly to water or steam. Any sensors located close to the floor should be high enough so that they will not be immersed if someone decides to hose down the area. The sensor should be removed or else a sensor plug (IST P/N F44-P) should be temporarily installed if you intend to hose down the area. Whenever possible, sensors should be installed at approximately chest level. This makes calibration convenient and also generally assures that sensors are not flooded by liquids. When there is a possibility of snow accumulating to the height that the sensor is installed, precautions must be taken to prevent the snow from reaching the sensor.

E) Gases have different densities, and some are lighter than air while others are heavier. However, this does not mean that sensors should be installed on the floor or ceiling to monitor these gases. Gases disperse easily and develop a concentration gradient, which means, for example, that a gas that is heavier than air will still be detected several feet off the ground. An important point to remember is that sensors must be accessible for calibration and maintenance, so they should be located where they can be easily reached. Thus, installing them on the floor or ceiling is normally not a good idea.

F) A sensor plug (such as IST P/N F44-P) should be temporarily installed if painting or welding is going to be done in the immediate vicinity of the sensor, to protect it from excessive gas fumes.

G) Sensor transmitters should not be installed too close to a wall or other surface. Space is needed to fit calibration canisters or adapters over the sensor's rainshield. Also, toxic gases tend to adsorb into walls. Then, a change in temperature or humidity can cause the wall to off-gas, causing the sensor to produce a reading. This reading may inadvertently be interpreted as "drifting" or a false reading when, in fact, the sensor is operating properly and just doing it's job of detecting gas.

12. FREQUENTLY ASKED QUESTIONS

1) What is Heater Voltage?

Answer: Solid-State and Catalytic sensors need to be heated to operational temperatures. This heater voltage defines the output characteristic of the sensor. For solid-state sensors, the value of this voltage is tagged with each new replacement sensor. The value typically ranges from 1.0 to 2.4 Volts, and each sensor will have its own optimal heater voltage setting. For catalytic sensors, the heater voltage range is from 2.0 to 2.4 volts. There is a potentiometer on the circuit card of the SM95 that is sealed with a green cap that prevents accidental changing of this critical value. SM95 transmitters are shipped from IST calibrated and with the heater voltage set. The heater voltage setting will last for the lifetime of the sensor and should never be adjusted, unless, you are explicitly instructed to do so by IST personnel, or, if you are replacing a sensor. The heater voltage for each replacement sensor will come with the sensor.

2) *The transmitter has no output. The voltage at TP1 and TP2 is 0.0 Volts.*

Answer: This can be caused by a loss of the heater voltage. Measure TB1-1 and TB1-3. The voltage between these two points should be equal to the sensor heater voltage setting of your unit. If there is no voltage, ***CAREFULLY*** make sure the sensor is plugged in and positioned properly. If there is still no output voltage, the sensor heater is open and sensor needs to be replaced. The most common cause of premature sensor failure is careless handling of the sensor element. The wires on the actual sensor are very fragile and a great deal of care should be exercised when handling the sensor element.

3) *How do I verify if an alarm condition exists? Or, you believe your sensor is malfunctioning or "drifting", because it will detect gas when you believe no gas is present.*

Answer: If a sensor is in alarm or is detecting gas when you believe none to be present, there is a simple and effective way to verify the presence of gas. Simply capture some air sample from an area that is considered "clean" (such as an office) with a plastic bag (such as a garbage bag) and insert and seal the sensor head into the bag for a few minutes. If the reading comes down, this means that there is the presence of some gas, although not necessarily the target. Most sensors will not selectively read only one gas and will respond to other gases besides the target gas. If you are certain none of the target gas is in the area, you should try to eliminate any chemicals or gases from the area that might make the sensor respond. You can contact IST for a list of gases that might make your particular sensor read. If the reading does not change upon covering the sensor with clean air, recalibrate the sensor.

4) ***Sensor produces low or no reading during calibration.***

Answer: Calibrating sensors with very reactive gases in low concentration mixtures; such as with Chlorine and Ammonia, can sometimes produce low readings. This is because the gas molecules react with the dirt in and around the protective sinter that covers the sensor. This effectively clogs the pores of the sensor sinter, inhibiting the diffusion of gas to the sensor. To remedy this, turn off the power to the sensor and remove the protective housing for the sensor (make sure to loosen the set screw before doing this). Thoroughly wash the rain shield in acetone and air-dry completely, making sure the rain shield is completely dried before reinstalling. Failure to dry completely will result in the sensor reading upscale.

5) ***The sensor reads at or near full scale when I first power the unit on. Is this normal?***

Answer: Yes, this is normal for a solid-state sensor. Solid-state sensors operate at an elevated temperature and require a warm-up period. This period is typically from a few minutes to a few hours, but we advise that you leave the sensor plugged in overnight before testing it. This is true for any unit that has been powered off for any significant period of time.

13. SPARE PARTS

Replacement Sensors

Part #	Description
9910-S1	Category 1, ppm range solid-state sensor
9910-S2	Category 2, ppm range solid-state sensor
9910-SL	%LEL or % by volume solid-state sensor
9909C	Catalytic sensor
9910E	Type 1 electrochemical sensor
9922E	Type 2 electrochemical sensor
9920	Oxygen sensor

Circuit Boards

Part #	Description
SM95-S-PCB	Set for SM95 solid-state sensor
SM95-C-PCB	For catalytic sensor
SM95-O-PCB	For oxygen sensor
SM95-EC-PCB	For Type 1 electrochemical sensor
SM95-ES-PCB	For Type 2 electrochemical sensor

Sensor Sockets

Part #	Description
9744	For solid-state or catalytic sensors
9754-EI-C	Type 1 EI sensor
9754-EI-S	Type 2 EI sensor
9754-O2	Oxygen sensor

Sensor Protective Housings and Sample Connections

Note: Parts with the F44 designation are for solid-state and catalytic sensors only. Others are as specified.

Part #	Description
F44T	Rain shield with sinter for solid-state and catalytic sensors
F44P	Plug to seal and protect sensor
F44PF	F44P with $^1/_4$" tube fitting for tube connection
F44TEF	Teflon housing for special non-hazardous areas
F44CO	Housing with charcoal filter for CO or H_2 gas

Part #	Description
F44RCO	Replacement charcoal pack for F44CO
F44C	F44T with inlet fitting for calibration gas
F44CS	Inlet and outlet port for sample to flow through
F44AVS	Sampling system with compressed air vacuum system
F44-WG	Water guard to protect sensor from hose down
9930SS	Inlet/outlet port for Type 1 electrochemical and O_2 sensors
9930AV	Same as 9930SS with compressed air pump



F44T **F44P** **F44TEF** **F44CO** **F44C** **F44CS** **F44AVS** **F44WG**

Duct Mounting Kits

Part #	Description
F44DM	F44 with 1" NPT external thread for duct mounting
F44DMK	F44 duct mounting kits
9945DMK	Duct mounting kit for Type 1 electrochemical and O_2 sensors
9945DM-1	1" NPT duct mount kit for Type 1 electrochemical and O_2 sensors

F44DM **F44DMK** **9945DMK** **9945DM-1**

Others

Part #	Description
S2K	Sampling system with dilution and periodic sampling
TR98M	Relay contact for transmitters with 4-20 mA signal
TR98S	Slave-additional relay contact for TR98M
-420I	Isolated 4-20 mA output for SM 95 and 4-20IQ

SM 95 Transmitter with TR98M Relay Contact.

SM95-420I, isolated 4-20mA output for SM 95

Visit our website at **www.intlsensor.com** for more details.

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