



VOC TRANSMITTER & RECEIVER

INSTRUCTION MANUAL MODEL VOC-900-2 VOC TRANSMITTER & RECEIVER

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VASHTI INSTRUMENTS PVT. LTD.

VOC TRANSMITTER & RECEIVER

MODEL: VOC 900-2

MODIFIED OPERATION, INSTALLATION, CALIBRATION & MAINTENANCE MANUAL

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Instrument	VOC 900-2 VOC Transmitter

Important: Read this manual completely before installation, commissioning, calibration, maintenance or sensor replacement. The instrument is intended for continuous monitoring of VOC gas in ambient air and is designed for hazardous-area installation as specified in the original manual.

1. INTRODUCTION

The VOC 900-2 is a continuous VOC gas transmitter designed for monitoring VOC concentration in ambient air. The standard system uses compact electronics housed in an explosion-proof enclosure with a solid-state PID sensor. Gas from the surrounding atmosphere reaches the active sensor by diffusion, and the sensor produces an electrical signal corresponding to the detected gas concentration. The electronics amplify and process this signal and provide an RS-485 output for remote indication and alarm functions.

2. INTENDED APPLICATION

The detector is intended for field installation where VOC gas may be present in ambient air. The sensor should be installed at a location representative of the area being monitored and, where practical, close to the potential source or accumulation zone. Site-specific hazardous-area requirements, plant safety procedures and applicable electrical/instrumentation practices shall always be followed.

3. TECHNICAL SPECIFICATIONS

The following specifications are taken from the supplied VOC 900-2 manual.

Parameter	Specification
Make	Vasthi
Model	VOC 900-2
Gas detection	VOC gas in ambient air
Operating principle	Diffusion
Sensor	PID sensor
Range	0–100 PPM
Sensor construction	SS housing; replaceable sensor mounted inside holder
Power supply	24 V DC from external source
Output	RS-485
Area classification	Explosion Proof; Zone 1, Class 1, Group IIA/IIB

4. PRINCIPLE OF OPERATION

The VOC gas present in the surrounding atmosphere diffuses into the sensor housing and reaches the active portion of the PID sensor. The sensor responds to the gas concentration and generates an electrical signal. The transmitter electronics amplify and process this signal and provide an RS-485 output proportional to the detected concentration and the configured span. Because the instrument operates by diffusion, the sensor must remain exposed to the ambient atmosphere and its sensing path must not be blocked by dust, oil, mist, condensation, paint, tape or other foreign material.

5. INSTALLATION PROCEDURE

5.1 Mounting and Location

The transmitter is housed in an explosion-proof enclosure suitable for fixing on a wall or pipe at the desired monitoring location. Select the location after considering the process, likely VOC release points, airflow and accessibility for maintenance.

Recommended installation precautions:

- Mount the sensor head in the vertical position with the sensing element pointing toward the floor for ambient detection, unless the site condition requires another orientation.
- Locate the sensor where VOC concentration is most likely to occur, while avoiding a location where normal ventilation would continuously dilute the sample.
- Do not install where rainwater can directly enter the sensor or transmitter.
- Protect the sensor from direct oil, mist, dust, condensation and process contamination.
- Keep the sensing opening unobstructed; do not cover the sensor with cloth, tape, plastic, paint or sealant.
- Provide adequate clearance around the transmitter for inspection, calibration and sensor replacement.
- Do not install the detector in a location where mechanical impact, vibration or unauthorized handling can damage the enclosure or sensor.
- Ensure the mounting support is rigid and suitable for the weight of the installed assembly.
- Confirm that the selected location and installation method are acceptable for the specified hazardous-area classification before energizing the instrument.

5.2 Electrical and Power Connections

The instrument requires a 24 V DC supply from an external source or from the gas monitor when supplied as part of the system. External connection terminals are provided inside the transmitter housing and are identified by labels. The sensor is internally connected through the sensor holder to the transmitter circuit.

Electrical precautions:

- Switch OFF and isolate the power supply before opening the enclosure or making any wiring changes.
- Verify the supply voltage and polarity before energizing the transmitter.
- Use suitable cables, glands and termination practices appropriate to the hazardous-area installation.
- Ensure enclosure covers, threads, glands and seals are correctly fitted after maintenance.
- Do not bypass protective devices or modify the explosion-proof construction.
- Ensure proper earthing/bonding in accordance with the site's approved electrical and hazardous-area practices.
- RS-485 wiring should be routed and terminated according to the connected monitoring system requirements; avoid routing signal wiring alongside high-noise/high-power cables where practicable.

6. COMMISSIONING / START-UP

1. Verify that the detector is securely mounted and that the sensor opening is clean and unobstructed.
2. Verify all electrical connections and confirm 24 V DC supply availability.
3. Energize the detector and allow it to warm up and stabilize for an appropriate period before checking the reading.
4. In clean ambient air, the output should indicate approximately 0 PPM. If required, perform zero adjustment as described in the calibration section.
5. Confirm that the remote display/monitor receives the RS-485 output correctly.
6. Check that the detector responds to a known calibration gas before placing the instrument into routine service.
7. Record the commissioning date, calibration gas concentration, observed output and technician details in the site maintenance record.

7 FUNCTIONAL CONTROLS

The system is provided with multi-turn potentiometers for zero and span adjustment:

- **PR1 – Zero adjustment:** Used to balance/set the zero calibration in clean ambient air.
- **PR2 – Span adjustment:** Used to set the response during calibration with a known gas concentration.
- **Output:** RS-485 communication output for remote indication/alarm.

8. CALIBRATION PROCEDURE

Calibration is necessary to maintain measurement accuracy and detector response. The original manual specifies zero adjustment in ambient air and span adjustment using 100 PPM Isobutylene gas.

Zero calibration

- Connect the 24 V DC power supply to the transmitter.
- Allow the transmitter to warm up and stabilize.
- Expose the sensor to clean ambient air that is free from the target VOC, as far as practicable.
- Adjust PR1 until the indication is 000.0 PPM (or the configured zero indication).

Span calibration

1. Use a certified/known 100 PPM Isobutylene calibration gas with a suitable balance gas and approved calibration arrangement.
2. Apply the calibration gas to the sensor in a controlled manner.
3. Allow the reading to stabilize.
4. Adjust PR2 to obtain the expected span indication according to the transmitter configuration.
5. Stop gas flow and allow the sensor to return toward zero in clean ambient air.
6. Recheck zero and span if necessary.
7. Record calibration results and the calibration gas details.

Calibration safety precautions: Calibration gas handling shall follow the gas-cylinder supplier's instructions and the site's permit/safety procedure. Calibration shall be performed only by trained personnel using suitable equipment. Do not intentionally release VOC calibration gas into an occupied area or create an uncontrolled flammable/toxic atmosphere.

9. ROUTINE OPERATION

During normal operation the detector continuously monitors VOC concentration in ambient air. When VOC concentration changes, the detector output changes accordingly. The connected monitoring/control system may use the RS-485 signal for remote display, logging or alarm functions.

Operator precautions:

- Do not obstruct the sensor.
- Do not clean the sensing opening using solvents, compressed air or liquids unless specifically approved by Vasthi/service instructions.
- Do not open the explosion-proof enclosure while energized in a hazardous area.
- Investigate abnormal readings before changing calibration settings.
- Do not repeatedly adjust zero/span to compensate for a suspected sensor, wiring, power-supply or environmental problem.

10. MAINTENANCE PROCEDURE

Maintenance consists primarily of periodic checks to ensure that the detector remains calibrated and responds to changes in VOC concentration. The original manual recommends checking the power supply and carrying out calibration checks quarterly or at least every six months using VOC gas of known concentration.

Recommended maintenance checklist:

Check item	Recommended action
Physical condition	Inspect enclosure, mounting, cable glands, sensor holder and external condition for damage.
Sensor opening	Check that the sensing path is clean, dry and unobstructed.
Power supply	Verify 24 V DC supply and polarity; investigate unstable supply.
Zero response	Check in clean ambient air; record reading.
Span response	Verify using known calibration gas at the planned interval.
RS-485 output	Confirm communication/reading at the receiving monitor.
Environmental contamination	Inspect for dust, oil, mist, condensation or other contamination.
Records	Document calibration, maintenance, sensor replacement and abnormalities.

11. SENSOR REPLACEMENT

The sensor is replaceable and is mounted inside the SS sensor holder. Replace the sensor when it no longer responds correctly after appropriate checks, when calibration cannot be maintained, or when authorized service personnel determine that replacement is required.

Procedure:

1. Follow the site's shutdown, isolation and hazardous-area safety procedure.
2. Disconnect the detector wire in the junction box as specified in the original manual.
3. Unscrew the SS sensor holder from the box using the threaded connection.
4. Remove the old sensor and install the new sensor in the same position.
5. Reconnect the wire in the same manner, observing the correct color code and secure connections.
6. Close and secure the junction box/enclosure correctly.
7. Energize the detector and allow it to stabilize.
8. Recalibrate the transmitter using the approved zero and span procedure before returning it to service.

Sensor replacement precautions:

- Use only the correct replacement sensor specified for the VOC 900-2.
- Prevent dust, moisture and foreign material from entering the sensor holder or enclosure.
- Never force threaded components or damage sealing surfaces.
- Confirm all connections are secure before energizing.
- After replacement, calibration is mandatory before routine operation.

12. TROUBLESHOOTING GUIDE

Symptom	Possible checks / action
Reading does not return to zero	Verify clean ambient air, sensor contamination, power supply and zero calibration. If the condition remains, inspect/service the sensor.
Reading is unstable	Check power stability, sensor contamination, condensation, airflow/environmental conditions and wiring/communication.
No VOC response	Check sensor condition, sensor connection, calibration gas application and sensor replacement requirement.
RS-485 communication failure	Check 24 V DC supply, wiring, terminal connections, communication configuration and receiving equipment.
Unable to calibrate	Verify correct calibration gas, gas delivery arrangement, sensor condition and zero stability before adjusting span.
Abnormally high reading	Check for actual VOC presence first; then inspect sensor contamination, calibration status, wiring and connected display/system.

13. GENERAL SAFETY PRECAUTIONS

- Read and understand this manual before operating the detector.
- Installation, electrical work, calibration and sensor replacement should be performed by trained/authorized personnel.
- Treat the installation as a hazardous-area instrument according to the specified classification and the site's approved procedures.
- Isolate power before opening the enclosure or performing wiring work.
- Never defeat or alter the explosion-proof construction.
- Keep the sensor free from water, oil, mist, dust and condensation.
- Do not use the detector as the sole safety barrier where the site risk assessment requires independent protection systems.
- Do not rely on an abnormal detector reading as proof that the atmosphere is safe; follow the site's gas-testing and emergency procedures.
- Calibration gas cylinders must be stored, connected and handled according to supplier and site requirements.

- Maintain calibration and service records for traceability.
- If physical damage, enclosure damage, damaged threads/seals, persistent calibration failure or unexplained readings are observed, remove the detector from service as required by the site's safety procedure and contact qualified service personnel.

14. PREVENTIVE MAINTENANCE SCHEDULE

Frequency	Activity
Before commissioning	Installation, wiring, power supply, sensor condition, zero and span verification.
Routine / periodic inspection	Visual inspection, sensor opening, enclosure, power supply and RS-485 communication.
Quarterly or at least six-monthly	Calibration check with VOC gas of known concentration, as specified in the original manual.
After sensor replacement	Full zero/span calibration and functional verification.
After abnormal event	Inspect detector and sensor, verify calibration and investigate cause before returning to se

15. IMPORTANT NOTE ON SOURCE CONTENT

This modified manual expands the supplied VOC 900-2 manual into a more structured field-use format. The original document specifies the VOC 900-2 technical characteristics, diffusion principle, installation considerations, 24 V DC supply, RS-485 output, zero/span controls, 100 PPM Isobutylene calibration example, start-up, periodic calibration and sensor replacement. The added precautions are presented as operational safety and good-practice guidance; site-specific hazardous-area, electrical, process-safety and calibration requirements must take precedence where applicable.