



BLUE DRAGON
T E C H N O L O G Y

810H2S-P

PORTABLE HYDROGEN SULFIDE TAPE ANALYZER

Operation, Installation & Maintenance Manual



Blue Dragon Sulfur Analysis Series

Document No. BD-810H2SP-MAN-EN | Revision C | 31 July 2026

For trained installation, operation, calibration and maintenance personnel



Document Control

This manual defines the approved operating, installation, calibration and maintenance guidance for the Blue Dragon 810H2S-P Portable Hydrogen Sulfide Tape Analyzer. The delivered nameplate, packing list, factory test report, option sheets and serial-number-specific drawings govern the exact supplied configuration.

Field	Details
Product	Blue Dragon 810H2S-P Portable Hydrogen Sulfide Tape Analyzer
Document	Operation, Installation & Maintenance Manual
Document number	BD-810H2SP-MAN-EN
Revision	C - Final publication release
Release date	31 July 2026
Language	English
Product family	Blue Dragon Sulfur Analysis Series
Standard configuration	Portable general-purpose H ₂ S analyzer using lead-acetate sensing tape; local LCD/keypad; manual flowmeter; order-specific range and power supply
Standard warranty	12 months, subject to the sales contract
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Revision History

Revision	Date	Description	Prepared by
A	31 July 2026	Initial Blue Dragon manual based on approved source documentation, with recreated diagrams and Blue Dragon product nomenclature.	Blue Dragon Technology
B	31 July 2026	Added improved illustrations, connection and tape references, an actual sensing-tape photograph, and editable native-DOCX operator-screen diagrams.	Blue Dragon Technology
C	31 July 2026	Final publication review: corrected menu and calibration workflows, added contents pagination and publication metadata, and retained the original Appendix G drawings pending vector restoration.	Blue Dragon Technology

IMPORTANT

The 810H2S-P is a general-purpose portable analyzer for non-classified locations. It is not certified for use in a hazardous area. The delivered nameplate and order documentation always take precedence over generic information in this manual.



Contents

Section	Title	Page
1	About This Manual	4
2	Safety Information	5
3	Product Overview	6
4	Measurement Principle and Performance	8
5	Technical Specifications	9
6	Receiving, Inspection and Storage	11
7	Analyzer Components and Controls	12
8	Installation and Sample Connections	15
9	Electrical Connections and Communications	19
10	Start-up and Commissioning	20
11	User Interface and Menu Structure	21
12	Routine Operation	24
13	Calibration and Verification	25
14	Sensing Tape, Humidifier and Optical Maintenance	28
15	Routine Maintenance	30
16	Troubleshooting	32
17	Shutdown, Storage and Disposal	34
18	Warranty and Technical Support	35
Appendix A	Quick Start Checklist	36
Appendix B	Keypad and Menu Reference	37
Appendix C	Calibration and Verification Record	38
Appendix D	Maintenance Log	39
Appendix E	Suggested Spare Parts	40
Appendix F	Available Options	41
Appendix G	Engineering Drawings	42



1. About This Manual

1.1 Purpose

This manual provides the information required to receive, inspect, install, connect, commission, operate, calibrate, maintain, store and troubleshoot the Blue Dragon 810H2S-P Portable Hydrogen Sulfide Tape Analyzer. It covers the base portable analyzer and identifies functions that may be optional or order-specific.

1.2 Intended Audience

- Instrumentation and electrical technicians responsible for power, signals and sample connections.
- Process, laboratory and environmental personnel responsible for H₂S monitoring and result interpretation.
- Operators trained in toxic-gas handling, calibration-gas use and the site permit-to-work system.
- Maintenance personnel responsible for sensing-tape replacement, humidifier service, filter cleaning and external inspection.

1.3 Configuration Control

The 810H2S-P can be supplied with different measuring ranges, power inputs, alarms, outputs, communications and sample-conditioning accessories. Menus for functions that are not installed may be unavailable or shown in a disabled state. The nameplate, factory test report and option sheets supplied with the analyzer govern.

1.4 Terminology

Term	Meaning
H ₂ S	Hydrogen sulfide.
ppb / ppmv	Parts per billion / parts per million by volume.
Full scale	Upper value of the configured measuring range and output scaling.
Lead-acetate tape	Chemically treated sensing medium that darkens in response to H ₂ S.
Field reference	Stored correction factor resulting from field calibration.
Tape advance	Controlled movement of clean tape into the detector after a measurement interval or RESET command.
General purpose	Non-hazardous, non-classified installation area.
SCFH	Standard cubic feet per hour; the source manual specifies 0.3 SCFH typical sample flow.



2. Safety Information

WARNING

Hydrogen sulfide is acutely toxic and may be flammable. Review the sample composition, pressure, temperature and applicable site controls before connecting or operating the analyzer.

2.1 General-Purpose Area Limitation

The standard 810H2S-P portable configuration is intended for General Purpose, non-hazardous locations only. Do not use the analyzer in a classified hazardous area unless a separately engineered and certified configuration has been supplied and approved by the responsible site authority.

2.2 Electrical Safety

- Installation and servicing shall be performed by qualified personnel in accordance with local electrical codes and site procedures.
- Provide an accessible external disconnect and suitable overcurrent protection for the delivered AC or DC power configuration.
- Isolate power before opening the cabinet, connecting or disconnecting wiring, changing internal modules or performing service.
- Do not disconnect powered equipment in an area that may contain flammable gas.
- Do not attempt internal electronic repair unless specifically authorised. Return the unit to Blue Dragon Technology or an authorised service centre for repair.

2.3 Sample-Gas and Vent Safety

- Use 316 stainless-steel sample tubing unless the application review specifies another material.
- Vent the analyzer outlet to a safe atmospheric-pressure location. The vent shall have no backpressure at any time.
- Never block, cap or throttle the vent. Backpressure can cause erratic response and non-uniform tape darkening.
- Use a regulator suitable for the sample pressure and gas composition. The analyzer sample inlet is not a substitute for a plant pressure-reduction system.
- Before loosening a fitting or opening sample equipment, isolate, depressurise, purge and verify the line is safe.

2.4 Chemicals and Consumables

- Wear suitable eye protection and gloves when handling sensing tape, humidifier solution or contaminated sample components.
- The humidifier uses 5% acetic-acid solution. Use only the approved solution; other liquids can damage the membrane tubing.
- Lead-acetate sensing tape and used tape may be regulated waste. Follow the applicable safety data sheet and local disposal rules.
- Calibration gas shall be handled using the cylinder, regulator, ventilation and gas-detection controls required by the site.

2.5 Mechanical and Thermal Precautions

- Keep the analyzer upright and stable during use, transport and humidifier service.
- Allow hot components to cool before service and avoid contact with energised or heated parts.
- Do not operate with damaged hinges, latches, electrical cables, tubing or enclosure seals.
- Obtain the required permits and apply lockout/tagout before maintenance.

CAUTION

Deviation from the specified procedure can cause personal injury, equipment malfunction or damage. Application-specific safety measures remain the responsibility of the operating organisation.



3. Product Overview

3.1 Description

The Blue Dragon 810H2S-P is a transportable industrial analyzer for selective measurement of hydrogen sulfide in gas samples. A controlled gas stream is humidified and passed tangentially across lead-acetate sensing tape. H2S darkens the tape; an LED and photodetector quantify the optical change, and the microprocessor converts the response to concentration.



Figure 1. Blue Dragon 810H2S-P Portable Hydrogen Sulfide Tape Analyzer.

3.2 Intended Applications

- Field verification and temporary monitoring of H2S in process or utility gas streams.
- Troubleshooting and cross-checking of installed online H2S analyzers.
- Laboratory or sheltered general-purpose measurement where a controlled gas sample is available.
- Low-level H2S studies requiring ppb resolution and selective lead-acetate chemistry.
- Commissioning, maintenance and process investigations in refinery, petrochemical, natural-gas and related facilities.

3.3 Standard Supply and Order-Specific Items

Category	Typical items
Base analyzer	Portable enclosure; LCD and keypad; tape deck; optical detector; manual flowmeter; humidifier; sample and vent connections; power configuration as ordered.



Category	Typical items
Operating supplies	Initial lead-acetate sensing tape and humidifier solution as specified by the order.
Documentation	Operation manual; factory test report; packing list; calibration or configuration records.
Order-specific / optional	Battery, alarms, isolated 4-20 mA, RS232/RS485 communications, range change, auto calibration, electronic flowmeter, bottle regulator, liquid-removal filter, heater or other sample-conditioning hardware.

3.4 Functional Architecture

810H2S-P Measurement and Sample-Handling Architecture

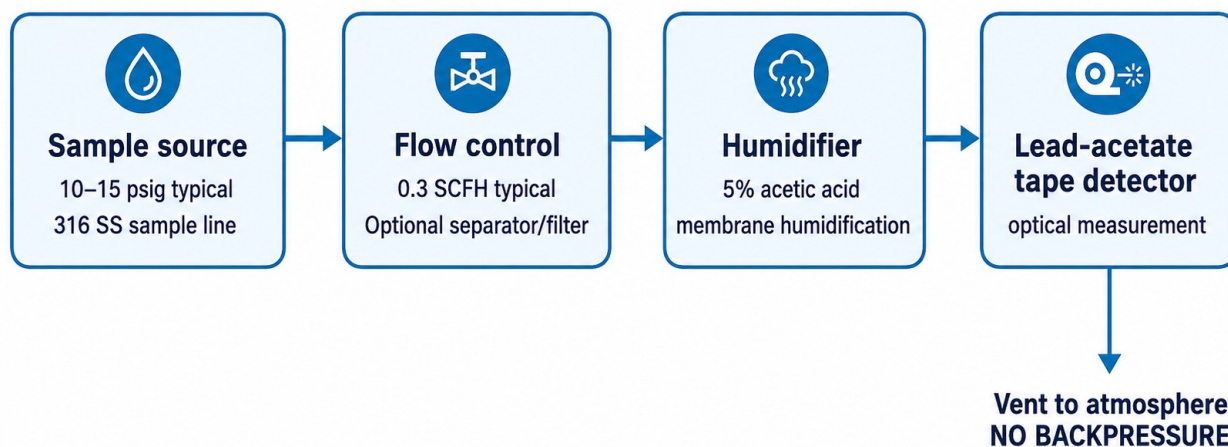


Figure 2. Measurement and sample-handling architecture.

NOTE

Direct ambient-air sampling requires a suitable pump or sampling accessory. The base documentation assumes a pressure-fed gas sample and a vent at atmospheric pressure.



4. Measurement Principle and Performance

4.1 Lead-Acetate Tape Detection

Hydrogen sulfide reacts with the lead-acetate chemistry on the sensing tape and produces a darkened spot. The optical system measures the rate and degree of darkening. The source documentation identifies three principal characteristics: sulfur-selective response, linear tape darkening with H₂S concentration, and parts-per-billion sensitivity.

4.2 Measurement Fundamentals

- The sample passes tangentially across the sensing tape, reducing sensitivity to tape-substrate porosity variation.
- The measured signal is generated by H₂S concentration; normal operation is not based on total sample volume passing through the tape.
- Spectral matching of the LED, tape and detector is used to improve optical coupling and signal quality.
- Signal oversampling and digital processing support statistical detection and reduce offset effects commonly described as drift.
- Full floating-point processing is used for concentration calculations.
- Local function keys, plain-language status messages, diagnostics and alarms support operation and fault identification.
- The linear response permits straightforward single-point span calibration.

4.3 Performance Characteristics

Parameter	Published base specification	Qualification
Resolution	1 ppb	Display / analytical resolution stated in the source manual.
Accuracy	±2% of full scale	Applies under specified factory/reference conditions; application verification is required.
Repeatability	±1% of full scale	Reference-condition specification.
Linearity	±1% of full scale	Reference-condition specification.
Drift	Nil	Source-manual statement; verify zero and span under the actual application and quality procedure.
Temperature coefficient	0.01% of full scale per °C	Source-manual value.
Analysis time	1 second	Internal analysis/update time; total response also depends on sample transport.
Chemical interference	No interference stated in source manual	The source manual states that no chemical interference was identified for the lead-acetate reaction. Confirm unusual contaminants and the complete gas matrix during application review.

IMPORTANT

The measurement range is order-specific. The serial-number label, factory test report and Unit Info screen govern the configured full-scale value.



5. Technical Specifications

5.1 Analyzer

Parameter	Specification
Product	Blue Dragon 810H2S-P Portable Hydrogen Sulfide Tape Analyzer
Measurement principle	Lead-acetate sensing tape with LED/photodetector optical measurement
Display	Alphanumeric LCD, 128 × 64 pixels
Operating temperature	0 to 50 °C
Storage temperature	0 to 70 °C
Resolution	1 ppb
Accuracy	±2% of full scale
Repeatability	±1% of full scale
Linearity	±1% of full scale
Drift	Nil stated in source manual; field verification required
Temperature coefficient	0.01% of full scale per °C
Analysis time	1 second
Area classification	General Purpose, non-hazardous locations only for the portable configuration
Approximate weight	10 lb / 4.5 kg
Approximate dimensions	10.5 in W × 12.5 in H × 6.5 in D / 267 × 318 × 165 mm
Analog output	Isolated 4-20 mA, when installed
Digital I/O	Up to 14 digital outputs and 6 digital inputs, configuration dependent
Communications	RS232 or RS485/Modbus; factory-specific ASCII serial protocol may be available

5.2 Power Configurations

Configuration	Base power requirement
110 V AC	110 V AC, 50/60 Hz, approximately 0.050 A / 5 W
220 V AC	220 V AC, 50/60 Hz; exact current from the delivered nameplate
12 V DC	12 V DC, approximately 0.2 A / 2.4 W
24 V DC	24 V DC, approximately 0.1 A / 2.4 W

CAUTION

Only one power configuration is installed in a given analyzer. Verify the nameplate before energising the unit; do not infer the supply from this manual.

5.3 Sample Connections and Operating Setpoints

Item	Base guidance
Sample inlet	1/8 in tube fitting; 316 stainless-steel sample line recommended



Item	Base guidance
Analyzer vent	1/4 in connection; vent to atmospheric pressure with no backpressure
Sample inlet pressure	10-15 psig typical; set the analyzer gauge to approximately 9 psig when the supplied regulator arrangement is used
Maximum inlet pressure	100 psig unless a separate upstream pressure regulator is used
Sample flow	0.3 SCFH typical on the manual flowmeter scale
Speed loop / sweep	A 10-20 psig differential can support rapid sweep flow; connect excess sample to an approved flare or low-pressure point through a check valve



6. Receiving, Inspection and Storage

6.1 Receiving Inspection

1. Inspect the shipping container for impact, crushing, water entry or tampering before opening.
2. Check the analyzer, accessories, operating supplies, manual, factory test report and packing list.
3. Inspect the enclosure, handle, hinges, viewing panel, display, keypad, flowmeter, fittings, tubing and power cable for damage.
4. Open the front panel and confirm that the tape deck, hubs, detector block and internal assemblies are secure.
5. Confirm that the model, serial number, range and power configuration match the order.
6. Report shortages or damage before operation. Retain the packaging for transport or warranty evaluation.

6.2 Storage Before Use

- Store the analyzer upright in a clean, dry, secure, non-hazardous location.
- Protect the LCD, viewing panel, fittings and flowmeter from impact, dust, direct sunlight, condensation and corrosive vapours.
- If the humidifier has been filled, keep the analyzer upright and prevent freezing or overheating.
- Store sensing tape sealed and protected from contamination; store humidifier solution according to its safety data sheet.
- For extended storage, isolate power and sample connections and follow Section 17.



7. Analyzer Components and Controls

7.1 Front Panel and Tape Deck

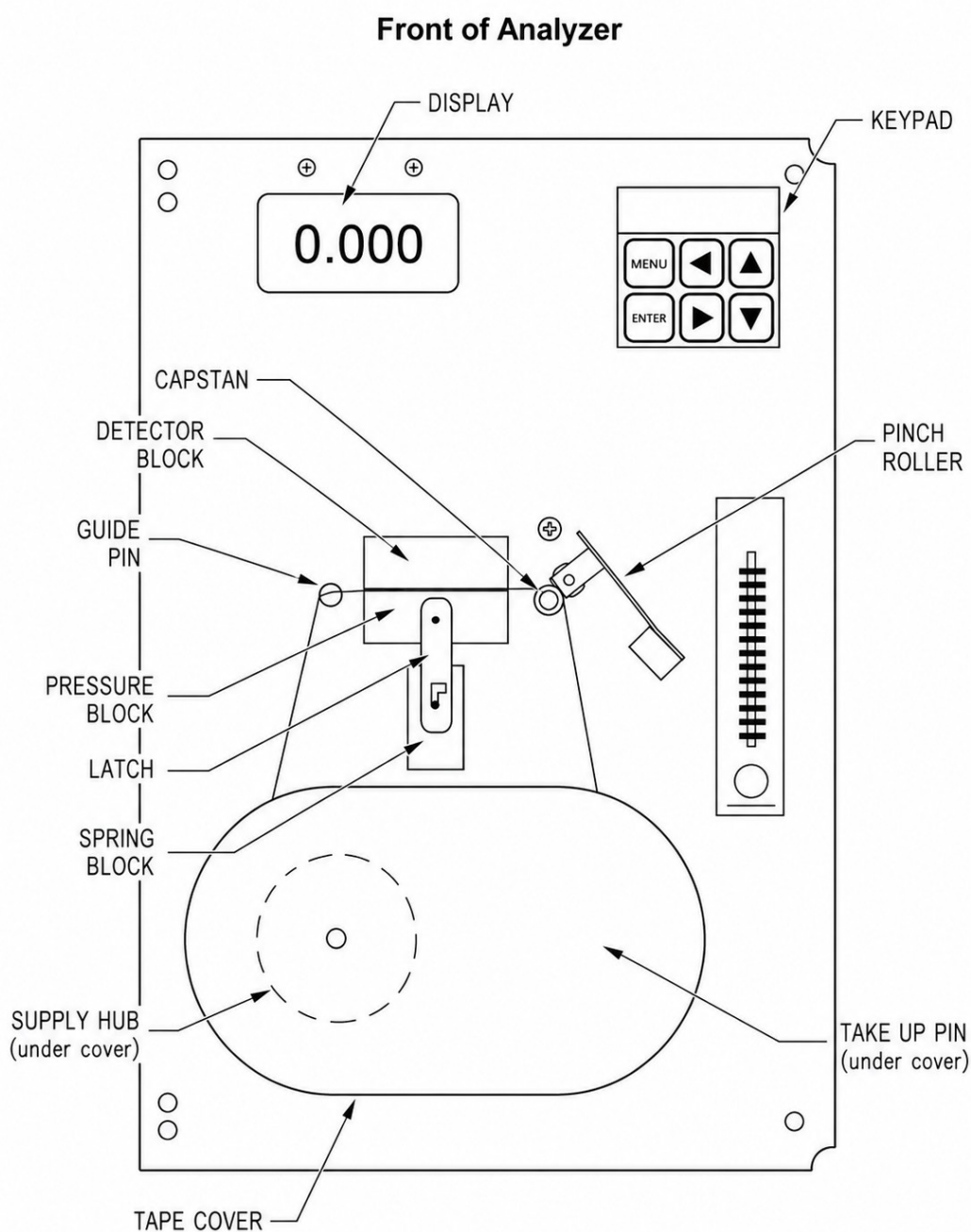


Figure 3. Front-of-analyzer component drawing.

Component	Function
Display	Shows concentration, units, date/time, calibration status, alarms and menu information.
Keypad	MENU, ENTER and four arrow keys provide menu navigation and data entry.
Pinch roller	Applies pressure to support tape movement by the capstan.
Capstan	Advances sensing tape through the detector/pressure blocks and toward the take-up hub.
Detector block	Contains the photodetector used for optical signal measurement.
Guide pins	Guide the sensing tape from the supply roll through the detector path.



Component	Function
Tape cover	Protects and retains the sensing-tape supply and used-tape path.
Supply hub	Holds the unused tape roll.
Take-up hub	Collects the used tape.
Pressure block	Provides the red LED illumination source and closes the optical measurement path.
Spring block / latch	Locks the pressure block open while loading tape.
Flowmeter	Measures and controls incoming sample flow.

7.2 Rear of Tape-Deck Panel

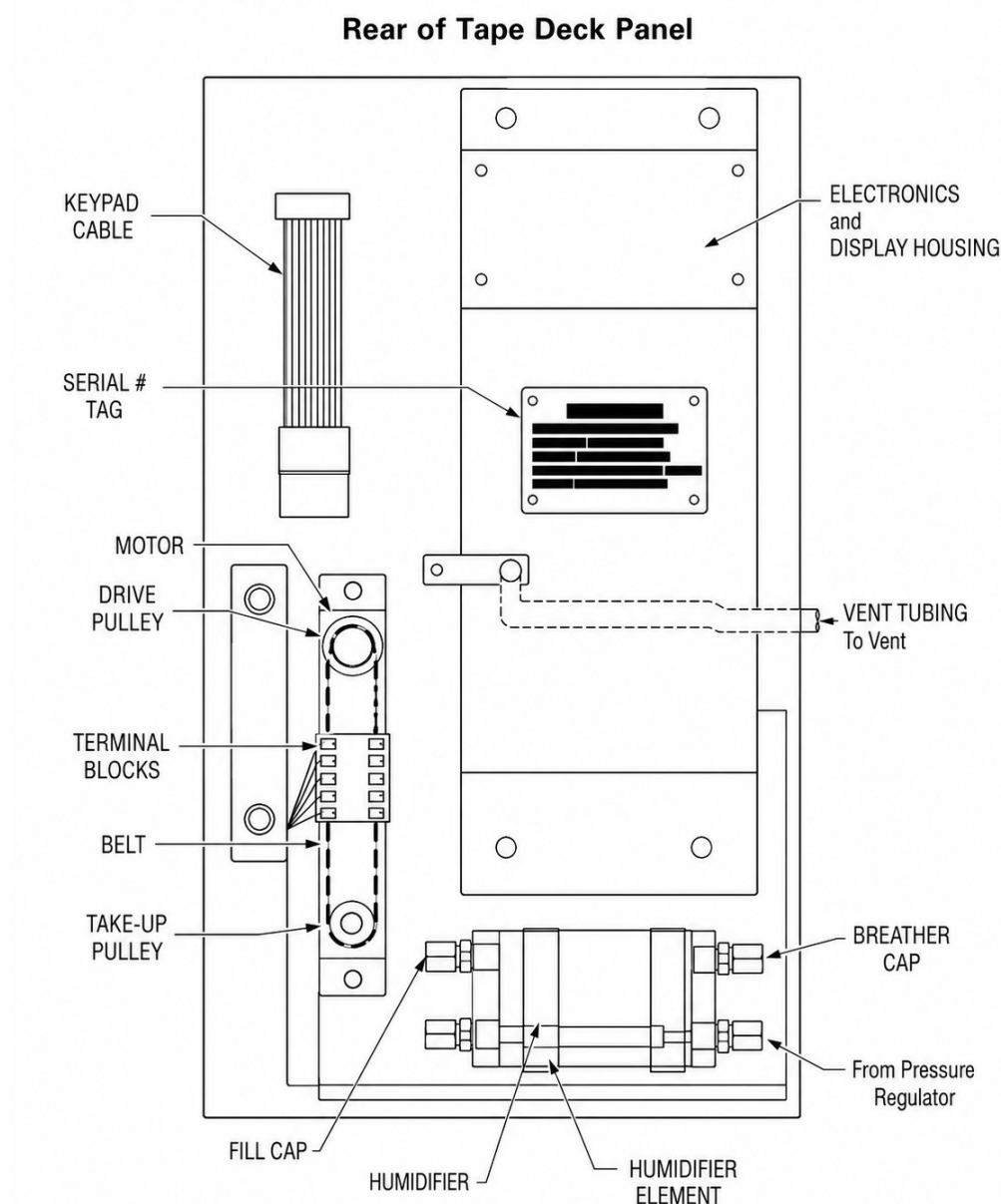


Figure 4. Rear-of-tape-deck panel drawing.

Component	Function
Motor and drive pulley	Provide motion for tape advance.
Drive belt and take-up pulley	Transmit motor rotation to the take-up hub.



Component	Function
Terminal blocks	Provide internal field and component wiring connections.
Humidifier	Conditions the incoming sample using 5% acetic-acid solution and membrane tubing.
Fill cap	Opening used to fill or remove humidifier solution.
Breather cap	Allows air entry while limiting solution leakage when the unit is handled upright.
Serial-number label	Identifies model, serial number, range, power and configuration.
Vent tubing	Carries sample gas from the detector to the atmospheric-pressure vent.

7.3 External Connections

Connection	Function
Sample In	Connection for the regulated sample-gas line.
Vent	Atmospheric-pressure outlet after the detector; must remain unrestricted.
Power	AC or DC input as identified on the nameplate.
Signal / output housing	Order-specific alarm, loop and communications connections.
Optional battery / power housing	Installed only when included in the ordered configuration.



External Connections and Port Identification

Blue Dragon 810H2S-P Portable Hydrogen Sulfide Tape Analyzer



Figure 4A. External connection and port-identification reference. Connector style and arrangement are configuration-dependent; the delivered nameplate and serial-number-specific drawings govern.

8. Installation and Sample Connections

8.1 Location and Orientation

- Use only in a non-hazardous, well-ventilated location suitable for the delivered enclosure and power configuration.
- Place the portable analyzer upright on a stable, level surface. Prevent tipping, vibration, direct heat and water spray.
- Provide access to the front panel, right-side fittings, power disconnect and atmospheric vent route.
- Keep the sample line as short as practical to minimise transport delay and adsorption effects.
- Confirm that a safe vent or exhaust location is available before admitting sample gas.



8.2 Fill the Humidifier

Humidifier Assembly and Fill Level

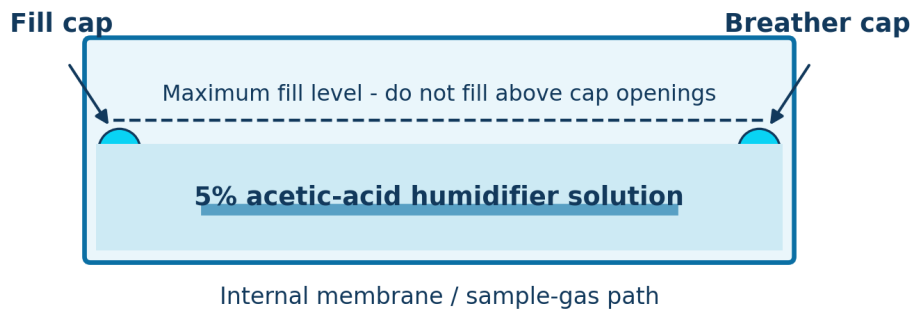


Figure 5. Humidifier assembly and maximum fill level.

1. Remove the fill cap. Do not remove the breather cap unless directed by a service procedure.
2. Using a clean fill bottle, add approved 5% acetic-acid humidifier solution through the fill opening.
3. Do not fill above the level of the fill and breather-cap openings.
4. Replace the fill cap securely. Confirm that the solution is clear and that the analyzer remains upright.

CAUTION

Filling the humidifier with any liquid other than approved 5% acetic-acid solution can permanently damage the internal membrane tubing.

8.3 Install Sensing Tape

Install a fresh roll of sensing tape before initial commissioning. Follow Figure 5A and Section 14.1. The detector requires clean white tape for the LED-calibration step.



Exact Sensing-Tape Threading Path

Blue Dragon 810H2S-P Portable Hydrogen Sulfide Tape Analyzer

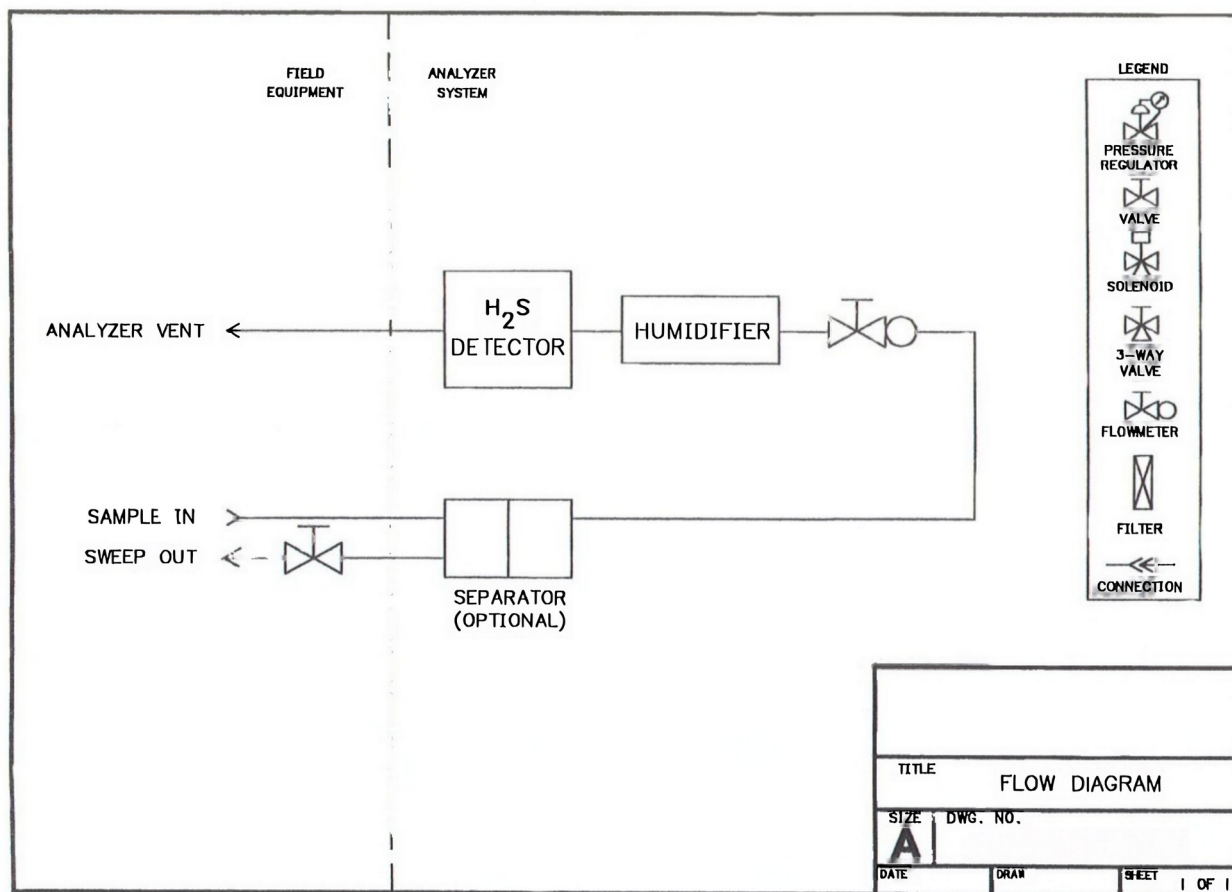


- Thread about 250 mm (10 in) of tape through the detector and guides before attaching it to the take-up hub.
- Remove slack, verify smooth untwisted tape travel, and close the pressure block fully.
- Run LED calibration on clean white tape after replacement.

Figure 5A. Exact sensing-tape threading path and component reference.



8.4 Sample and Vent Connections



Sample-flow diagram

Blue Dragon 810H2S-P | Drawing G-2

Sheet 2 of 5

Figure 6. Sample-flow arrangement. Optional separator and speed-loop components are shown.

1. Confirm that all valves, the regulator and the analyzer flowmeter are closed.
2. Connect the 1/8 in 316 stainless-steel sample line to SAMPLE IN and tighten using approved tubing practices.
3. Connect the 1/4 in analyzer vent to a safe atmospheric-pressure discharge. Do not connect it to a pressurised header.
4. When a sweep/speed loop is supplied, connect excess sample to the approved flare or low-pressure point through a check valve.
5. Open the sample isolation valve gradually and adjust the regulator to approximately 9 psig at the analyzer gauge.
6. Open the sample flowmeter and adjust to 0.3 SCFH.
7. Leak-check all connections and confirm unobstructed vent flow before placing the analyzer online.

WARNING

Do not proceed when sample flow or safe venting cannot be confirmed. Isolate the sample and correct the installation.



9. Electrical Connections and Communications

9.1 Power Connection

Verify the analyzer nameplate and the project wiring drawing before connection. Provide a user-supplied external switch/disconnect and suitable circuit protection. Keep power wiring separated from low-level detector, communication and analog-output wiring.

9.2 Analog Output and Alarms

An isolated 4-20 mA loop and alarm outputs may be installed. The configured full scale determines loop scaling. Alarm count, contact arrangement, rating and latching behaviour are option-specific; use the delivered wiring diagram and option sheet.

9.3 Digital Communications

Interface	Base information
RS232	Point-to-point serial communications through the order-specific connector/wiring.
RS485	Multi-drop serial interface; Modbus RTU may be configured.
Modbus settings	Mode, channel, slave address, baud rate and data format are set in Unit Info > Settings > Modbus.
ASCII protocol	A factory-specific ASCII protocol may be available; use the protocol file supplied with the order.

NOTE

Connector pin assignments and register maps can vary with electronics revision and installed options. The serial-number-specific drawing and protocol file govern.

9.4 Wiring Drawings

The engineering drawing set in Appendix G includes the base control-PCB field wiring and display/keypad/communications wiring. Internal board-level service is reserved for authorised personnel.



10. Start-up and Commissioning

10.1 Pre-start Checks

Check	Acceptance
Location	General-purpose area; analyzer upright, stable and accessible.
Power	Nameplate voltage confirmed; external disconnect and protection installed.
Humidifier	Filled with approved solution below maximum level; no leakage.
Sensing tape	Fresh tape correctly threaded; pressure block closed; tape cover installed.
Sample line	Correct material and pressure; leak-free connections.
Vent	Open route to safe atmospheric pressure; no restriction or backpressure.
Flow controls	Regulator and flowmeter initially closed.
Options	Alarm, loop and communications wiring verified against project drawings.

10.2 Power-on

1. With the sample isolated, energise the analyzer using the external disconnect.
2. Confirm that the Blue Dragon title screen appears and the tape motor operates briefly.
3. Wait approximately 10 seconds for the measurement/status screen.
4. Enter the CLOCK menu and set the correct date and time.
5. Review UNIT INFO and confirm model, serial number, software revision and full-scale range.
6. Perform the LED calibration in Section 14.3 before admitting sample gas.

10.3 Establish Sample Flow

1. Place the Online/Manual Calibration valve in the ONLINE position when fitted.
2. Open the sample isolation valve gradually.
3. Adjust the pressure regulator to approximately 9 psig at the analyzer gauge.
4. Adjust the flowmeter to 0.3 SCFH.
5. Confirm stable flow, unobstructed venting and no leaks.
6. Allow the sample line to purge and the reading to stabilise before recording results or setting alarms.

10.4 Commissioning Record

Record the serial number, configured range, power supply, output scaling, communication settings, alarm setpoints, calibration gas and acceptance results using Appendix C and the project commissioning documents.



11. User Interface and Menu Structure

11.1 Keypad

Key	Function
MENU	Opens the main menu and returns to the main menu from submenus; also functions as ESCAPE.
ENTER	Selects a menu item and saves entered values.
UP / DOWN	Move the cursor vertically; increase or decrease a selected value; adjust display contrast from the status screen.
LEFT / RIGHT	Move the cursor between fields or digits; may adjust display brightness on colour-display configurations.

11.2 Status Screen

After power-up, the status screen shows the measured H₂S concentration, engineering unit, last-calibration date and current status. The status line can show STATUS OK or diagnostic/alarm information. Press MENU to open the main menu.

Editable operator-screen reference - measurement and status

Normal measurement / status

```
0.000      PPMV
LAST CAL MO/DY  00/00
STATUS          OK
MENU = ESCAPE
```

Calibration active status

```
0.000      PPMV
LAST CAL MO/DY  00/00
STATUS          MANUAL CAL
                  ALMS DISABLED
MENU = ESCAPE
```

11.3 Main Menu

Editable operator-screen reference - main menu

Main menu

```
xRESET      MAN CAL
STATUS       AUTO CAL
ALARMS       LOOP CAL
CLOCK        UNIT INFO
SETUP        GRAPHICS
MENU = ESCAPE
ENTER = SELECT
```

Status page / event-log access

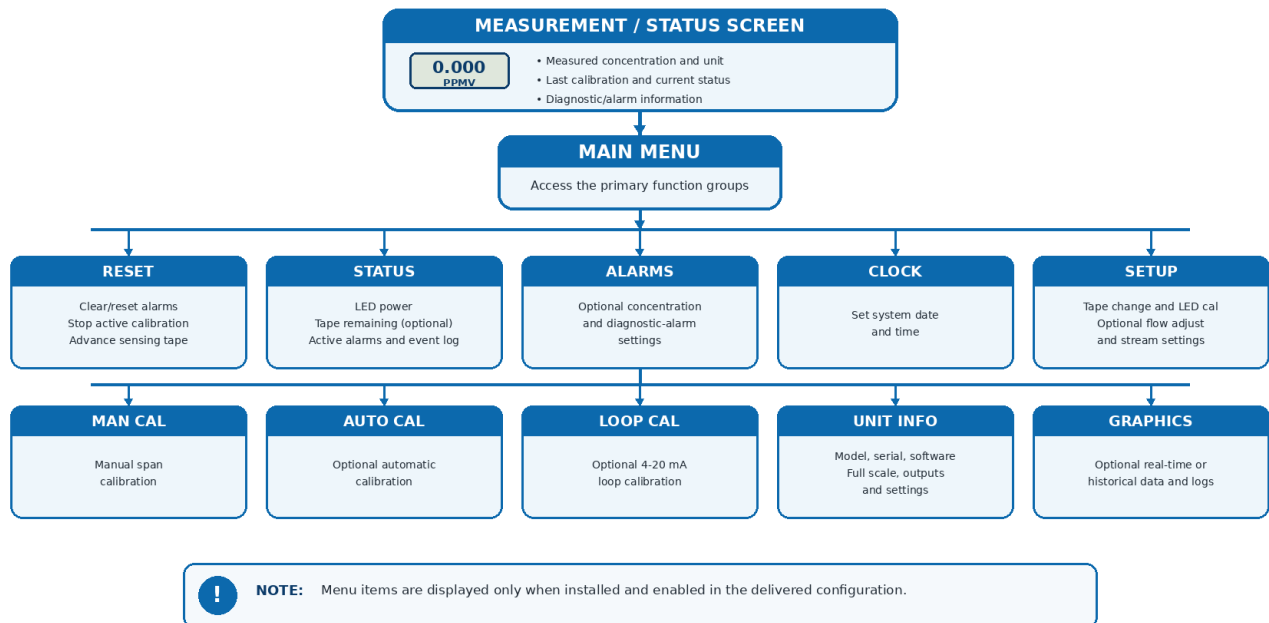
```
STATUS
XX.X DAYS TAPE LEFT
LED POWER      xx%
xEVENT LOG
MENU = ESCAPE
ENTER = SELECT
```

Event log

```
EVENT LOG
POWER      ON
           MM/DD HH:MM
ALARM 1    ON
           MM/DD HH:MM
NEXT       PREV
MENU = ESCAPE
```

Clock

```
CLOCK      MM/DD/YY HH:MM
IN USE     00/00/00 00:00
UPDATE     xx/xx/xx  xx:xx
MENU = ESCAPE
ENTER = SELECT
```

**Figure 7 Main Menu Structure***Figure 7. Main menu structure. Optional functions appear only when installed.*

Menu	Function
RESET	Clears/reset alarms, stops an active calibration and advances the sensing tape.
STATUS	Displays LED power, tape remaining when fitted, active alarms and the event log.
ALARMS	Configures optional concentration or diagnostic alarms.
CLOCK	Sets the system date and time.
SETUP	Provides tape-change, LED-calibration, flow-adjust and stream-setting functions.
MAN CAL	Sets and starts manual calibration using a known H2S standard.
AUTO CAL	Sets and starts optional automatic calibration.
LOOP CAL	Calibrates equipment connected to an optional 4-20 mA loop.
UNIT INFO	Shows model, serial number, software revision, full scale, outputs and advanced settings.
GRAPHICS	Displays optional real-time or historical data and log functions.

11.4 Setup and Unit Information

Editable operator-screen reference - setup and unit information

**Setup**

XTAPE CHANGE
LED CAL
FLOW ADJUST
STREAM SETTINGS

MENU = ESCAPE
ENTER = SELECT

Tape change

XX.X DAYS REMAIN

TAPE REPLACED xN
ALARM AT x.x DAYS

MENU = ESCAPE
ENTER = SELECT

Unit information - page 1

UNIT INFO PAGE 1
MODEL # 810H2S-P
SERIAL # XXXXX
DATE MFG MM/DD/YY
REV # XX

MENU = ESCAPE

Settings

SETTINGS
DISPLAY DIGITS 3
RESTORE DEFAULTS xN
LONG CALIBRATION N
MODBUS SETUP
MOTOR CAL
MENU = ESCAPE

Unit information - page 2

UNIT INFO PAGE 2
FULL SCALE XXXXX
ADVANCE INTERVAL XXXXX
OUTPUTS XXXXX
FIELD REFERENCE 1.000

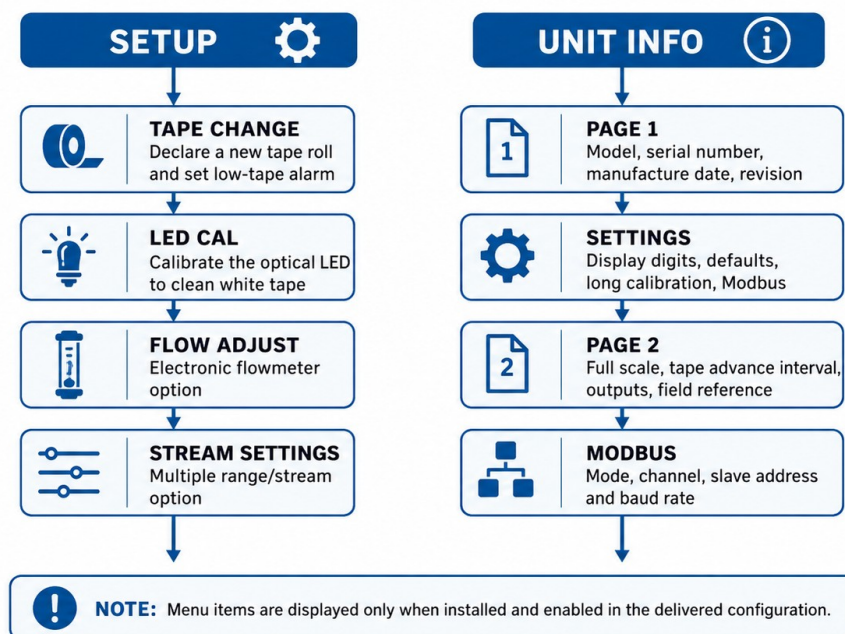
MENU = ESCAPE

Modbus setup

MODBUS SETUP
MODE XXXXX
CHANNEL XXXXX
SLAVE ADDRESS XXXXX
BAUD RATE XXXXX

MENU = ESCAPE

Screen representations are based on the documented analyzer interface and are provided for operator guidance. Menu availability, displayed units, decimal places and firmware wording may vary with the delivered configuration. The analyzer display and serial-number-specific documentation take precedence.

Figure 8 Setup and Unit-Information Menu Map*Figure 8. Setup and Unit Information menu map.***CAUTION**

The analyzer is off-line when the SETUP menu is active. If no action is taken for approximately 5-6 minutes, the analyzer may return automatically to online measurement.



12. Routine Operation

12.1 Normal Measurement

1. Confirm the sample valve is ONLINE, pressure is approximately 9 psig and flow is 0.3 SCFH.
2. Observe the status screen and confirm STATUS OK or an understood non-critical message.
3. Check the tape path, humidifier level and vent condition during routine rounds.
4. Record the concentration only after sample transport and the displayed value have stabilised.
5. Investigate alarms, unexpected tape darkening or unstable readings before relying on the result.

12.2 Status and Event Log

The STATUS page displays LED power from the last LED calibration and up to the three highest-priority alarms. When the low-tape option is installed, estimated tape life is also shown. Select EVENT LOG to review recent power, alarm, reset and calibration events. Representative editable screen diagrams are provided in Section 11.

12.3 Alarm Handling

- Determine whether the indication is a concentration alarm, diagnostic alarm or configuration message.
- Confirm actual process conditions using the site response procedure before changing setpoints or clearing alarms.
- Correct the underlying sample, tape, optical, flow or electrical condition.
- Use RESET only after it is safe to clear the indication; RESET also advances the tape and stops an active calibration.

12.4 Range and Output Settings

When range change is installed, use only approved ranges. Range selection changes the display scale and 4-20 mA scaling. The source documentation states that responsiveness and stability are best at the range identified on the serial-number label.

12.5 Normal Shutdown

1. Isolate the sample and allow safe purge gas or clean gas to pass through when required by the site procedure.
2. Close the analyzer flowmeter and pressure regulator.
3. Use the external disconnect to remove power.
4. Depressurise and disconnect tubing only after verifying the system is safe.
5. For extended shutdown, follow Section 17.



13. Calibration and Verification

13.1 Calibration Philosophy

The analyzer is factory calibrated. The source documentation states that periodic calibration is not normally required, but field calibration may be performed when site conditions, quality procedures or comparison results justify it. Use a known H₂S standard and preserve traceability to the cylinder certificate.

13.2 Manual Calibration

Editable operator-screen reference - manual calibration

Select MAN CAL

```
RESET      xMAN CAL
STATUS     AUTO CAL
ALARMS     LOOP CAL
CLOCK      UNIT INFO
SETUP      GRAPHICS

MENU = ESCAPE
ENTER = SELECT
```

Manual calibration page

```
MANUAL CALIBRATION
xSTART      SET=FACTORY
SPAN GAS VALUE
IN USE      x.xxx
UPDATE      x.xxx
STREAM NUMBER # x
MENU = ESCAPE
ENTER = SELECT
```

Calibration in progress

```
0.000      PPMV
LAST CAL MO/DY 00/00
STATUS      MANUAL CAL
            ALMS DISABLED

MENU = ESCAPE
```

Calibration complete

```
0.000      PPMV
LAST CAL MO/DY 00/00
STATUS      CAL COMPLETE
            ALMS DISABLED

MENU = ESCAPE
```

**Figure 9 Manual Calibration Workflow***Figure 9. Manual calibration workflow.*

1. From the main menu, select MAN CAL. The cursor appears beside START.
2. Move to the UPDATE span-gas field and enter the certified H₂S concentration.
3. Press ENTER and confirm that IN USE matches the UPDATE value.
4. Connect the calibration gas and place the Online/Manual Calibration valve in the calibration position.
5. Return the cursor to START and press ENTER. The status screen indicates MANUAL CAL and alarms are disabled.
6. Wait for CAL COMPLETE. Confirm that the last-calibration date and FIELD REFERENCE update.
7. Return the valve to ONLINE and wait for the indication to return to the process value.
8. Select RESET to stop the calibration program, re-enable alarms and advance the tape.

IMPORTANT

Leaving the calibration page with MENU does not necessarily stop calibration. Use RESET to terminate the calibration program and re-enable alarms.



13.3 Restore Factory Reference

When an unsatisfactory field calibration must be removed, select SET=FACTORY in the MAN CAL page and press ENTER. The field-reference value returns to 1.000. Verify the result with a suitable standard before returning the analyzer to service.

13.4 Calibration Acceptance

Record	Minimum information
Calibration gas	Cylinder identification, certified value, balance gas, expiry date and regulator.
Analyzer	Model, serial number, range, date/time and operator.
As-found result	Displayed value and error before adjustment.
As-left result	Displayed value and error after calibration.
Field reference	Value before and after calibration.
Disposition	Accepted, repeated, serviced or removed from service.



14. Sensing Tape, Humidifier and Optical Maintenance

14.1 Sensing-Tape Replacement

A tape roll typically lasts approximately four weeks to three months, depending on concentration, advance settings and operating time. The source documentation estimates approximately six rolls per analyzer per year. Replace tape when required or when the low-tape indication is reached.

Figure 10 Sensing-Tape Replacement Workflow

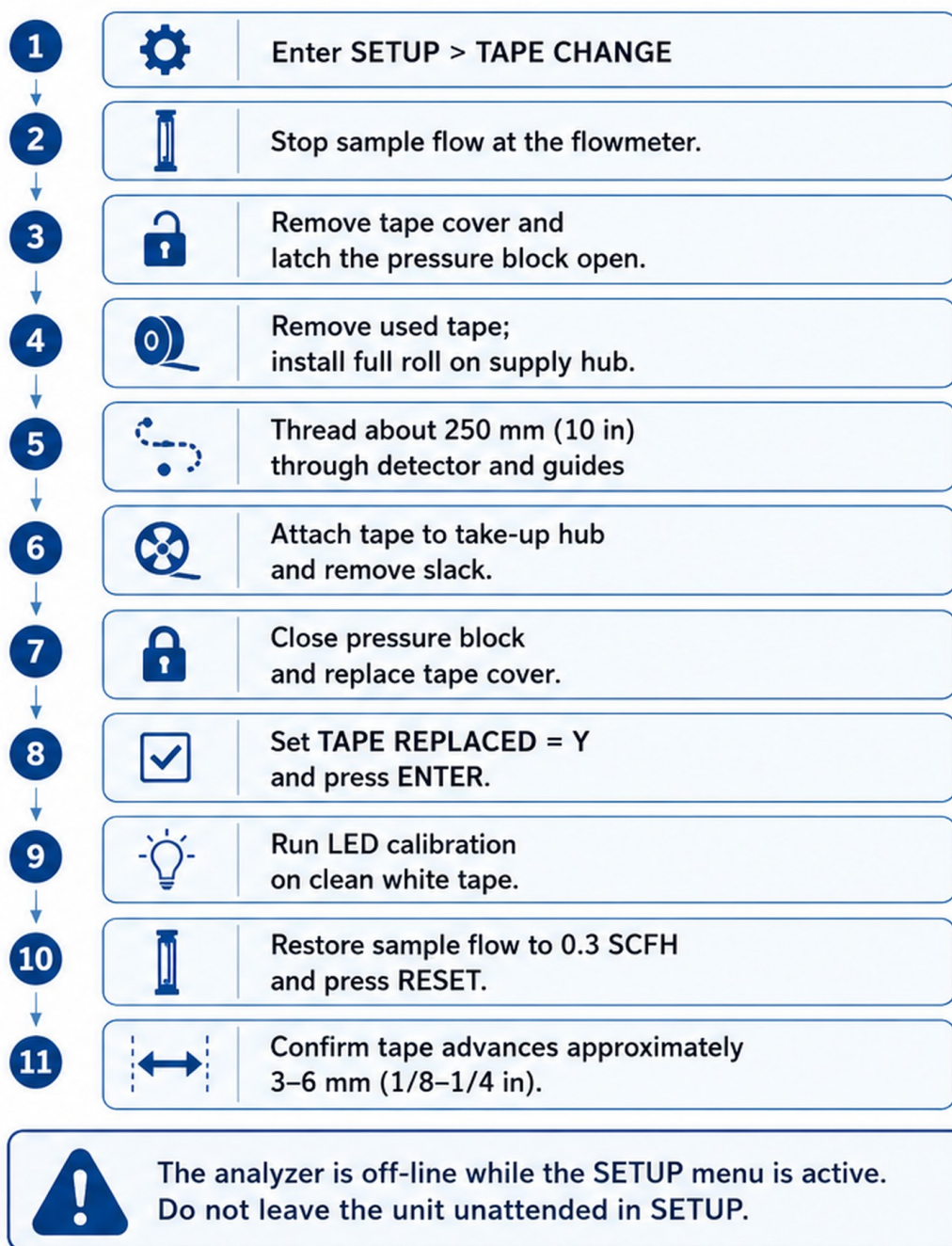


Figure 10. Sensing-tape replacement workflow.



Figure 10A. Actual sensing tape positioned through the detector and pressure-block area.

IMPORTANT

Thread the tape smoothly through the detector and guides. Ensure the pressure block snaps fully closed and the tape is free of folds, oil, moisture or contamination.

14.2 Humidifier Service

1. Inspect the solution level whenever tape is replaced and during routine rounds.
2. Top up only with approved 5% acetic-acid solution. Keep the level below both cap openings.
3. If the solution becomes cloudy, yellow or contaminated, remove it using a clean suction/fill bottle and refill with fresh solution.
4. Inspect the caps, tubing and membrane assembly for leakage or damage.
5. The source documentation estimates approximately eight quarts of solution per analyzer per year; actual use varies.

14.3 LED Calibration

Editable operator-screen reference - LED calibration

Select LED calibration

```
TAPE CHANGE
xLED CAL
FLOW
STREAM
LED POWER      xx%

MENU = ESCAPE
ENTER = SELECT
```

LED status / failure indication

```
STATUS

LED POWER      xx%
LOW LED / CAL FAIL

MENU = ESCAPE
ENTER = SELECT
```

The source manual identifies LED POWER, LOW LED and CAL FAIL indications. Exact wording and layout depend on the delivered firmware.

1. Enter SETUP. The analyzer is off-line while the menu is active.
2. Stop sample flow and confirm clean white tape is positioned in the detector.
3. Confirm that the pressure block is fully closed.
4. Select LED CAL and press ENTER when the confirmation screen appears.
5. The tape should advance approximately 1/8-1/4 in and stop.
6. Review the LED-power result. LOW LED is displayed when remaining LED power is below 20%.
7. If CAL FAIL appears, check tape position, pressure-block closure, detector cleanliness and electrical connections before repeating.
8. Restore sample flow and leave SETUP to return the analyzer online.

The source documentation identifies a detector voltage of approximately 120 ± 20 mV at the specified tape-deck terminal positions during service checks. This internal measurement is for authorised technical personnel only.

14.4 Optical Cleaning

- Isolate power and sample gas before cleaning.
- Use clean, lint-free materials suitable for the optical and tape-contact surfaces.
- Remove tape residue, dust or contamination from the detector and pressure blocks without scratching the surfaces.
- Repeat LED calibration after cleaning or component replacement.



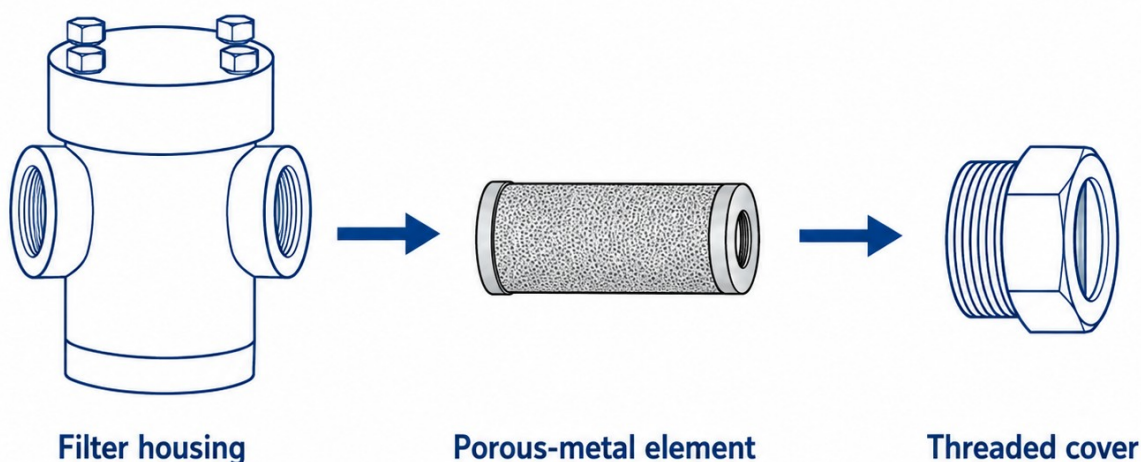
15. Routine Maintenance

15.1 Recommended Schedule

Item	Recommended interval	Action
Sensing tape	4 weeks to 3 months or as indicated	Replace roll; verify thread path; run LED calibration.
Humidifier solution	At tape change and routine rounds	Top up; replace if cloudy/yellow/contaminated.
Sample filter element	Monthly, or more often in dirty service	Inspect, clean/backflush and reinstall.
Liquid-removal filter	Periodically, when installed	Inspect membrane and replace according to the option sheet.
Flow and pressure	Each operating round	Verify approximately 9 psig and 0.3 SCFH.
Vent line	Each operating round	Confirm atmospheric discharge and no blockage.
Tape drive	At tape change / when alarmed	Press RESET; verify 1/8-1/4 in advance.
Optical LED/detector	At tape change / when LOW LED or CAL FAIL occurs	Run LED calibration; clean or replace authorised components.
Calibration gas	As required	Check cylinder pressure, certification and expiry.
Enclosure and fittings	Quarterly or site interval	Inspect hinges, latches, window, fittings, tubing and cables.

15.2 Sample Filter Element

Figure 11 Sample Filter Element - Removal and Reinstallation



**Close sample isolation valves before loosening the cover.
Clean/backflush the element and reinstall.**

Figure 11. Sample-filter element removal and reinstallation.

1. Close the inlet-sample and sweep-out isolation valves.



2. Loosen and remove the threaded filter-element cover.
3. Remove the porous-metal element, backflush/clean it and inspect for damage.
4. Reinstall the element in the cover and tighten the cover to the housing.
5. Reopen the isolation valves gradually and leak-check the assembly.

15.3 Field-Service Limits

Routine operator maintenance is limited to external inspection, consumables, sample-path items and procedures specifically described in this manual. Internal electronics, software, PCB repair and certified option modifications shall be performed only by Blue Dragon Technology or authorised service personnel.



16. Troubleshooting

16.1 Method

Begin with obvious causes and verify one segment at a time: power, sample pressure/flow, humidifier, tape drive, optical path, vent and electronics. Record the status message, error number, serial number, range and recent maintenance before requesting technical support.

16.2 Basic Checks

Area	Check
Power	Correct supply voltage, external disconnect, cable and internal power indication.
Humidifier	Correct solution level; clear solution; no leakage or damaged membrane.
Gas flow	Online valve position; approximately 9 psig; 0.3 SCFH; no leaks.
Drive motor	Press RESET and verify tape advances 1/8-1/4 in.
Pinch roller	Roller turns freely, spring is not bent and correct pressure is applied to the tape.
Illumination source	A red glow is visible when the pressure block is opened for authorised inspection; run LED calibration.
Vent	Line is open to atmosphere with no restriction or backpressure.

16.3 Indications and Corrective Actions

Indication	Probable cause	Check	Corrective action
Blurred spots on tape	Backpressure on vent	Blocked/restricted vent	Remove restriction and vent to atmospheric pressure.
Tape darkening other than spots	Sample leak	Leaks in sample flow path	Leak-check and seal connections.
Dark splotches	Pressure block out of position	Block not seated against tape	Close/seat pressure block correctly.
TAPE DARK / 9999	Low detector voltage or excessive darkening	LED operation, tape advance, H2S over range, dirty optical path	Correct tape/LED fault; remove over-range sample or use a higher range; clean optical path and recalibrate LED.
TAPE OUT / 9999	High detector voltage	Tape absent from detector or LED calibration incorrect	Install tape; verify approximately 0.120 V on clean white tape where authorised; recalibrate LED.
LED CAL FAIL	Optical adjustment at limit or unstable	Tape absent; pressure block open; weak light source; dirty/weak detector	Install tape, close block, clean optical path, replace authorised component and repeat calibration.
CAL FAIL	Automatic or manual calibration error	Calibration gas, valve position, span value and option configuration	Correct the calibration setup and repeat; consult the applicable option sheet.
OVER RANGE	H2S concentration above configured range or tape not advancing	Dark smear, tape movement, selected range	Remove the high concentration, restore tape movement or select an approved higher range.
LOW LED	Detector output approximately half normal or <20% LED power after calibration	LED calibration, light source, detector cleanliness, tape advance	Calibrate LED; clean/replace authorised optical components; verify tape movement.
SYSTEM ERROR xx	Internal electronics/software error	Record the two-digit error number	Remove the analyzer from critical service and contact technical support with the error number and serial data.



16.4 Unstable or Erratic Readings

- Confirm stable sample pressure and flow and eliminate leaks.
- Confirm the humidifier is correctly filled and not contaminated.
- Inspect the vent for backpressure and check for non-uniform tape darkening.
- Inspect the sample filter and liquid-removal option for blockage or carryover.
- Run LED calibration and inspect the tape path, pressure block and detector cleanliness.
- Compare with a certified calibration gas or independent method before changing calibration.



17. Shutdown, Storage and Disposal

17.1 Short-Term Shutdown

1. Isolate the process sample and apply purge gas when required by the application.
2. Close the analyzer flowmeter and pressure regulator.
3. Remove power using the external disconnect.
4. Leave the analyzer upright and protect the sample and vent fittings from contamination.

17.2 Extended Storage

1. Isolate, depressurise and disconnect the sample and vent lines.
2. Remove or drain humidifier solution when freezing, leakage or long storage is possible; rinse only according to approved service guidance.
3. Remove used sensing tape and clean accessible tape-contact surfaces.
4. Seal fittings, protect the viewing panel and store the analyzer upright in its transport packaging.
5. Before recommissioning, inspect, refill the humidifier, install fresh tape, perform LED calibration and complete the start-up checklist.

17.3 Disposal

- Dispose of used lead-acetate tape, contaminated filters and humidifier solution according to the applicable SDS and local regulations.
- Depressurise gas cylinders and return or dispose of them through the authorised supplier.
- Treat electronics, batteries and electrical components as regulated e-waste where required.
- Decontaminate sample-wetted components before shipment or disposal and provide the required declaration.



18. Warranty and Technical Support

18.1 Warranty

The standard warranty is 12 months unless the sales contract states otherwise. The warranty may be affected by unauthorised repair, incorrect power, operation outside the supplied area classification, blocked venting, incompatible chemicals, improper sample pressure, non-approved consumables, accidental damage or failure to follow the maintenance requirements.

18.2 Information Required for Support

Information	Where to find it
Model and serial number	Internal or external serial-number label and Unit Info screen.
Range and engineering unit	Serial-number label, factory test report and Unit Info full-scale page.
Power configuration	Nameplate and order confirmation.
Software revision	Unit Info page.
Status / error message	Status screen and event log.
Application conditions	Gas composition, pressure, temperature, expected H ₂ S range, flow and vent arrangement.
Recent actions	Tape change, humidifier service, calibration, cleaning, power event or option change.
Photos / records	Tape pattern, front panel, connections, calibration record and wiring drawing when safe to provide.

18.3 Contact

Contact Blue Dragon Technology or the authorised regional representative identified on the sales documentation. Product information and contact channels are available at [bluedragontechnology.com](https://www.bluedragontechnology.com)



Appendix A. Quick Start Checklist

- ☐ General-purpose location confirmed; analyzer upright and stable.
- ☐ Nameplate voltage verified; disconnect and overcurrent protection installed.
- ☐ Humidifier filled with approved 5% acetic-acid solution below maximum level.
- ☐ Fresh sensing tape correctly threaded; pressure block closed; tape cover installed.
- ☐ Sample line connected to SAMPLE IN using approved tubing and fittings.
- ☐ Vent connected to a safe atmospheric-pressure location with no backpressure.
- ☐ Analyzer powered; title and status screens normal; date/time set.
- ☐ Model, serial number and full-scale range verified in UNIT INFO.
- ☐ LED calibration completed successfully on clean white tape.
- ☐ Sample regulator adjusted to approximately 9 psig.
- ☐ Sample flow adjusted to 0.3 SCFH.
- ☐ Leak test completed; vent flow confirmed.
- ☐ Calibration/verification completed when required.
- ☐ Alarm, loop and communication settings recorded.
- ☐ Commissioning result accepted and signed.



Appendix B. Keypad and Menu Reference

Control / menu	Operator reference
MENU	Open main menu; escape/back to main menu.
ENTER	Select item; save changed value.
UP / DOWN	Move cursor; change selected value; adjust status-screen contrast.
LEFT / RIGHT	Move between digits/fields; adjust brightness on applicable display.
RESET	Clear/reset alarms; stop calibration; advance tape.
STATUS	Review LED power, tape remaining, alarms and event log.
ALARMS	Set/enable/disable optional alarms.
CLOCK	Set year, month, day, hour and minute.
SETUP > TAPE CHANGE	Declare replacement tape and set low-tape threshold.
SETUP > LED CAL	Calibrate optical LED on clean white tape.
SETUP > FLOW ADJUST	Configure optional electronic flowmeter.
SETUP > STREAM SETTINGS	Configure optional multiple ranges/streams.
MAN CAL	Set span-gas value and start manual calibration.
AUTO CAL	Optional automatic calibration scheduling and functions.
LOOP CAL	Optional 4-20 mA loop calibration.
UNIT INFO	Review model, serial, software, settings, full scale, outputs and field reference.
GRAPHICS	Optional real-time, detail, summary and saved log functions.



Appendix C. Calibration and Verification Record

Field	Entry
Analyzer model	810H2S-P
Serial number	
Configured range / unit	
Location / application	
Date and time	
Operator	
Calibration gas ID	
Certified concentration	
Balance gas	
Cylinder expiry	
Regulator / delivery pressure	
As-found reading	
As-found error	
Field reference before	
Calibration performed	Yes / No
As-left reading	
As-left error	
Field reference after	
Status / alarms normal	Yes / No
Disposition / comments	
Reviewed by	



Appendix D. Maintenance Log

Date	Operating hours / condition	Maintenance performed	Parts / consumables	Technician	Next due



Appendix E. Suggested Spare Parts

The following items are identified in the source documentation as typical spares for one year of operation. Final quantities and part numbers shall be confirmed against the delivered serial number and installed options.

Description	Recommended quantity (confirm by serial number)	Blue Dragon / OEM part number (order-specific)
Pressure-block assembly		
Detector-block assembly		
Humidifier assembly		
Keypad		
Pinch-roller assembly		
Tape motor		
Drive belt		
Flowmeter		
Cabinet heater (optional)		
Power module		
Display module		
15 psig pressure gauge		
Relay module (optional alarms)		
Flangeless nut		
Flangeless ferrule		
Three-way ball valve		
Cut-off valve		
Solenoid valve (optional auto calibration)		
Humidifier fill-plug cap		
Electronics assembly		
1/8 in sample-line nut		
Large terminal blocks		
1/8 in Teflon tubing		
1/8 in sample-line ferrule		



Appendix F. Available Options

The following functions are identified as available options in the source documentation. Availability, compatibility and certification depend on the ordered configuration. Separate option instructions may be supplied.

Option	Purpose
Isolated 4-20 mA output loop	Analog concentration output and loop calibration.
Diagnostic alarm	System-condition alarm output.
Concentration alarms	User-configurable high/low concentration outputs.
Low-tape alarm	Estimated tape remaining and low-tape indication.
Electronic flowmeter with alarm	Electronic flow measurement, adjustment and low/high flow alarm.
Data communications	RS232, RS485/Modbus and order-specific serial protocol.
Analysis/data software	Order-specific PC software or data integration package.
Range change	Multiple approved full-scale ranges or streams.
Automatic calibration	Timed or commanded calibration sequence with optional valves.
Chart recorder / logging	Analog recording or optional internal graphical/logging functions.
Bottle regulator	Calibration-gas cylinder pressure regulation.
Liquid-removal filter	Protection against entrained liquids in the gas sample.
Cabinet heater	Temperature support for approved low-temperature installations.

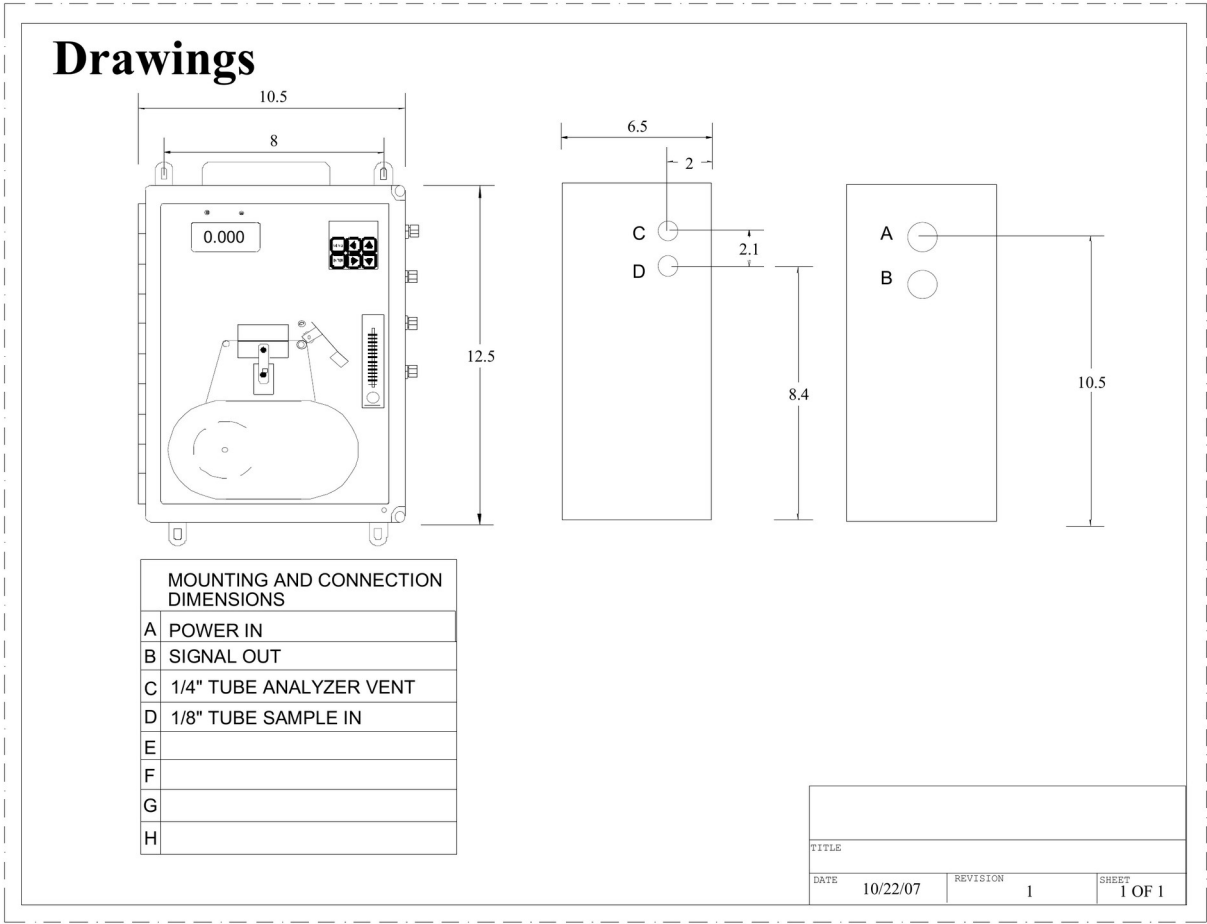


Appendix G. Engineering Drawings

NOTE

These drawings are reproduced from the source manual for reference in this publication release. Exact vector restoration is planned for a later revision. The serial-number-specific drawings supplied with the analyzer take precedence.

G.1 Mounting and connection dimensions



Mounting and connection dimensions

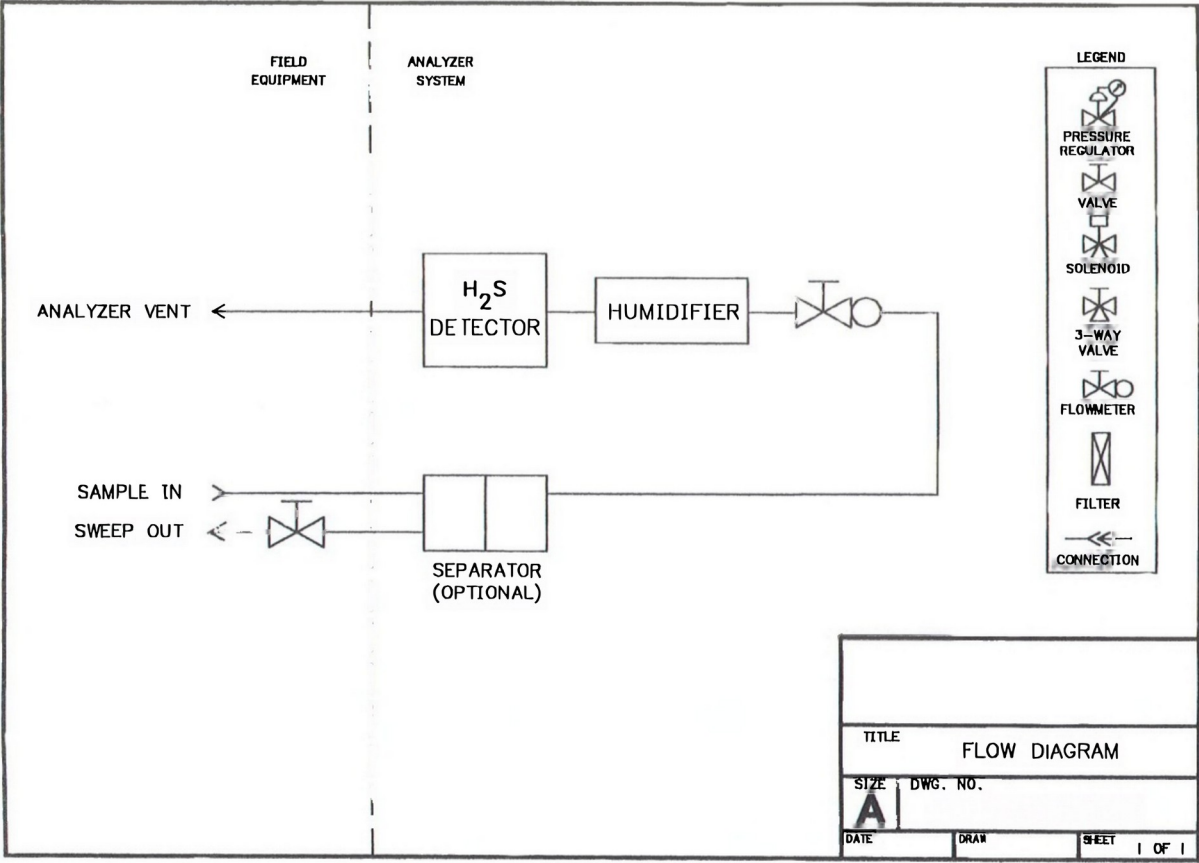
Blue Dragon 810H2S-P | Drawing G-1

Sheet 1 of 5

Drawing G-1. Mounting and connection dimensions.



G.2 Sample-flow diagram



Sample-flow diagram

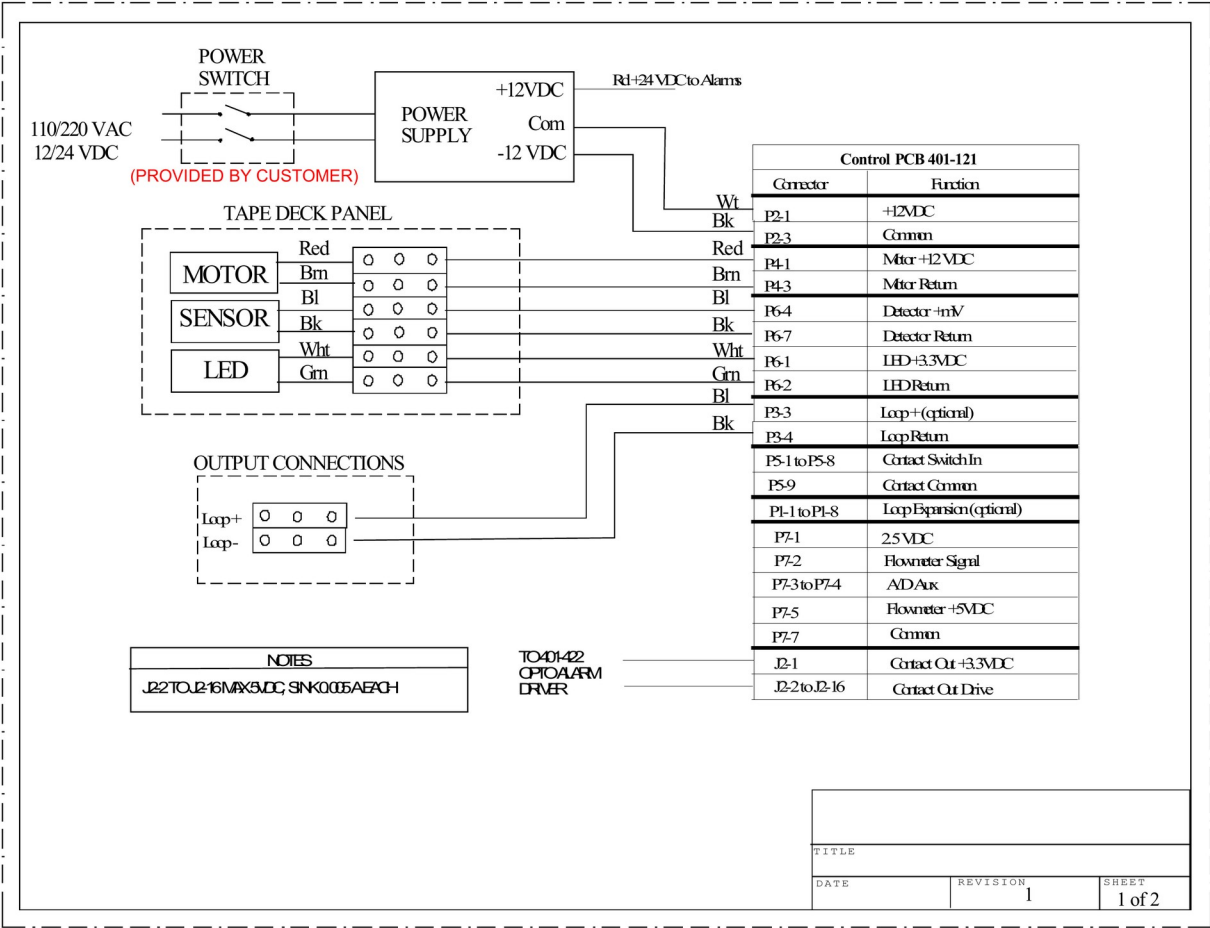
Blue Dragon 810H2S-P | Drawing G-2

Sheet 2 of 5

Drawing G-2. Sample-flow diagram.



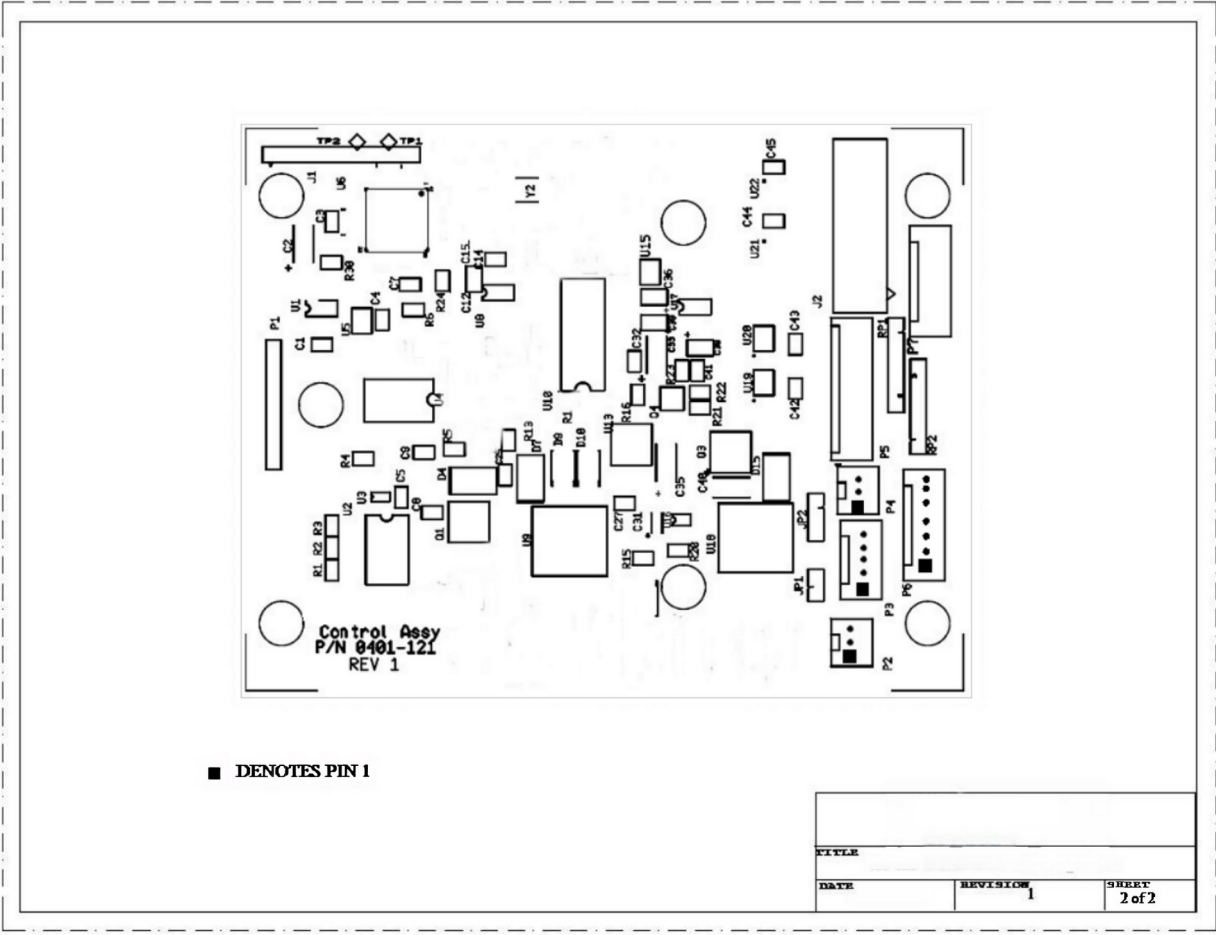
G.3 Control-PCB field wiring



Drawing G-3. Control-PCB field wiring.



G.4 Control-PCB component layout



Control PCB component layout

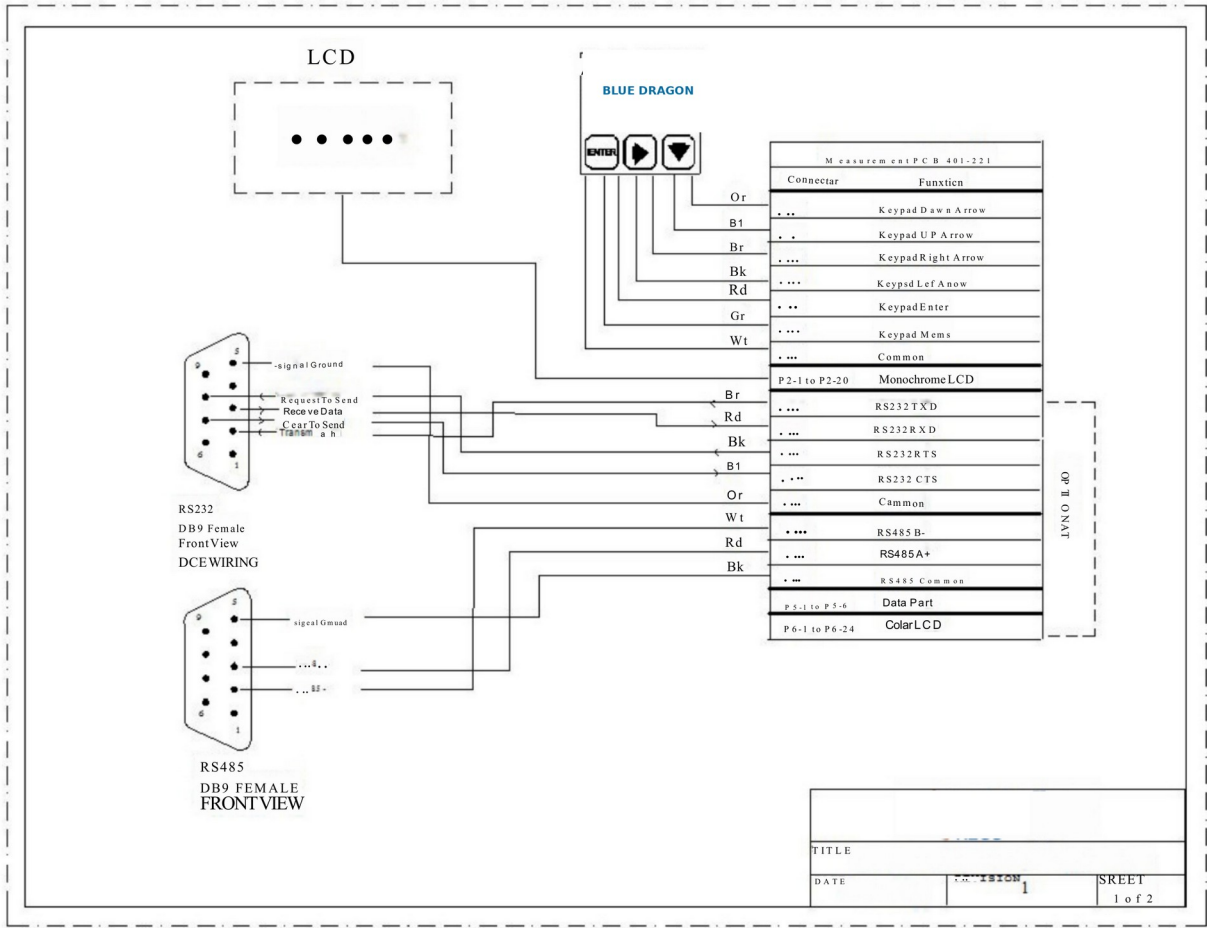
Blue Dragon 810H2S-P | Drawing G-4

Sheet 4 of 5

Drawing G-4. Control-PCB component layout.



G.5 Display, keypad and communications wiring



Drawing G-5. Display, keypad and communications wiring.