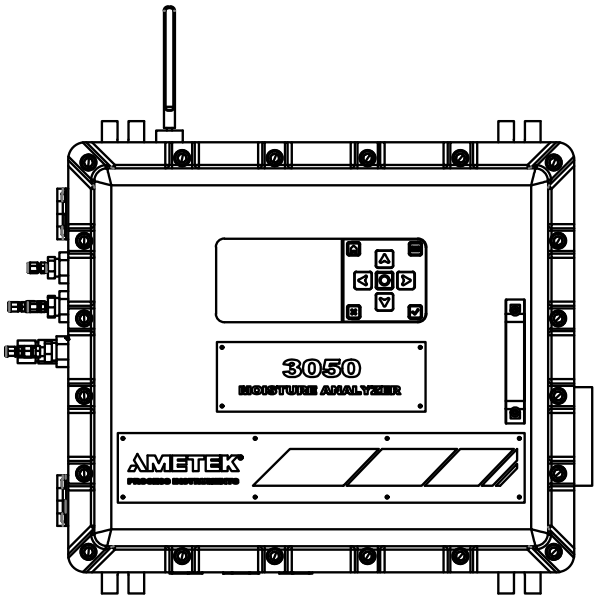
AMETEK®
PROCESS INSTRUMENTS

ESSENTIAL HEALTH and SAFETY

3050 Moisture Analyzer Series
ATEX/IECEx Zone 1



PN 10764-13-5_English,Rev C

To obtain a PDF of this manual, visit our Products page at www.ametekpi.com.

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Overview

About This Document

This document describes the essential health and safety (EH&S) requirements for the components that make up the 3050 Moisture Analyzer Series intended for use in ATEX/IECEx Zone 1 classified hazardous locations.

References to "3050 Moisture Analyzer Series" in this document refer to derivative models of this analyzer (3050-OLV, 3050-SLR, 3050-DO, 3050-TE), and depend on the application for which the analyzer is being used. Generally, the operation of the analyzer is the same for all versions.

This EH&S document contains critical information regarding the installation, operation, maintenance, testing, certification, and regulatory compliance for the 3050 Moisture Analyzer Series. It should be used in conjunction with all other accompanying documentation provided with the 3050 Moisture Analyzer Series.

Users must also adhere to additional safety measures as required by local, regional, and national regulations. Special precautions are necessary in environments where explosive atmospheres may be present to ensure user safety.

AMETEK takes great effort to ensure that its translations of documents into foreign languages are accurate and complete. However, in the case of any discrepancies between the English version and the translated version, the original English version shall take precedence. AMETEK will not assume liability for any such discrepancies, or issues arising from them.

Manufacturer's Address

This product is manufactured in United States of America:

AMETEK, Inc.
150 Freeport Road
Pittsburgh PA 15238
Tel: +1 412 828 9040

Important Safety Information

This section describes important safety information to avoid personal injury and damage to the equipment while installing, operating, maintaining, or servicing the equipment. All safety regulations, standards, and procedures at the analyzer location must be followed.

All personnel involved with the installation, start-up, operation, maintenance, service, and/or troubleshooting of the analyzer – and before opening it at any time after it has been in operation – must review and follow all Warnings, Cautions, and Notes in this document. This information contains important safety and general information about the analyzer.

WARNINGS, CAUTIONS, and NOTES contained in this manual emphasize critical instructions as follows:

An operating procedure which, if not strictly observed, may result in personal injury or environmental contamination.

An operating procedure which, if not strictly observed, may result in damage to the equipment.

Important information that should not be overlooked.

Burn hazard. Hot surface. Do not touch, allow to cool before servicing.

Electrical Safety

Up to 240 VAC may be present in the analyzer housings. Always shut down power source(s) before performing maintenance or troubleshooting. Only a qualified electrician should make electrical connections and ground checks.

Any use of the equipment in a manner not specified by the manufacturer may impair the safety protection originally provided by the equipment.

Grounding

Instrument grounding is mandatory. Performance specifications and safety protection are void if instrument is operated from an improperly grounded power source.

Verify ground continuity of all equipment before applying power.

Warnings, Cautions, Notes

Before installing, operating, and performing any maintenance, service, and/or troubleshooting on the analyzer, read and follow all safety information in this document (and in the main analyzer User Manual*). Misuse of this product could result in personal injury and/or damage to the equipment or its installation site.* ***All regulatory agency and personnel safety procedures for your jurisdiction must be followed.***

Failure to follow the installation and start-up instructions may void the instrument warranty.

All covers and doors must be closed and tightly fastened with all screws and all internal assemblies must remain in place while the circuits are live.

If installed in a hazardous classified area and it is necessary to remove the analyzer's covers or doors while the circuits are live, first test the area for flammable gases and proceed only when the area is safe. Continue to monitor the area while the covers or doors are open and the equipment is powered up.

When the Analyzer Enclosure's door is open (or Junction Box cover is off), take appropriate precautions to avoid electrical shock. Hazardous voltages are present inside.

Follow appropriate regulatory and/or company procedures to lock out and tag out the analyzer while working on its electronics.

Up to 240 VAC may be present in the analyzer housings. Always disconnect mains AC power and/or alternate power sources (example, for relay contacts) to the analyzer before removing any covers or opening any doors on the analyzer, before making any wiring or cable connections, and before and before removing any components from the analyzer.

All electrical connections, adjustments, or servicing of the analyzer must be performed only by properly trained and qualified personnel.

All electrical connections, materials, and methods (plus all safety policies and procedures) must be made in compliance with local wiring regulations and electrical codes for the hazardous area, as specified by the Owner Company, local electrical-inspection authority, and National/EU regulations.

Take extreme care to avoid damaging the threads on the cable entry glands. Clean, defect-free threads are essential to ensure a flameproof connection.

Before removing covers, turn off all air and sample lines to isolate the analyzer from process and wait 5 minutes for pressures to bleed down.

DO NOT REMOVE THE COVER UNTIL INTERNAL PRESSURE WITHIN THE FLAMEPROOF ENCLOSURE HAS BEEN RELIEVED.

Do not attempt to perform repairs on installed flame arrestors (flamepath).

If it becomes necessary to handle any of the electronic circuit boards, do not subject the boards to static discharge. The ideal solution is a static-safe work area. Since such areas typically are not available at field installation sites, the use of a wrist strap connected directly to a ground is recommended. If a wrist strap is not available, you should at the very least touch the metal chassis (to ground yourself) before, and handle/touch the boards only by their edges, to avoid touching any of their components.

For electric-shock protection, the analyzer must be operated from a grounded power source that has a securely connected protective-ground contact. Verify ground continuity of all equipment before applying power.

Special Warnings and Information for Safe Use of this Equipment in ATEX/IECEx Zone 1 Hazardous Locations

CAUTION: Refer to Specifications in this document for details about the suitability of this equipment in an explosive atmosphere or hazardous locations. This analyzer must not be commissioned until a person trained in the area of evaluating equipment for use in hazardous classified locations has confirmed that this equipment and its installation are in compliance with the requirements for the area.

WARNING: All input and output wiring must be in accordance with the appropriate ATEX/IECEx Zone 1 Ex db eb IIC Wiring Methods authorized for the area classification by the authority having jurisdiction.

WARNING: To reduce the risk of ignition of hazardous atmospheres conduit runs must have a sealing fitting connected within 457 mm (18") of this enclosure.

CAUTION: To reduce the risk of ignition of hazardous atmospheres, disconnect the equipment from the supply circuit before opening. Keep enclosure tightly closed when in operation.

Specific Conditions of use, for ATEX/IECEx Zone 1

- HSK series cable glands were tested at a reduced tensile force (25 %) and low (4 joule) impact as allowed by EN/IEC 60079-0. The installer shall ensure adequate clamping of the cable and protection from higher impact energy levels.
- After de-energizing, wait 10 minutes before opening the analyzer covers and doors.
- The process temperature should not exceed 60 °C (140 °F).
- In normal operation, process gas is to be outside the flammable range.
- The flameproof joints of the flanged enclosure have different dimensions from those specified in the tables of IEC 60079-1. Contact the manufacturer for any repair.
- Before interacting with the control keypads, operators must discharge any static electricity by touching a grounded metal object.
- The control keypads must be cleaned regularly to prevent dust accumulation. Use a damp cloth for cleaning to minimize the risk of electrostatic discharge.

Warning Labels

These symbols may appear on the instrument to alert you of existing conditions.

Protective Conductor Terminal
(BORNIER DE L'ECRAN DE PROTECTION)
Schutzerde

Caution – Risk of electric shock
(ATTENTION – RISQUE DE DÉCHARGE ÉLECTRIQUE)
Achtung – Hochspannung Lebensgefahr

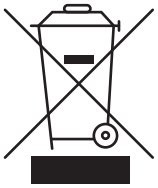
Caution – Refer to accompanying documents
(ATTENTION – SE RÉFERER AUX DOCUMENTS JOINTS)
Achtung – Beachten Sie beiliegende Dokumente

CAUTION – Hot Surface
(ATTENTION – SURFACE CHAUDE)
Achtung – Heiße Oberfläche

Environmental Information (WEEE)

This AMETEK product contains materials that can be reclaimed and recycled. In some cases the product may contain materials known to be hazardous to the environment or human health. In order to prevent the release of harmful substances into the environment and to conserve our natural resources, AMETEK recommends that you arrange to recycle this product when it reached its "end of life."

Waste Electrical and Electronic Equipment (WEEE) should never be disposed of in a municipal waste system (residential trash). The Wheelie Bin marking on this product is a reminder to dispose of the product properly after it has completed its useful life and been removed from service. Metals, plastics, and other components are recyclable and you can do your part by doing one of the following steps:



- When the equipment is ready to be disposed of, take it to your local or regional waste collection administration for recycling.
- If you need further assistance in recycling your AMETEK product, contact us through our Customer Support page at https://www.AMETEKpi.com/customersupport/requestsupport.

Electromagnetic Compatibility (EMC)

Read and follow the recommendations in this section to avoid performance variations or damage to the internal circuits of this equipment when installed in harsh electrical environments.

The various configurations of the 3050 Moisture Analyzer Series should not produce, or fall victim to, electromagnetic disturbances as specified in the European Union's EMC Directive. Strict compliance to the EMC Directive requires that certain installation techniques and wiring practices are used to prevent or minimize erratic behavior of the Analyzer or its electronic neighbors. Below are examples of the techniques and wiring practices to be followed.

In meeting the EMC requirements, the various Analyzer configurations described in this document rely heavily on the use of metallic shielded cables used to connect to the customer's equipment and power. Foil and braid shielded I/O and DC power cables are recommended for use in otherwise unprotected situations. In addition, hard conduit, flexible conduit, and armor around non-shielded wiring also provides excellent control of radio frequency disturbances. However, use of these shielding techniques is effective only when the shielding element is connected to the equipment chassis/earth ground at both ends of the cable run. This may cause ground loop problems in some cases. These should be treated on a case-by-case basis. Disconnecting one shield ground may not provide sufficient protection depending on the electronic environment. Connecting one shield ground via a 0.1 microfarad ceramic capacitor is a technique allowing high frequency shield bonding while avoiding the AC (or DC) ground metal connection. In the case of shielded cables, the drain wire or braid connection must be kept short. A 5 cm (two-inch) connection distance between the shield's end and the nearest grounded chassis point, ground bar or terminal is highly recommended. An even greater degree of shield performance can be achieved by using metallic glands for shielded cable entry into metal enclosures. Expose enough of the braid/foil/drain where it passes through the gland so that the shield materials can be wrapped backwards onto the cable jacket and captured inside the gland, and tightened up against the metal interior.

Inductive loads connected to the low voltage "Alarm Contacts" are not recommended. However, if this becomes a necessity, adhere to proper techniques and wiring practices. Install an appropriate transient voltage suppression device (low voltage MOV, "Transzorb," or R/C) as close as possible to the inductive device to reduce the generation of transients. Do not run this type of signal wiring along with other I/O or DC in the same shielded cable. Inductive load wiring must be separated from other circuits in conduit by using an additional cable shield on the offending cable.

In general, for optimum protection against high frequency transients and other disturbances, do not allow installation of this Analyzer where its unshielded I/O and DC circuits are physically mixed with AC mains or any other circuit that could induce transients into the Analyzer or the overall system. Examples of electrical events and devices known for the generation of harmful electromagnetic disturbances include motors, capacitor bank switching, storm related transients, RF welding equipment, static, and walkie-talkies.

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information
Unique Identifier: (e.g., 3050 Moisture Analyzer Series)
Responsible Party – U.S. Contact Information:
AMETEK, Inc.
150 Freeport Road
Pittsburgh PA 15238
Tel: +1 412 828 9040
ametekpi.com

FCC Compliance Statement (3050 Moisture Analyzer Series subject to Part 15)
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

About the Analyzer

The AMETEK 3050 Series Moisture Analyzer – available in ATEX/IECEx Zone 1 packaging – measures trace concentrations of moisture in a process gas stream.

The heart of the 3050 Series is a quartz crystal microbalance (QCM) sensor that is sensitive to moisture. The QCM moisture sensor is simply a quartz crystal oscillator, in which the quartz crystal has been coated with a proprietary hygroscopic coating. This coating selectively, and reversibly, adsorbs moisture from a sample gas stream. As the crystal is exposed to a gas stream containing water vapor, the hygroscopic coating adsorbs moisture from the gas stream, changing the mass of the coating. Changes in the mass are detected as changes in the natural resonance frequency of the oscillator.

3050 Series Models

3050 Model	Description
3050-OLV	0.1–2500 PPM range for monitoring moisture in natural gas, feed gas, and industrial gas.
3050-SLR	0.1–100 PPM range suitable for a variety of trace moisture applications.
3050-DO	0.02–100 PPM range designed to monitor moisture exiting mole sieve dryer systems.
3050-TE	0.01–100 PPM range ideal for monitoring moisture at the inlet/outlet to the turbo expander in a cryo-recovery plant.

For detailed information about the applications suited for these analyzers, refer to the 3050 Moisture Analyzer Series User Manual.

List of gases measured by the 3050 Moisture Analyzer Series:

Air, nitrogen, oxygen, hydrogen, helium, neon, argon, krypton, xenon, methane, ethane, ethene (ethylene), propane, butane, natural gas, Freon 12, Freon 22, Freon 114, Carbon Dioxide, propene (propylene).

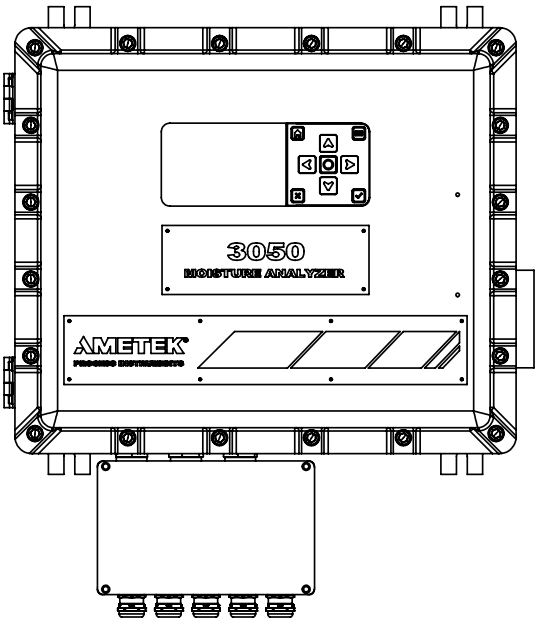


Figure 1.1.
3050 Moisture Analyzer Series, ATEX/IECEx Zone 1.

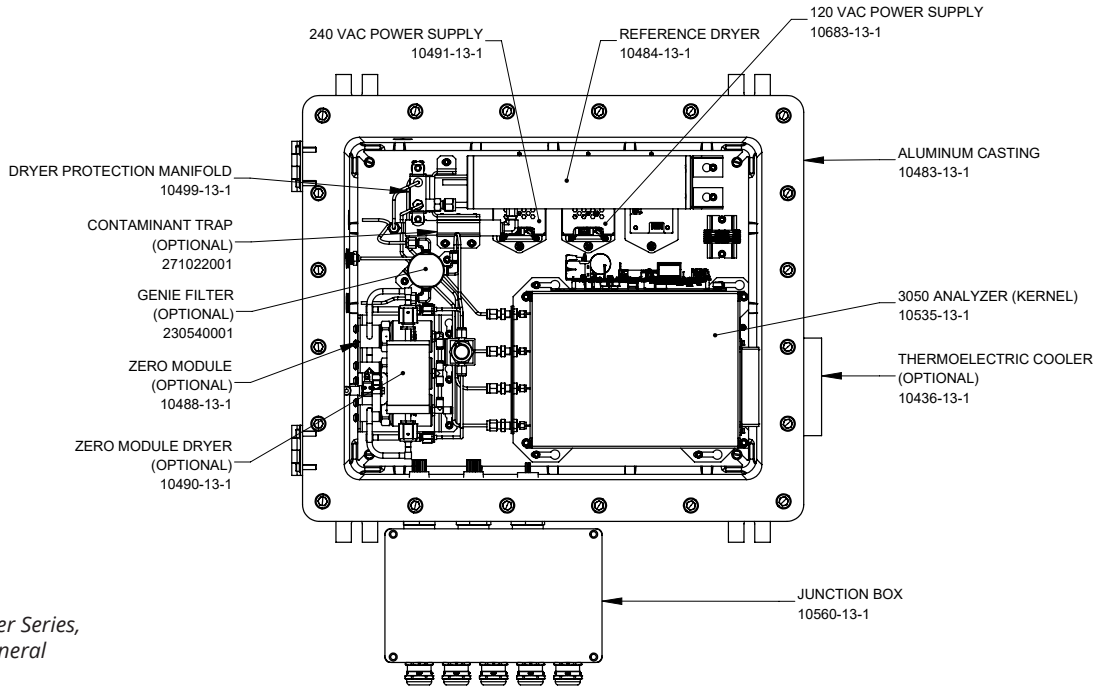


Figure 1.2.
3050 Moisture Analyzer Series, ATEX/IECEx Zone 1, general internal layout.

Flow Diagram, Analytical Kernel

In the Analytical Kernel, the sample gas enters the integrated sample system through the Sample Inlet port where it is directed to various paths within the sample system. The sample gas passes through the Dryer path where it is effectively dried and used as the internal *Reference* gas. Once the gas flows through the sample system, it exits through the Sample Outlet port, where it is vented to a safe area or flare system. The flow is balanced using a combination of restrictions, a flow meter, and a proportional valve.

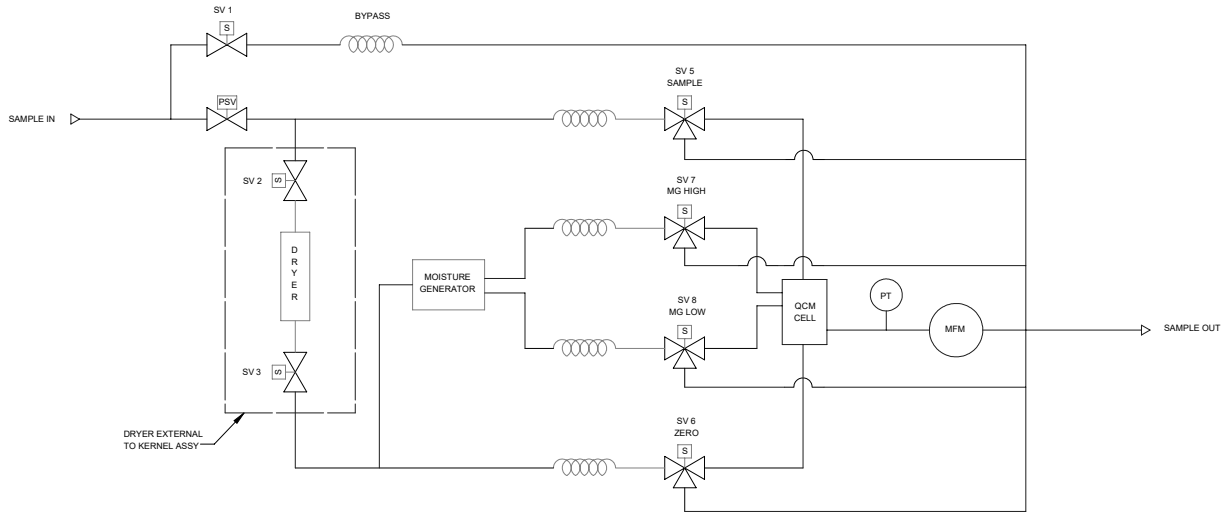


Figure 2.1.
Flow diagram, Analytical Kernel.

Flow Diagram, Overall Sample System

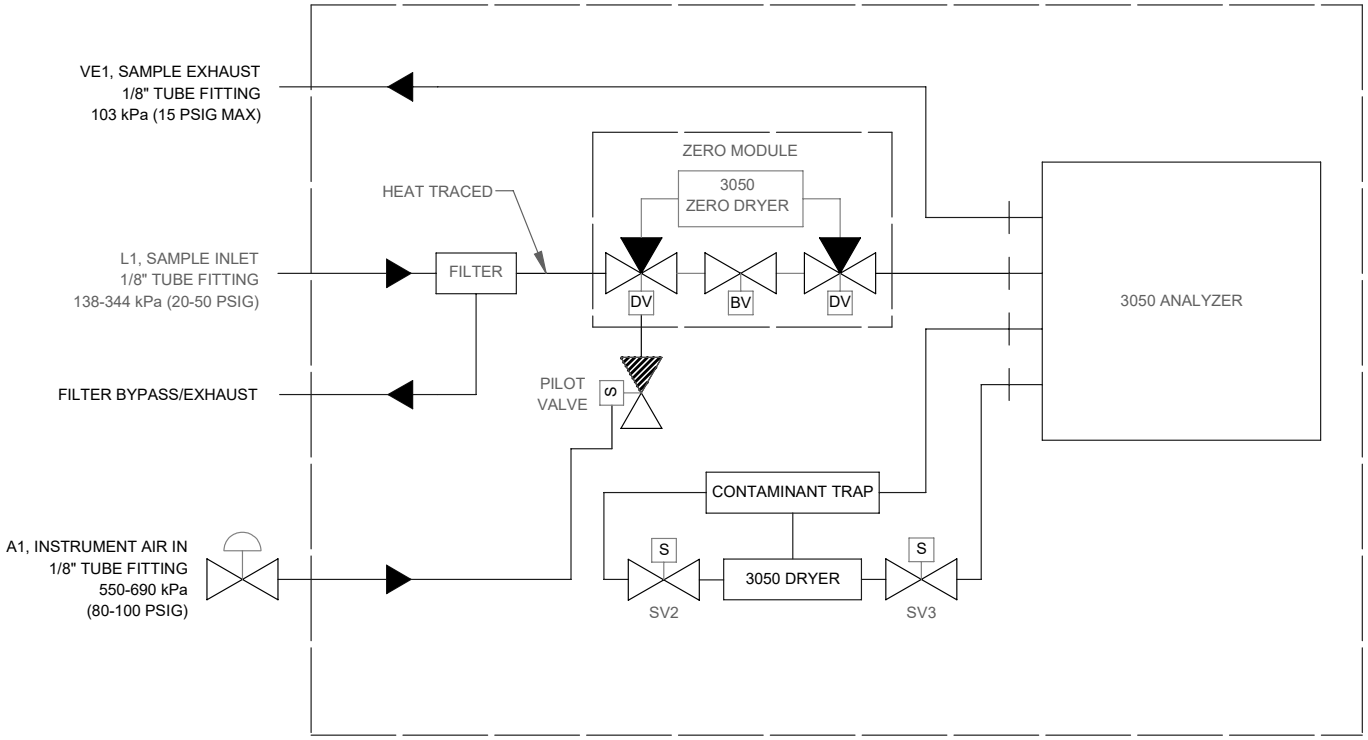


Figure 2.2.
Flow diagram, Overall 3050 Moisture Analytical sample system.

Digital Communications

All analyzer functions are controlled by a microprocessor housed within the smart sensor. Communication with the smart sensor is achieved through the following connections.

Communication Ports

There are three customer communication ports available:

- One (1) 10/100 MBS Ethernet port used to access the Web Interface and/or Modbus TCP/IP communications.
- One (1) 1000 GBS Ethernet port used to access the Web Interface and/or Modbus TCP/IP communications.
- One (1) RS-485 Modbus RTU port (2-wire/4-wire).
- One (1) USB port, used to transfer log and configuration data and firmware download via MSD.

I/O Signals

- Two (2) remote isolated digital inputs (triggered by contact closure).
- One (1) isolated analog input (selectable as 1–5 V or 4–20 mA) for process pressure.
- Two (2) isolated analog outputs, 16-bit, 4–20 mA.
- Four (4) alarm relay contacts, (dry relay contacts). One (1) relay each for **Service** alarm, **Data Valid** alarm, and **Moisture Concentration** alarm, and one (1) for a **User Configurable** alarm. The **Service** and **Data Valid** alarms are normally open (NO). The **Moisture Concentration** and **User Configurable** alarms are user-selectable.

IIoT Data Transmission

For the purpose of monitoring the analyzer's health and performance, the 3050 Analyzer uses a built-in cellular modem to transmit diagnostic data to the AMETEK Cloud. Data is transmitted once every two (2) seconds and can only be viewed by AMETEK personnel. No data is stored as the communication link is a simple pass through to the front end.

Verification

The 3050 Analyzer has a dual built-in Moisture Generator for onboard Verification. The Moisture Generator contains two separate permeation paths housed within a singular device. This design allows for a multiple-point onboard verification. The values for the 3050-OLV version of this analyzer are 25 PPMV and 75 PPMV (nominal), while for the 3050-SLR, -DO, and -TE versions, the values are 500 PPBV and 1.0 PPMV. When Cell Verification is initiated, the QCM sensor is alternately exposed to gas from the Moisture Generator and dry Reference gas. This process occurs twice, once for each permeation path. The moisture value is compared to a stored value and the sensor can make an adjustment if the value is within a tolerance band. If the value is outside the tolerance band, a failed Verification will result. Any span correction is only calculated using the higher generator level. The Moisture Generator is used as a field check.

Since the Moisture Generator uses a dried portion of Sample gas, sensor Verification is performed on a sample of the process gas. This yields the most realistic test of the sensors performance under process conditions.

Gas Flow

Normal operation of the 3050 Analyzer includes an internal bypass, which increases the response speed of the system; however, the 3050 Analyzer is capable of running in **Gas Saver** mode which allows the analyzer to run at a reduced flow rate.

Internal Timing

The analyzer operates in two (2) timing modes. The **Normal** mode consists of short intervals of Sample and Reference gas. The **Sensor Saver** mode reduces the exposure of the sensor to the Sample gas by cycling between 30-second intervals of Sample gas and 30-second intervals of dry Reference gas.

If the analyzer detects abnormal degradation of sensor performance over time in the **Normal** mode, the analyzer will automatically switch to **Sensor Saver** mode. Once the analyzer switches to **Sensor Saver** mode, it will not switch back on its own.

The **Sensor Saver** mode extends the life of the sensor, but provides slower response time.

Specifications

Specifications included in this chapter are typical for all models of the 3050 Moisture Analyzer Series (3050-OLV, 3050-SLR, 3050-DO, and 3050-TE).

Specification	Description
User Interface	Integrated display with optical keypad or touch screen.
IIOT Capable	Integrated network board, modem, and antenna.
Communications	• RS-485 2-wire Modbus RTU • Ethernet (10/100 MBPS, web interface, and Modbus TCP) • Ethernet (1 GBS, web interface, and Modbus TCP) • USB port, used to transfer log and configuration data and firmware download via MSD.
Inputs	Two (2) remote isolated digital (triggered by contact closure). One (1) isolated analog (selectable as 1–5 V or 4–20 mA) for process pressure.
Outputs	Two (2) isolated analog 16-bit 4–20 mA.
Alarms	Four (4) contact closures: One (1) each for Service, Data Valid, and Concentration. One (1) is User Configurable.
Ambient Temperature	-20 °C to +50 °C (-4 to +122 °F); -20 °C to +60 °C (-4 °C to +140 °F) with optional Thermoelectric Cooler (TEC).
Power Requirements	120 ±10 % VAC, 50/60 Hz, 100 W maximum 230 ±10 % VAC, 50/60 Hz, 100 W maximum
Ingress Protection	IP65 per IEC 60529 NEMA 4X
Environmental	Ambient Temperature: -20 °C to 60 °C (-4 °F to 140 °F) Relative Humidity: 90 % RH maximum, non-condensing Maximum Altitude: 2,000 meters (6,560 feet) Installation Category II: Overvoltage Category Pollution Degree 2: Maximum Indoor/Outdoor use
Physical Dimensions	**Explosion-Proof Enclosure Option:** Width: 613 mm (24.13 inches) Height: 308 mm (12.12 inches) Depth: 560 mm (22.05 inches) Weight: Approximately 99.8 Kg (220 lb), depending on the system.
Bolt Torque Specification on Casting	72 N-m

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Directives and Standards

The 3050 Moisture Analyzer is certified with regard to electrical safety for Pollution Degree 2 (normally nonconductive environmental pollution occurs with occasional condensation) and Installation Category II (local level transients, less than those found at power distribution level). Mains supply voltage fluctuations are not to exceed 10 % of the nominal supply voltage.

Directive	Standards / Notes
Designed to meet the requirements for General Purpose Locations/Electrical Safety and the following Hazardous Location classifications:	
Electromagnetic Compatibility (EMC) 2014/30/EU	IEC/EN 61326-1 IEC/EN 55011 (CISPR 55011) IEC/EN 61000-3-2 IEC/EN 61000-3-3 IEC/EN 61000-4-2 IEC/EN 61000-4-3 IEC/EN 61000-4-4 IEC/EN 61000-4-5 IEC/EN 61000-4-6 IEC/EN 61000-4-8 IEC/EN 61000-4-11
Restriction of Hazardous Substances (RoHS) 2011/65/EU	EN IEC 63000:2018
Low Voltage Directive 2014/35/EU	IEC/EN 61010-1
Explosive Atmosphere	ATEX Directive 2014/34/EU ATEX Certificate No.: PRESAFE 18 ATEX 13486X Ex IIG Ex db eb IIB + H2 T6 Gb -20 °C to +60 °C <u>Harmonized Standards:</u> EN IEC 60079-0: 2018 EN 60079-1 2014 EN IEC 60079-7 2015/A1:2018

Directive	Standards / Notes	
IECEx	IECEx Certificate No.:	IECEx PRE 18.0078X Ex db eb IIB+H2 T6 Gb -20 °C to +60 °C
	IEC 60079-0:2017 Edition:7.0 IEC 60079-1:2014 Edition:7.0 IEC 60079-7:2017 Edition:5.1	

Radio Equipment Certification – IIOT Enabled	
North America-FCC and ISED	
- Contains FCC ID:	XMR201910BG95M3
- Contains IC:	10224A-2019BG95M3

3050 Moisture Analyzer Series Markings

Figure 3.1.
3050 Moisture Analyzer Series label, ATEX/IECEX Zone 1.

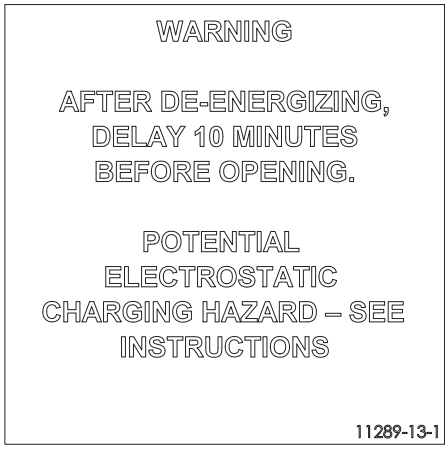

Figure 3.2.
3050 Moisture Analyzer Series Warning label ATEX/IECEX Zone 1.

3050 Moisture Analyzer Series Ex Protection Method

This section details how the 3050 Moisture Analyzer Series complies with regulatory standards for operation in hazardous environments, utilizing Ex db (flameproof) and Ex eb (increased safety) protection techniques to ensure safety and reliability.

Flameproof Enclosure (Ex db)

Enclosure Design:

- The Ex certified flameproof enclosure is designed to contain any internal explosion, preventing it from transmitting to the external atmosphere.
- Constructed from durable materials such as copper-free aluminum alloy to withstand high pressures, temperatures, and resist corrosion.
- Features a flange flame path, precisely machined to specific tolerances as per IEC/EN 60079-1 standards, to prevent flame propagation.

Cable Entry (Ex Certified Potted Cable Glands)

Cable Glands:

- Ex certified potted cable glands are used to seal cable entries, maintaining the flameproof integrity of the enclosure while ensuring secure cable entry.
- Chosen based on cable diameter and the required ingress protection level (IP65).

Potted Bushings (Ex Potted Bushings)

Bushings:

- Ex potted bushings form a seal between the Ex db flameproof enclosure and the Ex eb increased safety enclosure.
- Certified to Ex standards and capable of maintaining the flameproof barrier.
- Installed to prevent rotation and accidental loosening, ensuring a secure and flameproof connection.

Terminal Connections (Ex eb)

Terminals:

- Ex certified terminals are used for all internal connections within the Ex eb increased safety enclosure.
- Prevent sparking and maintain a secure connection under vibration and thermal cycling conditions.
- Appropriately sized to ensure that the temperature code is maintained, handling the expected current without exceeding the maximum allowable surface temperature.

Temperature Code Maintenance

Temperature Management:

- Cable lengths and terminal sizes are chosen to maintain the temperature code of the enclosure.
- Heat generated by electrical components is calculated to ensure it does not exceed the T-code rating.
- By integrating Ex db flameproof with Ex eb increased safety protection techniques into the design, the 3050 Analyzer provides protection against explosive atmospheres. The flameproof enclosure contains internal ignition sources, while the increased safety terminals and components prevent sparking and overheating. This combination ensures robust protection and reliability in industrial environments.

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Pre-Installation Requirements

Prior to Installation

Installation drawings in this section are for typical installations.

The installation of the 3050 Moisture Analyzer must be in accordance with all of the customer (end user) and local regulatory standards and procedures. There are no operator-serviceable components inside the 3050 Analyzer. Refer service requirements to qualified personnel.

Read this entire section before beginning installation of the 3050 Moisture Analyzer. Failure to do so, and / or use of the 3050 Analyzer in a manner not specified in this manual, may impair the protection against fire, electrical shock, and personal injury originally provided by this equipment.

Personnel Technical Level Required for Installation

Installation must be performed by qualified persons in accordance with local electrical safety codes, and NEC and CEC codes, where applicable. Prior to installation please consult the local codes in order to understand what is acceptable. To the extent this information is not consistent with local codes, the local codes should be followed. It is recommended that only trained personnel perform the installation of this equipment.

Unpacking and Inspection

Heavy Load Lifting
The standard analyzer system weighs approximately 99.8 Kg (220 lb) (may vary, depending on system). AMETEK recommends using a lifting hoist or jack to lift the analyzer when removing it from its crate, and when installing it.

Risk: Manual lifting of this load can result in severe injury or death.

Instructions:

- *Do Not Lift Manually: The weight exceeds safe manual lifting limits.*
- *Use Mechanical Aids: Employ forklifts, cranes, or hoists to lift the enclosure.*
- *Secure the Load Properly: Ensure the load is balanced and secured using appropriate lifting points.*
- *Follow Safety Protocols: Maintain a clear area around the lifting operation and use tag lines to control the load.*
- *Inspect Equipment: Check all lifting equipment and accessories for defects before use.*

Consequences of Non-Compliance:
Failure to follow these instructions can lead to serious injury, equipment damage, and potential legal consequences.

Do not use any part of the analyzer external fittings to lift it out of its shipping container, or to transport it.

Upon receiving the analyzer system, carefully remove it from its packing crate and check the exterior of the analyzer for damage. Open the analyzer enclosure door and inspect all interior components for obvious damage and broken/loose parts or fittings within the enclosure to ensure they are secure and there is no physical damage that may have been caused during shipping.

If equipment is damaged, notify the carrier and contact AMETEK Service (https://www.ametekpi.com/customersupport/requestsupport) immediately if parts are missing or damage is found, and to verify if damaged parts will require replacement prior to safely installing and operating the analyzer/equipment.

Storage Prior to Installation

If the analyzer is stored for any period of time prior to installation, store the equipment in an environment where it is not subject to dripping or splashing liquids, corrosive gases, high humidity, or excessive heat or cold. Recommended storage conditions include:

Temperature:	0 °C to 50 °C (32 °F to 122 °F)
Relative Humidity:	<90 %, non-condensing

Failure to comply with these storage conditions will void your warranty.

3050 Moisture Analyzer Site Preparation

The 3050 Moisture Analyzer is approved for installation in hazardous areas classified as ATEX/IECEx Zone 1.

Observe the following guidelines when selecting an analyzer installation location:

- Select a readily accessible location for the analyzer to allow for routine maintenance. Comfort levels for maintenance personnel should be considered in placement of the analyzer.

  Ensure the location does not allow direct sunlight on the HMI Display.

- **Space Requirements**
  Explosion-proof enclosure: approximately 696.2 mm/27.4 inches (W) x 866.7 mm/34.12 inches (H) x 350.5 mm/13.8 inches (D) plus adequate clearance on all sides to allow for analyzer connections, door swing, and to allow for routine maintenance. Refer to Figure 5 (Zone 1).

- The installation location should be free from excessive vibration and the ambient temperature is required to be within the limits listed in the Specifications section. If the ambient temperature is outside the specified limits or the vibration is excessive, contact your AMETEK representative to discuss solutions and special options to address ambient temperatures.

- **Power Requirements**
  The 3050 Moisture Analyzer is shipped according to the customer order and set for the voltage of the required mains power. The power requirements are stated on the product label on the casting and in the Specifications section of this EH&S document.

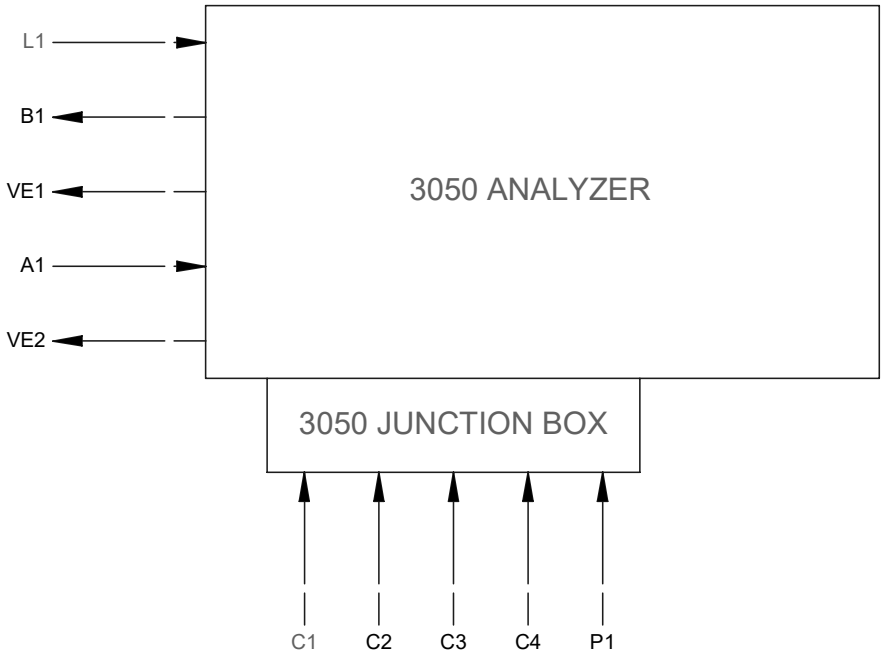
- **System Tubing**
  Recommended system tubing is 1/8-inch OD, electropolished, 316 stainless steel meeting ASTM #632 specifications (AMETEK PN 257707000 or equivalent).

- **Dry Reference Gas**
  A dryer is required to dry the Reference gas to less than 0.025 PPMV.

  A Zero module dryer (SLR, DO, and TE models only) is required to dry the gas to less than 0.01 PPMV for Zeroing the 3050 Analyzer. For these analyzers, both dryers are installed at the factory.

Dryers must be periodically replaced. In normal use, the dryer should dry a 50 PPM Reference gas to specification for three (3) years.

- **Sample Pressure and Temperature Requirements**
  Pressure reduction is user supplied and is required to ensure sample pressure to the analyzer remains within the range of 138–344 KPA (20–50 PSIG). Install the Pressure Reducer/Regulator with gauge near the Sample tap, between the tap and analyzer. Refer to Figure 2.2. For optimum performance, the sample line should be heat traced to maintain a constant sample temperature. Optimum Sample gas input is 60 °C.



Sample System Connections	
A1	Instrument Air Inlet: 550–690 kPA (80–100 PSIG)
B1	Filter Bypass
L1	Sample Gas Inlet to Analyzer: 138–344 kPA (20–50 PSIG)
VE1	Sample Gas Outlet
VE2	Internal Pressure Relief, Vent to Safe Area

Cable/Wiring Connection	
C1	Install Ethernet (1) Cable
C2	Install Ethernet (2) Cable
C3	Install Customer Modbus and Alarm Relays Cable
C4	Install Analog Input/Outputs and Remote Input Signal Cable (4–20 mA Output)
P1	Power Cable

Figure 4.
Block diagram, 3050 Moisture Analyzer Series, ATEX/IECEx Zone 1.

Tools, Equipment, and Supplies Required for Installation

To install the 3050 Moisture Analyzer, you will need:

- Set of open-end wrenches for fittings.
- Set of metric hexagonal wrenches.
- Set of ball drivers.
- Wire cutters, strippers, and crimpers.
- Flat blade instrument screwdriver.
- Soft, nonabrasive cloth.
- Wrist strap (for grounding).
- Detergent-based leak detector (Snoop® or another suitable leak detection agent is permissible).
- All mounting hardware should be M12, stainless steel.
  If using screws, use M12 flat washers, M12 lock washers. M12 x 20 mm screws.

  If using nuts, use M12 flat washers, M12 lock washers, and M12 nuts; or M12 flat washers and M12 lock nuts.
- One power-disconnect switch (**supplied and installed by the customer/end user**), rated for appropriate supply voltage of the analyzer and at the installation site, and certified for the hazardous location (to satisfy local electrical codes, the switch must be certified by the local authority for the appropriate hazardous location). This switch is to be connected to and mounted near the 3050 Moisture Analyzer, in an easily accessible area. The power-disconnect switch must be clearly labeled (e.g., "AMETEK 3050 Moisture Analyzer Mains AC Power-Disconnect Switch"). For safety reasons during maintenance, the power-disconnect switch allows the main AC power to be disconnected from the analyzer prior to performing service on the analyzer.

- One AC breaker (**supplied and installed by the customer/end user**), rated for appropriate supply voltage of the analyzer and at the installation site, and certified for the hazardous location (to satisfy local electrical codes, the breaker must be certified by the local authority for the appropriate hazardous location). This breaker must be connected upstream of the 3050 Moisture Analyzer power-disconnect switch. The breaker must be clearly labeled (e.g., "AMETEK 3050 Moisture Analyzer Mains AC Power Breaker"). For safety reasons during maintenance, this breaker allows the main AC power to be disconnected from the analyzer prior to performing service on the analyzer.

- Cable Glands (**supplied and installed by the customer/end user**), to install in Termination Enclosure (on the **AC Distribution** board) to secure the supply power wiring. The Cable Glands must be approved by the local authority for the appropriate hazardous location and must be rated for the maximum wattage for the analyzer (marked on the Product Label on the analyzer).

- Supply of adequately-sized electrical supply cable, which must be approved for the local wiring regulations and electrical codes for the hazardous location, and which must be rated at 600 Volts and 105 °C (221 °F).

- Supply of 1/8- inch OD, 316 Stainless Steel tubing, meeting ASTM # 632 specifications.

Mechanical Installation

Installing the 3050 Moisture Analyzer

Install the 3050 Moisture Analyzer as close as possible to the sample source. The unit should be protected from direct exposure to weather and sunlight, and located so that the ambient temperature specifications will not be exceeded.

When installing the 3050 Analyzer, observe all guideline discussed in the section "3050 Moisture Analyzer Site Preparation" earlier in this document.

The complete analyzer is contained within a standard enclosure. See Figure 5 for analyzer dimensions. Figure 1.2 shows the layout of the internal components (analytical kernel).

All external plumbing connections to and from the analyzer are made through the Inlet and Outlet Sample tube fittings on the left side of the analyzer (see Figures 4 and 5). Allow sufficient for the Sample Line and Vent Line and for the cable or conduit carrying wiring to the analyzer's cable entry ports.

The AC Power cable, communications cable(s), contact wiring, and customer I/O wiring terminations are made in the analyzer Disconnect Enclosure (located at the bottom of the analyzer). See Figures 4 and 5 for cable and wiring entry port locations. The cables and wiring are terminated as shown in the Terminal Block Assignments diagram (Figure 6.1).

To install the 3050 Moisture Analyzer:

1. If not already installed, install a main process shut-off valve at the Sample tap.

   Install the vaporizing regulator as close to the sample point as possible to reduce response time.

2. Install the 3050 Analyzer in its selected location and bolt it in place. Refer to Figure 5.

   After the analyzer has been mounted, install the IIOT antenna in the upper part of the casting.

3. Connect instrument air to the 1/4-inch Instrument Air In fitting on the analyzer. Maximum input is 689 KPA (100 PSIG). Set the Pilot Valve to 551–690 KPA (80–100 PSIG).

4. Connect an appropriate vent tube/system to the 1/8-inch Sample Out fitting on the analyzer.

5. Open the main process shut-off valve and purge entire length of the Sample line (up to the analyzer) to an appropriate area for at least five (5) minutes. Close the main process shut-off valve. This will help prevent contamination from entering the Cell.

6. Connect the Sample line to the 1/8-inch Sample In fitting on the analyzer.

Make this connection immediately after the Sample line purge has been completed.

7. Reinspect the process line connections and ensure that all are connected to the proper external supply, exhaust, and drain tubing to ensure the hazardous process gas will not be released into the atmosphere. Perform a pressure leak check to verify the connections.

The Differential pressure between the Inlet and Outlet must be at least 20 PSIG.

8. Open the main process shut-off valve.

9. Prior to applying power to the analyzer, open the Pilot Valve 1/4 to 1/2 turn.

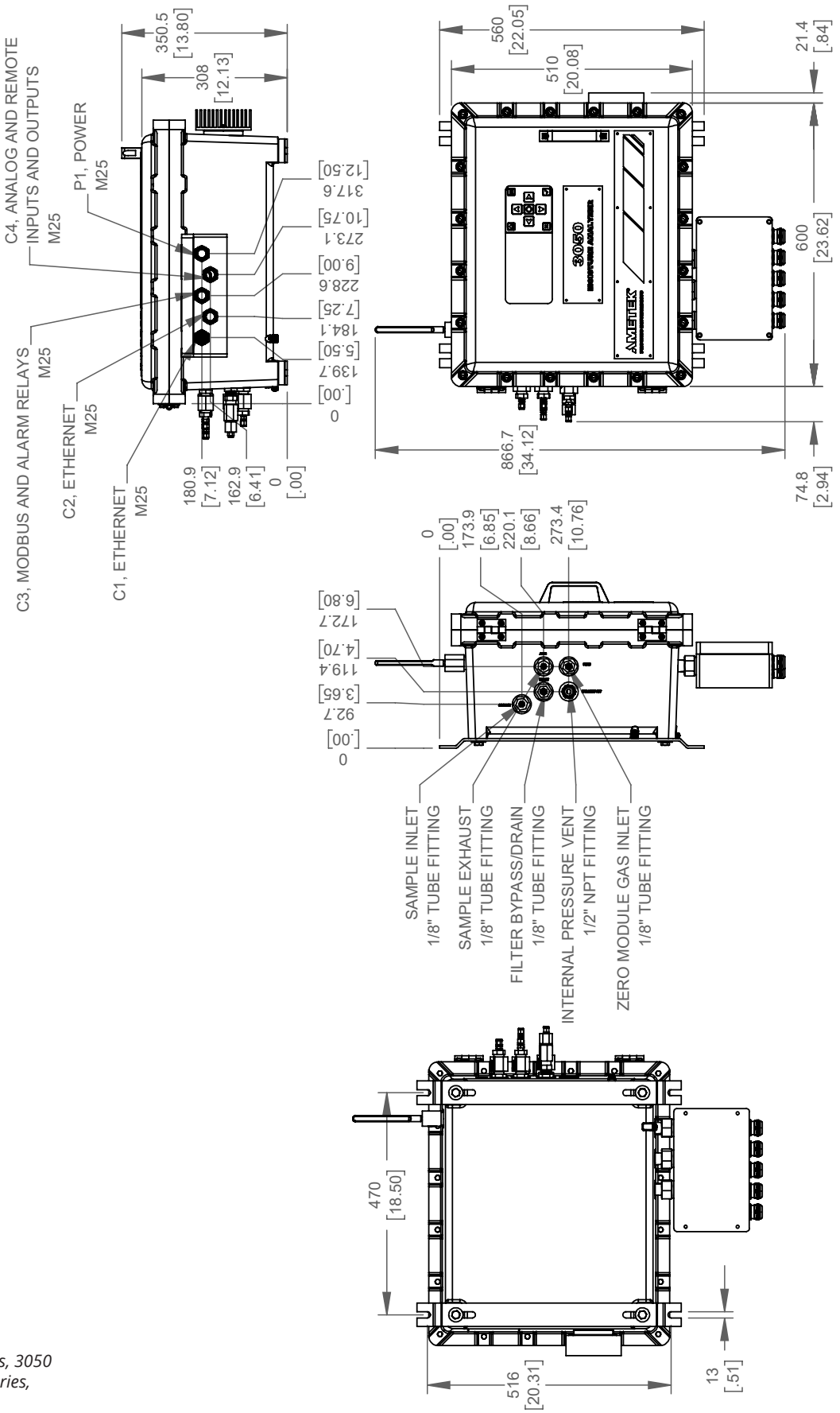


Figure 5.
Mounting dimensions, 3050 Moisture Analyzer Series, ATEX/IECEx Zone 1.

Sample Prerequisites

Sample Gases

The 3050 Moisture Analyzer is designed to operate on a clean gas stream; specifically, the Sample Gas stream must be free of particulates and aerosols. If the 3050 Analyzer is being used on a clean gas stream (i.e., free from particulates and aerosols), AMETEK recommends that the analyzer be installed in accordance with the information provided in this manual and in the Installation chapter of the 3050 Moisture Analyzer Series *User Manual*.

Sample Pressure and Temperature Requirements

Pressure reduction is user supplied to ensure sample pressure to the analyzer remains within the range of 138–344 KPA (20–50 PSIG). Install the Pressure Reducer/Regulator with gauge near the Sample tap, between the tap and analyzer.

For optimum performance, the Sample Line should be heat traced to maintain a constant sample temperature. Optimum Sample Gas input is 60 °C (140 °C).

AC Power and Signal Connections

The nominal operating voltage and power consumption is indicated on the Product Label on the analyzer (Figure 3.1). Verify that the operating voltage indicated on the label agrees with the operating voltage indicated on the documentation supplied with the analyzer. The analyzer is intended for use in Installation Category II (Overvoltage Category) and AC power requirements for each analyzer system are specified on the system electrical drawings. The AC electrical supply cable must be approved for the local wiring regulations and electrical codes for the hazardous location, and must be rated at 600 Volts and 105 °C (221 °F).

When installing external wiring to the junction box, use appropriate thorough-wall bulkhead connections suitable for the hazardous area classification and the environmental conditions encountered.

Analyzer power must be removed when connecting or disconnecting the 4–20 mA signal.

All entry cable glands are M25 compression glands. No potting is required. The compression gland entries are labelled for wiring.

Cable Requirements:

P1, Power (PE, L, N):	16 AWG/18 AWG (1.5 mm^2 to 1.0 mm^2)
C1, Ethernet 1 (24–29):	22 AWG (0.5 mm^2)
C2, Ethernet 2 (1–6):	20 AWG (0.75 mm^2)
C3, Modbus and Alarms (7–12):	18 AWG (0.5 mm^2)

C4 ANA Inputs/outputs and Remote Input Signal (4–20 mA output)

NOTE

The cable should be shielded with a single twisted pair.

Cable shields should be connected to both the analyzer and the DCS. If this is not possible, cable shields should be tied to the chassis at each 3050 Analyzer. If this is not possible, tie the shield at the PC or DCS to the chassis and the remaining shield to the chassis through a 0.1 mF @ 500 V capacitor.

The 3050 Analyzer signal common is connected to earth ground. If the analog output is also grounded, the analog output will no longer be electrically isolated. Contact AMETEK if this situation occurs.

The 4–20 mA loop circuit must have a load resistance of between 100–500 ohms or a malfunction may occur. If a loop check is performed, the resistor must be placed in series with the ohm meter.

NOTE

Total cable length not to exceed 1000 m. Cable should be low capacitance type for use in RS-485 applications (nominal impedance of 120 ohms, shielded twisted pairs). For example, Belden 9841 in two-wire applications, Belden 9842 in four-wire applications.

Install terminator plug (Part No. 305900901) is RS-485 OUT position of last controller in networks with both single and multiple 3050 Analyzers.

Cable shields should be tied to TB3-GND at each 3050 Analyzer. If this is not possible (for example, in the case of a ground loop), tie the shield at the PC or DCS to chassis and all other shields to earth through a 0.1 uF @ 500 V capacitor.

Adding a jumper between Pins 1 and 3 disables software control of the RS-485 mode. With jumper installed, the 3050 Analyzer will always be in four-wire mode.

To terminate the all of the signal wiring and AC mains power wiring:

1. Remove the Junction Box cover to access the wiring terminal blocks.

2. Route the Ethernet Cable 1 (10/100 MBPS) or Cable 2 (1000 MBPS) to the analyzer. Install the M25 cable gland, then route the cable into the Junction Box via the **C1** or **C2** cable entry port. Make the connections to the terminal block (see Figures 4, 6.1, and 6.2).

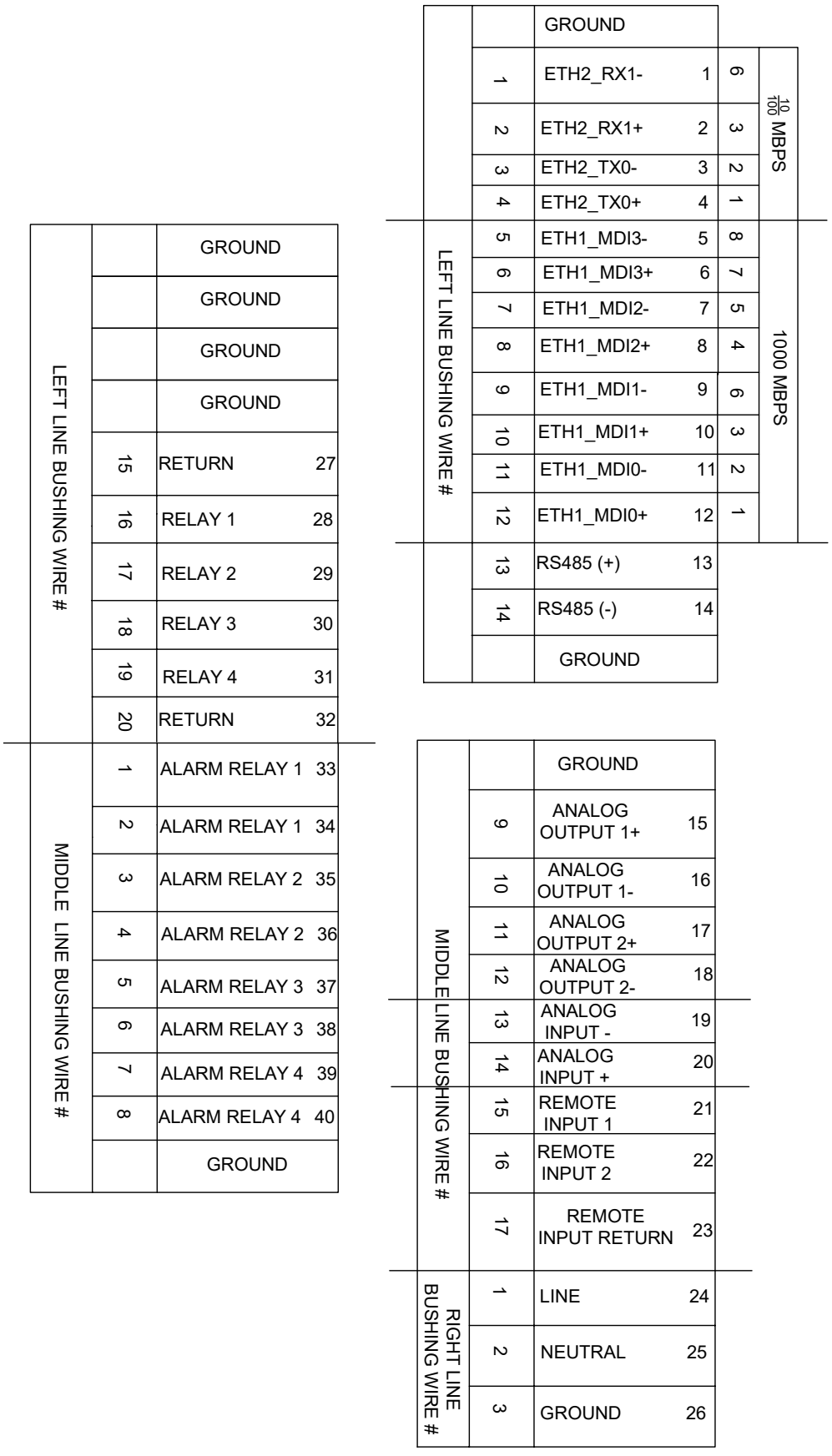


Figure 6.1.
Customer Connections wiring diagram.

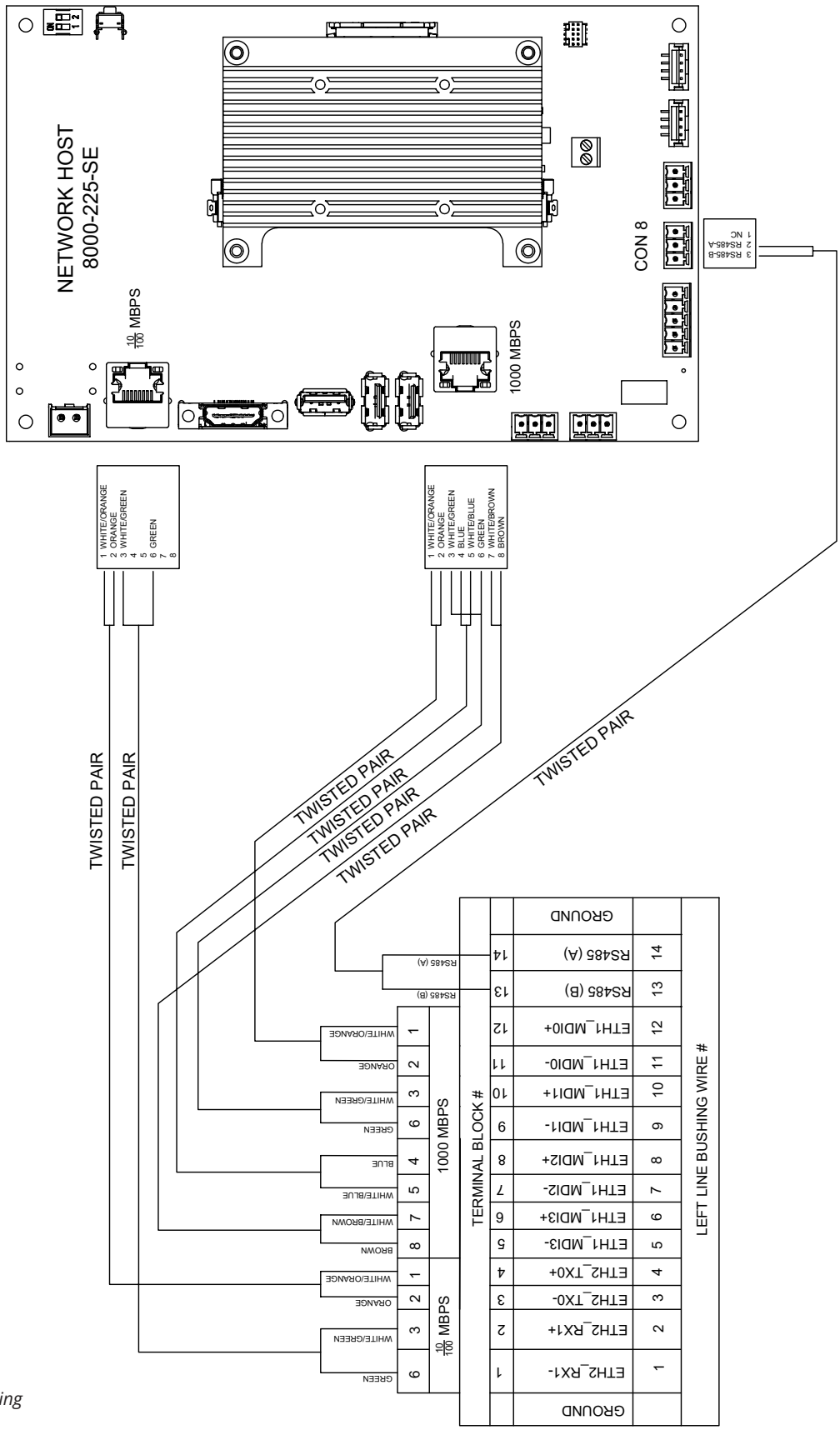


Figure 6.2.
Serial communication wiring diagram.

3. Route the Modbus cable, Alarm Relay wiring, and optional Cellular cable (optional, if used) to the analyzer. Install the M25 cable gland, then route the cables/wiring into the Junction Box via the **C3** cable entry port. Make the connections to the terminal block (see Figures 4, 5, and 6.3).

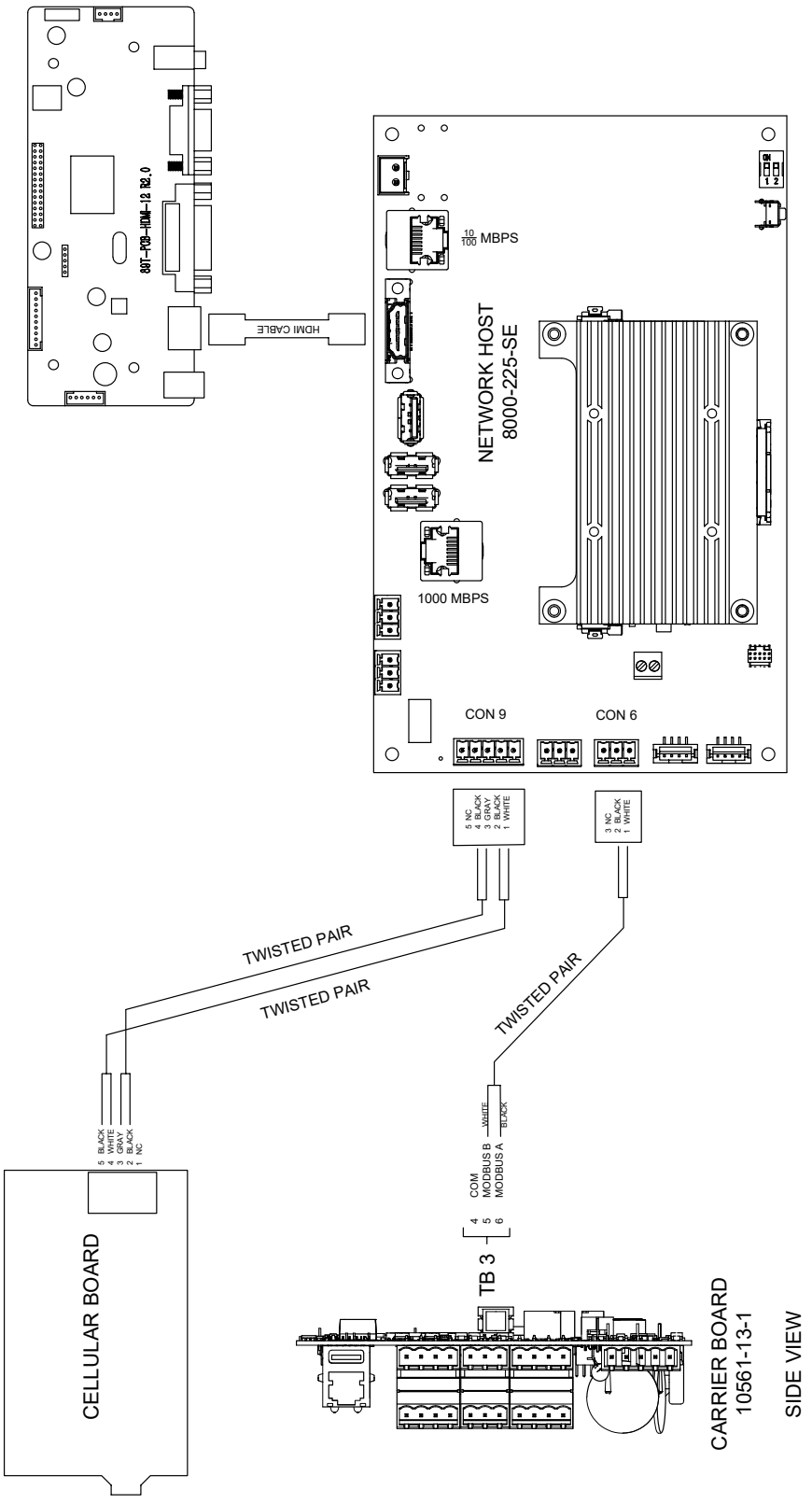


Figure 6.3.
Modbus and Cellular (optional) wiring diagram.

4. Route the 4–20 mA Analog Inputs/Outputs wiring and Remote Input Signal wiring from the user recording equipment to the analyzer. Install the M25 cable gland, then route the wiring into the Junction Box via the **C4** cable entry port. Make the connections to the terminal block (see Figures 4, 5, 6.4, and 6.5).

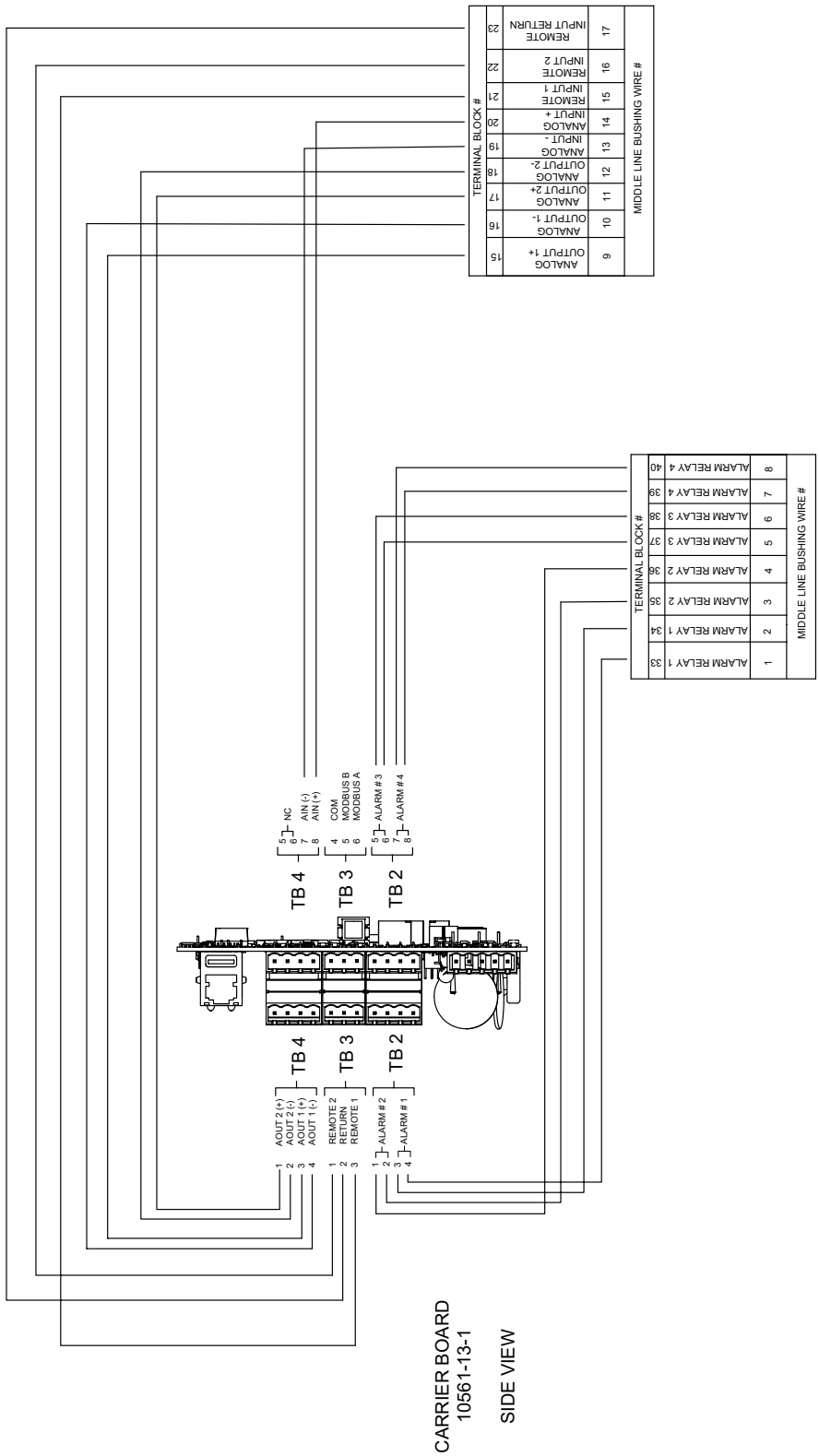


Figure 6.4.
Analog output and alarm contact wiring diagram.

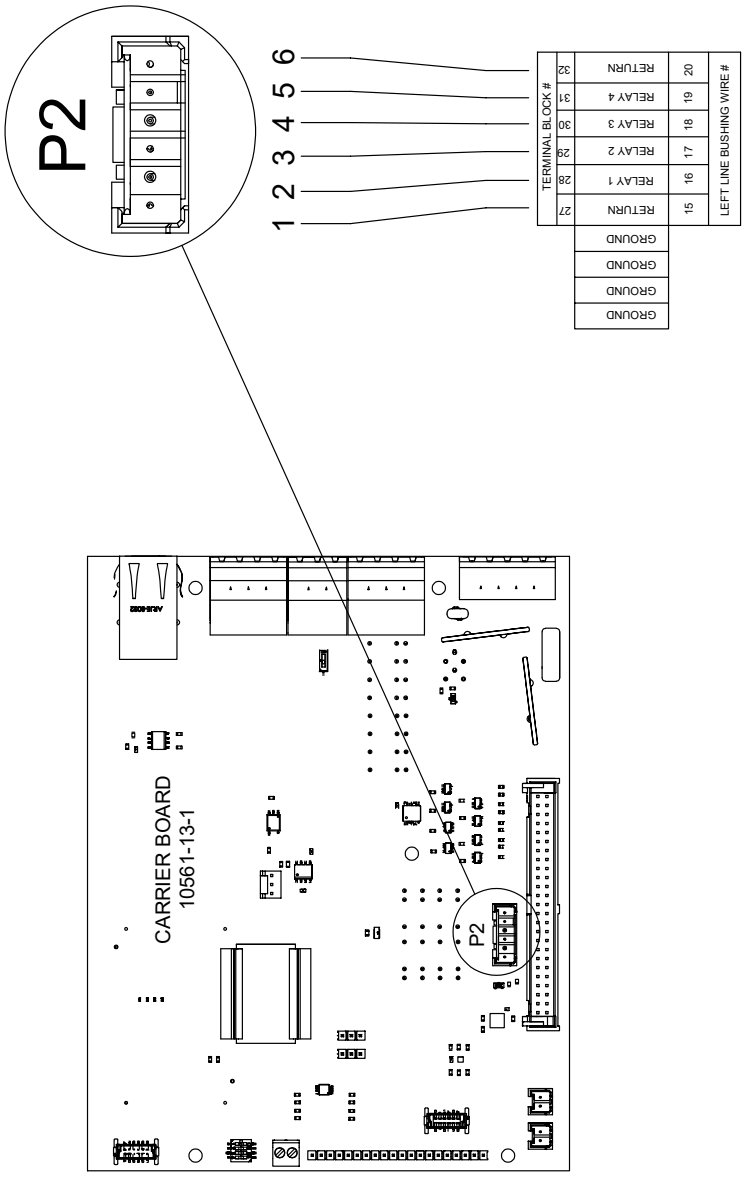


Figure 6.5.
4–20 mA output wiring diagram.

5. Install a power-disconnect switch and/or an AC breaker (supplied and installed by the customer/end user), within close proximity of the analyzer to remove AC power to the device if servicing is required. **The disconnect switch/AC breaker must be rated for appropriate supply voltage of the analyzer and for the area classification.**

   Route the AC mains power cable to the analyzer, via the disconnect switch/breaker. Install the M25 cable gland, then route the cable into the Junction Box via the **P1** cable entry port. Make the connections to the terminal block (see Figures 4 and 5, and the AC wiring diagram.

6. Refer to the 3050 Moisture Analyzer Series *User Manual* for power up instructions.

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Cleaning the Human-Machine Interface (HMI)

Clean the graphic panel on the HMI regularly to avoid dust build-up. When cleaning the graphic panel, power to the HMI (analyzer) must be OFF. Using a damp cloth to avoid electrostatic discharge, wipe the graphic display panel.

3050 Moisture Analyzer Replacement Parts

NOTE

** Indicates recommended stock spare parts to have on hand.*

Refer to the Figure number listed for the location of the part.

Part Description	Part Number
2-Micron Filter	305448902S
Back Pressure Regulator	305427901S
Reference Dryer	10484-13-1
Sensor Assembly, Sour Gas, 0–100 PPM	11701-13-3
Sensor Assembly, Sour Gas, 0–2500 PPM	11700-13-3
Sensor Assembly, CO2 Gas, 0–100 PPM	11699-13-3
Sensor Assembly, CO2 Gas, 0–2500 PPM	11698-13-3
Sensor Assembly, STD Gas, 0–100 PPM	11697-13-3
Sensor Assembly, STD Gas, 0–2500 PPM	11696-13-3
Glycol And Liquid Separator Membrane Replacement Kit	11694-13-3
Contaminant Trap	11692-13-3
Heater and Support Plate Assembly	11497-13-3
Motherboard Assembly	10792-13-3
Mass Flow Meter Assembly w/cable	10670-13-3
Pressure Sensor	10668-13-3
Cell Board Interface Cable	10625-13-3
Reference Dryer	10484-13-1
System Tubing, 1/8-inch OD, 316 SST	257707000

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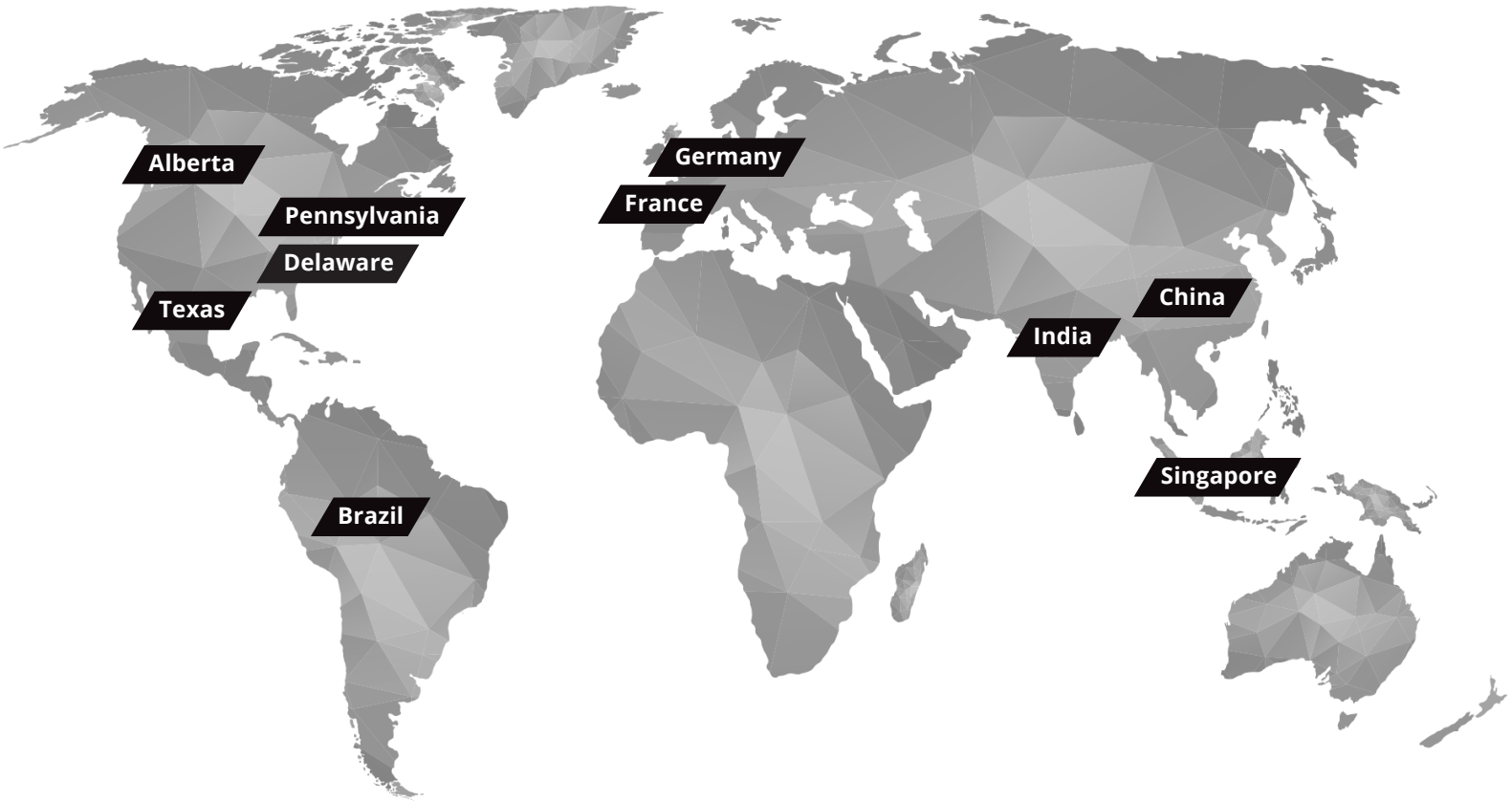

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