Model 3050-SLR
Moisture Analyzer

Essential Health & Safety Requirements

REGISTERED ISO 9001 MANAGEMENT SYSTEM

Part Number 305671001
Revision E

AMETEK

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About This Document

This document primarily describes the essential health and safety requirements for the Model 3050-SLR Moisture Analyzer intended for use in explosive atmosphere locations.

The procedures discussed in this document include only abbreviated steps to install, operate, and perform maintenance on the analyzer. They do, however, include all relevant safety warnings and cautions to ensure the safety of personnel and the analyzer in explosive atmosphere locations.
[For complete and detailed descriptions of the procedures discussed in this guide, refer to the analyzer *User Manual*.]

About the Model 3050 Moisture Analyzer

The AMETEK model 3050-SLR Moisture Analyzer measures trace concentrations of moisture in a process gas stream.
[For detailed information about the applications suited for these analyzers, refer to the specific analyzer User Manual.]

The measurements can be viewed using a computer connected to the analyzer and running AMETEK's Configurator Software.

Safety Notes

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.

Important Safety Information

Before installing, operating, or servicing the Model 3050-SLR Analyzer – and before opening it at any time after it has been in operation – read and follow all Warnings, Cautions, and Notes in this document and in the analyzer *User Manual*. This information contains important safety and general information about on the analyzer.

Always disconnect main AC power and/or alternate power sources (if used, i.e., for relay contacts) to the analyzer before opening any covers on the analyzer or before removing any sampling system assemblies and components from the analyzer.

If it is necessary to open the Ex d e Enclosure while the circuits are alive, the area first must be monitored for hazardous gases – and found to be safe – before proceeding, and continuously monitored as long as the equipment is operated with the enclosure open. When the Electronics Enclosures are open, take appropriate precautions to avoid electrical shock. Hazardous voltages are present inside.

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

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

For electrical-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.

Read the user manual before beginning the installation and operation of the 3050-SLR Analyzer system. Failure to do so, and or use of the equipment in a manner not specified in this manual or accompanying documents, may impair the protection against fire, electrical shock and injury originally provided by this equipment. In addition, failure to follow the installation and start-up instructions may void the instrument warranty.

*Up to **240Vac** may be present in the analyzer housings. Always disconnect power and/or external power sources to the analyzer before opening any covers on the analyzer to check or perform maintenance on any components within the enclosure.*

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

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 cover, turn off all air and sample lines to isolate analyzer from process and wait 5 minutes for pressures to bleed down. Difficulty turning cover could indicate pressure build-up inside enclosure due to extraordinary conditions.

COVER SHALL NOT BE REMOVED UNTIL INTERNAL PRESSURE IS RELIEVED

Special Warnings And Information For Use Of This Equipment In Division 1 Or Zone 1 Hazardous Locations

This Equipment is Suitable for Use in Class I, Division 1, Groups BCD, T5 and T6 areas or Zone 1 **II 2 Ex db e II C T* Gb**

All Input and Output Wiring Must be in Accordance with the Appropriate NEC/CEC Class I, Division 1 or European Zone 1 Ex d e IIC Wiring Methods, and in Accordance With the Authority Having Jurisdiction.

Warning - Explosion Hazard – Do Not Open Equipment Unless Power has been Disconnected and the Area is Known to be Non-Hazardous

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Special Conditions For Safe Use In European Zone 1 Areas

– All gases to be analyzed shall be pure process or mixtures of pure process gases (without any air or oxygen) and the gas shall be outside the flammable range.

– Maximum Ambient Temperature is 50°C.

Warning Label

These symbols may appear on the instrument in order 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 ÉLEC-TRIQUE)
Achtung - Hochspannung Lebensgefahr

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

CAUTION - Hot Surface

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 reaches 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 one of the following these steps:

- When the equipment is ready to be disposed of, take it to your local or regional waste collection administration for recycling.
- In some cases, your "end-of-life" product may be traded in for credit towards the purchase of new AMETEK instruments. Contact your dealer to see if this program is available in your area.
- If you need further assistance in recycling your AMETEK product, contact our office listed in the front of the instruction manual.

Specifications

For a complete listing of all analyzer specifications, refer to the analyzer *User Manual*.

Electrical Requirements

115 +/-10% Vac, 50/60 Hz, 150W max.
230 +/-10% Vac, 50/60 Hz, 150W max.
24 VDC, 50W max.

Outputs

Data:

Isolated 4 to 20 mA, 100 to 500W Analog output (software configurable) RS-232 or RS-485 serial port, two and four wire mode

Alarms/Alerts:

Two independent hermetically sealed reed type contact closures 60 VDC, 30 VAC, 10 VA maximum resistive for system alarm and data valid. All are fail-safe by default.

Alarms are available on RS-485 interface.

Ambient Temperature Limits

From -20° to 50°C (-4° to 122°F)

Allowable Inlet Pressure Range

20-50 psig (1.3-3.3 barg); up to 3000 psig (200 barg) with optional pressure reducer.

Exhaust Pressure

0 to 15 psi (0 to 1 barg) gauge

Sample Gas Temperature

0° to 100°C (32° to 212°F)

Gas Flow Requirements

Sample 150 +/- 20 SCCM; Bypass 1 +/- 0.1 SLPM

Instrument Air Requirements

5 to 7 bar (80 to 100 psig)

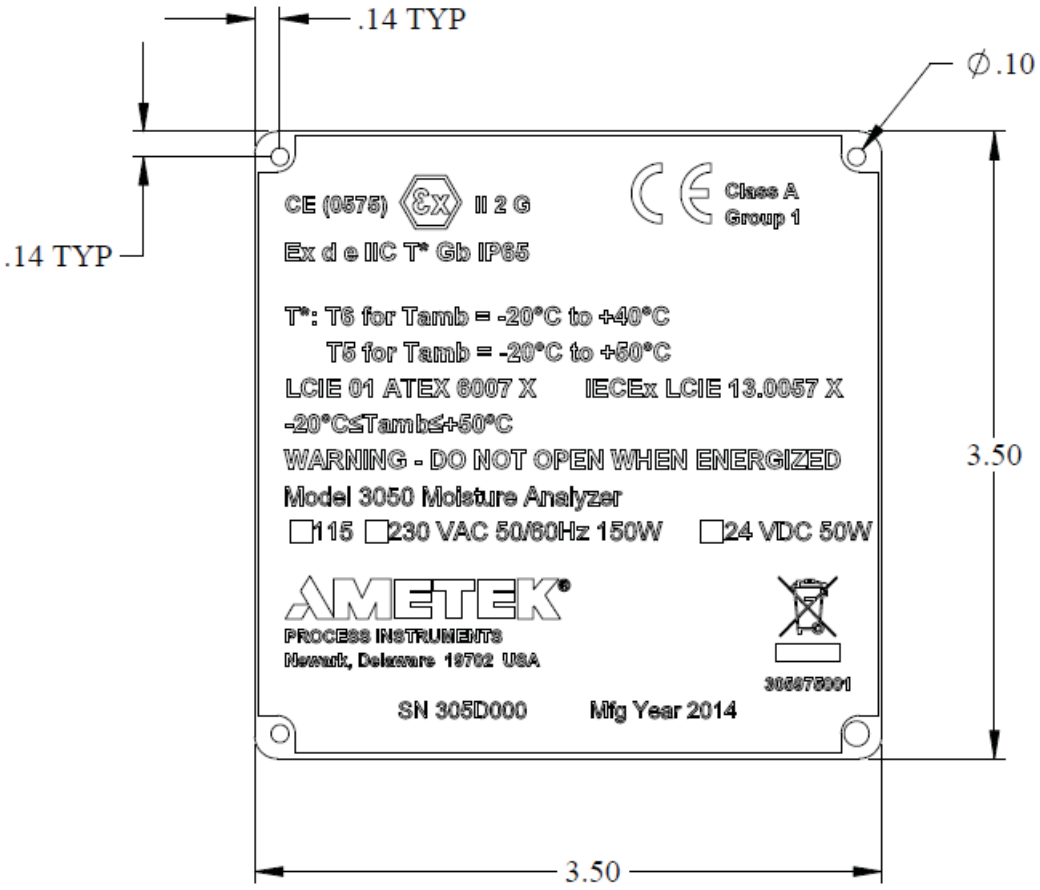
Approvals and Certifications

UL/CSA General Safety Requirements (general purpose)
UL/CSA Class I, Division 1, Groups B, C, D T6
ATEX: II 2 Ex db e II C T* Gb
T6: -20°C to 40°C or T5: -20°C to 50°C

Complies with all relevant European directives
Russian GOST 1ExdIICT6X
Russian GOST Pattern Approval

Analyzer Markings

The Model 3050-SLR Analyzer will be marked with a corresponding label to indicate its ATEX certification.



Installation

Unpacking and Inspection

Remove components from the packing case(s) carefully; check contents against packing list. Inspect all components for obvious damage and broken/loose parts or fittings. Notify the carrier and AMETEK Service (1-800-537-6044) immediately if parts are missing or damage is found.

Sample System Space Requirements

Explosion-proof enclosure - approximately 42 x 48 x 46 cm plus clearance for analyzer connections. Refer to Figure 3.

Power Requirements

The System is shipped according to the customer order and is fused and set for the voltage of the required mains power. The power requirements are stated on the metal plate on the side of the casting and in the specification section of analyzer manual.

System Tubing

Recommended system tubing is 1/8 inch OD, electro polished, 316 stainless steel meeting ASTM #632 specifications (AMETEK PN 257707000 or equivalent).

Dry Reference Gas

A dryer (AMETEK Dryer PN 305400901S or equivalent) is required to dry reference gas to less than 0.025 ppmv.

A dryer (AMETEK Dryer PN 305617901S or equivalent) is required to dry the gas to less than 0.01 ppmv for zeroing the 3050-SLR.

Dryers must be periodically replaced. In normal use, the dryer (PN 305400901S) should dry a 50-ppm reference gas to specification for 1 year.

Sample pressure and temperature requirements

Pressure reduction is user supplied to ensure sample pressure to the analyzer remains within the minimum and maximum range of 20 - 50 psig. The pressure reducer/regulator with gauge should be installed near the sample tap in-between the tap and analyzer. Refer to figure 3-6 in analyzer manual. For optimum performance, sample line should be heat traced to maintain a constant sample temperature. Optimum sample gas input is 60°C.

Mechanical Installation

Locate the 3050 system 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.

1. If not already installed, install a main process shut-off valve at the sample tap. Refer to figure 3-4 of users manual.

2. Mount system in selected location and bolt in place. Refer to figure 3-3 of users manual.

3. Connect instrument air to 1/4-inch tube fitting. Maximum input 100 psig. Set pilot valve to 80-100 pisg.

4. Connect the analyzer 1/8-inch exhaust tube fitting to appropriate vent system.

Insure venting does not empty into or create a hazardous atmosphere.

5. If purchased, connect the heated pressure reducer 1/4-inch relief out and vapor bypass tube fittings to appropriate vent system. Refer to figure 3-5 of users manual.

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

7. Connect the sample line to the sample valve 1/8-inch tube fitting.

Connect as soon as purge is complete.

8. Re-inspect process line connections making certain that all are connected to the proper external supply, exhaust, and drain tubing such that there shall be no release of hazardous process gas to the atmosphere.

Differential pressure between inlet and outlet must be at least 20 psig.

9. Open main process shut-off valve.

10. Open valve to dryer 1/4 to 1/2 turn prior to closing the lid and starting analyzer.

Electrical Connections

1. Access terminal in power signal Junction Box.

2. Connect the 4 to 20 mA analog output and alarm contacts from the terminal block to user recording equipment as shown on wiring diagram figure 2.

3. Connect serial communication from analyzer to the PC being used for customer parameter setup.

RS-232 Out - Connect RS-232 cable to connecter on the sample system plate.

RS-485 In - Connect RS-485 in cable to the terminal block. Refer to wiring diagram figure 2.

OR

RS-485 Out - Termination plug is installed at the factory. Remove the RS-485 termination plug from the RS-485 Out connection when communicating with multiple analyzers except for the last analyzer in a chain.

4. Connect line power to analyzer.

5. When installing external wiring to the outer protective enclosure, use appropriate thorough-wall bulkhead connections suitable for the hazardous area classification and the environmental conditions to be encountered.

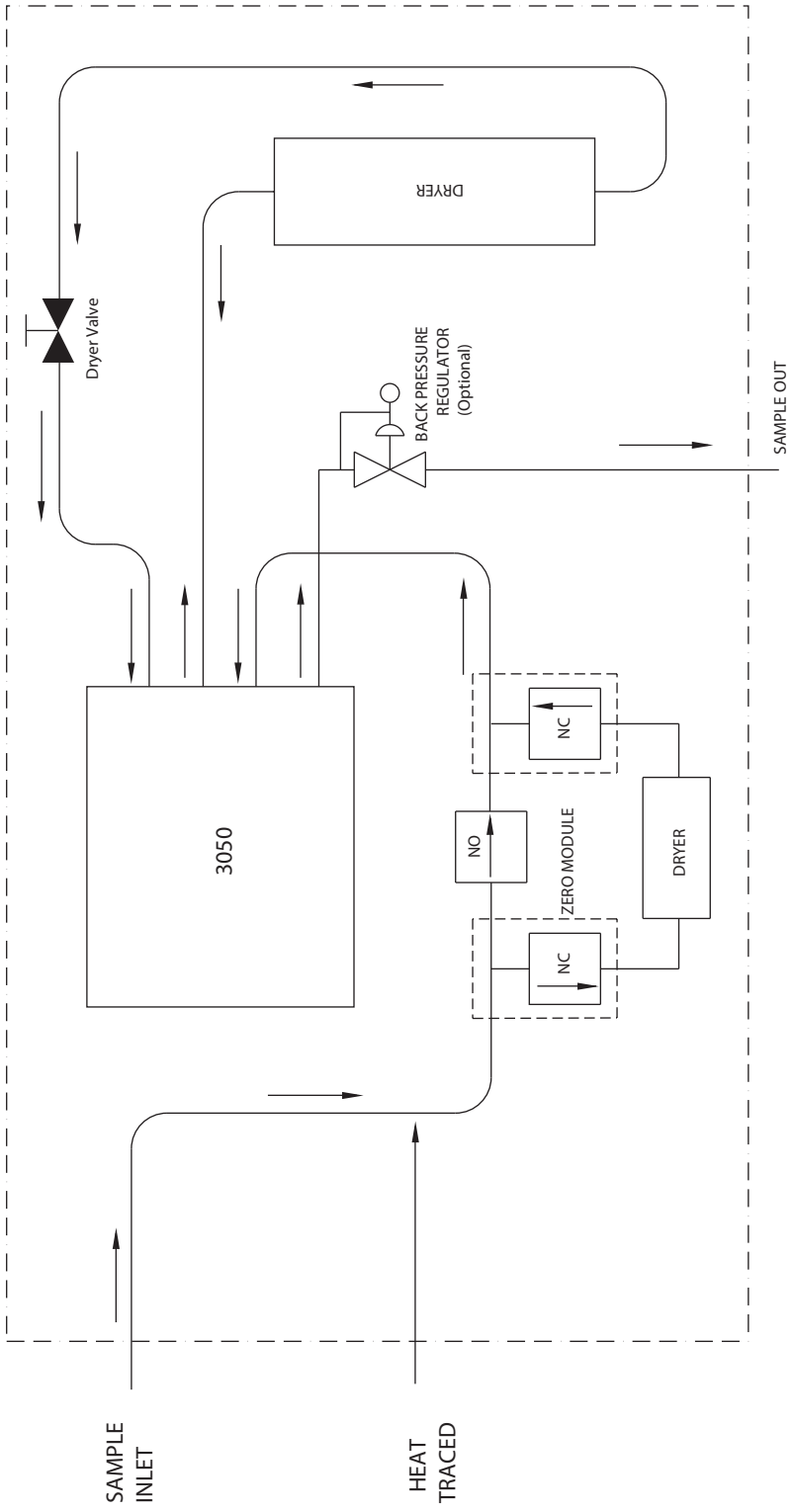


Figure 1. Sample System
Flow Diagram

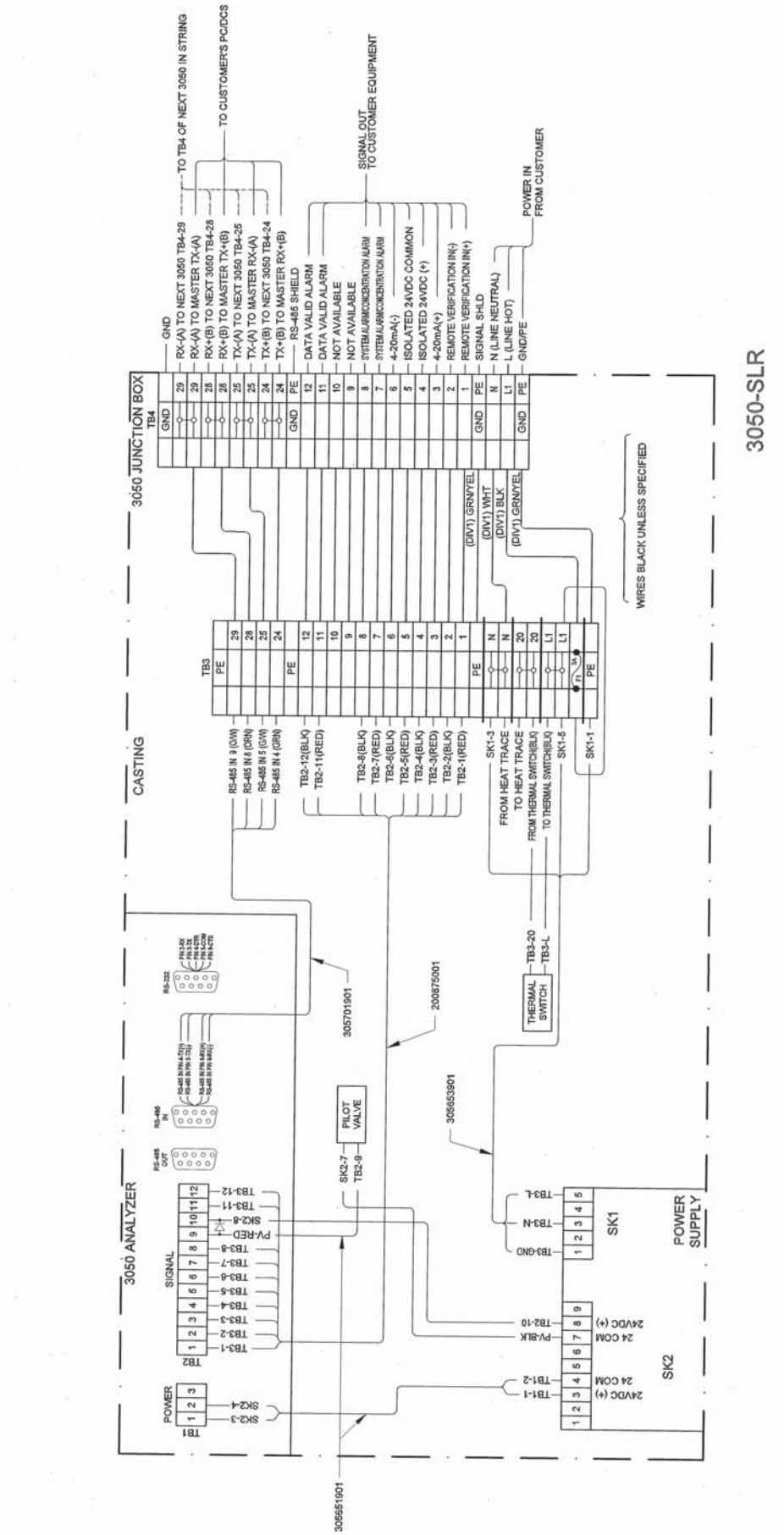


Figure 2.
Sample System Wiring Diagram with Junction Box

Analyzer Start-up

1. Turn on power source.

2. Open main process shut-off valve. Adjust sample pressure between 20 and 50 psig. Allow the analyzer to dry down before recording moisture concentration measurements.

Dry Down Period

Allow a minimum of two hours for the analyzer to dry down and stabilize. For sample systems, allow a minimum of three days. System alarms are normal during this period. When dry down is complete, cell frequency will be stable and the recorded data will have leveled off.

Status LEDs and Alarms

There are three LEDs used for local indication of the system status. The green LED indicates power is supplied to the system. The red LED is used to reflect the status of the concentration, data valid, and system alarms. In the event of a concentration alarm, the red LED will be on. The yellow LED reflects sample flow status. On indicates sample gas is being measured, off indicates dry reference gas. In the event of a system alarm, the red LED will signal the source of the problem. The red LED will flash on for one second and off for one second with the number of flashes as indicated in Table 1. Once a flash sequence has completed, the LED will remain off for five seconds. At the end of the pause period, the sequence will be repeated. If there are multiple system alarms then the highest priority alarm will be indicated until it clears. The alarms are listed in order of priority with the higher priority alarm having the fewest flashes.

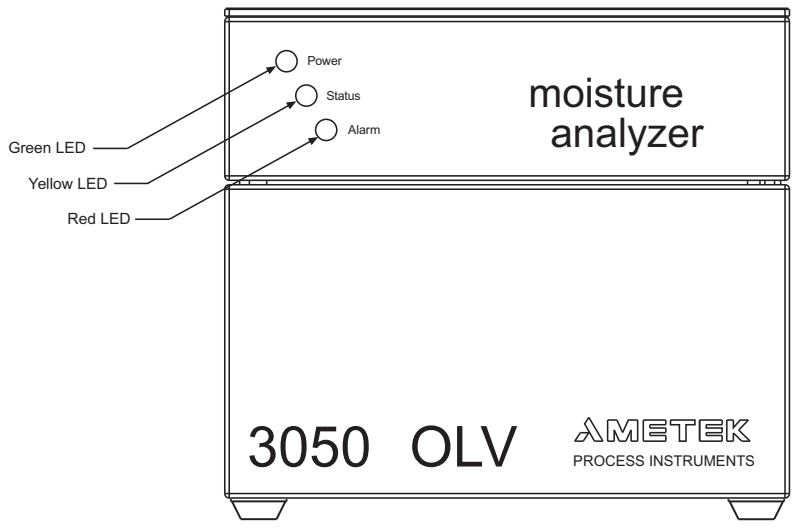


Figure 3. Leds

Table 1 Alarms

Alarm Source / LED Flashes per Cycle		Problem	Action
Memory Failure*	1	CPU hardware failure	Call AMETEK Service.
Sample Sensor Failure*	2	Sample senor hardware failure	Replace sensor or call AMETEK Service.
Calibration Failure*	3	Analyzer performance out of tolerance as detected during verification cycle.	Call AMETEK Service.
Oven Temperature*	4	Oven temperature is out of tolerance.	This will occur during start-up until the oven warms up. Call AMETEK Service if problem persists.
Flow Out of Tolerance*	5	Sample flow rate too high or too low	Check inlet and outlet pressure. Call AMETEK Service if problem persists.
Battery Low*	6	Battery needs to be replaced.	Call AMETEK Service.
Reference Gas*	7	Analyzer detected problem with reference gas.	Check and/or replace dryer. Call AMETEK Service if problem persists.
Enclosure Temperature	8	Excessive internal temperature.	External temperature should be 80°C or less.
Moisture Generator Date	9	Moisture generator date has expired.	Call AMETEK Service. Replace moisture generator.
Dryer Alarm	10	Dryer failure Imminent	Replace dryer
Reading Alarm	11	Moisture concentration is out of user defined limits, or analyzer is off-line verifying, or pressure is outside of range for dewpoint calculations.	Review alarm settings and use configurator software to identify source of

Data valid contact opens on all alarms and stays closed during normal functions and readings. An open data valid contact indicates verification is in process or an alarm condition.

* Indicates System Alarm and Data Invalid Signal