Instruction Manual
IM-105-3000, Orignal Issue
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OPM 3000

Opacity/Dust Density Monitor

ROSEMOUNT® Analytical

http://www.raihome.com

EMERSON™ Process Management

OPM 3000 Opacity/Dust Density Monitor

ESSENTIAL INSTRUCTIONS

READ THIS PAGE BEFORE PROCEEDING!

Emerson Process Management designs, manufactures and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you **MUST properly install, use and maintain them** to ensure they continue to operate within their normal specifications. The following instructions **MUST be adhered to** and integrated into your safety program when installing, using, and maintaining Emerson's Rosemount Analytical products. Failure to follow the proper instructions may cause any one of the following situations to occur: Loss of life; personal injury; property damage; damage to this instrument and warranty invalidation.

- **Read all instructions** prior to installing, operating and servicing the product.
- If you do not understand any of the instructions, **contact your Rosemount Analytical representative** for clarification.
- **Follow all warnings, cautions and instructions** marked on and supplied with the product.
- **Inform and educate your personnel in the proper installation, operation and maintenance of the product**.
- **Install your equipment as specified in the Installation Instructions of the appropriate Instruction Manual and per applicable local and national codes.** Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, **use qualified personnel** to install, operate, update, program, and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Emerson Process Management. Unauthorized parts and procedures can affect the product's performance, place the safe operation of your process at risk, **and VOID YOUR WARRANTY**. Look-alike substitutions may result in fire, electrical hazards or improper operation.
- **Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.**

The information contained in this document is subject to change without notice.

PREFACE

The purpose of this manual is to provide information concerning the components, functions, installation and maintenance of the OPM 3000.

Some sections may describe equipment not used in your configuration. The user should become thoroughly familiar with the operation of this module before operating it. Read this instruction manual completely.

DEFINITIONS

The following definitions apply to WARNINGS, CAUTIONS and NOTES found throughout this publication.

⚠WARNING

Highlights an operation or maintenance procedure, practice, condition, statement, etc. If not strictly observed, could result in injury, death, or long-term health hazards of personnel.

⚠CAUTION

Highlights an operation or maintenance procedure, practice, condition, statement, etc. If not strictly observed, could result in damage to or destruction of equipment, or loss of effectiveness.

NOTE
Highlights an essential operating procedure, condition, or statement.

SYMBOLS

⏚ : EARTH (GROUND) TERMINAL

⏚ : PROTECTIVE CONDUCTOR TERMINAL

⚠ : RISK OF ELECTRICAL SHOCK

⚠ : WARNING: REFER TO INSTRUCTION BULLETIN

NOTE TO USERS

The number in the lower right corner of each illustration in this publication is a manual illustration number. It is not a part number and is not related to the illustration in any technical manner.

Table of Contents

Section 1 Description and Specifications

SYSTEM OVERVIEW

The OPM 3000 Opacity/Dust Monitor provides continuous, low maintenance, precision measurement of opacity and optical density in industrial applications. It is a cost-effective instrument that serves as an aid in operating pollution and/or process control equipment.

Transmissometer/Retro Reflector

The OPM 3000 is a precision, double-pass, dual beam Transmissometer that consists of a transceiver (transmitter/receiver) mounted on one side of a stack or duct and a passive reflector mounted on the opposite side. The light source, photo detectors and all measurement/reference optics used in opacity measurement are housed in the transceiver.

The function of the reflector is to return the measurement beam to the detector in the transceiver, creating a double pass across the process stream. The standard reflector is used for measurement path lengths up to 15 feet (4.6 m). For longer path lengths, maximum 60 feet (18.3 m), reflectors, optical parts and electronics will vary.

Control Unit

Mounted in a control room environment, the OPM 3000 control unit provides instrument control functions, opacity readings, alarms, analog outputs, communications, system information and more.

Optional Air Purge Weather Cover System

The transceiver and reflector may be mounted in weather covers. The weather covers are fairly compact to allow movement around them even on a three-foot walkway or platform. They protect the stack-mounted components from dirt, moisture, stack temperatures within the specified ambient temperatures limits, and errant air currents around the stack.

The air purge system constantly circulates air past the optical window. The airflow is directed through the hose to an air plenum on the stack side of the optical window. The airflow in the air plenum area results in reduced pressure and increased velocity. This venturi effect tends to continually draw the air around the optical window into the purge air stream, thereby keeping the lens clean for long periods.

Alignment System

The OPM 3000 includes a built-in through-the-lens alignment system. The alignment target can be viewed through a window on the transceiver. Adjustments to changes in alignment are provided by a 3-point alignment system, which is integral to the air plenum.

Cabling

The standard cabling used between the stack-mounted units and the control unit is at a minimum 2-pair, #22 AWG, twisted, shielded cable. More pairs or larger than 20 AWG is acceptable.

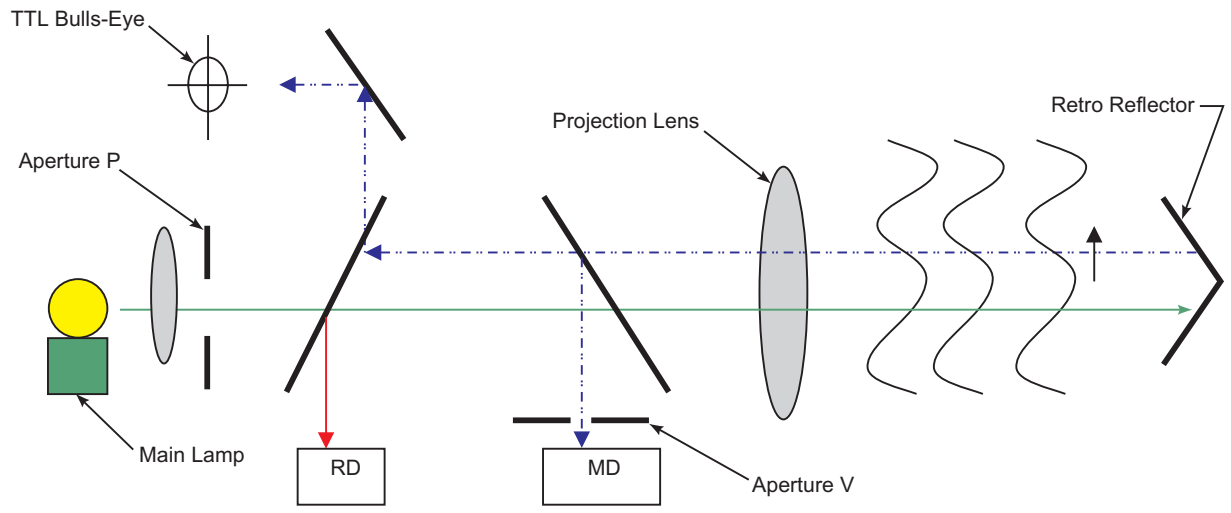
PRINCIPLE OF OPERATION

Normal Mode of Operation

The dual beam measurement system has a stack mounted transmissometer sensor system that consists of an optical transceiver mounted on one side of the stack and a retro reflector mounted on the other (Figure 1-1). To avoid errors due to ambient light, the lamp is electronically modulated and projects a collimated beam of light, which is split into a reference beam, and a measurement beam by an optical beam splitter. The reference beam is directed to the reference detector (RD). The measurement beam is projected across the stack to a retro reflector that returns the beam back across the stack to a beam splitter and directs the measurement beam to the measurement detector (MD). A portion of the returning light is also sent to the TTL (Thru The Lens) bulls-eye target viewed through a window provided at the rear of the transmissometer. The bulls-eye is used to correct changes in alignment and is unique in that no moving parts are used.

The ratio of the measurement and reference detectors is used to provide a transmittance^2 (T^2) signal. Because the same light source is used for both detectors, and a measurement / reference ratio is used throughout for the calculations, the monitor is insensitive to variations in light intensity. Since all measurements are made on a ratio basis, all resulting computations are independent of the absolute intensity of the light source or contamination of the optics associated with the collection and focusing of the energy from the lamp. The (T^2) signal is converted to a current format and sent to the control unit for processing. At the control unit the signal is processed to read 0-100% opacity, and provide alarms and outputs.

Figure 1-1. Component Relationships



SPECIFICATIONS

OPM 3000 Specifications	
Control Unit	
Enclosure	Panel mounted IP65/NEMA 4X Dimensions 3.8 in. x 3.8 in. x 2.5 in. (96 x 96 x 64 mm). Power 20.4 to 28.8VDC < 10% ripple, 400 mA.
Digital Display	LED backlight
Ambient Temperature Range	+32 to +122°F (0 to +50°C)
Power Requirements	24 VDC
Alarm Time Delay and Set Point	Field programmable, 10 pnp (source) outputs 24 VDC
Alarm Reset	Manual or Automatic
Analog Outputs	Two 12-bit Analog outputs: 4-20 mA, 0-10 VDC
Exit Correlation (Lx / Lt)	0.3~1.0 OPLR
Calibration Check Options	Manual zero and span calibrate with dedicated zero reflector or Zero with clear stack condition.
RS232/RS485 Two Ports each	Connect to GSM or standard telephone modem - send receive SMS messages; Remote access; RS485 networking
I/O Expansion Port	Up to 128 additional I/O
Battery Back	7 years typical
Transceiver/Reflector	
Enclosure	NEMA 4 watertight enclosure. Power 120/240 VAC, 50/60 Hz
Path Length	24 inches to 46 feet (61 cm to 14 meters)
Optical System	Double Pass
Reflector	Type 1 (plastic) reflector assembly
Light Source Aging Compensation	Automatic
Light Source Life	45,000 hours (>5 years)
Ambient Temperature Limits	-40 to + 130°F (-40 to +54°C)
Process Gas	Up to 750°F (400°C)
Alignment Verification	Built-in through-the-lens sytem standard
Mounting Flanges	3 inch IPS, 150 lb flange, standard
Ambient Light Immunity	Solid-state electronic light modulation
Wiring	2 pair twisted shielded cable, 22 AWG
Design and Performance	
Peak and Mean Spectral Response	Photopic; 515 to 585 nm less than 10% of peak response outside the desired 400 to 700 nm region.
Angle of View	<4.0° from optical axis
Angle of Projection	<4.0° from optical axis
Calibration Error	<±2% of full scale
Response time	<10 second
Zero Drift	<1% (24 hours)
Calibration Drift	<1% (24 hours)
Operational Period	6 Months

Section 2 Installation

⚠WARNING

Before installing this equipment, read the “Safety instructions for the wiring and installation of this apparatus” in Appendix A. Failure to follow safety instructions could result in serious injury or death.

⚠WARNING

Install all protective equipment covers and safety ground leads after installation. Failure to install covers and ground leads could result in serious injury or death.

⚠WARNING

Before making any electrical connections, make sure the AC power supply is first switched off. Failure to do so could cause personal injury or even death. Make sure that the voltage and frequency of the AC supply match the designations on the analyzer component tags.

INSTALLATION CONSIDERATIONS

Choose an Installation Site

The primary considerations for choosing a site for the OPM 3000 is accessibility, ambient environmental conditions, and locating the unit to obtain a representative sample of the process. The following general guidelines should be considered.

Accessibility

Locate the instrument where it will provide safe access for periodic maintenance and inspection. A platform or walkway is required for access to the sensors and weather covers.

Environment

Locate the stack-mounted units in an area with ambient temperatures between -40° to +130°F (-40° to 54°C). (Consult the factory for other temperature ranges.) Areas that are clean and dry are desirable. Avoid areas with condensation.

Maintenance intervals are directly related to the installation environment. Intervals can vary from 2 to 3 months in fairly clean environments, to twice a month in dirty environments. Lens cleaning is a function of the ambient conditions and cleanliness of the purge air.

Locate the instrument to avoid excessive vibration or shock.

Locate the control unit in an easily accessible area with temperatures between +32° to 122°F (0° to 50°C). To permit the operator to read and/or change controls, the unit should not be mounted higher than five feet from floor level.

Stack Exit

It is recommended to locate the transceiver at least two stack diameters from the stack exit.

MECHANICAL INSTALLATION

Drawing Notes

A review of the drawings and procedures provided will help to produce an error free installation. However, there are important additional points that must be observed. The beam of the instrument must be kept in a horizontal plane; the transceiver cannot be rotated more than ±10° from vertical. The weather covers must be installed vertically level.

Installation and wiring diagrams are found at the end of this manual. Please review all drawings prior to starting installation or wiring.

Platforms

A platform or walkway must be available for access to the weather covers. The optimum condition is to have the mounting flanges and weather covers approximately 5 feet (1.5 m) above the floor. A minimum of 12 in. (305 mm) from the bottom of the weather cover to the floor is required in order to remove the air filters. Railings and other obstructions should allow the weather cover to swing clear as shown in the installation drawings.

Alignment of Stack Flanges

Stack flange alignment is the first step in successful installation. The final beam alignment adjustments are described in the Beam Alignment Procedure.

Installation of Stack Flanges

For an opacity monitor, the customer is required to supply and install two 3 in. IPS flanges at eye level directly across from each other. The flange faces, mounted on pipe stubs, should be approximately 6 to 8 in. (152 to 203 mm) from the stack or insulation. On completion of the installation, the flanges must be aligned so that the total deviation of the light source flange relative to a common centerline does not exceed $\pm 1^{o}$ and the retro reflector flange does not exceed $\pm 3^{o}$.

Flanges should be mounted approximately 5 feet (1.5 m) up from the deck of the platforms, roof or walk way.

At installations where conditions permit, this may be accomplished by using a piece of 2-1/2 in. pipe suspended across the stack protruding far enough to allow slipping the 3 in. flange pipe assemblies over each end and welding in place as shown in Mounting: Under 6 ft (1.8 m) Diameter drawing in Section 8.

Any deviation up to the previously specified limits can be adjusted during the installation and alignment of the light source and retro reflector with the system's alignment adjustments.

Where installations do not permit the use of the method mentioned above, the following procedure will accomplish the same results. (See Mounting: Under 6 ft (1.8 m) Diameter drawing in Section 8). An alignment tool can be purchased from the factory to ensure accurate alignment.

Accurately locate one 3-1/2 in. (89 mm) diameter hole (large enough to accept the 3 in. pipe) and the other hole approximately 1/2 in. (12.7 mm) diameter, directly across from each other. Attach the alignment tool to the flange/pipe assembly and insert the pipe into the 3-1/2 in. (89 mm) hole in the stack wall. Align the assembly with the 1/2 in. (12.7 mm) diameter hole on the opposite side by viewing through the alignment tool and weld the pipe in place. Care must be exercised when welding to maintain alignment.

The 1/2 in. (12.7 mm) diameter hole should now be enlarged to approximately 3-1/2 in. (89 mm) to accept the other flange/pipe assembly. Proceed in the same manner, installing the assembly with the alignment tool attached, and weld in place maintaining concentric alignment with the 3 in. pipe previously installed on the opposite wall.

Sample Area

To achieve a representative sample, the accepted practice is to have the measurement path of the instrument directly in the center of the stack. An area should be chosen where the gases are not stratified in the stack or duct.

When installed near a bend, install the transceiver in the plane defined by the bend. Avoid locations where large amounts of condensed water may be present.

MOUNTING THE AIR PLENUM AND WEATHER COVERS

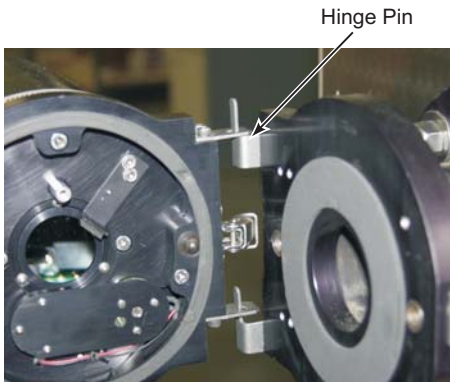
⚠WARNING

Control unit, Transceiver and Retro serial numbers must match.

After the installation site has been selected and the platform requirements have been met, the mounting flanges should be installed and aligned as described in Section 2, Installation of Stack Flanges. Flanges should be installed with the mounting faces on the vertical plane.

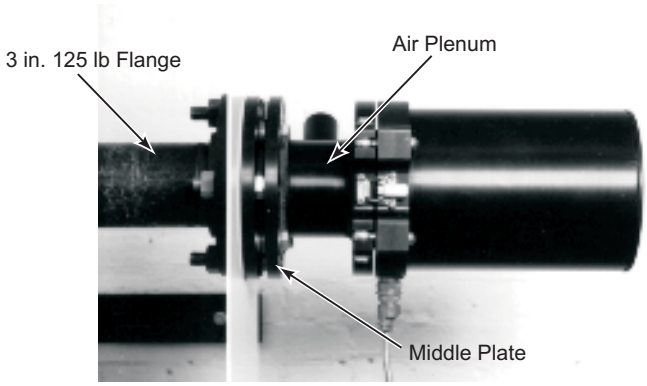
1. Before installing the transceiver, retro reflector, or any type of weather cover, remove the air plenum from both the transceiver and retro reflector. Removal will make the installation easier with less chance of damage while attaching the air plenums and optional weather covers when provided.

Figure 2-1. Transceiver and Retro Reflector Hinge Pins



2. If the transceiver and retro reflector have been shipped from the factory with the air plenum attached, un-clip both hold down latches, swing open and lift up and off the hinge pins (Figure 2-1). Place the transceiver and retro in a safe place.
3. The air plenum is attached to the customer supplied 3 in. pipe flange by four 2-1/2 in. long 5/8-11 bolts. Working from the 3 in. flange, assemble the gasket then air plenum.
4. If you have weather covers remove the two weather cover hood hinge pins located on the upper right and left hand corner of the hood. The air plenum and weather cover are attached to the 3 in. pipe flange by four 2-1/2 in. long 5/8-11 bolts (Figure 2-2). Working from the 3 in. flange assemble the gasket, weather cover mounting plate, gasket, and mating flange and air plenum. Place the 5/8-11 bolt through the top hole of the middle plate. Place a flat washer between the middle plate and mating flange and pass the bolt through. Slip a split lock washer over the bolt and secure with a nut. Repeat for the remaining three mounting bolts.
5. Connect any wiring or air hoses.

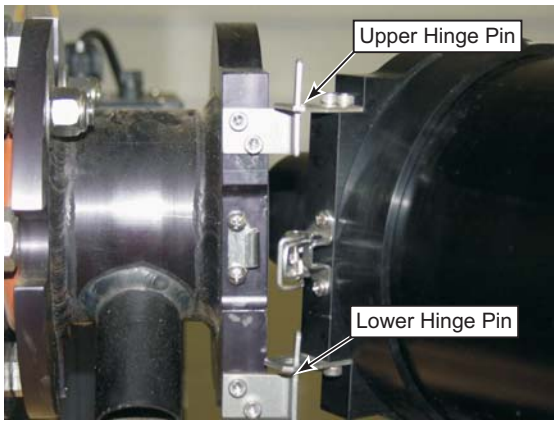
Figure 2-2. Air Plenum



Transceiver and Retro Reflector Assembly

1. Attach the transceiver and retro reflector to the air plenum assembly by placing them on the hinge pins (Figure 2-3).

Figure 2-3. Upper and Lower Hinge Pins



2. Close transceiver and retro and secure in place with the two hold down latches.
3. The air-purge blowers should be powered up at this time to prevent stack particulate from accumulating in the nipple and air-purge housing.

⚠CAUTION

If installed location has a positive pressure the air-purge system must be used continuously during installation to prevent process gases from contaminating optical surfaces or over heating instrument electronics. If the system is shut off for more than momentary interruptions, the instrument may be damaged. Failure to provide continuous air-purge may void the warranty.

All wiring from the control unit to the transceiver should be completed at this time.

Beam Alignment Procedure

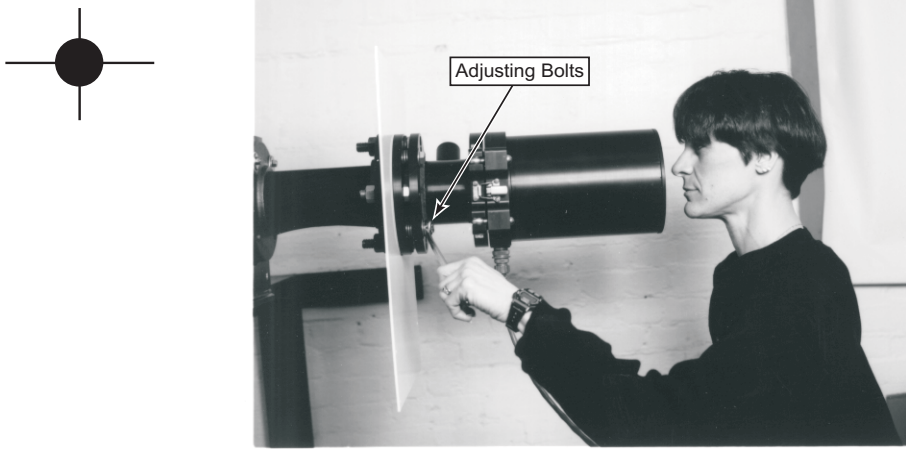
NOTE
Alignment can not be done unless the power is applied to the stack mounted service module. The control unit does not have to be connected or powered. For alignment accuracy, the stack should be at normal temperature.

NOTE
Alignment should be completed before instrument calibration. For alignment accuracy, the stack should be at normal temperature.

1. If not already on, turn on the power to all air purge systems and service module.
2. Align the reflector mating flange so it is level and parallel to the 3 in. 150 lb mounting flange. Use the 3 adjusting bolts on the air purge plenum flange until this is accomplished. The adjusting bolt nuts have nylon locking inserts to prevent loosening by vibration.

Move to the transceiver and determine monitor alignment by looking through the viewing port located on the rear of the transceiver and observing whether the beam image is in the center of the cross hair (bulls-eye) an shown in Figure 2-4.

Figure 2-4. Alignment of the Transceiver.



Section 3 Startup and Calibration

BEFORE STARTUP

You must complete the following before startup is attempted.

1. Measure and record flange-to-flange distance to verify it is the same as the final check out sheet.
2. If you are using a recorder, DAS, etc., **DO NOT CONNECT THEM NOW**. Outputs and inputs from other sources should be left off until system has been completely checked according to the following instructions. After system operation has been verified, connect and test external connections.
3. Read the instructions first to familiarize yourself with the instrument before attempting startup.
4. The air purge and weather cover system, transceiver, retro reflector, and service module must be installed and power applied.
5. Control unit must be installed and wired to the service module and customers equipment as applicable.
6. All wiring and mechanical installations must be complete per drawings provided in this manual. All wiring must be checked and power applied to both the control unit and the stack maintenance module.
7. Beam alignment procedure has been completed.

STARTUP

Emerson Process Management is available to assist you; call our Customer Support Center (CSC) at 1-800-433-6076 for details and to schedule startup.

FIRST TIME ADJUSTMENT AND CALIBRATION PROCEDURES

Clear On Stack Zero and Span Calibration

The following adjustments are for the first time the instrument is installed. Routine calibration is outlined in the following section.

To calibrate or adjust the OPM 3000, use the following steps.

NOTE
Calibration must be performed with the boiler or process shut down to produce a clear stack condition or use the optional OPM 3000 test flange kit.

The instrument has been calibrated at the factory to specifications received and if the actual dimensions of the flange to flange are exactly as received the calibration adjustments required will be minimal.

Before proceeding, clean both transceiver and retro reflector lens. Always disconnect power when removing or replacing the transceiver housing.

The beam alignment must be completed before calibration is performed.

Remove the transceiver cover by removing the screw below the target viewing window and pulling the housing straight back until it clears the optical plate.

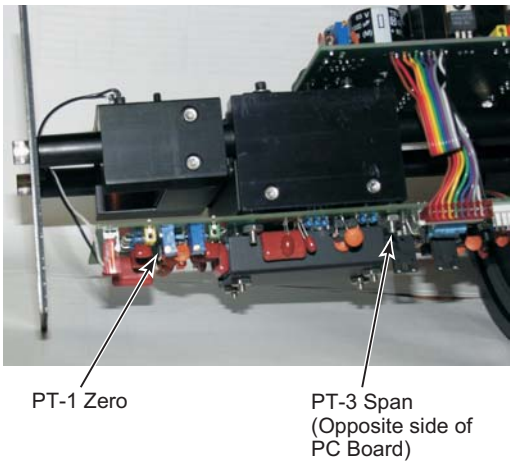
Connect an accurate meter to measure the 4-20 mA signal from the transceiver to the control unit at terminal 8 (+) and 9 (-) in the J box, Electrical Installation drawing in Section 8. The meter should be placed in series with wiring or remove both wires and place the meter across 8 (+) and 9 (-).

NOTE
Allow readings to stabilize before proceeding to the next step. Wait one minute for maximum accuracy.

With a Clear Stack Condition:

1. Remove the cover of the transceiver (Figure 3-1) and adjust PT-1 (zero) on the Signal Processor PCB slowly clockwise several turns until you decrease to about 10 mA. Slowly turn the PT-1 counterclockwise until you have 20 mA (zero % opacity).

Figure 3-1. Zero and Span Adjustments



   a. If you have the optional Micro-turn zero mirror, place it on the transceiver. Swing open the transceiver and attach the Micro-turn by placing it on the alignment pins and secure it to the transceiver with the thumb screw. With the large knurled adjustment knob adjust the Micro-turn to equal the across stack zero condition previously set, 20 mA zero % opacity, and then lock the mirror in place. Place a span filter of at least 80% in the slot provided in the Micro-turn and adjust PT-3 (span) on the Signal Processor PCB until the mA meter reads the calculated mA using the formula:

      $[(1- \%\ opacity/100)^2 \times 16] + 4 = mA$

   b. Without the optional Micro-turn zero mirror please call our Customer Support Center at 1-800-433-6076.

2. Repeat adjustments until they are within ± 0.04 mA.
3. Remove the on line reflector and place in a safe place. If at anytime you need to check the clearance across stack zero, just install the on-line reflector. Because the on-line reflector was set during initial calibration it can be used to re-establish the instruments across stack zero even if the source is running.
4. Calibration is complete. Connect the wires as before and replace the cover. Close the transceiver and clamp it securely in place.

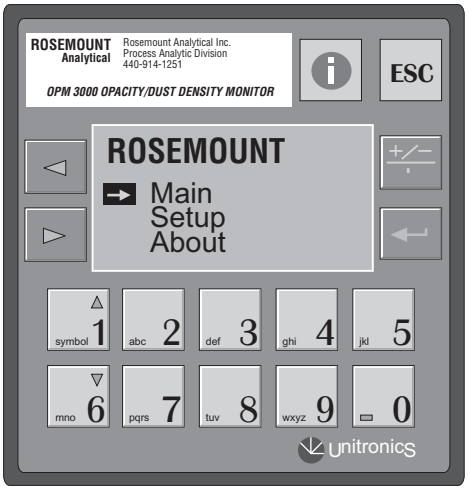
Section 4 Normal Operation

REMOTE CONTROL UNIT

Main Display Screens

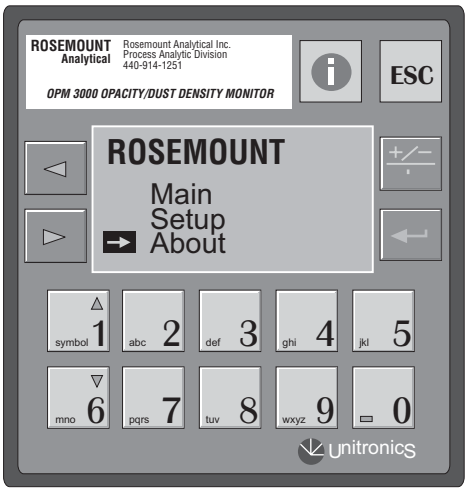
When power is first applied the screen is ready for the operator to select the operation. Arrow curser is pointing to Main (Figure 4-1).

Figure 4-1. Main Page



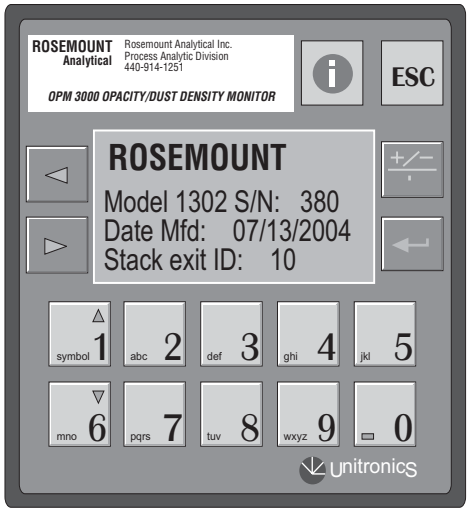
By pushing UP button (#1 ▲) or the DOWN button (#6 ▼) you can select the Main, Setup or About pages. Use the return button (←) to enter the page (screen) you desire.

Figure 4-2. About Page



Example: To get to the Setup page scroll down using button #6 ▼ to About (Figure 4-2) and press the right arrow head button ▶ to enter the 1st page of the about page (Figure 4-3). This will display the Model, Date of manufacture and Stack exit I.D.

Figure 4-3. First About Page



Now use the ▶ to toggle to the next about page that contains the Sensor location ID, Flange to Flange measurement and the OPLR (Optical Path Length Ratio), Figure 4-4.

Figure 4-4. Second About Page

Pressing ESC will get you back to the start page. Now press return button ↵ the process opacity will be displayed, Figure 4-5.

Press "ESC" to go back on any page.

Figure 4-5. Process Opacity

Setup of Password Protected Perimeters

From any screen press ESC until the Main, Setup and About Screen is visible. Scroll to Setup. Press the enter ←button and type in the password 1234. Next choose one of the 6 perimeters you want to set or change:

1. Exit diameter (Exit dia).
2. Measurement diameter (Measurement dia).

   Exit and Measurement diameters must be in the same scale i.e., inches, feet, mm, cm, etc. These measurements are used to automatically change the OPLR and will be displayed in the 2nd About screen.
3. Auto/Manual reset - In Auto Reset the alarm is cleared when the opacity level drops below the set points. In Manual Reset, alarms are latched until the ←is pressed.
4. Alarm set point - 0-99% must be above Early Warning set point.
5. Alarm delay - In seconds
6. Early warning set - 0-99% must be below Alarm set point.

OUTPUT CONNECTIONS

Channel #1, 0-100% Opacity 4-20 mA Output to Recording Devices

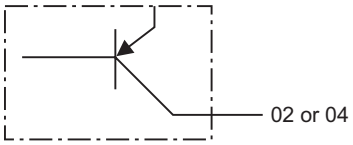
Maximum 500 ohm device load. Connect the minus (-) wire from your device to the bottom connector terminal 0V and the plus (+) wire from your device to the terminal A0.

Channel #2, 4-20 mA Output to Recording Devices

Maximum 500 ohm device load. Channel #2 is normally programmed for 0-100% opacity except if your system has the mg/m^3 then it will be 0-1000 mg/m^3. Connect the minus (-) wire from your device to the bottom connector terminal 0V and the plus (+) wire from your device to terminal A1.

ALARM OUTPUT CONNECTIONS

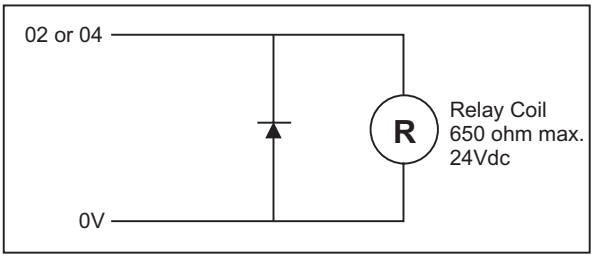
Alarm outputs are pnp transistor.



If you can not utilize the transistor, connect a 24Vdc relay (max 650 ohm coil) to bottom terminal 02 or 04 as shown in Figure 4-6. The coil will energize when the set limit is exceeded and will de-energize when reset only if the opacity has dropped below the set point. An additional Alarm 06 may be used for audible alarm and can be reset (acknowledged) even if the opacity is still above the set point.

NOTE
Make sure the jumper +V from the top connector to the Bottom connector +V is connected.

Figure 4-6. Alarm Relay Connection



EARLY WARNING ALARM OPTION

Follow Alarm instructions but connections for Early Warning are made to the bottom 03 and 05 terminals.

OFF STACK ZERO CALIBRATION

This procedure may be used if: A clear stack condition is not possible and the zero appears to be incorrect or if the flange to flange distance on site are different than the original factory set up.

1. Remove the transceiver and retro reflector from the hinge pins, remove the service module and install the system on test stands and at the correct flange to flange distance plus 11 in. (279 mm). The additional 11 in. (279 mm) compensates for air plenum spacing, as the air plenums are not used for the off stack zero calibration. If test stands are not available, an alternate method is to use 3 in. pipe flanges with air plenums installed, contact the factory for air plenum availability. Set the spacing between the 3 in. flanges exactly the same as flange-to-flange measurement.
2. Clean transceiver and retro windows.
3. Connect the control unit with the control to service module test cable kit and apply power to the system.
4. The retro reflector must be level.
5. Follow instructions for "Clear On Stack Zero and Span Calibration".

Section 5 Maintenance

⚠WARNING

Install all protective equipment covers and safety ground leads after equipment repair or service. Failure to install covers and ground leads could result in serious injury or death.

PREVENTIVE / CORRECTIVE MAINTENANCE SCHEDULE

Item to Check	Frequency	Procedure
Projection lens	As required	Clean with cloth, lens cleaning fluid
Beam alignment	As required	Check and adjust as necessary
Zero Reflector	As required	Clean with optical cloth and lens cleaning fluid
Air filters	3 months	Clean or replace as necessary
Air hoses	3 months	Replace as necessary
Hose clamps	3 months	Inspect and tighten
Mounting hardware	3 months	Check bolts for tightness
Weather cover	3 months	Clean as required
Cables and connectors	6 months	Check, clean, replace as required
Flange	6 months	Push build-up into stack to clear flange
Clear stack zero	Yearly	Calibrate if necessary
Transceiver and Retro	3-5 years (site dependent)	Return to the factory for internal optical alignment and cleaning

Section 6 Troubleshooting

TROUBLESHOOTING

Problem	Possible Cause	Remedy
Control unit reads high opacity	Smoke	Correct process
	Alignment is out	Adjust alignment until centered on target.
	Transceiver window and/or zero mirror is dirty	Clean window and or zero mirror
Control unit reads 100%	Transceiver current loop to the control unit is open	Check wiring for open from Terminal 7 and 8 on control unit to wire 9 and 8 at J-box location.
Alignment is good but control unit reads high opacity	Reference voltage TP-2 on signal processor is lower than 9.3V	Adjust lamp drive PT-2 on the power modulator until reference voltage TP-2 on signal processor is 10.0 Volts.
	Main lamp out	Replace main lamp assembly
Control unit reads high, lens clean, alignment is good	Dirt built up in flanges	Swing open transceiver and retro. Clean flanges with push rod.

Section 7 Replacement Parts

SPARE PARTS

Contact an Emerson Process Management sales department with the serial number of your instrument and they will make recommendations based on your system. Below are typical spares that should be considered.

OPM 3000 Recommended Spare Parts

Level I - General maintenance supplies recommended for all users.

Level II - Back-up critical printed circuit boards and parts suggested permitting rapid return to service if corrective maintenance is needed. Level II is recommended in addition to Level I for those users requiring maximum instrument availability.

Qty	P/N	Description
		Level I
1 per plant	6A00188607	Micro-turn 200 on-line test reflector kit. OPM 3000 Opacity/Dust Density Monitors, 3 neutral density filters and case
1 per inst.	1A99993H01	Main lamp pre-focused assembly
1 per inst.	1A99993H02	Transceiver/retro latch, spring and gasket repair kit
		Level II
1 per 4 inst. (minimum 1 per plant)	1A99993H03	R/M signal processor board
1 per 4 inst. (minimum 1 per plant)	1A99993H04	Power/modulator board
		Positive Air Purge Recommended Spares per plant
1 per plant	1A99993H07	Standard air purge blower, min 5CFM @ 36 inches H2O, Max 36CFM @ 2 Inches H2O
1 per inst.	1A99993H09	4-pack air filter replacement element (ID 1.5 OD 4.5 HT 5.875)
1 per inst.	1A99993H08	Air flow switch assembly for air purge blower

Section 8 Drawings

CONTROL UNIT PANEL MOUNTING DIMENSIONS

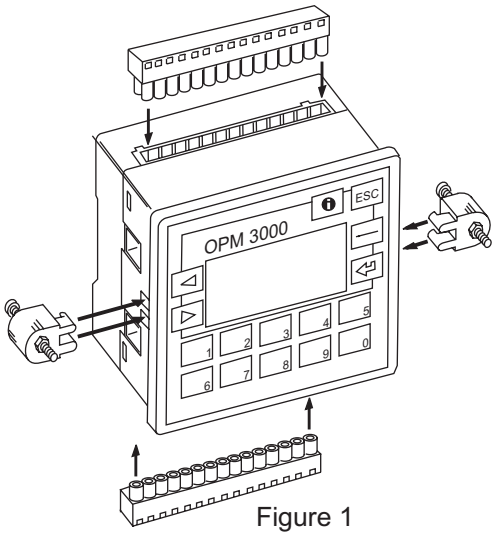


Figure 1

Before you begin, note that the panel itself cannot be more than 0.197 in. (5 mm) thick.

1. Make a panel cut-out that measures 3.62 x 3.62 in. (92 x 92 mm).
2. Check the seal that is placed over the back of the unit. The seal must fit snugly against the back rim of the operating panel.
3. Slide the controller into the cut-out.
4. Push the two black plastic mounting brackets into their slots on the sides of the controller as shown in Figure 1

.

5. Tighten the bracket screws against the panel as shown in Figure 2.

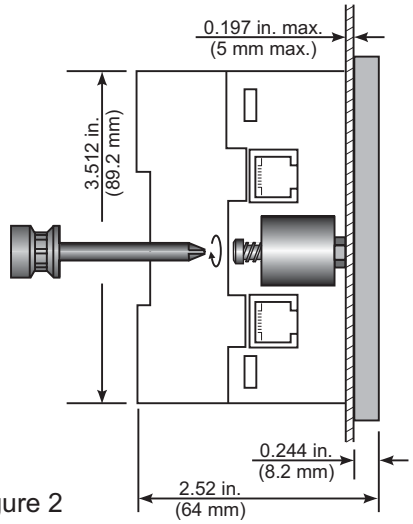


Figure 2

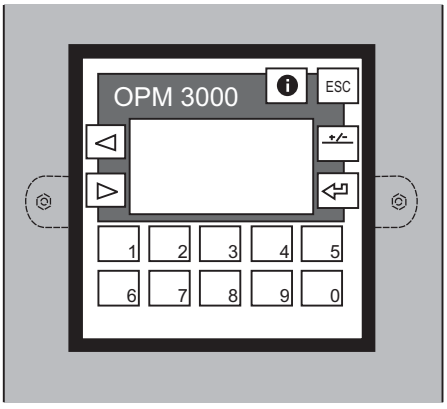
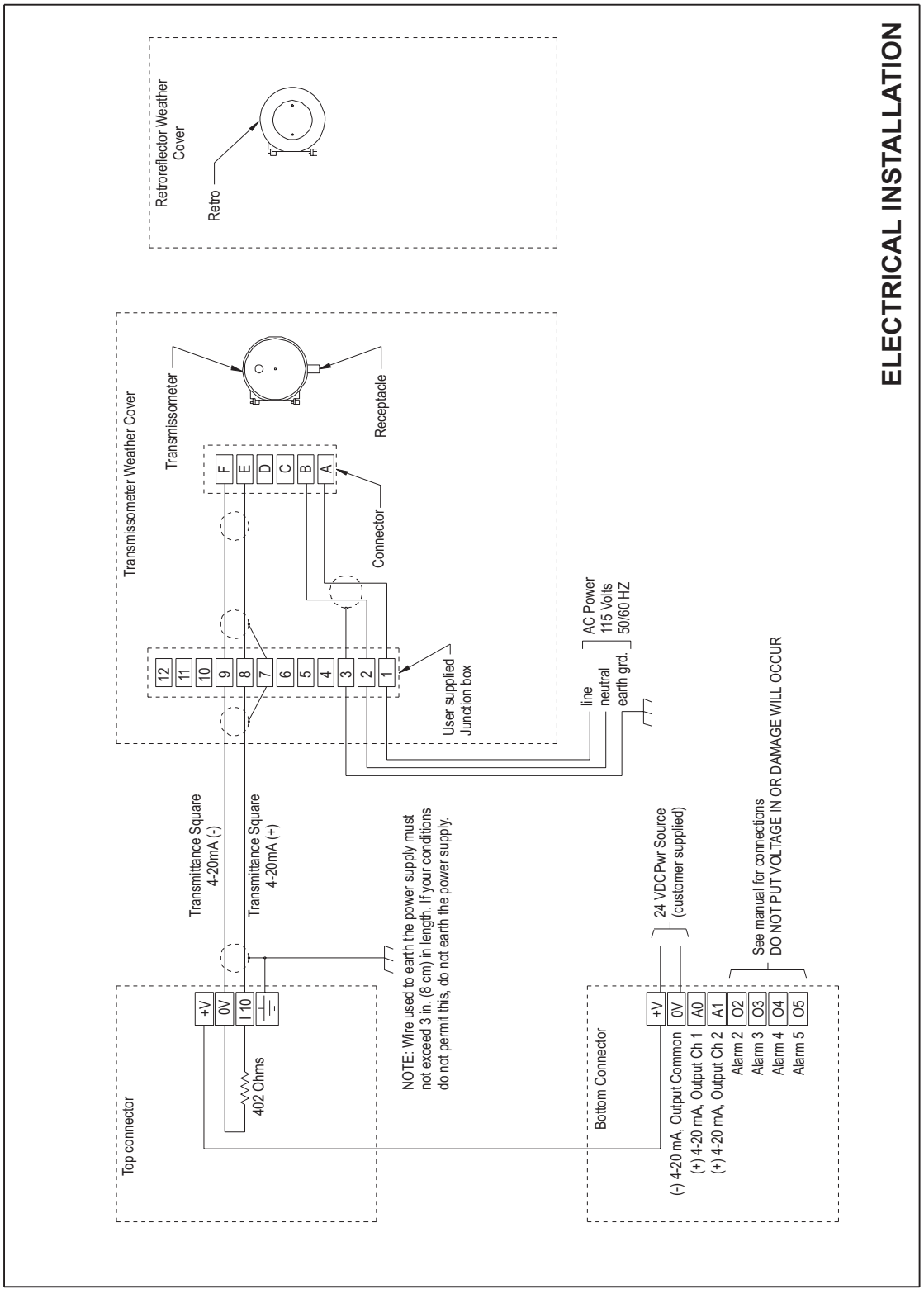


Figure 3

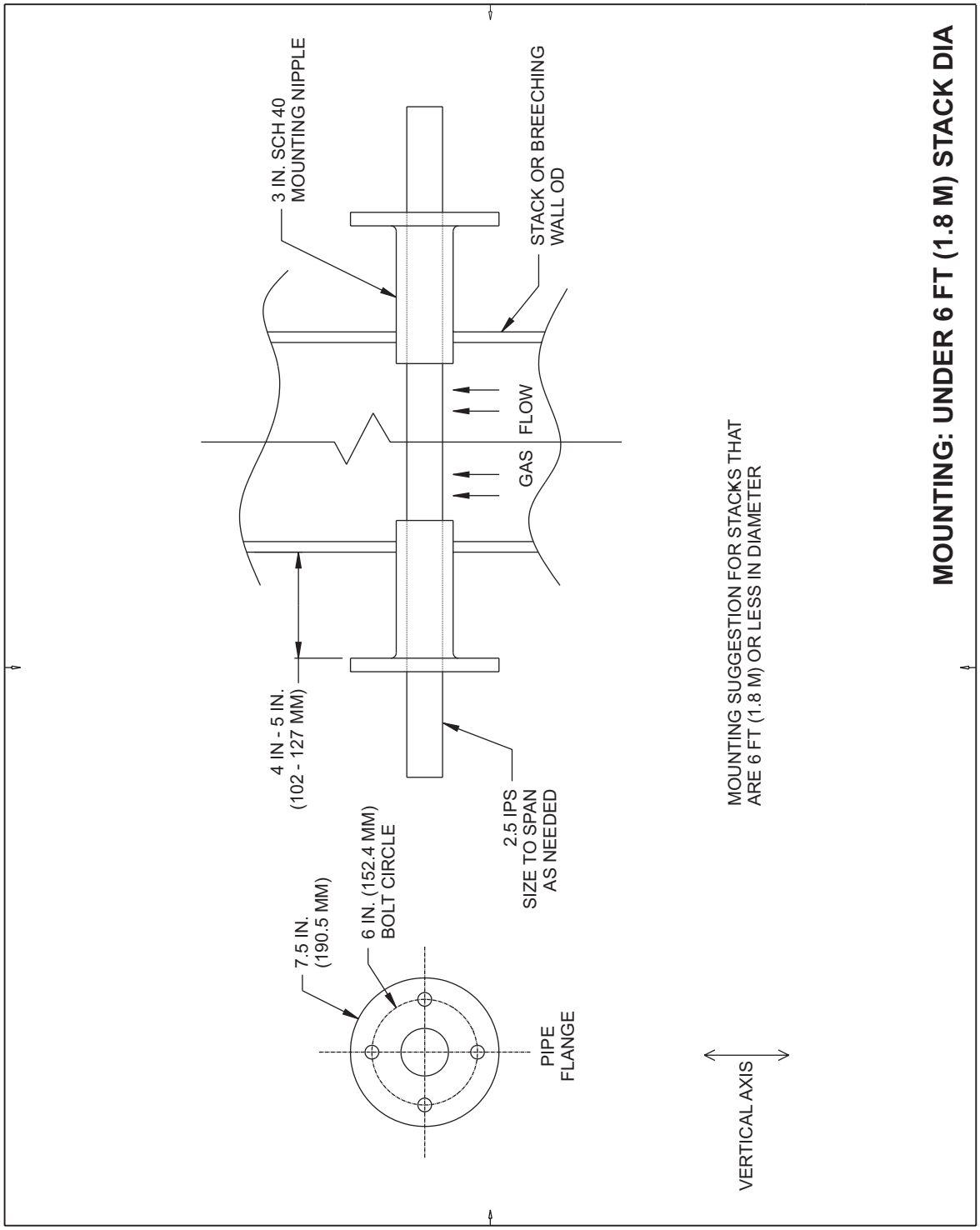
6. When properly mounted, the controller is squarely situated in the panel cut-out as shown in Figure 3.

CONTROL UNIT PANEL MOUNTING DIMENSIONS

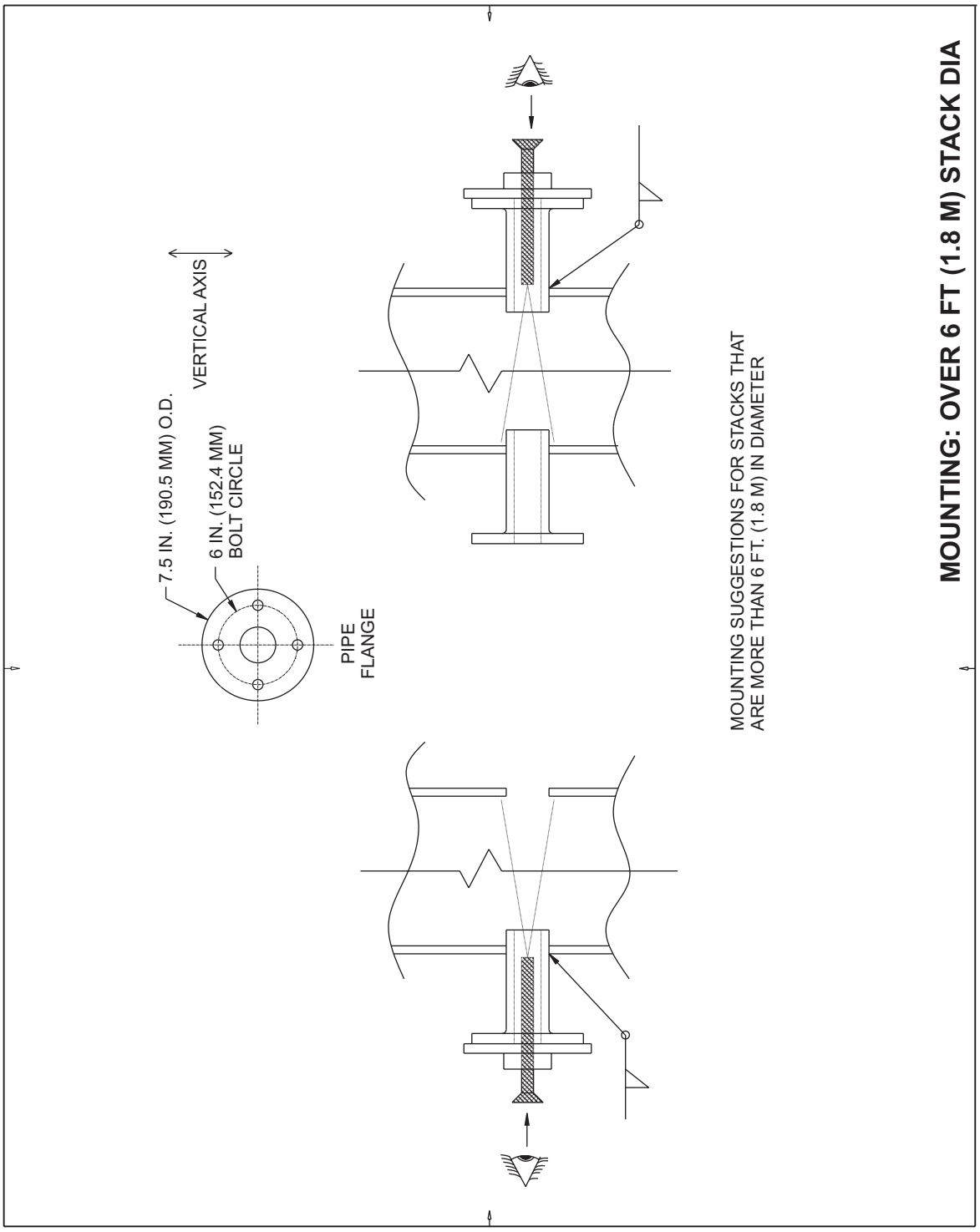
ELECTRICAL INSTALLATION



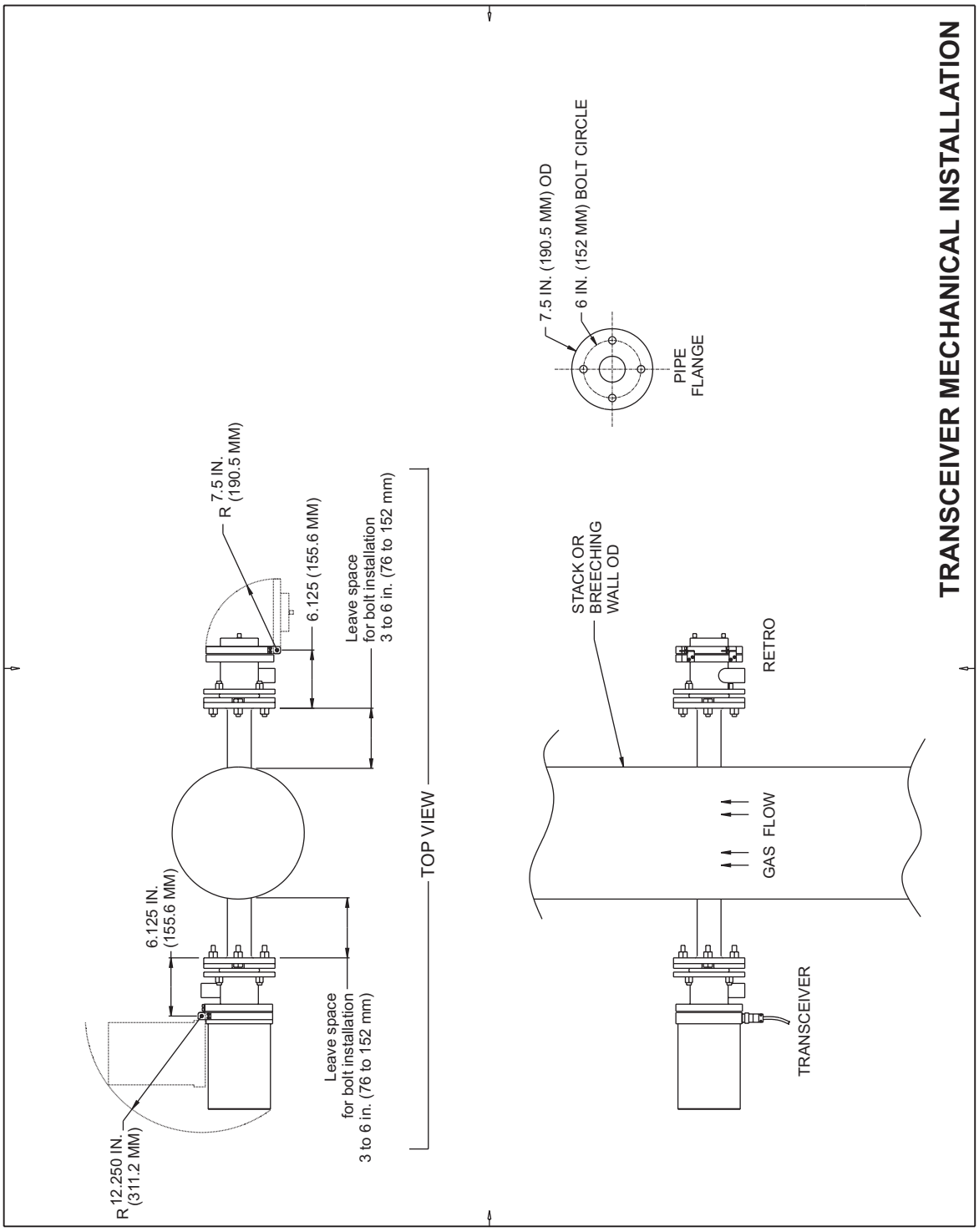
MOUNTING: UNDER 6 FT (1.8 M) STACK DIAMETER



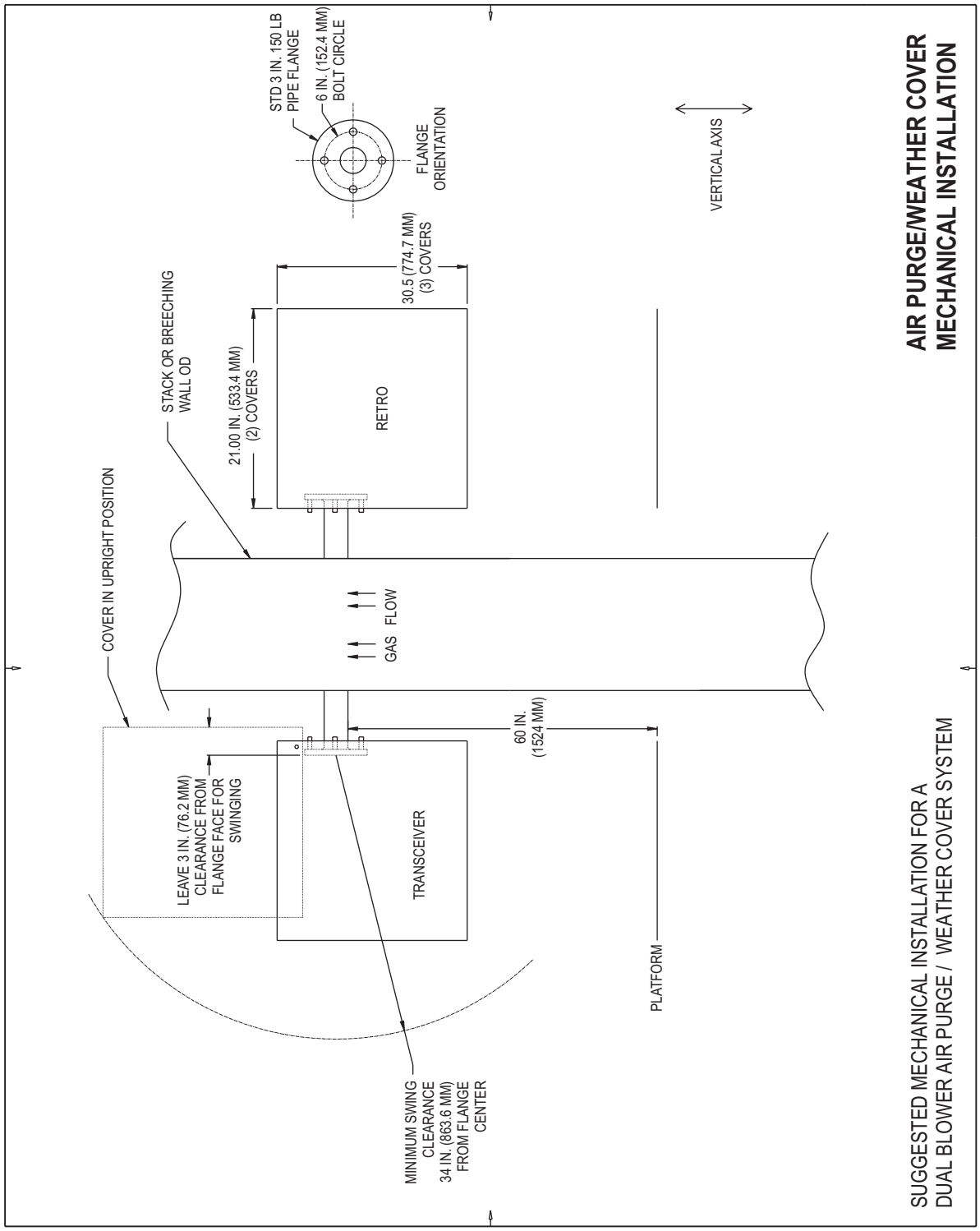
MOUNTING: OVER 6 FT (1.8 M) STACK DIAMETER



TRANSCEIVER MECHANICAL INSTALLATION



AIR PURGE/WEATHER COVER MECHANICAL INSTALLATION



Appendix A Safety Data

SAFETY INSTRUCTIONS

IMPORTANT

SAFETY INSTRUCTIONS FOR THE WIRING AND INSTALLATION OF THIS APPARATUS

The following safety instructions apply specifically to all EU member states. They should be strictly adhered to in order to assure compliance with the Low Voltage Directive. Non-EU states should also comply with the following unless superseded by local or National Standards.

1. Adequate earth connections should be made to all earthing points, internal and external, where provided.
2. After installation or troubleshooting, all safety covers and safety grounds must be replaced. The integrity of all earth terminals must be maintained at all times.
3. Mains supply cords should comply with the requirements of IEC227 or IEC245.
4. All wiring shall be suitable for use in an ambient temperature of greater than 75°C.
5. All cable glands used should be of such internal dimensions as to provide adequate cable anchorage.
6. To ensure safe operation of this equipment, connection to the mains supply should only be made through a circuit breaker which will disconnect all circuits carrying conductors during a fault situation. The circuit breaker may also include a mechanically operated isolating switch. If not, then another means of disconnecting the equipment from the supply must be provided and clearly marked as such. Circuit breakers or switches must comply with a recognized standard such as IEC947. All wiring must conform with any local standards.
7. Where equipment or covers are marked with the symbol to the right, hazardous voltages are likely to be present beneath. These covers should only be removed when power is removed from the equipment - and then only by trained service personnel.

8. Where equipment or covers are marked with the symbol to the right, there is a danger from hot surfaces beneath. These covers should only be removed by trained service personnel when power is removed from the equipment. Certain surfaces may remain hot to the touch.

9. Where equipment or covers are marked with the symbol to the right, refer to the Operator Manual for instructions.

10. All graphical symbols used in this product are from one or more of the following standards: EN61010-1, IEC417, and ISO3864.

BELANGRIJK

Veiligheidsvoorschriften voor de aansluiting en installatie van dit toestel.

De hierna volgende veiligheidsvoorschriften zijn vooral bedoeld voor de EU lidstaten. Hier moet aan gehouden worden om de onderworpenheid aan de Laag Spannings Richtlijn (Low Voltage Directive) te verzekeren. Niet EU staten zouden deze richtlijnen moeten volgen tenzij zij reeds achterhaald zouden zijn door plaatselijke of nationale voorschriften.

1. Degelijke aardingsaansluitingen moeten gemaakt worden naar alle voorziene aardpunten, intern en extern.
2. Na installatie of controle moeten alle veiligheidsdeksels en -aardingen terug geplaatst worden. Ten alle tijde moet de betrouwbaarheid van de aarding behouden blijven.
3. Voedingskabels moeten onderworpen zijn aan de IEC227 of de IEC245 voorschriften.
4. Alle bekabeling moet geschikt zijn voor het gebruik in omgevingstemperaturen, hoger dan 75°C.
5. Alle wartels moeten zo gedimensioneerd zijn dat een degelijke kabel bevestiging verzekerd is.
6. Om de veilige werking van dit toestel te verzekeren, moet de voeding door een stroomonderbreker gevoerd worden (min 10A) welke alle draden van de voeding moet onderbreken. De stroomonderbreker mag een mechanische schakelaar bevatten. Zoniet moet een andere mogelijkheid bestaan om de voedingsspanning van het toestel te halen en ook duidelijk zo zijn aangegeven. Stroomonderbrekers of schakelaars moeten onderworpen zijn aan een erkende standaard zoals IEC947.
7. Waar toestellen of deksels aangegeven staan met het symbool is er meestal hoogspanning aanwezig. Deze deksels mogen enkel verwijderd worden nadat de voedingsspanning werd afgelegd en enkel door getraind onderhoudspersoneel.

8. Waar toestellen of deksels aangegeven staan met het symbool is er gevaar voor hete oppervlakken. Deze deksels mogen enkel verwijderd worden door getraind onderhoudspersoneel nadat de voedingsspanning verwijderd werd. Sommige oppper-vlakken kunnen 45 minuten later nog steeds heet aanvoelen.

9. Waar toestellen of deksels aangegeven staan met het symbool gelieve het handboek te raadplegen.

10. Alle grafische symbolen gebruikt in dit produkt, zijn afkomstig uit een of meer van devolgende standaards: EN61010-1, IEC417 en ISO3864.

VIGTIGT

Sikkerhedsinstruktion for tilslutning og installering af dette udstyr.

Følgende sikkerhedsinstruktioner gælder specifikt i alle EU-medlemslande. Instruktionerne skal nøje følges for overholdelse af Lavsspændingsdirektivet og bør også følges i ikke EU-lande medmindre andet er specificeret af lokale eller nationale standarder.

1. Passende jordforbindelser skal tilsluttes alle jordklemmer, interne og eksterne, hvor disse forefindes.
2. Efter installation eller fejlfinding skal alle sikkerhedsdæksler og jordforbindelser reetableres.
3. Forsyningskabler skal opfylde krav specificeret i IEC227 eller IEC245.
4. Alle ledningstilslutninger skal være konstrueret til omgivelsestemperatur højere end 75°C.
5. Alle benyttede kabelforskruninger skal have en intern dimension, så passende kabelaflastning kan etableres.
6. For opnåelse af sikker drift og betjening skal der skabes beskyttelse mod indirekte berøring gennem afbryder (min. 10A), som vil afbryde alle kredsløb med elektriske ledere i fejlsitua-tion. Afbryderen skal indholde en mekanisk betjent kontakt. Hvis ikke skal anden form for afbryder mellem forsyning og udstyr benyttes og mærkes som sådan. Afbrydere eller kontakter skal overholde en kendt standard som IEC947.
7. Hvor udstyr eller dæksler er mærket med dette symbol, er farlige spændinger normalt forekom-mende bagved. Disse dæksler bør kun afmonteres, når forsyningsspændingen er frakoblet - og da kun af instrueret servicepersonale.

8. Hvor udstyr eller dæksler er mærket med dette symbol, forefindes meget varme overflader bagved. Disse dæksler bør kun afmonteres af instrueret servicepersonale, når forsyningsspænding er frakoblet. Visse overflader vil stadig være for varme at berøre i op til 45 minutter efter frakobling.

9. Hvor udstyr eller dæksler er mærket med dette symbol, se da i betjeningsmanual for instruktion.

10. Alle benyttede grafiske symboler i dette udstyr findes i én eller flere af følgende standarder:- EN61010-1, IEC417 & ISO3864.

BELANGRIJK

Veiligheidsinstructies voor de bedrading en installatie van dit apparaat.

Voor alle EU lidstaten zijn de volgende veiligheidsinstructies van toepassing. Om aan de geldende richtlijnen voor laagspanning te voldoen dient men zich hieraan strikt te houden. Ook niet EU lidstaten dienen zich aan het volgende te houden, tenzij de lokale wetgeving anders voorschrijft.

1. Alle voorziene interne- en externe aardaansluitingen dienen op adequate wijze aangesloten te worden.
2. Na installatie, onderhouds- of reparatie werkzaamheden dienen alle beschermdeksels /kappen en aardingen om reden van veiligheid weer aangebracht te worden.
3. Voedingskabels dienen te voldoen aan de vereisten van de normen IEC 227 of IEC 245.
4. Alle bedrading dient geschikt te zijn voor gebruik bij een omgevings temperatuur boven 75°C.
5. Alle gebruikte kabelwartels dienen dusdanige inwendige afmetingen te hebben dat een adequate verankering van de kabel wordt verkregen.
6. Om een veilige werking van de apparatuur te waarborgen dient de voeding uitsluitend plaats te vinden via een meerpolige automatische zekering (min.10A) die alle spanningvoerende geleiders verbreekt indien een foutconditie optreedt. Deze automatische zekering mag ook voorzien zijn van een mechanisch bediende schakelaar. Bij het ontbreken van deze voorziening dient een andere als zodanig duidelijk aangegeven mogelijkheid aanwezig te zijn om de spanning van de apparatuur af te schakelen. Zekeringen en schakelaars dienen te voldoen aan een erkende standaard zoals IEC 947.
7. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, kunnen zich hieronder spanning voerende delen bevinden die gevaar op kunnen leveren. Deze beschermdeksels/ kappen mogen uitsluitend verwijderd worden door getraind personeel als de spanning is afgeschakeld.

8. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, kunnen zich hieronder hete oppervlakken of onderdelen bevinden. Bepaalde delen kunnen mogelijk na 45 min. nog te heet zijn om aan te raken.

9. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, dient men de bedieningshandleiding te raadplegen.

10. Alle grafische symbolen gebruikt bij dit produkt zijn volgens een of meer van de volgende standaarden: EN 61010-1, IEC 417 & ISO 3864.

TÄRKEÄÄ

Turvallisuusohje, jota on noudatettava tämän laitteen asentamisessa ja kaapeloinnissa.

Seuraavat ohjeet pätevät erityisesti EU:n jäsenvaltioissa. Niitä täytyy ehdottomasti noudattaa jotta täytettäisiin EU:n matalajännitedirektiivin (Low Voltage Directive) yhteensopivuus. Myös EU:hun kuulumattomien valtioiden tulee nou-dattaa tätä ohjetta, elleivät kansalliset standardit estä sitä.

1. Riittävät maadoituskytkennät on tehtävä kaikkiin maadoituspisteisiin, sisäisiin ja ulkoisiin.
2. Asennuksen ja vianetsinnän jälkeen on kaikki suojat ja suojamaat asennettava takaisin pai-koilleen. Maadoitusliittimen kunnollinen toiminta täytyy aina ylläpitää.
3. Jännitesyöttöjohtimien täytyy täyttää IEC227 ja IEC245 vaatimukset.
4. Kaikkien johdotuksien tulee toimia >75°C lämpötiloissa.
5. Kaikkien läpivientiholkkien sisähalkaisijan täytyy olla sellainen että kaapeli lukkiutuu kun-nolla kiinni.
6. Turvallisen toiminnan varmistamiseksi täytyy jännitesyöttö varustaa turvakytkimellä (min 10A), joka kytkee irti kaikki jännitesyöttöjohtimet vikatilanteessa. Suojaan täytyy myös sisältyä mekaaninen erotuskytkin. Jos ei, niin jännitesyöttö on pystyttävä katkaisemaan muilla keinoilla ja merkittävä siten että se tunnistetaan sellaiseksi. Turvakytkimien tai kat-kaisimien täytyy täyttää IEC947 standardin vaatimukset näkyvyydestä.
7. Mikäli laite tai kosketussuoja on merkitty tällä merkillä on merkinnän takana tai alla hengenvaarallisen suuruinen jännite. Suojaa ei saa poistaa jänniteen ollessa kytkettynä laitteeseen ja poistamisen saa suorittaa vain alan asian-tuntija.

8. Mikäli laite tai kosketussuoja on merkitty tällä merkillä on merkinnän takana tai alla kuuma pinta. Suojan saa poistaa vain alan asiantuntija kun jännite-syöttö on katkaistu. Tällainen pinta voi säilyä kosketuskuumana jopa 45 mi-nuuttia.

9. Mikäli laite tai kosketussuoja on merkitty tällä merkillä katso lisäohjeita käyt-töohjekirjasta.

10. Kaikki tässä tuotteessa käytetyt graafiset symbolit ovat yhdestä tai useammasta seuraavis-ta standardeista: EN61010-1, IEC417 & ISO3864.

IMPORTANT

Consignes de sécurité concernant le raccordement et l'installation de cet appareil.

Les consignes de sécurité ci-dessous s'adressent particulièrement à tous les états membres de la communauté européenne. Elles doivent être strictement appliquées afin de satisfaire aux directives concernant la basse tension. Les états non membres de la communauté européenne doivent également appliquer ces consignes sauf si elles sont en contradiction avec les standards locaux ou nationaux.

1. Un raccordement adéquat à la terre doit être effectuée à chaque borne de mise à la terre, interne et externe.
2. Après installation ou dépannage, tous les capots de protection et toutes les prises de terre doivent être remis en place, toutes les prises de terre doivent être respectées en permanence.
3. Les câbles d'alimentation électrique doivent être conformes aux normes IEC227 ou IEC245.
4. Tous les raccordements doivent pouvoir supporter une température ambiante supérieure à 75°C.
5. Tous les presse-étoupes utilisés doivent avoir un diamètre interne en rapport avec les câbles afin d'assurer un serrage correct sur ces derniers.
6. Afin de garantir la sécurité du fonctionnement de cet appareil, le raccordement à l'alimentation électrique doit être réalisé exclusivement au travers d'un disjoncteur (minimum 10A.) isolant tous les conducteurs en cas d'anomalie. Ce disjoncteur doit également pouvoir être actionné manuellement, de façon mécanique. Dans le cas contraire, un autre système doit être mis en place afin de pouvoir isoler l'appareil et doit être signalisé comme tel. Disjoncteurs et interrupteurs doivent être conformes à une norme reconnue telle IEC947.
7. Lorsque les équipements ou les capots affichent le symbole suivant, cela signifie que des tensions dangereuses sont présentes. Ces capots ne doivent être démontés que lorsque l'alimentation est coupée, et uniquement par un personnel compétent.

8. Lorsque les équipements ou les capots affichent le symbole suivant, cela signifie que des surfaces dangereusement chaudes sont présentes. Ces capots ne doivent être démontés que lorsque l'alimentation est coupée, et uniquement par un personnel compétent. Certaines surfaces peuvent rester chaudes jusqu'à 45 mn.

9. Lorsque les équipements ou les capots affichent le symbole suivant, se reporter au manuel d'instructions.

10. Tous les symboles graphiques utilisés dans ce produit sont conformes à un ou plusieurs des standards suivants: EN61010-1, IEC417 & ISO3864.

WICHTIG

Sicherheitshinweise für den Anschluß und die Installation dieser Geräte.

Die folgenden Sicherheitshinweise sind in allen Mitgliederstaaten der europäischen Gemeinschaft gültig. Sie müssen strickt eingehalten werden, um der Niederspannungsrichtlinie zu genügen. Nichtmitgliedsstaaten der europäischen Gemeinschaft sollten die national gültigen Normen und Richtlinien einhalten.

1. Alle intern und extern vorgesehenen Erdungen der Geräte müssen ausgeführt werden.
2. Nach Installation, Reparatur oder sonstigen Eingriffen in das Gerät müssen alle Sicherheitsabdeckungen und Erdungen wieder installiert werden. Die Funktion aller Erdverbindungen darf zu keinem Zeitpunkt gestört sein.
3. Die Netzspannungsversorgung muß den Anforderungen der IEC227 oder IEC245 genügen.
4. Alle Verdrahtungen sollten mindestens bis 75°C ihre Funktion dauerhaft erfüllen.
5. Alle Kabeldurchführungen und Kabelverschraubungen sollten in Ihrer Dimensionierung so gewählt werden, daß diese eine sichere Verkabelung des Gerätes ermöglichen.
6. Um eine sichere Funktion des Gerätes zu gewährleisten, muß die Spannungsversorgung über mindestens 10 A abgesichert sein. Im Fehlerfall muß dadurch gewährleistet sein, daß die Spannungsversorgung zum Gerät bzw. zu den Geräten unterbrochen wird. Ein mechanischer Schutzschalter kann in dieses System integriert werden. Falls eine derartige Vorrichtung nicht vorhanden ist, muß eine andere Möglichkeit zur Unterbrechung der Spannungszufuhr gewährleistet werden mit Hinweisen deutlich gekennzeichnet werden. Ein solcher Mechanismus zur Spannungsunterbrechung muß mit den Normen und Richtlinien für die allgemeine Installation von Elektrogeräten, wie zum Beispiel der IEC947, übereinstimmen.

7. Mit dem Symbol sind Geräte oder Abdeckungen gekennzeichnet, die eine gefährliche (Netzspannung) Spannung führen. Die Abdeckungen dürfen nur entfernt werden, wenn die Versorgungsspannung unterbrochen wurde. Nur geschultes Personal darf an diesen Geräten Arbeiten ausführen.

8. Mit dem Symbol sind Geräte oder Abdeckungen gekennzeichnet, in bzw. unter denen heiße Teile vorhanden sind. Die Abdeckungen dürfen nur entfernt werden, wenn die Versorgungsspannung unterbrochen wurde. Nur geschultes Personal darf an diesen Geräten Arbeiten ausführen. Bis 45 Minuten nach dem Unterbrechen der Netzzufuhr können derartig Teile noch über eine erhöhte Temperatur verfügen.

9. Mit dem Symbol sind Geräte oder Abdeckungen gekennzeichnet, bei denen vor dem Eingriff die entsprechenden Kapitel im Handbuch sorgfältig durchgelesen werden müssen.
10. Alle in diesem Gerät verwendeten graphischen Symbole entspringen einem oder mehreren der nachfolgend aufgeführten Standards: EN61010-1, IEC417 & ISO3864.

IMPORTANTE

Norme di sicurezza per il cablaggio e l'installazione dello strumento.

Le seguenti norme di sicurezza si applicano specificatamente agli stati membri dell'Unione Europea, la cui stretta osservanza è richiesta per garantire conformità alla Direttiva del Basso Voltaggio. Esse si applicano anche agli stati non appartenenti all'Unione Europea, salvo quanto disposto dalle vigenti normative locali o nazionali.

1. Collegamenti di terra idonei devono essere eseguiti per tutti i punti di messa a terra interni ed esterni, dove previsti.
2. Dopo l'installazione o la localizzazione dei guasti, assicurarsi che tutti i coperchi di protezione siano stati collocati e le messa a terra siano collegate. L'integrità di ciscun morsetto di terra deve essere costantemente garantita.
3. I cavi di alimentazione della rete devono essere secondo disposizioni IEC227 o IEC245.
4. L'intero impianto elettrico deve essere adatto per uso in ambiente con temperature superiore a 75°C.
5. Le dimensioni di tutti i connettori dei cavi utilizzati devono essere tali da consentire un adeguato ancoraggio al cavo.
6. Per garantire un sicuro funzionamento dello strumento il collegamento alla rete di alimentazione principale dovrà essere eseguita tramite interruttore automatico (min.10A), in grado di disattivare tutti i conduttori di circuito in caso di guasto. Tale interruttore dovrà inoltre prevedere un sezionatore manuale o altro dispositivo di interruzione dell'alimentazione, chiaramente identificabile. Gli interruttori dovranno essere conformi agli standard riconosciuti, quali IEC947.
7. Il simbolo riportato sullo strumento o sui coperchi di protezione indica probabile presenza di elevati voltaggi. Tali coperchi di protezione devono essere rimossi esclusivamente da personale qualificato, dopo aver tolto alimentazione allo strumento.

8. Il simbolo riportato sullo strumento o sui coperchi di protezione indica rischio di contatto con superfici ad alta temperatura. Tali coperchi di protezione devono essere rimossi esclusivamente da personale qualificato, dopo aver tolto alimentazione allo strumento. Alcune superfici possono mantenere temperature elevate per oltre 45 minuti.

9. Se lo strumento o il coperchio di protezione riportano il simbolo, fare riferimento alle istruzioni del manuale Operatore.

10. Tutti i simboli grafici utilizzati in questo prodotto sono previsti da uno o più dei seguenti standard: EN61010-1, IEC417 e ISO3864.

VIKTIG

Sikkerhetsinstruks for tilkobling og installasjon av dette utstyret.

Følgende sikkerhetsinstruksjoner gjelder spesifikt alle EU medlemsland og land med i EØS-avtalen. Instruksjonene skal følges nøye slik at installasjonen blir i henhold til lavspenningsdirektivet. Den bør også følges i andre land, med mindre annet er spesifisert av lokale- eller nasjonale standarder.

1. Passende jordforbindelser må tilkobles alle jordingspunkter, interne og eksterne hvor disse forefinnes.
2. Etter installasjon eller feilsøking skal alle sikkerhetsdeksler og jordforbindelser reetableres. Jordingsforbindelsene må alltid holdes i god stand.
3. Kabler fra spenningsforsyning skal oppfylle kravene spesifisert i IEC227 eller IEC245.
4. Alle ledningsforbindelser skal være konstruert for en omgivelsestemperatur høyere en 750°C.
5. Alle kabelforskruvninger som benyttes skal ha en indre dimensjon slik at tilstrekkelig avlastning oppnåes.
6. For å oppnå sikker drift og betjening skal forbindelsen til spenningsforsyningen bare skje gjennom en strømbryter (minimum 10A) som vil bryte spenningsforsyningen til alle elektriske kretser ved en feilsituasjon. Strømbryteren kan også inneholde en mekanisk operert bryter for å isolere instrumentet fra spenningsforsyningen. Dersom det ikke er en mekanisk operert bryter installert, må det være en annen måte å isolere utstyret fra spenningsforsyningen, og denne måten må være tydelig merket. Kretsbrytere eller kontakter skal oppfylle kravene i en annerkjent standard av typen IEC947 eller tilsvarende.
7. Der hvor utstyr eller deksler er merket med symbol for farlig spenning, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjærnes når spenningsforsyning er frakoblet utstyret, og da bare av trenet servicepersonell.

8. Der hvor utstyr eller deksler er merket med symbol for meget varm overflate, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjærnes når spenningsforsyning er frakoblet utstyret, og da bare av trenet servicepersonell. Noen overflater kan være for varme til å berøres i opp til 45 minutter etter spenningsforsyning frakoblet.

9. Der hvor utstyret eller deksler er merket med symbol, vennligst referer til instruksjonsmanualen for instrukser.

10. Alle grafiske symboler brukt i dette produktet er fra en eller flere av følgende standarder: EN61010-1, IEC417 & ISO3864.

IMPORTANTE

Instruções de segurança para ligação e instalação deste aparelho.

As seguintes instruções de segurança aplicam-se especificamente a todos os estados membros da UE. Devem ser observadas rigidamente por forma a garantir o cumprimento da Directiva sobre Baixa Tensão. Relativamente aos estados que não pertençam à UE, deverão cumprir igualmente a referida directiva, exceptuando os casos em que a legislação local a tiver substituído.

1. Devem ser feitas ligações de terra apropriadas a todos os pontos de terra, internos ou externos.
2. Após a instalação ou eventual reparação, devem ser recolocadas todas as tampas de segurança e terras de protecção. Deve manter-se sempre a integridade de todos os terminais de terra.
3. Os cabos de alimentação eléctrica devem obedecer às exigências das normas IEC227 ou IEC245.
4. Os cabos e fios utilizados nas ligações eléctricas devem ser adequados para utilização a uma temperatura ambiente até 75ºC.
5. As dimensões internas dos bucins dos cabos devem ser adequadas a uma boa fixação dos cabos.
6. Para assegurar um funcionamento seguro deste equipamento, a ligação ao cabo de alimentação eléctrica deve ser feita através de um disjuntor (min. 10A) que desligará todos os condutores de circuitos durante uma avaria. O disjuntor poderá também conter um interruptor de isolamento accionado manualmente. Caso contrário, deverá ser instalado qualquer outro meio para desligar o equipamento da energia eléctrica, devendo ser assinalado convenientemente. Os disjuntores ou interruptores devem obedecer a uma norma reconhecida, tipo IEC947.
7. Sempre que o equipamento ou as tampas contiverem o símbolo, é provável a existência de tensões perigosas. Estas tampas só devem ser retiradas quando a energia eléctrica tiver sido desligada e por Pessoal da Assistência devidamente treinado.

8. Sempre que o equipamento ou as tampas contiverem o símbolo, há perigo de existência de superfícies quentes. Estas tampas só devem ser retiradas por Pessoal da Assistência devidamente treinado e depois de a energia eléctrica ter sido desligada. Algumas superfícies permanecem quentes até 45 minutos depois.

9. Sempre que o equipamento ou as tampas contiverem o símbolo, o Manual de Funcionamento deve ser consultado para obtenção das necessárias instruções.

10. Todos os símbolos gráficos utilizados neste produto baseiam-se em uma ou mais das seguintes normas: EN61010-1, IEC417 e ISO3864.

IMPORTANTE

Instrucciones de seguridad para el montaje y cableado de este aparato.

Las siguientes instrucciones de seguridad, son de aplicacion especifica a todos los miembros de la UE y se adjuntaran para cumplir la normativa europea de baja tension.

1. Se deben preveer conexiones a tierra del equipo, tanto externa como internamente, en aquellos terminales previstos al efecto.
2. Una vez finalizada las operaciones de mantenimiento del equipo, se deben volver a colocar las cubiertas de seguridad aasi como los terminales de tierra. Se debe comprobar la integridad de cada terminal.
3. Los cables de alimentacion electrica cumpliran con las normas IEC 227 o IEC 245.
4. Todo el cableado sera adecuado para una temperatura ambiental de 75ºC.
5. Todos los prensaestopas seran adecuados para una fijacion adecuada de los cables.
6. Para un manejo seguro del equipo, la alimentacion electrica se realizara a traves de un interruptor magnetotermico (min 10 A), el cual desconectara la alimentacion electrica al equipo en todas sus fases durante un fallo. Los interruptores estaran de acuerdo a la norma IEC 947 u otra de reconocido prestigio.
7. Cuando las tapas o el equipo lleve impreso el simbolo de tension electrica peligrosa, dicho alojamiento solamente se abrira una vez que se haya interrumpido la alimentacion electrica al equipo asimismo la intervencion sera llevada a cabo por personal entrenado para estas labores.

8. Cuando las tapas o el equipo lleve impreso el simbolo, hay superficies con alta temperatura, por tanto se abrira una vez que se haya interrumpido la alimentacion electrica al equipo por personal entrenado para estas labores, y al menos se esperara unos 45 minutos para enfriar las superficies calientes.

9. Cuando el equipo o la tapa lleve impreso el simbolo, se consultara el manual de instrucciones.

10. Todos los simbolos graficos usados en esta hoja, estan de acuerdo a las siguientes normas EN61010-1, IEC417 & ISO 3864.

VIKTIGT

Säkerhetsföreskrifter för kablage och installation av denna apparat.

Följande säkerhetsföreskrifter är tillämpliga för samtliga EU-medlemsländer. De skall följas i varje avseende för att överensstämma med Lågspännings direktivet. Icke EU medlemsländer skall också följa nedanstående punkter, såvida de inte övergrips av lokala eller nationella föreskrifter.

1. Tillämplig jordkontakt skall utföras till alla jordade punkter, såväl internt som externt där så erfordras.
2. Efter installation eller felsökning skall samtliga säkerhetshöljen och säkerhetsjord återplaceras. Samtliga jordterminaler måste hållas obrutna hela tiden.
3. Matningsspänningens kabel måste överensstämma med föreskrifterna i IEC227 eller IEC245.
4. Allt kablage skall vara lämpligt för användning i en omgivningstemperatur högre än 75ºC.
5. Alla kabelförskruvningar som används skall ha inre dimensioner som motsvarar adekvat kabelförankring.
6. För att säkerställa säker drift av denna utrustning skall anslutning till huvudströmmen endast göras genom en säkring (min 10A) som skall frånkoppla alla strömförande kretsar när något fel uppstår. Säkringen kan även ha en mekanisk frånskiljare. Om så inte är fallet, måste ett annat förfarande för att frånskilja utrustningen från strömförsörjning tillhandahållas och klart framgå genom markering. Säkring eller omkopplare måste överensstämma med en gällande standard såsom t ex IEC947.
7. Där utrustning eller hölje är markerad med vidstående symbol föreliggerisk för livsfarlig spänning i närheten. Dessa höljen får endast avlägsnas när strömmen ej är ansluten till utrustningen - och då endast av utbildad servicepersonal.

8. När utrustning eller hölje är markerad med vidstående symbol föreligger risk för brännskada vid kontakt med uppvärmd yta. Dessa höljen får endast avlägsnas av utbildad servicepersonal, när strömmen kopplats från utrustningen. Vissa ytor kan vara mycket varma att vidröra även upp till 45 minuter efter avstängning av strömmen.

9. När utrustning eller hölje markerats med vidstående symbol bör instruktionsmanualen studeras för information.

10. Samtliga grafiska symboler som förekommer i denna produkt finns angivna i en eller flera av följande föreskrifter:- EN61010-1, IEC417 & ISO3864.

ΠΡΟΣΟΧΗ

Οδηγίες ασφαλείας για την καλωδίωση και εγκατάσταση της συσκευής.

Οι ακόλουθες οδηγίες ασφαλείας εφαρμόζονται ειδικά σε όλες τις χώρες μέλη της Ευρωπαϊκής Κοινότητας. Θα πρέπει να ακολουθούνται αυστηρά ώστε να εξασφαλιστεί η συμβατότητα με τις οδηγίες για τη Χαμηλή Τάση. Χώρες που δεν είναι μέλη της Ευρωπαϊκής Κοινότητας θα πρέπει επίσης να ακολουθούν τις οδηγίες εκτός εάν αντικαθίστανται από τα Τοπικά ή Εθνικά Πρότυπα.

1. Επαρκείς συνδέσεις γείωσης θα πρέπει να γίνονται σε όλα τα σημεία γείωσης, εσωτερικά και εξωτερικά όπου υπάρχουν.

2. Μετά την εγκατάσταση ή την εκσφαλμάτωση όλα τα καλύμματα ασφαλείας και οι γειώσεις ασφαλείας πρέπει να επανεγκαθίστανται. Η καλή κατάσταση όλων των ακροδεκτών γείωσης πρέπει να ελέγχεται και να συντηρείται διαρκώς.

3. Τα καλώδια τροφοδοσίας πρέπει να πληρούν τις απαιτήσεις των IEC227 ή IEC245.

4. Ολες οι καλωδιώσεις θα πρέπει είναι κατάλληλες για χρήση σε ατμοσφαιρική θερμοκρασία χώρου υψηλότερη από 75°C.

5. Ολοι οι στυπιοθλίπτες θα πρέπει να είναι τέτοιων εσωτερικών διαστάσεων ώστε να παρέχουν επαρκή στερέωση των καλωδίων.

6. Για τη διασφάλιση ασφαλούς λειτουργίας της σύνδεσης τροφοδοσίας αυτής της συσκευής θα πρέπει να γίνεται μόνο μέσω ασφαλειοδιακόπτη (ελάχιστο 10A) ο οποίος θα αποσυνδέει όλους του ηλεκτροφόρους αγωγούς στη διάρκεια κατάστασης σφάλματος.
   Ο ασφαλειοδιακόπτης μπορεί επίσης να περιλαμβάνει μηχανικό διακόπτη απομόνωσης. Εάν δεν περιλαμβάνει, τότε άλλα μέσα αποσύνδεσης της συσκευής από την τροφοδοσία πρέπει να παροχηθούν και σαφώς να σημανθούν σαν τέτοια. Οι ασφαλειοδιακόπτες ή διακόπτες πρέπει να συμφωνούν με αναγνωρισμένα πρότυπα όπως το IEC947.

7. Οπου συσκευές ή καλύμματα είναι σημασμένα με το σύμβολο επικίνδυνες τάσεις ενυπάρχουν κάτω από αυτά.
   Αυτά τα καλύμματα θα πρέπει να αφαιρούνται μόνο όταν έχει αφαιρεθεί η τροφοδοσία από τη συσκευή και τότε μόνο από ειδικευμένο τεχνικό προσωπικό.

8. Οπου συσκευές ή καλύμματα είναι σημασμένα με το σύμβολο υπάρχει κίνδυνος από καυτές επιφάνειες κάτω από αυτά.
   Αυτά τα καλύμματα θα πρέπει να αφαιρούνται μόνο από ειδικευμένο τεχνικό προσωπικό, όταν η τροφοδοσία έχει αφαιρεθεί από από τη συσκευή. Τέτοιες επιφάνειες μπορούν να παραμείνουν ζεστές στην αφή έως και 45 λεπτά αργότερα.

9. Οπου συσκευές ή καλύμματα είναι σημασμένα με το σύμβολο αναφερθείται στις οδηγίες χρήσης της συσκευής.

10. Ολα τα γραφικά σύμβολα που χρησιμοποιούνται σε αυτό το προϊόν είναι από ένα ή περισσότερα από τα έχης πρότυπα: **EN61010-1, IEC417** και **ISO3864.**

WARRANTY

Rosemount Analytical warrants that the equipment manufactured and sold by it will, upon shipment, be free of defects in workmanship or material. Should any failure to conform to this warranty become apparent during a period of one year after the date of shipment, Rosemount Analytical shall, upon prompt written notice from the purchaser, correct such nonconformity by repair or replacement, F.O.B. factory of the defective part or parts. Correction in the manner provided above shall constitute a fulfillment of all liabilities of Rosemount Analytical with respect to the quality of the equipment.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF QUALITY WHETHER WRITTEN, ORAL, OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OF FITNESS FOR PURPOSE).

The remedy(ies) provided above shall be purchaser's sole remedy(ies) for any failure of Rosemount Analytical to comply with the warranty provisions, whether claims by the purchaser are based in contract or in tort (including negligence).

Rosemount Analytical does not warrant equipment against normal deterioration due to environment. Factors such as corrosive gases and solid particulates can be detrimental and can create the need for repair or replacement as part of normal wear and tear during the warranty period.

Equipment supplied by Rosemount Analytical Analytical Inc. but not manufactured by it will be subject to the same warranty as is extended to Rosemount Analytical by the original manufacturer.

At the time of installation it is important that the required services are supplied to the system and that the electronic controller is set up at least to the point where it is controlling the sensor heater. This will ensure, that should there be a delay between installation and full commissioning that the sensor being supplied with ac power and reference air will not be subjected to component deterioration.

OPM 3000

Instruction Manual
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