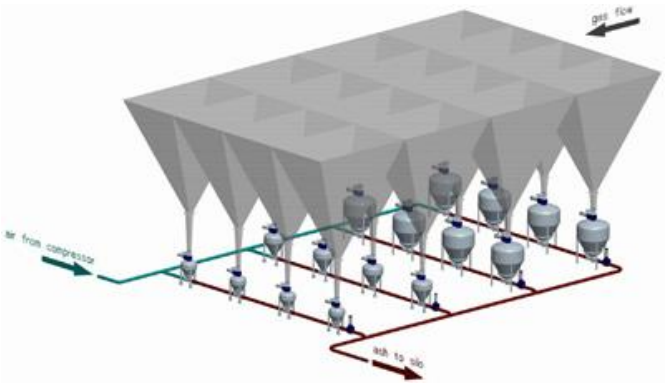
Volcan®

Instruction Manual

Measures ESP hoppers and provides accurate measurement of the fly ash gathered inside the hoppers.



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1 About this Document

This operation manual provides detailed product related information, installation, setup, and operation instructions for Volcan models S, M, and MV. This manual is designed for trained personnel. Please read it entirely and carefully before unpacking and installing the product.

1.1 Symbols in Use

The following symbols indicate different sections of additional information as follows:

IMPORTANT: An indication for additional information, tips, hints, or an indication of helpful additional knowledge.

WARNING: An indication of a potentially dangerous situation, which could result in serious injury to persons and/or damage to the Volcan.

1.2 For Your Safety

Read the following safety instructions carefully.

Authorized Personnel

All operations described in this manual must be carried out by authorized, trained personnel only. For safety and warranty reasons, any internal work on the scanners must be carried out by manufacturer-authorized personnel only.

Warning about Misuse

Inappropriate or incorrect use of the scanner may result in hazards and application-specific malfunctioning such as overflow of vessels or damage to system components through incorrect mounting or adjustments.

General Safety Instructions

The Volcan is a high-tech device requiring strict observance of standard regulations and guidelines. The user must strictly follow the safety instructions in this operation manual. Local and national electrical codes and all common safety regulations and accident prevention rules should also be considered during installation.

CE Conformity

The Volcan conforms to CE's EMC and NSR standards. CE conformity is as follows:

EMC	• EN 61326-1: 2006 • CISPR 11: 2003 Class A • IEC 61000-4-2: 2001 Air Discharge, 8kV • IEC 61000-4-3: 2002 80-1000MHz, 1V/m; 1.4-2GHz, 1V.m; 2.0-2.7GHz, 1V/m • IEC 61000-4-4: 2004 Power Lines: 1kV; Signal Lines: 0.5kV • IEC 61000-4-6: 2004 0.15-80MHz 1VRMS, 80% A.M. by 1kHz Power & Signal Lines
NSR (73/23/EWG)	• EN 61010-1: 2001

FCC Conformity (EMC)

FCC Part 15, Sub-part B, Class A.

1.3 Storage and Transport

The scanner is protected by special packaging during transport, and is guaranteed to handle normal loads during transport.

2 Volcan Overview

This chapter provides a brief overview of the Volcan application solution.

2.1 Theory of Operation

The GTS Volcan™ provides accurate measurement of ashes gathered in an ESP (Electrostatic Precipitator) hopper. The product incorporates GTS unique dust-penetrating technology to achieve an unrivalled degree of process measurement and inventory control.

The Volcan™ includes an array of three antennas that generate low frequency acoustic signals and receive echo signals from the contents of the hopper. Using these antennas, the unit measures not only the time/distance of each echoed signal but also its direction.

The built-in Digital Signal Processor digitally samples and analyzes the echoed signals and produces accurate measurements of the level, volume, and mass of the stored contents. It generates a 3D representation of the position and form of the material within the container and displays the representation on remote computer screens.

2.2 Process Flow

Gas rises through the chimney and into the ESP. The ESP includes vertical plates that separate the dust particles from the gas flow using electrostatic forces. The dust particles then fall into the ESP hoppers below the ESP plate.

By knowing the amount of fly ash inside the hoppers, and the structure of the material inside the hoppers (build ups), the Volcan improves the processes inside and outside the hoppers. This is achieved by changing the precipitator's potential, changing the heating plates based on the buildup location, activating vibrators, and deciding when and where to take out the material from the hoppers. The scanner is used to prevent the ESP hoppers from dust overflow and avoid damage to the precipitator plates.

The Volcan installed in each hopper is a continuous measurement sensor scanner that can connect to any PLC or SCADA system, thus making it a powerful and effective system.

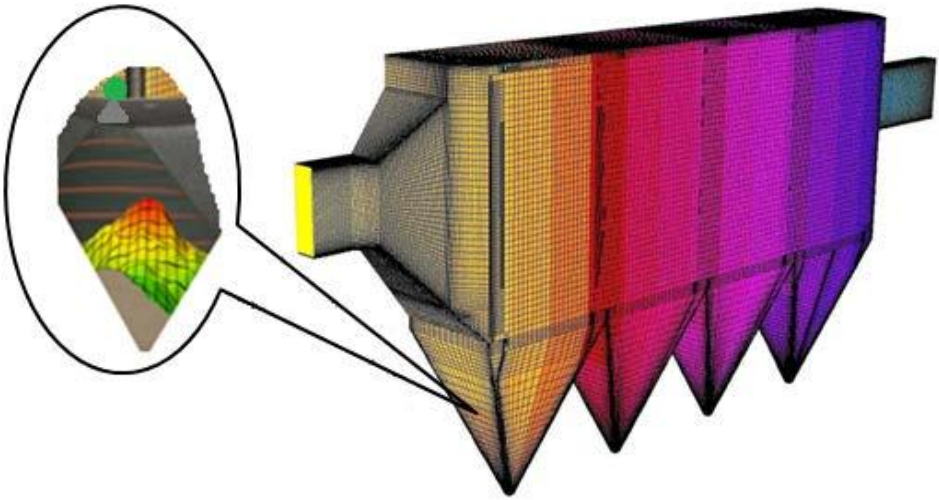


Figure 1: Volcan Process

2.3 Advantages

- **Service and maintenance-friendly** – Non-contact measuring principles, the Volcan™ is highly easy to service and maintain
- Operates the emptying process more effectively due to continuous measurement and therefore saves energy and maintenance (wear and tear)
- The only available device for ESP hopper content measurement
- The only available device that measures minimum and maximum levels
- Operates in dusty, moist, and hot environments
- Self-cleaning antenna
- 3-Dimensional mapping visualization tool

2.4 Models

The Volcan™ line of products consists of three models: **S**, **M,** and **MV**.

Model S

The S model determines the average level of the stored contents and average distance from the scanner to the surface of the material. Based on a 300 beam angle, The S model is ideal for small and narrow vessels of up to 4m (13ft) in diameter.

Model M

The M model yields highly accurate readings of level and volume. It is appropriate for large vessels of up to 15m (50ft) in diameter and at least twice as high (30m / 100ft), open bins and stockpiles. It is based on a 70° beam angle. The M model also presents the minimum and maximum Level/Distance measurements along with the calculated average.

Model MV

The MV model is identical to the M model, with the additional capability of generating a 3-dimensional representation of the stored contents on a remote computer. This feature is highly useful for mapping build-up loads that form randomly over time, and other irregularities.

The Volcan in this manual is referred to as Volcan or simply the controller; if nothing else is mentioned it applies to any of the scanner's models.

3 Physical Installation

This chapter describes the necessary steps to install the Volcan properly beginning with important pre-installation considerations such as environmental conditions, correct positioning, and orientation, through the mounting and configuration process.

3.1 Location and Positioning Guidelines

When choosing the proper location for the Volcan™, consider every aspect of the ESP hopper and contained materials, including hopper dimensions, type of material and angle of repose, locations of filling and emptying points, maximum level of material, internal construction and moving parts, vicinity to the electrostatic precipitators, and any other considerations which may possibly affect scanner performance. Consult with GTS Technical Support on the recommended positioning and mounting instructions.

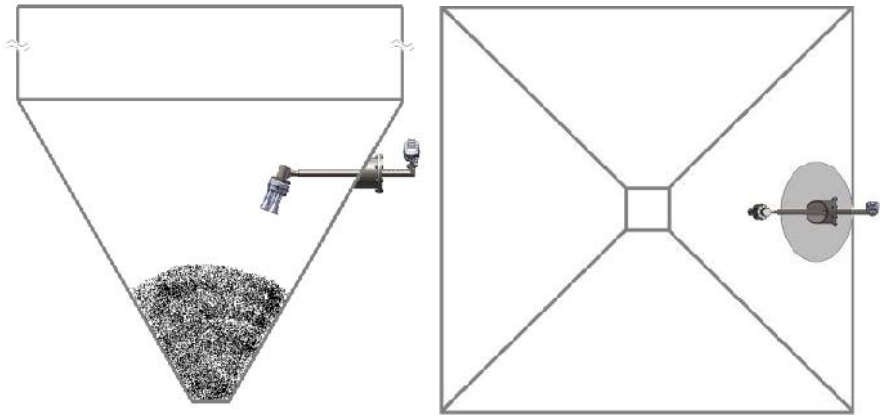


Figure 2: volcan Location Schematics (side and top views)

Installation Location

Choosing the proper location for installing the Volcan is an important part of the installation process. Wrong location may result in erroneous measurements or loss of performance.

The following factors must be taken into consideration while choosing the installation position: vessel dimensions, filling and emptying point locations, internal structure or support, additional restrictions related to the vicinity of noisy devices (such as electrical motor), and any other element which may affect the proper operation of the scanner.

Measuring Range

The measuring range is set in the scanner and defined by hopper dimensions, and the full and empty calibration levels. These levels set the 100% and 0% values respectively.

The scanner measurements are calibrated to the top of the body (horns).

NOTE: If the material level reaches the antenna, build up could form inside the horns over time and cause measurement errors or damage to the membranes.

NOTE: The Volcan™ has 500mm (20") of dead zone (or blanking zone).

Pressure

The process fitting must be sealed in case of a pressurized vessel. Before usage, verify that the sealing material is resistant to the stored medium. The maximum allowed pressure (stated in *Appendix D: Specifications on page 29*) is indicated on the type label of the sensor.

Moisture and Water Condensation

Use the recommended cable gland and tighten the cable connection. For additional protection against moisture, lead the connection cable downward in front of the cable entry. Rain and condensation water can thus drain off. This applies mainly to mounting in areas where moisture is expected (e.g. by cleaning processes), or on cooled or heated vessels.

3.2 Mounting Orientation

Mounting the Volcan in a specific direction is important. The ridge on the scanner/horn body, and the notch on the top of the thread (representing antenna no.1) should be on the same line as the mounting bracket.

3.3 Site Preparation

Site preparations described in this section must be completed and verified prior to installation. For optimal installation, ensure that the Volcan can be positioned and fitted in accordance with the guidelines described in the beginning of this chapter.

For a list of items recommended to prepare before installing the Volcan, refer to *Appendix C: Recommended Tools on page 28*.

Before installing, make sure the following preparations have been completed.

Power

- A 24VDC (1.5 Watt) power supply is prepared and ready to use near the scanner mounting location.
- Grounding – It is recommended to consult with local electrician on grounding options.
- The Volcan is a 4-Wire device. The voltage supply and data output (4-20mA) are carried along two separated two-wire connection cables.

Communications

- Communication cables are routed in proper conduits and use a proper cable type.
- The cable used for RS-485 is of a twisted-pair type, shielded, with 120 Ohm impedance and approved for RS-485 communications.
- The cable used for 4-20mA is rated for analog signals, twisted-pair, low resistance, and shielded.

Mounting

- Vertical flange should be prepared for the mounting bracket, the flange must fit the bracket flange in size the screws' locations.
- The hole in the side of the hopper should be no less than 25cm in diameter and must be in consideration with the mounting bracket and the horns assembly.

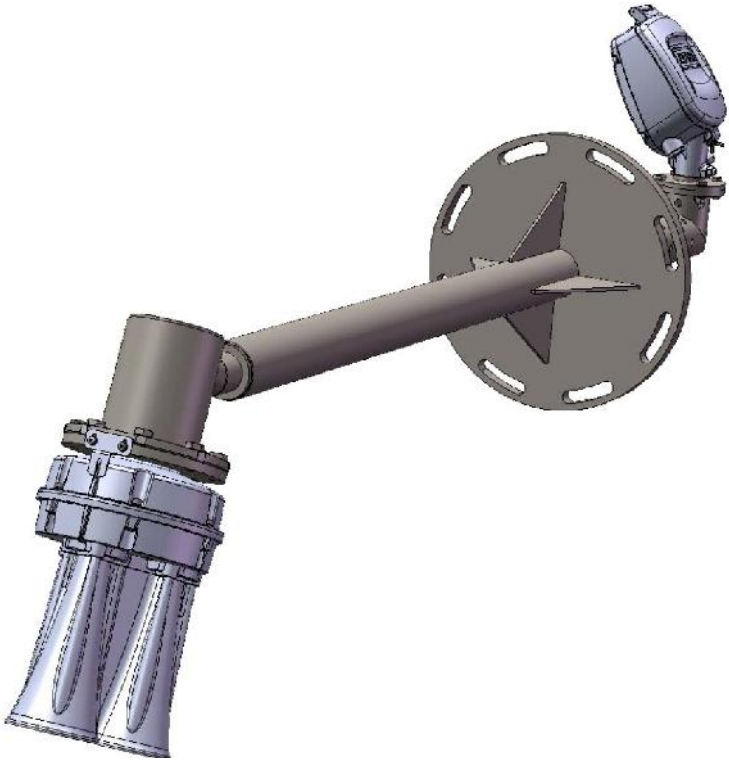


Figure 3: Scanner aligned with bracket

3.4 Assembly and Mounting

Perform the procedures in this chapter to assemble and mount the Volcan.

Package Contents

The supplied package includes:

- Volcan sensor
- Documentation
- Installation kit with additional NPTl/2 adaptors where ordered
- CD including the 3DLevel Manager software and marketing materials

Included Components

The Volcan includes the following components:

Figure 4: volcan Body

Figure 5: volcan Head

- Volcan Body: Includes three antenna horns, three transducers, and a temperature sensor.
- Volcan Head: Includes the electronic board with an LCD display and keypad, and all wiring and grounding connections. The Head is mounted outside the hopper.

Bracket Preparation

Prepare an installation bracket prior to the installation of the Volcan.

The bracket should be manufactured in accordance with GTS recommendations. Contact GTS Customer Support for additional information

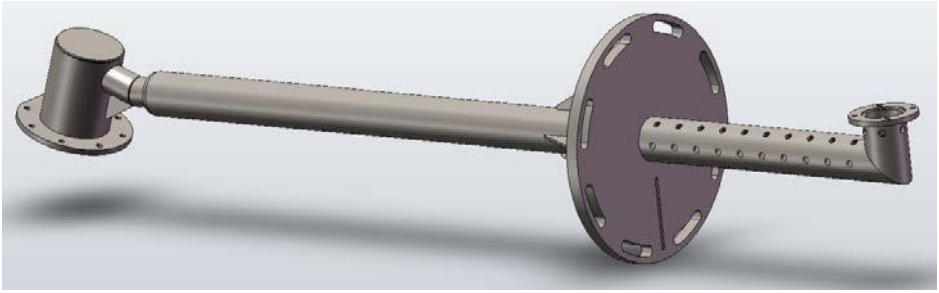
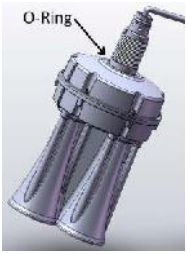


Figure 6: Mounting Bracket

Installing the Control Body

1 Ensure that the O-ring on the neck tube remains in place, as shown.



2 Place the flange over the neck tube with the cut side above the ridge on the scanner body, as shown.

3 Connect the angle bracket and tighten the two screws, to align and secure the flange to the scanner body. Seal with a gasket.

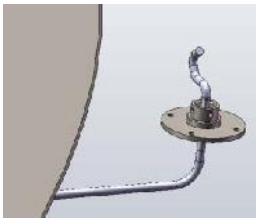
Mount the scanner body and flange, on the same line as the mounting bracket described in *Mounting Orientation on page 9*.

4 Pass the cable through the bracket tube. Assemble the scanner body onto the scanner bracket. Secure the body flange and mounting adapter flange together with all screws.

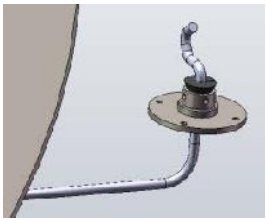
5 The scanner body is secured on the scanner bracket.

Installing the Control Head

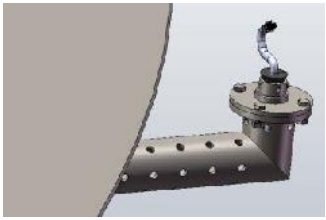
1 Pass the cable through the head adapter.



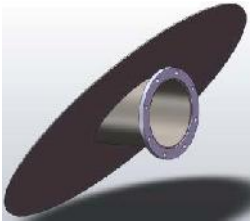
2 Mount the rubber sealing on the head adapter, as shown.



3 Place the head adapter on the scanner bracket and secure all screws.



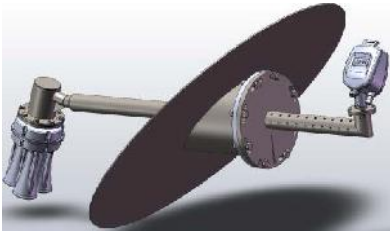
4 Pass the assembled scanner bracket through the hopper wall and flange.



5 Secure the scanner bracket to the flange and make sure that the ridge on the flange is facing down (ensuring that the scanner body is facing down).

Mount the Scanner head on the head adapter.

The scanner is installed.



3.5 Wiring

The Volcan can be connected in different modes and configurations for different external systems. These include: PLC or DCS and communications on RS485, ModBus, and HART, and also to RS485 bus converting adapters to communication gateways such as 3DLinkPro for GSM or GPRS data relay and TCP/IP gateway. For in-depth details and explanations on wiring and communication, refer to *Different Connection Methods on page 20*.

- Use 8-13mm (20-24 AWG) diameter cables to ensure proper and effective sealing of the cable gland entry opening.
- Select a cable suitable for application (indoor or outdoor) and safety certified in accordance with national regulations.

Communications

NOTE: If electromagnetic interference is expected, usage of a screened and twisted wired cable is recommended for the signal lines, which should be connected to the ground reference.

CAUTION: Always observe the following safety instructions:

- Connections must be made only in the complete absence of line voltage.
- If power surges are expected, surge protectors should be installed.
- Use only a safety-certified power supply with dual insulation between the primary and output for powering the unit. The power supply output rating must be limited to 20-32VDC, lA for a single Volcan device, and should not be connected to a DC distribution network.

Power Supply

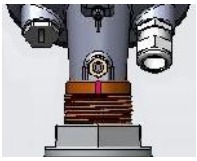
For power supply specifications, refer to *Appendix D: Specifications on page 29*.

4-20mA/HART 4-wire: The power supply and signal current inputs must be carried over two separated pairs.

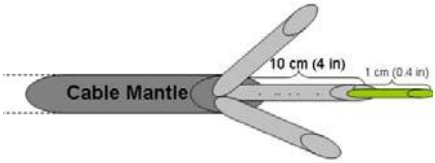
Connection Procedure

1 Loosen the four screws of the scanner housing rear panel and remove the rear panel. The screws are of captive type and do not fall off.

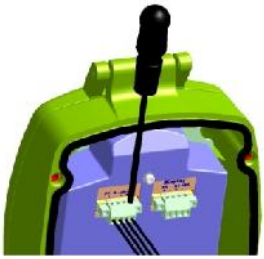
2 Loosen the compression nut of the cable gland entry. And Insert the cable into the scanner through the cable gland entry.



3 Remove approximately l0cm (4 inches) of the cable mantle and strip approximately lcm (0.4 inches) of each conductor edge.



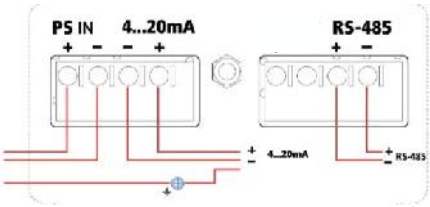
4 Open the terminal block screws located inside the scanner housing using a thin flat (A3/32") screwdriver. Insert the wire edges into the terminals in accordance with the wiring plan (in the following step). Fasten the terminal screws. Gently pull the wires to ensure they are securely connected.



5 Terminal block wiring plan.

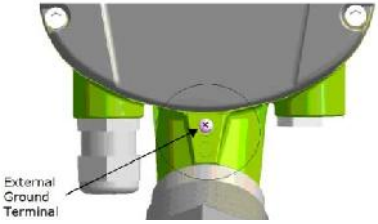
The tables below describe the connections.

Refer to the Local Connection and Multi-Drop Connection drawing for details.

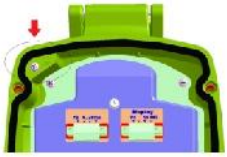


Left Connector		Right Connector	
Ports	**Description**	**Ports**	**Description**
PS IN + -	Feed in power supply 20 – 32 VDC	RS-485 + -	RS-485 / ModBus RTU Communications terminals
4...20mA - +	4 – 20mA / HART Communications terminals		

f Connect the external ground terminal with potential equalization to the external ground terminal of the scanner, located as shown.



Note: An internal cable grounding connection is also possible using the inner connection as shown.



7 Tighten the compression nut over the cable gland entry opening. Verify that the sealing ring completely wraps the cable.

IMPORTANT: Gland compression nut tightening provides good sealing. It is necessary for the scanner to maintain IP67 requirements for extended scanner

lifetime.

8 Attach the rear panel at the rear of the scanner housing and tighten the four screws using a 4mm hex key.

The Volcan is ready for configuration.

IMPORTANT: Use direct connection between the scanners and the plant (PLC/SCADA).

CAUTION: Do not connect power supply to the 4-20mA or to the RS-485 ports.

The Volcan is not a loop powered device but a 4W device.

WARNING: The 4-20mA/HART lines should NOT be connected using multidrop.

4 First-Time Activation

4.1 Local User Interface

The Volcan must be configured and adjusted using the 3DLevelManager software, with the optional addition of GSM/GPRS communications using 3DLinkPro. For a detailed configuration procedure, refer to the *GTS 3DLevelManager Software Manual* and the *3DLinkPro Manual*.

Volcan User Interface

The user interface includes a 4-line LCD display and four keys, located on the front side of the device marked ESC, +, -, and E.

Key functions are as follows:

ESC — Navigates back within a function menu.
A continuous 3 second press exits to the default screen.

\+ — Navigates upwards in the navigation list.
Navigates right within a function.

\– — Navigates downwards in the navigation list.
Navigates left within a function.

E — Navigates to the right within a function group.
Stores a configured value.

The following simultaneous key-press combinations perform the following functions:

+ E / – E — Press and hold the E button, then use the + or – buttons to increase/decrease the intensity of the display.

Operating Menu

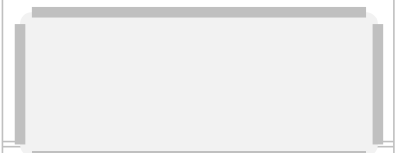
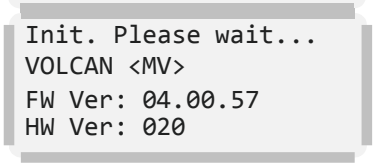
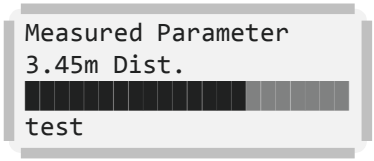
The operating menu consists of two levels:

- **Function groups**: The scanner functions are organized in groups. Available function groups are: Output Settings, Display Settings, Device Info, and Device Reset.

- **Functions**: Each function group consists of one or more functions. The functions may perform different actions or modify scanner setting parameters. Numerical values are entered and parameters are selected and saved.

4.2 Operating the Controller

Once the Volcan is connected to the power supply and switched on, a 30 second self-test is initialized. When the initialization is complete, the following content is displayed allowing the user to select a language and distance units.

1 Turn on the unit. The unit initializes for about 30 seconds, during which the display remains blank.	
2 The version screen appears. The value in <> describes the scanner model: S, M, MV, or MVL. FW Ver: Firmware version HW Ver: Hardware version	
3 Once the startup process is complete, the following screen appears showing the current distance measurement. The third line displays the scanner tag name. By default, when the name has not been configured yet, this line remains empty. Press E to return to the Main Menu. Press ESC for 3 seconds to switch to the basic measurement screen.	

4.3 Initial Activation

The following is a list of actions taken during the initial activation of the controller:

Connect the power to the scanner. After approximately 30 seconds, the version screen appears.

After a little while, the display switches to the current distance measurement screen.

Press E to enter the Main Menu.

In the Main Menu, select **Output Settings**, by pressing E.

Set the polling address.

After completing the initial activation, use the 3DLevelManager software to establish the connection and to make all the necessary configurations.

4.4 Initial Setup Procedure

Setting the Control Address

The scanner address setting is mandatory when multiple scanners are connected over a RS485-Multidrop (Daisy Chain). Addresses must be set prior to parameter adjustment.

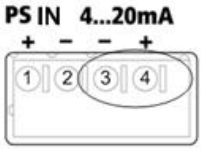
1	In the Main Menu, scroll down to the Output Settings option using the ▭ key, and press E to switch to the Polling Address configuration screen.	Main Menu →**Output Settings** Display settings Device info
2	Use the ▭ key to switch between the two digits. Use the I key to modify the value. The default polling address is 00. The polling address ranges from 00 to 63. Press E to store the modified address.	Polling Address 40 **00**

5 Different Connection Methods

Using the 3DLevelManager for communicating with the Volcan allows the user to choose from several communication types: RS-485, HART, GSM, GPRS, and TCP/IP. For more information and details regarding communications, refer to the *GTS 3DLevelManager Software Instructions manual*.

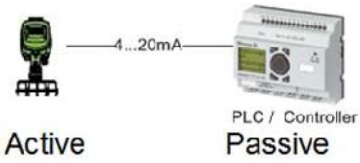
5.1 4-20mA Connection

The Volcan outputs the Volume percentage as set in the configuration and between the Full and Empty calibration levels. The 4-20mA current output is available through ports 3 and 4 of the green connector (as shown in the drawing to the right). Ports 3 and 4 are the negative and positive poles, respectively.



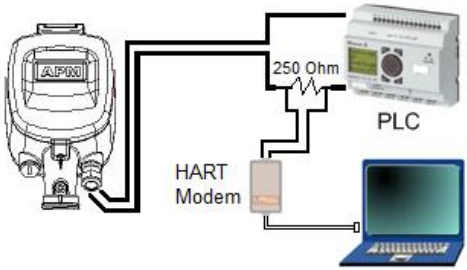
The 4...20mA line is connected directly from the mounted controller to the PLC/DCS/Display, or any other device (as shown below).

IMPORTANT: This type of connection is active and not passive, hence the Volcan is the active module and the PLC should be the passive module.



5.2 HART Communication

The Volcan supports HART protocol over the 4-20mA wires. Communication to and from the controller can be established from the 3DLevelManager software by connecting a 250o resistor and a HART modem on one of the wires.



5.3 RS-485 Communication

The 3DLeveScanner includes an RS485 communication port. This type of connection allows a computer to communicate with the controller. It also allows a multiple controller connection on the same RS-485 bus and communication with all scanners using a single connection to the computer running the software.

In both a single and a multi- controller connection, an appropriate cable rated for RS-485 is required. The cable should be twisted, have impedance of 120o, and shielded. The total length of the cable should not reach 1000m (3280ft).

When using a multi- controller connection, all scanners must be connected in parallel mode in the RS-485 ports. Hence, all the '+' (positive) ports of the RS-485 should be connected and all the '-' (negative) ports of the RS-485 should commonly be connected. The connection must be of Daisy-Chain type and have at each of the far ends of the chain a 120Ω resistor (this resistor is provided with the controller).

Each controller must be configured with a different polling address.

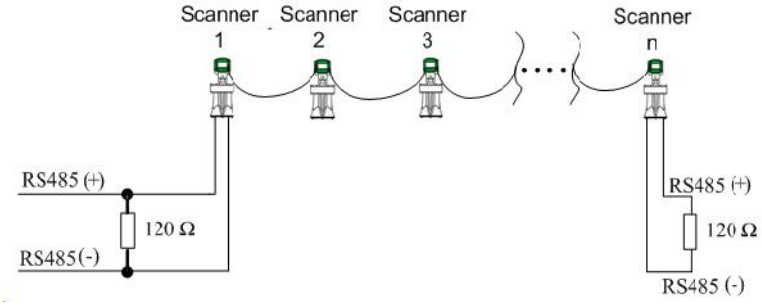


Figure 7: Daisy chain Connection

5.4 Communication Using 3DLinkPro

In both a single and a multiple controller installation, the Volcan can be connected to a GSM/GPRS modem in order to transfer the data over the cellular network. The 3DLinkPro should be connected on the RS485 bus, including cable and resistors needed. For further details on wiring and establishing a connection, refer to the *GTS 3DLinkPro manual* and to the *3DLevelManager Software Instructions manual*.

NOTE: In such a communication mode, with only one computer running, the 3DLevelManager software can be connected to the scanners.

5.5 TCP/IP Communication

The RS-485 bus can be converted to TCP/IP communication. TCP/IP to RS-485 converter installation should be done as with any controller, including the resistors and daisy-chain considerations.

NOTE: Consult with GTS Technical Support team for assistance on the proper TCP/IP converter to use.

Appendix A: Onboard Configuration

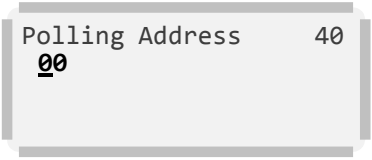
Output Settings

This function defines the controller polling address, and additional measured parameter settings. In the Main Menu, navigate down using the ↓ key. Select **Output Settings** and press E to enter the Output settings menu.

The first screen of Output Settings allows for setting the controller polling address.

Select the relevant polling address using the ↑/↓ keys. Press E to proceed.

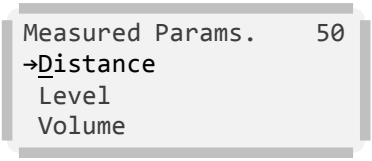
Exiting this menu automatically switches to the Measured Params menu.



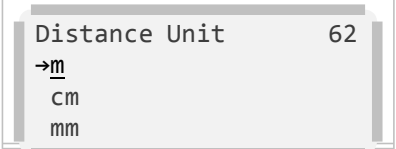
The following functions set displayed measurement units for Distance, Level, Volume, Temperature, and their maximum allowed values. It also allows for reading the current measurements of the Analog Output, SNR, and Temperature. This menu is not accessible from the main menu. It appears following completion of the Output Settings or the Display Settings.

1 **Measurement Distance settings**

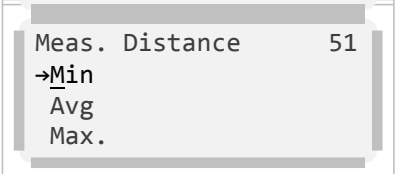
Navigate up/down the menu using the ↑/↓ keys. Select the **Distance** option. Press E to proceed.



2 Select the desired **Distance Unit** using the ↑/↓ keys. Press E to store the option and proceed.



3 This menu defines how the Measured Distance is displayed: by a minimum value, a maximum value, or an average value. Select the desired option using the ↑/↓ keys. Press E to store and proceed.



4 **Measurement Level settings**

This menu defines how the Measured Level is displayed: by a minimum value, a maximum value, or an average value. Select the desired Meas. Level option using the ↑/↓ keys. Press E to store and proceed.

```
Meas. Level          52
→Min
 Avg
 Max.
```

5 **Measurement Volume**

Select **Volume** from the Measured Params menu. Press E to proceed.

```
Measured Params.     50
 Distance
 Level
→Volume
```

The Measured Parameter screen appears displaying the Volume percentage.

```
Measured Parameter
100% Volume
[████████████████████]
test
```

r **Analog Output**

Select **Analog Output** from the Measured Params menu. Press E to proceed.

```
Measured Params.     50
 Level
 Volume
→Analog Output
```

The Measured Parameter screen appears displaying the Analog Output value in mA.

```
Measured Parameter
20.0mA Ang. Out.
[████████████████████]
test
```

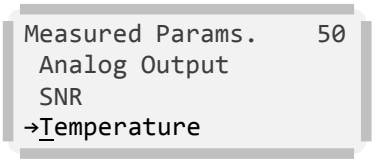
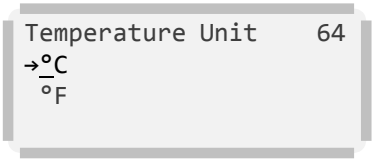
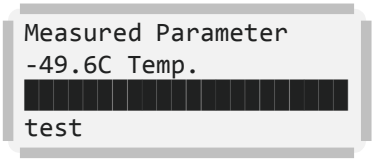
7 **SNR**

Select **SNR** from the Measured Params menu. Press E to proceed.

```
Measured Params.     50
 Volume
 Analog Output
→SNR
```

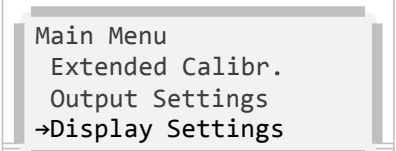
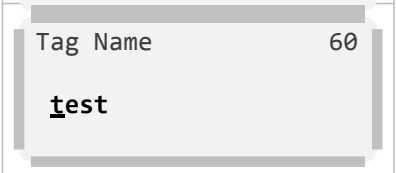
The Measured Parameter screen appears displaying the SNR value in dB.

```
Measured Parameter
8.0dB SNR
[████████████████████]
test
```

a	**Temperature** Select **Temperature** from the Measured Params menu. Press E to proceed.	
	Select the desired temperature measurement unit using the I/▫ keys. Press E to store and proceed.	
	The Measured Parameter screen appears displaying the measured temperature value using the selected unit.	

Display Settings

This function allows setting a Tag Name for the current controller.

In the Main Menu, navigate down using the ▫ key and select **Display Settings.** Press E to proceed.	
Set the tag name for the current controller. Switch between the letters using the ▫ key and modify the selected digit using the I key. Press E to store the option. The display switches to the Measured Params menu.	

Device Info

This function allows setting the device information for the current controller.

In the Main Menu, navigate down using the ▭ key and select **Device Info**. Press E to proceed.	Main Menu Output Settings Display Settings →Device Info
1 The controller Serial Number is displayed. This is a read-only identifier which is unique to each controller. Press E to proceed.	Serial Number 70 **709001234**
2 The controller Software Version is displayed. Press E to proceed.	Software Version 71 **03.00.37**
3 The controller Firmware Version is displayed. Press E to proceed.	Firmware Version 72 **020**
4 The controller Hardware communications interface information is displayed. Press E to proceed.	HW Interface 73 4...20mA/HART Modbus RS485
5 The Device Type: S, M, or MV, is displayed. Press E to exit and switch back to the Main Menu.	Device Type 74 Volcan <MV>

Device Reset

This function allows selection of different reset options: Reset, Reset to Factory, and Reset to Lab. use with caution!

In the Main Menu, navigate down using the → key to select **Device Reset**. Press E to proceed.	Main Menu Display Settings Device Info →Device Reset
1 The Reset menu allows for selection of the required Reset option. The **Reset** option brings the controller to power-up mode and clears measurements. The **Reset to Factory** option resets all parameters to their default values and performs the Reset option. The **Reset to Lab** option is password protected and reserved for factory use. Select the desired option using the → key and press E to proceed.	Reset 80 →Reset Reset to Factory Reset to Lab
2 On selecting Reset or Reset to Factory, a confirmation request screen appears. Select **Yes?** to proceed, or **No?** to cancel. Press E to proceed and return to the main menu.	Reset the device? 81 →Yes? No?

Appendix B: Accessories

Cable Glands

The Volcan™ is shipped with one M20 cable gland and one M20 blind plug.

When ordering a Volcan with option N in the Cable Entry/Plug Connection section (field V in the Pricelist), it is supplied with an accessory kit that includes:

- 1 x M20 cable gland
- 2 x NPT ½" adaptor

The provided glands and accessory kit allows the installer to use any of the following options:

- One gland and one blind
- Two glands – unscrew the blind and attach the M20 gland
- Conduits or ½" glands, by unscrewing the existing gland or blind, attaching the NPT ½" and connecting the conduit or gland to the adaptor. This can be done using one or both cable entries

Figure 8: M20 Blind Gland

Figure 9: M20 Cable Gland

Figure 10: NPT ½" Adaptor

Appendix C: Recommended Tools

The following tools are recommended for the installation process:

- Site application documents (IPF, AAF) and technical vessel drawings
- Set of small precision screwdrivers, to be used with the terminal blocks
- 13mm open wrench
- 4mm hex key (preferably with a handle)
- Large adjustable wrench 18"
- Stanley knife, cutter, pointed pliers, isolating tape
- Laser measurement device (or other means to ensure correct positioning and distance to the material)
- RS485 to USB converter, including drivers
- 120Ω (RS485) and 250Ω (HART) resistors
- PC/Laptop
- Internet GSM Stick to test communications between the installed controller and the monitoring computer at the center, using the 3DLinkPro

Appendix D: Specifications

Technical Data

Materials, non-wetted parts

Housing & Antenna	Painted Aluminum
Inspection window in housing cover	Polycarbonate
Ground terminal	Stainless steel 1.4571/1.4435

Physical

Weight	5.6kg (12.34 lbs.)

Output variables

Output signal	4 - 20mA
Resolution	10µA
Current limitation	22mA
Communication	RS485 / ModBus RTU

Display panel

Display	LCD 4 lines x 20 characters
Adjustment elements	4 keys (ESC, +, -, E)

Load

4-wire sensor	See load diagram bellow
Integration time	0...9999 s, adjustable

Ambient conditions

Ambient / storage / transport temperature:	-40...180°C (-40...+356°F) Volcan™
Relative humidity	20...85%
Maximum altitude	5,000m (16,400ft)

Process conditions

Vessel pressure	-0.5...3bar (-50...300 kPa or -7.25...43.5 Psi)

Process temperature

Measured on the process fitting:	-40...180°C (-40...+356°F) Volcan™

Vibration resistance:	Mechanical vibrations of 2g at 5...200 Hz

Measurement characteristics

Frequency	2.3-7 kHz
Beam angle with horn antenna	70 degrees
Interval	>2 s (depending on parameter adjustment)
Adjustment time	>3 s (depending on parameter adjustment)

Power supply – 4-wire device

A safety certified power supply which provides double insulation between the primary and output must be used for powering the unit. The power supply must be a limited power source type with maximum output current 1A and voltage range of 20VDC minimum and 32VDC maximum, and not to be connected to a DC distribution network.

Power Supply

The power supply will not connect to a DC distribution network.

Supply voltage	18 - 32 VDC
Power consumption	max 1.5W

Electrical protective measures

Protection	IP 67 according to IEC 60529

Approvals

CE

EMC (2004/108/EC) Emission: EN 61326: 1997 (class B)

Susceptibility: IEC/EN 61326:1997 + A1:1998 + A2:2001 + A3:2003

NSR (73/23/EWG) EN 61010-1: 2001

FCC

Conformity to part 15 of the FCC regulations

FCC 47 CFR part 15:2007, subpart B, class A

The Volcan 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.

Dimensions

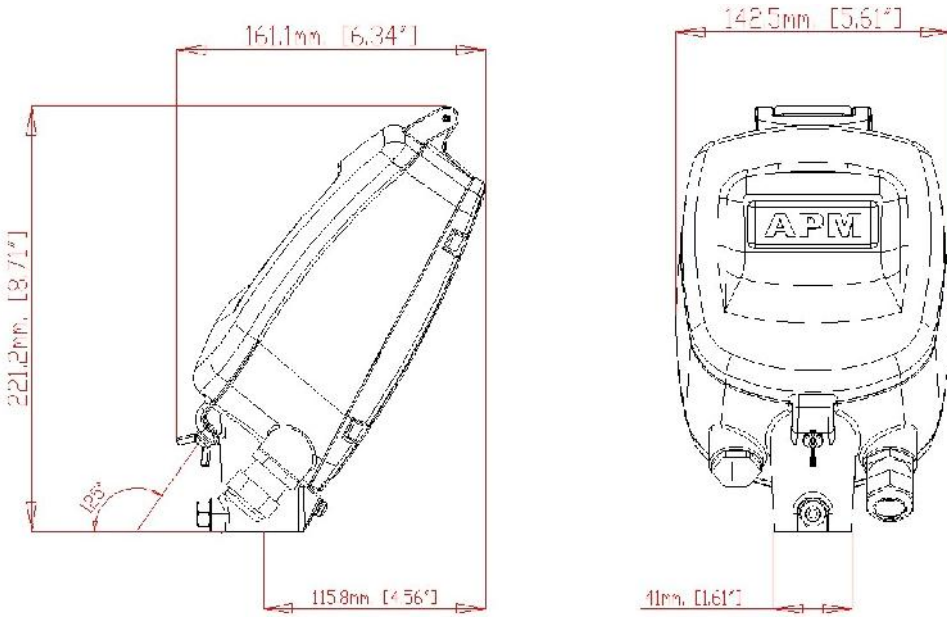


Figure 11: Volcan Dimensions: Head

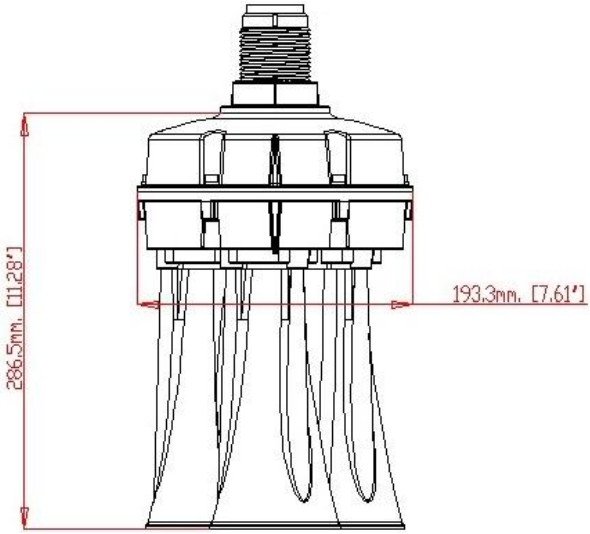


Figure 12: Volcan Dimensions: Body

Appendix E: RMA Procedure

Return Material Authorization Policy

Overview

This document explains the return policy of GTS. It describes the procedures that should be followed to request a Return Material Authorization, how to package and ship the Returned Product, as well as the process from start to finish.

A Customer may request a Return Material Authorization (RMA) by first making a call to technical support and then preparing and submitting proper paperwork.

Glossary

GTS: GTS

RMA: Return Material Authorization
Customer: GTS Authorized Distributor
Return Part / Product: the part or product thought to be defective (initiates the need for an RMA)

Warranty Period

GTS provides a one-year warranty for covered Products and Parts, starting on the date when they are first shipped to the Customer, unless otherwise agreed between the Customer and GTS in the signed distribution agreement.

RMA Request

A request to initiate an RMA procedure must take place prior to returning any Part/Product to GTS. The Customer must start by contacting GTS Technical Support (by phone, email or fax) to obtain approval to report the problem as an RMA. Once GTS confirms that the problem may be reported as an RMA, the Customer needs to fill-in and submit the RMA Form using the link below. GTS will then provide the Customer with an RMA Number to be used on all documentation pertaining to the Product / Part in question.

For tracking and handling purposes, a separate RMA From must be completed and submitted for each product to be returned. The RMA request must include the product's serial number and a detailed description of the problem encountered. Once an RMA number has been issued, a confirmation by e-mail or fax will be sent to the Customer detailing the RMA number, the Product and Product quantities authorized for return, together with shipping address details and RMA terms and conditions. For both in-warranty and out-of-warranty repairs, the Customer is responsible for paying the outbound freight expense, and any applicable import and/or export duties and taxes. GTS will pay the return freight expense for in-warranty repairs. All Products/Parts returned for repair, both in-warranty and out-of-warranty, should have a label attached detailing the failure/fault/defect and its RMA number.

Note: GTS strongly advises its Customers to hold a small quantity of products in stock for immediate replacement of faulty or damaged units at end-user sites, thereby providing the best service.

Packing and Shipping of Return Products / Parts

It is preferable that original packing, including any anti-static and foam wrapping, be used on all returned products. Should the original product packing not be available, adequate packing should be used taking into account the method of shipment of the returned product. The Customer is responsible for delivering the returned product to GTS safely and undamaged. The RMA number should be clearly marked on all returned products, boxes, packages and accompanying paperwork. RMAs received by the factory service department that are not clearly marked may experience processing delays.

All Return Products/Parts should be shipped to:

GTS, Inc.
Attn: RMA# _____
70 6th Ave, Shalimar, FL 32579
Phone: 850-651-3388
Email: info@onthelevel.com

Discrepancies

Any product received without a proper RMA will be returned to the Customer at the Customer's expense. If any product and/or component(s) of the product listed on the RMA are missing from the box, the Customer will receive notification of the discrepancy and a replacement part will not include the missing component(s). Any unauthorized product included with the RMA shipment may be returned at GTS discretion.

Defect Verification

All Return parts sent to GTS are subject to verification. Product determined to be non-defective will be returned to the Customer as-is. If a product is found to be defective and it is deemed necessary to send the item to the factory for further analysis, please note that they may require up to an additional 21 working days for a final evaluation. In a case where the defect is caused by improper use (not according to the manual) or was damaged intentionally, a repair invoice will be issued to the Customer to approve or leave as-is.

Defect Qualifications

No Return part will be accepted as defective if abused or altered, no matter what the defect is. Products which have been dropped or damaged due to being installed improperly or overpowered will be considered as having been abused by the Customer. Products with customer (or other) markings such as initials or numbers will be accepted only if the product is truly defective and the markings do not interfere with product functionality.

Returning Goods

Following the defect verification, GTS Technical Support will send a report to the Customer describing the fault found and the proposed options at that point.

In case the fault found was due to misuse, whether for a product in-warranty or out-of-warranty, GTS will offer the Customer to fix the Returned Product/Part at the cost as it appears in the pricelist, or alternatively to purchase a new part. The offer to fix the returned part or product is based on the assumption that it can be fixed. The time between accepting the offer to fix the product or part to completion may take up to 4 weeks and this should be considered accordingly. In a case where it is not possible to fix the returned part or product, GTS will offer to sell the Customer a new product in accordance with the pricelist.

Upon completion of the repair, GTS will add the Product to the Customer's next shipment or in any other way per his request and account. GTS will send the Product according to the Customers' directions.

In cases where it is determined that the fault found is GTS responsibility, GTS will try to fix the Returned Product/Part, and if not possible GTS will replace with a new one. In such instances GTS will assume the shipping costs of returning the repaired/replaced goods to the Customer.

Note: RMA Policy, procedure and Forms are subject to change without notice.

GTS, Inc.
PO Box 799
Shalimar, FL 32579
Ph: 850-651-3388
Fx: 850-651-4777
Email: info@onthelevel.com
Website: www.onthelevel.com