

# ViscoSite

Viscometer

## Installation and Safety Manual

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## NOTICES

All information in this manual is subject to change without notice and does not represent a commitment on the part of Galvanic Applied Sciences, Inc.

Note: Changes or modifications not expressly approved by Galvanic Applied Sciences, Inc. could void the user's authority to operate the equipment.

## Purpose

This manual describes how to safely install the ViscoSite viscometer.

## Important

Read Section 1 before proceeding to use the ViscoSite viscometer. Galvanic Applied Sciences is not responsible for any deviation from this manual.

## Scope

If products and components from other manufacturers are used, these must be recommended or approved by Galvanic Applied Sciences.

Due to design changes and product improvements, information is subject to change without notice. The manufacturer reserves the right to change hardware and software design at any time, which may subsequently affect the contents of this manual.

The manufacturer assumes no responsibility for any errors that may appear in this manual. The manufacturer will make every reasonable effort to ensure that the manual is up to date and corresponds with your ViscoSite viscometer.

## Users

The ViscoSite viscometer described in this manual is intended for use by trained personnel. Trained personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with the ViscoSite viscometer. For startup or technical assistance contact

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## Section 1 ViscoSite Viscometer General Information

### 1.1 General Information

The Galvanic Applied Sciences ViscoSite viscometer transmitter, when connected to a VL800 viscosity transducer, is designed to measure the viscosity in any type of liquid sample stream, over a broad range of temperatures. The ViscoSite is also capable of both temperature and density compensation in the viscosity measurement.

This manual applies to the following designations of the ViscoSite analyzer:

ViscoSite VL800	-40°C to 300°C, five-decade range viscosity
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### 1.2 Analyzer Specifications

#### 1.2.1 Outputs / Inputs / Interface

Outputs	<ul style="list-style-type: none"> <li>• 3 x 0-10VDC/2-10VDC/0-20mA/4-20mA self powered analog outputs (isolated, scaled to range, user configurable)</li> <li>• 2 x SPDT Relays for alarm annunciation and status annunciation.</li> <li>• Ethernet for modbus TCP/IP or remote GUI login.</li> <li>• USB Type B for local GUI login.</li> <li>• RS232c/RS485 serial output for modbus</li> <li>• 3 x Status LEDs (Alarm, Arcnet and Keypad)</li> </ul>
Inputs	<ul style="list-style-type: none"> <li>• 2 x RTD Inputs (Transducer Dome and Probe temperature), factory configured</li> <li>• 1 x Analog Inputs (external density measurement, loop or self-powered 4-20 mA devices, isolated).</li> </ul>
Operator Interface	<ul style="list-style-type: none"> <li>• 5-3/8"x2-7/8" LCD Screen (4 line x 20 column blue print on black)</li> <li>• Front Panel membrane keypad (not intrinsically safe)</li> <li>• 4 LEDs for quick status</li> <li>• Remote PC application program</li> </ul>

## 1.2.2 Instrument Specifications

Size	Transmitter: 565mm (22.25") H x 406mm (16") W x 234mm (9.2") D VL800 Transducer, no mount: 313 mm (13.5") H x 113 mm (4.45") Ø
Weight	Transmitter: 17.5kg (38.6lb) VL 800 Transducer: Depends on application
Ambient Temperature	Transmitter: 0°C to 60°C (32°F to 140°F) VL800 Transducer: -40°C to 300°C (-40°F to 572°F)

## 1.3 Safety Information

### 1.3.1 General Safety Information

Manufacturer:	Galvanic Applied Sciences Inc.
Manufacturer's Address:	101 Billerica Avenue Building 5, Suite 104 North Billerica MA, 01862
Assessment Standards:	CSA C22.2 No. 213 CSA C22.2 No. 61010-1 (as a guide) UL 61010 ANSI/ISA 12.12.01

When installing, operating, and maintaining the ViscoSite viscometer, adhere to the following safety and handling precautions:

- Read and understand the manual before working with the analyzer.
- Pay attention to warning labels on containers, chemicals, enclosures, and packages.
- Only qualified personnel should install, operate, and maintain the analyzer.
- No modifications to the flamepaths are permitted without consultation with the controlled documentation or notified body.
- Use only those bolts supplied with the enclosure. No cover bolts are to be omitted. Install and alternate cover bolt pattern when tightening, see recommended torque value table.

Recommended Torque Value		
Bolt Size	Torque	
3/8" x 1.5"	30 FT LBS	41 Nm

The analog outputs and alarm relay contacts may be powered by a source separate from the one (s) used to power the analyzer system. Disconnecting the main power source may not remove power from the analog output signals.

Any safety recommendations or comments contained herein are suggested guidelines only. Galvanic Applied Sciences Inc. bears no responsibility and assumes no liability for the use and/or implementation of these suggested procedures.

This system, when operating in its normal mode, and/or when it is being serviced, maintained, installed and commissioned contains items which may be hazardous to humans if handled or operated incorrectly or negligently. These items include, but are not limited to:

- a) High Voltage Electrical Energy

### 1.3.2 Messages and Symbols Used in Manual



The Danger symbol indicates a hazardous situation that, if not avoided will result in death or serious injury.



The Warning symbol indicates a hazardous situation that, if not avoided could result in death or serious injury.



The Caution symbol with the safety alert symbol indicates a hazardous situation that, if not avoided could result in minor or moderate injury.



The Notice symbol is used to highlight information that will optimize the use and reliability of the system.

Please read the following warnings and cautions carefully before using the ViscoSite viscometer



This equipment must be used as specified by the manufacturer or overall safety will be impaired.



Access to this equipment should be limited to authorized, trained personnel ONLY.



Observe all warning labels on the analyzer enclosures.



Substitution of components may impair suitability for approved hazardous location

### 1.3.3 Warning Symbols Marked on Analyzer



ALL INCOMING SIGNALS SHALL BE CLASS 2 ONLY

This warning is located on the device label.



DO NOT SERVICE WHILE CIRCUITS ARE LIVE. MULTIPLE CIRCUITS

This warning is located on the device label.



EXPLOSION HAZARD. DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED.

This warning is located on the device label. There is an explosion risk if the enclosure is opened or the window is removed and explosive gases are present.

### 1.3.4 Lifting and Carrying

The transmitter weight may be up to 17.5 kg. Adhere to local safety and regulatory procedures for lifting items of this size. The transducer weight may be up to 38kg. Exact weight will depend on application and mount style.

### 1.3.5 Operator Accessible Ports

During normal operation of the analyzer, the controller enclosure window must remain in place. If no IS barrier is present, the USB and Ethernet connection ports are on the bottom side of the enclosure and can be accessed even while the area is classified, while all other connections are made at the analyzer motherboard and can only be accessed while the area is known to be safe.

### 1.3.6 External Protective Earthing

The external protective earthing connection is located on the transmitter panel. The ground wire shall be 12 AWG (4 mm<sup>2</sup>).



### 1.3.7 Safety Barrier Earthing

The end user is responsible for the supply and installation of the safety barrier permanent earthing conductor(s); one (1) 4mm<sup>2</sup> or two (2) 2mm<sup>2</sup>. Connection to the barrier earth terminal must be made using a ring crimp terminal. The temporary connection must be removed after the permanent connection has been completed.

### 1.3.8 External Power Switch

The viscometer is designed to be installed at a measurement site on a permanent basis and is permanently connected to the main power supply. A suitably located and easily reached switch must be included in the installation. The switch must be marked as the disconnecting device for the viscometer. The switch must have clearly marked ON and OFF positions. No power consuming components shall be located electrically between the power source and the disconnecting device. See Section 1.3.10 for the power requirements.

### 1.3.9 Ventilation Requirements

The viscometer transmitter shall be located in a well ventilated area.

### 1.3.10 Analyzer Ratings

Supply Voltage			
	Voltage (Volts)	Frequency (Hz)	Power (Watts)
	24 DC	NA	10 watts
	90-240 VAC	50/60	10 watts

Supply Wiring and Fuses	
Insulation Rating for External Circuits, DC Power	Ability to withstand a dielectric strength test at 1400 VAC RMS or 2000 VDC
Insulation Rating for External Circuits, AC Power	Ability to withstand a dielectric strength test at 2200 VAC RMS or 3100 VDC
Recommended Input Power Wiring	Minimum: 14 AWG (2 mm <sup>2</sup> ) Maximum: 8 AWG (8 mm <sup>2</sup> )
Temperature Rating for External Wiring	80 °C
Replaceable Fuses	F1 Main Power Input: 5x20mm 250V 5A Time Lag

Input / Output Connections	
Communication	Modbus RS232c/485, Ethernet
Analog Outputs	Up to 3, 0-10 VDC / 2-10 VDC / 0-20 mA / 4-20 mA, Self-Powered
Relay Outputs	2 x SPDT Mechanical Relay, 4A @30VDC/120VAC OR 2A @ 240VAC
Digital Inputs	2 x Dry Contact
	2 x Wet Contact, 24 VDC

### 1.3.11 Enclosure Entry Location and Size

#### AC and DC Powered Units

The power terminal and AC to DC converter are located inside the main enclosure. The power entry is by cable gland and is located on the bottom of the enclosure as shown in Figure 1.

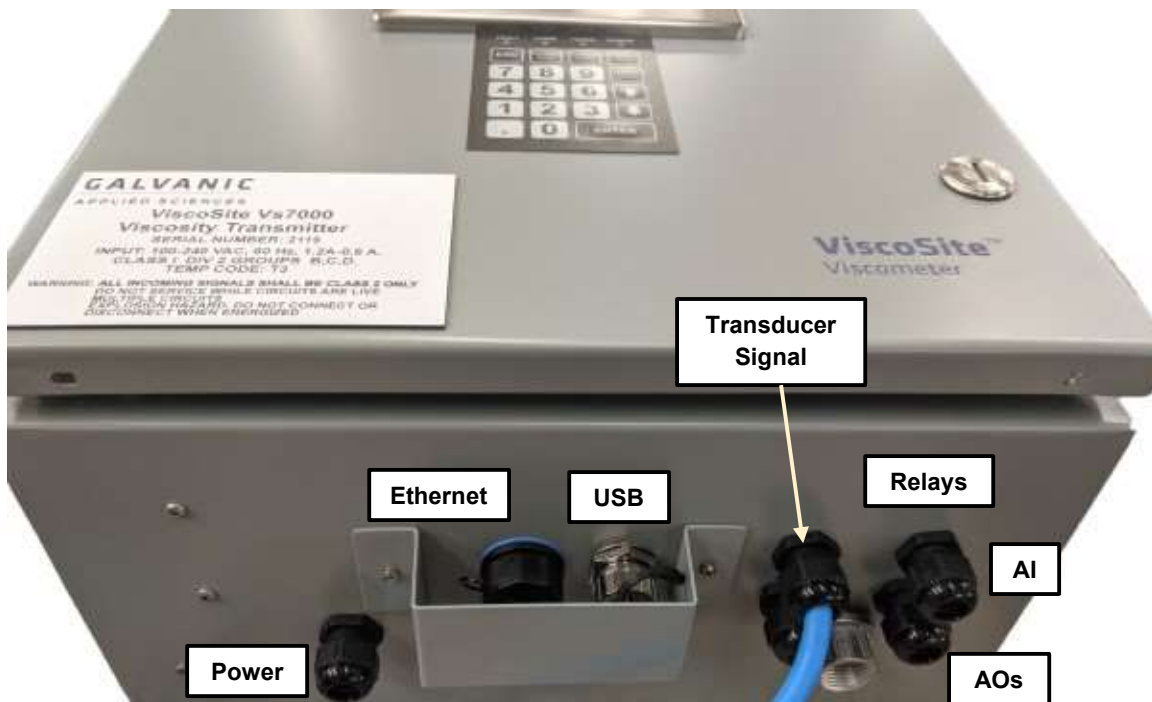


Figure 1: Power and Signal Entries for AC or DC Power

## Section 2 Installation

### 2.1 Receiving the System

When the system arrives, inspect the packaging for external signs of damage. If there is any obvious physical damage, contact the shipping agent and Galvanic Applied Sciences to report the damage and request that the carrier's agent be present when the unit is unpacked. It is recommended that you retain the shipping container so that it may be used for future shipment of the unit, if necessary.

### 2.2 Installation Requirements

#### 2.2.1 Electrical Requirements

Supply Ratings		
Voltage (Volts)	Frequency (Hz)	Power (Watts)
24 DC	NA	10 watts
110 AC	50/60	10 watts
230 AC	50/60	10 watts

#### 2.2.2 Location of the System

##### **NOTICE**

The descriptions in this section only cover information critical to safe installation of the product. Refer to the ViscoSite Viscometer Operating Manual for more information on proper location and installation of the viscometer.

#### **Transmitter**

The transmitter is designed to be operated at ambient temperatures from 0°C to 60°C. The transmitter should be mounted in a location where it is not exposed to direct sunshine or rainfall. It should also be installed in a location where the vibration is not excessive. Further, it should be located no more than 300 metres from the viscosity transducer install point (less if the signal cable cannot travel in a straight line from the transducer to the transmitter). Please contact Galvanic Applied Sciences, Inc. (or your local representative) for additional information.

## Transducer

The transducer has several configurations that will impact the operation temperature. Please contact Galvanic Applied Sciences, Inc. (or your local representative) for questions about the configuration of your product.

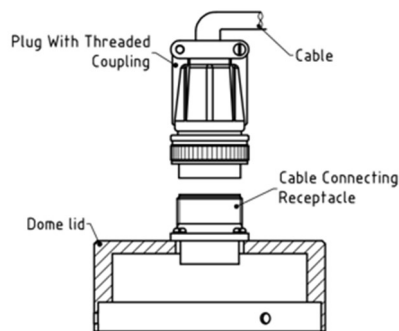
The transducer may have a flange mount, a sanitary mount, or a threaded mount depending on the specific customer requirements. While the transducer can be installed horizontally, vertically, or at any angle, it is very important that the probe points into the sample flow, to minimize stagnant flow and trapped air. The sensor must be immersed in representative material. If the flow rate of the sample fluid is high, and/or the viscosity of the sample fluid is high, the transducer must be installed parallel to the direction of flow to prevent damage to the probe.



**The transducer dome temperature must not exceed 230°C. Additional cooling is required to operate above 230°C. See ViscoSite Viscometer Operating Manual for more information.**

## Sensor Cable

The sensor cable should be run through conduit from the transmitter to the transducer. No rigid connection should be made to the transducer, so the sensor cable must exit the rigid conduit and travel through flexible metal conduit before connecting to the transducer. The cable connector on the transducer should be sprayed with contact cleaner/moisture repellent before connecting the cable. Securely fasten the cable to the transducer using the screw fitting on the cable. Figure 2 shows a schematic of the transducer cable installation.



**Figure 2: Sensor cable connection to transducer**

## 2.2.3 Dimensions and Space Requirements



Minimum distance between flange flame paths and adjacent equipment is

1 9/16" (40mm).

Leave space below the transmitter to allow for the connection of signal wires, power wires, and communication wires to the transmitter, and space to the left of the transmitter to allow the enclosure door to open fully.

### Dimensions

The dimensions of the transmitter are 565mm (22.25") H x 406mm (16") W x 234mm (9.2") D as shown in Figure 3. The unit weighs 17.5kg.

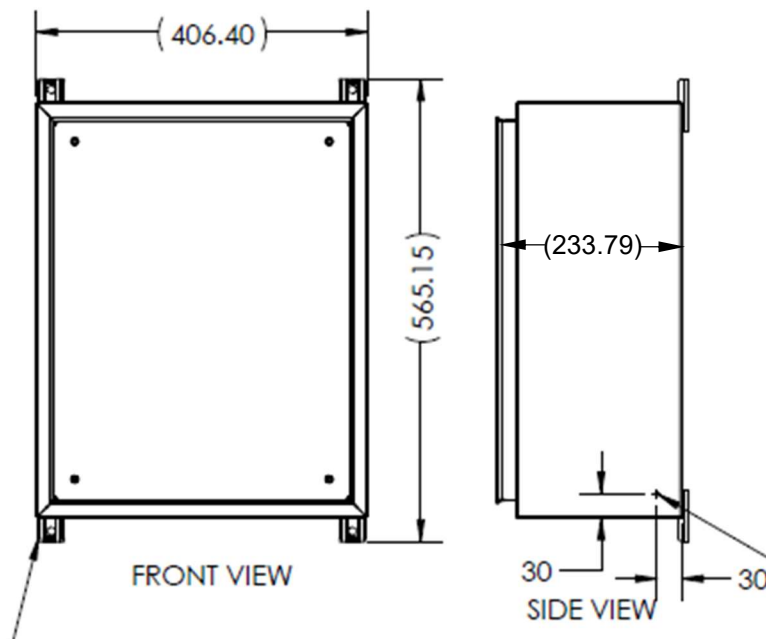


Figure 3: AC or DC Powered Analyzer Dimensions

## 2.2.4 Area Classification Information

**Transmitter:**

Class 1, Division 2 Groups B, C, D

**Transducer:**

Class 1 Division 1 Groups B, C, D

The analyzer is in compliance with the following standards:

CSA C22.2 No. 213

CSA C22.2 No. 61010-1 (as a guide)

ANSI/UL 61010-1

UL 12.12.01

## 2.3 Unpacking

To unpack the system:

Open the shipping container and remove all packing material and boxes. Visually inspect the system and accessories packages to ensure that no major damage has occurred. If damage has occurred, contact the shipping company and Galvanic Applied Sciences. Place the small packages aside in a safe, secure storage area as they are not needed at this stage of the system installation.

If any damage is visible do not proceed with the system installation. Do not attempt to facilitate repairs yourself as this will negate and/or invalidate any possible insurance claim or equipment warranty.

## 2.4 Mounting

The analyzer must be mounted in a vertical position.

Ensure that the mounting hardware and structure is suitable to support the analyzer's weight (up to 17.5 kg).

## 2.5 Connecting the Power



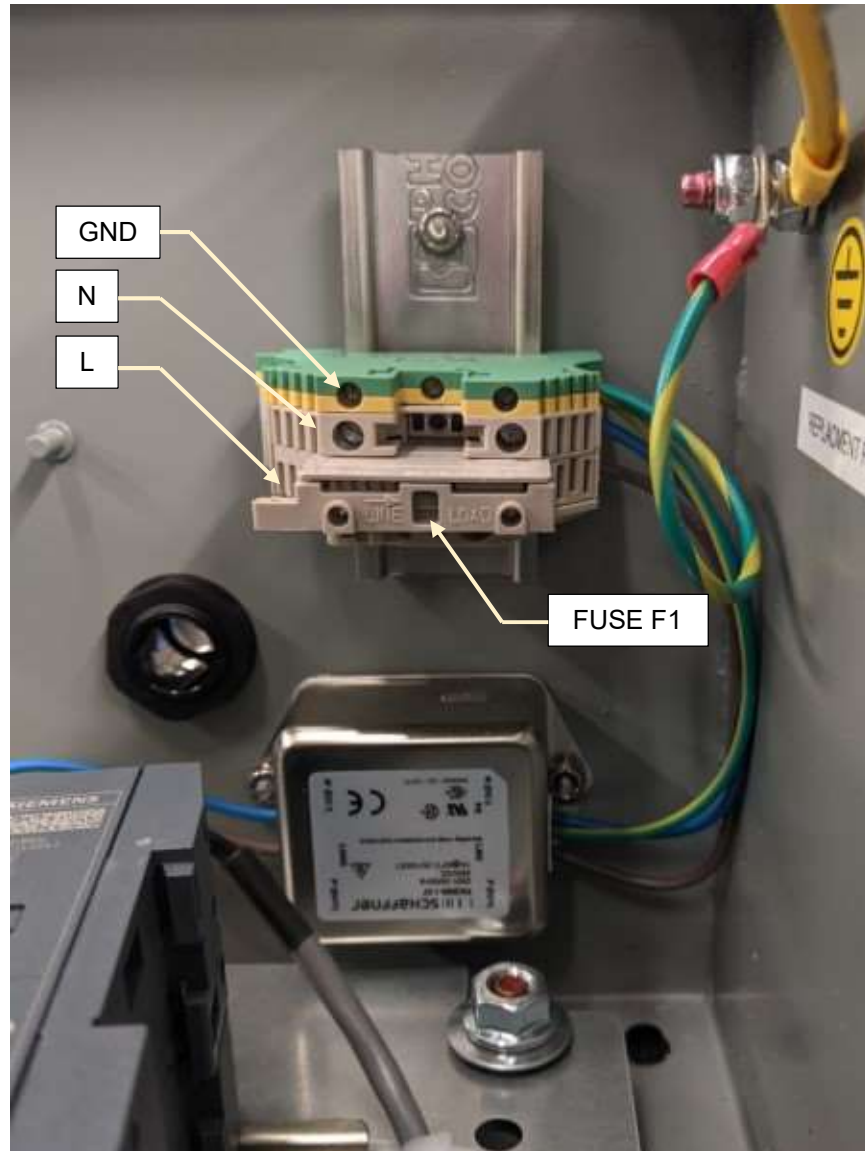
All wiring methods must comply with the standards of the jurisdiction having authority.



Explosion hazard, do not remove or replace fuse when energized.

## AC Powered Units

Figure 4 shows the wiring location and the location of the replaceable fuses for an AC powered analyzer.



**Figure 4: Power Connection and Replaceable Fuse Location for AC Powered Viscometer**

## DC Powered Units

Figure 5 shows the wiring location a DC powered analyzer.



**Figure 5: Power Connection for DC Powered Viscometer**



## 2.6 Customer Connections

Connection to the analyzer can be made by ethernet, serial port (RS232 or RS485) or analog signal (4-20mA). Relay signals can also be connected for status monitoring.

Connecting by ethernet or USB is required for the computer user interface application.

Refer to the ViscoSite Viscometer Operation Manual Section 3.8 for more information.

## 2.7 Operation and Maintenance

Refer to the ViscoSite Viscometer Operation Manual for more information.

## 2.8 Cleaning



To minimize the risk from electrostatic discharge, clean transmitter with dampened cloth – water only. Do not clean inside of transmitter while energized.