sensia
Rockwell Automation + Schlumberger

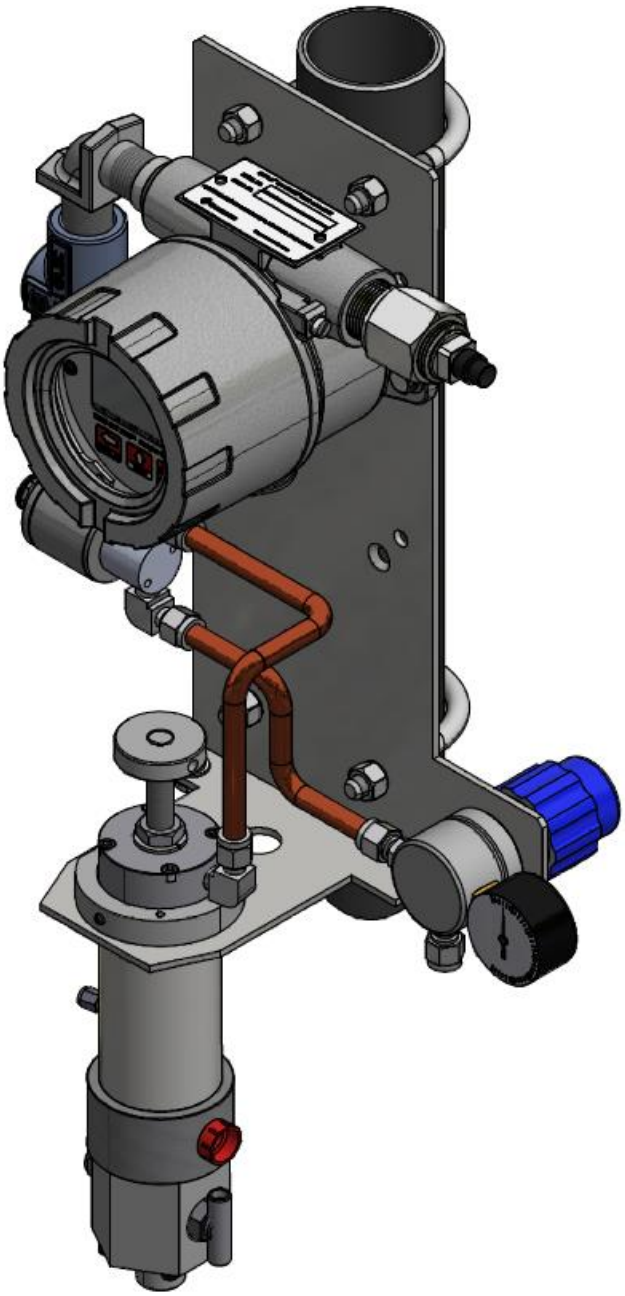
+ MEASUREMENT

CLIF MOCK™

+ LGS-2000 Sampling System

Installation, Operation & Maintenance Manual

MODEL: LGS-2000



INTELLIGENT ACTION

Manual No. 9A-70165003, Rev. 02

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Important Safety Information

Terms Used in This Manual

Caution	**Caution, risk of electric shock**
Attention	**Attention, risque d'électrocution**

WARNING	**A warning identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.**
AVERTISSEMENT	**Un avertissement identifie des informations sur des pratiques ou des circonstances pouvant entraîner des blessures corporelles ou la mort, des dommages matériels ou des pertes économiques.**

Caution	Caution statements Indicate actions or procedures which, if not performed correctly, may lead to personal injury or incorrect function of the instrument or connected equipment.
Attention	Indiquez les actions ou les procédures qui, si elles ne sont pas effectuées correctement, peuvent entraîner des blessures ou un mauvais fonctionnement de l'instrument ou de l'équipement connecté.

Note	Indicates additional information about specific conditions or circumstances that may affect instrument operation.
Remarque	Indique des informations supplémentaires sur des conditions ou des circonstances spécifiques pouvant affecter le fonctionnement de l'instrument.

REVISION HISTORY

REVISION:	DESCRIPTION OF CHANGE:	ISSUER:	APPROVER:	DATE:
1	Initial Release	AK	TMM	June 2011
2	Update Electronics Package	AK	TMM	September 2020

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GENERAL

WARNING!

To avoid the risk of electric shock and fire, the following safety instructions must be observed and the guidelines followed.

The specifications must not be exceeded, and the device must only be applied as described in the following.

Prior to the installation and commissioning of the unit, the installation guide must be examined carefully.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

GENERAL

AVERTISSEMENT!

Pour éviter tout risque de choc électrique et d'incendie, les consignes de sécurité de ce manuel doivent être observées, et les instructions suivies.

Les spécifications ne doivent pas être dépassées, et l'unité ne doit être appliquée que comme décrit dans le texte suivant.

Ce manuel doit être examiné avec soin, avant l'installation et la mise en service de l'unité.

Si l'équipement est utilisé d'une manière non spécifiée par le fabricant, la protection assurée par l'équipement peut être altérée.

INSTALLATION

WARNING!

Installation may only be carried out by electrically skilled and instructed personnel in accordance with national legislation, including the relevant standards.

All technical data on the instrument is to be observed.

Changes to the design and modifications to the equipment are not permitted.

The equipment shall only be operated as intended and only in undamaged and perfect condition.

Sufficient segregation must exist between different cables and wires carrying different types of signal or power and all other circuits.

All wires must be terminated, complete with crimping lugs. Unused cores should be terminated to the earth bus bar.

INSTALLATION

AVERTISSEMENT!

L’installation ne peut être effectuée que par un électricien qualifié, conformément à la législation nationale, y compris les normes pertinentes.

Toutes les données techniques sur l'instrument doivent être observées.

Modifications de l'équipement ne sont pas autorisés.

L'équipement ne doit être utilisé comme prévu par le fabriquant et uniquement si il est en parfait état.

Une séparation suffisante doit exister entre les différents câbles et les fils transportant différents types de signaux ou de puissance et tous les autres circuits.

Tous les fils doivent être terminés, avec pattes de sertissage. Les noyaux non-utilisés doivent être terminés au jeu de barres de la terre.

Section 1: LGS-2000 System Overview

The Clif Mock LGS-2000 Sampling System pairs a microcontroller-based electronic sample controller with an integral liquid/gas sample pump for sampling liquid or gas flow streams. The sample pump connects directly or remotely to a sample probe and to a sampler receiver used to collect samples for analysis. See the Sensia website or contact your local Sensia sales representative for information on Sensia probes and receivers, sold separately.

The LGS-2000 system is designed to operate with system pressures ranging between 30 psi to 1500 psi with the provided low power solenoid.

An external 6 to 30 VDC power supply can be used to power the system, while the low power solenoid requires a 24 VDC power supply through the Solid-State Relay output from the True Cut 2000 Main Circuit Board Assembly.

The system supports flow volume input. It can detect signal from the magnetic pickup of a turbine flowmeter in the range of 20 mV to 200 mV, peak to peak.

While external communications are not required for operating the LGS-2000 system, external Modbus communicating devices or Modbus SCADA systems can be connected to the controller for collecting real-time data or for configuring the controller remotely.

The True Cut 2000 Sampler Controller Electronics is CSA certified for use in Class I, Division 1, Groups B, C, and D hazardous areas with explosion proof rating when installed in accordance with Sensia instructions, as well as Class I, Division 2, Groups A, B, C and D for non-sparking rating.

This document describes the installation and typical configuration of the LGS-2000 system. For additional information about the installation, operation, and maintenance of individual components, see the following component manuals provided with the LGS-2000 system, and available for download from the Sensia website:

- True Cut 2000 Sampler Controller User Manual, Part No. 9A-70165002
- LGS-1 Sample Pump User Manual, Part No. 9A-99104500147

Section 2: LGS-2000 System Components and Specifications

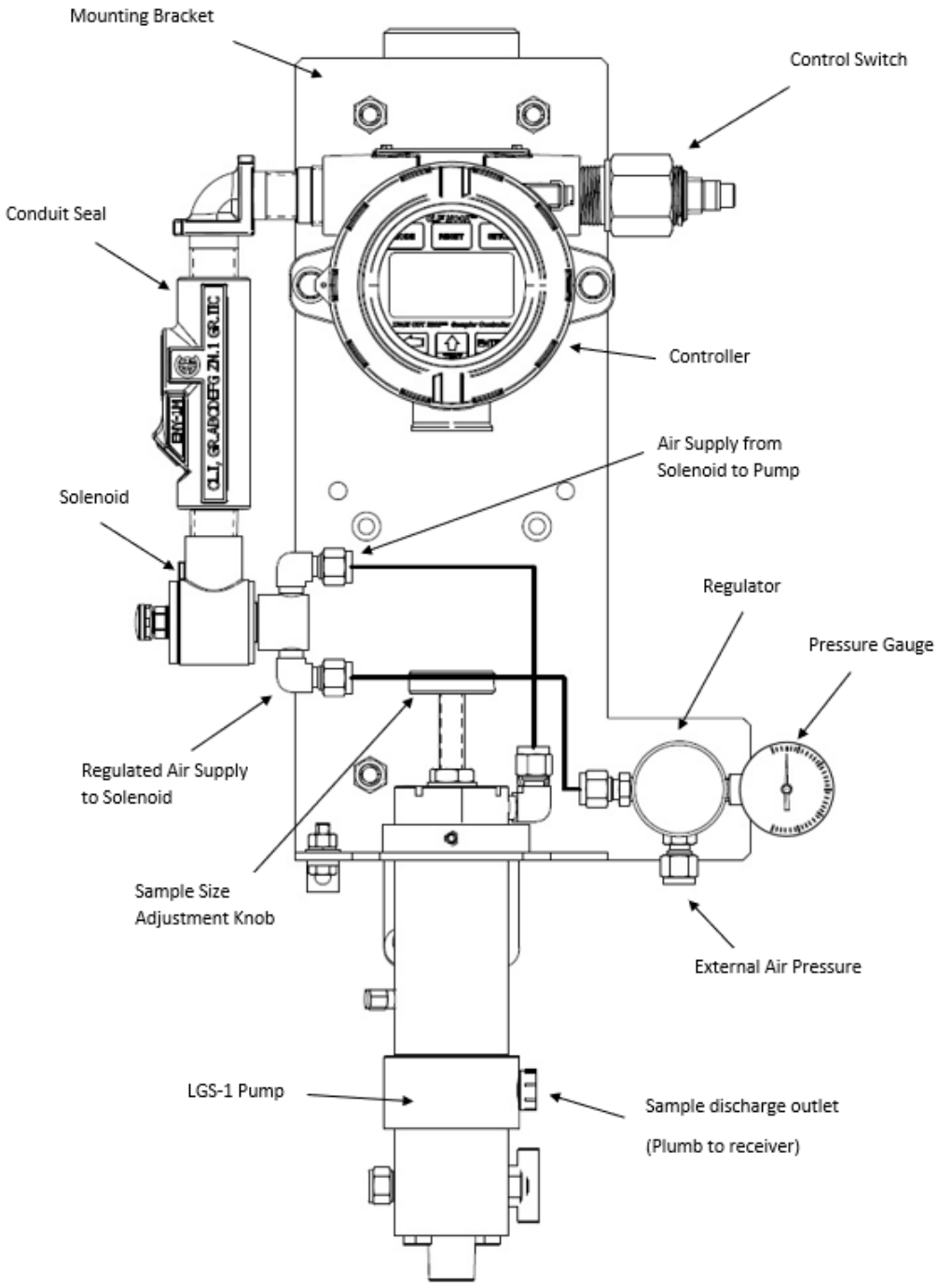

Figure 1: LGS-2000 System Components

SAMPLER CONTROLLER

The True Cut 2000 Sampler Controller can be configured proportional to time or proportional to volume for sampling product. This allows external pacing devices such as turbines meters to control the sampling frequency while the controller displays the total volume and flow rate. The controller consists an explosion proof Control Switch that can be used to start and stop the sampling. Refer to True Cut 2000 Sampler

Controller User Manual, Part Number. 9A-70165002 for additional details. Ideally, the controller should be configured prior to installing the system in the field.

SOLENOID

The solenoid which mounts on the side of the enclosure, connects to an air supply, and is controlled by the controller circuit board with an external 24V DC power supply with a minimum of 36mA. When the controller is installed as part of a sampling system, the solenoid is activated by the controller circuit to direct air pressure to a sample pump, initiating the sampling process.

The air supply may be either an external customer-supplied air supply (for liquid sampling, hazardous gas applications, or low-pressure gas applications) or pipeline gas. A regulator, which is sold separately, maintains the incoming air pressure being fed to the solenoid at a maximum of 150 psi (stainless steel solenoid).

PRODUCT IDENTIFICATION

A Serial Number Tag mounted to the outside of the controller enclosure identifies the product by its part number and serial number, refer to True Cut 2000 Sampler Controller User Manual, Part No. 9A-70165002. A System Information Tag is located on the mounting plate of the LGS-2000 system, see Figure 2.

Figure 2: System Information Tag

AIR PRESSURE REGULATOR

The regulator supplied with the LGS-2000 Sampling System ensures that incoming air pressure is reduced to 150 psi before it reaches the solenoid. Sensia's standard regulator input is rated at 3000 psi maximum and output is rated at 200 psi maximum for use with external compressed air.

The regulator is plumbed to either a fitting on the pump (when pipeline pressure is actuating the pump), or to an external air supply (recommended for liquid applications and some low-pressure gas applications).

PRESSURE GAUGE

A 1.5-in. pressure gauge is mounted with the regulator and provides a readout of actuation air pressure. See the LGS-1 Sample Pump User Manual for a chart that can be used to determine the appropriate actuation air pressure for a specific application. To set the pressure, adjust the regulator knob on the back of the sampler bracket.

CONDUIT SEAL

A conduit seal is required for True Cut 2000 Sampler Controller Electronics to the Solenoid Valve. Solenoid Valve should be pre-wired and installed form factory; however, all conduit seal compound should be poured during the field installation phase.

Note	**Conduit Seal must be installed within 18-inches from the True Cut 2000 Sampler Controller. Conduit Seal Compound is to be poured during the field installation phase.**

OTHER REQUIRED CUSTOMER-SUPPLIED EQUIPMENT

SAMPLE PROBE

A sample probe delivers the sample fluid to the supply inlet of the purge valve manifold connected to the bottom of the pump. The probe should be made of non-corrosive material. 316 stainless steel tubing is recommended.

SAMPLE RECEIVER

A vented receiver or pressure-balanced cylinder should be connected to the discharge outlet of the pump to collect the samples. The size of the receiver is typically entered into the controller when configuring sample frequency.

If a pressurized receiver is used, an outlet check valve should be installed between the sample discharge outlet and the receiver to prevent the process fluid from flowing back to the pump. The valve is an accessory supplied by Sensia (Part No. 9A-50142303543).

EXTERNAL AIR SUPPLY

Pipeline gas is frequently used to actuate the pump in gas sampling applications. However, in liquid applications and some low-pressure gas applications, an external air supply is required. To determine whether an external air supply is required for a gas application, the user must determine the pipeline pressure of the fluid to be sampled. If pipeline pressure is below 15 psi, an external air supply is required to actuate the pump. See the LGS-1 Sample Pump User Manual for details.

LGS-2000 SAMPLER SPECIFICATION

Table 1: LGS-2000 System Components

Sampler Controller	True Cut 2000 Sampler Controller Supports time-based and volume-based sampling of gases and liquids Accepts inputs from turbine flowmeters *See the True Cut 2000 Sampler Controller User Manual, Part No. 9A-70165002, for enclosure, power supply, keypad security, and input/output specifications.*
Operating Environment	True Cut 2000 Sampler Controller: -40°C to 70°C (-40°F to 158°F) LGS-1 Pump: -26°C to 190°C (-15°F to 375°F)
	0 to 90% non-condensing relative humidity
	LCD contrast is reduced below -30°C (-22°F)
Solenoid	24V DC low power solenoid, 0.85-watt, 0-150 PSI
Pump	LGS-1 Sample Pump Stainless steel construction Maximum working pressure: 1500 PSI *See the LGS-1 Sample Pump User Manual, Part No. 9A-99104500147, for details.*
Regulator	3000 PSI in, 200 PSI out max.
Mounting Options	Direct mount to sample probe
	Remote mount to 2-in. vertical pipe with U-bolts

Section 3: System Installation

GENERAL INFORMATION

The LGS-2000 Sampling System can be mounted using any of three basic methods:

- Direct Mount (Recommended)—The sampler may be mounted directly on the sample probe. This eliminates the need for tubing and provides the shortest path for the sample fluid. This method is preferred when the piping configuration allows. If pipeline vibration is a concern, additional support may be added for the enclosure.

- Remote Mount (Bulkhead)—The sampler may be bulkhead-mounted to a flat surface using holes provided in the mounting bracket supplied with the LGS-2000 system. A stainless-steel tube is used to convey the sample fluid from the sample probe to the inlet of the purge valve manifold.

- Remote Mount (Pipe Mount)—The sampler may be mounted to a 2-in. vertical pipe using a pair of U-bolts, sold separately. A stainless-steel tube is used to convey the sample fluid from the sample probe to the inlet of the purge valve manifold.

Step-by-step instructions for installing the system are provided below. See Figure 6, for typical arrangement of direct-mount and remote-mount installations.

HAZARDOUR AREA PRECAUTIONS

EXTERNAL POWER

True Cut 2000 Sampler Controller is powered with 6-30 VDC power supply, refer to True Cut 2000 Sampler Controller User Manual, Part No. 9A-70165002, for additional details.

Note	All Conduit Seal Compound is to be poured during the field installation phase. Conduit Seal applies to the Solenoid Valve and all power/ signal cable from other devices.

TUBING CONNECTIONS

Tubing arrangements vary, depending on the product sampled (gas or liquid) and site restrictions. At a minimum, ¼-in. stainless steel tubing is required to

- connect the incoming air from a regulator to the solenoid valve

- connect the outgoing air supply from the solenoid valve to a sample pump

- connect tubing to regulator if external air supply is being used

INSTALLATION PROCEDURE

The following procedure is a guide to a typical installation. Tubing arrangements will vary, depending on the product sampled (gas or liquid). Typical connections are shown in Figure 6.

For more information on remote mount or fast-loop tubing configurations, see the LGS-1 Sample Pump User Manual, Part Number. 9A-99104500147, for additional details.

1. Mount the sample probe vertically in a horizontal pipe run as per API Chapter 8, Section 2 and be located as per API Chapter 8, Section 2, Appendix A. The end of the sample probe should be cut at a 45º angle to the pipeline and should penetrate the center one half of the pipeline.

2. Connect the pump either directly or indirectly to the sample probe, as described in the LGS-1 Sample Pump User Manual supplied with the LGS-2000 system.

3. Connect the pump discharge outlet to the sample receiver using 1/4 in. stainless steel tubing.

Note	If a pressurized receiver is used, install an outlet check valve between the sample dis- charge outlet and the receiver to prevent the process fluid from flowing back to the pump. The valve is an accessory supplied by Sensia (Part No. 9A-50142303543).

4. Make sure the “inlet” and “outlet” connections from solenoid are secure; tighten if required. The “inlet” connection supplies air pressure from the regulator to the solenoid. The “outlet” connection supplies air pressure from the solenoid to actuate the pump.

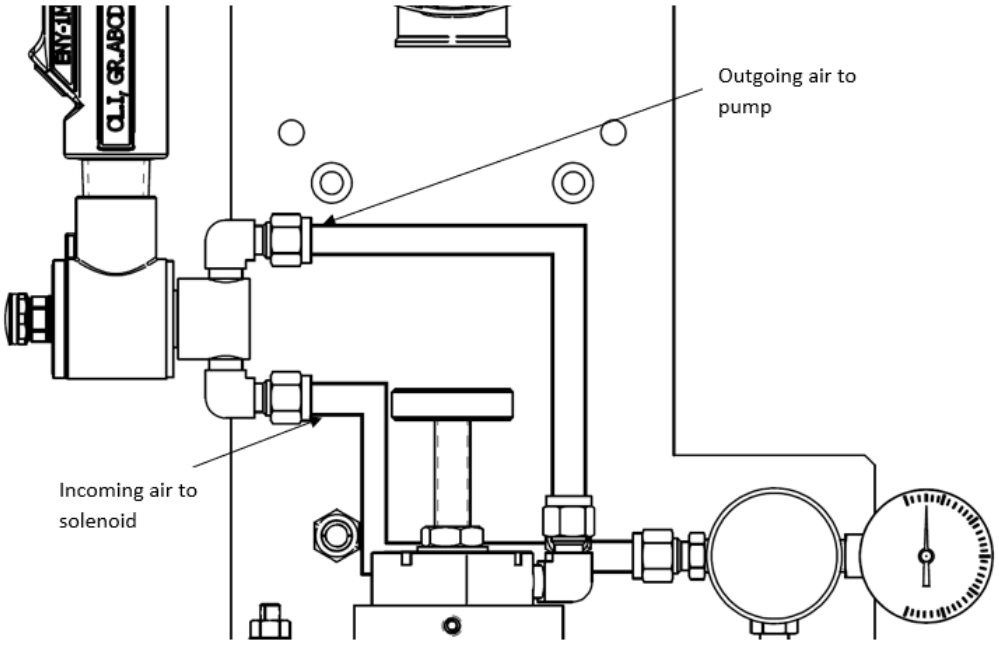

Figure 3: Controller inlet and outlet connections

5. If using an external air supply, connect the air supply discharge outlet to the regulator using stainless tubing. If process gas will be used to actuate the pump, the air supply tubing will be connected to the pump.

6. Adjust the regulator adjustment knob until the pressure gauge displays the appropriate pump actuation pressure for the application, as shown in Figure 4.

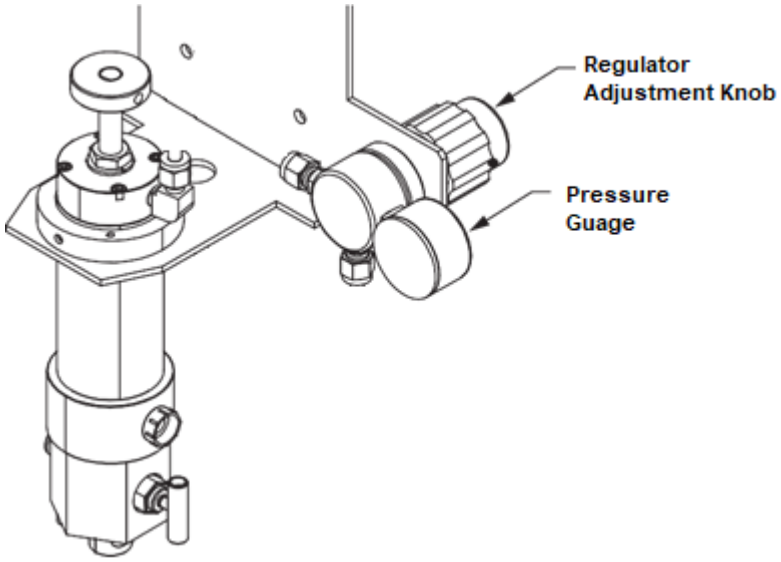

Figure 4: Regulator adjustment control

7. If a fast loop connection is required, connect the reinjection line fitting in the side of the purge valve manifold to the low-pressure side of the orifice fitting in the pipeline as shown in Figure 6. See Figure 5 for the location of the fast-loop reinjection line fitting. Also see the LGS-1 Sample Pump User Manual, Part No. 9A-99104500147, for additional details.

8. Cover the vent hole in the side of the pump with 1/16-17 NPT screen, if necessary, to prevent build-up of debris in the hole.

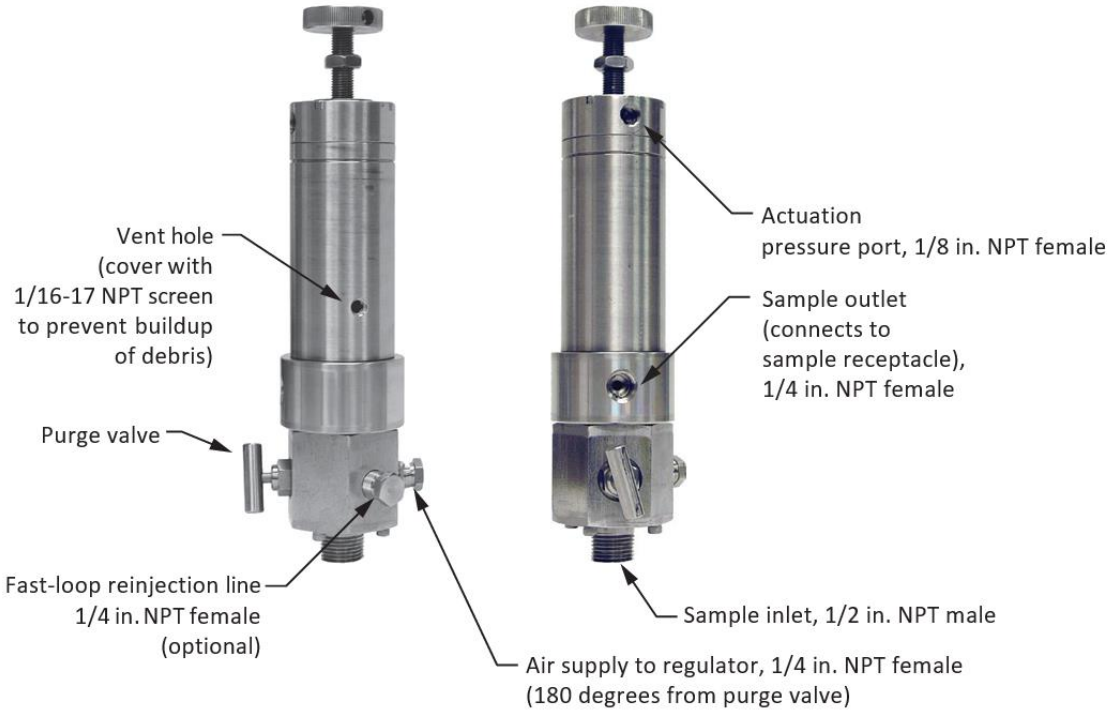

Figure 5: Pump tubing connection; note the orientation of the image above (the photo on the right is rotated 90 degree clockwise from the position shown on the left)

9. Connect the external power supply and observe the display boot-up sequence.

10. Set the size by adjusting the pump and configure the controller. Instructions are provided in the True Cut 2000 Sampler Controller User Manual, Part No. 9A-70165002.

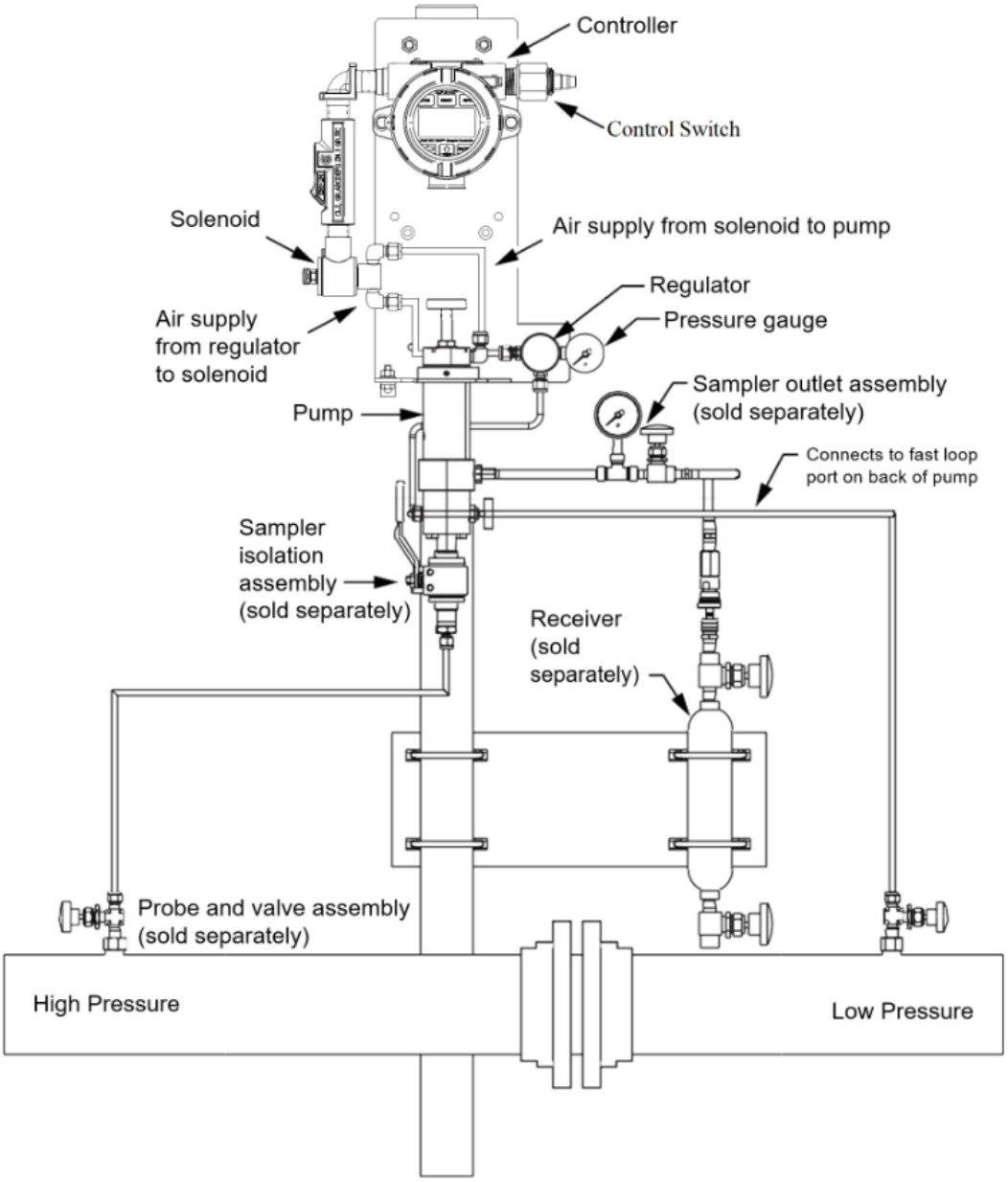

Figure 6: Remote-mount installation, shown with optional fast-loop connections

Section 4: LGS-2000 Sampling System Spare Parts

WARNING	**EXPLOSION HAZARD – Substitution of components may impair suitability for Class I, Division 1. Use of spare parts other than those identified by Sensia LLC. voids hazardous area certification. Sensia bears no legal responsibility for the performance of a product that has been serviced or repaired with parts that are not authorized by Sensia.**

For True Cut 2000 Sampler Controller, refer to User Manual, Part Number. 9A-70165002 for additional details.

Table 2: LGS-2000 System Components

Part Number	*Description*
50361619	True Cut 2000 Sampler Controller
50361604	Low Power Solenoid, 24V DC, 150 PSI (Stainless Steel)
2296099-01	Regulator, 3000 PSI input, 200 psi output max. (Brass)
2296179-01	Gauge, 0-160 psi
50361617	Conduit Seal, ½-in. MNPT to FNPT, with Nipple (Aluminum)

Table 3: LGS-1 Pump

Part Number	*Description*
9A-50132160150	LGS-1 Sample Pump Assembly
9A-50142150715	Overhaul Kit (contains O-rings and springs for full overhaul of the LGS-1 pump)
9A-50142150708	Seal Kit (contains O-rings for the LGS-1 pump and purge valve manifold)
9A-50142200643	Filter, LGS-1, 40-micron

Table 4: Optional Accessories

Part Number	*Description*
9A-66046405010	Hardware, Remote Mount, Top of Pole
9A-100023269	Hardware, Remote Mount, U-Bolt, Set of Two
9A-50132307870	True Cut Probe and Valve Assembly
9A-50142303543	Outlet Check Valve, 1 psi (required for installations with pressurized receivers)

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Appendix A: **Publisher Notes**

SUPPORT

For further support, contact:

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WEB https://sensiaglobal.com/Measurement

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