

CLIF MOCK™

# LGS-2000 Sampling System

*Sample Pump, Controller & Regulator*

The Clif Mock LGS-2000 answers the call for dependable sampling of liquid or gas flow streams by combining quality materials, high-performance electronics, and a configuration interface that is so simple, even first-time operators can put the device into operation within minutes.

The controller is user-configured to sample product in proportion to time or volume. As the electronics drives the solenoid to supply air pressure to the pump, the pump collects product samples from the pipeline and deposits them into a receiver which can be transported for offsite analysis.

A bracket connects the pump to the weatherproof controller enclosure for ease of installation. The system can be direct-mounted to a sample probe in a pipeline, or remote-mounted to a bulkhead or a vertical pipe, using stainless steel tubing to carry the sample from the sample probe to the pump inlet.

The unit is CSA certified as an intrinsically safe device for use in Class I, Division 1, Groups C and D hazardous areas.

## Sample Controller

The controller combines the electronic sampling circuitry, a battery, and a solenoid in a compact, weatherproof enclosure. The LCD readout, which displays sample count and other job status indicators, is mounted in the door for easy viewing, and a six-key keypad allows quick and easy configuration. RS-485 communications also allow remote configuration of the device and realtime data collection using any Modbus-compliant device or host system.

The controller supports inputs from both turbine meters and pulse-generating devices such as the contact closure input of a positive displacement meter. The controller can be user-configured to act as a timer or a pulse counter for sampling product, and enables flow total, flow rate and various performance indicators to be viewed on demand.

The controller can be powered three ways. A lithium battery pack typically provides autonomous power for 15 months or longer when the device is configured for 30-minute sampling intervals. Where solar power is desired, the controller is equipped with a rechargeable lead acid battery. An external



DC power supply can also be used to power the device, with the lithium battery on board for backup protection.

The controller's ability to calculate sample volume or frequency greatly simplifies the configuration process. Operators simply select the type of sampling desired, and respond to the setting prompts that follow on the LCD.

## Sample Pump

The pneumatically operated all-stainless sample pump transfers samples of liquid or gas into an atmospheric sample receiver or pressurized cylinder. The controller solenoid valve remains on for 1 second when it receives a signal to initiate a sample. The sample size is adjusted by controlling the size of the sample taken during the 1-second period. See sample size ranges in the table below.

### Features

<b>Enclosure</b>	Weatherproof fiberglass, 2-in. pole or bulkhead mount, with 6-key keypad Two cord grips for circuit board connections (solar cable, meter inputs, communications, etc.) and two fittings for air input/output
<b>Power Supply</b>	Integral 7.2V lithium battery pack Rechargeable 6V lead acid battery and 6V solar panel 9-15V external power supply
<b>LCD Display</b>	8-digit top readout of values (7-segment characters) 6-digit bottom readout of scrolling parameters and associated engineering units (11-segment characters for easy-to-read prompts) 0.3" character height Configurable scan parameters and duration
<b>Solenoid</b>	Standard, 100 psi maximum air pressure Premium (stainless steel), 120 psi maximum air pressure Exhaust is vented through a 1/4" bulkhead fitting for release to atmosphere or for collection and disposal.
<b>Pump</b>	1500-psi maximum input 5-second minimum cycle time 0.25 cc to 1.25 cc sample size for liquid 0.05 cc to 1.00 cc sample size for gas
<b>Regulator</b>	Standard, 3000-psi maximum input Premium, 3,600-psi maximum input, stainless steel Economy, 300-psi maximum input (external air required)
<b>Communications</b>	2 RS-485 communication ports (RTU Modbus®)
<b>Environment</b>	-40°F to 140°F (-40°C to 60°C) or -40°F to 104°F (-40°C to 40°C), battery dependent 0 to 90% non-condensing relative humidity LCD contrast is reduced below -22°F (-30°C)
<b>Security</b>	Two security levels, password protection
<b>Safety Approval</b>	Intrinsically Safe - Class I, Division 1, Groups C and D, US and Canada

## Air Pressure Regulator

The regulator receives air pressure from the pipeline or an external air supply and reduces it to a level that the solenoid can accept (100 or 120 psi). Regulator models are available for liquid and gas sampling applications, and the premium stainless steel model offers additional corrosion resistance where required.

### Inputs/Outputs

<b>Turbine Meter Input</b>	Configurable sensitivity adjustment (20mV to 200 mV, peak to peak) Frequency range: 0 to 5000 Hz Input amplitude: 20 mV to 3000 mV, peak to peak Programmable K-factor Cannot be used with Pulse Input
<b>Pulse Inputs 1 &amp; 2</b>	Accept a signal from a turbine meter or positive displacement meter Optically isolated Frequency range: 0 to 5000 Hz (continuous 50/50 duty cycle) Input: 3 to 15 VDC or contact closure Pulse Input 2 dedicated to sampling termination
<b>Digital Outputs 1 &amp; 2</b>	Digital Output 1, solenoid drive, rated for 300 mA max at 6VDC Digital Output 2, solenoid drive or pulse output, rated for 60 mA max at 15 VDC

### Sampling Methods

<b>Proportional to Time</b>	Batch Sampling (controller calculates the frequency of samples required to fill the bottle in a specified time) Time Sampling (controller collects samples at user-configured frequency until specified number of samples is collected) Continuous Time Sampling (controller collects samples at user-configured frequency until sampling period is manually terminated)
<b>Proportional to Volume</b>	Preconfigured Pulse Input (controller collects samples to deliver specified volume, based on pulse input from an external device) Manually Entered Pulse Input (controller collects samples to deliver specified volume, based on manually-entered pulse input frequency settings) Turbine Input (controller collects samples to deliver specified volume, based on turbine input frequency settings)
<b>Volume Units</b>	GAL, BBL, M3, LIT, CF, and NONE
<b>Rate Units</b>	/SEC, /MIN, /HR, and /DAY

### Custom Installations

Cameron recognizes that in the sampling system business, one size does not fit all.

Cameron offers a variety of equipment and has the expertise to design a sampling system that is ideal for each client's specific needs.

First, we listen. We gather information about our clients' line pressure, process fluid, sample collection schedules and

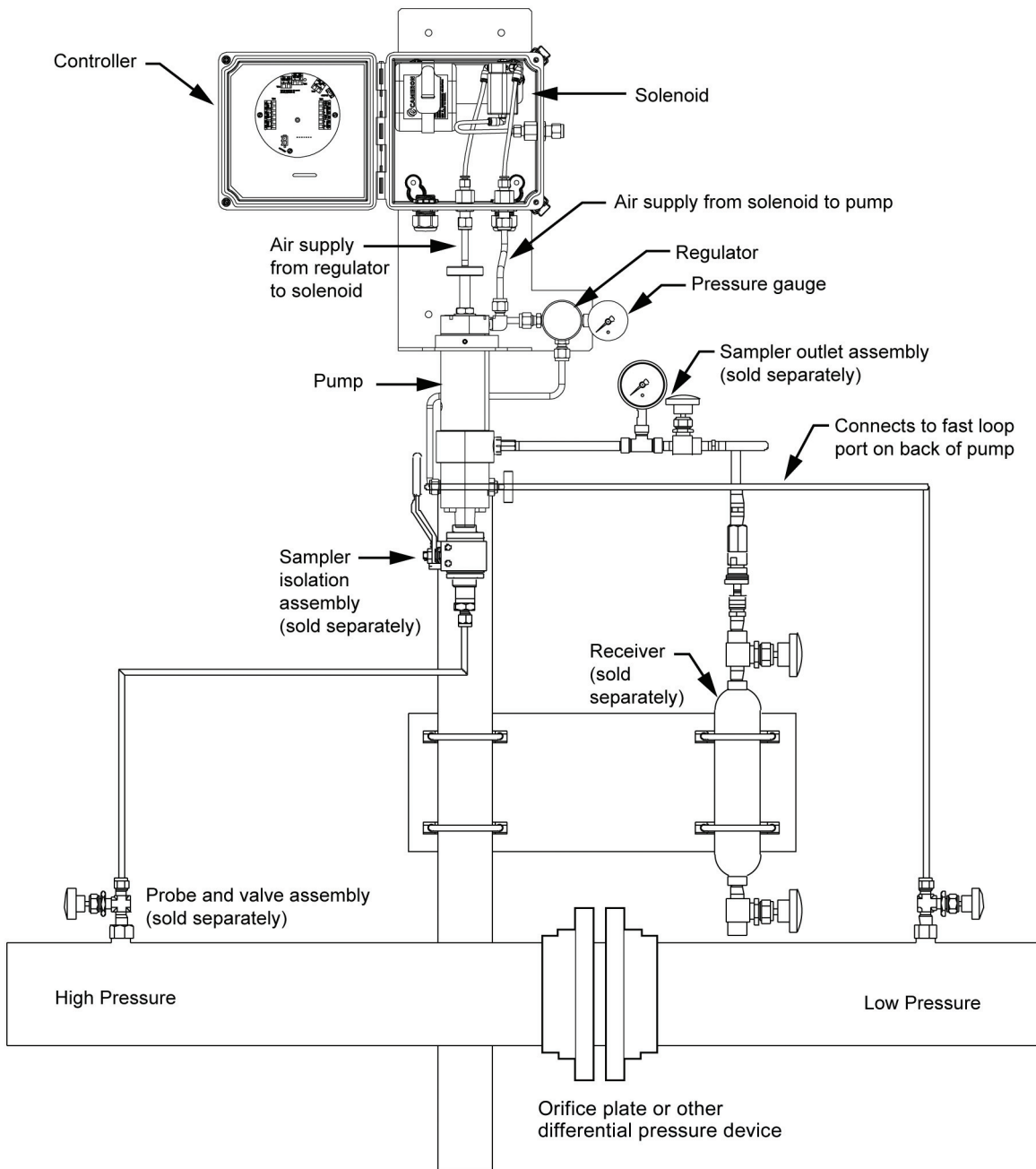
power supply needs so we can select the right materials for the job.

Then we design to the client's specifications to configure a system that is specifically matched to the customer's application and built for lasting performance.

The diagram below shows a typical fast-loop configuration in which sample

fluid is sampled upstream, flows through the pump and is reinjected into the pipeline downstream. This configuration ensures that a fresh product sample is collected with each sampling cycle.

For more information or a free quote, contact your local Cameron sales representative.



## Application Data

The first step in configuring a sampling system is to collect data about the application. The Application Design Data Sheet on our website (Measurement Systems > Flow Analysis > Sampling Products & Systems > Samplers) can guide you through the process.

Contact your local Cameron sales representative for more information.

### MEASUREMENT SYSTEMS

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