Ellington Valley Technologies, Inc.

SMAART™ Transport Startup Guide

September 30, 2026
Rev B

REVISION BLOCK

Rev	Change Description	ECO	Date
A	Initial release.	-	08/05/26
B	Administrative changes.	ECO-40	09/30/26

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About this Manual

This manual provides instructions for safe installation, set-up, and operation of the equipment. Before installing or operating the equipment, please read the entire manual and observe all hazard notices, symbols, and labels on the equipment and in the manual.

Technical Support and Contact Information

Safe and reliable operation of this equipment is conditional on all installation, operation and maintenance procedures being carried out in accordance with the appropriate manuals, by personnel having appropriate qualifications, experience, and training. Failure to observe the requirements of the manual may result in the user being held responsible for the consequences and may invalidate any warranty.

Customer Support	+1 (860) 661-1424 support@EllingtonValley.com

For automation requests in the software, reach out to the EVT Sales and Marketing team using the above contact information.

Manufacturer Address

SMAART™ Transport Manufacturing Site
Ellington Valley Technologies Inc.
32 North Road
East Windsor, CT 06088
U.S.A.

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Table of Contents

Copyright Notices and Disclaimers 3

About this Manual 3

Technical Support and Contact Information 3

Manufacturer Address 3

1. Safety Information 6

Hazard Notices Used 6

Symbols Used on the Equipment 6

General Safety Precautions 7

2. SMAART™ Transport Overview 8

3. Facility and Installation Requirements 9

Installation Site Requirements 9

Installation Dimensions 10

Drawings and Figures 10

Initial Inspection 12

System Storage 12

Initial Setup 13

Overview of Mechanical and Gas Connections 13

Customer Supplied Gas Lines and Connection 13

4. Transport Core HMI Overview 14

5. Delivering Gases Using HMI Touchscreen 16

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1. Safety Information

The chapter identifies potentially hazardous conditions which may be present during installation, operation, and serving of the equipment. The equipment is intended for indoor use in a dry, clean environment.

Hazard Notices Used

The equipment poses potential hazards during installation, operation, and service. In this manual, there are four levels of safety precautions and importances that conform to ANSI Z535 and ISO 3864. These hazard notices identify the hazard, explain how to avoid the hazard, and identify probably consequences of not avoiding the hazard. These notations are provided primarily in the procedural sections and are intended to complement the ANSI and/or ISO safety labels physically located on the equipment.

DANGER	**Avoid hazard.** Danger notifications indicate a hazardous situation which, if not avoided, **will** result in serious injury or death. The hazard is imminent.
WARNING	**Avoid hazard**. Warning notifications indicate a hazardous situation which, if not avoided, **could** result in serious injury or death. The hazard is possible.
CAUTION	**Avoid hazard.** Caution notifications indicate a hazardous situation which, if not avoided, could result in minor to moderate injury and/or equipment damage.
NOTICE	Notice notifications provide information to follow to avoid damaging system hardware or losing data.

Symbols Used on the Equipment

	ON (Power) *IEC 60417, No. 5007*
	OFF (Supply) *IEC 60417, No. 5008*
	Protective Earth Terminal (Ground) *IEC 60417, No. 5019*
	General Warning *ISO 7010, W001*
	Warning: Risk of Electric Shock *ISO 7010, W012*
	Electronics Waste *The equipment should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling.*

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General Safety Precautions

This section lists the hazards that could be encountered when installing, operating, and/or servicing the equipment. More specific hazards are listed throughout the manual in the relevant sections.

DANGER	**Suffocation Hazard.** The SMAART™ Transport uses nitrogen and other compressed gases during routine operation, which could displace the air in confined areas and create an oxygen deficient atmosphere. Ventilation is required to prevent high concentrations of gas from building up inside enclosed areas.
WARNING	**Personal Protective Equipment (PPE).** When handling/using chemicals for preparation or use within the equipment all applicable local and national laboratory safety practices must be followed. This would include, but is not limited to, following general laboratory and chemical handling safety practices, use of all relevant engineering controls such as ventilation hoods and, appropriate selection and use of PPE. Failure to adhere to laboratory safety practices could lead to injury or death.
	Application Suitability: It is the customer's responsibility to determine the suitability and hazards of the equipment for a given application. Ellington Valley Technologies makes no representation that the potential hazards presented in this guide are the only hazards associated with this system and its installation, operation, and maintenance.
	Inhalation Hazard. Be sure that any sample exhaust ports are properly connected to a safe vent location to prevent exposure to potentially dangerous gas mixtures. Inhalation of certain gases may cause headache, dizziness, nausea, bodily irritation, irregular heartbeat, or death.
	Analysis of gases shall be below all hazardous limits for toxicity and caustic exposure (inhalation, skin contact, eye contact and swallowing) as set forth by applicable national laboratory standards and governing regulatory agencies. Where toxic gases are analyzed, it is the end-user's responsibility to purge the equipment of hazardous residue in advance of any service.
CAUTION	Only trained and experienced operators should perform maintenance and repairs. Contact Ellington Valley Technologies for service and/or training.
	Do not substitute parts or modify equipment. Do not install substitute parts or perform any modifications to the hardware that have not been authorized by Ellington Valley Technologies.
	Use the proper power cord. Use the proper power cord. Only use a detachable power cord that is rated for the voltage and current specified on the equipment nameplate. The power cord should have a minimum cross-sectional area of 0.75 mm2 (18AWG). The power cord should be certified by an appropriately qualified agency such as UL, VDE, or Semko.
	Compressed Gas Hazard. The equipment requires compressed gas for zero and calibration gases. Check for leaks before turning on any gas supply and wear safety glasses to prevent injury. Failure to comply could result in injury.

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2. SMAART™ Transport Overview

This chapter introduces the SMAART™ Transport, explains the principle of operation, and provides an overview of the major components.

The SMAART™ Transport product line is a rack-mounted gas delivery platform designed to distribute calibration gases directly to analyzers and through the sampling system with consistency and control.

Designed for flow rates up to 20LPM, the SMAART™ Transport is built for modern workflows and simplified calibration setups. When paired with the EVT Ensight Solution Manager, the SMAART™ Transport allows for high level automation in calibration gas distribution.

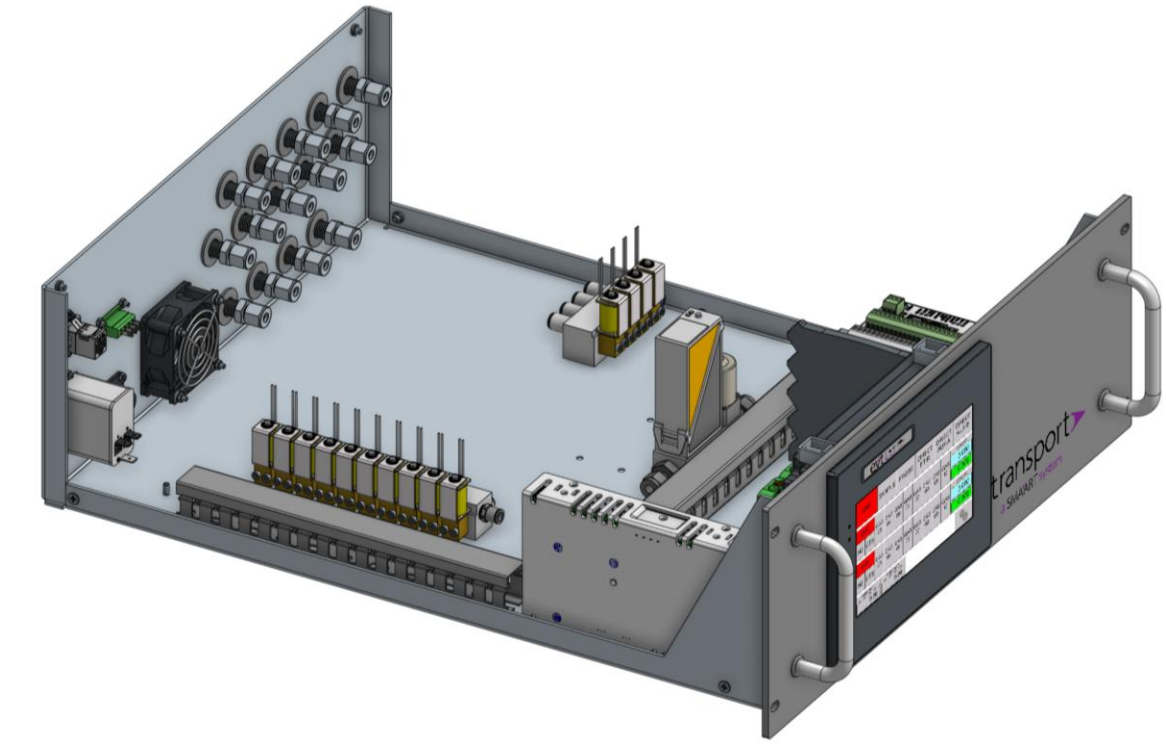

Table 2.2.1. Key Features of SMAART™ Transport *

10 Input Ports • N_2, CTS, up to 8 calibration gases
4 Output Ports • Probe (System or Spike) • Direct FTIR • 2 Additional Direct Outputs
Single High-Flow MFC (0-20 LPM)

** Controllable from HMI touchscreen or remotely.*

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3. Facility and Installation Requirements

This chapter describes how to prepare a site for installation, as well as procedures for uncrating the equipment and initial setup.

⚠CAUTION	Do not attempt to install, commission, maintain, or operate this equipment unless you have been trained or are an experienced instrument technician.

Installation Site Requirements

Table 3.1. Facilities Requirements

Condition	Requirement	Cords / Tubing	Fittings
Power	120-240 VAC, 50/60 Hz, 2A max		
Gas Requirements		¼" Tubing	¼" Swagelok
Interface Connections		CAT5E/6 Patch Cord	
Pump Control Cable *(Optional)*		4-Conductor CPC Cable	
Analog Input Cable *(Optional)*		Screw Terminal for 4-20mA wire pairs	

Table 3.2. Environmental Requirements

Condition	Requirement
Operating Temperature	0 to 40°C *MFCs require ambient operating temperature variability of no more than ±2°C for optimum performance. Flow/dilution values may be degraded outside of this range.*
Humidity	5-95% non-condensing
Altitude	0-2500 meters
Storage Temperature	See Table 3.5 for requirements.
Overvoltage Category	**Category II.** Equipment with plug and socket connector or fixed connection supplied from the electrical system of a building.
Pollution Degree	**Pollution Degree 2.** Normally only nonconductive pollution occurs. Temporary conductivity caused by condensation is to be expected.
Mains Supply Voltage Fluctuations	± 5%

Table 3.3. Gas Sampling Requirements

Condition	Requirement
Input Gas Pressure	30-50 PSIG; 40 PSIG Nominal
Maximum Output Backpressure	5 PSIG

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Installation Dimensions

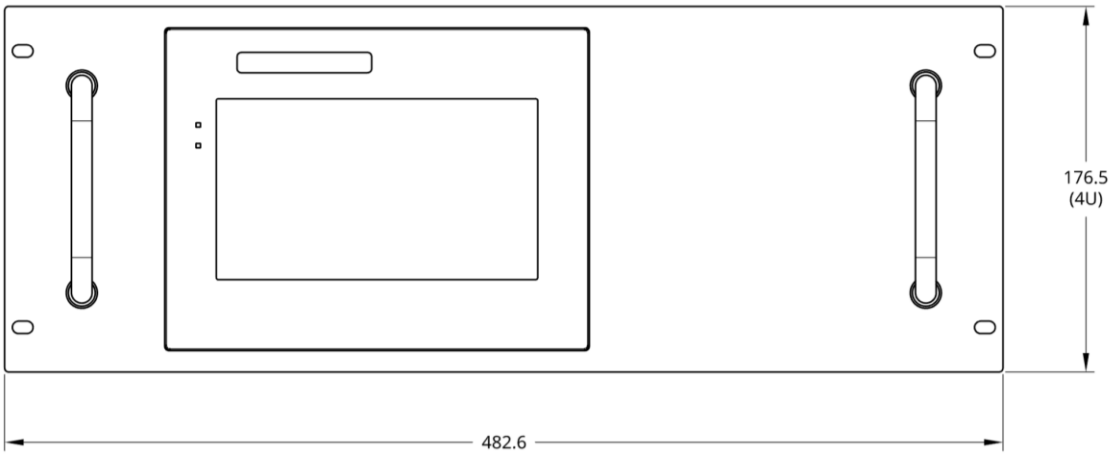
The overall dimensions of the equipment are shown below. The equipment should be installed to allow clearance for operation and service.

Table 3.4. Installation Dimensions

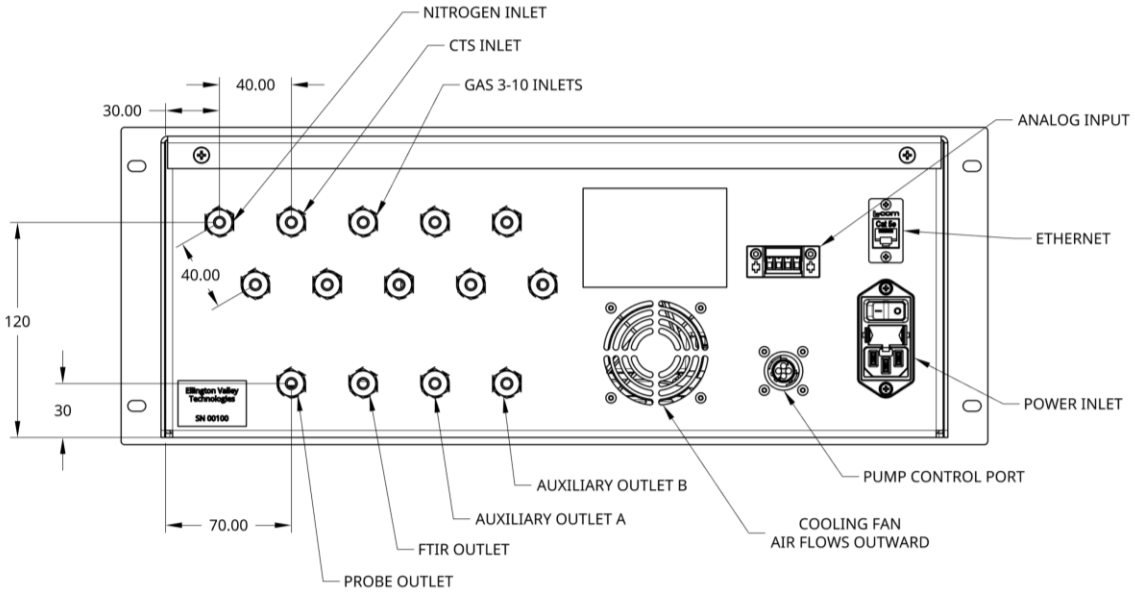
SMAART™ Transport	Dimension (W x D x H)	Weight
Imperial Measurements	19 x 7 x 25.2”	24 lbs.
Metric Measurements	483 x 177 x 640mm	10.9 kg

Drawings and Figures

Front View



Rear View



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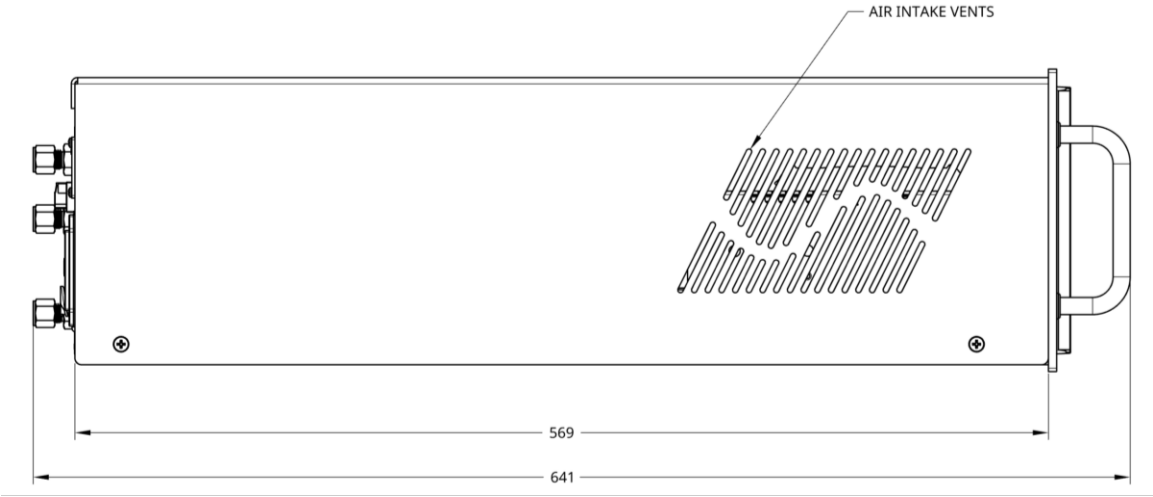
Side View



Top View



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Initial Inspection

The equipment is carefully packed to reach its destination in excellent condition. When the equipment is received, inspect the box for damage. If any damage is found, notify the freight carrier and Ellington Valley Technologies immediately. If it is necessary to return the equipment, obtain an RMA Number before shipment. The original packing materials are required to return the instrument, and the use of unsuitable packing material during return shipment will void the instrument warranty.

⚠CAUTION	Unpacking the equipment cold may result in damaging condensation on the electronic components. Allow 24 hours for the equipment to reach room temperature before unpacking.

System Storage

If the system needs to be stored before installation, ensure the system is stored in its original packaging in an area that both humidity and temperature are controlled to the following conditions:

Table 3.5. System Storage Requirements

Condition	Requirement
Temperature	-10 to 70°C
Humidity	5-95%, non-condensing
Packaging	Original packaging must stay closed.

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Initial Setup

Overview of Mechanical and Gas Connections



Customer Supplied Gas Lines and Connection

The SMAART™ Transport is equipped with 10 dedicated gas inputs.

- The **N2** port, taking the place of **Gas 1**, is reserved for supply nitrogen. This port is placed strategically along the internal gas manifolds to facilitate purging of other gases when nitrogen is selected.
- The **CTS** port, taking the place of **Gas 2**, is reserved for supply CTS, or Calibration Transfer Standard gas.
- Ports **3 through 10** are user defined gases.

A purging run with N_2 is recommended between gases to prevent line contamination within the system.

Table 3.6. SMAART™ Transport Fuses and Circuit Breakers

Location	Identifier	Value	Description
Rear Fused Power Inlet	T2A/250	2A	

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4. Transport Core HMI Overview

This chapter provides an overview of the functions of the touchscreen HMI for manual operation of the Transport Core.

1. Initial Startup



Overview of Home Screen

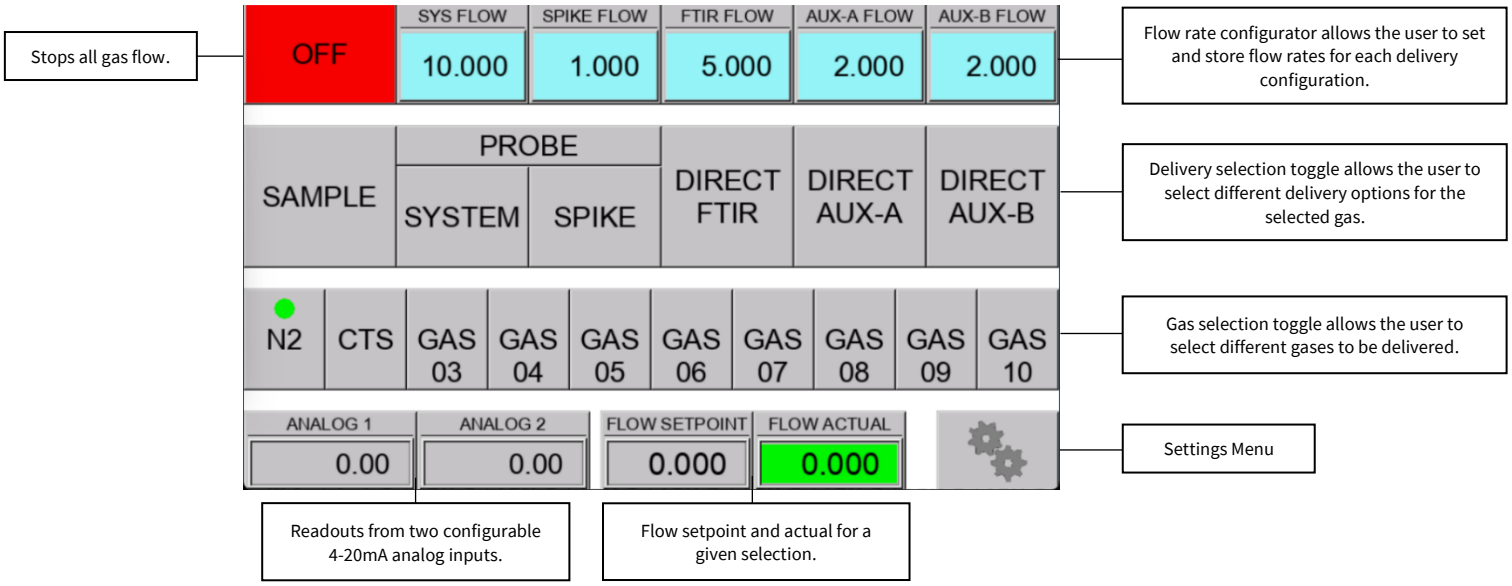
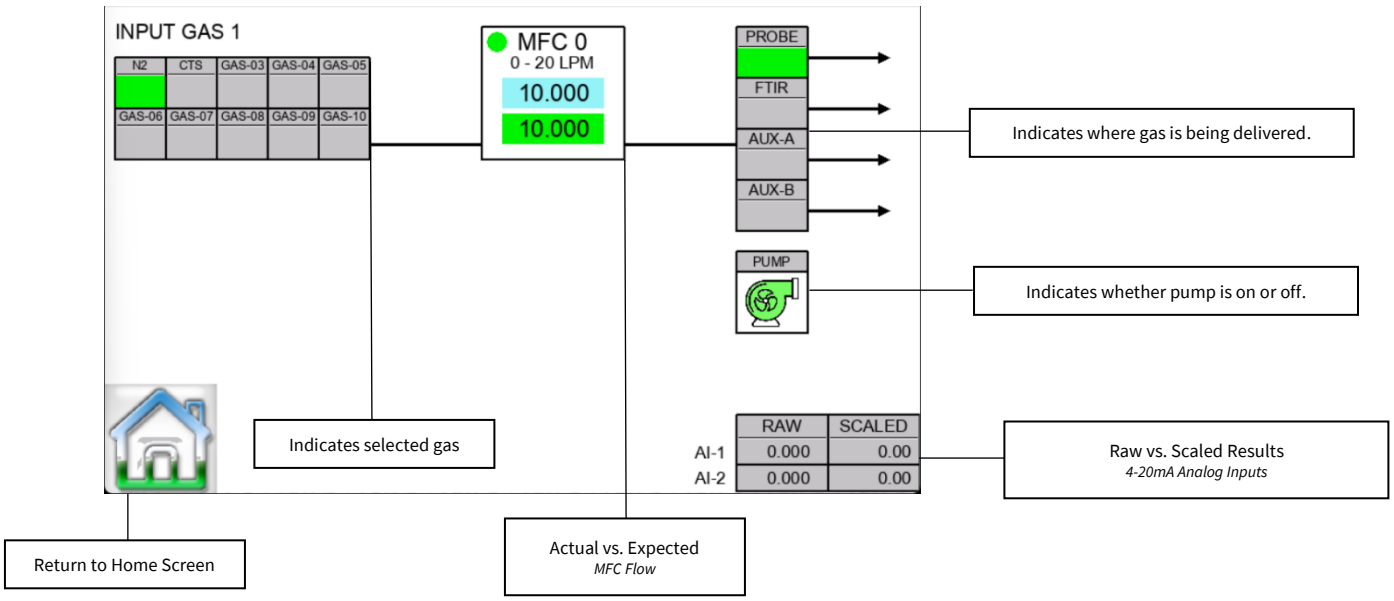


Table 4.1. SMARRT™ Transport HMI Color Code

	Denotes active gas selection and actual flow rate matching the setpoint.
	Denotes manually configurable setpoints.
	Denotes OFF, inactive, or actual flow rate not matching the setpoint.

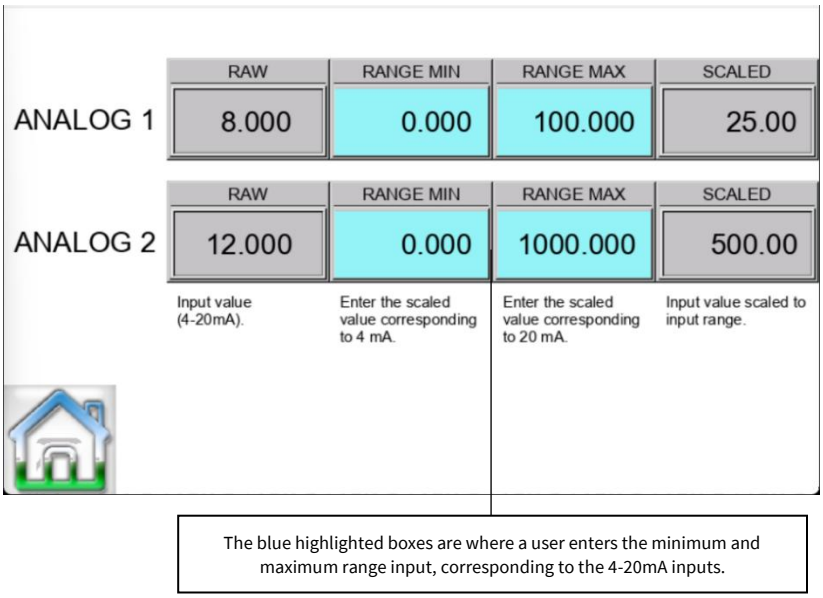
Overview of Settings Menu

Selecting the settings icon opens the following view:



Analog Input Configuration

Selecting the Analog input raw vs. scaled icon opens the following view:



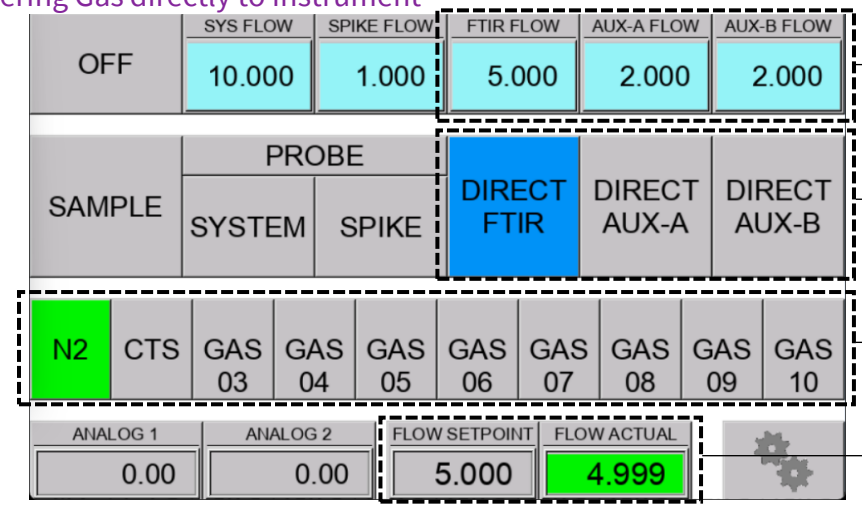
Using the Ensight™ software, these analog inputs can be outputted in MODBUS TCP or .csv format.

5. Delivering Gases Using HMI Touchscreen

NOTICE

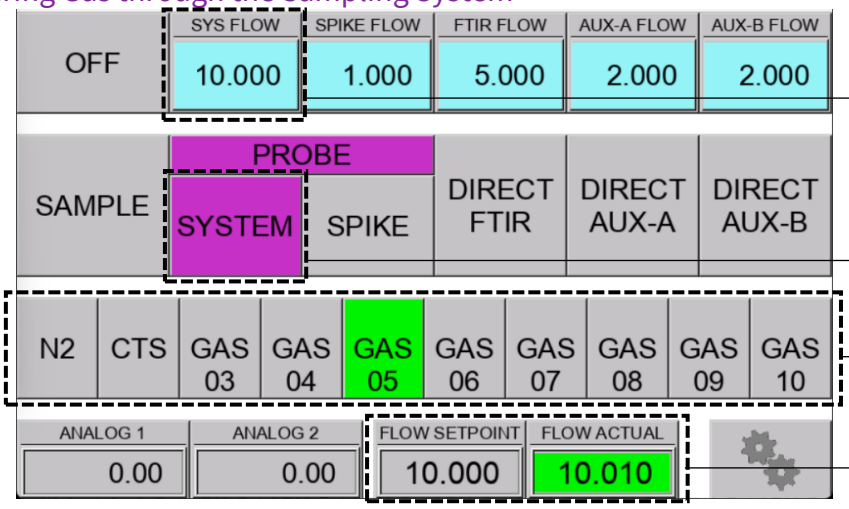
After defining the flow rates for each output configuration, the desired output channel must be reselected in order to deliver the gas. It is recommended that the flow rates are defined prior to gas delivery.

Delivering Gas directly to Instrument



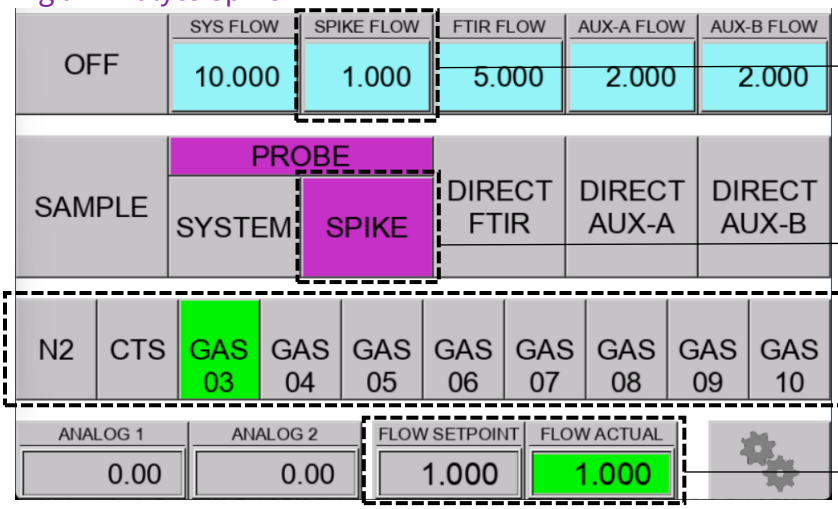
1. Define direct delivery flow rate to each channel in use.
2. Define active channel.
3. Define gas that will be delivered.
4. Verify actual flow rate matches setpoint.

Delivering Gas through the Sampling System



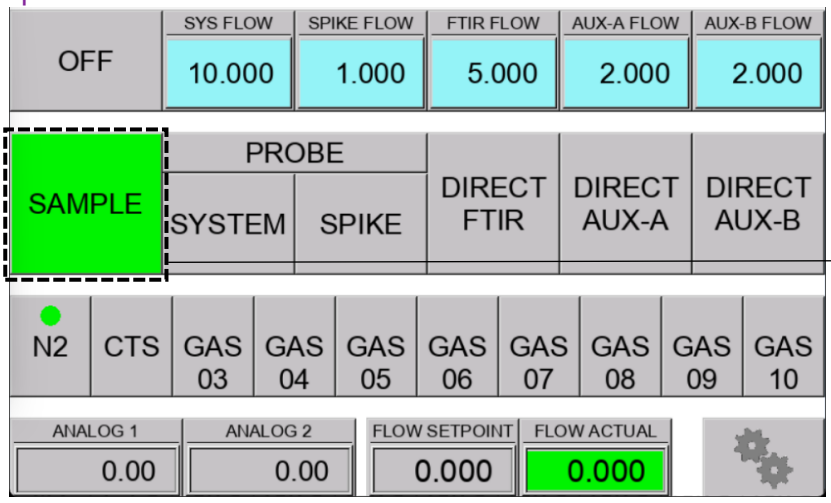
1. Define system delivery flow rate.
2. Define active channel.
3. Define gas that will be delivered.
4. Verify actual flow rate matches setpoint.

Delivering an Analyte Spike



1. Define spike delivery flow rate.
2. Define active channel.
3. Define gas that will be delivered.
4. Verify actual flow rate matches setpoint.

Sample Collection



1. Select **SAMPLE** to begin sampling.

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