INSTRUCTION MANUAL

Perma Pure LLC Integrator Series

SERIES – SAMPLE GAS DRYING SYSTEM

PERMA PURE LLC
A HALMA COMPANY
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Table of Contents

A: SPECIFICATIONS

Physical Description

AG-412 Model – Vertically surface mounted system in aluminum case with removable cover.

AG-193U Model – 19” rack mounted system in aluminum case with removable cover. 3U panel height.

Operating Specifications

Sample Gas Flow Range	0.5-1.5 Lpm @ 380mm Hg (15” Hg)
Sample gas humidity inlet	Maximum 95% RH at room temperature, non-condensing
Dimensions	305mm x 305mm x 102mm (12” x 12” x 4”)
Weight	3.3 Kg. (7.3 lbs)
Inlet Sample Temperature	1-45°C
Maximum Inlet Pressure	1 Bar (15 psig)
Ambient Temperature Range	1° - 45°C (33° - 113°F)
Inlet Dew Point at rated flow	20°C
Outlet Sample Gas Dew Point (based on 20C saturated inlet humidity)	-1°C @ 0.5 Lpm sample flow rate 4°C @1.0 Lpm sample flow rate 10°C @ 1.5 Lpm sample flow rate
Inlet Tubing Connection	¼” tube (compression)
Outlet Tubing Connection	¼” tube (compression)
Purge (Pump) outlet Connection	¼” tube (compression)
Power Requirement	230 VAC, 50 Hz, 3A
Ambient operating humidity range	0-95% RH, non-condensing

B: LIMITED WARRANTY

Perma Pure LLC
WARRANTY and DISCLAIMERS

Perma Pure (Seller) warrants that product supplied hereunder shall, at the time of delivery to Buyer, conform to the published specifications of Seller and be free from defects in material and workmanship under normal use and service. Seller's sole obligation and liability under this warranty is limited to the repair or replacement at its factory, at Seller's option, of any such product which proves defective within one year after the date of original shipment from seller's factory (or for a normal usable lifetime if the product is a disposable or expendable item) and is found to be defective in material or workmanship by Seller's inspection.

Buyer agrees that (1) any technical advice, information, suggestions, or recommendations given to Buyer by Seller or any representative of Seller with respect to the product or the suitability or desirability of the product for an particular use or application are based solely on the general knowledge of Seller, are intended for information guidance only, and do not constitute any representation or warranty by Seller that the product shall in fact be suitable or desirable for any particular use or application; (2) Buyer takes sole responsibility for the use and applications to which the product is put and Buyer shall conduct all testing and analysis necessary to validate the use and application to which Buyer puts the product for which Buyer may recommend the use or application of the product by others; and (3) the characteristics, specifications, and/or properties of the product may be affected by the processing, treatment, handling, and/or manufacturing of the product by Buyer or others and Seller takes no responsibility for he nature or consequence of such operations or as to the suitability of the product for the purposes intended to be used by Buyer or others after being subjected to such operations.

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C: PRINCIPLE OF OPERATION

The AG-412/193U system is a passive system in the sense that it will not move the sample gas from point A to point B. It will only dry sample gas that is pushed or pulled through it by an external pump or pressure/vacuum source. The pump in the system is present only to provide a vacuum source on the purged side of the membrane dryer.

As sample gas is drawn or pushed through the system by the external pump or pressure/vacuum source, it is dried to a low moisture condition. A precision orifice serves to meter a portion of the dried sample gas into the purged portion of the dryer. After passing through this orifice, the pressure of the gas drops to about 15”hg. This change in total pressure of the sample gas also lowers the partial pressure of the water vapor contained in the gas effectively making it dry enough to be used as purge gas for the membrane dryer. This purge gas sweeps away the moisture that is being removed from the sample gas flow by the membrane tube in the dryer.

A silica gel filled tube on the front panel is used in the purge stream to indicate proper operation. Initially, the silica gel indicator may be blue or pink depending upon the storage conditions of the system. Once the system is put into operation and within a short period of time, the silica gel will turn to a mostly light purple color, indicating the sample gas is dry and ready for analysis. The silica gel material is blue when very dry and pink when not dry.

A vacuum gauge on the front panel shows the level of vacuum as an indication that the purge pump is functioning.

D: INSTALLATION

Mounting

Mount AG-412 on a vertical surface using fasteners appropriate for the surface on which it is to be mounted or install AG-193U in a standard 19” rack cabinet.

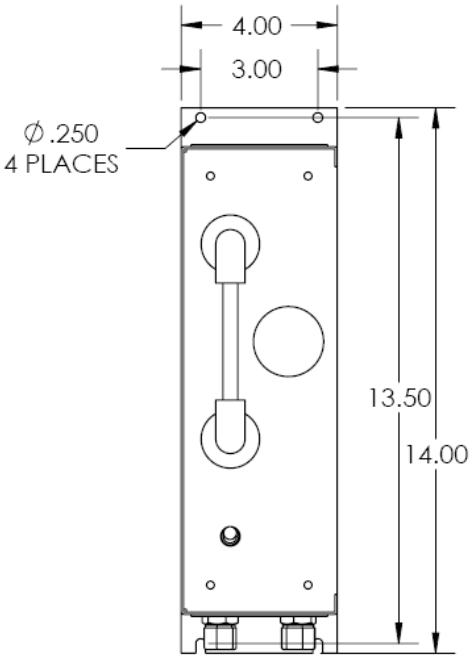


Figure 1 - AG-412 Mounting

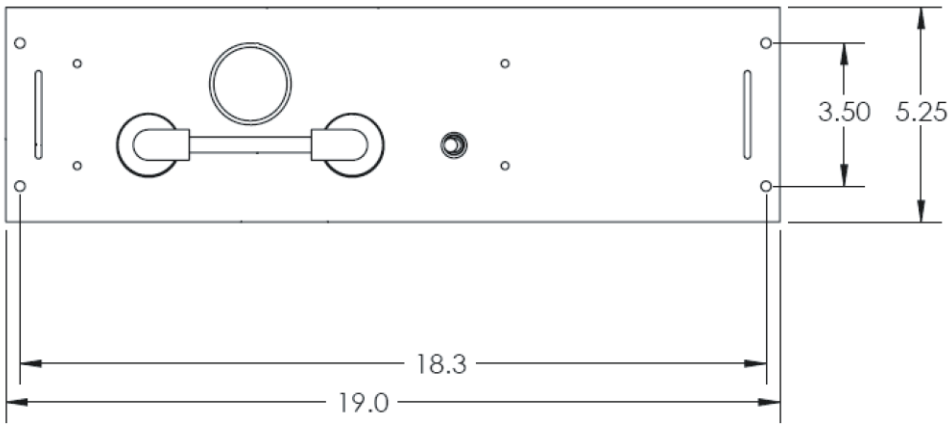


Figure 2 - AG-193U Mounting

The suggested typical System connection method is shown below.

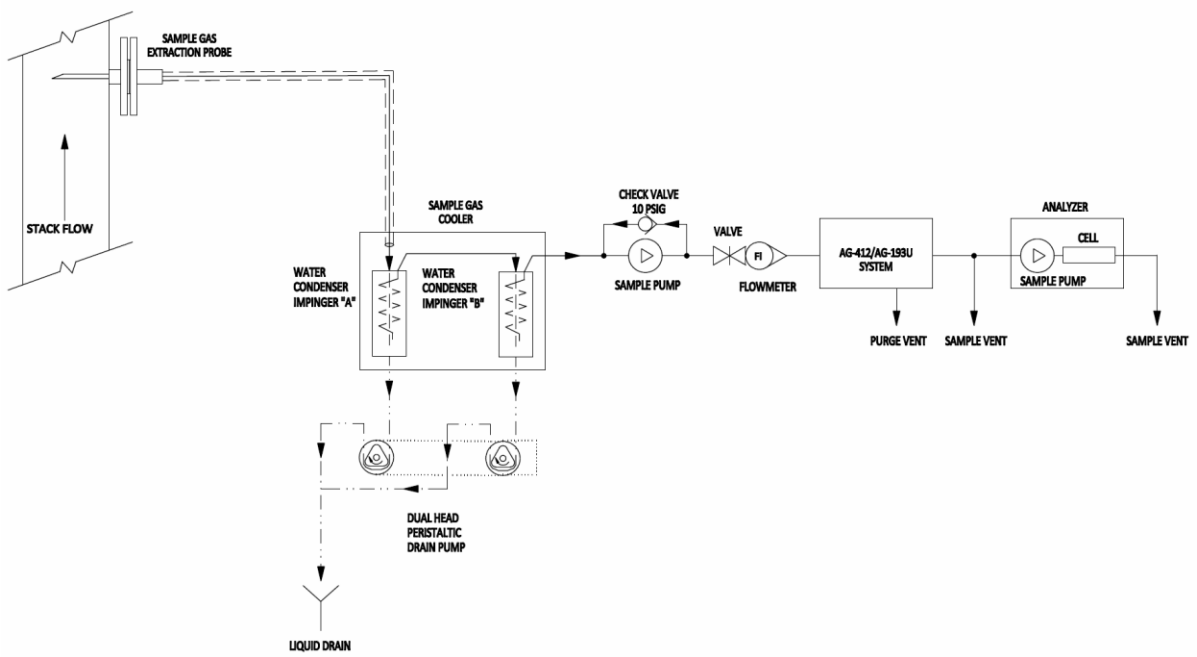


Figure 3 - Typical Connection Diagram

Tubing Connections

- Connect the sample inlet port to sample line from the sample pump.
- Connect the sample gas outlet to the analyzer via a tee fitting that allows excess sample flow to be vented.
- If required, due to sample gas composition, connect pump (purge) exhaust port to a tube that allows the system to vent in a suitable location. This is very important if the sample gas is toxic or corrosive.

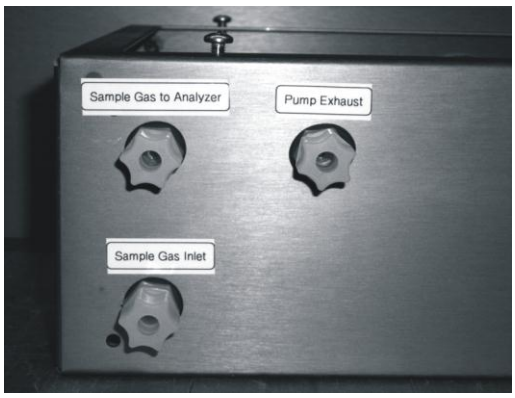


Figure 4 - Tubing Connections

Electrical Connections

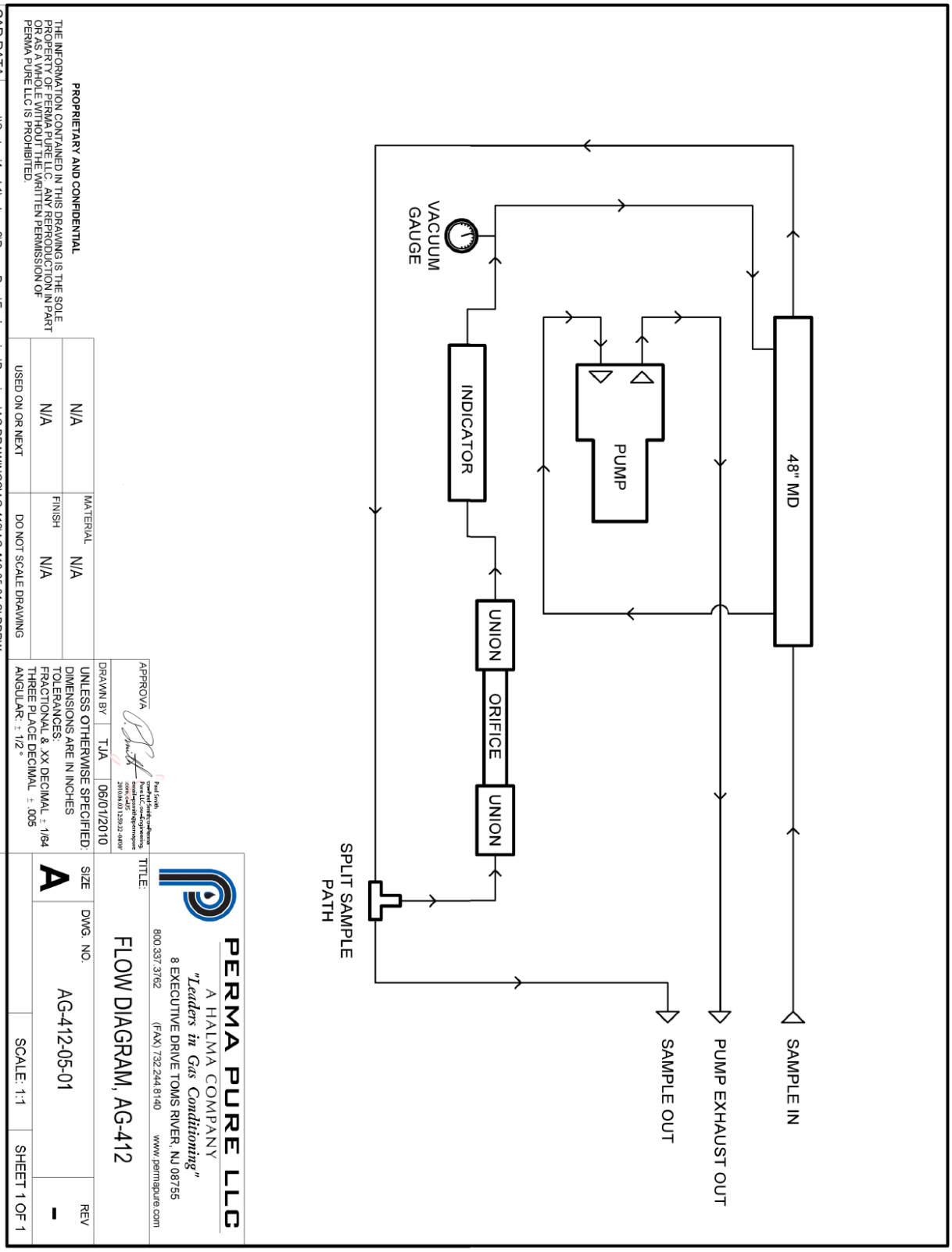
- Connect the system to an appropriate power source while following all local and regional electrical codes and guidelines.

E: START-UP PROCEDURE

Be sure the analyzer is off and that no sample gas is being drawn through the analyzer. After confirming that the system has been properly installed, turn on the main power switch at the power inlet module. Turn the system on with the front panel power switch. The pump will start and the vacuum level will remain higher than 15”Hg when the system is operating properly. The flow meter between the pump and the AG-412/193U system should be set to a flow rate that is just slightly higher than the flow that the analyzer pump is set to deliver an never more that about 1.5lpm. Sample gas flow greater than 1.5 lpm will greatly reduce the drying effectiveness of the system. Allow the system to run for about 1/2hr before turning on the analyzer pump for the first time. At this point the vacuum level should be greater than 15”Hg and the indicator on the front panel will have at least a few areas of blue silica gel crystals. The analyzer pump may now be started.

F: DRAWINGS

AG-412-05-01: Plumbing Diagram for MDSS Series



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APPROVA		

CAD DATA \\Svdag-j4mrh1\volume2\Perma Pure\Engineering\Drawings\AG DRAWINGS\AG-412\AG-412-05-01.SLDDRW

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TITLE: FLOW DIAGRAM, AG-412

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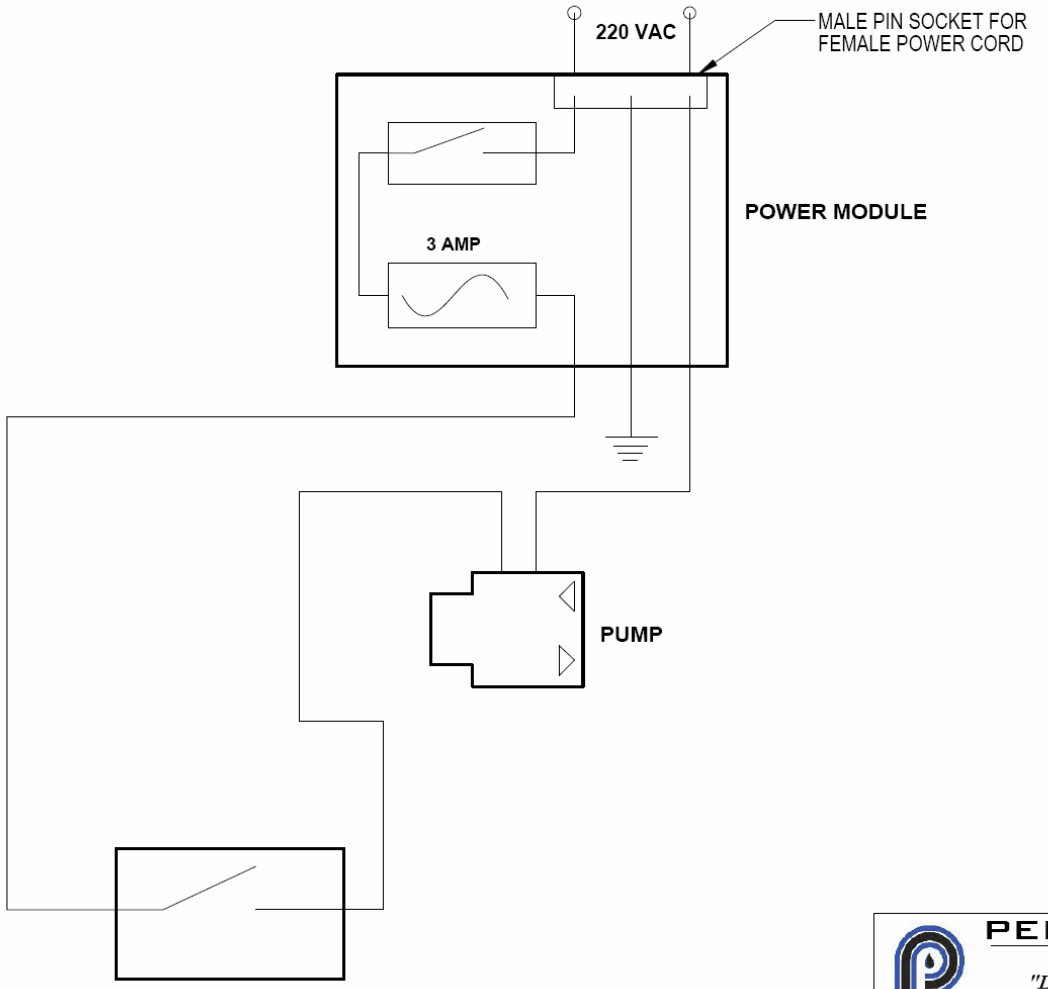
	SCALE: 1:1	SHEET 1 OF 1

AG-412-04-01: Electrical drawing for MDSS Series



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APP'D: Paul Smith cn=Paul Smith, o=Perma Pure LLC, ou=Engineering, email=psmith@permapure.com, c=US 2010.08.25 09:34:54 -04'00'

TITLE: ELECTRICAL DIAGRAM, AG-412

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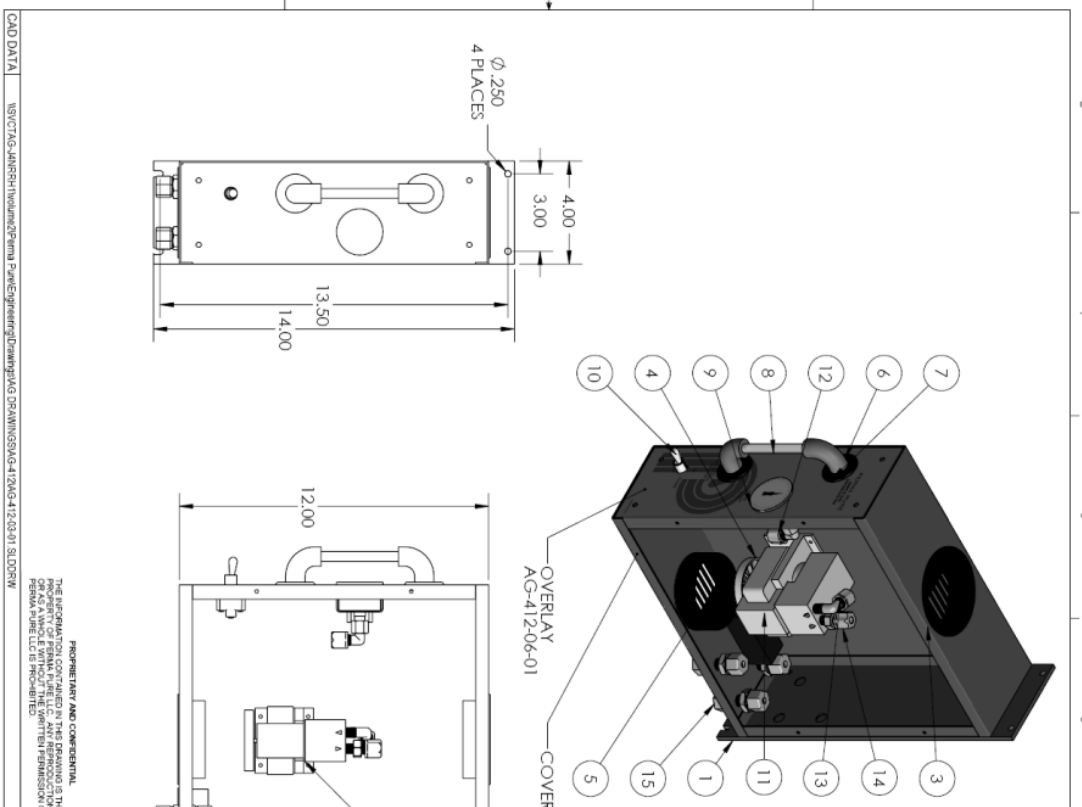
AG-412-03-01: Wall mounted MD Split Sample conditioning system



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	AG-412-02-02	MOUNTING BRACKET	1
2	AG-412 Dryer	MEMBRANE DRYER	
3	AG-193U-02-01	RACK MOUNT BOX	1
4	102684	KNF PUMP	1
5	102672	LOUVER	2
6	102670	3/8" KYNAR ELBOW	2
7	102669	GROMMET	2
8	101995	3/8" TEFLON TUBING	1
9	101857	VACUUM GAGE	1
10	100644	TOGGLE SWITCH	1
11	100368	POWER MODULE	1
12	100277	1/8" FPT x 1/4 TUBE ELBOW	1
13	100269	1/8" MPT x 1/4" TUBE ELBOW	1
14	100171	1/8" MPT x 1/4" TUBE STRAIGHT	1
15	100107	1/4" TUBE BULKHEAD	3

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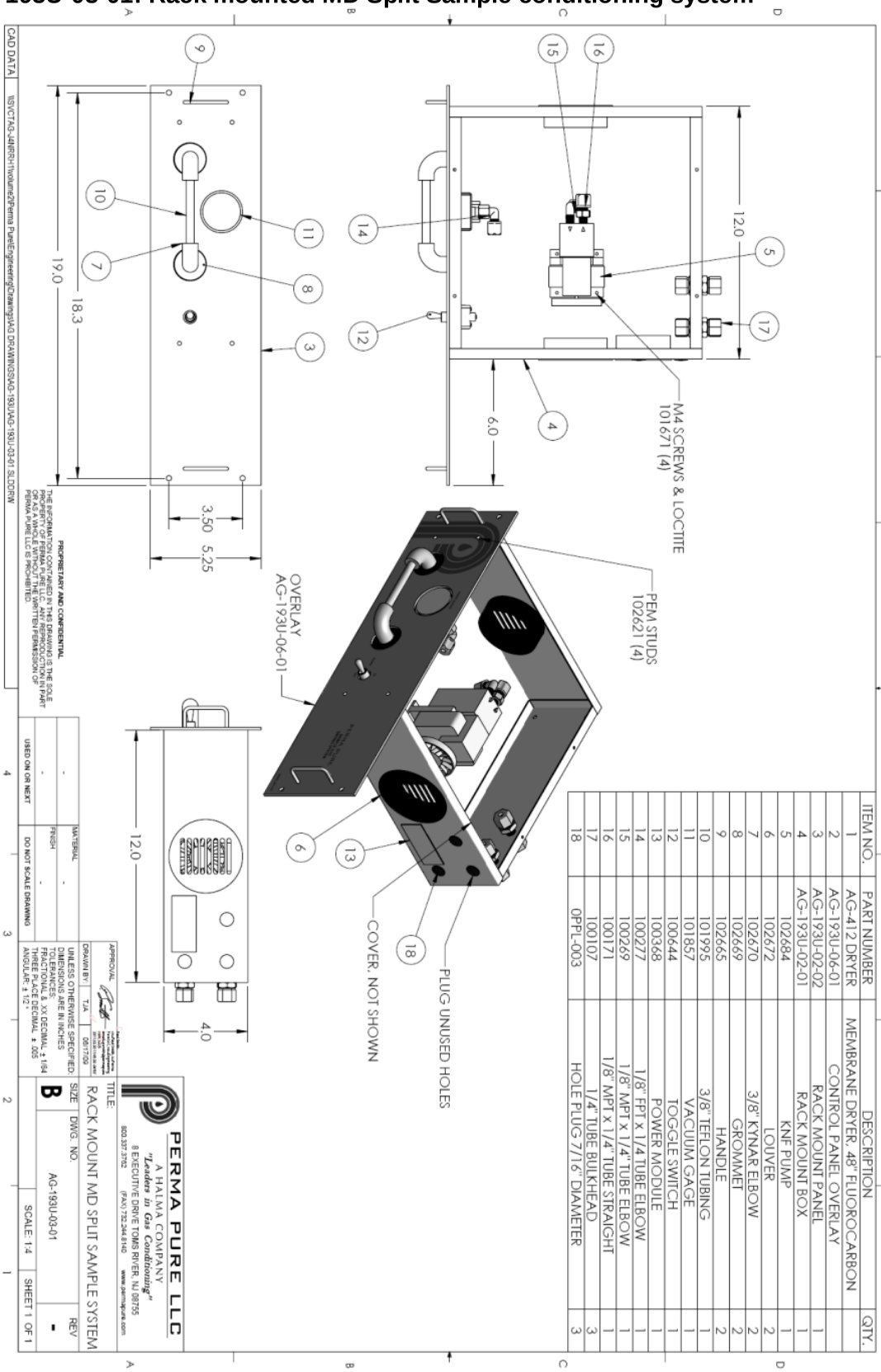
TITLE: WALL MT. MD SPLIT SAMPLE SYSTEM
SIZE: B
DWG. NO.: AG-412-03-01
REV: -
SCALE: 1:4
SHEET 1 OF 1

AG-193U-03-01: Rack mounted MD Split Sample conditioning system



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	AG-412 DRYER	MEMBRANE DRYER, 48" FLUOROCARBON	
2	AG-193U-06-01	CONTROL PANEL OVERLAY	1
3	AG-193U-02-02	RACK MOUNT PANEL	1
4	AG-193U-02-01	RACK MOUNT BOX	1
5	102684	KNF PUMP	1
6	102672	LOUVER	2
7	102670	3/8" KYNAR ELBOW	2
8	102669	GROMMET	2
9	102665	HANDLE	2
10	101995	3/8" TEFLON TUBING	1
11	101857	VACUUM GAGE	1
12	100644	TOGGLE SWITCH	1
13	100368	POWER MODULE	1
14	100277	1/8" FPT x 1/4 TUBE ELBOW	1
15	100269	1/8" MPT x 1/4" TUBE ELBOW	1
16	100171	1/8" MPT x 1/4" TUBE STRAIGHT	1
17	100107	1/4" TUBE BULKHEAD	3
18	OPPL-003	HOLE PLUG 7/16" DIAMETER	3

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SIZE: B
DWG. NO.: AG-193U-03-01
REV: -
SCALE: 1:4
SHEET 1 OF 1

H: TEST & ADJUSTMENT PROCEDURES

NOTE: All test and adjustment procedures have been performed at the factory.

For further service assistance, contact:
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