

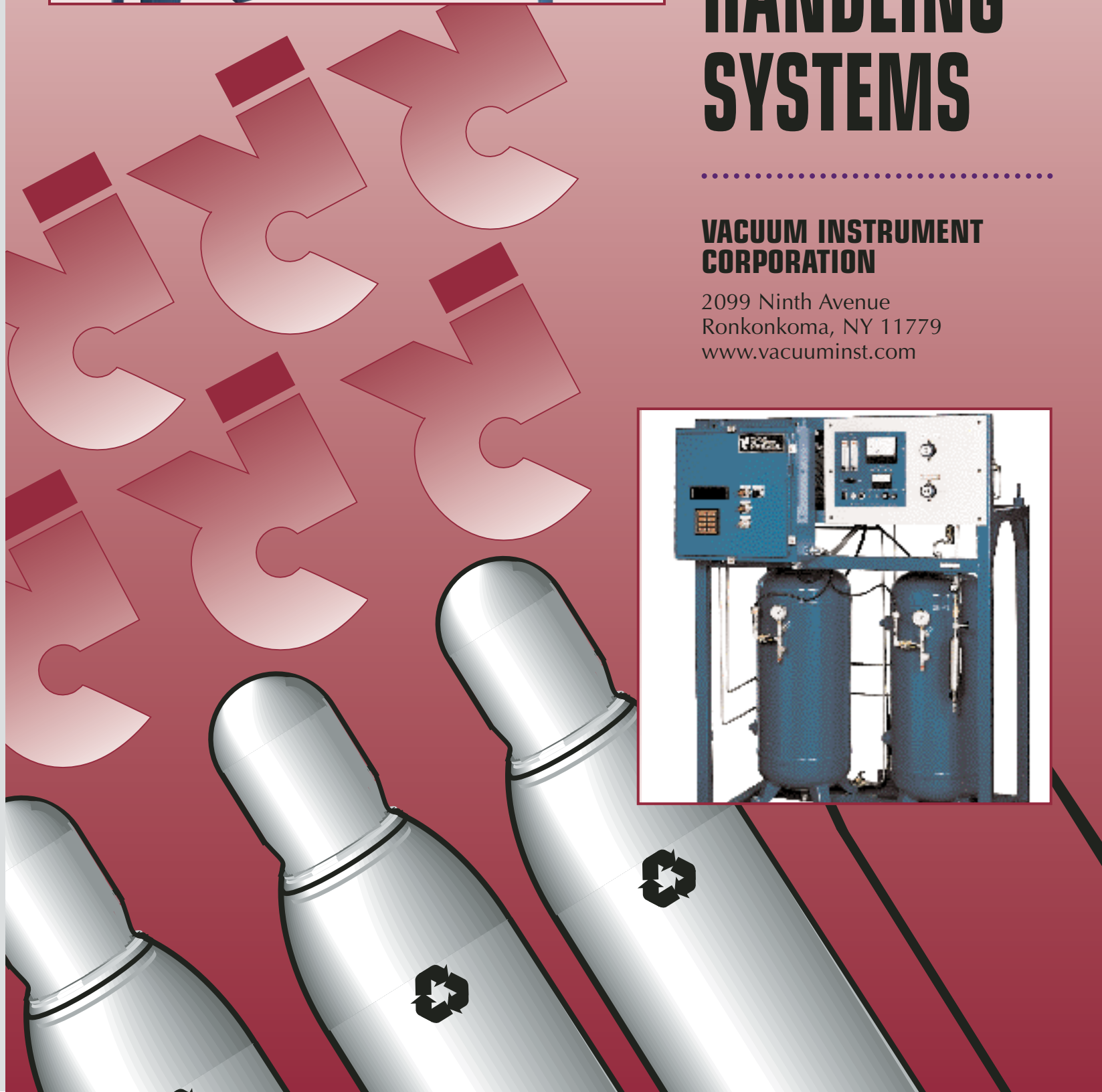


GAS HANDLING SYSTEMS

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**VACUUM INSTRUMENT
CORPORATION**

2099 Ninth Avenue
Ronkonkoma, NY 11779
www.vacuuminst.com



- **Smart Charge II™** – An advanced gas backfill and evacuation system with built-in gross leak test. Ideally suited for tracer gas charging of products prior to fine leak testing.

- **Gas Recovery** – A group of high efficiency gas recycling systems. A wide choice of models provides the flexibility to meet your capacity requirements while reducing tracer gas operating costs.

- **Gas Mixing** – A microprocessor-based system designed to blend two gas components, typically helium and air. These systems provide a cost effective alternative to 100% tracer gas.

- **Gas Boosting** – A system designed for boosting supply gas for high pressure applications. Ideally suited for boosting house-shop air supply.

Behind these quality cost saving products is a first class customer service organization. We provide complete turnkey leak test system capability, something no other U.S. based helium mass spectrometer manufacturer can offer. Our staff of application specialists can assist in determining product leak rate specifications, gas handling requirements and equipment recommendations.

Vacuum Instrument's business goal is to be the world's leading supplier of Leak Detection products. This goal will be achieved by fulfilling our customers needs with the highest quality equipment and customer service while maintaining competitive pricing.

FEATURES

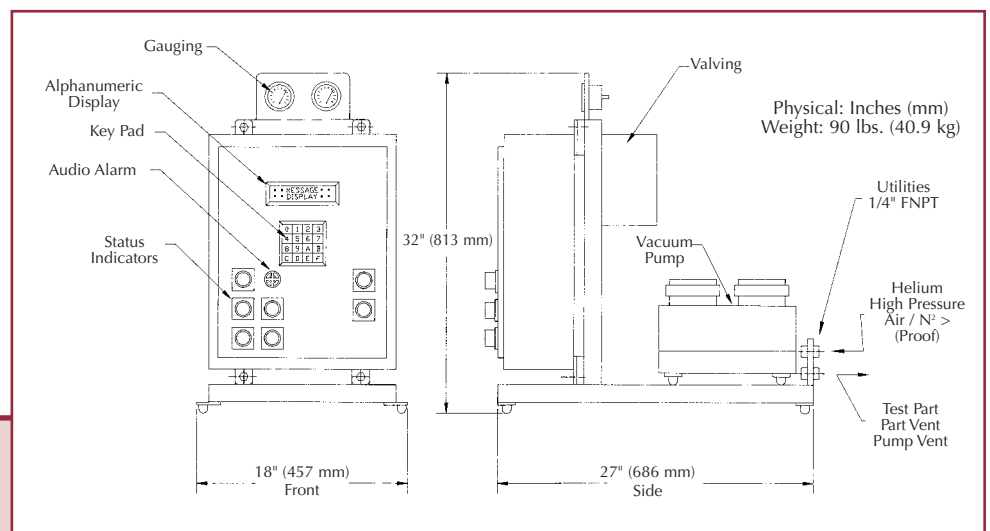
- Microprocessor-based electronics with menu-based operation.
- Self-calibrating high resolution transducer.
- Flexible configuration to incorporate vacuum/pressure decay gross leak testing prior to tracer gas charging.
- Oil-less product evacuation pump.
- Electronics housed in NEMA 12 enclosure.
- Incorporates tracer gas housekeeping utilities.
- Communication option for interfacing to PLC control logic.
- All internal plumbing features seamless tubing.
- Utilizes fast response solenoid valves designed for vacuum and pressure service.
- Built-in diagnostics with fault messages.
- Recovery and mixing options available.
- Audio alarm for rejects and start/stop operational indications.
- Front panel key lock-out prevents unauthorized use.
- High pressure up to 750 psig available.
- Automatic, manual or manual step modes of operation front panel selectable.

Smart Charge II™ – The genius in tracer gas backfill equipment.

The Smart Charge represents a total gas handling package to prepare products for leak detection. The system was designed to complement VIC's helium mass spectrometer leak test systems. The versatility of its design allows the system to be used in any gas charging application that requires the evacuation and subsequent pressurization of the test product.

At the heart of the Smart Charge package is a powerful software program coupled with a high resolution pressure/vacuum measurement transducer. A unique gas distribution manifold interfaced to a common facility plate round out the functionality and robust design.

The Smart Charge is a fully automatic system capable of being custom configured to the specific charging requirements of the product. A menu-based configuration scheme ensures optimum performance under a variety of test conditions.





Complete operation instructions in plain English and other languages...

```
VACUUM DECAY DIFF.
E>SELECT B>UP F>DOWN
```

Our interactive display provides information on testing options. . .

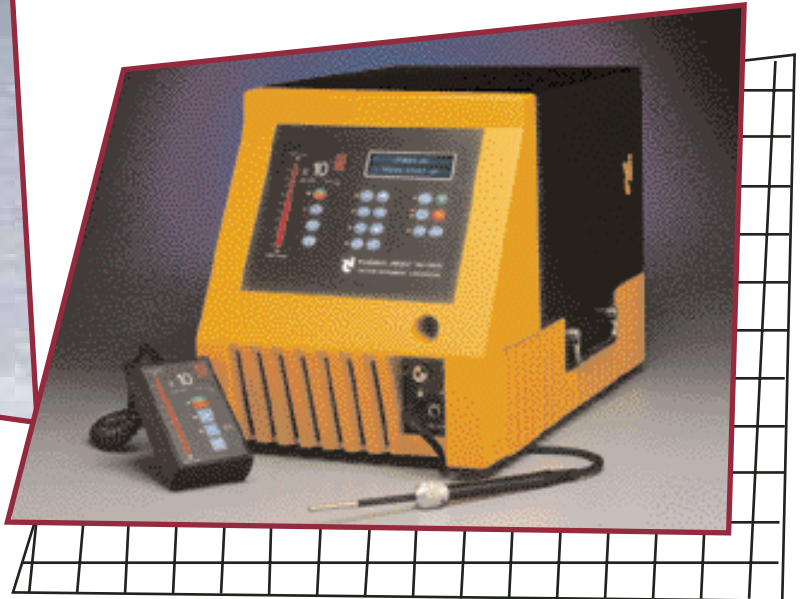
```
HEL. CHRG 220 PSIG
A>EXIT          E>SAVE
```

Current system configuration. . .

```
HELIUM PRESS. DECAY
E>SELECT B>UP F>DOWN
```

And operation sequence. . .

All of which makes the **Smart Charge™** friendly!



Smart Charge™ shown with **Turbo Test™ MD-490S**.

Operation Sequence

The normal automatic charging sequence includes the following steps:

- Operator connects process fitting to the product to be tested and initiates the test cycle.
- The product is evacuated by an oil-less vacuum pump prior to performing a vacuum decay gross leak test. This pre-qualification of the product integrity guards against tracer gas charging of products with large leaks, reducing the effects of releasing large amounts of tracer gas into the vicinity of the fine leak detection instrumentation. (Typically, a mass spectrometer, SF6, Halogen leak detector or residual gas analyzer).
- Upon successful completion of the vacuum decay test, the product is back-filled to a user programmable pressure with the leak test tracer gas (ie: He, SF6, R-12/R-22 or others).
- The operator would either hand probe the product (sniff testing) or perform a hard vacuum chamber test. During the operation, a pressure decay check is also being performed as a redundant leak test.
- Upon completion of the fine leak test, the product is vented of its tracer gas charge and re-evacuated to ensure adequate removal of any residual tracer gas present when the product is disconnected from the process fitting. This tracer gas "housekeeping" feature ensures low levels of background tracer gas in the vicinity of the leak detection units.



RECYCLING, a term whose time is NOW!

As we enter the 21st century, conservation of our natural resources has become a paramount issue. While industries strive to meet increasing demands to offer higher quality products at lower prices, the need to efficiently recycle process gases becomes apparent.

Introducing a solution to lower the cost associated with tracer gas consumption.

How It Works

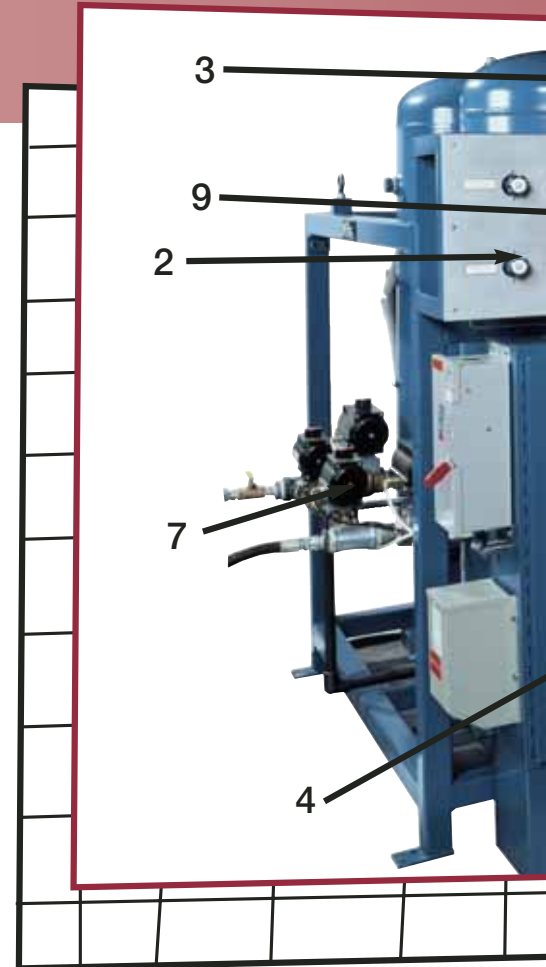
The Gas Recovery Systems offered consists of ASME coded pressure tanks, a set of compressor(s), gas analyzer, microprocessor controls and all necessary valving, gas regulation and piping.

The gas recovery operation includes these major steps:

- The tracer gas in the product is vented into the vacuum surge tank (T1).
- During each stage of compression the tracer gas is passed through a set of high efficiency water cooled heat exchangers to remove the heat generated during compression.
- The final compressor outputs to tank (T3) completing the recycling operation.

FEATURES

- Stand-Alone programmable control packages.
- Compressors utilizing an oil-less piston seal design to prevent oil contamination of the test object.
- Recovery efficiencies up to 98% are common.
- ASME coded and certified gas storage vessels.
- Continuous on-line gas concentration monitoring and feedback ensures tracer gas percentage levels.
- Real time diagnostics.
- Automatic start-up operation.



DOES IT MAKE \$ENSE?

Very often the decision to invest in a Gas Recovery system is determined by its financial feasibility. Here is a sample calculation to assist in determining if the system can be justified.

- Application: Helium leak test of A/C components
- Internal volume of product: 100 in³
- Production rate: 500/hr
- Tracer gas test pressure: 200 psig

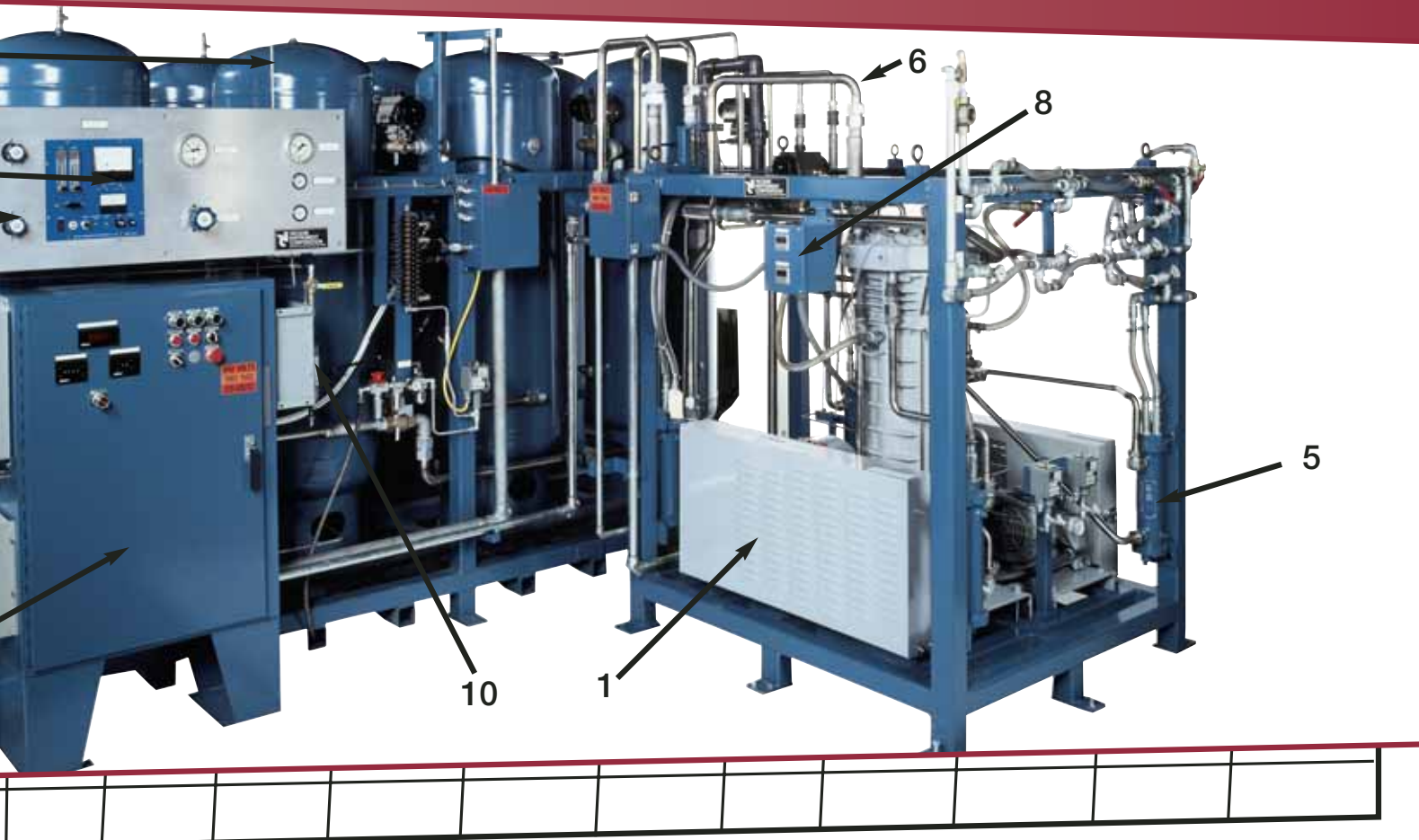
In the above application the Helium gas usage is 393.7 CFH
If we assume 2 shifts per day the Helium consumption is 6300 ft³

**CONSIDERING AN AVERAGE COST OF BULK HELIUM @ \$10/100 ft³
THE DAILY COST OF HELIUM IS \$630.**

AT THESE LEVELS THE TYPICAL PAYBACK ON THE GAS RECOVERY SYSTEM IS LESS THAN ONE YEAR!

NOW THAT MAKES \$ENSE.

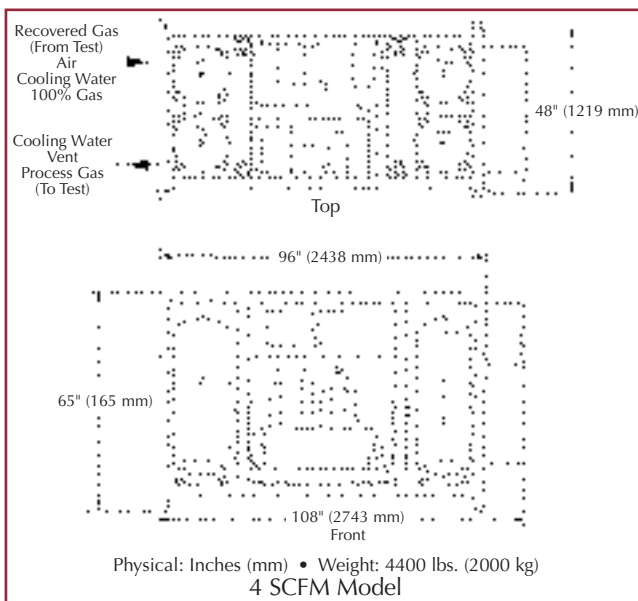
We also feature a very attractive leasing arrangement. Interested? Please ask for the latest details.



DETAILS

ITEM/DESCRIPTION

1. COMPRESSOR SKID
2. MAIN GAS CONTROL PANEL
3. ASME CODED PRESSURE STORAGE TANKS
4. OPERATING CONTROL AND CONSOLE
5. HIGH EFFICIENCY WATER COOLED HEAT EXCHANGERS
6. ALL STAINLESS STEEL INTERCONNECTING MANIFOLDING
7. HIGH CONDUCTANCE PNEUMATICALLY ACTUATED BALL VALVES
8. THERMOCOUPLE FOR MONITORING TEMPERATURE IN CRITICAL AREAS
9. BUILT-IN GAS ANALYZER
10. CALIBRATION STANDARD



GAS MIXER/BLENDER

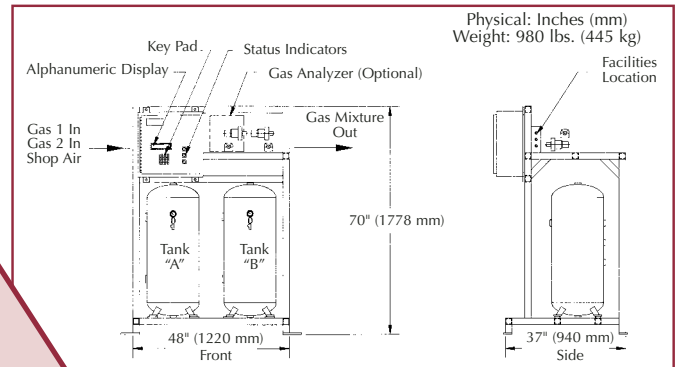
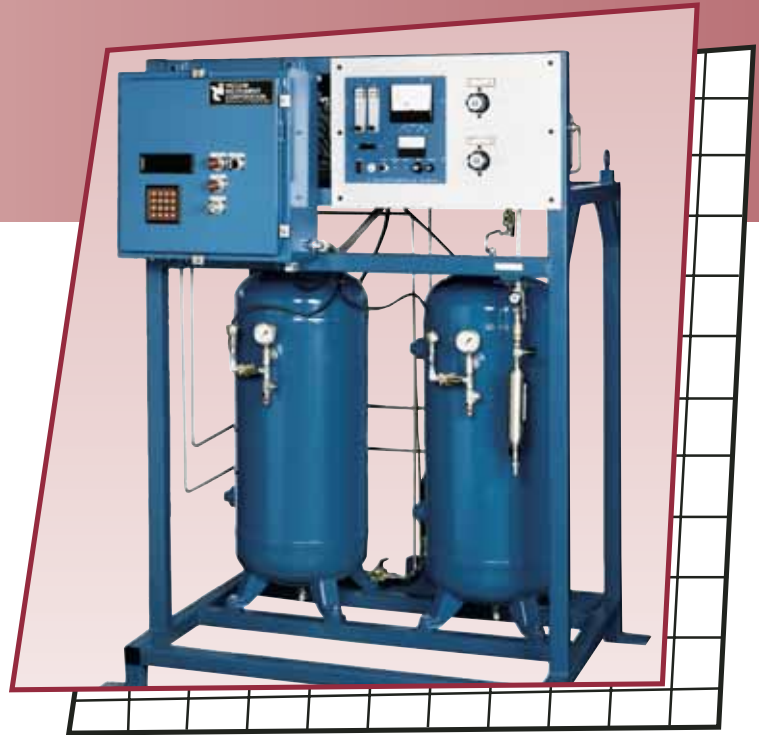
The gas mixer provides a mixture of two gases by alternately filling a tank until each gas has contributed proportionally to the tanks final pressure. The volume ratio of each gas is determined by the selected mix percentage.

Sequence of Operation. As easy as 1...2...3.

1. Fill Tank 1 with Gas A to a specified pressure.
2. Introduce Gas B to Tank 1 to complete mix operation.
3. Repeat above steps for Tank 2.

FEATURES

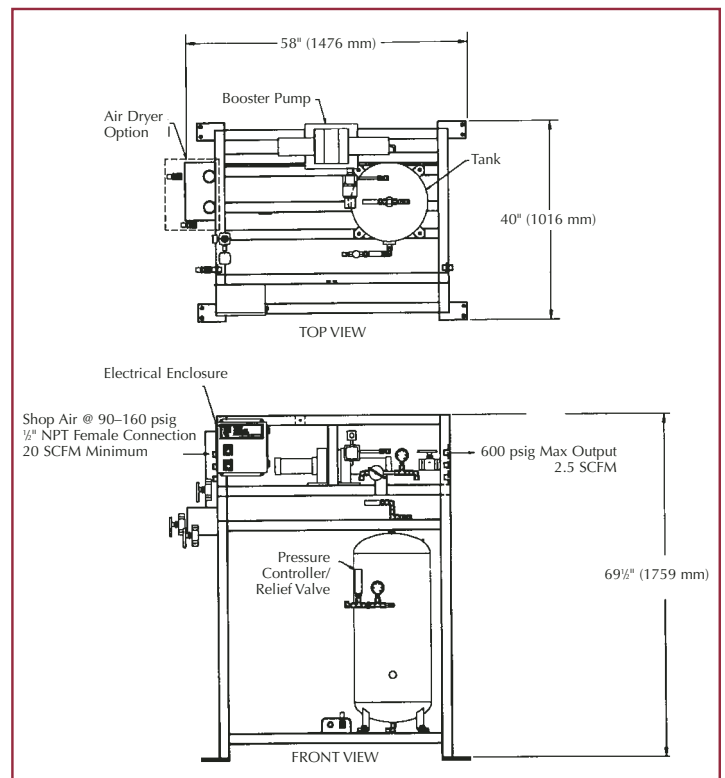
- Full microprocessor control with nonvolatile memory.
- Dual 30 gallon ASME coded tanks rated for 600 psig.
- Gas mixture selectability.
- Single step calibration.
- Optional on-line concentration monitoring.
- 40 character alphanumeric (AN) display.
- Fault control system with (AN) display of fault.
- High reliability encapsulated linear power supply.
- Photo isolated opto relays with zero voltage turn on.
- Keyboard control of mix percentage and operating pressure.
- High flow air actuated ball valves.
- Unique diffuser mechanism assures a proper and consistent gas mixture.
- On-Line display provides information on tank pressure, valve status, and system prompts.
- Moisture-proof, water resistant stainless steel cased high resolution pressure transducers.



GAS BOOSTER/AMPLIFIER

The gas booster or amplifier systems are designed to produce high-pressure process gas supplies from lower pressure sources. Typically these units are employed using a shop air source (80–100 psig), which is boosted to output pressures of 600 psig. Higher-pressure ranges are available (up to 1200 psig) upon request.

To minimize the effects of moisture condensation, VIC offers a heat-less regenerative gas dryer option for our booster products. Utilizing the pressure swing principle of operation ensures maximum removal of moisture contamination. A desiccant bed in one tower dries the incoming process gas stream, while a second tower is undergoing regeneration via a dry air purge sequence. The dryer bed uses the chemical-physical property of the desiccant material for absorption of water vapor and for its removal during the regeneration cycle.



SPECIFICATIONS

SMART CHARGE II™

Model Selection

Base unit performs evacuation (25" Hg), vacuum decay test and tracer gas backfill to 300 psig.

Units can be configured to perform evacuation to lower vacuum levels, proof test with pressure decay, high pressure operation (to 750 psig), gas recovery and communication interface.

Performance

Pressure Transducer

Solid state with all welded construction. Resolution of 0.1 psi (0.2" Hg) in vacuum mode, 1.0 psi in pressure mode. Accuracy of $\pm 0.25\%$.

Valving

Fast acting pull type solenoid featuring epoxy encapsulated design.

Manifolding

Seamless tubing with compression fitting interconnects. Helium leak tested to 1.0×10^{-6} Atm-cc / sec @ 600 psig.

Evacuation Pump

3.6 CFM oil-less vacuum mechanical pump. Ultimate vacuum level 25.5" Hg.

Electronics

Advanced microprocessor-based, housed in NEMA 12 enclosure.

Gauging

Two independent 2½" liquid filled pressure and vacuum gauges.

Operator Interface

Menu-based operation with 2 × 40 character alphanumeric display. Includes automatic or manual sequencing of valves, diagnostics, key lockout security protection and full user programmable test parameters, audio alarm provided for end of cycle, and test completion.

Power

105 to 125 VAC 50/60 Hz

Power Consumption

720 Watts

GAS RECOVERY

Model Selection

A variety of models are available, each designed to recover a particular volume of gas.

Standard Sizes Include:

4 SCFM P/N 925-117

8 SCFM P/N 925-119

20 SCFM P/N 925-112

Performance

Efficiency

Approximately 97–98%. Actual efficiency will be dependent on charge

pressure, cycle time and product volume.

Compressors

Systems utilize oil-less piston compressors designed for industrial gas compression applications.

Electronics

Microprocessor-based programmable logic controller housed in NEMA 12 enclosure. System includes diagnostics and operating parameter displays.

Valving

Rack and pinion pneumatically actuated ball valves.

Pressure Vessels

ASME coded tanks designed for 300 psig service. Actual number and volume of tanks will be dependent upon gas handling volume. All manifolding, valving and tanks are helium leak tested to 1×10^{-6} Atm. cc/sec at 300 psig.

Heat Exchangers

Four high efficiency tube and shell exchangers ensure adequate cooling of process gas.

Process Monitors

A group of thermocouples and pressure transducers monitor temperature and pressure in critical areas. System

includes real time monitoring capability and process alarm display.

Gauging

Tank pressures are displayed on operator control panel. System includes high pressure regulators for output supply and make-up process gas.

Utility Requirement

Power: 440 / 60Hz / 3 phase
Power Consumption: Approx. 18,000 watts

Cooling Water: 3-5 GPM at 70° F

Ratings are based on 250 psig output.
Other sizes available on request.

GAS MIXER/BLENDER

Model Selection

Base unit performs blending of two gas components based on pressure ratio. Options available include on-line gas mixture analysis, air driven pressure booster systems (up to 600 psi) for one or both gases.

Base Unit P/N 925-102

Base Unit with Gas Analyzer P/N 925-110

Gas Boost Options available on request.

Performance

Pressure Measurement

Two solid state all welded transducers rated for 0-1000 psig used for mixture control.

Two 2½" liquid filled gauges mounted on each pressure vessel.

Pressure relief valves incorporated into each vessel for safety.

Valving

Rack and pinion pneumatically actuated high conductance ball valves.

Manifolding

Seamless tubing, helium leak tested to 1.0×10^{-6} Atm. cc/sec at 600 psig.

Pressure Vessels

Two 30 gallon ASME coded tanks designed for 600 psig service.

Electronics

Microprocessor-based housed in NEMA 12 enclosure.

Operator Interface

Menu-based operation with 2 × 40 character alphanumeric display. Includes data entry capability for gas mixture, remix and output pressure. Displays tank pressures and current gas mixture in operating mode.

Power

105–125 VAC 50/60 Hz

Power Consumption

240 Watts (375 Watts with optional gas analyzer).

GAS BOOSTER/AMPLIFIER

Model Selection

Base units are available to provide up to 600 psig pressure output. Options are available to provide higher pressure outputs, and process gas drying capability.

Single Boost, rated @ 2.0 SCFM P/N 925-906

Dual Boost, rated @ 4.0 SCFM P/N 925-907

Performance

Rated Inlet: 125 psig (maximum)

Rated Outlet: 600 psig (maximum) Higher pressures available on request.

Boosted Throughput:

Single Boost 2.0 SCFM nominal

Double Boost 4.0 SCFM nominal

Pressure Measurement

Solid state 0–1000 psig adjustable pressure controller.

Valving

Rack and pinion pneumatically actuated high conductance ball valves.

Manifolding

Seamless tubing, helium leak tested to 1×10^{-6} Atm.cc/sec at 600 psig

Pressure Vessels

30 gallon ASME coded tank design for 600 psig service.

Power

105–125 VAC 50/60 Hz

Power Consumption

230 watts

Gas Dryer option

Rated inlet condition

Temperature: 100°F (max)

Pressure : 150 psig (max)

Relative Humidity: 100% RH

Rated Outlet Condition

Dew Point: -40°F

Due to continuous product improvement, specifications are subject to change.