Polycontrols Gas Recovery & Recycling System is a customized turn-key package designed to recover and purify raw Helium or Argon to high purity gas as per the specified requirements. The Polycontrols ARS & HRS unit is based on our field-tested & proven working technology and use dry treatment of gases by means of High-Purity filtration and pressure swing adsorption (PSA) for removal of H2O, CO2, N2, O2, and Ne in a two steps process.

Polycontrols ARS & HRS Gas Recovery & recycling System is designed for the specific needs of Plasma Atomization and Cold Spray processes operating in continuous/long run configuration. Each system is easily customizable and can be configured to recycle gas from individual or multiple processes.

Helium Recovery System - 160 Nm³/h
**Advantages**

- Typically reduction costs of Helium or Argon by a factor of 10 compared to traditional system configurations
- Modular structured - Seamless integration with all your Plasma & Cold Spray equipment
- Simple, Reliable and Transparent integration - No intervention is required from the operator who can concentrate on production.
- Proven technology - Wide installed base.

**Modular system**

Designed to fit with Polycontrols’ IRS & HPA pressure boosting system, the ARS & HRS gas recovery & recycling system is modular and comes in two separate versions to ensure simplicity, reliability and savings:

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**Helium / Argon Gas recovery and recycling cycle**

1. **Compressor**
2. **High Purity Gas Filtration Unit**
3. **Gas Separation Unit**
4. **High Pressure Booster**

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Argon Recovery System
1500 slpm 220 psig
Compressor – IRS Series
The Polycontrols’ IRS Compressor system provides a practical solution for a reliable supply of gas in Plasma Atomization & High pressure Cold Spray Applications. Designed to integrate perfectly with the ARS & HRS system, our Industrial Rotary Screw type compressor system (IRS) is available at:
www.polycontrols.com/irs

High Pressure Booster - HPA Series
The Polycontrols’ HPA Boosting system provides a practical solution for a reliable supply of gas up to 5000 psig. Designed to integrate perfectly with the ARS & HRS system, our High Pressure Boosting System (HPA) is available at:
www.polycontrols.com/hpa

ARS technical Outline
Configured and designed to virtually eliminate particles matter over 0.5 microns and reduce hydrocarbon content to 0.01 ppm w/w. The ARS system is filled with activated carbon adsorbent that adsorbs contaminants onto the surface of its internal pores to produce gas quality of a grade of 1.2.1 as per ISO 8573 standard (gas quality usually suited for pharmaceuticals processing and microprocessor manufacturing).

High purity Gas Filtration Unit – ARS Series
- Simple, Reliable & economical
- Compatible with both Dry and Wet Dust Collector installations - Design based on 100% relative humidity (RH) with zero water content in feed gas
- Based on gas dry treatment using High Purity filtration to produce pharmaceuticals/semiconductor grade helium or Argon free of dust, moisture vapor and particulate matter over 0.5 micron in size and heavy hydrocarbons & oil vapor content carried over from upstream equipment to 0.01 ppm w/w
- Very Low and easy maintenance (8000 hours of autonomy)
- Designed to integrate perfectly with Polycontrols’ IRS Series compressors
- Typically used upstream a gas separation unit or stand alone in Plasma Atomization applications.

Gas Separation Unit – HRS Series
- Designed to by used in conjunction with the High Purity Gas Filtration Unit, the HRS Unit combines pressure swing adsorption (PSA) technology and conventional beaded adsorbents to efficiently separate helium from He/Air or He/Ar mixture.
- Simple to operate, the system is fully automated and is designed to adapt itself to the instantaneous process conditions
- Deliver high purity helium that can be recycling in Cold Spray Applications (typically from 95% to 99,995%)
- Typical recovery rate of 95%+
**HRS technical outline**

The HRS gas separation system is designed to separate gas mixtures by means of the Pressure Swing Adsorption (PSA) process. This process takes advantage of the selective adsorption characteristics of different gases by zeolite adsorbents when subjected to varying pressures. The mixed gases which come from the process are made to flow through a column of adsorbent material at high pressure. The easily adsorbed components of the mixture (‘heavy’ components) are retained by the adsorbent while the ‘light’ components (the Helium in occurrence) are released from the column as purified gas. Before the adsorbent material becomes saturated by the ‘heavy’ gas components, product delivery is halted and the pressure is released from the adsorbent column (‘bed’). The lower pressure releases the heavy gases from the zeolite and they are forced to flow out of the system as waste (exhaust) gases. The adsorbent bed is then re-pressurized and is ready to repeat the cycle.

The inherently intermittent nature of the process means that a single adsorbent bed can only deliver purified product gas for a portion of its cycle. To ensure a continuous supply of product gas, the system is equipped with multiple adsorbent beds which are cycled in a balanced, sequential manner through identical operating cycles. In addition to providing a continuous supply of product gas, the operating cycle also includes advanced features such as pressure equalization between beds to minimize energy losses and an advanced flow control system to allow adjustment for peak operating performance. The HRS System is also equipped with thermal conductivity gas analyzers which monitor the helium concentration and are paired with optimization algorithms, ensure a stable process even under changing conditions.

**Engineering experiences**

Custom designed and built to meet customer’s unique application needs. The ARS & HRS System ensures:

- Nominal pressure and flow rate to accommodate all commercially available Plasma Atomization & High Pressure Cold Spray systems
- Built per North American standards and built to simplify in-house maintenance and upkeep
- Transparent integration and open platform
- Intuitive control - Designed to be user friendly and flexible
- Seamless integration; system is designed to be easily integrated with our compressor and Gas booster to provide you with a complete gas supply package.

**Safety**

We take your safety concerns seriously by complying with North American regulations concerning electrical and pressurized installations. (cULus, CSA, CE, ASME, CRN)