Cold Gas Inflation System

- Replacement for pyrotechnic, hybrid and cold gas inflators
- Available as single-stage and dual-stage version
- Electronic firing valve with < 200 µs firing delay
- Adjustable gas flow rate and pressure (1% repeatability)
- Operates with helium, nitrogen, argon or gas mixtures

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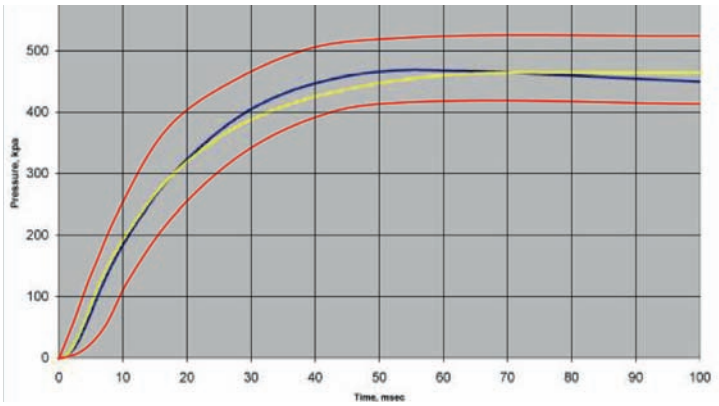
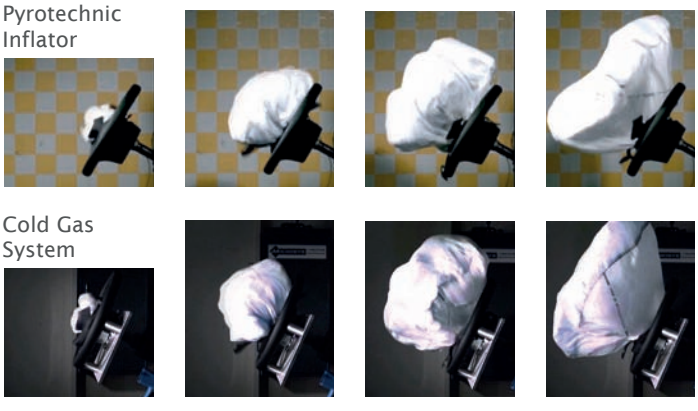
Cold Gas Inflation System (CGS)

When tuned for cover testing, the CGS output pressure curve closely follows the pyrotechnic inflator curve during the initial 20 ms. The corresponding high speed video demonstrates the accuracy of the CGS as a pyro replacement.



Pyrotechnic inflator
CGS output
USCAR inflator pass/fail limits



The Cold Gas Inflation System...

... replaces pyrotechnic, hybrid and cold gas inflators, saving both money and time. Superior technical performance allows for better, more innovative product designs.

By charging the CGS with a mixture of helium and nitrogen, it is possible to reproduce the performance of pyrotechnic and hybrid inflators very closely.

Example #1: Airbag module development

Using the Microsys CGS to replace inflators in the airbag module development process results in significant cost savings by eliminating the majority of prototype inflators used for testing the design. Also, with the 1% repeatability of the CGS, engineers are able to quickly ascertain the effect of design changes, resulting in shorter schedules and a better product.

Exp. #2: Instrument Panel (IP) and airbag cushion R&D

For interiors companies developing seamless instrument panels or seats, as well as for cushion designers, the Microsys CGS can replace inflators for most R&D testing. This allows engineers to easily adjust the airbag speed and pressure to determine the effect on their product, which is impossible to do using live inflators. Compared to using inflators, the Microsys CGS offers more than better product designs; it is also far more repeatable, allows for faster cycle times and saves the cost of expensive live airbags.

Exp. #3: To replace an inflator for production testing

In this mode the Microsys CGS is an inexpensive, adjustable and repeatable replacement for an actual inflator. Prior to using the system, performance must be calibrated by connecting the output to a test tank, typically either 60 L or 28.3 L. The CGS settings are adjusted until the test tank pressure curve is equivalent to the pressure curve of the inflator it is replacing. At this point the CGS may be connected to an airbag for deployment. Seamless IPs and seats can be tested with the CGS for a small fraction of the price of real airbags.

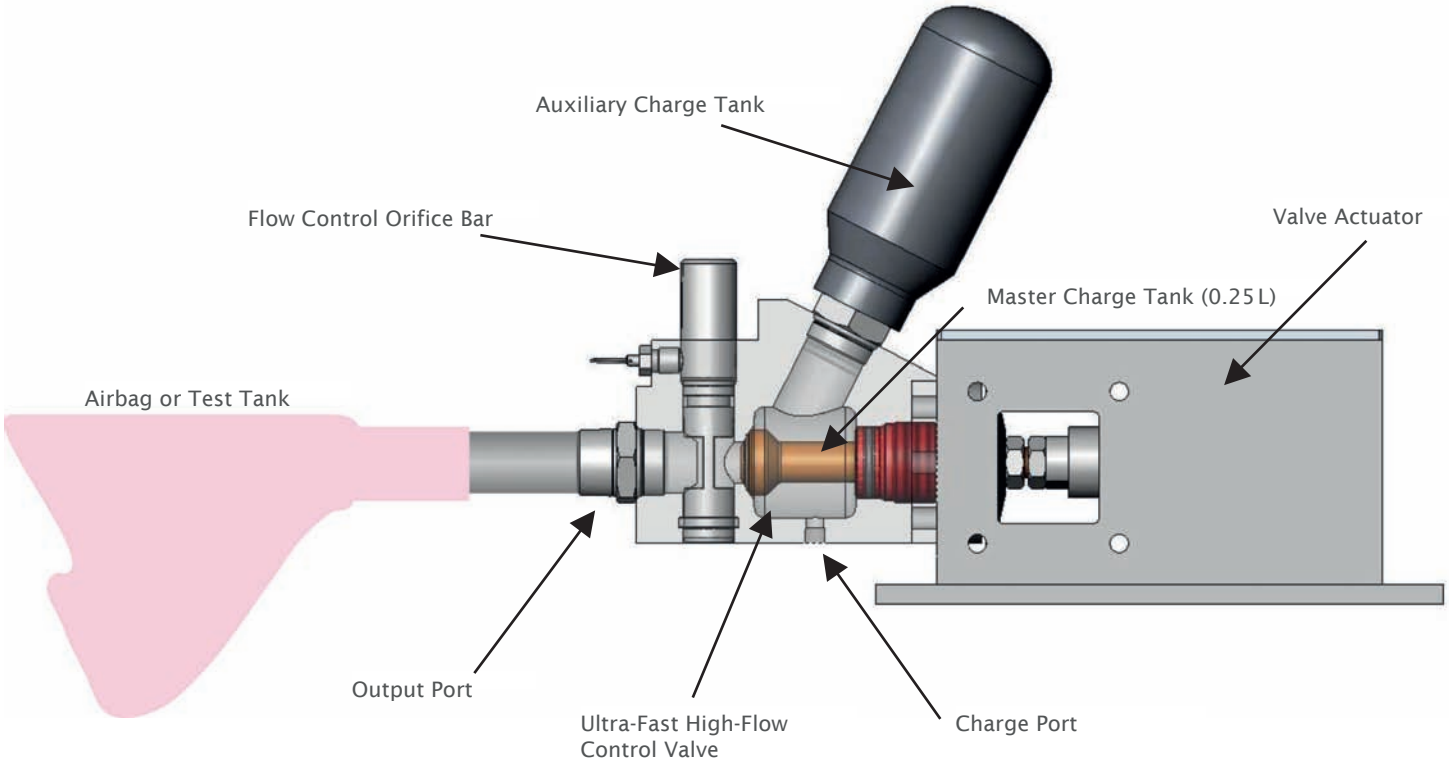
Gas mixtures

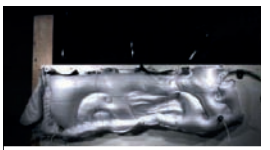
The three primary effects on airbag performance that result from the hot gas produced by pyrotechnic inflators are pressure build-up, cushion leakage and the jetting effect. The optimum ratio of helium to nitrogen to use with the CGS depends on which of these effects is of primary interest.

When using the CGS to examine cover break-through, cushion fold or for OOP, the pressure build-up and jetting effect are the main factors. Using a test tank, the CGS is charged with a mixture of Helium and Nitrogen and then tuned to match the rise time of the inflator as shown in the graph on the right.

For impactor testing, charging the CGS with a predetermined mixture of Helium and Nitrogen closely simulates the cushion leakage effect.

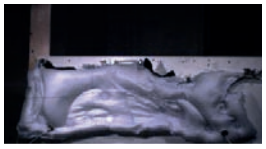
The Cold Gas Inflation System (CGS) is used in R&D testing of airbags, cushions, instrument panels and seats. Using the CGS in place of inflators gives you an accurate and repeatable test instrument with the flexibility to modify the gas output flow rate and pressure, resulting in improved product designs. Significant cost and time savings are realized by reducing the use of expensive and long lead time prototype inflators. The CGS is based on Microsys patented ultra-fast valve technology.




Real Inflator 10 ms

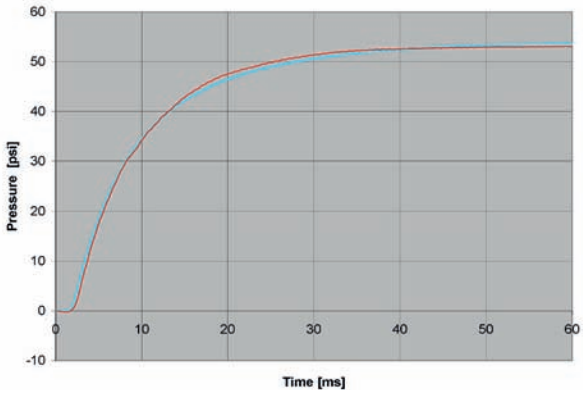

Real Inflator 20 ms


Real Inflator 30 ms


CGS 1400 psi 10 ms


CGS 1400 psi 20 ms


CGS 1400 psi 30 ms



The Microsys Cold Gas Inflation System is a natural replacement for stored gas inflators.

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Cold Gas Inflation System (CGS)

Performance Specifications

- Master charge tank volume: 0.25 L
- Auxiliary charge tank volume: 0 - 2 L, 0 - 3 L, 0 - 4 L charge tank volume ± 1.5 %
- Working gas pressure: 5 ~ 20.7 MPa, adjustable to Φ ≤ 1 %
- Gas volume: 0.5 ~ 36 moles per stage (determined by working gas pressure & total charge tank volume)
- Working Gas: Helium, Nitrogen, Argon, Mixtures
- Valve Opening Time: Φ 2 ms (electronic firing version)
- Valve Opening Delay: Φ 200 µs (electronic firing version)
  50 ~ 150 ms (pneumatic firing version)
- Valve Programmable Timing: 0 to 900 ms, 0.1 ms increments
- Valve Outlet Diameter: 25 mm
- Performance Repeatability: Φ 1 %
- Standard Orifice Bar: 10.2, 12.7, 15.2, 17.8, 20.3 mm
- Hole Diameters: 0.4, 0.5, 0.6, 0.7, 0.8 in.
- Operator Interface: Color LCD touch screen
- Mechanical Buttons: Arm, Stop, Fire, E-Stop
- Complies with EU Pressure Equipment Directive 97/23/EC

Ordering Information

MT4200-121: Dual stage electronic firing cold gas system
- Auxiliary charge tanks ordered seperately (2 required)
- Includes 10 fixed size orifice bars and 4 user customizable orifice bars

MT4200-120: Single stage electronic firing cold gas system
- Auxiliary charge tanks ordered seperately (1 required)
- Includes 5 fixed size orifice bars and 2 user customizable orifice bars

Input/ Output Connections

- Gas output port: 1.625 in. 12 tpi O-Ring Boss Seal (also known as SAE-20)
- Gas charge port: S/JIC male (1/4 " tube, thread 7/16-20)
- Trigger input: BNC (requires non-powered contact closure)
- Trigger output: BNC (NPN style contact closure) Quantity 2
  Imax = 50 mA, Vmax = 70 V
- Pressure ports: SAE #4 O-Ring Boss Seal
  Quantity 4 per stage:
  2 located before orifice and 2 located after orifice to allow mass-flow calculations

Physical Information

- Hydrostatic test pressure: 150 % max working pressure
- Upgradeability: Single stage electronic firing to dual stage
- Service interval: 5 000 cycles
- Compressed air: 120 psi (8.3 bar, 830 kPa)
- Operating temperature: 18 ~ 30 C, 35 ~ 85 % RH
- Power requirements: 100 ~ 240 VAC, 50/60 Hz, 250 W
- Dimensions: 1 048 mm x 963 x 984 mm (L x W x H)
  Largest aux. charge tank H = 1 342 mm
- Weight: 165 kg (single-stage electronic firing version)

Options

- MT4717-028: 28.3 L Inflator test tank
- MT4717-060: 60 L Inflator test tank
- MT4300-001: SureFire data acquisition system
- MT4200-103: SureFire integrated CGS control
- MT9013-001: Installation
- MT9003-004: Training
- 200725-004 Orifice bar, 10.2 mm (0.4 in.)
- 200725-005 Orifice bar, 12.7 mm (0.5 in.)
- 200725-006 Orifice bar, 15.2 mm (0.6 in.)
- 200725-007 Orifice bar, 17.8 mm (0.7 in.)
- 200725-008 Orifice bar, 20.3 mm (0.8 in.)
- 200725-009 Orifice bar, blank with pilot hole
- MT4200-050 Auxiliary variable charge tank, 0 - 2 L
- MT4200-050 Auxiliary variable charge tank, 0 - 3 L
- MT4200-050 Auxiliary variable charge tank, 0 - 4 L

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