

NATURAL ACTION WORKS

INDUSTRIAL COUNTER VORTEX SYSTEM

General description:

The ICVS is a modular designed machine available in a number of configurations to meet a variety of flow applications in both light commercial and heavy industrial applications. It incorporates ICVD modules (Counter Vortex Devices) used in conjunction with hydraulic or air fluid systems. Fluid logic circuits regulate charging, pressure, flow and temperature for proper system integration. The ICVS uses 2 to 6 ICVD modules according to design applications. Applications which require more flow or charging can be achieved by joining multiple systems using the same logic. Flow and charging levels can be arranged for any application from hundreds to millions of gallons per minute.

System Features:

The base machine configuration has two inlet and exhaust connections with infinitely adjustable cross connections. This allows for delivery of different fluid mediums and highly efficient homogenization of the two.

Base systems provides 5 different operating modes excluding isolation:

- 1. Single Fluid 'High Charge' (low flow)*
- 2. Simultaneous Dual Flow Charging*
- 3. Simultaneous Dual Flow Mixing*
- 4. 'High Flow' Single Fluid*
- 5. System Bypass*

System Modularity:

- **Infinite series/parallel functions can be met**
- **Basic module features: ICVM (Device Module)**
- **All construction is 304SS minimum.**
- **150#, 300#, and 3000# classes available**
- **All flanged connections**
- **T.I.G welds and NDT certifications**
- **Internal fluid hammer prevention to critical parts**
- **Internal modularity (3-10, 4-10, 6-12) (3-5)" pipe equivalent**

Basic System Features: ICVSM m (System Module manual)

- **Automatic Temperature Protection and Monitoring**
- **Automatic Pressure Protection and Monitoring**
- **5 manual operational modes**
- **Passcode protected alarm trips/hour meter**

Advanced System Features: ICVS x

- **Automatic Flow PID's**
- **Automatic Pressure PID's**
- **Automatic Mixing PID's**
- **Automatic Temperature PID's**
- **Performance Data Logging/Remote live monitoring**
- **Additional optional performance modes**

System Construction:

- **The ICVS is mounted by sound isolation clamps to a rigid frame designed to be fastened to its foundation. Optional caster wheels allow mobility in proper applications.**

Approximate Sizing:

- **ICVS m2: 6'H x 4'W x 3'L**
- **ICVS m4: 6'H x 4'W x 4'L**
- **ICVS m6: 6'H x 4'W x 5'L**

Approximate System weight:

- **ICVS m2-3-10ELm 150#: 800lbs**
- **ICVS m6-3-10ELm 150#: 1000lbs**
- **ICVS m6-3-10ELx 150#: 1300lbs**

The common frame will house both -10 and -12 units and utilize common control functions.

Electrical:

- **A common NEMA-12 electrical enclosure will house processors, displays, and electrical components.**

Retrofit:

- **The Base system (ICVS m) can be easily upgraded to full automatic (x)**

Power Requirements:

- **120vac supply, 10 amp service**
- **100 psig clean, dry air @5 scfm non-continuous**
- ***System does not include pumps***

Plant System Integration Advantages:

- **For testing purposes a number of configurations can easily be configured. This would define the operating mode/s for the process which possess the greatest ROI, and the ideal modular configuration for the application. Additional systems can be coupled if gain threshold is not discovered. This will ultimately define the 'maximum charging potential' that can be practically achieved for any given process – and when to apply it.**

System Integration Disadvantages:

- **Systems may be altered sufficiently to cause process changes. Nullification of reactive chemicals which are required for some process can cause production issues. Great attention to the surrounding process and ability to isolate ICVS in case of danger coming or going is a must in more complex process, without impacting the whole process in a negative way.**

System Logic integration:

- **All system parameters can be coupled to existing system by simple or complex logic programming. Integration with plant engineers is required.**

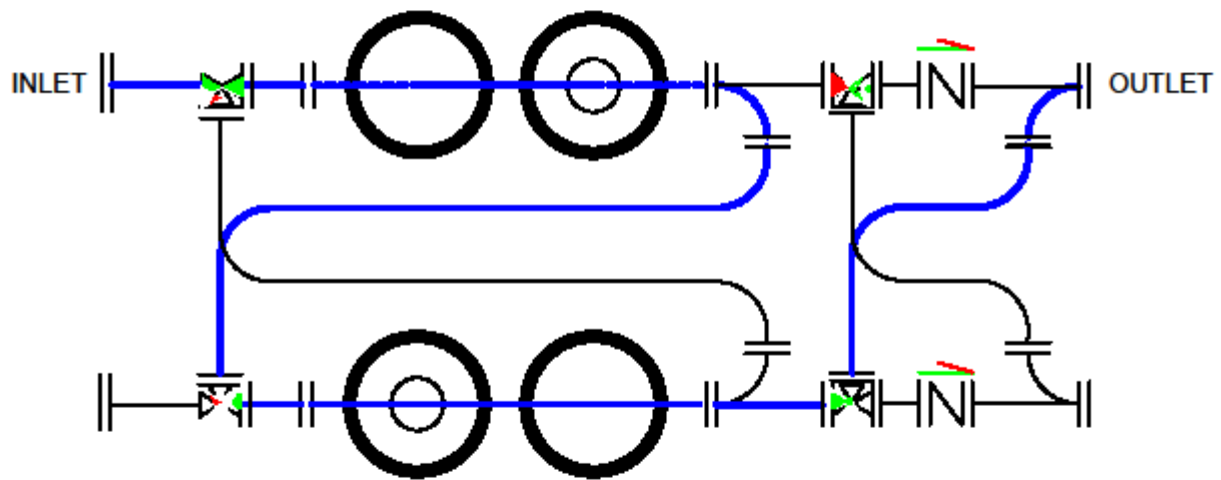
Mean Time Failure:

- **Inspection codes are good for 15 years on pipe weldments**
- **1 million cycle failure on all cyclic devices**

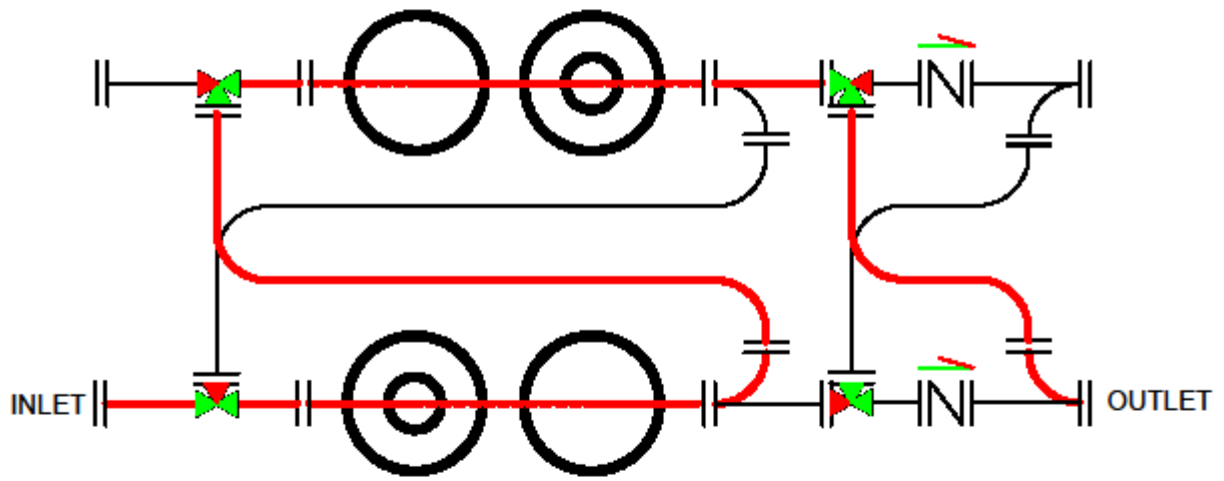
Legal Documentation and Engineering Integration includes:

- **Process diagram dwg's and field device ID**
- **General Arrangement dwg.**
- **Electrical Enclosure and Electrical dwg**
- **MDS and MSDS**
- **Operator Manual**
- **Field Service and Start up**
- **Process Engineering Consulting**

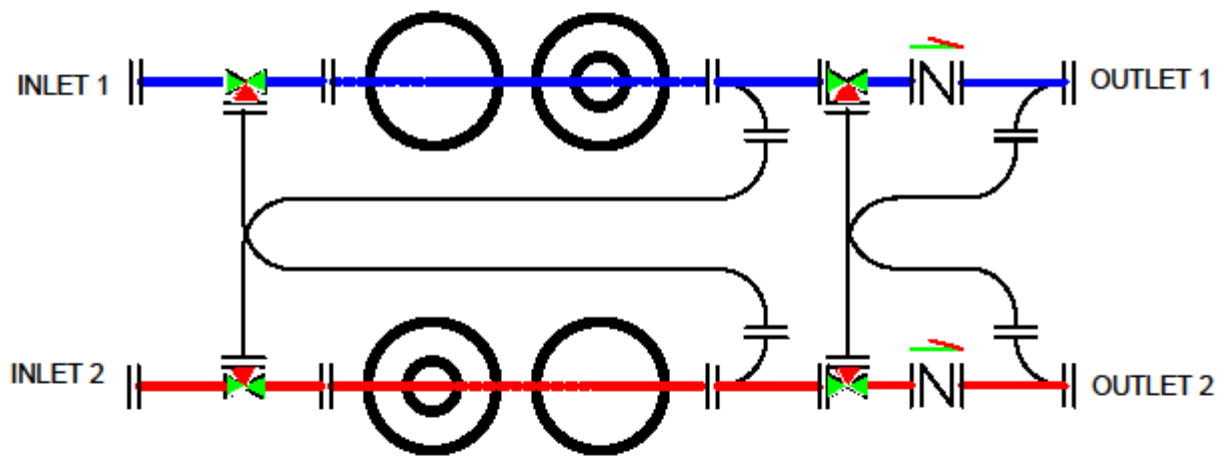
SINGLE INLET SERIES COLD M4



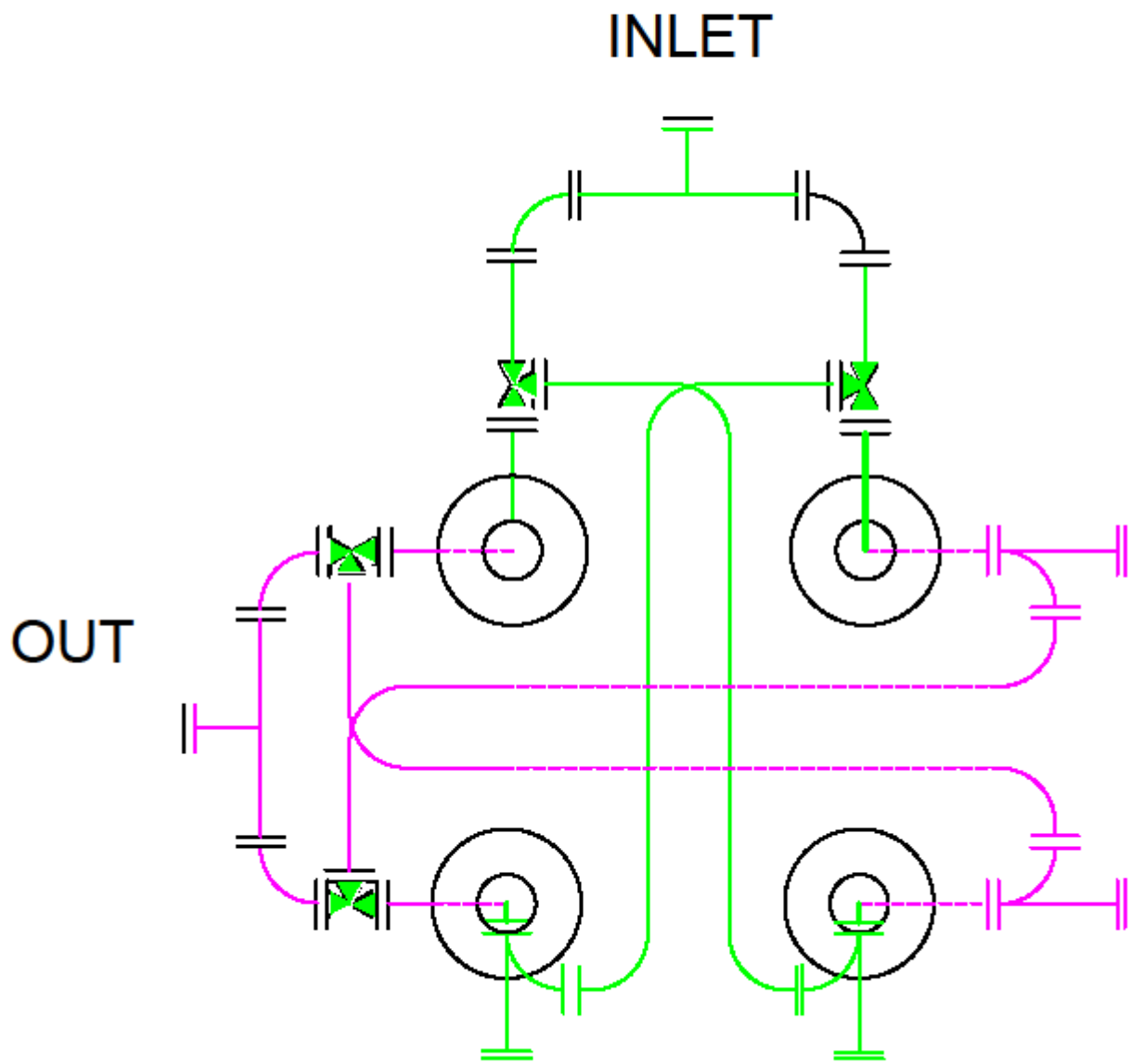
HOT MODE ONLY SERIES M4



SERIES PARALLEL DUAL MODE



HIGH FLOW MODE



SYSTEM BYPASS

