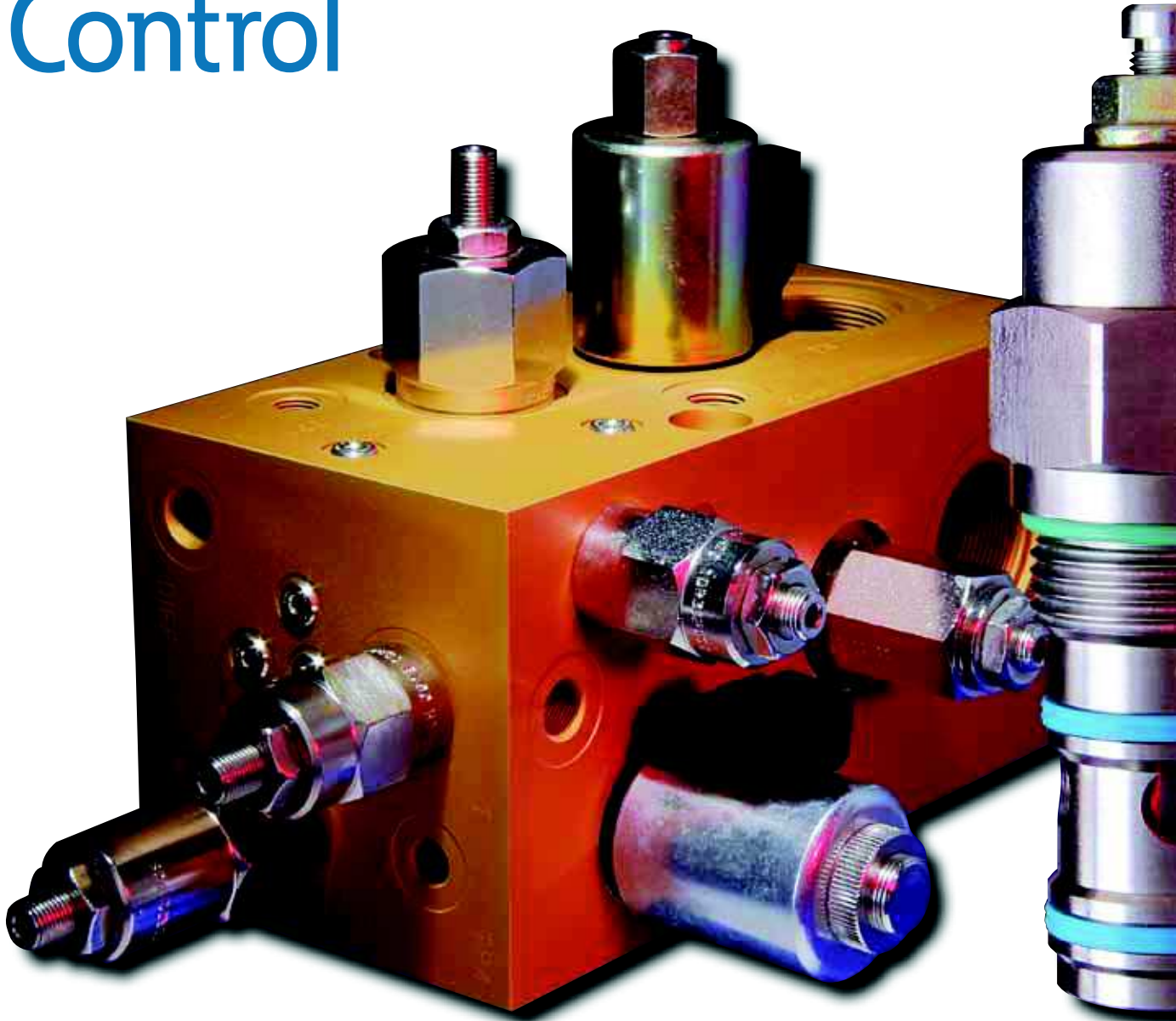


Eaton® , Integrated Hydraulics™
Hydraulic Screw-in Cartridge Valves (SiCV)

World-Class Control



EATON
Powering Business Worldwide

 **Integrated
Hydraulics**
An Eaton Brand



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Introduction/
Valve Locator

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Solenoid
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Coils & Electronic
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Directional
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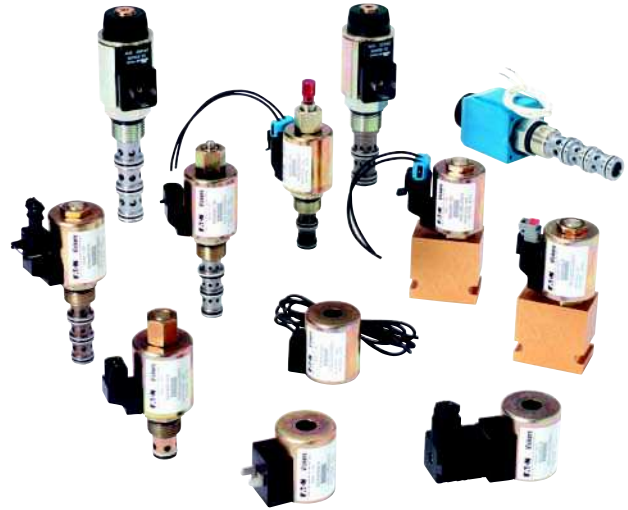
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N

Screw-in Cartridge Valves (SiCVs)

Introduction

For over seventy years, the Vickers and Integrated Hydraulics brands have provided its customers with quality products and innovative solutions for all their power and motion control needs. The products featured in this catalog represent the very best in screw-in cartridge valve technology. Eaton is committed to maintaining this position by offering the most comprehensive range of cartridge valves for stationary and on/off highway equipment. This catalog gives detailed specifications for the entire line of Eaton's screw-in cartridge valves. Its purpose is to provide a quick, convenient reference tool when choosing cartridge valves or designing a system using these components. It is divided into sections according to valve function.



Hydraulic Integrated Circuits

Hydraulic Integrated Circuits (HICs) are valve packages containing combinations of screw-in cartridge valves in a manifold block. The package is dedicated to the hydraulic control of a particular application. HICs can be as extensive as necessary to meet the most complex applications or as simple as two or three cartridges in a basic single manifold.

All HIC packages are designed and manufactured by Eaton to customer specifications. Manifolds can be designed to hold the requisite cartridges, pilot pistons, orifice discs, or any other components needed for individual applications and integrated with other Eaton components. Standard cavity tooling provides precision machining of standard cartridge cavities.

Global Support

Eaton's world-wide distribution and service network is quick, reliable, and responsive to the customer's needs. Our customers can rest assured that no matter where they're located, Eaton will be there with unrivaled products and technical expertise.

Technical Support

Quality products are only part of Eaton's commitment to our customers. We also provide advisory, planning and design services specifically geared to your application and backed by on-time delivery.

Features and Benefits

Eaton's screw-in cartridge valves provide many advantages over traditional hydraulic valves. While offering the same control functions as traditional hydraulic valves, screw-in cartridge valves are compact, reliable, and economical.

The concept of combining multiple cartridge valves in a common manifold offers both the mobile and industrial user substantial cost-saving advantages that cannot be achieved with traditional valving. Here are some of the advantages of Eaton cartridge valves:

- Response times and efficiency gains, by eliminating many of the hoses, tubes and fittings necessary in traditional installations
- Fewer potential leakage points than with conventional valves ensuring cleaner, safer application environments
- Compact and neat assemblies for economy of space and weight
- Increased ability to withstand vibration, giving optimum machine reliability and performance
- Multiple mounting configurations offers maximum design flexibility
- Greater contamination tolerance
- Faster cycle times
- Lower noise levels
- Faster on-site servicing and troubleshooting
- Resistance to fluid contamination
- Hardened ground steel operating parts

Materials

Cartridge bodies are manufactured from high grade cold drawn steel bar, with the internal working parts hardened and ground for maximum performance and durability. Our line bodies, Hydraulic Integrated Circuit blocks and special bodies are manufactured from high strength, wrought aluminum bar and mild steel or stainless steel, dependant upon the exact requirements of individual applications. Various specialized coatings/finishes are obtainable for when environmentally unfriendly conditions are a consideration. For complete specifications and compatibilities, please consult our technical department.

It is recommended that for pressures above 210 bar (3000 psi) steel bodies are used. Whilst in most cases the aluminum bodies are strong enough, if transient peak pressures are encountered frequently, there is a possibility of fatigue.

Ports

The ports on all our bodies are BSP (parallel) and SAE O-ring and range in size from 1/4" to 1-1/4". NPT ports are available on request.

Seals

We use Nitrile as standard for temperatures of -30° C to +90° C (unless otherwise stated). Viton seals are available on request. Polyurethane seals are also available on some valves but care must be taken in their application with regard to fluid compatibility.

Temperature Ranges

Temperature ranges quoted throughout this catalog relate to the seal material only. The viscosity index of the fluid should also be taken into account when selecting a valve. If in doubt please contact our technical department.

Fluids

Recommended fluid is mineral oil.

Note: All our test performances are carried out by using hydraulic oil with a viscosity of 21.8 or 32 cSt at 40°C. For water based fluids, i.e., 95/5 and 60/40 emulsion consult factory.

Filtration

Our valves utilize precision hydraulic components and we recommend a filtration level of between 15 and 25 microns, to produce a cleanliness level of BS5540/4 Class 18/16/13, dependent on the type of valve used. Replace filter elements regularly, try to avoid filter bypass condition - special attention should also be paid to filtration when first commissioning the system or machine, when contamination levels are high.

Tamperproof Devices

Various tamperproofing methods are available upon request for our range of cartridges and valves.

Cartridge Valve Installation

The correct machining of cavities to suit our range of cartridges is critical. Cavity tools are available for sale or hire and certified drawings are available upon request. All drawings and information contained within this catalog are for guidance only. Where dimensions and actual valve usage is critical, please consult our technical department for full specifications and compatibilities. We reserve the right to alter specifications without notice or incurring obligation.

Note: It is important that each designer analyses all aspects of their application including consequences of any failure and review the information concerning the product or system in the current product catalog. The responsibility for final selection rests with the customer.

Torque Figures

The torque values stated in this catalog are for testing purposes only. Assembly tightening torque depends on many factors, including lubrication, coating and surface finish. Contact main office for further information.

Adjustment

The adjustment range and Max setting figures shown throughout this catalog give the design range for each valve, higher or lower values may be attainable but should not be used without first contacting our Engineering department. Setting must ALWAYS be carried out using an appropriate gauge and it must NOT be assumed that screwing an adjuster to its maximum or minimum position will yield the maximum or minimum stated design setting for that valve.

Pressure Equipment Directive

All our pressure control valves are designed to be "Pressure Accessories" in accordance with article 3 section 3 of the Pressure Equipment Directive and Sound Engineering Practice and sold in good faith as such. For "Safety Accessories" as defined in article 3 section 1.4 of the Pressure Equipment Directive.

Note for products intended to be sold in European Economic Area

Please note that "safety devices" or other safety functions mentioned in any product literature are not necessarily "safety components" as defined by the Machinery Directive 2006/42/EC, unless otherwise state together with the CE mark and specific reference to said directive.

Limited Warranty

Please see our website for details.

In memory of Paul Hensman (1960-2009), Eaton Integrated Hydraulics Marketing Manager (2000-2009), whose dedication and hard work was instrumental in the design and completion of this catalogue.



Hydraulic Integrated Circuits

High Performance in One Compact, Efficient Package

Customized Solutions from a Single Source

Eaton is a major supplier of Hydraulic Integrated Circuits (HIC) manifold block systems. Application and use of HIC packages has spread across virtually every market and is a major growth area increasing at a rate 2 to 3 times the growth rate for the rest of the hydraulics industry.

Market trend forces are fueling growth away from line mounted valves to subplate

mounted valves to, ultimately, HIC Manifold Valve Systems. Operating costs - reduced complexity, elimination of leakage, and improved serviceability - as well as initial installed cost factors - compact size, lower purchase cost, reduced customer engineering, fewer component parts and a higher level of integration - are contributing to this trend.

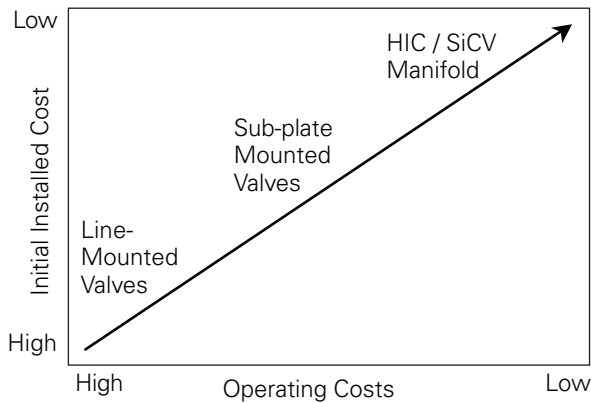
No Leaks, No Lines

HIC packages are created to meet specific circuit or installation requirements where two or more valves are required. The valves are packaged by hydraulic product suppliers, or OEMs, into either aluminum or steel blocks instead of using traditional cast iron individual in-line valve bodies. This permits the creation of compact, leak-free valve control system packages while eliminating the cost and time to connect the valves together with lines and fittings. This capability satisfies many application requirements where available space for hydraulic components is limited. HIC packages are ideally suited for a quick and easy, low cost hydraulic circuit which has repetitive applications. This requirement actually led to the development of the screw-in cartridge valve (SiCV) concept.

From Screw-in Cartridge Valves to Complete Systems

SiCVs gained their initial market success and position in the agricultural equipment industry in the late 1960s. SiCV technology rapidly spread from the traditional basic valve control functions of flow pressure and direction to many specialty valve control functions that were not always practical or economical in the traditional cast iron housing configuration. From these modest but demanding beginnings in the agricultural vehicle and implement markets, the concept of packaging two or more valves to form a unique control system and/or subsystem quickly spread into other cost sensitive high volume markets. Examples include aerial work platforms, lift trucks, road pavers, road rollers, concrete pavers, small construct equipment vehicles, and mining equipment.

Market Trends



The Evolution of the HIC Package

This technology has evolved from labor intensive, costly line and subplate mounted components to compact leakfree HIC packages.

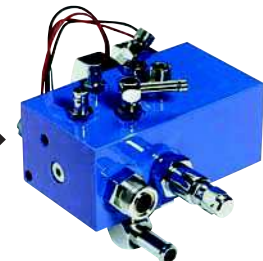
Line Mounted Valves



Mounted Sub-plate Mounted



HIC Package



Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.

Hydraulic Integrated Circuits

High Performance in
One Compact, Efficient Package



Better Results in Many Applications

More industries are becoming aware of the advantages of HIC packages:

- Low installed cost
- Leak-free packaging
- Reduced hydraulic line clutter
- Smaller package size

As awareness increases, usage of HIC packages is spreading to specialty

vehicles and machines including paper cutting machines, newspaper printing presses, tree removal/planting vehicles, and utility trucks.

As more and more HIC packages continue to appear in the marketplace the use has spread to encompass virtually every conceivable market where hydraulic systems can be applied.

Trouble-free Installation and Troubleshooting

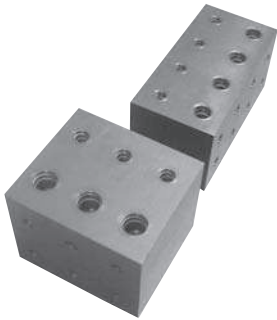
The HIC package may be designed by Eaton or customers to satisfy specific performance or installation requirements. The key design feature is the combination of two or more control functions into a compact manifold block where internal passages eliminate the need for interconnecting lines and fittings between valves. The construction eliminates not only potential leakage points, but also the procurement, storage, handling and installation costs associated with traditional line mounted valve systems. The only lines and fittings required are those for the system inlet and return and the connections to the actuators being controlled. In addition, the HIC is a complete package with no time or procurement problems to complete the installation of the circuit due to the possible shortage of one or more valves. Conveniently located SICVs in a single manifold block provide faster field servicing and troubleshooting, maximizing machine utilization.

Features and Benefits

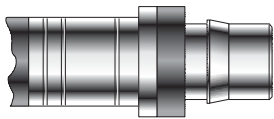
- An efficient low maintenance system - the cartridge concept facilitates improved productivity from customized circuits
- Compact, unitized design-maximum savings on lines and fittings costs plus faster installation and system start up
- Fewer potential leakage points - ensure a cleaner, safer application environment
- Increase ability to withstand vibration - gives optimum machine reliability
- Faster response time and enhance efficiency - response time and power transmission efficiency gains by eliminating many of the hoses, tubes and fittings necessary in traditional installations
- Compact, neat assembly - provides space and weight savings
- Ability to manifold other valves such as Vickers Directional Controls DG valves & CMX valves - provides increased systems flexibility to control multiple and diverse actuators
- Components sourced from a single supplier - simplifies procurement processing and reduces acquisition costs



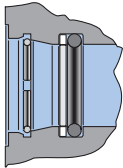
Aluminum and Steel Manifold Packages with Direct Port STC Connections



STC Ports in action



STC Hose/Connector



STC Port

Design Features

- Positive round-wire style latching mechanism
- Swivels for installation, (in absence of pressure)
- Low profile, compact design
- Elastomeric o-ring seal –available in many materials
- Dual purpose dust seal/ release sleeve
- Simple stamped release tool for disconnecting
- Zinc plated steel construction

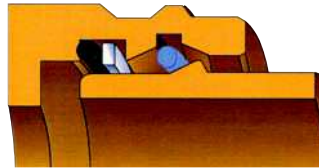
Benefits

- Fast reliable one-hand STC connections requiring no assembly tools
- Easy installation in confined areas
- Eliminates cross-threading, over-or under-torquing, and hose twisting
- Resists loosening when vibration is present
- Zero leak performance per SAE J1176
- Repairable seals for increased useful life
- Direct porting eliminates adapters to maximize cost savings
- Resists external contamination
- Design allows easy disconnection with release tool
- Ease of assembly for HICs with multiple ports in tight spaces

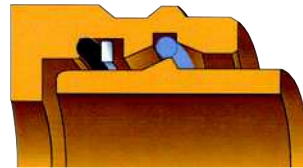
How to Use STC

STC Assembly Action

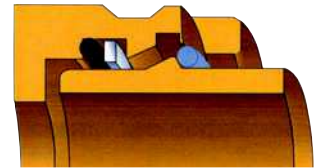
Note: Always remember to verify that your STC connection has been made successfully by pulling the connection.



Male connector is inserted into the female connector. The male shoulder spreads the latch ring open.



Latch ring is in its open position which allows the male shoulder to slide past the latch ring.



Male and female are locked into place. As fluid pressure is applied, the latch ring is wedged between the male shoulder and the female angle.

The proper connection and disconnection of STC is outlined in Bulletin JA535E.



As the STC tool is inserted behind the release sleeve, the steel insert pushes the latching ring forward into a groove in the female half I.D., thus allowing the two halves to be pulled apart. The thickness of the tool moves the sleeve forward far enough to disconnect, so prying sideways with the tool is unnecessary.

