

**milwaukee**  
*Cylinder*  
**Specials Are Our Standard**



# **ICB™ Series**

— **Integrated Counterbalance** —  
**Valve Series**



**The ICB Series integrates counterbalance valve(s) directly onto the cylinder in an easy to order package, making it easy to add counterbalance valve technology to your hydraulic circuit.**

- **Counterbalance Valve and Manifold Integrated on Cylinder**
- **Easy to Specify Platform**
- **Readily Available**
- **Available on Rod End, Blind End, or Both Ends**
- **Available on all H-Series Standard Cylinder Mounts and Sizes**
- **Counterbalance Valve Load Holding Pressure Set at Factory**



Learn more about  
the ICB Series

[milwaukeeecylinder.com](http://milwaukeeecylinder.com)

**TOPICS**

- 1. Introduction
- 2. Manifold Capacity Chart
- 3. Manifold Dimensions
- 4. Typical Circuits
- 5. How to Order/Code Adder Configurator

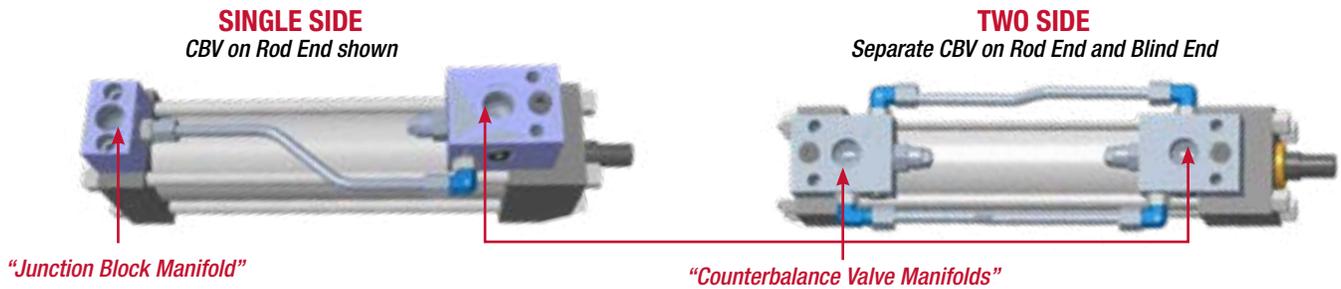
**1. INTRODUCTION**

Milwaukee Cylinder ICB Series™ is an option for our H-Series cylinders that includes “manifold & counterbalance valve” packages that we integrate directly to our cylinders. Our packages fit on any standard H-Series mount and bore size. Cylinders are modified to accept ICB packages and should be ordered at the same time. Depending upon whether a counterbalance valve (CBV) is being used on a single side or both sides of a cylinder, the ICB Series package includes -

Single side: 1 Counterbalance Valve, 1 Counterbalance Valve Manifold, 1 Junction Block Manifold, and 1 Plumbed Steel Pipe

Two side: 2 Counterbalance Valves, 2 Counterbalance Manifolds, and 2 Plumbed Steel Pipes

Different manifolds are available based on cylinder bore size and desired flow capacity. Our standard counterbalance valve is a 3:1 pilot ratio, ductile iron construction, offered in different flow rates, different load holding pressure capacities, and vented or non-vented options. For convenience, the counterbalance valve load holding pressure is set at our factory.



**2. MANIFOLD CAPACITY CHART**

This table is used with the cylinder bore size to determine the size of manifold available for the application and is used as an input to the Code Adder Configurator (see Section 5). This chart also includes the user connecting port sizes and manifold cavity information.

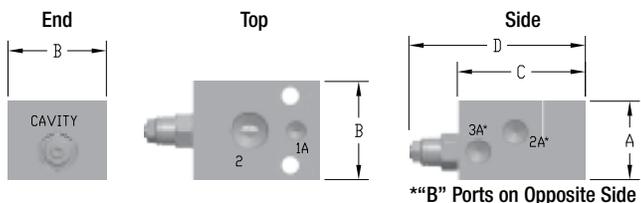
Manifold Flow Size	Nominal Flow Rate	Works with Cylinders with Bore Sizes of:	Cylinder Working Ports (Labeled Port 2 on manifolds)	Counterbalance Valve Cavity	
				3 Port (Non-Vented)	4 Port * (Vented)
Low Flow	15 GPM	All Sizes	10 SAE	T11A	T21A
Medium Flow	30 GPM	3 1/4" and Up	12 SAE	T2A	T22A
High Flow	60 GPM	5" and Up	16 SAE	T17A	T23A

\*: Cavity vent port is 6 SAE. Customer should pipe back to tank or other collection area. Only used with 4 Port/Vented CBV

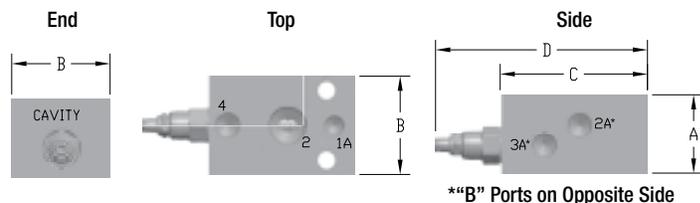
**3. MANIFOLD DIMENSIONS**

There are two types of manifolds included in this series: 1) “Counterbalance Valve Manifold” and 2) “Junction Block Manifold.” A pair of manifolds are used on each cylinder. When a counterbalance valve is required on both the rod end and blind end (“Two Side”), two “Counterbalance Valve Manifolds” are used. When a counterbalance valve is used on only one side of the cylinder (“Single Side”), a “Counterbalance Valve Manifold” and a “Junction Block Manifold” are used. Manifolds are offered in three sizes. The dimensions on the following page are for the manifolds only. **3D Models are available upon request.**

**COUNTERBALANCE VALVE MANIFOLD**



**3 PORT/NON-VENTED**



**4 PORT/VENTED**

Manifold Flow Size	Cavity	A (in)	B (in)	C (in)	D (in)	PORT 1A	PORT 2	PORT 4
<b>3 Port/Non Vented</b>								
<b>Low Flow</b>	T11A	2	2.5	3.25	4.61	4 SAE	10 SAE	N/A
<b>Medium Flow</b>	T2A	2.5	2.5	3.5	5.24	4 SAE	12 SAE	N/A
<b>High Flow</b>	T17A	3	3	4.345	6.35	4 SAE	16 SAE	N/A
<b>4 Port/Vented</b>								
<b>Low Flow</b>	T21A	2	2.5	3.75	5.52	4 SAE	10 SAE	6 SAE
<b>Medium Flow</b>	T22A	2.5	2.5	4.38	6.44	4 SAE	12 SAE	6 SAE
<b>High Flow</b>	T23A	3	3	5.345	7.37	4 SAE	16 SAE	6 SAE

For Customer Use: Port 1A is cylinder pressure; Port 2: Cylinder working port; Port 4: CBV Vent-Only used with 4 Port CBV and needs to be piped to tank.

For Factory use: Port 2A and 2B: For transmitting pilot pressure; Port 3A and 3B: Pilot pressure port.

All non-used ports come plugged.

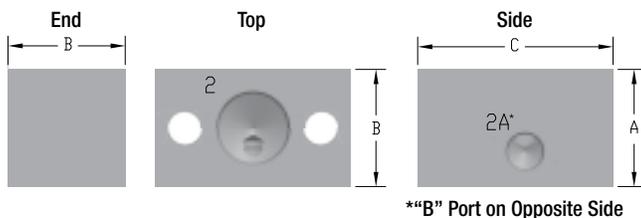
Note: For use on rod end or blind/cap end.

Note: Manifolds do not extend over the non-tube facing side of either end cap.

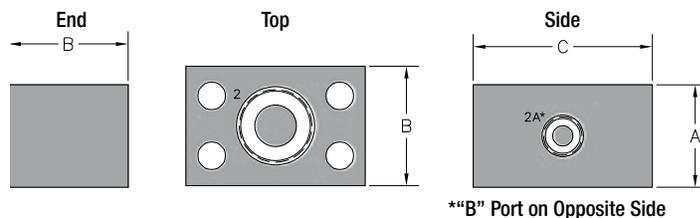
For cylinders with bore size 1.5", 2", or 2.5", the end cap height dimension will be larger than standard by 0.83" to accommodate the ICB

Cylinder height = standard cylinder height + manifold "A" dimension + 0.83".

**JUNCTION BLOCK MANIFOLD– USED WITH SINGLE CBV PACKAGES**



**LOW FLOW**



**HIGH & MEDIUM FLOW**

Manifold Flow Size	Junction Block				
	Mounting	A (in)	B (in)	C (in)	PORT 2
<b>Low Flow</b>	2 Bolt	1.5	1.5	2.5	10 SAE
<b>Medium Flow</b>	3/4 Code 61	1.5	1.75	2.62	12 SAE
<b>High Flow</b>	1 Code 61	1.5	2	2.82	16 SAE

For Customer Use: Port 2: Cylinder working port.

For Factory use: Port 2A and 2B: For transmitting pilot pressure.

All non-used ports come plugged.

Note: For use on rod end or blind/cap end.

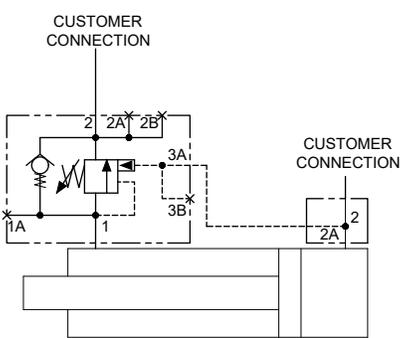
Note: Manifolds do not extend over the non-tube facing side of either end cap.

For cylinders with bore size 1.5", 2", or 2.5", the end cap height dimension will be larger than standard by 0.83" to accommodate the ICB Cylinder height = standard cylinder height + manifold "A" dimension + 0.83".

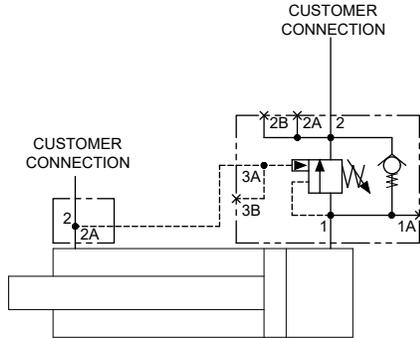
4. TYPICAL CIRCUITS

3 PORT NON-VENTED COUNTERBALANCE VALVE CIRCUIT (FIG 1)

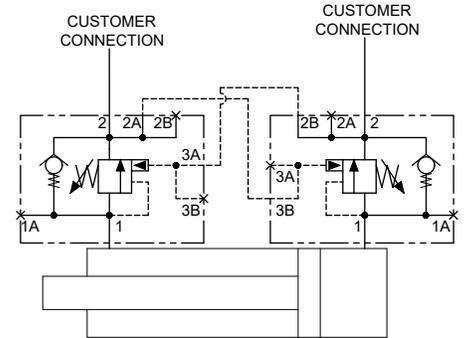
*Actual manifold is inscribed with notations shown*



**ROD END COUNTERBALANCE**



**CAP/BLIND END COUNTERBALANCE**

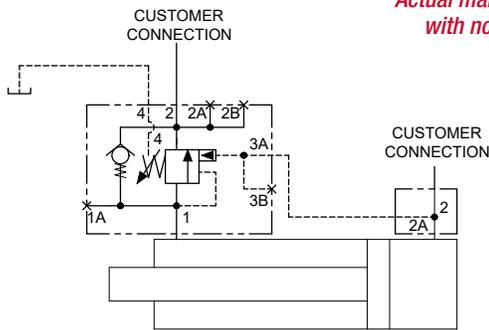


**BOTH ENDS COUNTERBALANCE**

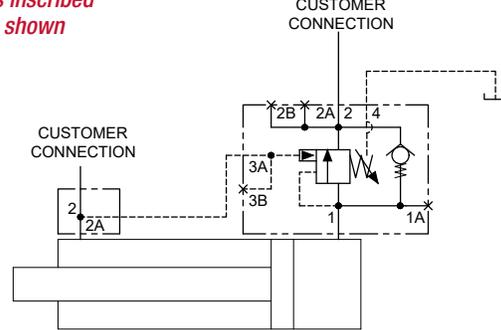
*Note: 3 Port Non-Vented Counterbalance valves circuits are the most common configuration.*

4 PORT VENTED COUNTERBALANCE VALVE CIRCUIT (FIG 2)

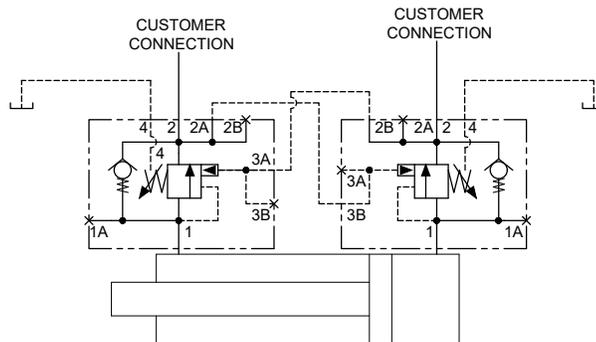
*Actual manifold is inscribed with notations shown*



**ROD END COUNTERBALANCE**



**CAP/BLIND END COUNTERBALANCE**



**BOTH ENDS COUNTERBALANCE**

*Note: Use the 4 Port Vented Counterbalance Valve when high return pressure is expected.*

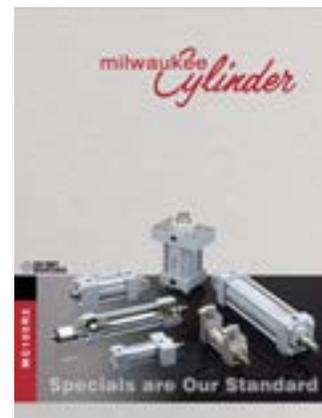
*This configuration requires port 4 to be piped to tank.*

**5. HOW TO ORDER/CODE ADDER CONFIGURATOR**

1. Select desired cylinder – see our Milwaukee Cylinder Catalog

Note: When ordering your cylinder, include the “S” for special in the cylinder model number and add the ICB Series Option Code Adder to your “S” description.

2. Use “Code Adder Configurator” to Determine the ICB Series Option Code Adder



Use our catalog to select desired cylinder

**CODE ADDER CONFIGURATOR**

Manifold Flow Size	Counterbalance Type: Vented/Non-Vented	Counter Balance Valve Location	Load Holding Adjustment Range	Factory Preset Pressure
<b>3</b>	<b>3</b>	<b>R</b>	<b>I</b>	<b>585</b>
1: Low Flow Rate - 15 GPM  2: Medium Flow Rate - 30 GPM  3: High Flow Rate - 60 GPM  Note: Counterbalance valve flow rating sized to match manifold flow rating	3: Non-Vented (3 Port)  4: Vented (4 Port)	C: Cap/Blind End Only  R: Rod End Only  B: Both Sides	I: Intermediate Range (400-1500 PSI)*  H: High Range (1000-4000 PSI)*  *Caution: Do not set above max circuit operating pressure.	N: Customer will Set  or  XXXX psi (Customer Desired)  Note: Will be set at Milwaukee Cylinder with +/- 50 PSI

Example: ICB Series Option Code Adder: 33RI-585 (use in your “S” description of your cylinder order)

Meaning: High Flow Capacity (60 GPM); Non-Vented (3 Port); Counterbalance valve is connected to the rod end; the Intermediate Hold Pressure Range (400-1500 psi); with factory to set hold pressure at 585 psi

**OPTIONS**

**COUNTERBALANCE VALVE**

**Standard:**

Counterbalance valve flow ratings match manifold capacity; Ductile iron construction; Buna seals; 3:1 pilot ratio

**Upon Request - Additional Counterbalance Valve Options:**

Lower flow counterbalance valves at each manifold flow capacity size; aluminum construction; Viton seals; other pilot ratios

**MANIFOLDS**

Other configurations are available as specials, including different port configurations, putting two CBV on one manifold block, aluminum construction, etc.

**PILOT OPERATED CHECK VALVES (POCV)**

Our manifolds can support POCVs. Contact Milwaukee Cylinder to discuss your application

Specials are our standard

# milwaukee *Cylinder*

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Cudahy, Wisconsin 53110-2456 USA



**Milwaukee Cylinder offers:**

- Specials / Custom Products
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- Pneumatic Cylinders
- Aluminum Cylinders
- Hydraulic Pneumatic Devices
  - Pressure Boosters
  - Air Oil Tanks
  - Accumulators
- Cylinder Accessories
  - Linear Alignment Tools
  - Amlok® Rod Clamp
- Industrial Manipulators
- Power Units and Valves
- Test Stands

*Contact Milwaukee Cylinder for your application needs.*

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Standard***