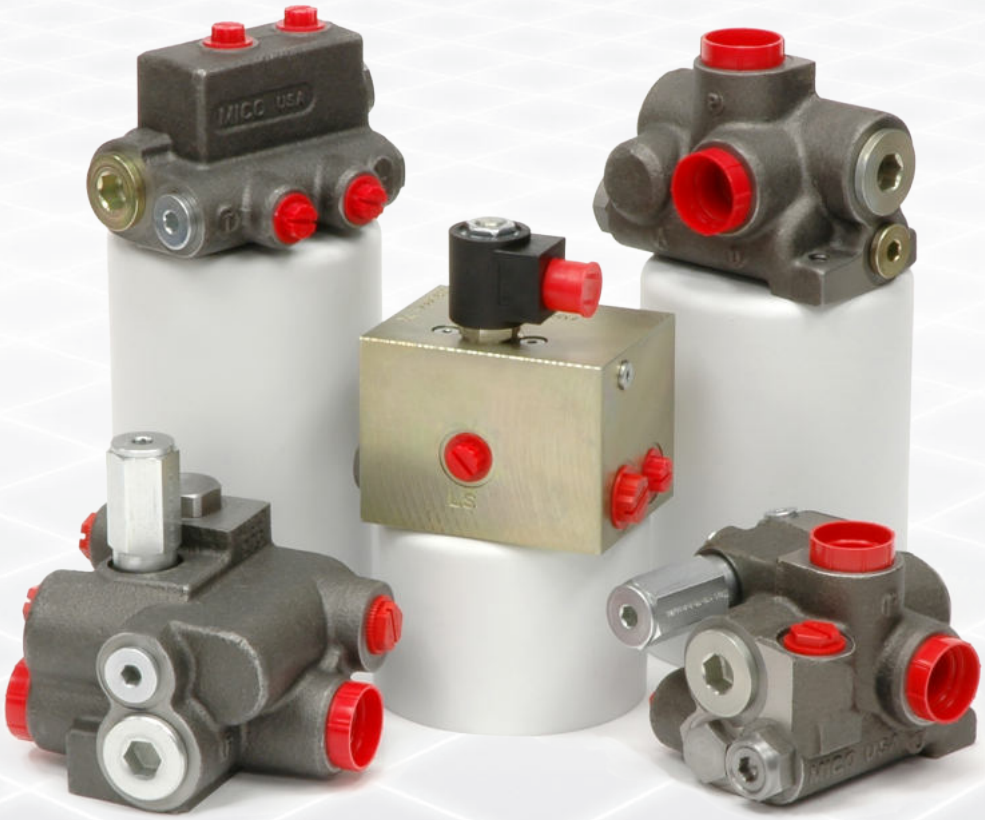
MICO®

a WABCO company

Accumulator Charging Valves

single charging valves, dual charging valves,
and load sensing charging valves



Versatile, High-performance
Accumulator Charging Valves

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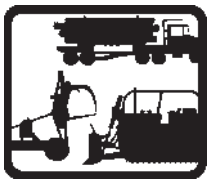
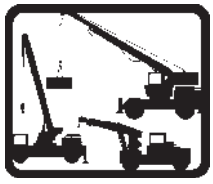


Forestry Equipment

Agricultural Equipment

Heavy Construction Equipment



Swing Drive Equipment

Mining Equipment

In-Plant & Warehouse Equipment

Airport Support Vehicles

Why choose MICO?

MICO, Inc. designs, manufactures and markets hydraulic components, controls, and brake systems primarily for off-road markets. We have manufacturing facilities in:

- North Mankato, Minnesota U.S.A.
- Ontario, California U.S.A.
- Empalme, Sonora, Mexico

Many of the world's largest off-highway OEMs value the knowledgeable staff at MICO and work with us to make their products better. Our custom-engineered products are designed with the customer requirements as the primary driver. It is our intent to help customers build their systems with our expertise in hydraulic components, braking systems and controls.

Our goal is to meet or exceed our customers' expectations in every aspect of our business.

Product lines we specialize in include:

- Actuators
- Brake Locks
- Brakes
- Controls
- Cylinders
- Electrohydraulics
- Master Cylinders
- Valves

MICO is proud to be ISO 9001 and ISO 14001 certified and continuously strive for improvement while remaining a quality leader in our field. We have been a successful business for over 60 years. Privately owned, customer driven. We look forward to working with you!

MICO®
a WABCO company

Accumulator Charging Valves

The same dependability, safety and performance that goes into every MICO Braking System Product also goes into our accumulator charging valves. This is an important consideration when you select a source of supply for your fluid power needs.

The MICO® Accumulator Charging Valves presented in this catalog are designed for vehicles that are equipped with other hydraulic power devices in either open center, closed center or load sensing hydraulic systems. This design feature eliminates the need for a separate hydraulic fluid system.

Unless specified, all valves in this catalog are used with mineral base hydraulic oil. Consult MICO when using other fluids. Dimensional drawings shown may vary slightly between similar units and are to be used for reference purposes only.

For more information regarding brake system design see Technical papers 80-950-073, 80-950-074, 80-950-098, and 80-950-102 at www.mico.com.

Complete the appropriate Application Data Sheet online, www.mico.com. The MICO, Inc. Applications Department will analyze your specifications and based on your input recommend an accumulator charging valve suitable for your requirements.

For more information about MICO® Hydraulic Brake Valves see catalog 84-466-001.

Accumulator Charging Valve Catalog Code

Product designator

ACV = Accumulator Charge Valve

Number of accumulators

S = One
D = Two

Type of actuation

M = Hydro-mechanical

Excess flow

N = Not applicable
F11 = Flow through, maximum flow rate in dekaliters/min is 11 (30 GPM)
F13 = Flow through, maximum flow rate in dekaliters/min is 13 (35 GPM)
F25 = Flow through, maximum flow rate in dekaliters/min is 25 (65 GPM)
O11 = Power beyond, maximum flow rate in dekaliters/min is 11 (30 GPM)
O13 = Power beyond, maximum flow rate in dekaliters/min is 13 (35 GPM)
O25 = Power beyond, maximum flow rate in dekaliters/min is 25 (65 GPM)

MICO defines flow through as flow that passes through the accumulator charging valve and returns to the reservoir.

MICO defines power beyond as flow that may be used to perform work at auxiliary functions.

Load sensing

Blank = Not load sensing
LS = Standard bleed down
LSB = With additional 0.4 mm diameter bleed down orifice

Relief valve

Blank = No relief valve
RV*** = Relief valve (system, full flow where *** = relief valve setting in bar) (example: RV203)

Unloading valve

Blank = No unloading valve
UL12 = Unloading valve (12 Vdc)
UL24 = Unloading valve (24 Vdc)

Low charging limit

Pressure setting - bar

High charging limit

Pressure setting - bar

Charging rate

3 L/min
4 L/min
6 L/min
8 L/min
9 L/min
10 L/min
11 L/min
13 L/min
14 L/min
15 L/min
16 L/min
17 L/min
19 L/min

Seal material

Blank = Nitrile
V = Fluorocarbon

NOTE: Not all listed code combinations are attainable.

Single Accumulator Charging Valves

PRINCIPLES OF OPERATION

These MICO® Single Accumulator Charging Valves are designed for installation in an open-center hydraulic system between the pump and its relief valve and the downstream secondary hydraulic devices; for example, a power steering control valve and cylinder installed in the same hydraulic circuit.

These single accumulator charging valves supply oil to an accumulator from an open center circuit on demand. This is accomplished at a preset rate, L/min (GPM), at a selected pressure and is constant within the preset pressure limits.

The flow to the downstream secondary hydraulic devices will be reduced when the accumulator is charging. This does not noticeably affect the operation of these components. Full system pressure is available to the downstream secondary hydraulic devices at all times provided oil delivery and pressure from the pump and relief valve are not impeded.

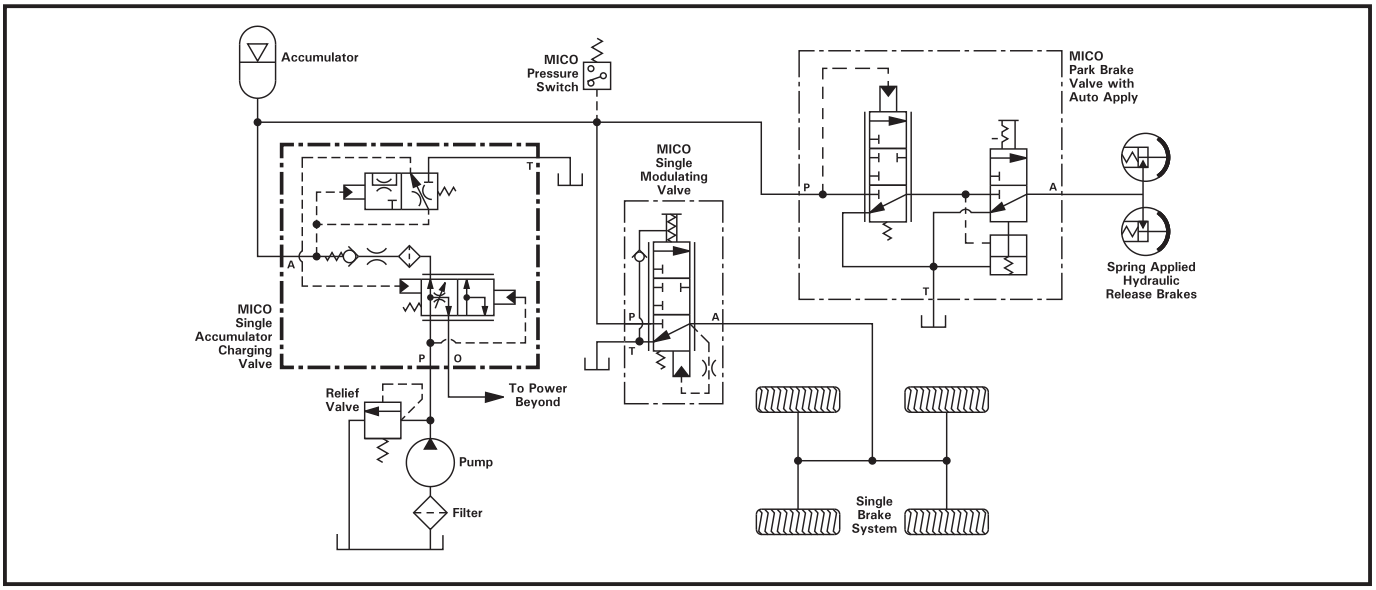
The accumulator charging flow rates and upper and lower accumulator pressure limits are set at the time of manufacture.

MICO also offers a complete line of hydraulic pressure switches for your application. Contact MICO for more information.

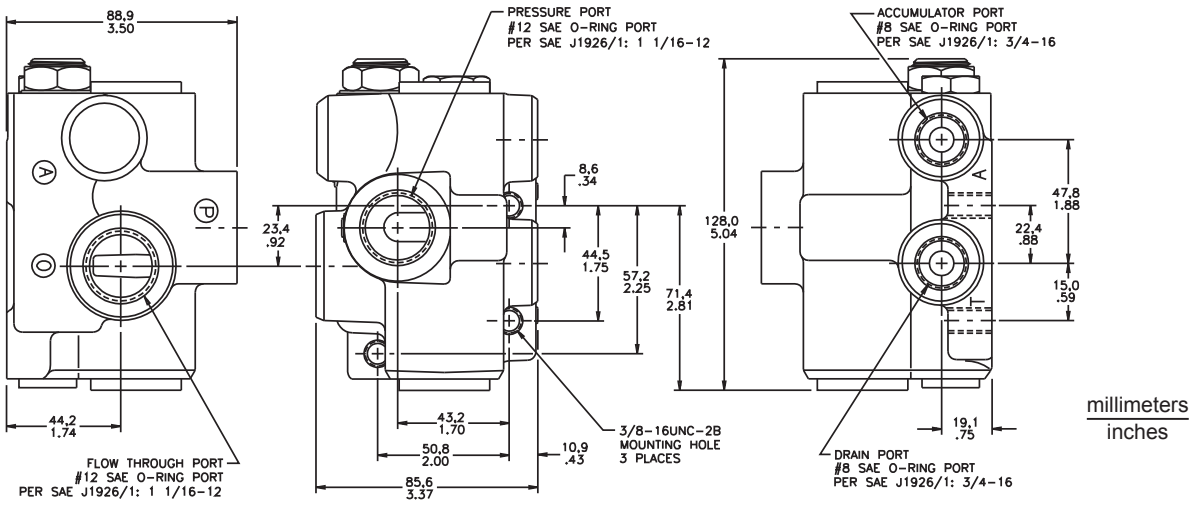
FEATURES

- Uses power developed in the main hydraulic system
- Remotely mounted from brake valves
- Snap action control section promotes positive unloading of the pump
- Designed to improve efficiency by having no continuous drain of oil to reservoir
- Large variety of pressure ranges between high and low limits are available in order to reduce pump cycle time
- Designed for mobile equipment with varying pump flows
- Flow rates to 113 L/min (30 GPM)

Typical Circuit Schematic



Typical Valve



Dimensions may vary slightly by model number.

SPECIFICATIONS

Model Number	Catalog Code (refer to page 5)	Low Limit Tolerance		High Limit Tolerance		Accumulator Charging Rate Tolerance	
		bar	(PSI)	bar	(PSI)	L/min	(GPM)
06-463-008	ACV-SMO11- 67- 95- 10	± 3.5	(± 50)	± 1.7	(± 25)	± 2.3	(± 0.6)
06-463-010	ACV-SMO11- 41- 90- 10	± 3.5	(± 50)	± 1.7	(± 25)	± 2.3	(± 0.6)
* 06-463-012	ACV-SMO11- 94-124- 6	± 2.6	(± 37)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-014	ACV-SMO11- 55- 76- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-016	ACV-SMO11- 83-103- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-018	ACV-SMO11-145-190- 10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-020	ACV-SMO11-128-159- 10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-022	ACV-SMO11-155-186- 10	± 3.5	(± 25)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-024	ACV-SMO11-103-128- 10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-026	ACV-SMO11-103-138- 3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-028	ACV-SMO11- 94-124- 10	± 2.6	(± 37)	± 3.5	(± 50)	± 1.9	(± 0.5)
* 06-463-030	ACV-SMO11- 55- 76- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
* 06-463-032	ACV-SMO11-103-128- 10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-034	ACV-SMO11-124-152- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-036	ACV-SMO11-114-138- 17	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-038	ACV-SMO11- 86-124- 3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-040	ACV-SMO11-114-138- 10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-044	ACV-SMO11- 86-124- 4	± 3.5	(± 50)	± 3.5	(± 50)	± 1.1	(± 0.3)
06-463-048	ACV-SMO11-103-138- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-050	ACV-SMO11-117-145- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
* 06-463-052	ACV-SMO11-114-138- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-054	ACV-SMO11- 72-103- 3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-056	ACV-SMO11- 93-124- 3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-058	ACV-SMO11-114-138- 3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-060	ACV-SMO11- 45- 60- 3	± 1.7	(± 25)	± 1.7	(± 25)	± 0.1	(± 0.25)
06-463-064	ACV-SMO11-128-159- 3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-066	ACV-SMO11- 48- 90- 6	± 3.5	(± 50)	± 1.7	(± 25)	± 1.9	(± 0.5)
06-463-078	ACV-SMO11-116-159- 10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)

* Water emulsion models

Consult MICO Applications Department for other available models and application detail.

PERFORMANCE DATA

System pressure . . . . . to 206.8 bar (3000 PSI)
Power beyond flow capacity . . . . . 7.5 to 113 L/min (2 to 30 GPM)
Flow through pressure drop. . . . . 4.8 bar at 56.8 L/min (70 PSI at 15 GPM)
Accumulator capacity is determined from brake line pressure, displacement and number of power-off emergency brake applications.

Dual Accumulator Charging Valves

PRINCIPLES OF OPERATION

These MICO® Dual Accumulator Charging Valves perform essentially the same functions as the single charging valves. When the dual accumulator charging valves are used in a split hydraulic brake system each individual axle is separately controlled. These dual charging valves charge both accumulators. The primary advantage of dual charging valves are that if half of the brake system fails the remaining half will continue to function.

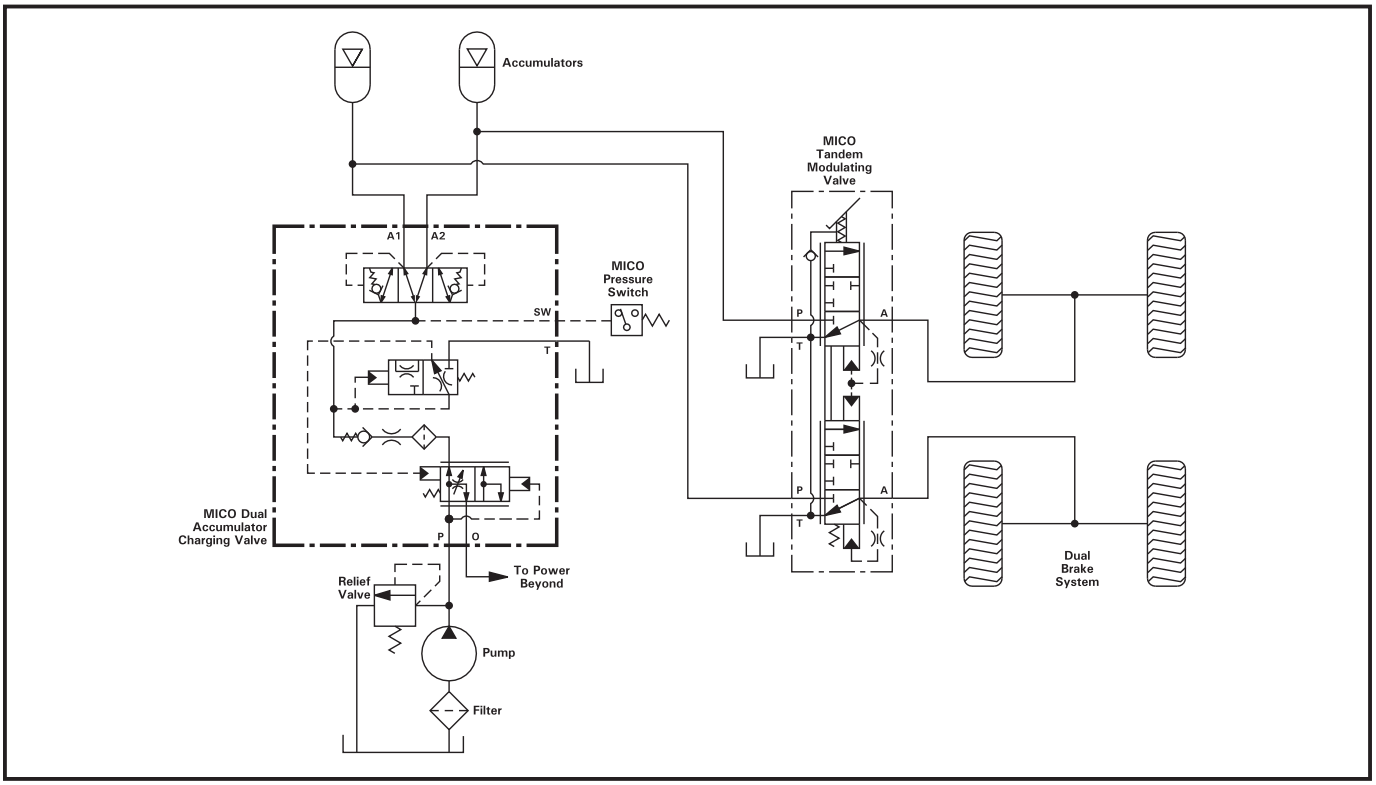
These dual charging valves charge the accumulators from the open center circuit upon demand and within its preset operating charge rate and maximum pressure. Other charge rates and pressures are available upon request.

MICO also offers a complete line of hydraulic pressure switches for your application. Contact MICO for more information.

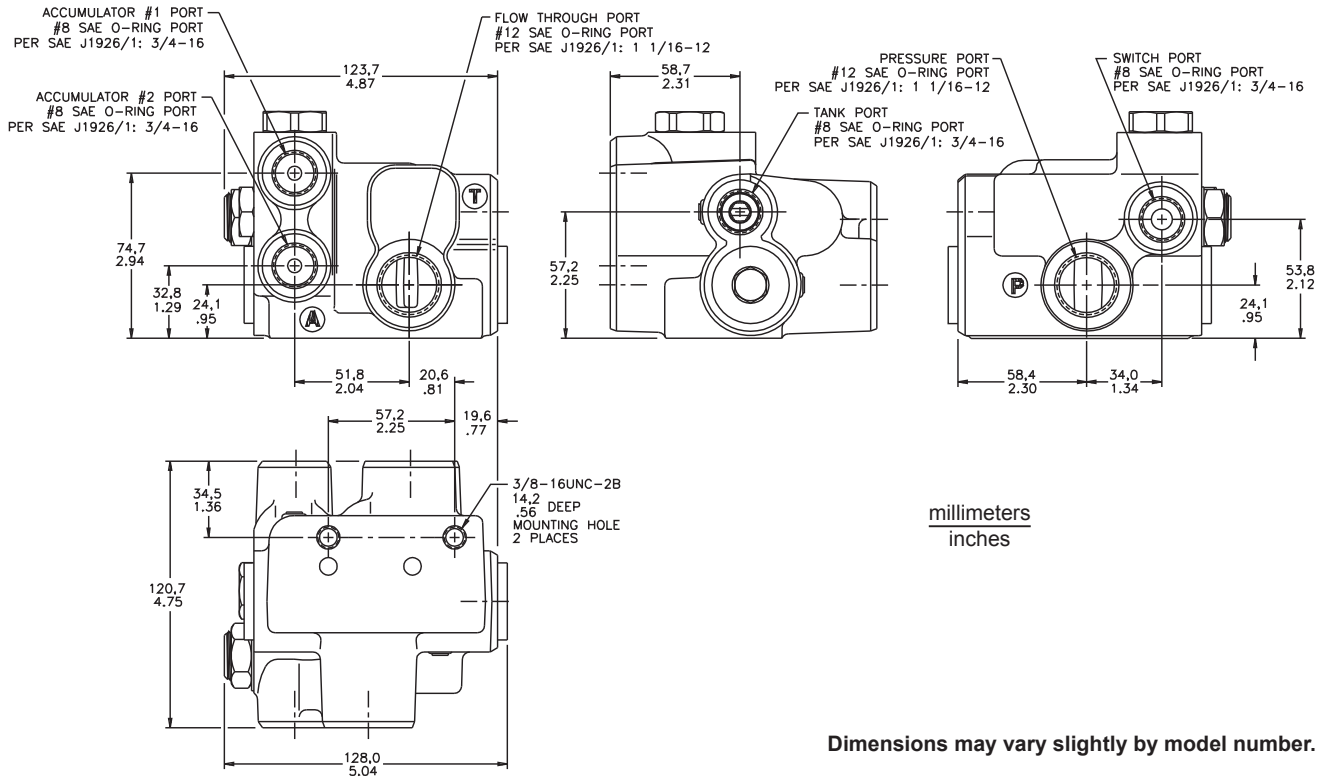
FEATURES

- Uses power developed in the main hydraulic system
- Remotely mounted from brake valves
- Snap action control section promotes positive unloading of the pump
- Designed to improve efficiency by having no continuous drain of oil to reservoir
- Large variety of pressure ranges between high and low limits are available in order to reduce pump cycle time
- Designed for mobile equipment with varying pump flows
- Pressure switch port senses the lower pressure of the two accumulators
- Flow rates to 113 L/min (30 GPM)

Typical Circuit Schematic



Typical Valve



SPECIFICATIONS

Model Number	Catalog Code (refer to page 5)	Low Limit Tolerance		High Limit Tolerance		Accumulator Charging Rate Tolerance	
		bar	(PSI)	bar	(PSI)	L/min	(GPM)
06-463-200	ACV-DMO11-128-159-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-202	ACV-DMO11-155-190-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-204	ACV-DMO11-114-138-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-206	ACV-DMO11-86-124-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-208	ACV-DMO11-117-145-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-210	ACV-DMO11-103-128-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-212	ACV-DMO11-86-103-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-214	ACV-DMO11-64-83-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-216	ACV-DMO11-93-114-3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-218	ACV-DMO11-95-124-6	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-222	ACV-DMO11-148-179-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-224	ACV-DMO11-138-166-6V	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-226	ACV-DMO11-86-103-3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-228	ACV-DMO11-145-179-3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-230	ACV-DMO11-114-138-6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-234	ACV-DMO11-138-166-6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-250	ACV-DMO11-148-179-10V	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)

Consult MICO Applications Department for other available models and application detail.

PERFORMANCE DATA

System pressure . . . . . to 206.8 bar (3000 PSI)
Power beyond flow capacity . . . . . 7.5 to 113 L/min (2 to 30 GPM)
Flow through pressure drop. . . . . 4.8 bar at 56.8 L/min (70 PSI at 15 GPM)
Accumulator capacity is determined from brake line pressure, displacement and number of power-off emergency brake applications.

Single Accumulator Charging Valves with Relief Valve

PRINCIPLES OF OPERATION

The MICO® Single Accumulator Charging Valves with Relief Valve incorporate a main system relief valve. This valve was developed for installation in an open center hydraulic system between the pump and the down-stream
secondary hydraulic devices; for example, a power steering control valve and cylinder installed in the same hydraulic circuit.

These valves supply oil to the system accumulator from an open center circuit on demand. This is accomplished at a preset rate L/min (GPM) at a selected pressure and is relatively constant within the preset pressure limits.

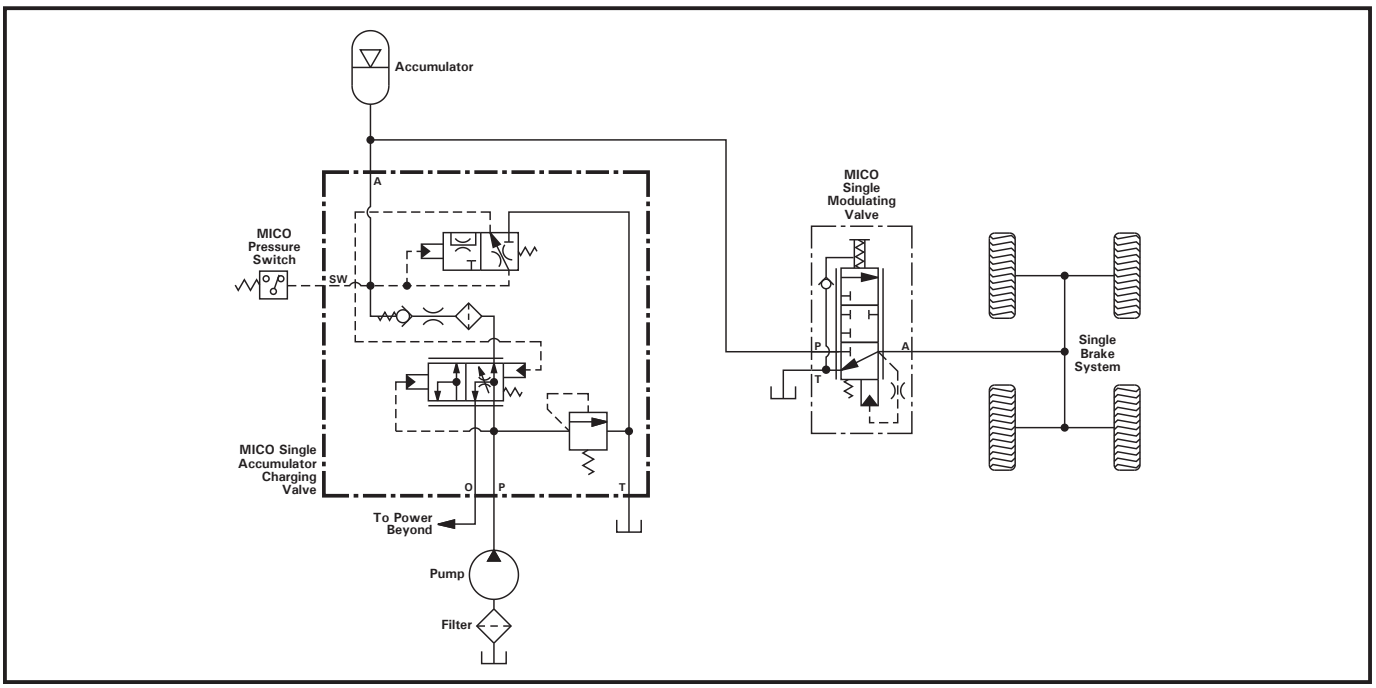
The flow to the downstream secondary hydraulic devices will be reduced when the accumulator is charging. This does not noticeably affect the operation of these components. Full system pressure is available to the downstream secondary hydraulic devices at all times provided oil delivery and pressure from the pump is not impeded. Maximum system pressure is set by an integral relief valve.

MICO also offers a complete line of hydraulic pressure switches for your application. Contact MICO for more information

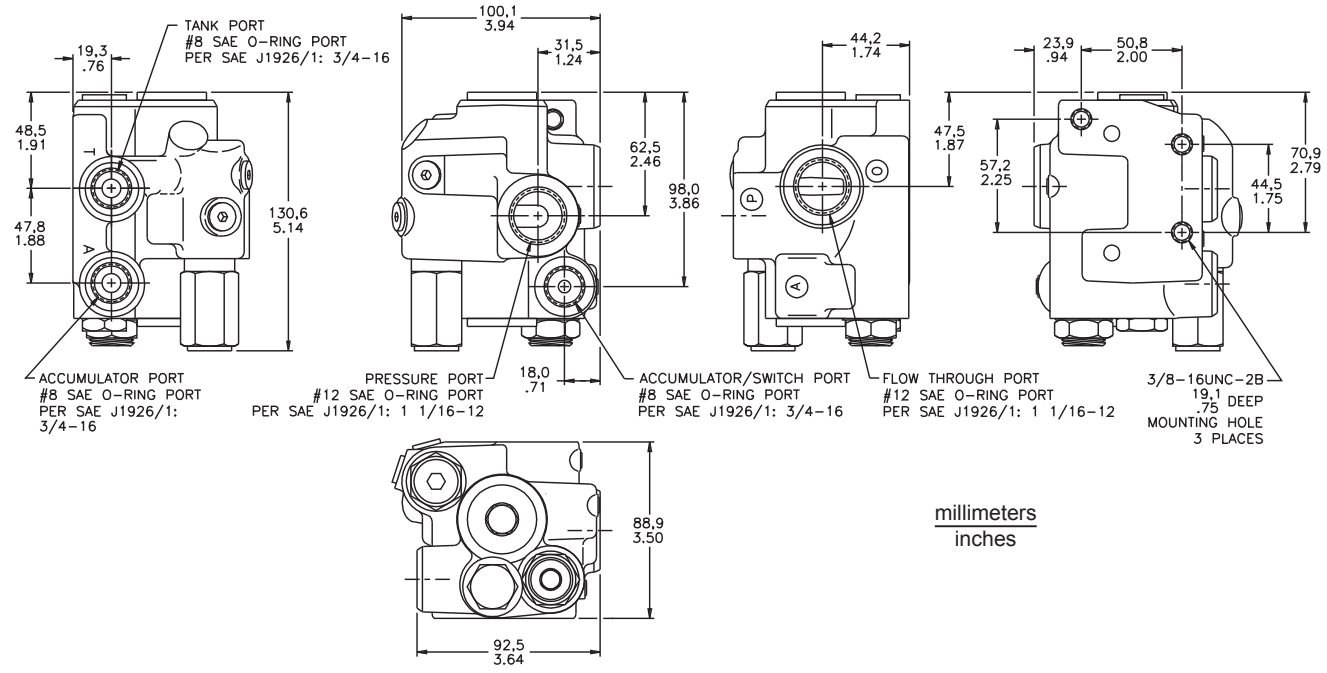
FEATURES

- Incorporated pump relief valve
- Direct acting relief valve for reliability and fast action
- Uses power developed in the main hydraulic system
- Remotely mounted from brake valves
- Snap action control section promotes positive unloading of the pump
- Designed to improve efficiency by having no continuous drain of oil to reservoir
- Large variety of pressure ranges between high and low limits are available in order to reduce pump cycle time
- Designed for mobile equipment with varying pump flows

Typical Circuit Schematic



Typical Valve



Dimensions may vary slightly by model number.

SPECIFICATIONS

Model Number	Catalog Code (refer to page 5)	Low Limit Tolerance		High Limit Tolerance		Accumulator Charging Rate Tolerance		Relief Valve Setting Tolerance	
		bar	(PSI)	bar	(PSI)	L/min	(GPM)	bar	(PSI)
06-463-302	ACV-SMO11 - RV172 - 86 -124- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-304	ACV-SMO11 - RV190 - 86 -124- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-306	ACV-SMO11 - RV138 - 83 -103- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-308	ACV-SMO11 - RV172 -103-138-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-312	ACV-SMO11 - RV203 -153-186-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-314	ACV-SMO11 - RV203 -128-159- 6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-318	ACV-SMO11 - RV203 -128-159-17	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-320	ACV-SMO11 - RV121 - 86 -107- 3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)	± 3.5	(± 50)
06-463-324	ACV-SMO11 - RV172 -128-159- 3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)	± 3.5	(± 50)
06-463-328	ACV-SMO11 - RV172 -110-134-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)

Consult MICO Applications Department for other available models and application detail.

PERFORMANCE DATA

System pressure . . . . . to 206.8 bar (3000 PSI)
Power beyond flow capacity . . . . . 7.5 to 113 L/min (2 to 30 GPM)
Flow through pressure drop. . . . . 4.8 bar at 56.8 L/min (70 PSI at 15 GPM)
Relief valve flow capacity . . . . . 76 L/min (20 GPM)
Relief valve setting . . . . . 206.8 bar (3000 PSI) maximum
Accumulator capacity is determined from brake line pressure, displacement and number of power-off emergency brake applications.

Dual Accumulator Charging Valves with Relief Valve

PRINCIPLES OF OPERATION

The MICO® Dual Accumulator Charging Valves with Relief Valve incorporate a main system relief valve. This valve was developed for installation in an open center hydraulic system between the pump and downstream secondary hydraulic devices; for example, a power steering control valve and cylinder installed in the same hydraulic circuit.

These valves supply oil to the system accumulators from an open center circuit on demand. This is accomplished at a preset flow rate and is constant within the preset pressure limits.

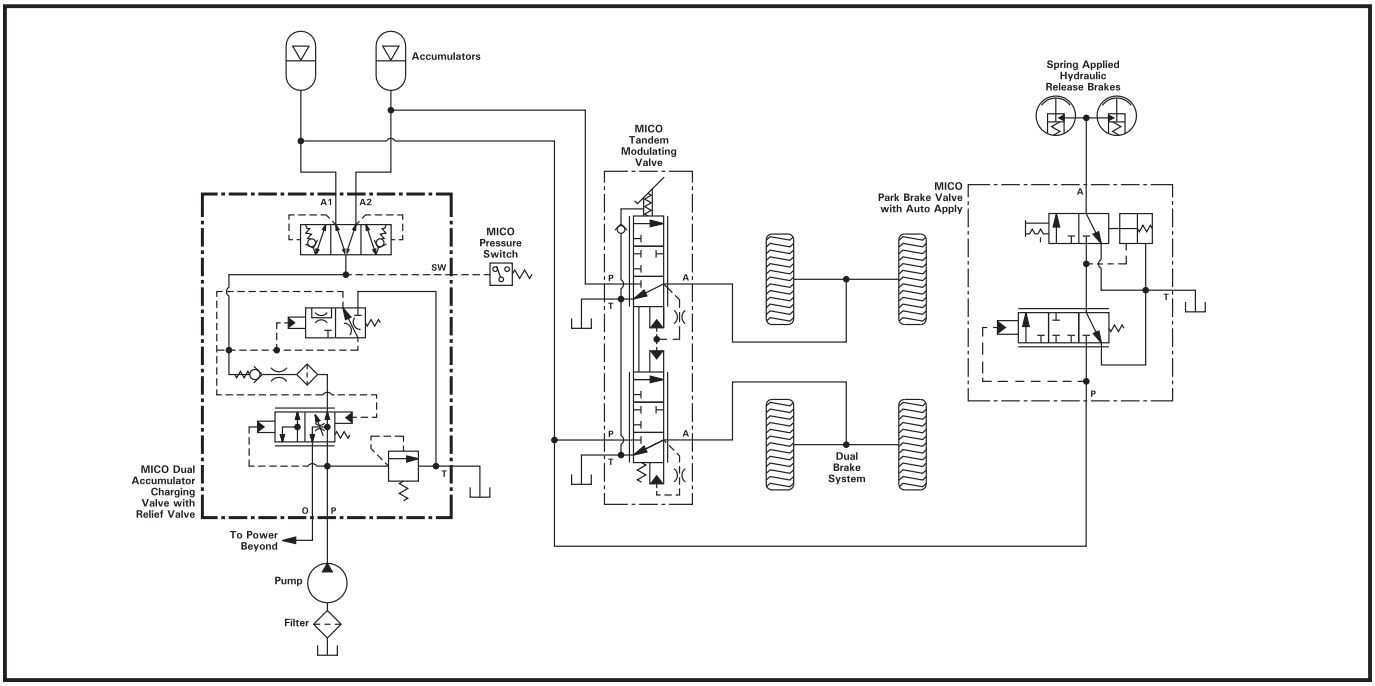
The flow to downstream secondary hydraulic devices will be reduced for a short time when the accumulator is charging. This does not noticeably affect the operation of these components. Full system pressure is available to the downstream secondary hydraulic devices at all times provided oil delivery and pressure from the pump is not impeded. Maximum system pressure is set by an integral relief valve.

MICO also offers a complete line of hydraulic pressure switches for your application. Contact MICO for more information.

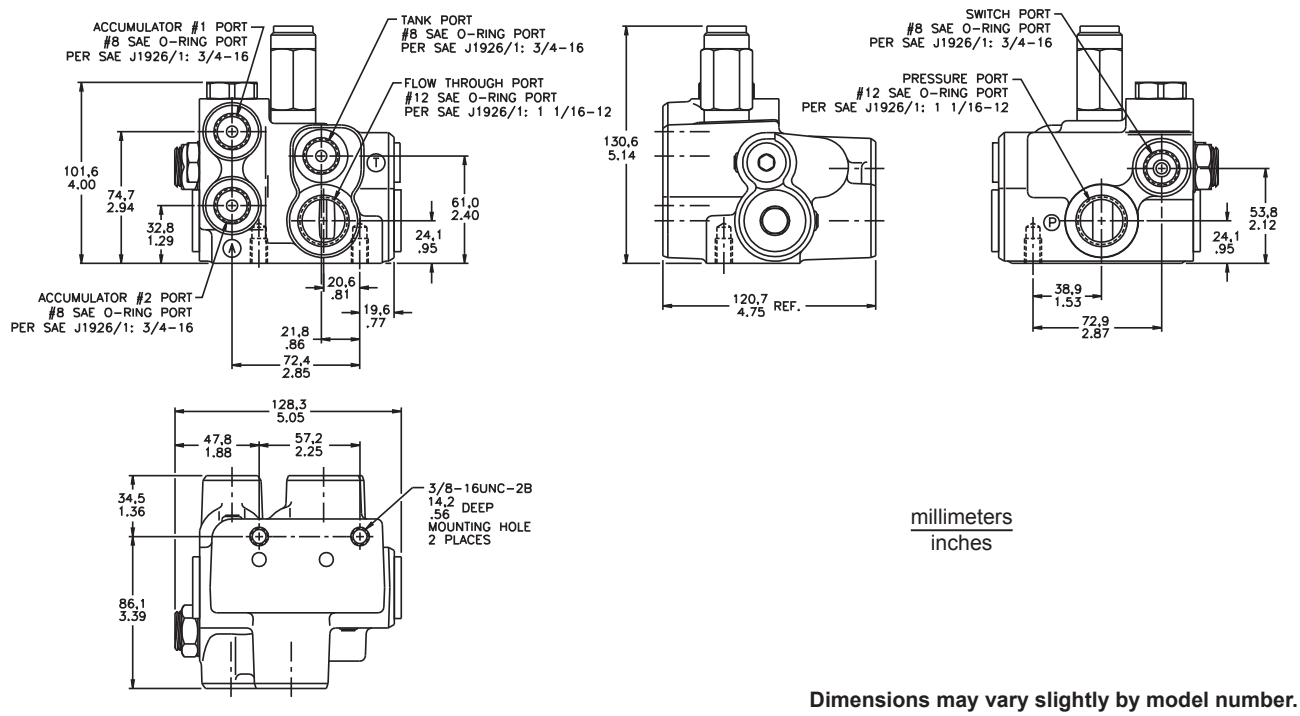
FEATURES

- Incorporated pump relief valve
- Pilot operated relief valve for reliability and fast action
- Uses power developed in the main hydraulic system
- Remotely mounted from brake valves
- Snap action control section promotes positive unloading of the pump
- Designed to improve efficiency by having no continuous drain of oil to reservoir
- Large variety of pressure ranges between high and low limits are available in order to reduce pump cycle time
- Designed for mobile equipment with varying pump flows
- Flow rates to 113 L/min (30 GPM)

Typical Circuit Schematic



Typical Valve



Dimensions may vary slightly by model number.

SPECIFICATIONS

Model Number	Catalog Code (refer to page 5)	Low Limit Tolerance		High Limit Tolerance		Accumulator Charging Rate Tolerance		Relief Valve Setting Tolerance	
		bar	(PSI)	bar	(PSI)	L/min	(GPM)	bar	(PSI)
06-463-415	ACV-DMO11-RV138- 86 -103-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-424	ACV-DMO11-RV203-155- 18 -10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-425	ACV-DMO11-RV203-147-176-14	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-426	ACV-DMO11-RV202-150-181- 3	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)	± 3.5	(± 50)
06-463-432	ACV-DMO11-RV172-126-155-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-434	ACV-DMO11-RV145-103-128-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)
06-463-440	ACV-DMO11-RV210-138-193-19	± 3.5	(± 50)	± 3.5	(± 50)	± 3.8	(± 1.0)	± 3.5	(± 50)
06-463-496	ACV-DMO11-RV207-140-189-10	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)	± 3.5	(± 50)

Consult MICO Applications Department for other available models and application detail.

PERFORMANCE DATA

System pressure (unless otherwise indicated) . . . . . to 206.8 bar (3000 PSI)
Power beyond flow capacity . . . . . 7.5 to 113 L/min (2 to 30 GPM)
Flow through pressure drop. . . . . 4.8 bar at 56.8 L/min (70 PSI at 15 GPM)
Accumulator capacity is determined from brake line pressure, displacement and number of power-off emergency brake applications.

Load Sensing Accumulator Charging Valves (single)

PRINCIPLES OF OPERATION

The MICO® Load Sensing Accumulator Charging Valves operate in a flow and pressure-on-demand system. The control section of these valves send a pilot signal to a pressure compensated load sense pump when fluid is required. It maintains reserve volume and pressure in the accumulator, allowing the pump to stand by when there is no demand for fluid.

These charging valves are normally used in single systems in conjunction with one accumulator and single brake valve.

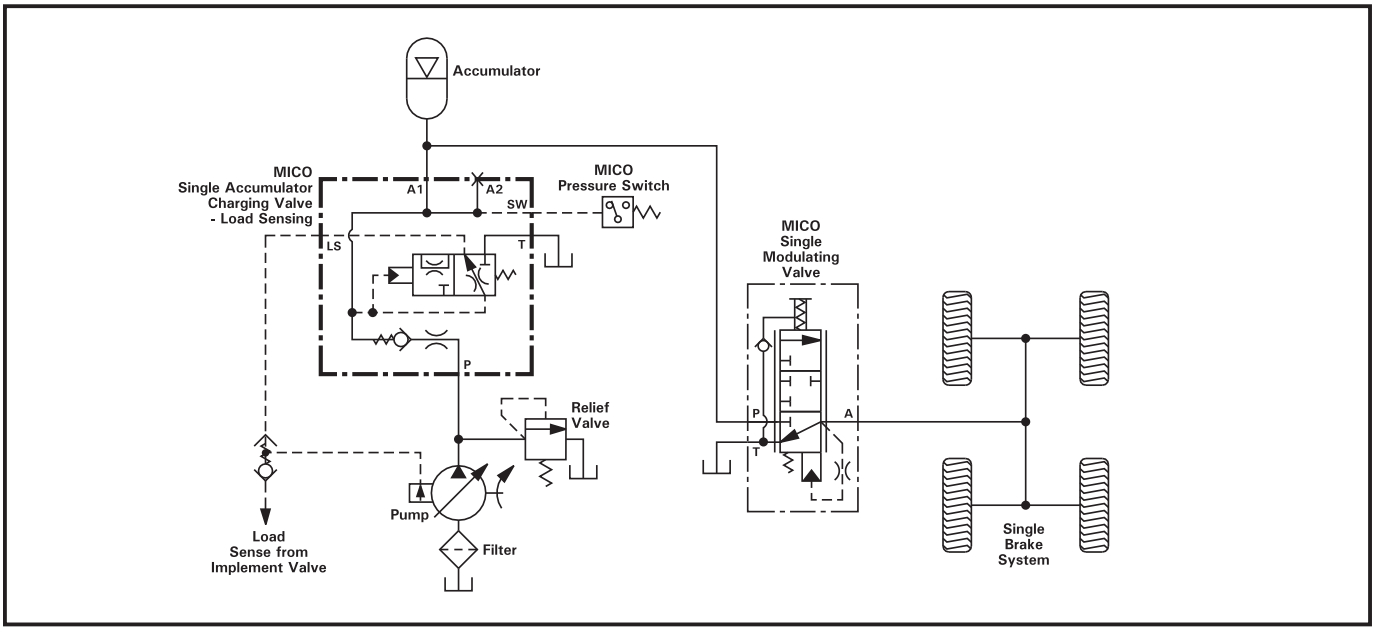
The charge rate and upper and lower accumulator pressure limits are set at the time of manufacture. Various charge rates, high and low limit settings and pressure ranges between high and low limits are available to conform to specific customer requirements.

MICO also offers a complete line of hydraulic pressure switches for your application. Contact MICO for more information.

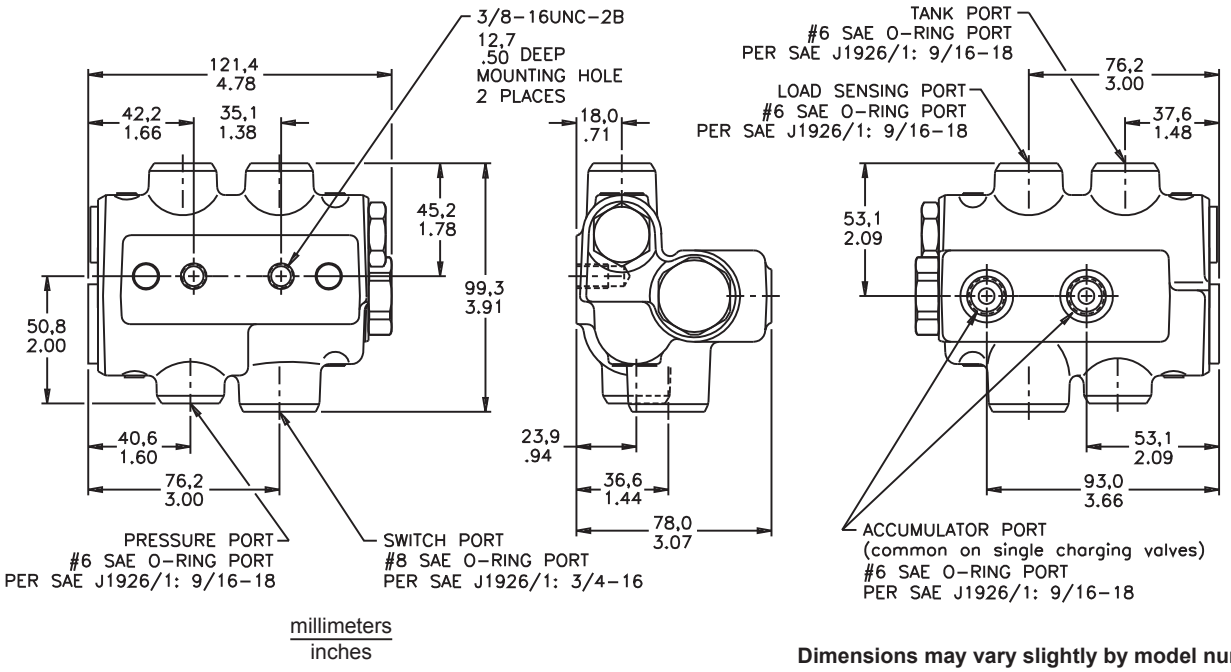
FEATURES

- Uses power developed in the main hydraulic system
- Remotely mounted from brake valves
- Snap action control section promotes positive unloading of the pump
- Designed to improve efficiency by having no continuous drain of oil to reservoir
- Large variety of pressure ranges between high and low limits are available in order to reduce pump cycle time

Typical Circuit Schematic (Single)



Typical Valve



Dimensions may vary slightly by model number.

SPECIFICATIONS

Model Number	Catalog Code (refer to page 5)	Low Limit Tolerance		High Limit Tolerance		Accumulator Charging Rate Tolerance	
		bar	(PSI)	bar	(PSI)	L/min	(GPM)
06-463-102	ACV-SMN-LSB-74-107-6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-106	ACV-SMN-LSB-104-129-10	± 2.6	(± 37)	± 1.7	(± 25)	± 1.9	(± 0.5)
06-463-108	ACV-SMN-LSB-117-159-11	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-110	ACV-SMN-LSB-116-141-11	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-112	ACV-SMN-LSB-117-159-15	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-114	ACV-SMN-LSB-93-114-11	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-116	ACV-SMN-LSB-83-103-6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-136	ACV-SMN-LS-128-166-15	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-158	ACV-SMN-LSB-153-186-11	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)

Consult MICO Applications Department for other available models and application detail.

NOTE: Model numbers with LSB catalog code designation are designed for use in load sense systems with pumps that do not have a bleed down orifice.

PERFORMANCE DATA

System pressure . . . . . to 206.8 bar (3000 PSI)
Flow through capacity . . . . . not applicable
Flow through pressure drop. . . . . not applicable
Accumulator capacity is determined from brake line pressure, displacement and number of power-off emergency brake applications.

Load Sensing Accumulator Charging Valves (dual)

PRINCIPLES OF OPERATION

The MICO® Load Sensing Accumulator Charging Valves operate in a flow and pressure-on-demand system. The control section of these valves send a pilot signal to a pressure compensated load sense pump when fluid is required. It maintains reserve volume and pressure in the accumulators, allowing the pump to stand by when there is no demand for fluid.

These charging valves are used in split systems with two or more accumulators and a tandem or dual brake valve.

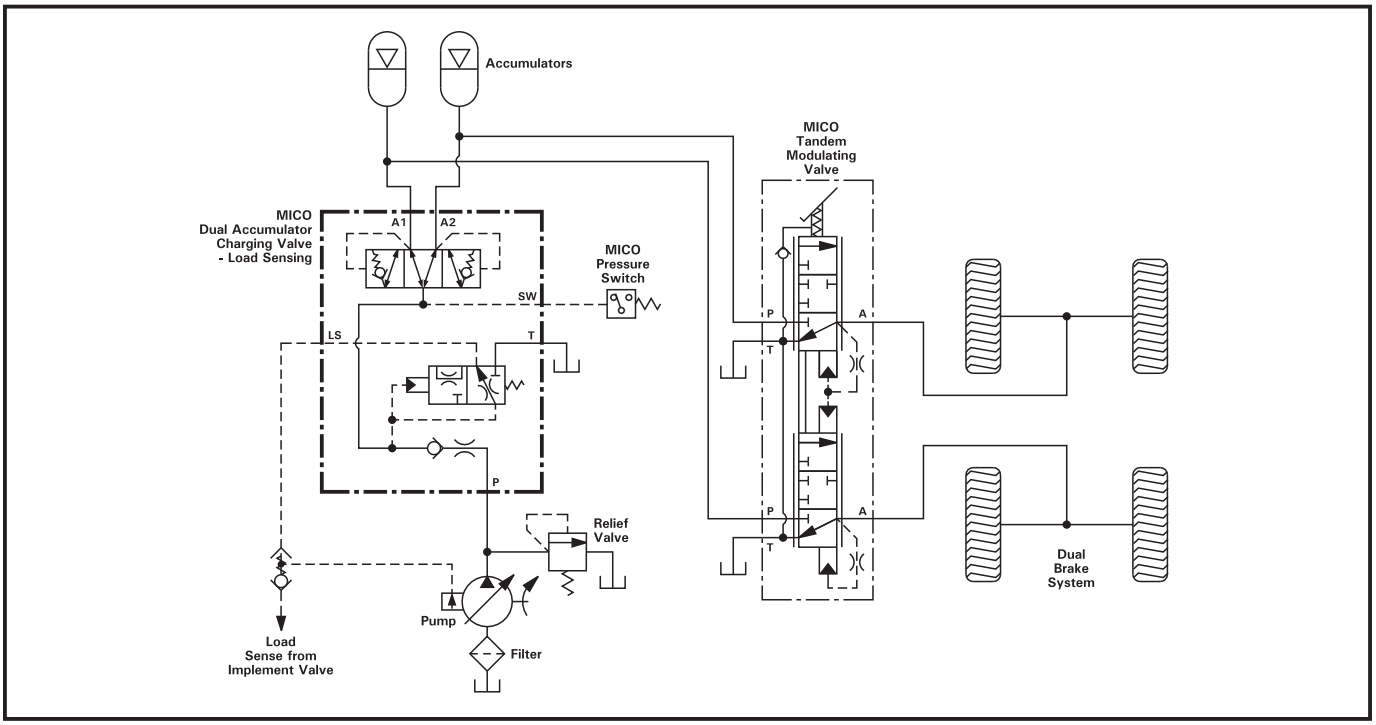
The charge rate and upper and lower accumulator pressure limits are set at the time of manufacture. Various charge rates, high and low limit settings and pressure ranges between high and low limits are available to conform to specific customer requirements.

MICO also offers a complete line of hydraulic pressure switches for your application. Contact MICO for more information.

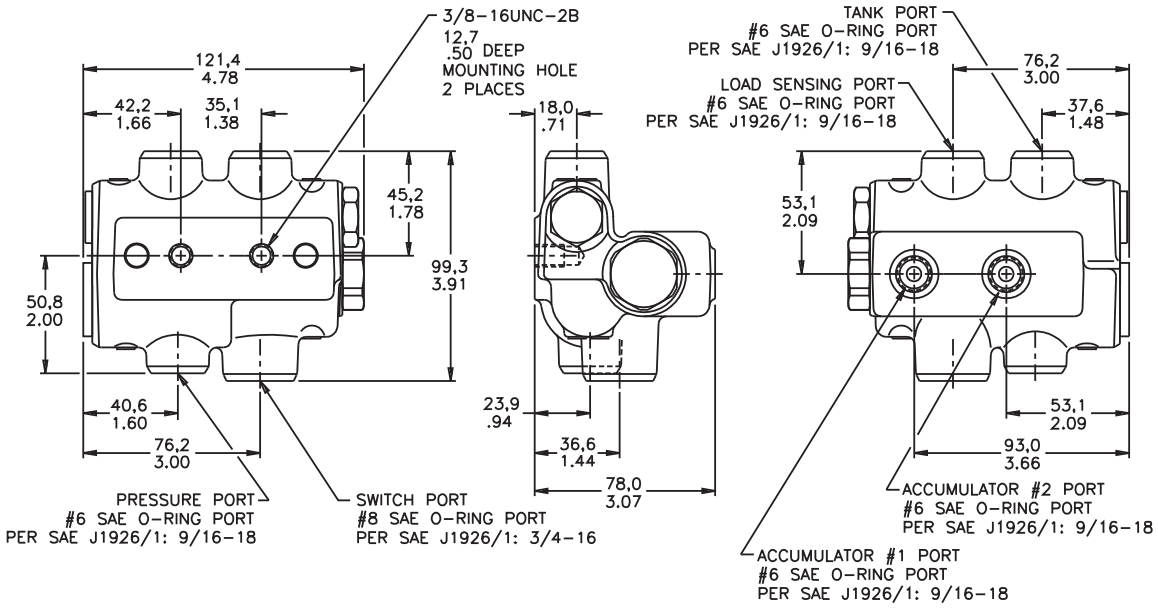
FEATURES

- Uses power developed in the main hydraulic system
- Remotely mounted from brake valves
- Snap action control section promotes positive unloading of the pump
- Designed to improve efficiency by having no continuous drain of oil to reservoir
- Large variety of pressure ranges between high and low limits are available in order to reduce pump cycle time
- Pressure switch port senses the lower pressure of the two accumulators

Typical Circuit Schematic (Dual)



Typical Valve



millimeters
inches

Dimensions may vary slightly by model number.

SPECIFICATIONS

Model Number	Catalog Code (refer to page 5)	Low Limit Tolerance		High Limit Tolerance		Accumulator Charging Rate Tolerance	
		bar	(PSI)	bar	(PSI)	L/min	(GPM)
06-463-100	ACV-DMN-LSB-55-78-6	± 3.5	(± 50)	± 1.7	(± 25)	± 1.9	(± 0.5)
06-463-118	ACV-DMN-LS-128-159-6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-122	ACV-DMN-LSB-119-145-11V	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-124	ACV-DMN-LS-97-172-8V	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-126	ACV-DMN-LS-86-114-6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-128	ACV-DMN-LS-155-190-16	± 3.5	(± 50)	± 3.5	(± 50)	± 2.8	(± 0.75)
06-463-148	ACV-DMN-LSB-86-114-8	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-156	ACV-DMN-LS-128-159-13	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-162	ACV-DMN-LS-145-176-13	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-164	ACV-DMN-LSB-128-159-13	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-166	ACV-DMN-LSB-166-186-6	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-184	ACV-DMN-LSB-128-159-13	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)

Consult MICO Applications Department for other available models and application detail.

PERFORMANCE DATA

System pressure . . . . . to 206.8 bar (3000 PSI)
Flow through capacity . . . . . not applicable
Flow through pressure drop. . . . . not applicable
Accumulator capacity is determined from brake line pressure, displacement and number of power-off emergency brake applications.

Load Sensing Accumulator Charging Valves with Load Sense Unloading

PRINCIPLES OF OPERATION

These are load sensing accumulator charging valves with an integral solenoid valve to disable the load sensing signal when energized. These high-pressure charging valves operate in a flow and pressure on demand system.

The control section of these valves send a pilot signal to a load sense pump when fluid is required. They maintain and isolate hydraulic energy in two separate accumulators allowing the pump to standby when there is no demand for fluid.

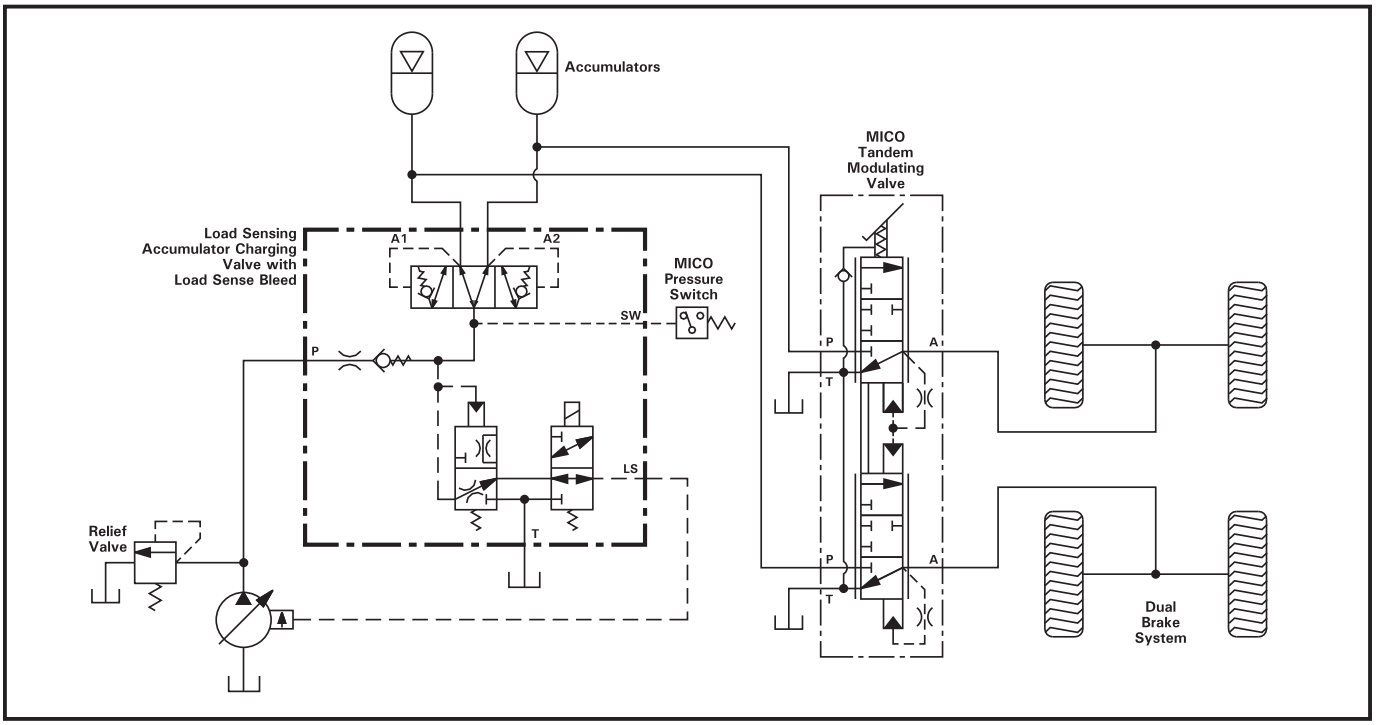
These charging valves feature a solenoid-operated valve that can be used to unload the pilot signal from the charging valve to the pump at startup.

Typical applications would include off-highway vehicles with split braking systems that have two or more accumulators and a tandem or dual full power brake valve. The load sense-unloading feature is for vehicles that require startup at low hydraulic load such as vehicles that operate in cold climates.

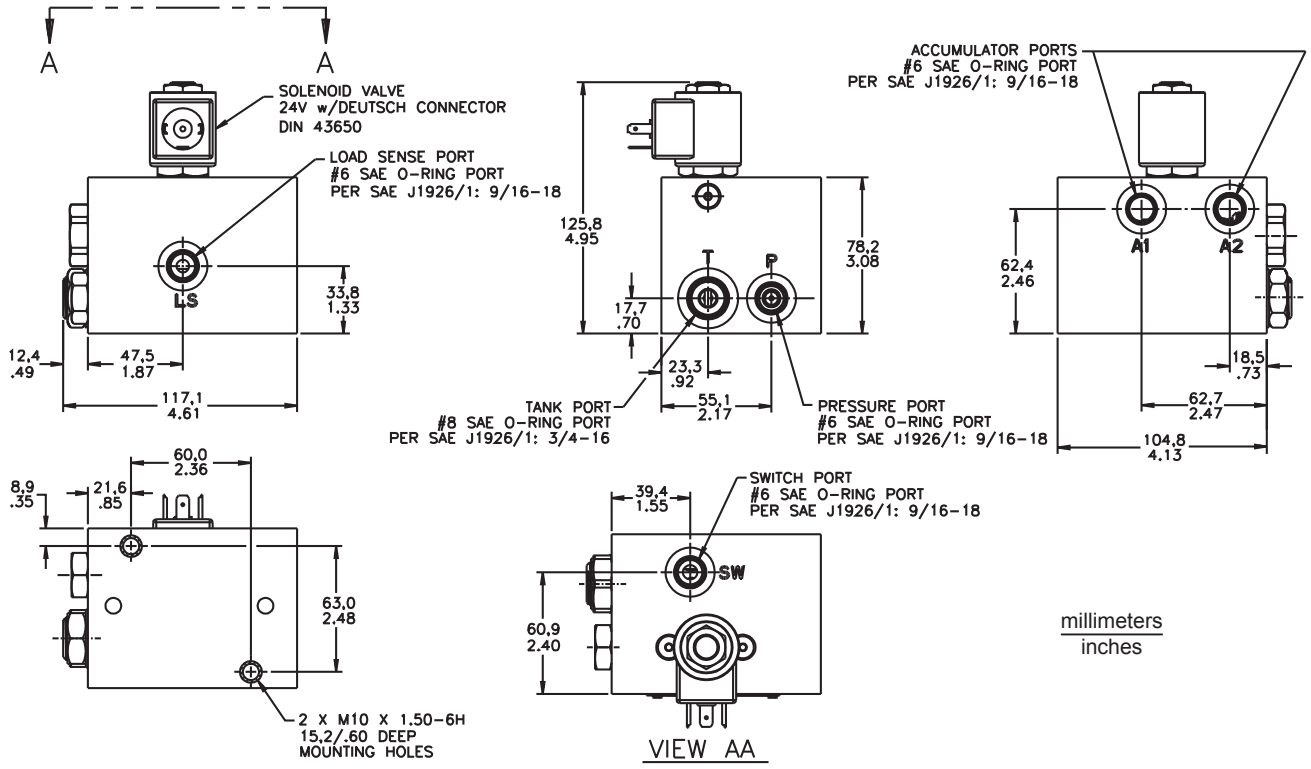
FEATURES

- Solenoid feature allows machine to be started without immediately charging accumulators
- Solenoid feature is desirable in cold start conditions and marginal horsepower applications
- Solenoid valve could be controlled by a timer, ignition switch, or computer system
- If solenoid stays on, accumulators will not charge
- Contact MICO for single accumulator charging valve design

Typical Circuit Schematic



Typical Valve



Dimensions may vary slightly by model number.

SPECIFICATIONS

Model Number	Catalog Code (refer to page 5)	Low Limit Tolerance		High Limit Tolerance		Accumulator Charging Rate Tolerance	
		bar	(PSI)	bar	(PSI)	L/min	(GPM)
06-463-132	ACV-DMN-LS-UL24-134-166-6V	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-134	ACV-DMN-LS-UL24-97-172-8V	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-140	ACV-DMN-LS-UL24-120-160-6V	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
06-463-142	ACV-DMN-LS-UL24-103-128-3V	± 3.5	(± 50)	± 3.5	(± 50)	± 0.1	(± 0.25)
06-463-146	ACV-DMN-LS-UL24-103-128-9V	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)
* 06-463-150	ACV-DMN-LS-UL24-120-160-6V	± 3.5	(± 50)	± 3.5	(± 50)	± 1.9	(± 0.5)

* System pressure to 250 bar (3625 PSI)

Consult MICO Applications Department for other available models and application detail.

PERFORMANCE DATA

System pressure . . . . . to 206.8 bar (3000 PSI)
Flow through capacity . . . . . not applicable
Flow through pressure drop. . . . . not applicable
Accumulator capacity is determined from brake line pressure, displacement and number of power-off emergency brake applications.

Single Accumulator Charging Valves (high flow)

PRINCIPLES OF OPERATION

The MICO® Single Accumulator Charging Valves may be used in an open center hydraulic system in conjunction with an accumulator and a MICO® Modulating Valve or other hydraulic components.

These charging valves control the charging rate of the accumulator and the pressure of the fluid in the accumulator. These valves automatically halt the charging when the accumulator pressure reaches its high limit.

When the accumulator pressure reaches its low limit, these charging valves divert a small amount of fluid from the main open center hydraulic system to charge the accumulator.

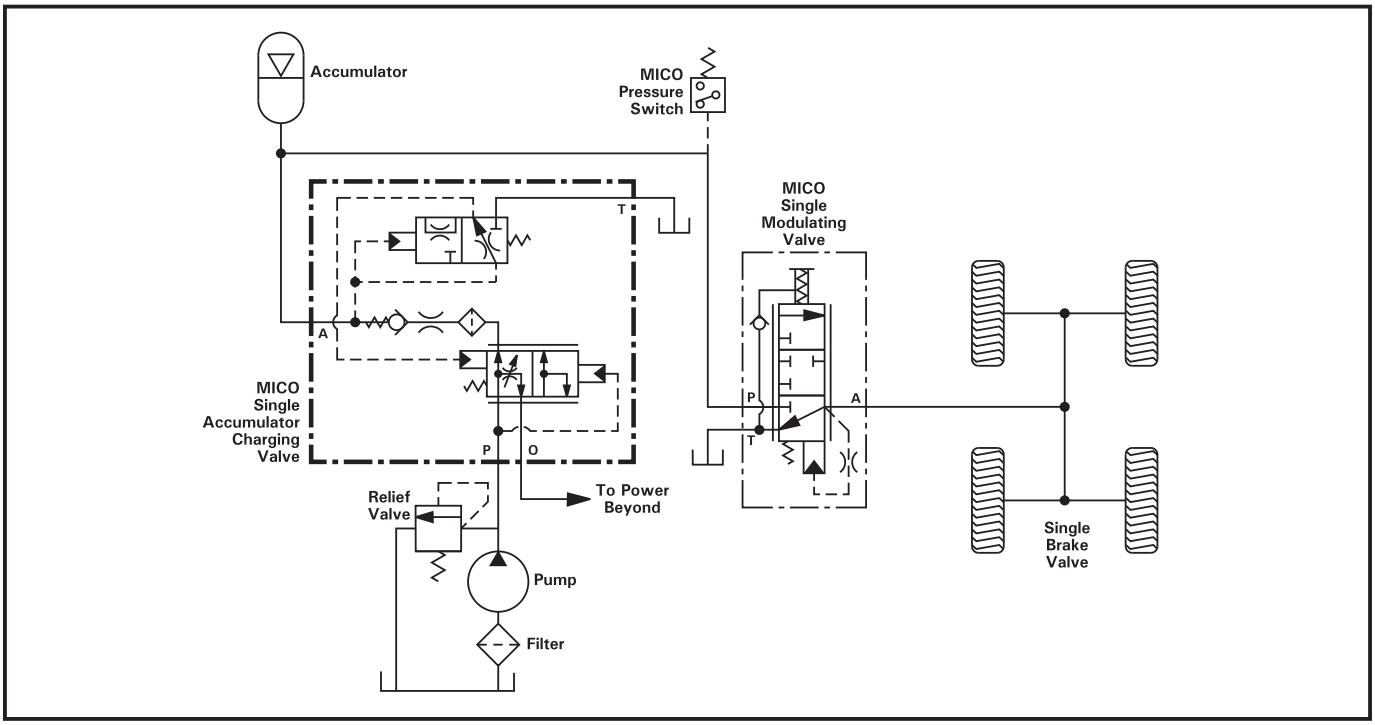
These valves charge the accumulator from the open center circuit upon demand and within its preset operating charge rate and maximum pressure. Other charge rates and pressures are available upon request.

MICO also offers a complete line of hydraulic pressure switches for your application. Contact MICO for more information.

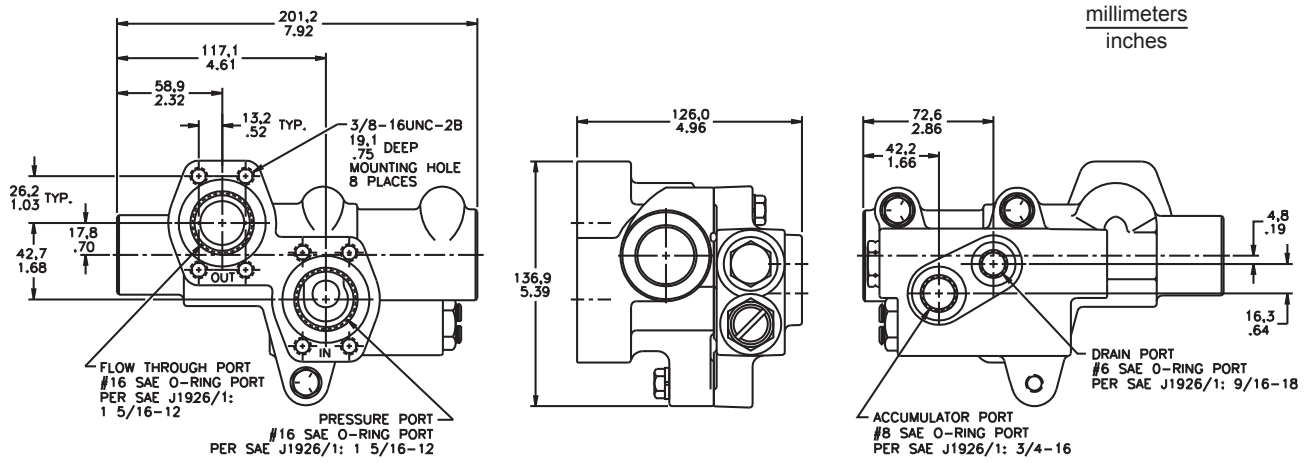
FEATURES

- Uses power developed in the main hydraulic system
- May be remotely mounted from brake valves
- Settings are adjusted at the time of manufacture to conform to specific customer requirements
- Flow rates up to 246 L/min (65 GPM)

Typical Circuit Schematic



Typical Valve



Dimensions may vary slightly by model number.

SPECIFICATIONS

Model Number	Catalog Code (refer to page 5)	Low Limit Tolerance		High Limit Tolerance		Accumulator Charging Rate Tolerance	
		bar	(PSI)	bar	(PSI)	L/min	(GPM)
* 06-460-202	ACV-SMO25-148-178-10	± 3.5	(± 50)	± 1.7	(± 25)	± 2.3	(± 0.6)
06-460-210	ACV-SMO13-117-145 3	± 3.5	(± 50)	± 1.7	(± 25)	± 0.1	(± 0.25)
06-460-214	ACV-SMO13-145-172- 3	± 3.5	(± 50)	± 1.7	(± 25)	± 0.1	(± 0.25)
06-460-224	ACV-SMO13-131-159-10	± 3.5	(± 50)	± 1.7	(± 25)	± 2.3	(± 0.6)
06-460-226	ACV-SMO13- 66 - 83 - 3	± 3.5	(± 50)	± 1.7	(± 25)	± 0.1	(± 0.25)
* 06-460-230	ACV-SMO13-124-152-10	± 3.5	(± 50)	± 1.7	(± 25)	± 2.3	(± 0.6)
06-460-238	ACV-SMO25- 55 - 79 -10	± 3.5	(± 50)	± 1.7	(± 25)	± 2.3	(± 0.6)
* 06-460-240	ACV-SMO25-131-159-10	± 3.5	(± 50)	± 1.7	(± 25)	± 2.3	(± 0.6)
06-460-242	ACV-SMO13-145-172-10	± 3.5	(± 50)	± 1.7	(± 25)	± 2.3	(± 0.6)
06-460-244	ACV-SMO13- 83 -103- 3	± 3.5	(± 50)	± 1.7	(± 25)	± 0.1	(± 0.25)
06-460-248	ACV-SMO13-116-145- 6	± 3.5	(± 50)	± 1.7	(± 25)	± 1.9	(± 0.5)
06-460-254	ACV-SMO13- 83 -103- 6	± 3.5	(± 50)	± 1.7	(± 25)	± 1.9	(± 0.5)
06-460-256	ACV-SMO13-100-128- 6	± 3.5	(± 50)	± 1.7	(± 25)	± 1.9	(± 0.5)
06-460-258	ACV-SMO13- 97 -121- 3	± 3.5	(± 50)	± 1.7	(± 25)	± 0.1	(± 0.25)
06-460-268	ACV-SMO13- 66 - 93 -10	± 3.5	(± 50)	± 1.7	(± 25)	± 2.3	(± 0.6)
06-460-270	ACV-SMO13-110-138- 6	± 3.5	(± 50)	± 1.7	(± 25)	± 1.9	(± 0.5)
06-460-276	ACV-SMO13- 83 -103-10	± 3.5	(± 50)	± 1.7	(± 25)	± 2.3	(± 0.6)

* Pressure port and flow through port conform to SAE 1 inch split flange.

Consult MICO Applications Department for other available models and application detail.

PERFORMANCE DATA

System pressure . . . . . to 186.2 bar (2700 PSI)
Power beyond flow capacity . . . . . 132 to 246 L/min (35 to 60 GPM) (split flange models only)
Flow through pressure drop. . . . . 1.4 bar at 132 L/min (20 PSI at 35 GPM)
2.8 bar at 246 L/min (40 PSI at 65 GPM) (split flange models only)

Accumulator capacity is determined from brake line pressure, displacement and number of power-off emergency brake applications.

Dual Accumulator Charging Valves (high flow)

PRINCIPLES OF OPERATION

These MICO® Dual Accumulator Charging Valves perform essentially the same functions as the single charging valves. When the dual accumulator charging valves are used in a split hydraulic brake system each individual axle is controlled separately by a modulating valve and an accumulator. These valves charge both accumulators. The primary advantage of the dual charging valves over the single charging valves are that if half of the brake system fails the remaining half will continue to function.

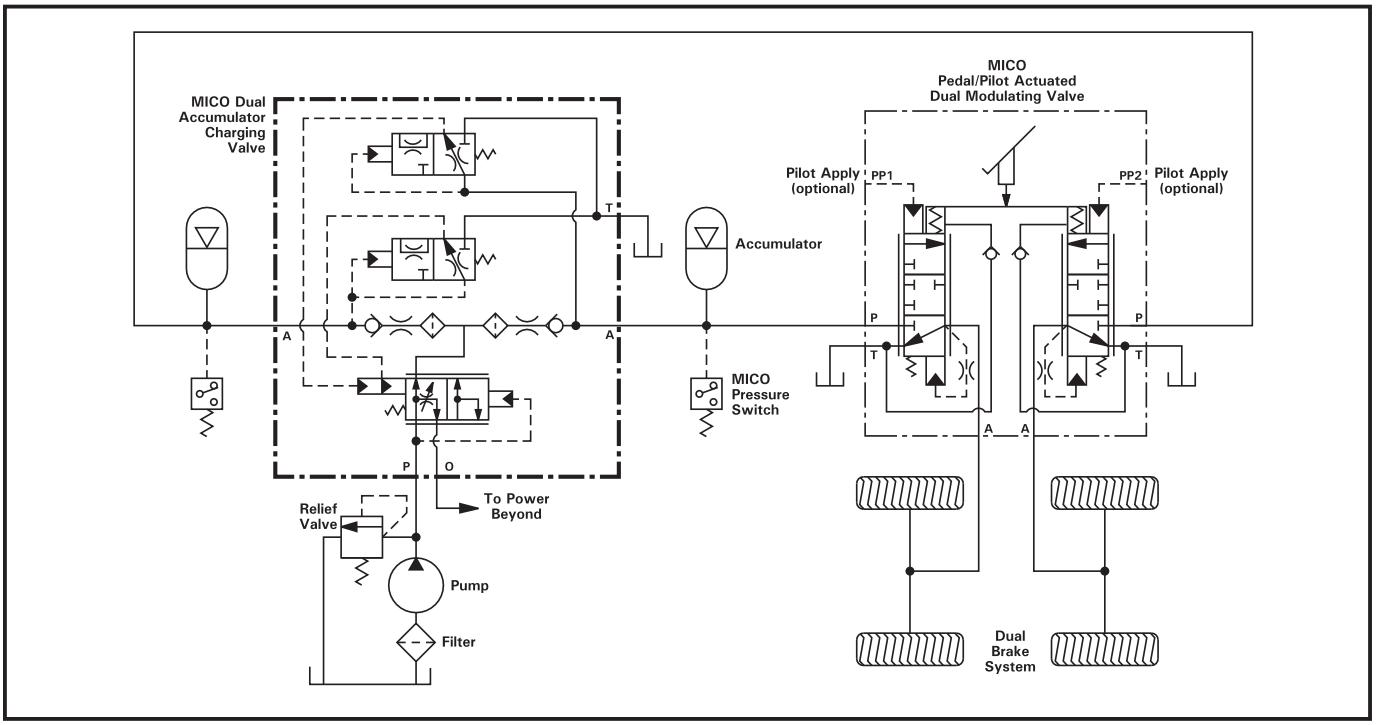
These valves charge the accumulators from the open center circuit upon demand and within its preset operating charge rate and maximum pressure. Other charge rates and pressures are available upon request.

MICO also offers a complete line of hydraulic pressure switches for your application. Contact MICO for more information.

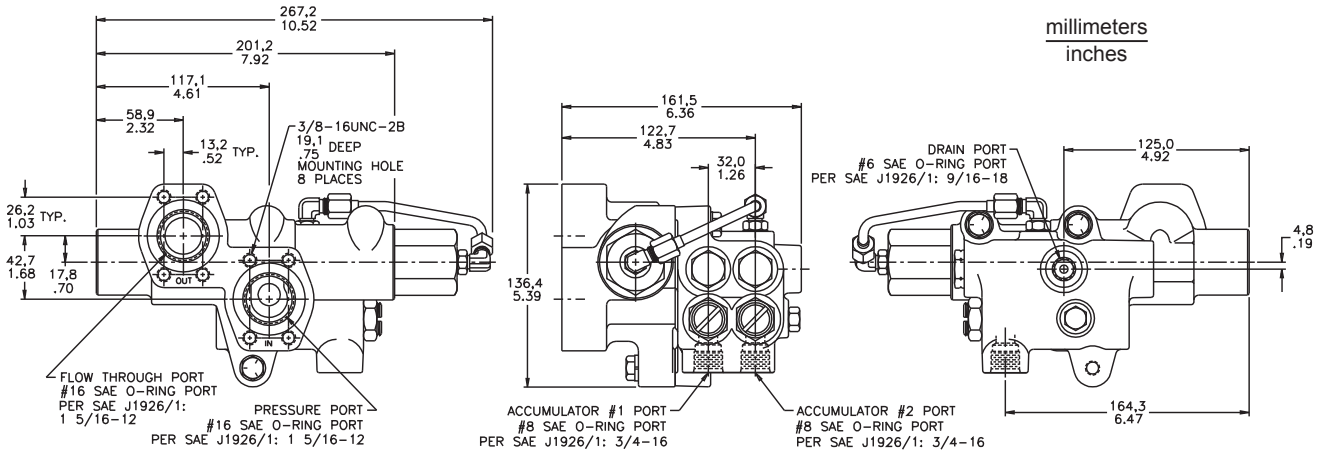
FEATURES

- Uses power developed in the main hydraulic system
- May be remotely mounted from brake valves
- Full system pressure is available to the power steering or secondary devices at all times
- Flow rates to 246 L/min (65 GPM)

Typical Circuit Schematic



Typical Valve



Dimensions may vary slightly by model number.

SPECIFICATIONS

Model Number	Catalog Code (refer to page 5)	Low Limit Tolerance		High Limit Tolerance		Accumulator Charging Rate Tolerance	
		bar	(PSI)	bar	(PSI)	L/min	(GPM)
06-460-216	ACV-DMO13-48-69-3	± 3.5	(± 50)	± 1.7	(± 25)	± 0.1	(± 0.25)
06-460-218	ACV-DMO13-97-124-3	± 3.5	(± 50)	± 1.7	(± 25)	± 0.1	(± 0.25)
06-460-222	ACV-DMO13-131-159-6	± 3.5	(± 50)	± 1.7	(± 25)	± 1.9	(± 0.5)
06-460-252	ACV-DMO13-97-124-6	± 3.5	(± 50)	± 1.7	(± 25)	± 1.9	(± 0.5)
06-460-264	ACV-DMO13-126-153-3	± 3.5	(± 50)	± 1.7	(± 25)	± 0.1	(± 0.25)
06-460-290	ACV-DMO13-97-124-6	± 3.5	(± 50)	± 1.7	(± 25)	± 1.9	(± 0.5)
06-460-292	ACV-DMO13-131-159-3	± 3.5	(± 50)	± 1.7	(± 25)	± 0.1	(± 0.25)

Consult MICO Applications Department for other available models and application detail.

PERFORMANCE DATA

System pressure . . . . . to 186.2 bar (2700 PSI)
Power beyond flow capacity . . . . . 132 to 246 L/min (35 to 65 GPM) (split flange models only)
Flow through pressure drop. . . . . 1.4 bar at 132 L/min (20 PSI at 35 GPM)
2.8 bar at 246 L/min (40 PSI at 65 GPM) (split flange models only)
Accumulator capacity is determined from brake line pressure, displacement and number of power-off emergency brake applications.

Full Power Brake Valves

PRINCIPLES OF OPERATION

The MICO® Full Power Power Brake Valves use the hydraulic power developed for the power steering system to actuate the vehicle's brakes, eliminating the need for a separate power brake unit or separate hydraulic system fluid.

These valves control the charging rate of the accumulator, the pressure of the fluid in the accumulator, and the flow and pressure of the fluid to the brakes.

All hydraulic fluid from the hydraulic pump system flows through the valve. When the accumulator pressure reaches its low limit, the valve diverts a small amount of fluid from the main open center hydraulic system to charge the accumulator. It automatically halts the charging when accumulator pressure reaches its high limit.

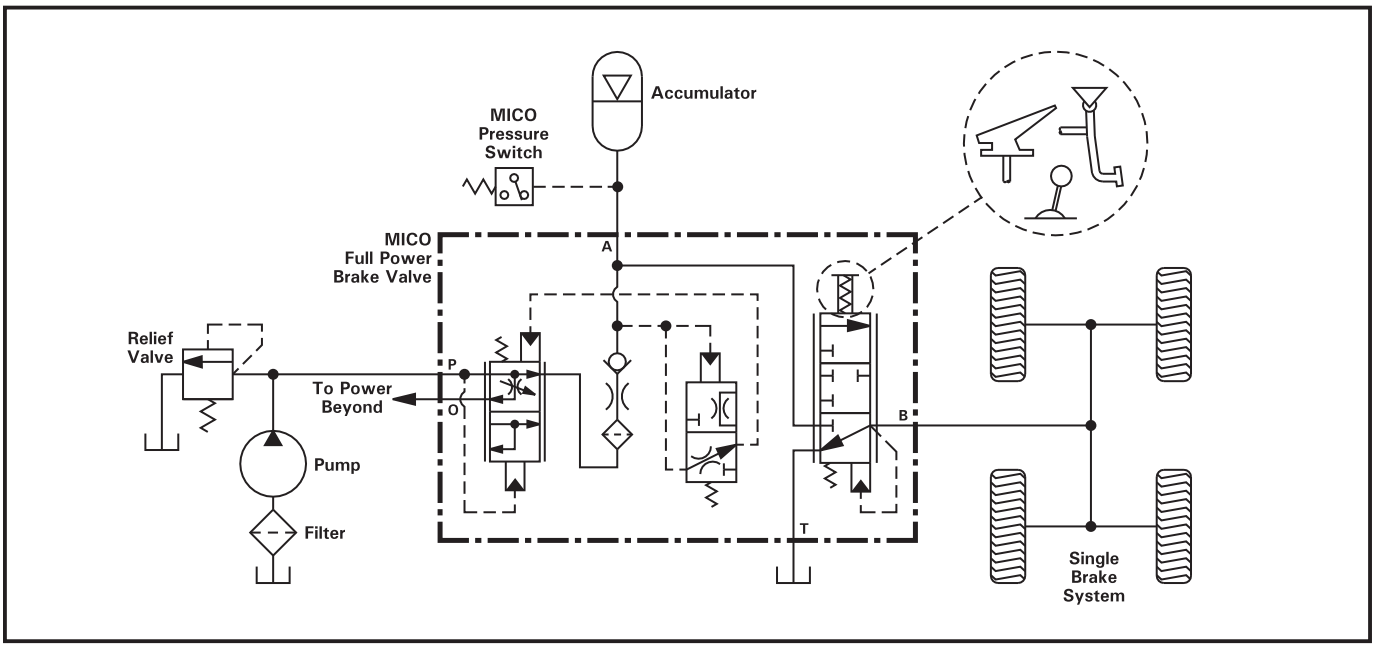
Actuation of the valve provides output pressures to the brakes in direct proportions to the pedal effort applied.

MICO also offers a complete line of hydraulic pressure switches for your application. Contact MICO for more information.

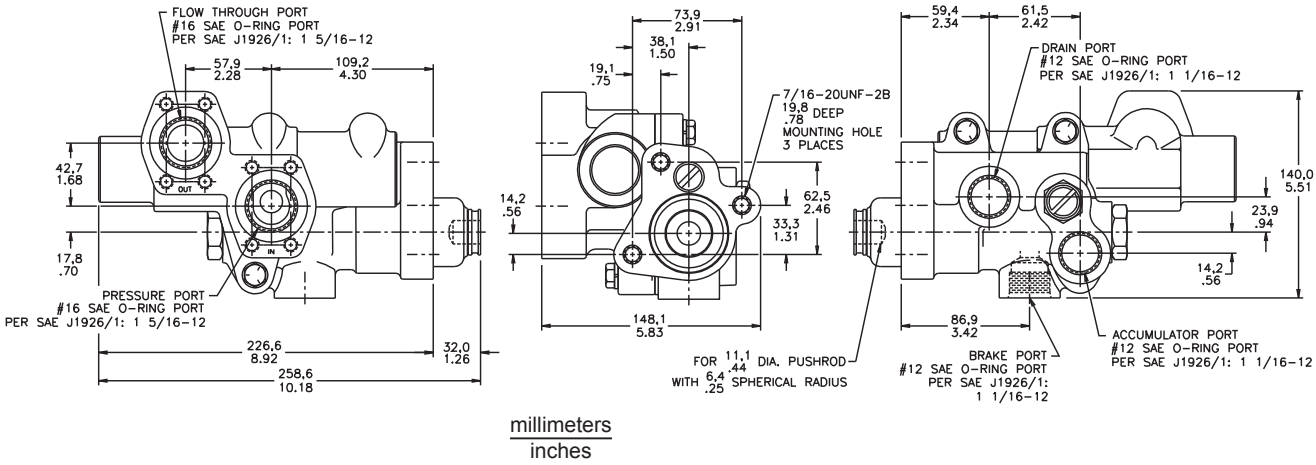
FEATURES

- Readily adaptable to both hydraulic and mechanical brakes
- Uses power developed in main hydraulic system
- Brake response much faster than air brakes
- Provides limited power-off braking through pressure and volume stored in the accumulator

Typical Circuit Schematic



Typical Valve



Dimensions may vary slightly by model number.

SPECIFICATIONS

Model Number	Maximum Brake Pressure Setting		Nominal Accumulator Charging Rate		Nominal High Limit		Nominal Low Limit		Push Rod Force at Maximum Pressure	
	bar	(PSI)	L/min	(GPM)	bar	(PSI)	bar	(PSI)	N	(lb)
06-460-800	44.8 ± 3.5	(650 ± 50)	6.4 ± 1.9	(1.7 ± 0.5)	89.6 ± 1.7	(1300 ± 25)	41.4 ± 3.5	(600 ± 50)	1690	(380)
06-460-810	108.6 ± 1.7	(1575 ± 25)	9.8 ± 2.3	(2.6 ± 0.6)	124.1 ± 1.7	(1800 ± 25)	96.5 ± 3.5	(1400 ± 50)	3692	(830)
06-460-814	103.4 ± 3.5	(1500 ± 50)	6.4 ± 1.9	(1.7 ± 0.5)	131.0 ± 1.7	(1900 ± 25)	106.9 ± 1.7	(1550 ± 25)	3514	(790)
06-460-816	108.6 ± 1.7	(1575 ± 25)	9.8 ± 2.3	(2.6 ± 0.6)	124.1 ± 1.7	(1800 ± 25)	96.5 ± 3.5	(1400 ± 50)	3692	(830)
06-460-820	44.8 ± 3.5	(650 ± 50)	9.8 ± 2.3	(2.6 ± 0.6)	89.6 ± 1.7	(1300 ± 25)	41.4 ± 3.5	(600 ± 50)	1690	(380)
06-460-830	98.3 ± 5.2	(1425 ± 75)	6.4 ± 1.9	(1.7 ± 0.5)	103.4 ± 1.7	(1500 ± 25)	82.7 ± 3.5	(1200 ± 50)	3514	(790)
06-460-832	65.5 ± 3.5	(950 ± 50)	6.4 ± 1.9	(1.7 ± 0.5)	103.4 ± 1.7	(1500 ± 25)	82.7 ± 3.5	(1200 ± 50)	2358	(530)
06-460-834	82.7 ± 3.5	(1200 ± 50)	9.8 ± 2.3	(2.6 ± 0.6)	103.4 ± 1.7	(1500 ± 25)	82.7 ± 3.5	(1200 ± 50)	2811	(632)
06-460-838	106.9 ± 5.2	(1550 ± 75)	6.4 ± 1.9	(1.7 ± 0.5)	148.2 ± 5.2	(2150 ± 75)	110.3 ± 3.5	(1600 ± 50)	3514	(790)
06-460-846	108.6 ± 1.7	(1575 ± 25)	9.8 ± 2.3	(2.6 ± 0.6)	120.7 ± 1.7	(1750 ± 25)	96.5 ± 3.5	(1400 ± 50)	3559	(800)
06-460-848	70.7 ± 1.7	(1025 ± 25)	6.4 ± 1.9	(1.7 ± 0.5)	113.8 ± 1.7	(1650 ± 25)	93.1 ± 3.5	(1350 ± 50)	2624	(590)
06-460-852	98.3 ± 5.2	(1425 ± 75)	2.8 ± 0.1	(0.75 ± 0.25)	103.4 ± 1.7	(1500 ± 25)	82.7 ± 3.5	(1200 ± 50)	1335	(300)
06-460-854	103.4 ± 3.5	(1500 ± 50)	2.8 ± 0.1	(0.75 ± 0.25)	134.4 ± 3.5	(1950 ± 50)	106.9 ± 3.5	(1550 ± 50)	1335	(300)
06-460-856	98.3 ± 5.2	(1425 ± 75)	6.4 ± 1.9	(1.7 ± 0.5)	110.3 ± 1.7	(1600 ± 25)	89.6 ± 3.5	(1300 ± 50)	3514	(790)
06-460-858	117.2 ± 3.5	(1700 ± 50)	6.4 ± 1.9	(1.7 ± 0.5)	153.4 ± 1.7	(2225 ± 25)	124.1 ± 3.5	(1800 ± 50)	3514	(790)
06-460-860	75.8 ± 5.2	(1100 ± 75)	9.8 ± 2.3	(2.6 ± 0.6)	93.1 ± 1.7	(1350 ± 25)	75.8 ± 3.5	(1100 ± 50)	2669	(600)
06-460-870	69.0 ± 5.2	(1000 ± 75)	2.8 ± 0.1	(0.75 ± 0.25)	70.7 ± 1.7	(1025 ± 25)	57.9 ± 3.5	(840 ± 50)	2491	(560)
06-460-890	25.9 ± 1.7	(375 ± 25)	9.8 ± 2.3	(2.6 ± 0.6)	89.6 ± 1.7	(1300 ± 25)	41.4 ± 3.5	(600 ± 50)	956	(215)
06-460-894	22.4 ± 1.0	(325 ± 15)	9.8 ± 2.3	(2.6 ± 0.6)	89.6 ± 1.7	(1300 ± 25)	41.4 ± 3.5	(600 ± 50)	1601	(360)
06-460-900	18.6 ± 1.0	(270 ± 15)	9.8 ± 2.3	(2.6 ± 0.6)	89.6 ± 1.7	(1300 ± 25)	41.4 ± 3.5	(600 ± 50)	712	(160)
06-460-950	134.4 ± 3.5	(1950 ± 50)	6.4 ± 1.9	(1.7 ± 0.5)	165.5 ± 3.5	(2400 ± 50)	134.5 ± 3.5	(1950 ± 50)	1335	(300)
06-460-956	25.9 ± 1.7	(375 ± 25)	2.8 ± 0.1	(0.75 ± 0.25)	89.6 ± 1.7	(1300 ± 25)	43.1 ± 1.7	(625 ± 25)	1890	(425)
06-460-958	34.5 ± 3.5	(500 ± 50)	6.4 ± 1.9	(1.7 ± 0.5)	89.6 ± 1.7	(1300 ± 25)	60.3 ± 3.5	(875 ± 50)	1335	(300)
06-460-960	41.4 ± 3.5	(600 ± 50)	9.8 ± 2.3	(2.6 ± 0.6)	120.7 ± 3.5	(1750 ± 50)	56.9 ± 3.5	(825 ± 50)	2825	(635)

Consult MICO Applications Department for other available models and application detail.

PERFORMANCE DATA

Flow through capacity . . . . . .to 137 L/min to 246 L/min (35 to 65 GPM) (split flange models only)
Flow through pressure drop. . . . . .1.4 bar at 132 L/min (20 PSI at 35 GPM)
2.8 bar at 246 L/min (40 PSI at 65 GPM) (split flange models only)
Accumulator pressure, maximum . . . . . to 189.6 bar (2750 PSI)
Accumulator charging rate. . . . . 1.9 to 12.1 L/min at 69.0 bar (0.5 to 3.2 GPM at 1000 PSI) in three ranges
Actuating push rod stroke . . . . . 5.56 mm to 10.67 mm (0.219 in to 0.420 in) depending on model number
Accumulator capacity is determined from brake line pressure, displacement and number of power-off emergency brake applications.

USEFUL FORMULAS

Piston Area (in^2) = π (3.1416) x r^2 (in)

$$\text{Piston Radius (in)} = \sqrt{\frac{\text{Area (in}^2\text{)}}{\pi\ (3.1416)}}$$

Force (lb) = Piston Area (in^2) x Line Pressure (PSI)

$$\text{Piston Area (in}^2\text{)} = \frac{\text{Force (lb)}}{\text{Line Pressure (PSI)}}$$

$$\text{Line Pressure (PSI)} = \frac{\text{Force (lb)}}{\text{Piston Area (in}^2\text{)}}$$

Volume (in^3) = Piston Area (in^2) x Stroke (in)

$$\text{Piston Area (in}^2\text{)} = \frac{\text{Volume (in}^3\text{)}}{\text{Stroke (in)}}$$

$$\text{Stroke (in)} = \frac{\text{Volume (in}^3\text{)}}{\text{Piston Area (in}^2\text{)}}$$

Volume (gallons) = Flow Rate (GPM) x Time (min)

$$\text{Flow Rate (GPM)} = \frac{\text{Volume (gallons)}}{\text{Time (min)}}$$

$$\text{Time (min)} = \frac{\text{Volume (gallons)}}{\text{Flow Rate (GPM}}$$

$$\text{Flow Rate (GPM)} = \frac{\text{Pump Displacement (cir}*\text{) x Pump RPM}}{231**}$$

$$\text{Pump displacement (cir)} = \frac{\text{Flow Rate (GPM) x 231}}{\text{Pump RPM}}$$

$$\text{Pump RPM} = \frac{\text{Flow Rate (GPM) x 231}}{\text{Pump Displacement (cir)}}$$

PTO/Pump RPM = PTO % Engine Speed x Engine RPM

$$\text{PTO \% Engine Speed} = \frac{\text{PTO/Pump RPM}}{\text{Engine RPM}}$$

$$\text{Engine RPM} = \frac{\text{PTO/Pump RPM}}{\text{PTO \% Engine Speed}}$$

$$\text{Horsepower} = \frac{\text{Flow Rate (GPM) x Line Pressure (PSI)}}{1714 \text{ x \% Pump Efficiency}}$$

$$\text{Horsepower} = \frac{\text{Torque (lb·ft) x RPM}}{5252}$$

$$\text{Torque (lb·ft)} = \frac{\text{Horsepower x 5252}}{\text{RPM}}$$

$$\text{RPM} = \frac{\text{Horsepower x 5252}}{\text{Torque (lb·ft)}}$$

∗ **cir = cubic inches per revolution**
∗∗ **231 cubic inches = 1 U.S. gallon**

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PRODUCT LINE:

Brakes
Caliper Disc Brakes
Multiple Disc Brakes

Brake Locks
Electric
Mechanical

Controls
Electronic Controls
Hydraulic Throttle Controls
Pedal Controls
Switches
Transducers/Sensors

Cylinders
Drive Axle Brake Actuators
Slave Cylinders
Wheel Cylinders

Master Cylinders
Boosted Cylinders
Hydraulically and Air Actuated
Straight Bore Cylinders
Two-Stage Cylinders

Valves
Accumulator Charging
Electrohydraulic Brake
Park Brake
Pressure Modulating

Miscellaneous Components
In-line Residual Check Valves
Pump with Integrated Valves
Reservoirs

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