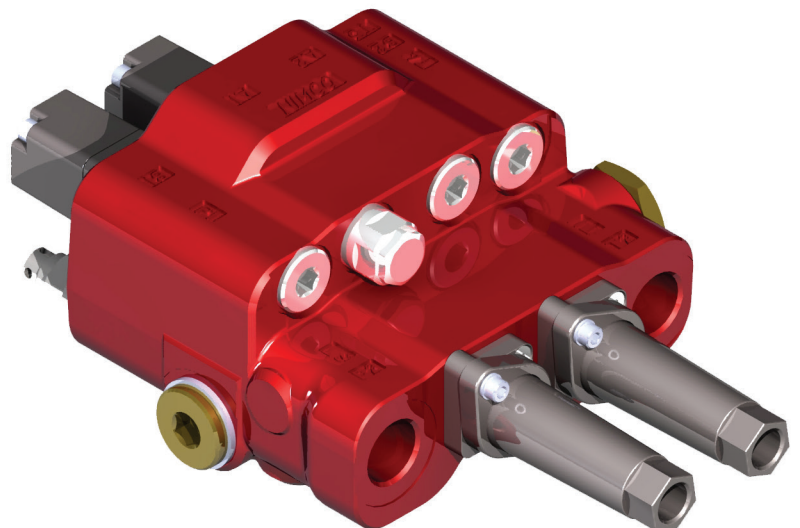
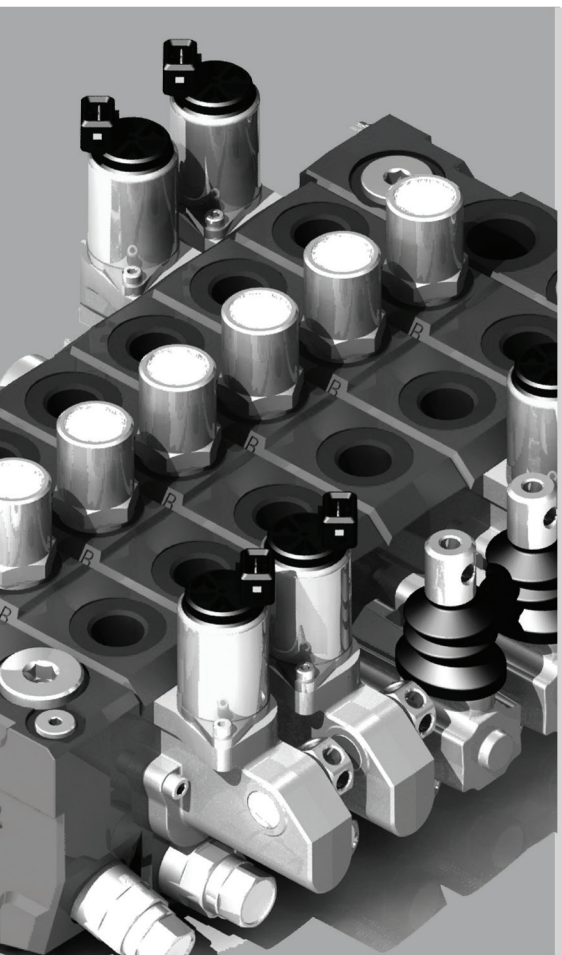


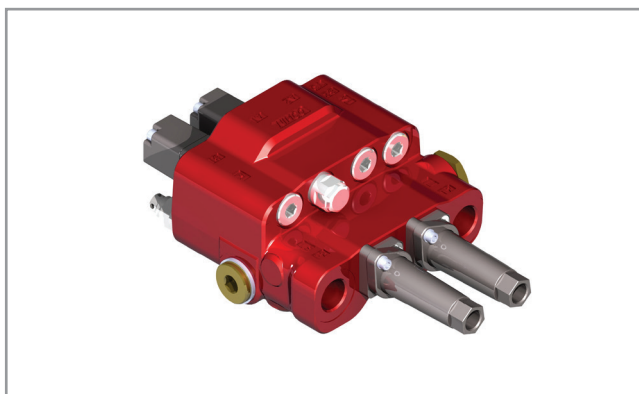
## DIRECTIONAL CONTROL VALVE SERIES CV 652

SPECIFIC FRONT END LOADER APPLICATION





Page 4	General Information
Page 7	Technical data
Page 8	Design
Page 9	Schematics and Performance
Page 10	Dimensions
Page 11	Secondary Valves
Page 12	Spools
Page 13	Spool Controls
Page 14	Accessories
Page 16	Order Code



The agricultural loader market has become far more sophisticated over the last 15 years. The main developments are the use of load sensing pumps on larger tractors, the introduction of more advanced valves that offer very low spool leakage for load-holding operations, and the integration of electrical proportional valves that can offer a number of control options that were not previously possible with earlier hydraulic systems.

Nimco Controls has been at the forefront of this evolution. The company has introduced a number of solutions and has been instrumental in bringing the market to its present technical level, by constantly offering a full state-of-the-art range of open center and load sensing valves covering all tractor and loader sizes.

Complete control. One of the most critical factors for any loader operator today is absolute control of the load at all times. This is made easier by the use of well-designed valves that include load holding check valves and 'turned' spools which not only allow the operator to have absolute control of the load at all times for safety reasons, but also give him the ability to keep the load steady without cylinder drift. The float position is a necessity for most loaders. As it is not feasible to use traditional over-center valves in combination with the float position, it is necessary to achieve very low spool leakage in the directional control valve to obtain minimum cylinder drift.



- Start
- Nimco valve
- Conventional valve

Nimco has solved this problem by offering valves with exceptionally low spool leakage rates, which is the combined result of continuous improvement in the design of the valve itself and the finished spool bore through highly specific spool bore finishing methods. (Comparison of a Nimco low leakage (2 cc/min) valve with competitive model (8 cc/min) on a parked loader, over 10 minutes with a 100 bar load and a 46 cST viscosity.

Nimco Controls offers its customers a leakage rate which is below 2 cc/min on all of its loader valves, which translates to only 0.4 mm per minute cylinder drift. A conventional valve would have 13 mm in cylinder drift over a 10-minute period, while a Nimco valve would have only 4 mm. Considering the geometry of the loader, this has a big effect on where the load ends up over this period of time. This has proved particularly useful when the agricultural loader is being used for precise work such as pallet stacking or animal and goods transporting.

The CV652 is a modular 2-spool monoblock valve. Produced in three model designs, open center, constant pressure and load-sensing. The open center and constant pressure designs can be serial connected to achieve additional spool functions by using a high pressure carry-over fitting. The valve is designed for a maximum working pressure of 320 bar (4600 psi) with a recommended flow from 15 to 120 l/min (4-32 USGpm).

The CV652 valve offers optimized characteristics with regard to function, capacity and quality. It is designed with the machine builders high demands of cost effectiveness, function and need of exceptionally good load maneuverability in mind. Particularly suitable for use on modern agricultural, or construction, loaders and other equipment where precise load control is required.

The uniquely designed valve body casting results in exceptionally low pressure drops leading to improved performance and longer life not only of the control valve but also of the other components in the hydraulic system.

The CV652 is manufactured using the highest quality cast iron which in combination with NIMCO's advanced machining and control methods assures the precise accuracy of every component. Each valve is tested and the results documented prior to shipment.

The CV652CP Constant Pressure is used in systems where a higher demand for parallel control of the function is desired.

The CV652LS Load-sensing can be used with either a variable or a fixed pump. The extraordinary good parallel control of the functions is achieved in both versions. However, the main reason for using LS-system, energy-saving, is lost when a fixed pump is used.

#### Easy assembly -The NIMCO concept

As the cylinder ports are all located in-line with the spools, all plumbing and controls can be done from one side. The valve has two inlet and outlet ports allowing alternative connections that allows for simplified plumbing in less space. It also allows for the use of quick couplers to be assembled directly on to the valve.

#### Minimized spool leakage.

Hard chromium plated spools and a specially developed honing method provides absolute minimum spool leakage of the valve.

**Excellent load control.**

CV652 spools are designed to provide optimum control characteristics over the valves entire flow range.

**Full utilization of the spool stroke.**

Optimized metering grooves are integrated in each spool and the precise machining of every component allows the entire stroke of the spool to be used. This allows full control of the load whether the operator is using very little or full flow capacity. In addition the movement of any spool in any direction will give the same speed of machine function, enhancing safety and reliability. Load holding check valves are integrated in each section.

**Multifunctional control.**

Both spools can be operated at the same time even when very large differences in load are at hand due to the NIMCO's unique spool and internal valve design.

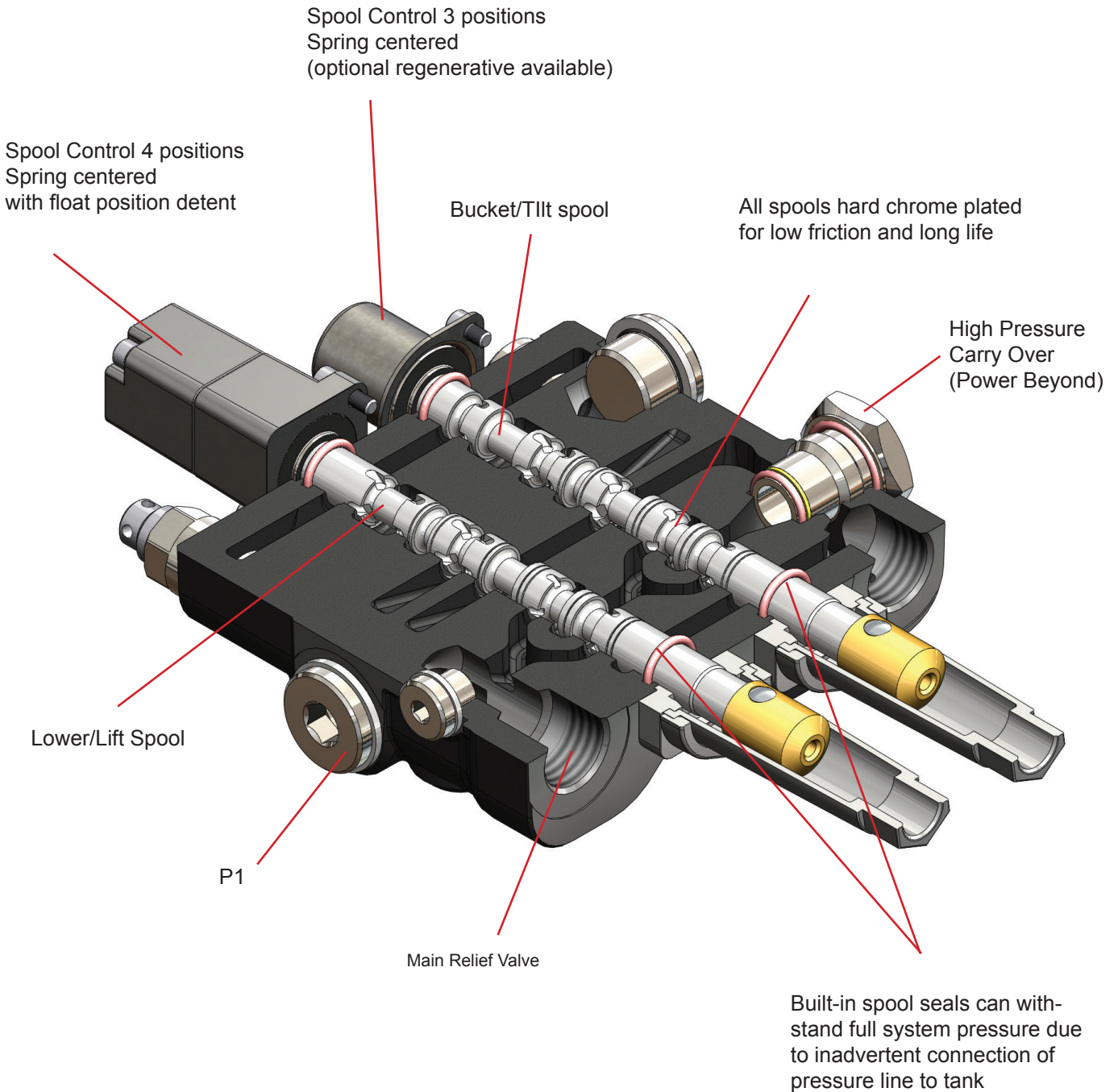
**Uniform and low lever forces.**

By combining the unique design features of the valve body and the spools an excellent balance of the dynamic forces is achieved throughout the entire pressure and flow range. This keeps spring forces at a minimum and makes the valve very easy to operate by hand lever as well as with cables up to 3500 mm (138 inch) length.

**Wide range of accessories.**

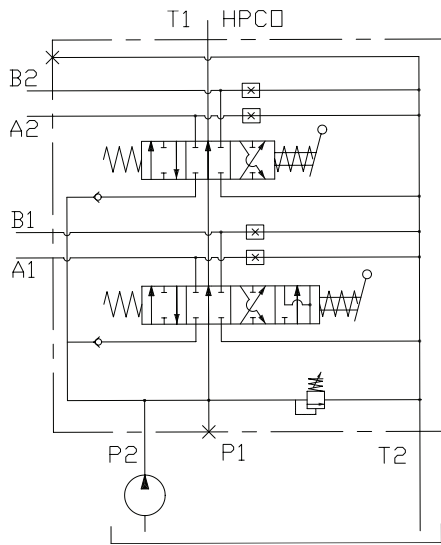
A wide range of spools and remote controls such as single or joystick cable controls, pneumatic, electro-hydraulic proportional, or electrical on/off controls are available. A special Quick-connection system is available for the CV652, allowing for easy and fast change over of a front end loader from one tractor to another without having to individually connect and disconnect each coupling.

Max Pressure Setting	bar	psi
Main Relief Valve	320	4600
Port Relief Valve	330	4700
Tank line	10	145
Flow rates	l/min	US gpm
Max for the Valve	120	32
Temperature Range	° C	°F
Fluid Mineral Oil	-40 to +80	-40 to +176
Spool Leakage	cm <sup>3</sup> /min	inch <sup>3</sup> /min
100 bar (1450 psi) and 25 mm <sup>2</sup> /s (cSt) (117SSU) viscosity A and B port	0.8 - 2	0.05 - 0.12
Filtration		
Contamination level equal or better	18/14 according to ISO 4406	NAS 1638-class 10
Viscosity	mm <sup>2</sup> /s	cSt
Recommended operating Viscosity range	10-400	47 - 1875
Start viscosity up to	1000	4687
Weight	kg	lbs
CV652	0000	0000
Operating force on the spool	N	kp
Spring centred	140	14
Detent in	330	33
Detent out	90	9

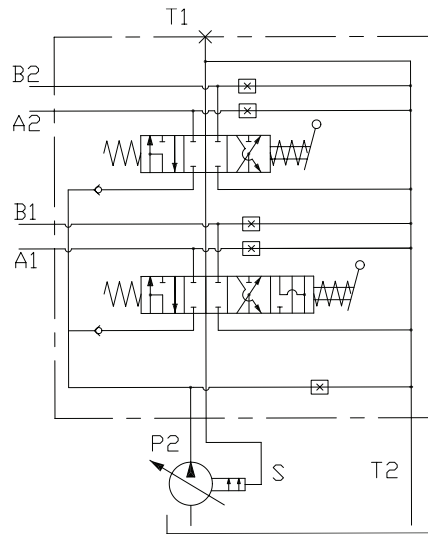




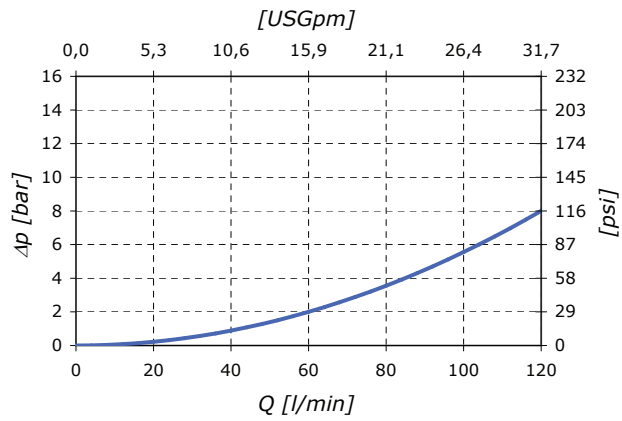
**Open Center**



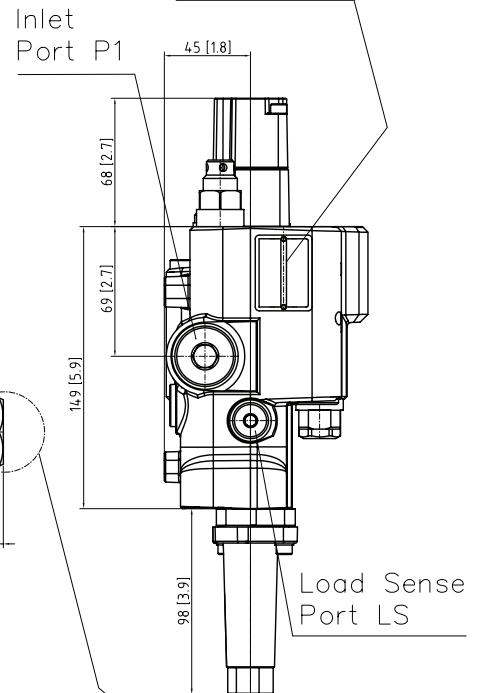
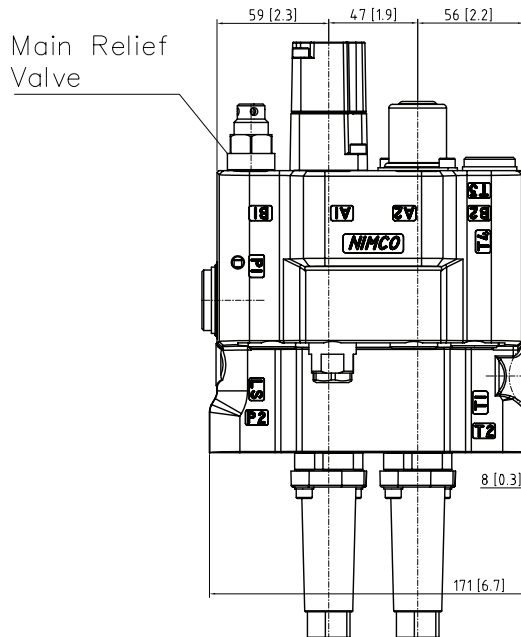
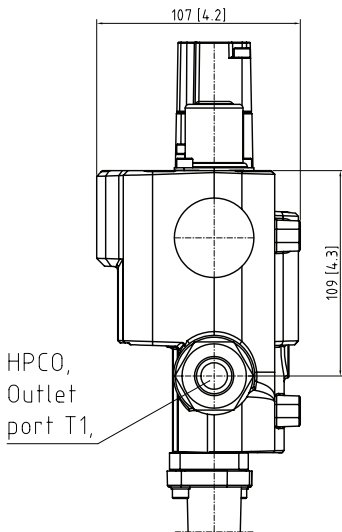
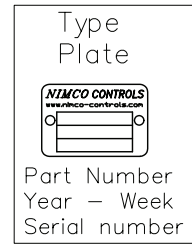
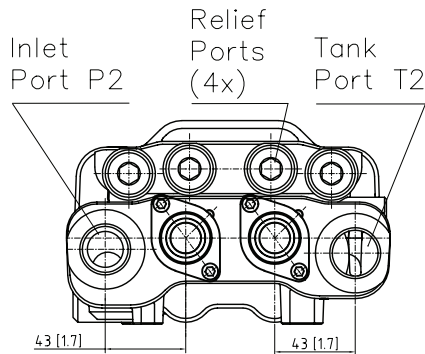
**LS Pressure on Demand**



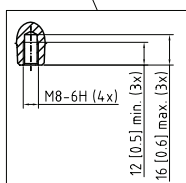
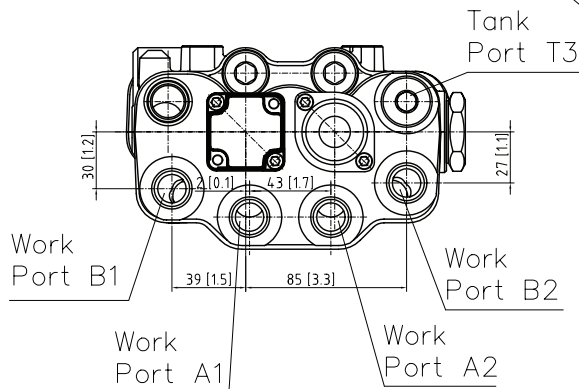
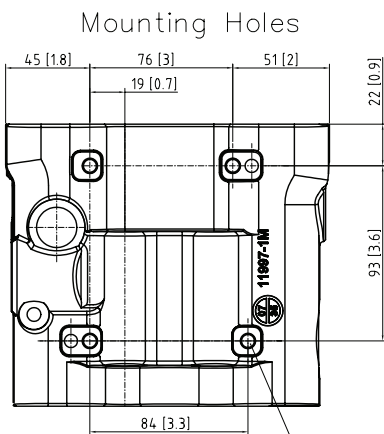
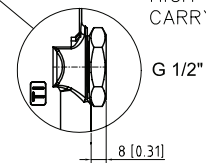
**PRESSURE DROP P-T**



The dimensions outside the brackets are in mm and the dimensions inside are in inches.

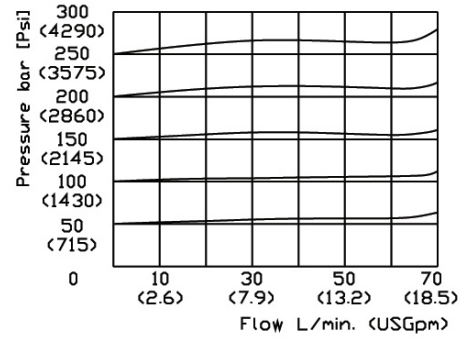
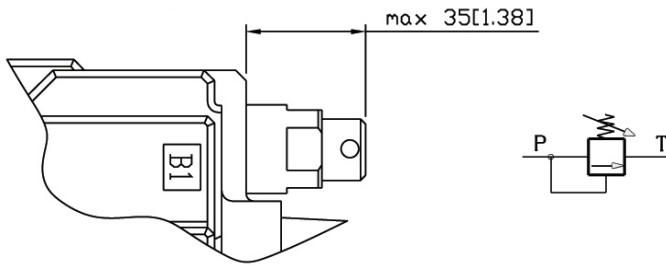


POWER BEYOND, HIGH PRESSURE CARRY OVER



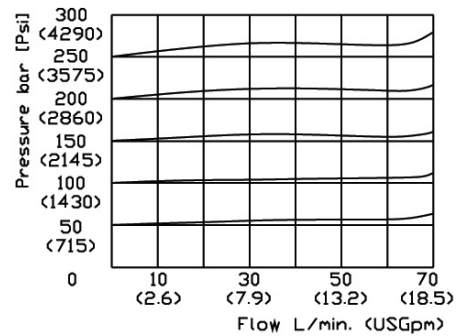
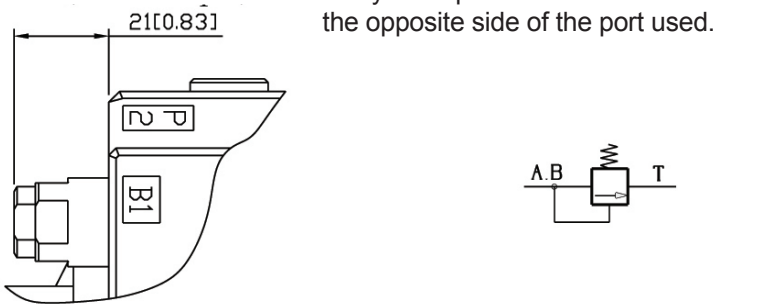
Port Size	BSP	Metric	SAE
A, A2, B1, B2	1/2"	M18 x 1.5	SAE8 SAE 10
Inlets P1 P2	3/4"	M18x1.5	SAE8 SAE 10 SAE 12
Outlet T1, T3	3/4"	M22 x 1.5	SAE8 SAE 10 SAE 12
HPCO in T1	1/2" 3/4"	M12 x 1.5	SAE8 SAE 10

Main relief valve. Differential operated relief valve for the main circuit. Adjustable from 35 to 320 bar (500-4600 psi).



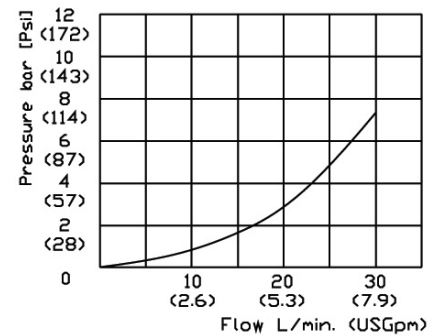
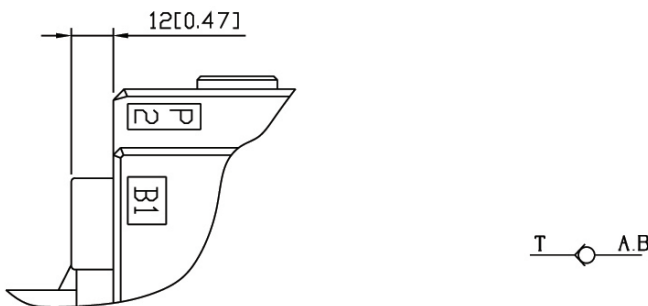
Order code: RV+pressure setting

Cylinder port mounted secondary valves. Relief valve. Differential operated port relief valve preventing pressure peaks. Fixed pressure setting from 35 to 330 bar (500-4700 psi).



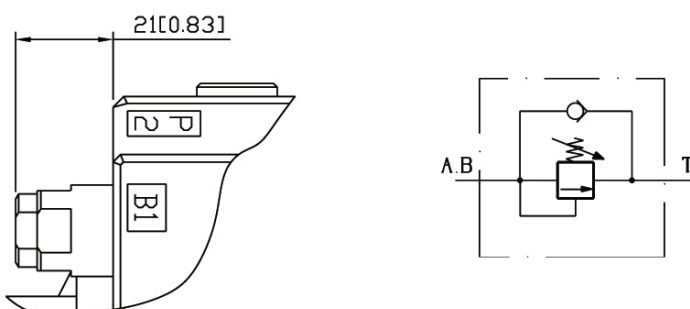
Order code: C+pressure setting

Anti-cavitation valve. Check valve used to level under pressures that can occur in the cylinder ports.



Order code: A

Relief anti-cavitation valve. Works as both port relief and anti-cavitation valve.



Characteristics according to C and A.

Order code: RV+pressure setting

Graphs valid for 25 mm<sup>2</sup>/s (cSt.)  
(117 SSU) 70 bar=1000 psi

All of NIMCO's spools are designed for specific flow rates in order to achieve optimal control characteristics and to fully utilize the spool's entire stroke. By optimizing the balance between spools and valve housing, spring forces are minimized and exact maneuvering is achieved.

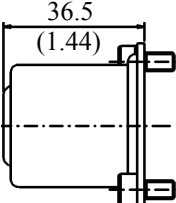
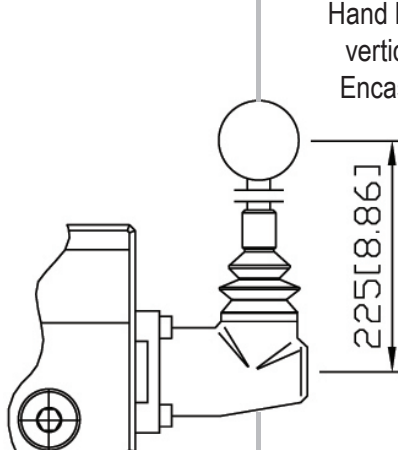
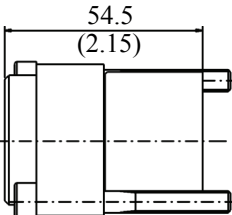
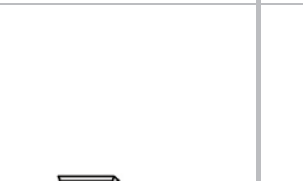
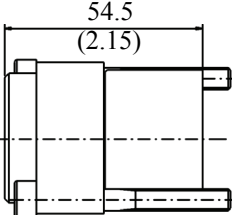
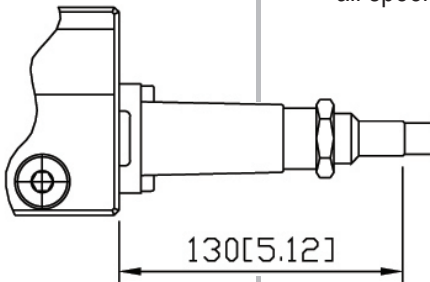
Besides the standard spools listed there are also special spools available. For further information concerning these types please contact your Nimco representative.

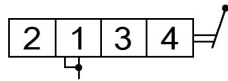
Spool Type	Symbol	Spool Code
Double Acting		1R
Single Acting		2R
LS Spool		1LS
Double Acting with Float Position		3R
LS with FLoat Position		3LS
Single Acting with Float Position		7R



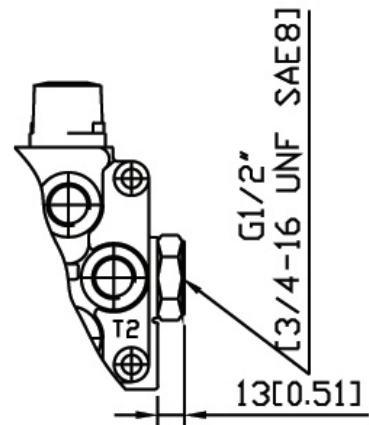
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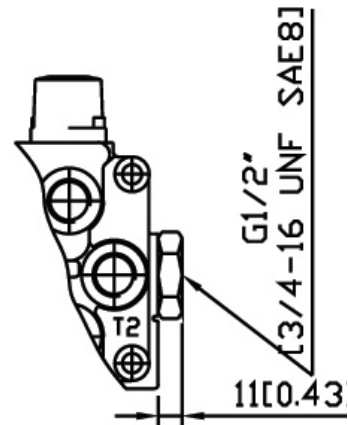
Code	Type	A-side	B-side	Type	Code
9	Spring centered			Hand lever vertical. Encased	S5
11	Spring centered. Detent in position 4			Wire control for all spools	
18	Spring centered. Detent in position 4. Regenerative stroke indication			Wire control for all spools	3W



High pressure carry-over adaptor (Power Beyond), must be installed in the T1-port when two or more valves are used in the same circuit. T2 must then be connected to tank. For B and CP.



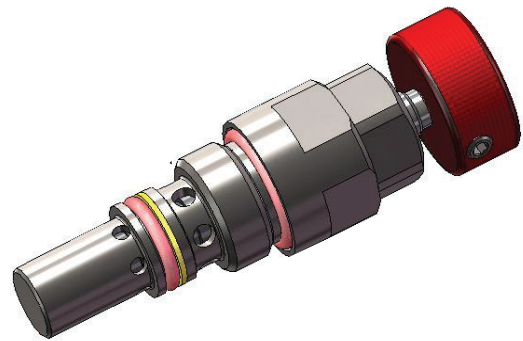
Tank port reduction adaptor, can be installed in the T1 port when the thread size is to be reduced.



Remote wire control WK300 and WK350 for spool control 3W is available as a bankable single control units as well as a joystick for dual spool control. Please refer to WK300 and WK350 separate data sheet for detailed information.

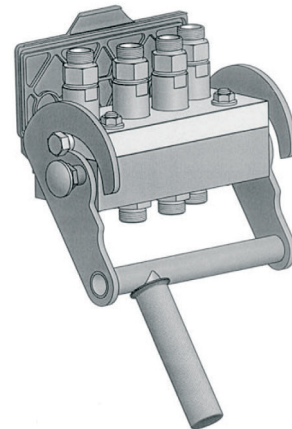


Cartridge to convert single acting to double acting function by simply screwing the top.

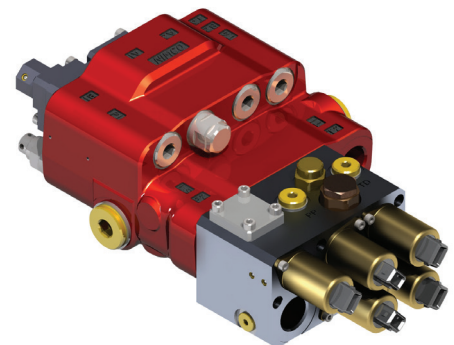


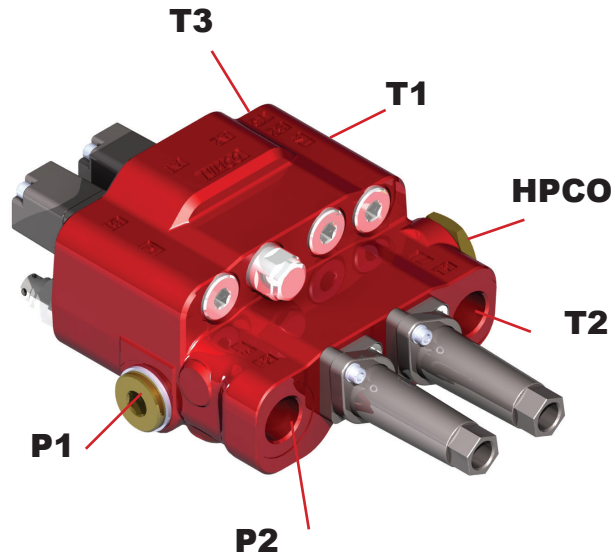
The CV652 valves can be fitted with the Nimco's QMC fastconnect coupling system which allows for the quick coupling of all the hoses to the loader from the tractor in a single movement.

The multi-coupling can also be delivered with a variety of electrical connectors. The main features of the multi coupling are: Prevention against commutability of hydraulic lines, quick connecting, coupling against trapped pressure and minimized leakage during coupling process to avoid external oil contamination



CV652 is also available in the Electro-Hydraulic Proportional version called the EPCV652. It allows the easy operation of the loader by offering a precise load control millimeter by millimeter and the use of pre-programmed functions when used together with the EPC800 joystick.





No. Sect.	Pump Port	Main Relief	Spool 1	Control A1	Control B1	Port Valve A1	Port Valve B1	Tank Port Options	Tank Port	Threads	Paint		
CV652													
<b>Circuit</b>											<b>Code</b>	<b>Paint</b>	
Bypass	<b>B</b>											-	No Paint
Load Sensing	<b>LS</b>											<b>RF</b>	Painted
Constant Pressure	<b>CP</b>												
<b>Pump Inlet</b>											<b>Code</b>	<b>Thread Type</b>	
Side	<b>P1</b>											<b>G</b>	BSP
Top	<b>P2</b>											<b>S</b>	SAE
												<b>M</b>	METRIC
<b>Main Relief Valve</b>											<b>P/N</b>	<b>Code</b>	<b>Tank Port</b>
Adj. Main Relief Valve		<b>ARV+Setting</b>										<b>T1</b>	Side
Fix Main Relief Valve		<b>RV+Setting</b>										<b>T1</b>	Top
Main Relief Plug		<b>CP</b>											
<b>Spool Type</b>											<b>Code</b>	<b>Outlet Options</b>	
Double Acting (Metering)												<b>HPCO</b>	High-Pressure-Carry-Over
Single Acting												<b>P</b>	Plug
Load Sensing													
<b>Spool Control A-Side</b>											<b>Code</b>	<b>Secondary Valves</b>	
Spring Centred												<b>C+Setting</b>	Shock Relief Valve
Detent in pos. 1, 2 & 3												<b>CA+Setting</b>	Shock Relief and Anti Cavitation Valve
Spring Centred w. Detent in Pos. 4												<b>JCA+Setting</b>	Adjustable Shock Relief and Anti Cavitation Valve
												<b>A</b>	Anti Cavitation Valve
												<b>P</b>	Cavity Blanking Plug
<b>Spool Control B-Side</b>											<b>Code</b>	<b>Spool Control B-Side</b>	
												<b>3W</b>	Wire









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# nimco

hydraulic systems

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