

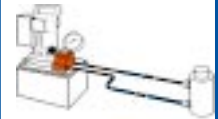
# Valve Information

## Valve selection chart

Order No.	Page No.	*Cylinder Application	Operation	Valve Type	Volt	Advance/Return	Advance/Hold Return	Posi-Check® Feature
9500	147	S.A. & D.A.	Manual	4-way, 3 Pos. Tandem Center	—	no	yes	no
9501	147	S.A. & D.A.	Manual	4-way, 3 Pos. Closed Center	—	no	yes	no
9502	146	S.A.	Manual	3-way, 3 Pos. Closed Center	—	no	yes	yes
9504	145	S.A. & D.A.	Manual	3/4-way, 2 Pos.	—	yes	yes	no
9506	147	D.A.	Manual	4-way, 3 Pos. Tandem Center	—	no	yes	yes
9507	147	D.A.	Manual	4-way, 3 Pos. Closed Center	—	no	yes	yes
9511	147	S.A. & D.A.	Manual	4-way, 3 Pos. Open Center	—	yes	yes	no
9512	150	D.A.	Solenoid	4-way, 3 Pos. Tandem Center	24	no	yes	yes
9513	150	D.A.	Solenoid	4-way, 3 Pos. Tandem Center	115	no	yes	yes
9516	150	D.A.	Solenoid	4-way, 3 Pos. Tandem Center	12DC	no	yes	yes
9517	145	S.A.	Manual	2-way, 2 Pos.	—	no	yes	no
9519	150	D.A.	Solenoid	4-way, 3 Pos. Tandem Center	230	no	yes	yes
9520	146	S.A.	Manual	3-way, 3 Pos. Tandem Center	—	no	yes	yes
9522	150	D.A.	Solenoid	4-way, 3 Pos. Open Center	230	yes	no	no
9523	150	S.A.	Pilot Operated Solenoid	3-way, 2 Pos.	230	yes	no	no
9552	149	S.A. & D.A.	Solenoid	3/4-way, 2 Pos.	230	yes	no	no
9553	150	S.A.	Pilot Operated Solenoid	3-way, 2 Pos.	24	yes	no	no
9569	149	S.A.	Solenoid	3-way, 2 Pos.	24	no	yes	no
9570	149	S.A.	Solenoid	3-way, 2 Pos.	230	no	yes	no
9572	149	S.A. & D.A.	Solenoid	3/4-way, 2 Pos.	24	yes	no	no
9576	146	S.A.	Manual	3-way, 3 Pos. Metering Tandem Center	—	no	yes	no
9579	149	S.A.	Solenoid	3-way, 2 Pos.	115	no	yes	no
9582	145	S.A.	Manual	3-way, 2 Pos.	—	no	yes	no
9584	145	S.A.	Manual	3-way, 2 Pos.	—	no	yes	no
9589	150	S.A.	Pilot Operated Solenoid	3-way, 2 Pos.	115	yes	no	no
9590	150	D.A.	Solenoid	4-way, 3 Pos. Open Center	115	yes	no	no
9592	149	S.A. & D.A.	Solenoid	3/4-way, 2 Pos.	115	yes	no	no
9594	149	S.A. & D.A.	Air	3/4-way, 2 Pos.	—	no	yes	yes
9599	148	S.A.	Pilot Operated Solenoid	3-way, 3 Pos. Tandem Center	24	no	yes	yes
9605	148	S.A.	Pilot Operated Solenoid	3-way, 3 Pos. Tandem Center	115	no	yes	yes
9609	148	S.A.	Manual	3-way, 4 Pos. Tandem Center	—	no	yes	no
9610	145	S.A.	Auto Pilot Operated	3-way, 2 Pos.	—	yes	no	no
9610A	145	S.A.	Manual	2/3-way, 2 Pos.	—	no	yes	no
9615	150	D.A.	Solenoid	4-way, 3 Pos. Open Center	24	yes	no	no
9628	151	S.A. & D.A.	Manual	Post Tensioning	—	special	no	no
9632	151	S.A. & D.A.	Manual	Post Tensioning	—	special	no	no

Choosing the right valve  
Pages 190-191

Pump mounted valves  
Pages 145-151



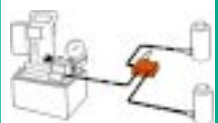
Order No.	Page No.	*Cylinder Application	Operation	Valve Type	Volt	Advance/Return	Advance/Hold Return	Posi-Check® Feature
9508	153	S.A. & D.A.	Manual	4-way, 3 Pos. Closed Center	—	no	yes	yes
9509	153	S.A. & D.A.	Manual	4-way, 3 Pos. Tandem Center	—	no	yes	yes
9514	153	D.A.	Solenoid	4-way, 3 Pos. Tandem Center	115	no	yes	yes
9524	152	S.A. & D.A.	Solenoid	3/4-way, 2 Pos.	230	no	yes	no
9525	153	D.A.	Solenoid	4-way, 3 Pos. Tandem Center	230	no	yes	yes
9526	153	S.A.	Solenoid	3-way, 2 Pos.	230	no	yes	no
9554	152	S.A. & D.A.	Solenoid	3/4-way, 2 Pos.	24	no	yes	no
9555	153	D.A.	Solenoid	4-way, 3 Pos. Tandem Center	24	no	yes	yes
9556	153	S.A.	Solenoid	3-way, 2 Pos.	24	no	yes	no
9559	153	S.A.	Solenoid	3-way, 2 Pos.	115	no	yes	no
9593	152	S.A. & D.A.	Solenoid	3/4-way, 2 Pos.	115	no	yes	no
9595	152	S.A. & D.A.	Air	3/4-way, 2 Pos.	—	no	yes	no

Remote mounted valves  
Pages 152-153



Order No.	Page No.	*Cylinder Application	Operation	Valve Type	Volt	Advance/Return	Advance/Hold Return	Posi-Check® Feature
9575	155	S.A.	Manual	Shut-off Valve	—	—	—	—
9580	155	S.A.	Automatic	One-way Check Valve	—	—	—	—
9581	155	S.A. & D.A.	Automatic	Pilot Op. Check Valve	—	—	—	—
9596	154	S.A.	Manual	Load Lowering Valve	—	—	—	—
9597	154	S.A. & D.A.	Automatic	Sequence Valve	—	—	—	—
9608	154	S.A. & D.A.	Automatic	Pressure Reducing Valve	—	—	—	—
9623	155	S.A. & D.A.	Automatic	Pressure Relief Valve	—	—	—	—
9631	155	S.A. & D.A.	Automatic	Metering Valve	—	—	—	—
9633	155	S.A. & D.A.	Automatic	Pressure Regulator Valve	—	—	—	—
9720	154	S.A. & D.A.	Automatic	Counter Balance Valve	—	special	—	—
9721	154	S.A. & D.A.	Automatic	Counter Balance Valve	—	special	—	—
RV12178	155	—	Automatic	Relief Valve	—	—	—	—

In-line valves  
Pages 154-155



\* "S.A." represents single-acting cylinders, "D.A." represents double-acting cylinders

# Hydraulic Valves

## Pump Mounted, Manual and Pilot Operated

### 700 bar, $\frac{3}{8}$ " ports, 19 L/min. max flow rate.

#### 3-way/2-position manual valves

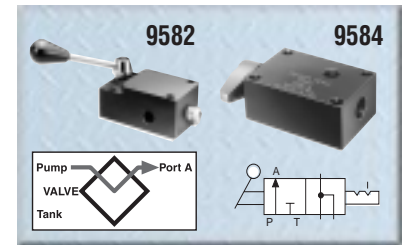
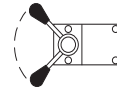
**Applications:** *Single-acting cylinders.*     **Actuation:** Lever operated.

**Functions:** Cylinder piston "advance", "hold" and "return".

**Used on these pumps:** P460, PE17, PE21, PE30, PE46, PE55, PE84, PE90, PE120, PQ60 and PQ120 series.

**No. 9582** – 3-way/2-position manual valve. Wt. 1.1 kg.

**No. 9584** – Same as 9582, but has "flipper" control. Wt., 0.8 kg.



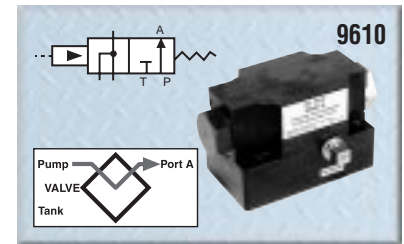
#### 3-way/2-position, pilot operated automatic valve

**Application:** *Single-acting cylinders.*     **Actuation:** Pilot oil.

**Functions:** When pump is started, pilot oil automatically closes valve and directs oil to cylinder; when pump is stopped, valve automatically opens and oil returns to reservoir.

**Used on these pumps:** Furnished with pilot lines and adapters for PA55, PA90, PE30, PE55, PE90 and PE120 series.

**No. 9610** – 3-way/2-position pilot operated automatic valve. Wt., 1.9 kg.



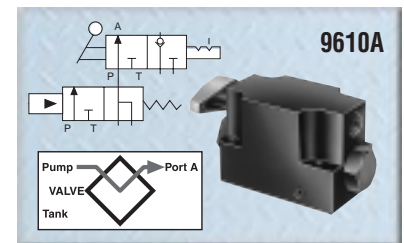
#### 2/3-way/2-position manual/pilot operated automatic valve

**Application:** *Manual operation for load lifting and holding with single-acting cylinders; automatic "dump" for operating hydraulic tools.*     **Actuation:** Flipper lever/pilot oil.

**Functions:** With lever in closed position, valve will hold the load. When lever is "open", valve functions as a true automatic "dump" valve.

**Used on these pumps:** Furnished with pilot lines and adapters for PA55, PA90, PE30, PE55, PE90 and PE120 series. For application on other pumps, consult factory.

**No. 9610A** – 2/3-way/2-position manual/pilot operated automatic valve. Wt., 2 kg.



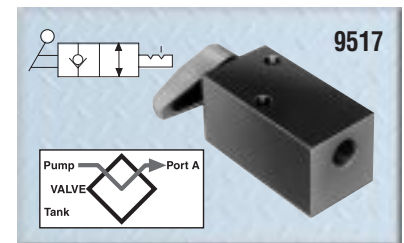
#### 2-way/2-position manual valve

**Application:** *Single-acting cylinders.*     **Actuation:** Flipper lever operated.

**Functions:** Cylinder piston "advance", "hold" and "retract".

**Used on these pumps:** PE172, PA172 and PE84 series.

**No. 9517** – 2-way/2-position manual valve. Wt., 1.5 kg.



#### 3/4-way/2-position manual valve

**Application:** *Single- or double-acting cylinders.*     **Actuation:** Lever operated, detent positioned.

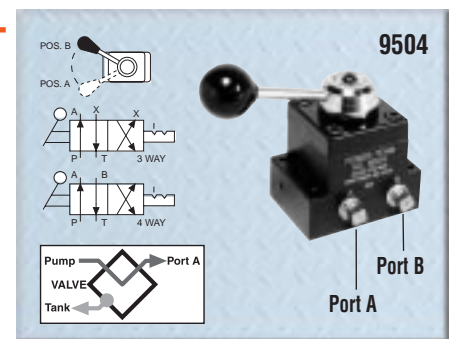
**Functions:** Pos. 1 – Oil is directed to "advance" side of cylinder, oil from "retract" side goes to reservoir; cylinder "holds" with pump shut off. Pos. 2 – Oil goes to "retract" side of cylinder; cylinder "holds" with pump shut off. When using as a 3-way valve for single-acting cylinders, port "A" or "B" is plugged.

See note on page 146 regarding plugging of ports and resulting heat build-up.

**Used on these pumps:** P460, PA6D, PA17, PA46, PA55, PA60, PE17, PE21, PE30, PE46, PE55, PE84, PE90, PE120, PE200, PE400, PQ60 and PQ120 series.

**No. 9504** – 3/4-way/2-position manual valve. Wt., 1.9 kg.

**NOTE:** 9504 can be remote mounted with a 9510 subplate (see page 163).



**NOTE:** A pressure switch and/or gauge may be attached to any valve on this page. (refer to pages 76-77, 163)

**CAUTION:** To prevent sudden, uncontrolled descent of a load as it is being lowered, use a No. 9596 Load Lowering Valve or No. 9720 Counter Balance Valve (see page 154) in conjunction with the directional valve used in your application.

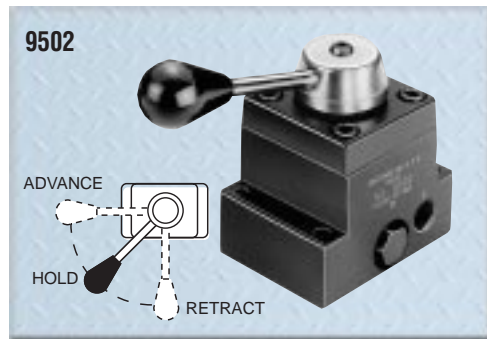
**IMPORTANT:** Conversion kit 251528 must be used when mounting any of the valves on this page on PA17 or PE17 pumps.

**IMPORTANT:** When ordering any valve for a PE30 or PG30 series pump, 12.7 mm longer mounting screws are required. For valves 9504, 9584, 9610 and 9610A, order four 12001 cap screws. For valve 9582, order two 12001 and two 10856 cap screws.

# Hydraulic Valves

## Pump Mounted

700 bar, 3/8" ports, 19 L/min. max flow rate.



### 3-way/3-position (closed center) non-interflow manual valve with "Posi-Check®"

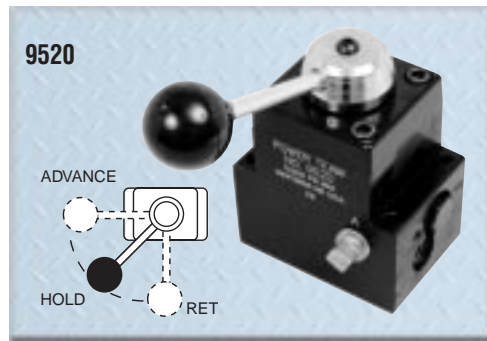
**Application:** Single-acting cylinders. **Actuation:** Lever operated, detent positioned.

**Functions:** Pos. 1 – Oil is directed from pump to cylinder and "holds" with pump shut off; line to reservoir is blocked. Pos. 2 – All oil is open to reservoir through tank line. Center pos. – Cylinder pressure is held; pump should be shut off.

**Used on these pumps:** P460, PA17, PA46, PA55, PA60, PE17, PE21, PE30, PE46, PE55, PE84, PE90, PE120, PE200, PE400, PQ60 and PQ120 series.

**NOTE:** A pressure switch and/or gauge may be attached if desired (see pages 76-77, 163). Also, the 9502 can be remote mounted if a 9510 subplate is used (see page 163).

**No. 9502** – 3-way/3-position (closed center) manual valve. Wt., 1.9 kg.



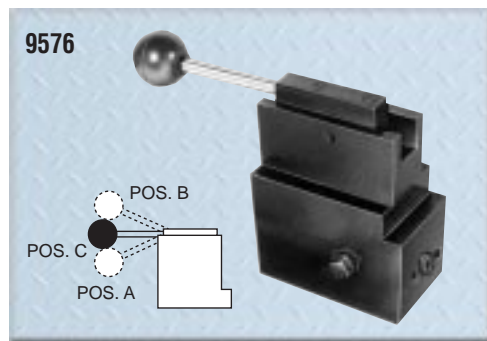
### 3-way/3-position (tandem center) manual valve with "Posi-Check®"

**Application:** Single-acting cylinders. **Actuation:** Lever operated, detent positioned.

**Functions:** "Advance" "hold" and "return". When shifted to "return" position, pump and cylinder return oil through their own separate return lines, allowing faster retraction of piston. The "Posi-Check®" feature guards against pressure loss when shifting from "advance" to "hold" position.

**Used on these pumps:** P460, PA17, PA46, PA55, PE17, PE21, PE30, PE46, PE55, PE84, PE90, PE120, PQ60, PQ120, PE200, PE400, PG30, PG55, PG120 and PG400 series.

**No. 9520** – 3-way/3-position (tandem center) manual valve. Wt., 2.3 kg.



### 3-way/3-position (tandem center) metering valve

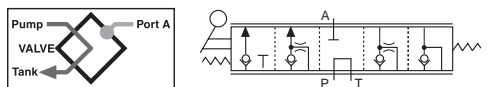
**Application:** Single-acting cylinders. **Actuation:** Lever operated.

**Functions:** Cylinder piston metered "advance", "hold" and metered "return".

**Used on these pumps:** PA17, PA46, PA55, PE17, PE21, PE30, PE46, PE55, PE84, PE90, PE120, PQ60, PQ120, PE200, PE400, PG30, PG55, PG120 and PG400 series.

**NOTE:** A pressure switch and/or gauge may be attached if desired (see pages 76-77, 163). Also, the 9576 can be remote mounted with a 9510 subplate (see page 163).

**No. 9576** – 3-way/3-position (tandem center) metering valve. Wt., 3.9 kg.



**CAUTION:** To prevent sudden, uncontrolled descent of a load as it is being lowered, use a No. 9596 Load Lowering Valve or No. 9720 Counter Balance Valve (see page 154) in conjunction with the directional valve used in your application.

**NOTE:** Valves 9501, 9502, 9504 and 9507 can have a port blocked or have a closed center position. When a port is blocked and the valve is shifted to the blocked port, the pump will generate excessive heat. An electric or rotary air pump can either be turned off manually or with a pressure switch. Reciprocating air pumps may be adjusted to stall out and stop. **NOTE:** Gauge ports monitor pump pressure only, not pressure to the hydraulic cylinder(s).

**IMPORTANT:** Conversion kit 251528 must be used when mounting any of the valves on this page on PA17 or PE17 pumps.

**IMPORTANT:** When ordering any valve for a PE30 or PG30 series pump, 12.7 mm longer mounting screws are required. For valves 9502 and 9520, order four 12001 cap screws. For valve 9576, order four 17428 cap screws.

# Hydraulic Valves

## Pump Mounted

700 bar, 3/8" ports, 19 L/min. max flow rate.

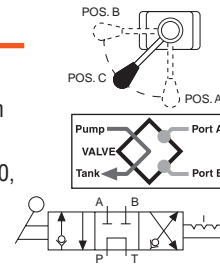
### 4-way/3-position (tandem center) valve with "Posi-Check®"

**Application:** Double-acting cylinders. **Actuation:** Lever operated, detent positioned.

**Functions:** "Advance", "hold" and "return". The "Posi-Check®" feature guards against pressure loss when shifting from "advance" to "hold" position.

**Used on these pumps:** P460, PA6D, PA17, PA46, PA55, PE17, PE21, PE30, PE46, PE55, PE84, PE90, PE120, PE200, PE400, PED, PG30, PG55, PG120, PG400, PQ60 and PQ120 series

**No. 9506** – 4-way/3-position (tandem center) manual valve. Wt., 2.3 kg.



### 4-way/3-position (tandem center) and (open-center) manual valves

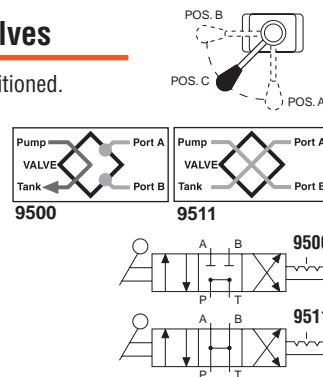
**Application:** Single- or double-acting cylinders. **Actuation:** Lever operated, detent positioned.

**Functions:** The 9500 provides "advance", "hold" and "return". The 9511 (open center) valve can be used if holding is not a requirement, as when running two separate hydraulic tools. Provides "advance" and "return" only.

**Used on these pumps:** P460, PA17, PA46, PA55, PE17, PE21, PE30, PE46, PE55, PE84, PE90, PE120, PE200, PE400, PG30, PG55, PG120, PG400, PQ60 and PQ120 series.

**No. 9500** – 4-way/3-position (tandem center) manual valve. Wt., 1.9 kg.

**No. 9511** – Same as 9500, except has an open center.



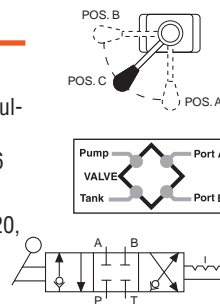
### 4-way/3-position (closed center) manual valve with "Posi-Check®"

**Application:** Single- or double-acting cylinders. **Actuation:** Lever operated, detent positioned.

**Functions:** Similar to 9506, but is a closed center valve with "Posi-Check®". Generally used to operate multiple cylinders with a single pump. Provides "advance", "hold" and "return". The "Posi-Check®" feature guards against pressure loss when shifting from the "advance" to "hold" position. See note on page 146 regarding plugging of ports and resulting heat build-up.

**Used on these pumps:** P460, PA17, PA46, PA55, PA60, PE17, PE21, PE30, PE46, PE55, PE84, PE90, PE120, PE200, PE400, PQ60 and PQ120 series.

**No. 9507** – 4-way/3-position (closed center) manual valve. Wt., 2.3 kg.



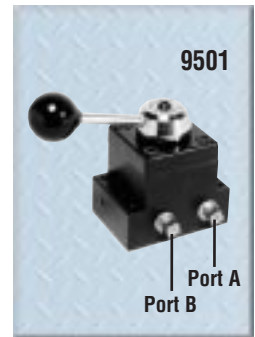
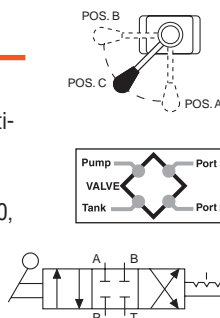
### 4-way/3-position (closed center) manual valve

**Application:** Single- or double-acting cylinders. **Actuation:** Lever operated, detent positioned.

**Functions:** "Advance", "hold" and "return". Closed center design makes valve suitable for operating multiple cylinders from a single pump. See note on page 146 regarding plugging of ports and resulting heat build-up.

**Used on these pumps:** P460, PA17, PA46, PA55, PA60, PE17, PE21, PE30, PE46, PE55, PE84, PE90, PE120, PE200, PE400, PQ60 and P120 series.

**No. 9501** – 4-way/3-position (closed center) valve. Wt., 1.9 kg.



**NOTE:** A pressure switch and/or gauge may be attached to valves 9500, 9501, 9506, 9511 if desired (see pages 76-77, 163). Also, all valves on this page may be remote mounted with a 9510 subplate (see page 163).

**CAUTION:** To prevent sudden, uncontrolled descent of a load as it is being lowered, use a No. 9596 Load Lowering Valve or No. 9720 Counter Balance Valve (see page 154) in conjunction with the directional valve used in your application.

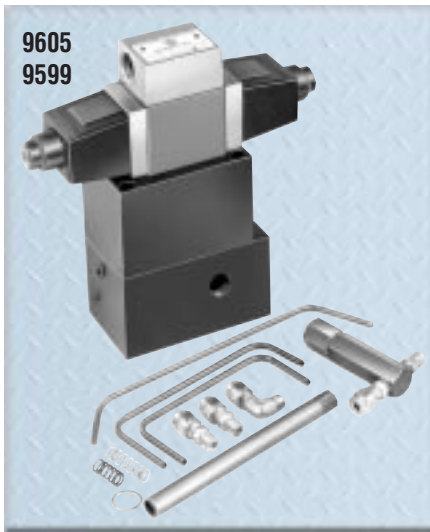
**IMPORTANT:** Conversion kit 251528 must be used when mounting any of the valves on this page on PA17 or PE17 pumps.

**IMPORTANT:** When ordering any valve for a PE30 or PG30 series pump, 12.7 mm longer mounting screws are required. For valves 9500, 9501 and 9511, order four 12001 cap screws. For valves 9552, 9506 and 9507, order four 11956 cap screws.

# Hydraulic Valves

## Pump Mounted

700 bar, 3/8" ports, 19 L/min. max flow rate.



### 3-way/3-position (tandem center) solenoid valves with "Posi-Check®"

**Application:** Single-acting cylinders.

**Actuation:** Solenoid operated: 9605 is 115 volt, 50/60 Hz; 9599 is 24 volt, 50/60 Hz.

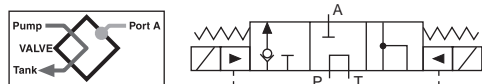
**Functions:** "Advance", "hold" and "return" positions. When in "advance", solenoid "B" is energized and oil goes from pump to cylinder through pressure port. In "return" position, solenoid "A" is energized and oil is directed from cylinder and pump to reservoir. With both solenoids de-energized, in "hold" position, oil from pump is directed back to reservoir while oil is checked in cylinder. The "Posi-Check®" feature holds load when shifting from "advance" to "hold" position.

**Used on these pumps:** Furnished with pilot lines and adapters for PE55, PE30 (carrying handles must be removed) and PE120 series. For application on other models, consult factory.

**No. 9605** – 3-way/3-position (tandem center) solenoid valve, 115 volt, 50/60 Hz. Wt., 6.4 kg.

**No. 9599** – Same as 9605 except for 24 volt, 50/60 Hz circuits.

**NOTE:** Valves above are shipped without controls. Use 202777 remote hand control (see page 162). Consult factory for field installation.



### 3-way/4-position manual pressure compensated valve

**Application:** Single-acting cylinders. Primarily for use in testing soil, rock, concrete, asphalt and related engineering materials.

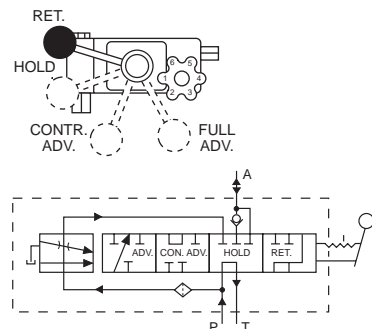
**Actuation:** Lever and adjustable, pressure compensated flow control valve.

**Functions:** Cylinder piston "return", "hold", "controlled advance" (pressure compensated) and "advance" (full flow). Will deliver a relatively constant flow regardless of pressure between 70 and 700 bar

**Used on these pumps:** PA17, PA46, PA55, PE17, PE21, PE30\*, PE46, PE55, PE90, PE200, PE400, PG30\*, PG55, PG120, PG400, PQ60 and PQ120 series. \* **NOTE:** Adapter kit 252161 is required for mounting this valve to a PE30 or PG30 series pump.

**NOTE:** This valve can be remote mounted with a 9510 subplate (see page 163).

**No. 9609** – 3-way/4-position manual pressure compensated valve. Wt., 4 kg.

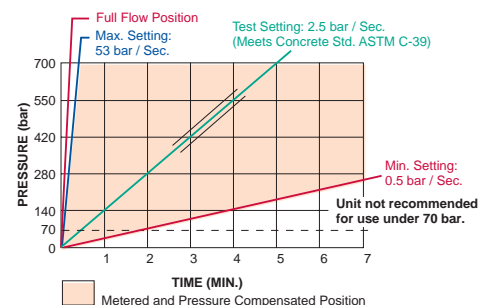


**Flow:**

Full flow position — 19 L/min. (Ref.)  
Metered advance position - 1.04 L/min. (Max.)

**Pressure:**

Min. working pressure - 70 bar.  
Max. working pressure - 700 bar  
Max. valve case pressure - 35 bar.



**CAUTION:** To prevent sudden, uncontrolled descent of a load as it is being lowered, use a No. 9596 Load Lowering Valve or No. 9720 Counter Balance Valve (see page 154) in conjunction with the directional valve used in your application.

**IMPORTANT:** Conversion kit 251528 must be used when mounting the 9609 valve on PA17 or PE17 pumps.

**IMPORTANT:** When ordering any valve for a PE30 or PG30 series pump, 12.7 mm longer mounting screws are required. For valves 9599 and 9605, order four 251078 cap screws. For valve 9609, order four 10855 cap screws.

# Hydraulic Valves

## Pump Mounted, Solenoid or Air Operated

### 700 bar, 3/8" ports, 19 L/min. max flow rate.

### 3-way/2-position solenoid valve

**Application:** *Single-acting cylinders.* **Actuation:** Solenoid operated, 115 volt, 50/60 Hz.

**Functions:** Cylinder piston advances when solenoid is de-energized and pump is running. When solenoid is energized, oil is directed to reservoir, and piston returns. For "hold" position, pump is stopped with solenoid de-energized.

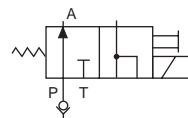
**Used on these pumps:** PE17, PE21, PE30, PE46, PE55, PE84, PE90, PE120, PE200, PE400, PQ60 and PQ120 series.

**No. 9579** – 3-way/2-position solenoid valve, 115 volt, 50/60 Hz. Wt., 4.4 kg.

**No. 9569** – Same as 9579, except with 24 volt, 50/60 Hz solenoid.

**No. 9570** – Same as 9579 except with 230 volt, 50/60 Hz solenoid.

**NOTE:** Valves above are shipped without control switch. Use 202777 remote hand switch (see page 162).



**NOTE:** When this valve is mounted, the pump must be equipped with an outlet check valve.



### 3/4-way/2-position solenoid valves

**Application:** *Single- or double-acting cylinders.* **When used with single-acting cylinders, one port should be plugged.** **Actuation:** Solenoid operated.

**Functions:** Oil is directed to "extend" side of cylinder, oil from "retract" side goes to reservoir; cylinder "holds" with pump shut off. Oil is directed to "retract" side of cylinder; oil from "extend" side goes to reservoir.

**NOTE:** Cylinder will not "hold" in the "return" position with motor running or shut off.

**Used on these pumps:** 9552, 9572 and 9592 are used with PE17, PE30 (with carrying handles removed), PE46, PE55, PE84, PE90, PE200, PE400, PQ60 and PQ120 series.

**No. 9592** – 3/4-way/2-position solenoid valve, 115 volt, 50/60 Hz. Wt., 6.6 kg.

**No. 9552** – Same as 9592, except with 230 volt, 50/60 Hz solenoid.

**No. 9572** – Same as 9592, except with 24 volt, 50/60 Hz solenoid.

**NOTE:** Valves above are shipped without controls. The 9552, 9572 and 9592 can be used with the 304718 remote hand control. (see page 162)



### Air actuated valve

**Application:** *Single- or double-acting cylinders.* **When used with single-acting cylinders, one port should be plugged.** **Actuation:** Air operated.

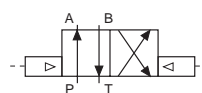
**Functions:** Oil is directed to "extend" side of cylinder, oil from "retract" side goes to reservoir; cylinder "holds" with pump shut off. Oil is directed to "retract" side of cylinder; oil from "extend" side goes to reservoir.

**NOTE:** Cylinder will not "hold" in the "return" position with motor running or shut off.

**Used on these pumps:** PA17, PA46 and PA55 series.

**No. 9594** – 3/4-way/2-position solenoid valve, air operated (minimum of 3.5 bar air pressure required). Wt., 5 kg.

**NOTE:** Valve above is shipped without controls. 9594 can be used with the 209593 remote hand control (see page 162).



**NOTE:** See page 154 for remote mounted models of this valve.



**CAUTION:** To prevent sudden, uncontrolled descent of a load as it is being lowered, use a No. 9596 Load Lowering Valve or No. 9720 Counter Balance Valve (see page 154) in conjunction with the directional valve used in your application.

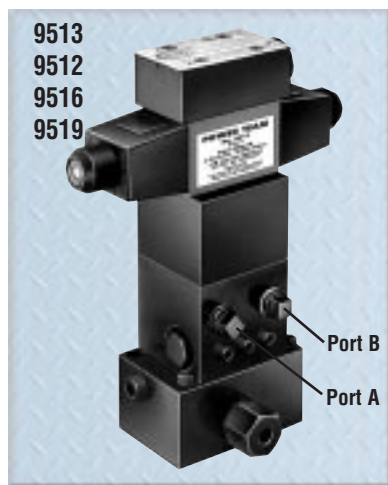
**IMPORTANT:** Conversion kit 251528 must be used when mounting any of the valves on this page on PA17 or PE17 pumps.

**IMPORTANT:** When ordering any valve for a PE30 or PG30 series pump, 12.7 mm longer mounting screws are required. For valves 9569, 9570 and 9579, order four 10856 cap screws. For valves 9552, 9572 and 9592, order four 12001 cap screws.

# Hydraulic Valves

## Pump Mounted

700 bar,  $\frac{3}{8}$ " ports, 19 L/min. max flow rate.



### 4-way/3-position (tandem center) pilot operated solenoid valve

**Application:** Double-acting cylinders. **Actuation:** Solenoid operated, 115 volt, 50/60 Hz.

**Functions:** "Advance", "hold" and "return". The "Posi-Check<sup>®</sup>" feature holds the load when shifting from the "advance" to the "hold" position.

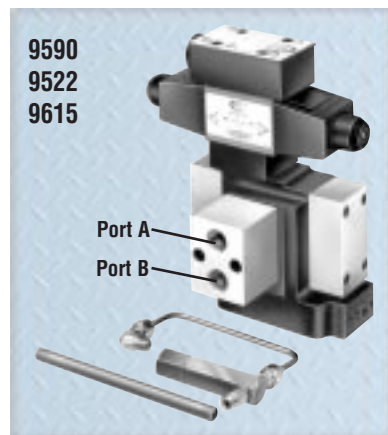
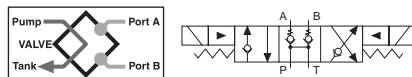
**Used on these pumps:** PE17, PE21, PE30 (with carrying handles removed), PE46, PE55, PE84, PE90, PE120, PE200, PE400, PQ60 and PQ120 series. **NOTE: A gauge may be attached if desired (see pages 76-77).**

**No. 9513** – 4-way/3-position (tandem center) solenoid valve, 115 volt, 50/60 Hz. Wt., 8.2 kg.

**No. 9512** – Same as 9513 except for 24 volt, 50/60 Hz circuits.

**No. 9516** – Same as 9513 except for 12 volt DC. For use on the PG1204S and PG400 series pumps only.

**No. 9519** – Same as 9513 except for 230 volt, 50/60 Hz circuits. Consult factory for field installation



### 4-way/3-position (open center) solenoid valve

**Application:** Double-acting cylinders. **Actuation:** Solenoid operated, 115 volt, 50/60 Hz.

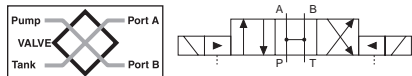
**Functions:** "Advance", open center and "return" positions. Cylinder ports and pump port are open to reservoir in "neutral".

**Used on these pumps:** Furnished with pilot lines and adapters for PE30 (with carrying handles removed), PE55, PE90 and PE120 series. For other pump models, consult factory. **NOTE: A pressure switch and/or gauge may be attached if desired (see pages 76-77, 163).**

**No. 9590** – 4-way/3-position (open center) solenoid valve, 115 volt, 50/60 Hz. Wt., 7 kg.

**No. 9522** – Same as 9590 except for 230 volt, 50/60 Hz.

**No. 9615** – Same as 9590 except for 24 volt, 50/60 Hz.



### 3-way/2-position (pilot operated) solenoid valve

**Application:** Single-acting cylinders. **Actuation:** Solenoid operated, 115 volt, 50/60 Hz.

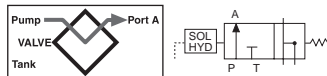
**Function:** "Advance" and "return".

**Used on these pumps:** Furnished with pilot lines and adapters for PE30 (with carrying handles removed), PE55, PE90 and PE120 series. For other pump models, consult factory. **NOTE: A pressure switch and/or gauge may be attached if desired (see pages 76-77, 163).**

**No. 9589** – 3-way/2-position (pilot operated) solenoid valve, 115 volt, 50/60 Hz. Wt., 3.7 kg.

**No. 9523** – Same as 9589 except for 230 volt, 50/60 Hz.

**No. 9553** – Same as 9589 except for 24 volt, 50/60 Hz.



**NOTE:** Valves above are shipped without control switch. Use 202777 remote hand switch (see page 162).

**CAUTION:** To prevent sudden, uncontrolled descent of a load as it is being lowered, use a No. 9596 Load Lowering Valve or No. 9720 Counter Balance Valve (see page 154) in conjunction with the directional valve used in your application.

**IMPORTANT:** Conversion kit 251528 must be used when mounting the 9609 valve on PA17 or PE17 pumps.

**IMPORTANT:** When ordering any valve for a PE30 or PG30 series pump, 12.7 mm longer mounting screws are required. For valves 9513 and 9519, order four 11956 cap screws. For valves 9523, 9553 and 9589, order four 10855 cap screws. For valves 9522, 9590 and 9615, order four 10854 cap screws.

# Hydraulic Valves Pump Mounted

700 bar,  $\frac{3}{8}$ " ports, 19 L/min. max flow rate.

## 4-way/3-position (tandem center) manual valve

**Application:** Single strand, single-acting stressing jacks with Power Wedge seater.

**Actuation:** Lever operated, detent positioned.

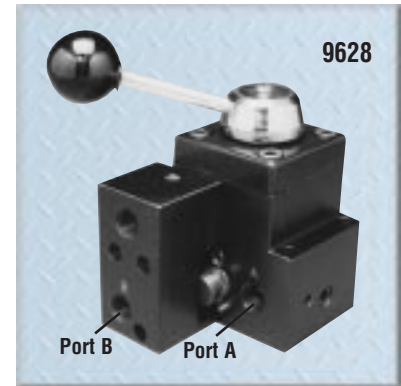
**Operation:**

1. With valve in center position, pump is started.
2. Cable is inserted into stressing tool, valve is placed in "A" position. "Pull" portion of stressing tool is pressurized to specified level for proper cable tensioning ("A" port is checked internally, can only be released by building pressure in "B" position).
3. Valve is placed in "B" position, which is pressure controlled and will not exceed 440 bar. "Return" portion of stressing tool is pressurized and will release "A" port when pressure reaches approximately one-half the "A" port pressure. "A" port remains open as long as this pressure differential is maintained.
4. Pump is stopped, valve is placed in "A" position, releasing "B" port pressure.

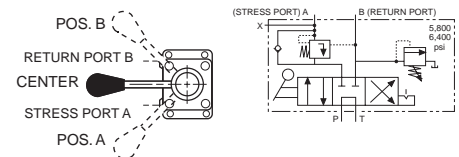
**Used on these pumps:** PA17\*, PA46\*, PA55, PE17\*, PE21\*, PE30, PE46\*, PE55, PE60, PE84, PE120, PE200, PE400, PG30\*, PG55, PG120, PG400, PQ60 and PQ120 series.

\* These pumps may have reduced first flow stage characteristics due to internal valve restrictions.

**No. 9628** – Post tensioning valve for 700 bar (max.) single-acting/Power Wedge seater. Wt., 2.5 kg.



Designed for use with Power Team air, gasoline and electric powered hydraulic pumps.



## "Twin" 4-way/3-position (tandem center) manual valve

**Application:** Multistrand, double-acting stressing jacks with an auxiliary seating cylinder.

**Actuation:** Dual lever operated, detent positioned.

**Operation:**

1. With valves "A" and "B" in center position, pump is started; cable is inserted into stressing tool.
2. Valve "A" is placed in "Stress" position; cylinder extends to tension cable. Pump pressure controls force exerted by tensioning cylinder in this position. "Stress" port is checked internally, and can only be released by building pressure in the valve "B" return position.
3. When desired cable tension is achieved, valve "A" is placed in valve "B" position and valve "B" in "Seat" position. Seating portion of cylinder will be pressurized to seating pressure controlled by "Seat" relief valve (factory set to 270 bar).
4. Valve "B" is shifted to "Return" position, which is pressure controlled and will not exceed 150 bar. "Return" portion of stressing tool should be pressurized and will release "Stress" port when pressure reaches 15% of "Stress" port pressure.
5. "Stress" port will remain open and cylinder will return as long as pressure differential is maintained. "Stress" and "Seat" ports are open to reservoir.
6. When cylinder has fully returned, both valves are shifted to "Center" position and oil will be directed to reservoir. Maximum pressure setting for the "Seat" relief valve is 415 bar.

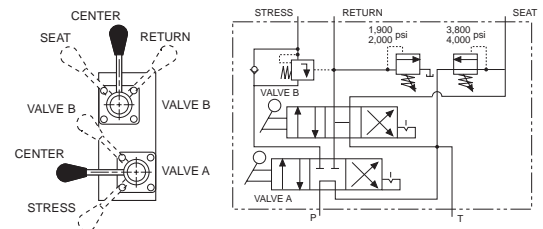
**Used on these pumps:** PA17\*, PA46\*, PA55, PE17\*, PE21\*, PE30, PE46\*, PE55, PE84, PE120, PE200, PE400, PG30\*, PG55, PG120, PG400, PQ60 and PQ120 series.\*

\* These pumps may have reduced first flow stage characteristics due to internal valve restrictions.

**No. 9632** – Post tensioning valve for 700 bar (max.) double-acting systems. Wt., 6.2 kg.



Pump mounted, 6-position detented 5-way manual dual valve. Rated pressure to valve "A" is 700 bar and valve "B" is 415 bar. Case pressure is 35 bar max.



**NOTE:** Check the operating pressures of your stressing tool. If different than above, consult tool manufacturer.

**CAUTION:** To prevent sudden, uncontrolled descent of a load as it is being lowered, use a No. 9596 Load Lowering Valve or No. 9720 Counter Balance Valve (see page 154) in conjunction with the directional valve used in your application.

**IMPORTANT:** Conversion kit 251528 must be used when mounting any of the valves on this page on PA17 or PE17 pumps.

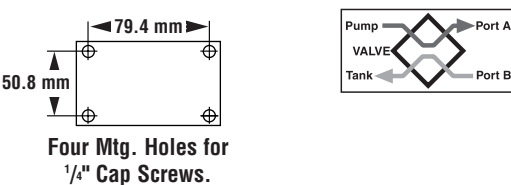
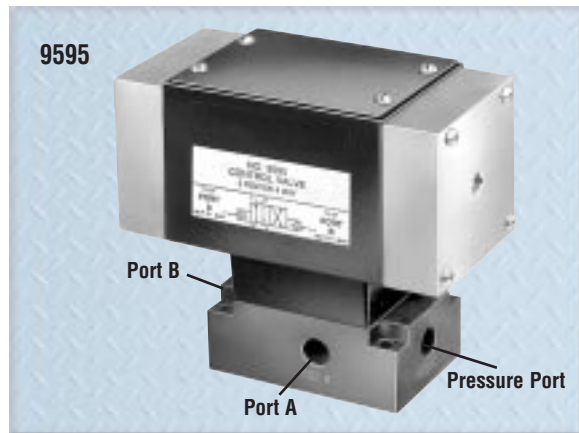
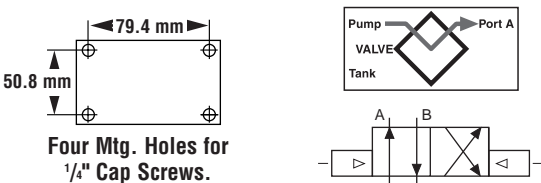
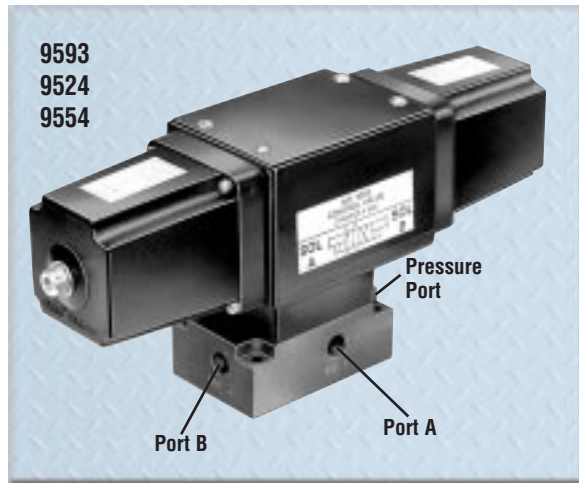
**IMPORTANT:** When ordering any valve for a PE30 or PG30 series pump, 12.7 mm longer mounting screws are required. For valve 9628, order four 11956 cap screws. For valve 9632, order four 216234 cap screws.



# Hydraulic Valves

## Remote Mounted

700 bar, 1/4" ports, 19 L/min. max flow rate.



### 3/4-way/2-position solenoid and air actuated valves

**Application:** Single- or double-acting cylinders.

**Actuation:** 9593, 9524 and 9554 are solenoid operated, 9595 is air operated.

**Operation with single-acting cylinder:** Either oil port "A" or "B" must be plugged on valve. With port "B" plugged, solenoid is energized to position "A", oil port "A" becomes pressurized. When solenoid is energized to position "B", oil port "A" becomes the return port.

**Operation with multiple single-acting cylinders:**

A pressure line from one bank can be connected to oil port "A" and the other to oil port "B" on the valve. Sequence: When energized to position "A", oil port "A" becomes pressurized and clamps the fixture connected to oil port "A"; oil port "B" becomes a "return" port for cylinder connected to oil port "B", and retracts it. The opposite happens when solenoid "B" is energized.

**Operation with double-acting cylinder:** Port "A" is connected to "advance" port of cylinder, oil port "B" connects to cylinder "return" port. Solenoid is energized to position "A", oil port "A" becomes pressurized to extend cylinder piston. The opposite happens when solenoid "B" is energized. Valve does not hold in "retract" position.

**NOTE:** When using more than one valve on a pump, the tank port may require a check valve to permit inadvertent, momentary extension of a retracted cylinder.

**NOTE:** If pump is equipped with an internal outlet check, a "hold" position can be maintained with the pump shut off.

**No. 9593** – 3/4-way/2-position, remote mounted solenoid valve, 115 volt, 50/60 Hz. Wt., 7 kg.

**No. 9524** – Same as 9593 except with 230 volt, 50/60 Hz.

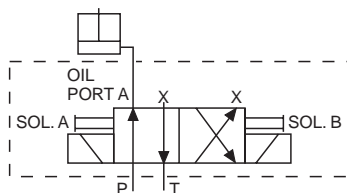
**No. 9554** – Same as 9593 except with 24 volt, 50/60 Hz.

**No. 9595** – Same as 9593 except is air operated (minimum of 3.5 bar air pressure required). Wt., 5.2 kg.

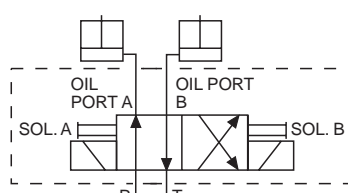
**NOTE:** Valves above are shipped without controls. The 9524, 9554 and 9593 can be used with the 304718 remote hand control (see page 162). The 9595 can be used with the 209593 remote hand control (see page 162).

**NOTE:** Valves have 1/4" NPTF ports. 3/8" to 1/4" adapters are included.

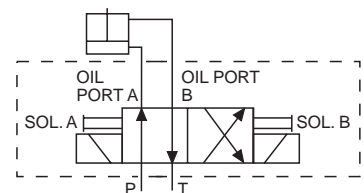
**NOTE:** Maximum tank line pressure for remote mounted valves is 35 bar.



1. To actuate one single-acting cylinder.



2. To actuate two single-acting cylinders.



3. To actuate one double-acting cylinder.

**NOTE:** Valves above are shipped without control switch. Use 202777 remote hand switch (see page 162).

**CAUTION:** To prevent sudden, uncontrolled descent of a load as it is being lowered, use a No. 9596 Load Lowering Valve or No. 9720 Counter Balance Valve (see page 154) in conjunction with the directional valve used in your application.

# Hydraulic Valves

## Remote Mounted

700 bar, 3/8" ports, 19 L/min. max flow rate.

### 4-way/3-position (closed center) and (tandem center) manual valves

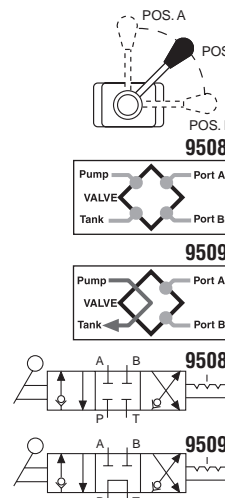
**Application:** Single- or double-acting cylinders. When used with single-acting cylinders, one port must be plugged. For double-acting cylinders, either port can be used for "advance" or "return".

**Actuation:** Lever-operated, detent positioned.

**Functions:** The 9508 provides "advance", "hold" and "return" positions with all ports blocked (closed center) in the "hold" position. The 9509 has "advance" "hold" and "return" with tandem center (cylinder ports are blocked, pump remains running). Both valves have "Posi-Check®" feature to guard against pressure loss when shifting from "advance" to "hold".

**No. 9508** – 4-way/3-position (closed center) manual valve, including subplate for remote mounting. Wt., 2.9 kg.

**No. 9509** – Same as 9508, except is tandem center.



### 4-way/3-position (tandem center) solenoid valve

**Application:** Double-acting cylinders. **Actuation:** Solenoid operated, 115 volt, 50/60 Hz.

**Functions:** Push button control of "advance", "hold" and "return". The "Posi-Check®" feature guards against pressure loss when shifting from "advance" to "hold". With valve in "hold" position, cylinder ports are blocked and oil is directed from pump to reservoir.

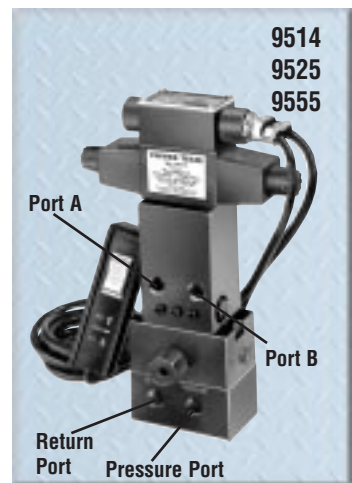
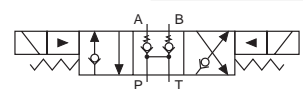
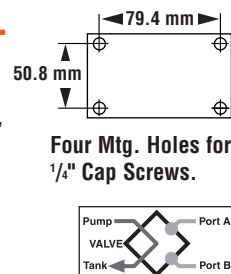
**NOTE:** Do not allow return tank pressure to exceed 35 bar at the valve.

**No. 9514** – 4-way/3-position (tandem center) solenoid valve, 115 volt, 50/60 Hz. Remote hand control included. Wt., 4.6 kg.

**No. 9525** – Same as 9514 except for 230 volt, 50/60 Hz.

**No. 9555** – Same as 9514 except for 24 volt, 50/60 Hz.

**NOTE:** Consult factory before installing a pressure switch on any of these valves.



### 3-way/2-position solenoid valve

**Application:** Single-acting cylinders. **Actuation:** Solenoid operated, 115 volt, 50/60 Hz.

**Function:** Advances cylinder piston when solenoid is de-energized, and pump is running. When solenoid is energized, oil is directed back through valve "return" port and cylinder piston returns. To place cylinder in "hold" position, pump must be stopped or its flow held at the valve "pressure" port with the solenoid de-energized.

**NOTE:** Valve is equipped with a 9631 snubber valve in port "A". The line from the "return" port of the valve must be unrestricted (7 bar back pressure maximum) back to the reservoir.

**IMPORTANT:** A 9580 in-line check valve (see page 155) must be installed in the "pressure" port if the supply pump is not equipped with an outlet check valve.

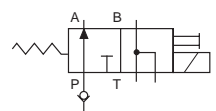
**No. 9559** – 3-way/2-position solenoid valve, 115 volt 50/60 Hz. Includes a remote mounting subplate. Wt., 4.4 kg.

**No. 9526** – Same as 9559 except for 230 volt, 50/60 Hz.

**No. 9556** – Same as 9559 except for 24 volt, 50/60 Hz.

**NOTE:** The 9559, 9526 and 9556 are shipped without control switch. Use 202777 remote hand switch (see page 162). Other switches also available; consult factory.

**NOTE:** Maximum tank line pressure for remote mounted valves is 35 bar.

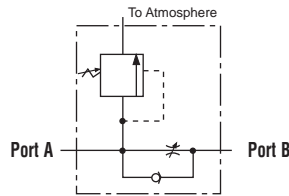


**CAUTION:** To prevent sudden, uncontrolled descent of a load as it is being lowered, use a No. 9596 Load Lowering Valve or No. 9720 Counter Balance Valve (see page 154) in conjunction with the directional valve used in your application.

# Hydraulic Valves

## In-Line

700 bar, 19 L/min. max flow rate.



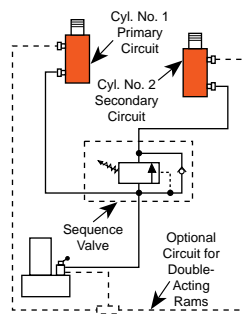
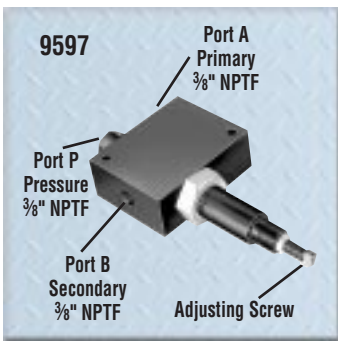
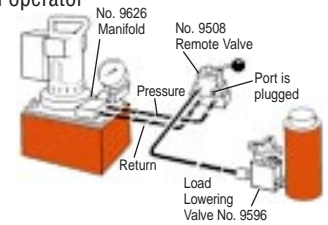
### Load lowering valve

**Application:** Precision metering for controlled cylinder piston return.

**Operation:** Permits free flow when extending cylinder, built-in pressure relief and "Posi-Check"™ locks and holds load in raised position until operator opens valve. May be pre-set to provide consistent metered return, or operator may select rate of return with each actuation. Has 3/8" NPTF ports.

**NOTE:** Pressure relief valve setting is 830 bar. Operating pressure is 700 bar and max. flow rate is 19 L/min..

**No. 9596** – Load lowering valve. Wt., 1 kg.

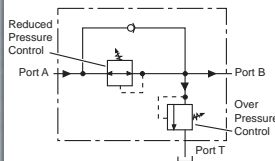
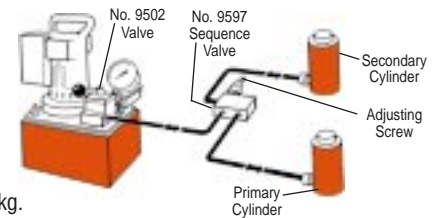


### Sequence valve

**Application:** Used when one cylinder in a multi-cylinder application must advance before any other.

**Operation:** Pump is connected to port "P" and separate cylinders to ports "A" and "B". When pressure is applied to port "P", cylinder "A" advances. Cylinder "B" will not advance until a predetermined pressure setting is reached in cylinder "A". Pressure setting is adjustable from 35 to 550 bar with adjustment screw; factory preset at 70 bar. Has 3/8" NPTF ports.

**No. 9597** – Pressure control sequencing valve. Wt., 2.5 kg.

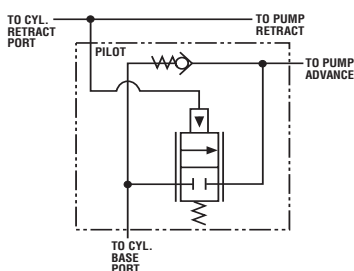


### Pressure reducing valve

**Application:** Provides complete, independent pressure control to two or more clamping systems operated by a single power source.

**Operation:** Can be used to provide different pressures in various stages of a single system. Virtually zero leakage across valve means each system can be operated by a single continuous pressure source. Adjustable from 70 to 350 bar at outlet port "B" (secondary). Has 1/4" NPTF ports.

**No. 9608** – Pressure reducing valve. Wt., 2.6 kg.



### Counter balance valve

**Application:** Double-acting cylinders. Provides positive holding and controlled, "chatter-free" lowering of a load.

**Operation:** Load is raised at flow rate of pump, and held when pump is shut off. When the pump is shifted to "retract", the counter balance valve will continue to hold the load until system pressure exceeds pressure caused by load. The load can then be lowered smoothly to the flow rate of the pump. The counter balance valve is designed to operate with pumps having a high pressure flow rate of up to 1.9 L/min. and cylinder ratios of 3 to 1.

**No. 9720** – Counter balance valve, including two male and two female half couplers, two hydraulic hoses, fittings and dust caps. Wt., 4.5 kg.

**No. 9721** – Same as 9720, but does not include couplers, hoses, fittings and dust caps. Wt., 4.2 kg.

**CAUTION:** The 9720 patented counter balance valve has a pilot pressure as high as 210 bar. Because this pressure is applied to the rod end of the cylinder while it is already under load, the system should not be sized for loads greater than 80% of cylinder rated capacity.

**CAUTION:** To prevent sudden, uncontrolled descent of a load as it is being lowered, use a No. 9596 Load Lowering Valve or No. 9720 Counter Balance Valve in conjunction with the directional valve used in your application.

700 bar, 22.7 L/min. max flow rate.

## Shut-off valve

**Application:** This needle valve permits fine metering of hydraulic oil.

**Operation:** Can be used for controlling multiple single-acting cylinders.

**No. 9575** – Shut off valve with 3/8" NPTF ports. Wt., 0.6 kg.

## Check valve

**Application:** Permits flow of hydraulic oil in one direction only.

**Operation:** Installs right in hydraulic line.

**No. 9580** – Check valve with 3/8" NPTF male ends. Wt., 181 g.

## Pilot operated check valve

**Application:** For use with open or tandem center valves. Permits free flow of fluid in one direction.

**Operation:** Flow is blocked in opposite direction until pilot oil pressure is applied. This prevents the loss of pressure if the valve is inadvertently shifted or the pump line is broken. Minimum cracking pressure is 4.1 bar. Required pilot pressure is approximately 16% of checked system pressure.

**No. 9581** – Pilot operated check valve with 3/8" NPTF ports. Wt., 1.7 kg.

## “In-line” pressure relief valve

**Application:** Single- or double-acting cylinders. For remote locations in a hydraulic circuit where maximum pressure requirements are less than basic overload valve setting in pump.

**Operation:** Adjustable from 70 to 700 bar. Valve is spring-loaded and direct-acting.

**No. 9623** – Pressure relief valve with 3/8" NPTF ports. Wt., 0.9 kg.

## Metering valve

**Application:** For systems using large cylinders or extended lengths of hydraulic hose.

**Operation:** Controls surges by restricting flow if it exceeds 26.5 L/min. When flow subsides, valve reopens automatically. Has 3/8" NPTF male end to thread into return port of system control valve, and a 3/8" NPTF female end, permitting return hose to be directly connected.

**No. 9631** – Metering valve. Wt., 91 g.

## “In-line” pressure regulator valve

**Application:** Single- or double-acting cylinders. Permits adjusting operating pressures at various values below relief valve setting of pump.

**Operation:** Regulator valve is easily adjusted to maintain pressures between 20 and 700 bar. Maintains a given pressure setting within 3% over repeated cycles. Flow range is .27 to 22.7 L/min.

**No. 9633** – In-line pressure regulator valve with two 3/8" NPTF inlet ports, one 1/8" NPTF tank port and 1 m drain line kit. Wt., 0.9 kg.

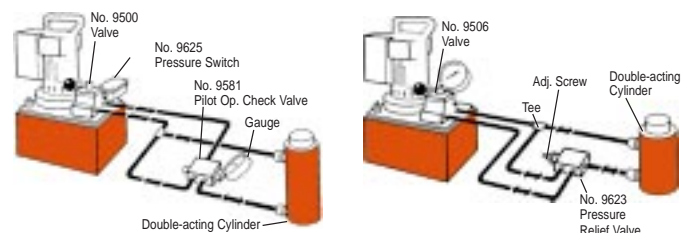
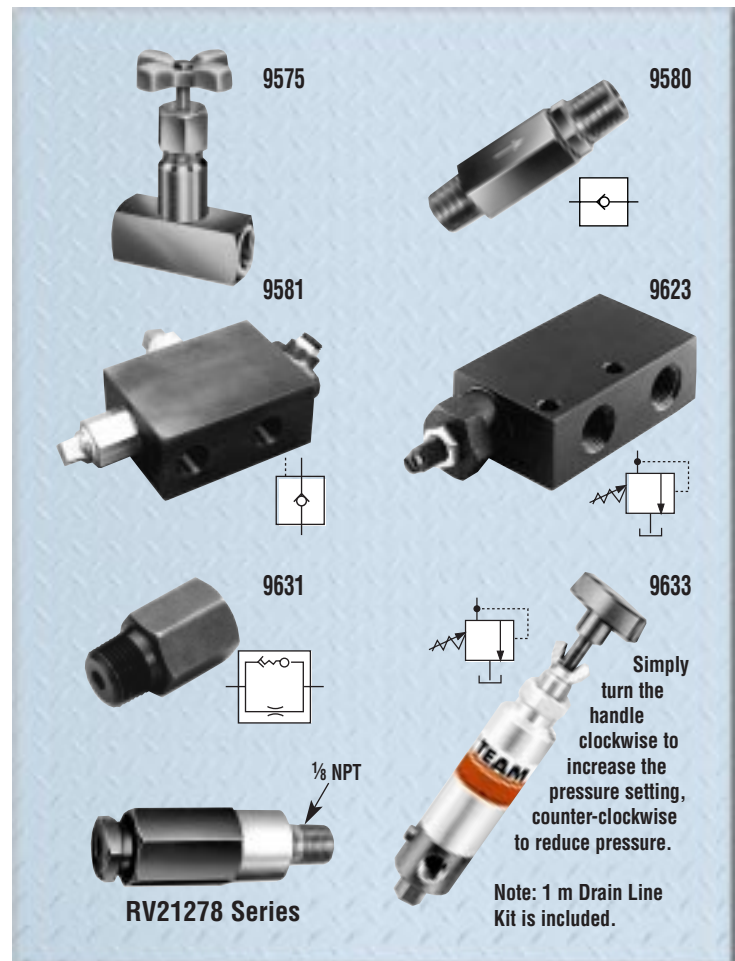
## Relief valves

**Application:** Provide an economical means of protecting an hydraulic circuit against over pressurization.

**Operation:** These factory preset valves are designed for maximum flow rate of 19 L/min.. Furnished with 1/8" NPTF male port.

All valves weigh 91 g. See chart to the right for ordering information.

**NOTE:** Care should be exercised to protect workers from hot, pressurized hydraulic oil. Install these valves only in an enclosed or shielded area.



Valve Order No.	Pressure Setting (bar)
RV21278	697 / 738
RV21278-6	41 / 44
RV21278-10	62 / 69
RV21278-15	103 / 117
RV21278-20	131 / 152
RV21278-28	186 / 207
RV21278-30	207 / 235
RV21278-32	214 / 228
RV21278-35	241 / 262
RV21278-40	283 / 310
RV21278-43	304 / 331
RV21278-48	338 / 366
RV21278-50	352 / 393

Valve Order No.	Pressure Setting (bar)
RV21278-52	366 / 407
RV21278-55	386 / 428
RV21278-57	400 / 442
RV21278-60	421 / 462
RV21278-65	455 / 497
RV21278-70	490 / 531
RV21278-75	524 / 566
RV21278-80	559 / 600
RV21278-83	580 / 621
RV21278-86	600 / 642
RV21278-88	614 / 662
RV21278-90	628 / 669

Preset — Non-Serviceable