

Type “P” Rotair® Pneumatic Directional Control Valves

Catalog pages from SC-700
June 2003

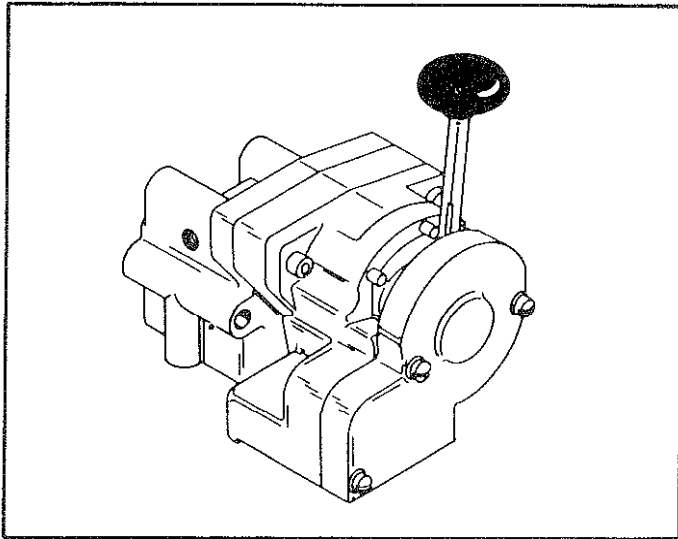
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REXROTH TYPE "P" ROTAIR® VALVES

MULTIPLE HANDLE POSITION THREE-WAY VALVE COMBINATIONS



The ROTAIR Valve is a handle-operated, rotary-type, directional control valve. Air-flow patterns are selected by using up to eight distinct handle positions, and delivery air is directed through a rotary valve to the necessary number of delivery ports.

Those models with an "S" suffix (see the "Identity Schedule") have a limit-switch which is activated in the NEUTRAL position. This electrical switch can provide a neutral starting interlock when the starting switch to the engine starting relay is wired through it.

The number of handle positions in each valve is indicated by the initial digit in the model designation (see the "Identity Schedule").

Some models of the Rotair Valve are equipped with a "Downshift Inhibitor" (See Identity Schedule). This safety feature prevents downshifting until the proper electrical signal is obtained from the transmission. Detented models have pins in the cover only, except between neutral & 1st.

INSTALLATION

The Rotair Valve can be installed in any position convenient for manual operation; however, an installation with the handle vertical is recommended. As assembled, each valve includes a pipe bracket, or subbase, to which all piping connections are made. Pipe connections are clearly marked by numbers on the bracket. All ports between the pipe bracket and valve assembly are sealed with tetraseals*. This arrangement permits easy removal of the valve assembly without disturbing the pipe connections.

An adequate air filter should be installed in the supply line ahead of the ROTAIR Valve. Clean air is essential to the trouble-free life of the rotary valve seat.

When the neutral start interlock is desired, the terminals marked "normally closed" and "common", on the limit switch, should be used. The "normally open" terminal can be used for other purposes since the circuit will be made at all times other than in neutral.

OPERATION

(reference assembly views on page 51)

Maximum operating pressure for the ROTAIR Valve is 150 psi, with a temperature range of -40° F to $+160^{\circ}$ F. The handle-positioning labyrinth is composed of two mating parts, the body (1), and cover (2). The handle shaft (3) moves, by side-to-side motion, through an arc of designated handle positions, assuring correct sequence of operation. A handle position cannot be bypassed unintentionally on those models with a labyrinth slot pattern.

Movement of the handle rotates the rotary valve (4), acting through the rotary valve key (5). The ported rotary valve is aligned with ports in the rotary valve seat (6) as determined by handle position. The aligned ports form a passage for air to flow from the IN port to the numbered OUT ports. Those OUT ports which are not aligned to supply in a particular handle position are connected to exhaust.

With the handle in NEUTRAL position on those models containing a limit-switch, the handle shaft, acting on the set screw (7), positions the switch lever (8) to activate the limit-switch (9).

The solenoid portion of the inhibitor (10) is wired to the electric switch on the transmission. The inhibitor is activated by presence of current during improper conditions for shifting. The inhibitor clutches (11 & 12) engage to prevent handle movement in the downshift direction, which if done at the wrong time, could cause damage to the engine and the transmission.

ADJUSTMENT

A set screw (7) is provided to adjust the trip point of the limit-switch, if necessary. This adjustment may be made externally through a hole in the bottom of the valve body. An additional function of the hole is drainage of water or sludge.

REXROTH TYPE "P" ROTAIR® VALVES

FEATURES OF CURRENT DESIGN

Greater dependability and longer, trouble-free service are provided by the current, improved ROTAIR VALVE. Corrosion resistance throughout the valve is ensured by the materials used, and several important design changes. Obsolete numbers are shown in identity schedule.

The valve cover (2), pipe bracket (13), and the body (1) are die-cast aluminum. Handle-guide pins in the body are hardened steel, cadmium plated. To eliminate maintenance problems and the need for frequent relapping of the rotary valve seat and rotary valve, caused by dirt and foreign matter in the air system, seven molded nylon, 150-micron strainers (14) are installed in the pipe bracket, one in each port. The pipe bracket was redesigned to accommodate these seven strainers, the single strainer in the IN port no longer being required.

A ni-resist iron rotary valve seat (6) is used, and seven tetraseals (11) now seal the pipe bracket and seat in the place of six larger "O" rings and one small "O" ring in the older design. Although not recommended, the new seat may be used

with the old pipe bracket, but only when tetraseals replace the six large "O" rings. The old seat cannot be used with the new pipe bracket because of the slight shift in port locations to accommodate the new strainers.

Longer wear results from separate, hardened steel, cadmium-plated switch tips (15) attached to a single handle shaft (3), to activate the limit-switch in the selected handle position. Any of the shafts may be replaced by the new shaft as long as the appropriate switch tip is used. Made from tougher, more wear-resistant steel, also cadmium plated, the new shaft is designed with rounded corners for smoother operation. Also the pin with cotters has been replaced with a nut and handle pin.

To improve the handle centering and eliminate the use of shims, the rotary valve key has been redesigned to contain a handle leveler and spring, which replace the spring, shim, and spring seat formerly assembled inside the valve cover on the opposite side of the handle shaft.

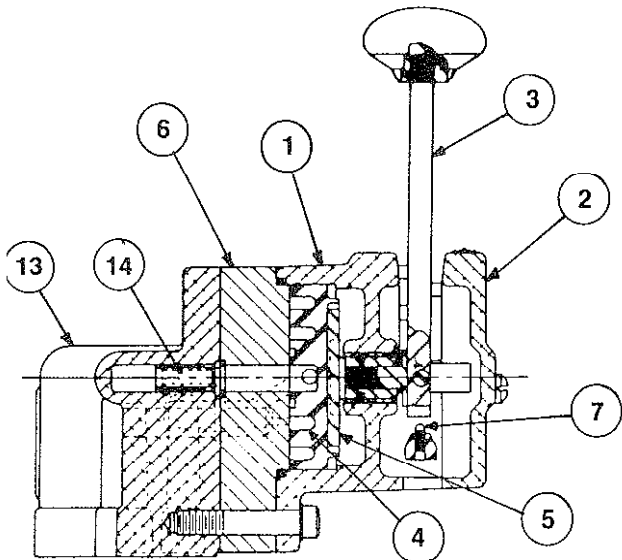
VALVE MODEL IDENTITY SCHEDULE

Valve Model	Current Pc. No.	Handle Position Designations	Type of Handle Movement	Special Details
5P-5S	P55804-0001	R/N/F1/F2/F3	Labyrinth	R2 & F4 positions blocked
6P-5S	P57081-0001	R1/N/F1/F2/F3/F4	Labyrinth	R2 position blocked
6P-2S	P62255	R1/N/F1/F2/F3/F4	Labyrinth	12VDC Inhibitor, R2 position blocked
6P-1S	P63984-0001	R/N/1/2/2-4/2-5	Detented	Two forward position blocked
6P-5S	P65235-0001	N/1/2/3/4/5	Labyrinth	R position blocked
7P-5S	P55421-0001	R2/R1/N/F1/F2/F3/F4	Labyrinth	24VDC Inhibitor
7P-2S	P60984-0001	R2/R1/N/F1/F2/F3/F4	Labyrinth	No neutral switch
7P-5	P63348	R/N/1/2/3/4/5	Labyrinth	F4 position blocked
7P-5S	P61184	R3//R2/R1/N/F1/F2/F3	Labyrinth	
7P-5S	P55380-0001	R/N/1/2/3/4/5	Labyrinth	
7P-7S	P57564-0001	R2/R1/N/F1/F2/F3/F4	Labyrinth	
7P-8S	P57250-0004	R3/R2/R1/N/F1/F2/F3	Labyrinth	Nameplate reversed
7P-8S	P57250-0006	F3/F2/F1/N/R1/R2/R3	Detented	Offset handle with "Z" slot
7P-9	P58914-0001	R/N/1/2/3/4/5	Labyrinth	No neutral switch
7P-9S	P63985	R/N/1/2/2-3/2-4/2-5	Detented	
7P-9S	P63985-0001	R/N/1/1-2/1-3/1-4/1-5	Detented	
7P-9S	P63985-0002	R/N/1/2/3/4/5	Detented	
7P-9S	P63985-0003	R/N/1/2/3/4/5	Detented	Switch trip at position 1
8P-1S	P55556-0003	R/N/F1/F2/F3/F4/F5/F6	Labyrinth	
8P-1S	P55556-0004	R/N/F1/F2/F3/F4/F5/F6	Labyrinth	
8P-2S	P60867-0004	R/N/F1/F2/F3/F4/F5/F6	Labyrinth	12VDC Inhibitor
8P-2S	P60867-0005	R/N/F1/F2/F3/F4/F5/F6	Labyrinth	24VDC Inhibitor
8P-1S	P64733	R/N/F1/F2/F3/F4/F5/F6	Labyrinth	
8P-1S	P63983-0001	R/N/F1/F2/F3/F4/F5/F6	Labyrinth	24VDC Inhibitor

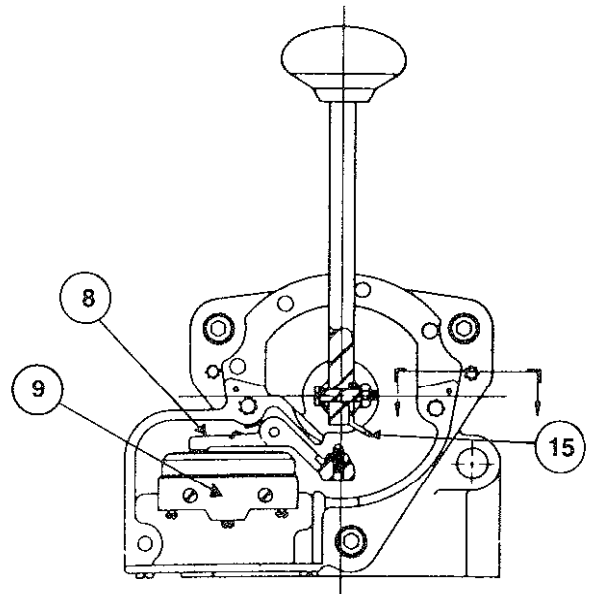
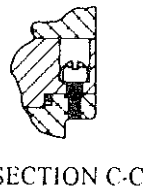
OPTION: Latch for "P" ROTAIR part no. P-026578-00000.

REXROTH TYPE "P" ROTAIR® VALVES

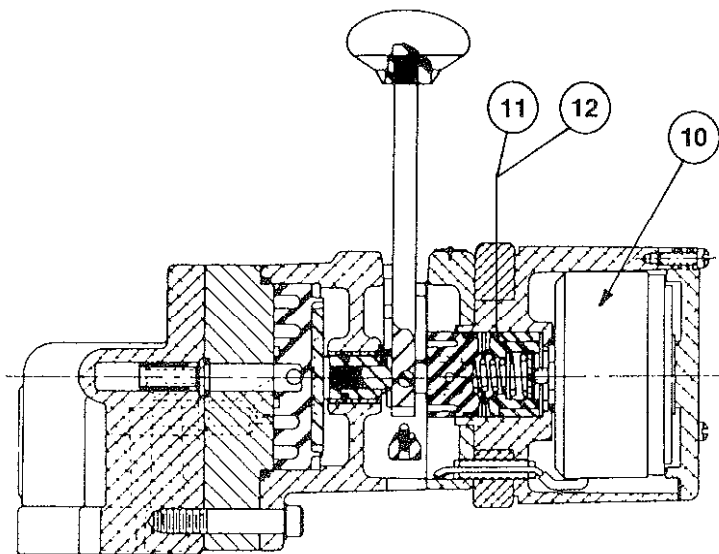
ASSEMBLY VIEWS



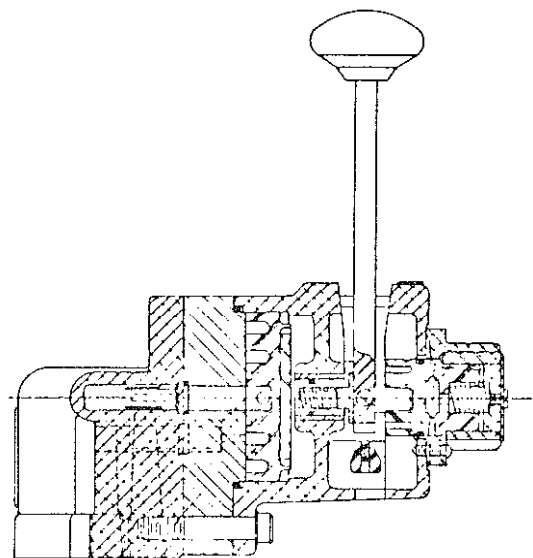
All models except those with detents or inhibitors.



Typical operator portion all models.



All Inhibitor Models.



Detent Models

REPAIRING THE "P" ROTAIR VALVE

The rotary valve (polyacetal) and the rotary valve seat (nichrome cast iron) in these assemblies have their mating sealing surfaces machine lapped for sealing. When in need of repair, it is recommended that the valve be shop repaired with new parts as necessary. The valve portion can be removed from the pipe bracket without removing the piping connections. Refer to service bulletin B4-76.00 for parts information and service instructions.

REXROTH TYPE "P" ROTAIR® VALVES

HANDLE POSITION PORTING DIAGRAMS (Listed counterclockwise when facing handle end of valve)

PC. NO. P55804-0001, 5P-5S					
HDL. POS.	PRESSURE SUPPLIED TO PORTS				
	1	2	3	4	5
R	X	X		X	
N	X	X			
F1	X	X	X		X
F2	X	X			X
F3	X				X

Port 6 in the "IN" port.

PC. NO. P61325, 6P-2S P6225, 6P-2S P57081-0001, 6P-5S					
HDL. POS.	PRESSURE SUPPLIED TO PORTS				
	1	2	3	4	5
R1	X	X		X	
N	X	X			
F1	X	X	X		X
F2	X	X			X
F3	X				X
F4					X

Port 6 is the "IN" Port.

PC. NO. 63984, 6P-1S				
HDL. POS.	PRESSURE SUPPLIED TO PORTS			
	6	3	2	4
R			X	
N				
1	X			X
2		X		X
2-4		X		
2-5	X			

Port in side of the pipe bracket is "IN" port. Ports #1 & 5 are plugged 1/8" exhaust port in the bracket.

PC. NO. P61184, 7P-5S						
HDL. POS.	PRESSURE SUPPLIED TO PORTS					
	1	2	3	5	6	
R3		X				
R2	X	X				
R1	X	X				X
N	X	X	X			X
F1	X		X	X	X	
F2	X			X	X	
F3	X			X		

Port 4 is in "IN" Port.

PC. NO. P55421-0001, 7P-5S P60984, 7P-2S					
HDL. POS.	PRESSURE SUPPLIED TO PORTS				
	1	2	3	4	5
R2		X	X	X	
R1	X	X		X	
N	X	X			
F1	X	X	X		X
F2	X	X			X
F3	X				X
F4					X

Port 6 is the "IN" port.

PC. NO. P63348, 7P-5						
HDL. POS.	PRESSURE SUPPLIED TO PORTS					
	1	2	3	5	6	
R		X				
N	X	X				
1	X	X				
2	X	X	X		X	
3	X		X	X	X	
4	X			X	X	
5	X			X		

Port 4 is in "IN" Port.

PC. NO. P55380-0001, 7P-5S						
HDL. POS.	PRESSURE SUPPLIED TO PORTS					
	1	3	4	5	6	
R	X					X
N	X			X	X	
1	X		X	X	X	
2		X	X	X	X	
3		X	X	X		
4		X		X		
5		X				

Port 2 is in "IN" Port.

PC. NO. P57250-0004, 7P-8S					
HDL. POS.	PRESSURE SUPPLIED TO PORTS				
	1	2	3	4	5
R3				X	X
R2		X		X	X
R1		X	X		X
N		X			
F1	X	X	X		
F2	X	X		X	
F3	X			X	

Port 6 is the "IN" port.

PC. NO. P57564-0001, 7P-7S					
HDL. POS.	PRESSURE SUPPLIED TO PORTS				
	1	2	3	4	5
R2			X	X	X
R1				X	X
N				X	
F1		X		X	
F2		X	X	X	
F3	X	X	X		
F4	X	X			

Port 6 is the "IN" port.

PC. NO. P58914-0001, 7P-9						
HDL. POS.	PRESSURE SUPPLIED TO PORTS					
	1	2	3	4	5	6
5	X	X	X	X	X	X
4	X	X	X	X	X	
3	X	X	X		X	X
2	X	X	X	X	X	X
1	X	X	X	X	X	X
N	X	X	X	X	X	X
R	X	X		X	X	X

"IN" port located on pipe bracket

PC. NO. P63985, 7P-9S P63985-0001, 7P-9S P63985-0002, 7P-9S P63985-0003, 7P-9S				
HDL. POS.	PRESSURE SUPPLIED TO PORTS			
	6	3	2	5
R			X	
N				
1				X
2	X			X
2-3	X	X		X
2-4		X		
2-5	X			

Port in side of the pipe bracket is "IN" port. Port #4 is exhaust. #1 is plugged. See identity schedule for other handle positions designations.

PC. NO. P55556-0003, 8P-1S P55556-0004, 8P-1S					
HDL. POS.	PRESSURE SUPPLIED TO PORTS				
	1	2	3	5	6
R		X			
N	X	X			
F1	X				X
F2	X		X		X
F3	X		X	X	X
F4	X			X	X
F5	X			X	
F6					X

Port 4 is the "IN" port.

PC. NO. P64733, 8P-1S P63983-1, 8P-1S					
HDL. POS.	PRESSURE SUPPLIED TO PORTS				
	1	6	3	2	5
R				X	
N					
F1		X			X
F2	X	X	X		X
F3	X		X		X
F4	X	X			X
F5	X				X
F6					X

"IN" port in the side of pipe bracket 1/8" Exhaust port is in the bracket

PC. NO. P65235-0001, 6P-5S				
HDL. POS.	PRESSURE SUPPLIED TO PORTS			
	6	3	2	5
N				
1				X
2	X			X
3	X	X		X
4		X		
5	X			

Port in side of the pipe bracket is "IN" port. Port #4 is exhaust, #1 is plugged.

PC. NO. P57250-0006, 7P-8S					
HDL. POS.	PRESSURE SUPPLIED TO PORTS				
	1	2	3	4	5
F3				X	X
F2		X		X	X
F1		X	X		X
N			X		
R1	X	X	X		
R2	X	X		X	
R3	X			X	

Port 6 is the "IN" port. 1/8" exhaust port is in the side of the pipe bracket.

NOTE:

"X" denotes port is pressurized in that position. Empty block indicates port is exhausted in that position.

NOTICES TO PRODUCT USERS

1. WARNING: FLUID MEDIA

Bosch Rexroth pneumatic devices are designed and tested for use with filtered, clean, dry, chemical free air at pressures and temperatures within the specified limits of the device. For use with media other than air or for human life support systems, Bosch Rexroth must be consulted. Hydraulic cylinders are designed for operation with filtered, clean, petroleum based hydraulic fluid; operation using fire-resistant or other special types of fluids may require special packing and seals. Consult the factory.

2. WARNING: MATERIAL COMPATIBILITY

Damage to product seals or other parts caused by the use of non-compatible lubricants, oil additives or synthetic lubricants in the air system compressor or line lubrication devices voids Bosch Rexroth's warranty and can result in product failure or other malfunction. See lubrication recommendations below.

AIR LINE LUBRICANTS! In service higher than 18 cycles per minute or with continuous flow of air through the device, an air line lubricator is recommended.* (Do not use line lubrication with vacuum products.) However, the lubricator must be maintained since the oil will wash out the grease, and lack of lubrication will greatly shorten the life expectancy. The oils used in the lubricator must be compatible with the elastomers in the device. The elastomers are normally BUNA-N, NEOPRENE, VITON, SILICONE and HYTREL. Bosch Rexroth recommends the use of only petroleum based oils without synthetic additives, and with an aniline point between 180° F and 210° F.

COMPRESSOR LUBRICANTS! All compressors (with the exception of special "oil free" units) pass oil mist or vapor from the internal crankcase lubricating system through to the compressed air. Since even small amounts of non-compatible lubricants can cause severe seal deterioration (which could result in component and system failure) special care should be taken in selecting compatible compressor lubricants. It is recommended that users review the National Fluid Power Association "Recommended Guide Lines For Use Of Synthetic Lubricants In Pneumatic Fluid Power Systems" (NFPA T1.9.2-1978).

3. WARNING: INSTALLATION AND MOUNTING

The user of these devices must conform to all applicable electrical, mechanical, piping and other codes in the installation, operation or repair of these devices.

INSTALLATION ! Do not attempt to install, operate or repair these

--Refer to the appropriate service catalog for parts and service information.

devices without proper training in the technique of working on pneumatic or hydraulic systems and devices, unless under trained supervision.

Compressed air and hydraulic systems contain high levels of stored energy. Do not attempt to connect, disconnect or repair these products when a system is under pressure. Always exhaust or drain the pressure from a system before performing any service work. Failure to do so can result in serious personal injury.

MOUNTING! Devices should be mounted and positioned in such a manner that they cannot be accidentally operated.

4. WARNING: APPLICATION AND USE OF PRODUCTS

The possibility does exist for any device or accessory to fail to operate properly through misuse, wear or malfunction. The user must consider these possibilities and should provide appropriate safe guards in the application or system design to prevent personal injury or property damage in the event of a malfunction.

5. WARNING: CONVERSION, MAINTENANCE AND REPAIR

When a device is disassembled for conversion to a different configuration, maintenance or repair, the device must be tested for leakage and proper operation after being reassembled and prior to installation.

MAINTENANCE AND REPAIR! Maintenance periods should be scheduled in accordance with frequency of use and working conditions. All Bosch Rexroth products should provide a minimum of 1,000,000 cycles of maintenance free service when used and lubricated as recommended. However, these products should be visually inspected for defects and given an "in system" operating performance and leakage test once a year. Where devices require a major repair as a result of the one million cycles, one year, or routine inspection, the device must be disassembled, cleaned, inspected, parts replaced as required, rebuilt and tested for leakage and proper operation prior to installation. See individual catalogs for specific cycle life estimates.

6. PRODUCT CHANGES

Product changes including specifications, features, designs and availability are subject to change at any time without notice. For critical dimensions or specifications, contact factory.

*Many Bosch Rexroth pneumatic valves and cylinders can operate with or without air line lubrication; see individual sales catalogs for details.

LIMITATIONS OF WARRANTIES & REMEDIES

Bosch Rexroth warrants its products sold by it to be free from defects in material and workmanship to the following:

For twelve months after shipment Bosch Rexroth will repair or replace (F.O.B. our works), at its option, any equipment which under normal conditions of use and service proves to be defective in material or workmanship at no charge to the purchaser. No charge will be made for labor with respect to defects covered by this Warranty, provided that the work is done by Bosch Rexroth or any of its authorized service facilities. However, this Warranty does not cover expenses incurred in the removal and reinstallation of any product, nor any downtime incurred, whether or not proved defective.

All repairs and replacement parts provided under this Warranty policy will assume the identity, for warranty purposes, of the part replaced, and the warranty on such replacement parts will expire when the warranty on the original part would have expired. Claims must be submitted within thirty days of the failure or be subject to rejection.

This Warranty is not transferable beyond the first using purchaser. Specifically, excluded from this Warranty are failures caused by misuse, neglect, abuse, improper operation or filtration, extreme temperatures, or unauthorized service or parts. This Warranty also excludes the use of lubricants, fluids or air line additives that are not compatible with seals or diaphragms used in the products. This Warranty sets out the purchaser's exclusive remedies with respect to products covered by it, whether for negligence or otherwise. Neither Bosch Rexroth nor any of its affiliates will be liable for consequential or incidental damages or other losses or expenses incurred by reason of the use or sale of such products. Our liability (except as to title) arising out of the sale, use or operation of any product or parts, whether on warranty, contract or negligence (including claims for consequential or incidental damage) shall not in any event exceed the cost of replacing the defective products and, upon expiration of the warranted period as herein provided, all such liability is terminated. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHETHER FOR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE.** No attempt to alter, amend or extend this Warranty shall be effective unless authorized in writing by an officer of Bosch Rexroth Division.

Bosch Rexroth reserves the right to discontinue manufacture of any product, or change product materials, design or specifications without notice.

This is a Year 2000 Readiness disclosure as defined and used in the Year 2000 Information and Readiness Disclosure Act:

Notwithstanding any provision to the contrary, Seller acknowledges the potential Year 2000 problem and hereby promises to use its good faith, best efforts to attempt to be Year 2000 Compliant as soon as practicable. "Year 2000 Compliant" means that Seller's goods and services will be designed to be used prior to, during, and after calendar year 2000 A.D., and to operate during each such time period without substantive error relating to date data, specifically including any substantive error relating to, or the product of, date data which represents or references different centuries or more than one century, and will recognize the calendar year 2000 A.D. as a leap year.