

PowerMaster® Pneumatic Directional Control Valves



PowerMaster® Valve, 4-Way Directional Control

Technical data and features

Rexroth
Bosch Group

4 Way / 2 & 3 Position

1/4" - 1-1/4" NPTF Solenoid, Air Pilot & Mechanical Operators

TECHNICAL DATA:

Port Sizes: 1/4", 3/8", 1/2", 3/4", 1" 1-1/4" NPTF

Working Pressure: Maximum valve inlet air pressure: 150 psi (10.3 bar)
Minimum air pilot pressure:
15 psi (1.0 bar) w/o return spring (all sizes)
30 psi (2.1 bar) 1" and 1-1/4" valves w/return spring
40 psi (2.8 bar) 1/2" and 3/4" valves w/return spring
50 psi (3.4 bar) 1/4" and 3/8" valves w/return spring
Valves can also be used for vacuum or dual pressure service when externally piloted.

Flow: C_v 2.39 (2390 NI/min) 1/4" NPTF
C_v 3.73 (3730 NI/min) 3/8" NPTF
C_v 6.17 (6170 NI/min) 1/2" NPTF
C_v 7.88 (7880 NI/min) 3/4" NPTF
C_v 13.61 (13,610 NI/min) 1" NPTF
C_v 15.75 (15,750 NI/min) 1-1/4" NPTF

Temperature Range: -20°F to +160°F (-29°C to 71°C)

Media: Air and inert gases (In service higher than 18 cycles per minute or with continuous air flow, a lubricator is recommended.)

Materials: Bodies and operators: Die cast aluminum
Spool: Machined from high-tensile aluminum, hard anodized, ground & polished to 8 micro-inch finish
Seals: Buna-N, oil-resistant, and bonded to a metallic ring (HI-Nitrile Buna-N seals are also available.)

Manual Override: Non-Locking

Electrical Data:

Standard Voltage (all coils are rated for continues duty)	Power Consumption	
	Inrush	Holding
120, 240 VAC 60 Hz	33 VA	22 VA
12, 24 VDC	12 W	

Features:

- **Response time.** Actual test data shows only 175 milliseconds is required to fill a 250 cubic inch volume to 80% of line pressure with a normally closed solenoid operated valve. Where a spring is used to open the valve (normally open valve) only 253 milliseconds is required to fill the same volume.
- **Continuous-duty solenoid.** Won't burn out...even when energized for extended periods. Pilot operated for fast response.
- **Lightweight aluminum spool** of extra large diameter assures high-speed performance. Requires only short movement to deliver high-capacity air flow. File-hard anodized surface, polished to an 8 micro-inch finish, withstands wear and abrasion; offers greatest sealing qualities, minimum friction and maximum speed. Spool is balanced so air pressure won't affect its position.
- **Low-friction, positive sealing ring** is actually two seals in one; an outer static seal and an inner dynamic seal bonded to a metallic spacer ring. The ring protects the inner seal from the radical compression absorbed by the other seal. Assures longest life with positive sealing.
- **Seal retainers** keep inner and outer sealing surfaces in precise position for maximum reliability and efficiency. Combined with the non-compressible seal rings, PowerMaster valve retainers eliminate tolerance build-up in the free stack height of both retainers and seals.
- **Free-floating piston** with extra large surface area means faster response at lower pressures.
- **Manual non-locking overrides** allow supplementary manual control an permits operating the valve when the electric power is off.
- **External pilot** allows an independent air supply to be connected to the pilot port in the valve operator or subplate for air pilot pressure.
- **Wire leads** of 24" allows simplified conduit wiring.
- **Solenoid coil removal.** Unscrew hex nut and slip off the solenoid housing and coil.
- **Exhaust restrictors** can be used in either or both exhaust port to provide speed control of cylinders. (Refer to Accessory Valve catalog SC-400.)



PowerMaster® Valve, 4-Way Directional Control

4 Way, 2 and 3 Position, single and double solenoid operated
Tapped body, 1/4" through 3/4" NPTF models



Single & Double Solenoid Coil Voltages

120 VAC part numbers are shown on this page, for other voltages, use the following table and substitute the appropriate suffix on the MODEL number of the valve being used.

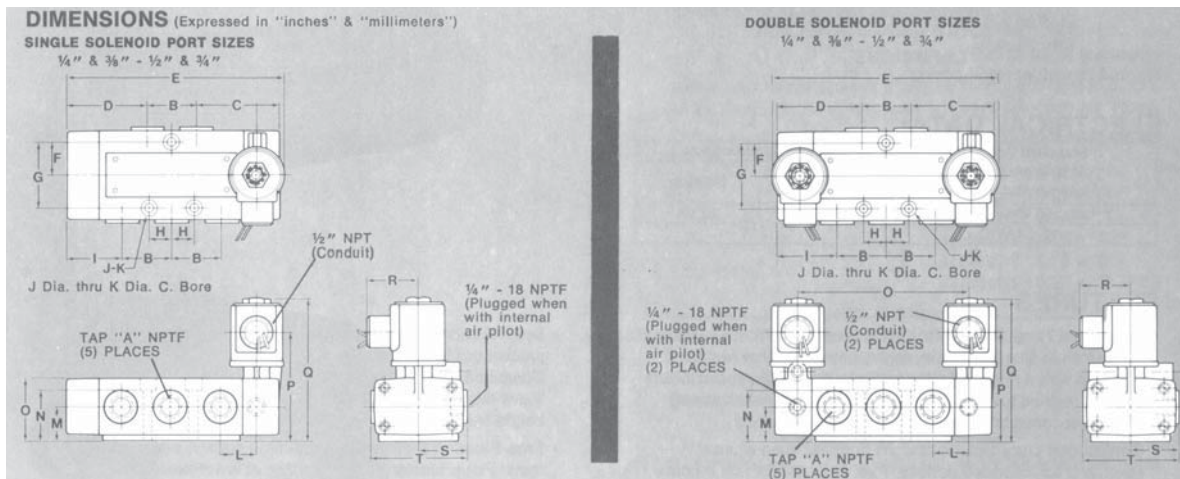
Coil Voltages		Suffix: Single Solenoid	Suffix: Double Solenoid
AC	120 Volts 60 Hz	8500	8484
AC	240 Volts 60 Hz	8700	8686
AC	480 Volts 60 Hz	8900	8888
AC	110 Volts 50 Hz	8100	8080
AC	220 Volts 50 Hz	8300	8282
DC	12 Volts	9500	9494
DC	24 Volts	9100	9090
DC	240 Volts	9300	9292

Single Solenoid 4 Way, Tapped Exhaust

Port Size	Internal Air Pilot		External Air Pilot	
	Part No.	Model No.	Part No.	Model No.
1/4"	R431008519	PT-024106-08500	R431008516	PT-024104-08500
3/8"	R431008542	PT-034106-08500	R431008538	PT-034104-08500
1/2"	R431008566	PT-044106-08500	R431008564	PT-044104-08500
3/4"	R431008595	PT-064106-08500	R431008589	PT-064104-08500

Double Solenoid: 4 Way, Tapped Exhaust

Port Size	Internal Air Pilot		External Air Pilot	
	Center Spring, 3 Pos. Closed Ctr.	2 Position No Springs	Center Spring, 3 Pos. Closed Ctr.	2 Position No Springs
1/4"	R431008524 (PT-024117-08484)	R431008521 (PT-024107-08484)	— (PT-024115-08484)	R431009183 (PT-024105-08484)
3/8"	R431008550 (PT-034117-08484)	R431008545 (PT-034107-08484)	R431008549 (PT-034115-08484)	R431008541 (PT-034105-08484)
1/2"	R431008575 (PT-044117-08484)	R431008571 (PT-044107-08484)	R431008574 (PT-044115-08484)	R431009193 (PT-044105-08484)
3/4"	R431008601 (PT-064117-08484)	R431008598 (PT-064107-08484)	R431008600 (PT-064115-08484)	R431008593 (PT-064105-08484)



	A	B		C		D		E		F		G		H		I		J	
		IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
SINGLE SOLENOID	1/4" & 3/8"	1.50	38	2.56	65	2.44	62	6.65	169	1.00	25	2.00	51	.69	18	1.69	43	.28	7
	1/2" & 3/4"	1.88	48	3.06	78	2.94	75	8.03	204	1.19	30	2.38	60	.94	24	2.00	56	.28	7
DOUBLE SOLENOID	1/4" & 3/8"	1.50	38	2.56	65	2.56	65	6.91	176	1.00	25	2.00	51	.69	18	1.81	46	.28	7
	1/2" & 3/4"	1.88	48	3.06	78	3.06	78	8.28	210	1.19	30	2.38	60	.94	24	2.12	54	.28	7

	K		L		M		N		O		P		Q		R		S		T	
	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
SINGLE SOLENOID	.50	13	1.12	28	1.06	27	1.56	40	1.94	49	3.31	84	4.38	111	1.56	40	1.50	38	3.00	76
	.50	13	1.44	37	1.06	27	1.69	43	2.06	52	3.44	87	4.50	114	1.56	40	1.75	44	3.50	89
DOUBLE SOLENOID	.50	13	1.12	28	1.06	27	1.56	40	5.25	133	3.31	84	4.38	111	1.56	40	1.50	38	3.00	76
	.50	13	1.44	37	1.06	27	1.69	43	6.62	168	3.44	87	4.50	114	1.56	40	1.75	44	3.50	89

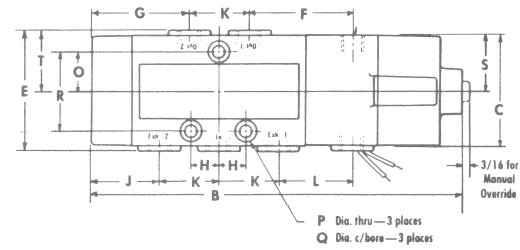
PowerMaster® Valve, 4-Way Directional Control

4 Way, 2 and 3 Position, single and double solenoid operated
Tapped body, 1" and 1-1/4" NPTF models



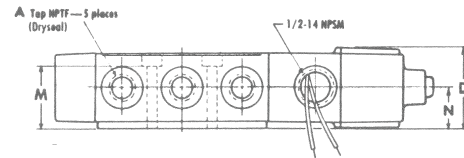
Single Solenoid, Tapped Exhaust

Port Size	Part No.	Model No.	Approx. Weight lbs. (kg)
1"	R431008610	PT-084106-03100	10 (4.5)
1-1/4"	R431008619	PT-094106-03100	10 (4.5)



Dimensions in inches (mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T
1"-11 1/2	13.44	4.13	2.59	4.38	4.19	4.00	1.31											
1 1/4"-11 1/2	(341)	(105)	(66)	(111)	(106)	(102)	(33)											
	2.69	2.63	2.75	2.13	1.31	1.50	0.34	0.63	3.00	2.06	2.19							
	(68)	(67)	(70)	(54)	(33)	(38)	(8.7)	(15.9)	(76)	(52)	(56)							

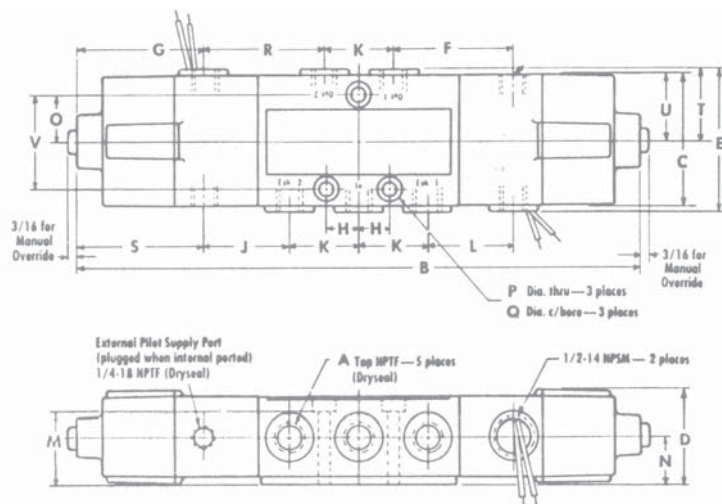


Double Solenoid, Tapped Exhaust

Port Size	Internal Air Pilot			Approx. Weight lbs. (kg)
	Center Spring, 3 Pos. Closed Ctr.	Center Spring, 3 Pos. Exhaust Open Ctr.	No Springs	
1"	R431008613 PT-084117-03030	R431008615 PT-084517-03030	R431008611 PT-084107-03030	12.25 (5.57)
1-1/4"	R431008623 PT-094117-03030	R431008625 PT-094517-03030	R431008621 PT-094107-03030	12.25 (5.57)

Dimensions in inches (mm)

A	B	C	D	E	F	G	H	J	K	L
1"-11 1/2	16.25	4.13	2.59	4.38	4.19	2.75	1.31	2.88	2.63	2.88
1 1/4"-11 1/2	(413)	(105)	(66)	(111)	(106)	(75)	(33)	(68)	(67)	(73)
M	N	O	P	Q	R	S	T	U	V	
2.13	1.31	1.50	0.34	0.63	4.06	2.63	2.19	2.06	3.00	
(54)	(33)	(38)	(8.7)	(15.9)	(103)	(67)	(56)	(52)	(76)	



Note:

All valves on this page are also available in 24VDC. Substitute -04300 as the suffix in the model code for single solenoid models, or -04242 for double solenoid valves. 120VAC and 24VDC are the only voltages available in 1" and 1-1/4" models. A complete listing of model codes to new part numbers is available online on the PowerMaster Valve page at: www.boschrexroth-us.com/pmvalve

PowerMaster® Valve, 4-Way Directional Control

4 Way, 2 and 3 Position, lever operated
Tapped body, 1/4" through 3/4" NPTF models



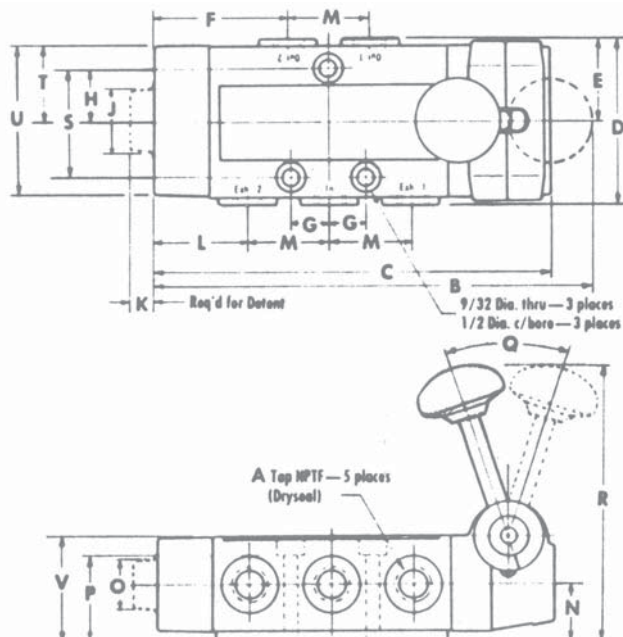
4 Way, Tapped Exhaust, Lever Operated

Port Size	Two Position			Approx. Weight lbs. (kg)
	Return Spring	Detents	No Spring or Detents	
1/4"	R431008510 (PT-024101-00200)	R431008508 (PT-024101-00011)	R431008507 (PT-024101-00010)	3.25 (1.48)
3/8"	R431008532 (PT-034101-00200)	R431008530 (PT-034101-00011)	R431008529 (PT-034101-00010)	3.25 (1.48)
1/2"	R431008558 (PT-044101-00200)	R431008556 (PT-044101-00011)	R431008555 (PT-044101-00010)	4.25 (1.93)
3/4"	R431008583 (PT-064101-00200)	R431008581 (PT-064101-00011)	R431008580 (PT-064101-00010)	4.25 (1.93)

Port Size	Three Position				Approx. Weight lbs. (kg)
	Closed Center		Exhaust Open Center		
	Center Springs	Detents	Center Springs	Detents	
1/4"	R431008511 (PT-024101-00300)	R431008509 (PT-024101-00115)	R431008526 (PT-024501-00300)	R431008525 (PT-024501-00115)	3.25 (1.48)
3/8"	R431008533 (PT-034101-00300)	R431008531 (PT-034101-00115)	R431008553 (PT-034501-00300)	R431008552 (PT-034501-00115)	3.25 (1.48)
1/2"	R431008559 (PT-044101-00300)	R431008557 (PT-044101-00115)	R431008577 (PT-044501-00300)	R431008576 (PT-044501-00115)	4.25 (1.93)
3/4"	R431008584 (PT-064101-00300)	R431008582 (PT-064101-00115)	R431008604 (PT-064501-00300)	R431008603 (PT-064501-00115)	4.25 (1.93)

Dimensions in inches (mm)

A	B	C	D	E	F	G	H	J	K	L
1/4-18	8.13	7.25	3.00	1.50	2.44	0.69	1.00	1.13	0.44	1.69
3/8-18	(207)	(184)	(76)	(38)	(62)	(17.5)	(25)	(29)	(11.2)	(43)
1/2-14	9.44	8.69	3.50	1.75	2.94	0.94	1.19	1.34	0.63	2.00
3/4-14	(240)	(221)	(89)	(44)	(75)	(23.9)	(30)	(34)	(16.0)	(51)
M	N	O	P	Q	R	S	T	U	V	
1.50	1.06	0.88	1.56	37°	5.19	2.00	1.38	2.75	1.94	
(38)	(27)	(22.2)	(40)		(132)	(51)	(35)	(70)	(49)	
1.88	1.06	1.09	1.69	35°	5.44	2.38	1.63	3.25	2.06	
(48)	(27)	(43)	(43)		(138)	(60)	(41)	(83)	(52)	



PowerMaster® Valve, 4-Way Directional Control

4 Way, 2 and 3 Position, treadle operated
Tapped body, 1/4" through 3/4" NPTF models



4 Way, Tapped Exhaust, Treadle Operated

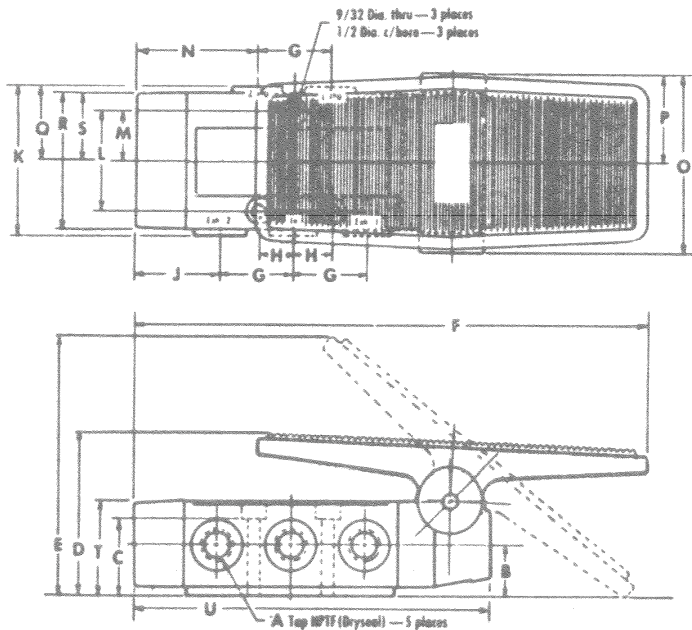
Port Size	Less Springs	Center Springs Closed Center	Approx. Weight lbs. (kg)
1/4"	R431008513 (PT-024101-01100)	R431008514 (PT-024101-01200)	4.25 (1.93)
3/8"	R431008535 (PT-034101-01100)	R431008536 (PT-034101-01200)	4.25 (1.93)
1/2"	R431008561 (PT-044101-01100)	R431008562 (PT-044101-01200)	5.50 (2.49)
3/4"	R431008586 (PT-064101-01100)	R431008587 (PT-064101-01200)	5.50 (2.49)

Treadle Operators

Treadle operators are furnished without a return spring for two-position heel and toe operation. For three-position operation, centering springs are used. The two-position model may also be used as a three-position, closed center combination.

Dimensions in inches (mm)

A	B	C	D	E	F	G	H	J	K
1/4-18	1.06	1.56	3.31	5.31	10.44	1.50	0.69	1.69	3.00
3/8-18	(27)	(40)	(84)	(135)	(265)	(38)	(17.5)	(43)	(76)
1/2-14	1.06	1.69	3.88	5.75	11.94	1.88	0.94	2.00	3.50
3/4-14	(27)	(43)	(99)	(146)	(303)	(48)	(23.9)	(51)	(89)
L	M	N	O	P	Q	R	S	T	U
2.00	1.00	2.44	3.56	1.78	1.50	2.75	1.38	1.94	7.25
(51)	(25)	(62)	(90)	(45)	(38)	(70)	(35)	(49)	(184)
3.38	1.19	2.94	3.56	1.78	1.75	3.25	1.63	2.06	8.69
(86)	(30)	(75)	(90)	(45)	(44)	(83)	(41)	(52)	(221)



PowerMaster® Valve, 4-Way Directional Control

4 Way, 2 and 3 Position, pedal operated, spring returned
Tapped body, 1/4" through 3/4" NPTF models

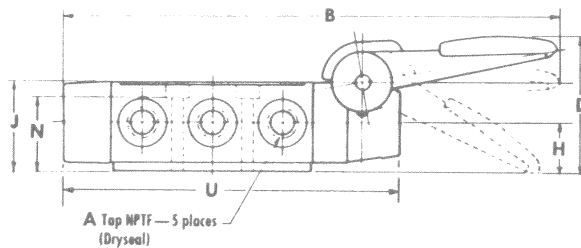
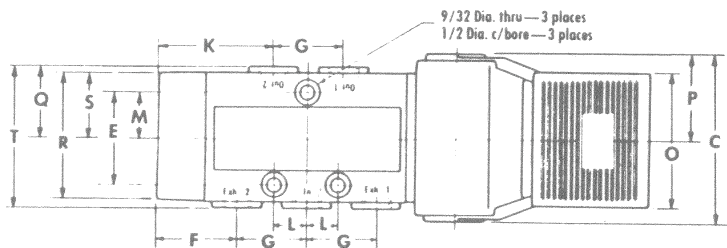


4 Way, Tapped Exhaust, Pedal Operated

Port Size	Part Number (Model Number)	Approx. Weight lbs. (kg)
1/4"	R431008512 (PT-024101-01000)	3.25 (1.48)
3/8"	R431008534 (PT-034101-01000)	3.25 (1.48)
1/2"	R431008560 (PT-044101-01000)	4.25 (1.93)
3/4"	R431008585 (PT-064101-01000)	4.25 (1.93)

Dimensions in inches (mm)

A	B	C	D	E	F	G	H	J	K
1/4-18 3/8-18	10.69 (272)	3.56 (90)	2.91 (74)	2.00 (51)	1.69 (43)	1.50 (38)	1.06 (27)	1.94 (49)	2.44 (62)
1/2-14 3/4-14	12.06 (306)	3.56 (90)	2.94 (75)	2.38 (60)	2.00 (51)	1.88 (48)	1.06 (27)	2.10 (53)	2.94 (75)
L	M	N	O	P	Q	R	S	T	U
0.69 (17.5)	1.00 (25)	1.56 (40)	2.88 (73)	1.78 (45)	1.50 (38)	2.75 (70)	1.38 (35)	3.00 (76)	7.25 (184)
0.94 (23.9)	1.19 (30)	1.69 (43)	2.88 (73)	1.78 (45)	1.75 (44)	3.25 (83)	1.63 (41)	3.50 (89)	8.69 (221)



PowerMaster® Valve, 4-Way Directional Control

4 Way, 2 and 3 Position, air pilot operated
Tapped body, 1/4" through 1-1/4" NPTF models

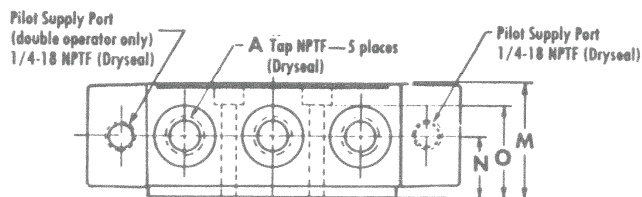
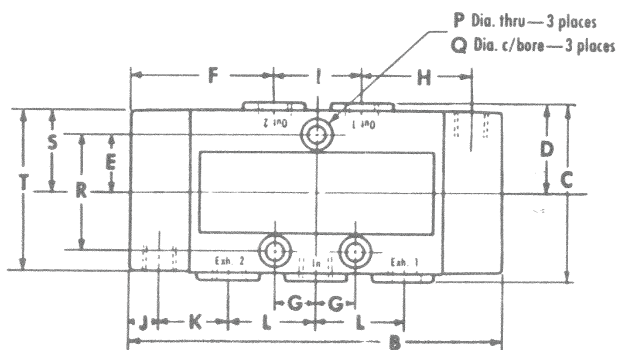


4 Way, Tapped Exhaust, Air Pilot Operated

Port Size	Single Air Pilot	Double Air Pilot			Approx. Weight lbs. (kg)
		Center Springs, Closed Center	Center Springs, Exh. Open Center	No Springs	
1/4"	R431008515 (PT-024104-01700)	R431008523 (PT-024115-01616)	R431008528 (PT-024515-01616)	R431008518 (PT-024105-01616)	2.75 (1.25)
3/8"	R431008537 (PT-034104-01700)	R431008547 (PT-034115-01616)	R431008554 (PT-034515-01616)	R431008540 (PT-034105-01616)	2.75 (1.25)
1/2"	R431008563 (PT-044104-01700)	R431008573 (PT-034115-01616)	R431008578 (PT-044515-01616)	R431008565 (PT-044105-01616)	4.25 (1.93)
3/4"	R431008588 (PT-064104-01700)	R431008599 (PT-064115-01616)	R431008606 (PT-064515-01616)	R431008592 (PT-064105-01616)	4.25 (1.93)
1"	R431008607 (PT-084104-01700)	R431008612 (PT-084115-01616)	R431008614 (PT-084515-01616)	R431008609 (PT-084105-01616)	7.75 (3.52)
1-1/4"	R431008616 (PT-094104-01700)	R431008622 (PT-094115-01616)	R431008624 (PT-094515-01616)	R431008618 (PT-094105-01616)	7.75 (3.52)

Dimensions in inches (mm)

A	B	C	D	E	F	G	H	J	K
1/4-18 3/8-18	6.63 (168)	3.00 (76)	1.50 (38)	1.00 (25)	2.56 (65)	0.69 (17.5)	1.88 (48)	0.69 (17.5)	1.13 (29)
1/2-14 3/4-14	8.00 (203)	3.50 (89)	1.75 (44)	1.19 (30)	3.06 (78)	0.94 (23.9)	2.38 (60)	0.69 (17.5)	1.44 (37)
1-11 1/2 1 1/4—11 1/2	10.63 (270)	4.38 (111)	5.19 (132)	1.50 (38)	4.00 (102)	1.31 (33)	3.25 (83)	0.75 (19.1)	1.94 (49)
L	M	N	O	P	Q	R	S	T	
1.50 (38)	1.94 (49)	1.06 (27)	1.56 (40)	0.28 (7.1)	0.50 (12.7)	2.00 (51)	1.38 (35)	2.75 (70)	
1.88 (48)	2.06 (52)	1.06 (27)	1.69 (43)	0.28 (7.1)	0.50 (12.7)	2.38 (60)	1.63 (41)	3.25 (83)	
2.63 (67)	2.59 (66)	1.31 (33)	2.13 (54)	0.34 (8.6)	0.63 (15.9)	3.00 (76)	2.06 (52)	4.13 (105)	



PowerMaster® Valve, 4-Way Directional Control

Repair kits



Repair Kits (Buna-N elastomers)

Port Size	Repair Kit	Part No.	Old Part No.
1/4" - 3/8"	Valve spool kit	R431004790	P -058875-00000
1/2" - 3/4"	Valve spool kit	R431004795	P -058884-00000
1" - 1 1/4"	Valve spool kit	R431004793	P -058880-00000
1/4" - 3/8"	*Solenoid Repair	R431006971	P -066948-00000
1/2" - 3/4"	*Solenoid Repair	R431006972	P -066948-00001
1" - 1 1/4"	*Solenoid Repair	R431004792	P -058878-00000
1/4" - 3/8"	*Air Pilot Operator	R431005569	P -060693-00000
1/2" - 3/4"	*Air Pilot Operator	R431005568	P -060692-00000
1" - 1 1/4"	*Air Pilot Operator	R431005567	P -060691-00000

* Two each required for double operator valves.

Repair Kits (Hi-Nitrile)**

Port Size	Repair Kit	Part No.	Old Part No.
1/4" - 3/8"	Valve spool kit	R431004791	P -058875-00001
1/2" - 3/4"	Valve spool kit	R431004796	P -058884-00001
1" - 1 1/4"	Valve spool kit	R431004794	P -058880-00001

* These seals have been tested and have proven compatible with ASTM #1 and #3 oils as well as ANDEROL 500.

With these repair kits, the elastomer seals and some common wear parts on the component are renewed. On severely worn or damaged components, additional parts may be required. For additional parts, information and service instructions, refer to Service Manual SM-300.8000.

Solenoid Repair for 1/4" – 3/4" Valves

Voltage	Coil Only	Complete Solenoid Operator
120VAC, 60 Hz	R431005915	R431002779
240VAC, 60 Hz	R431005916	R431002780
480VAC, 60 Hz	R431005917	R431002781
12VDC	R431005918	R431002782
24VDC	R431005919	R431002783
240VDC	R431005920	R431002789
120VAC, 50 Hz	—	R431005751
240VAC, 50 Hz	—	R431005750
Sol. Operator Repair Kit **		R431005645
Solenoid Exhaust Muffler		R431006057

** Includes plunger, return spring and gasket. Order coil separately.

Solenoid Repair for 1" – 1 1/4" Valves

Voltage	Coil Only
120VAC, 60 Hz	R431004228
240VAC, 60 Hz	R431004229
480VAC, 60 Hz	R431009174
12VDC	R431004223
24VDC	R431004222
230VDC	R431004224
120VAC, 50 Hz	R431004225
240VAC, 50 Hz	—
Sol. Operator Repair Kit***	Part No.
Internal Pilot	R431004652
External Pilot	R431004647

*** Coils are not included and must be ordered separately.

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° 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 T1-1978).

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 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 system is under pressure. Always exhaust or drain the pressure from 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 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 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 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 major repair as 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 components can operate with or without air line lubrication; see individual sales catalogs for details.

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

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 Corporation.

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

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The data specified herein only serves to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The given information does not release the user from obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

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