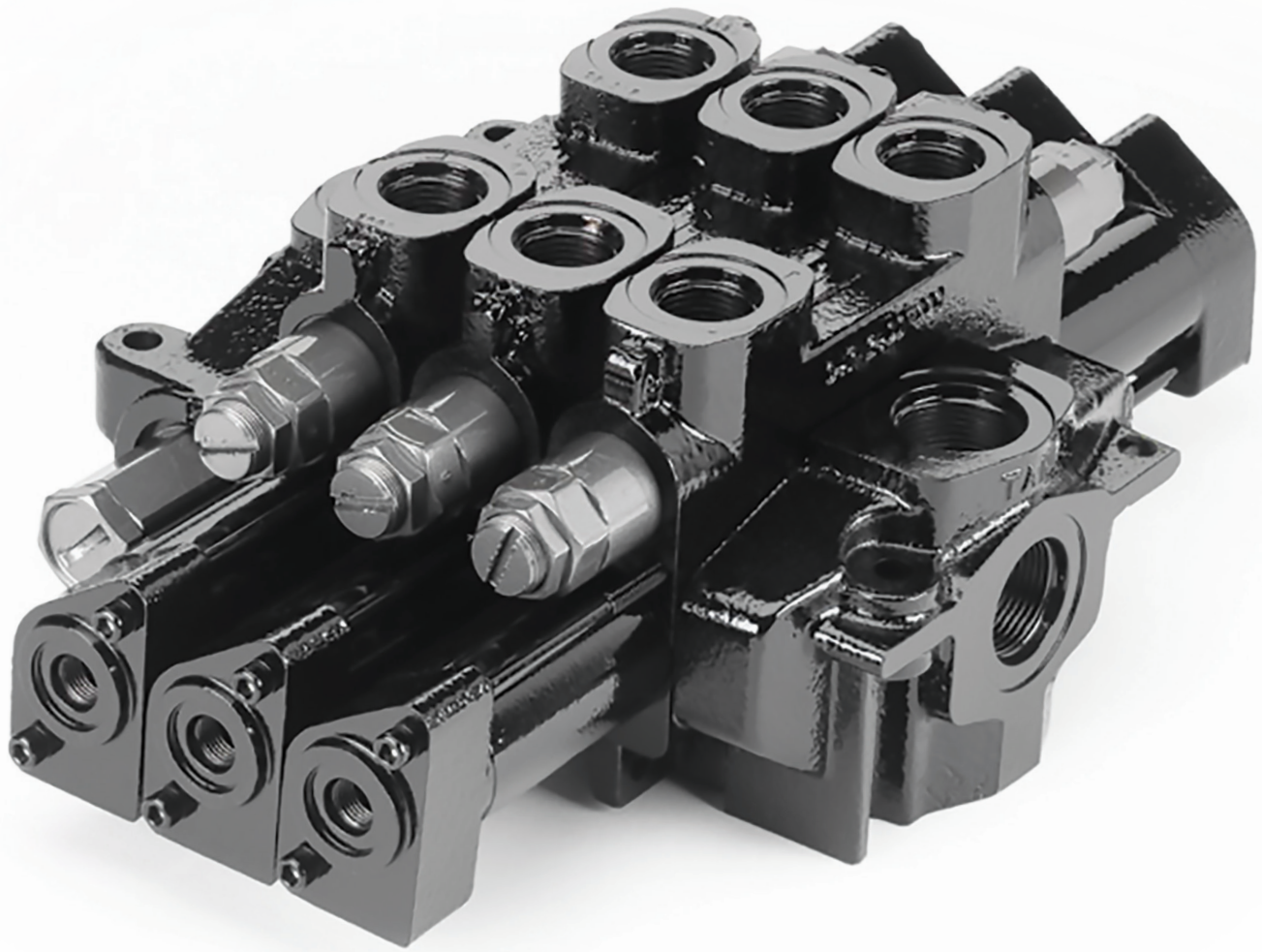

Seal Kit Guide VA/VG20, VA/VG35, and Legacy Commercial Valves

Service and Parts Bulletin
Bulletin MSG14-2005-M1/US

Parker

ENGINEERING YOUR SUCCESS.

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General Information

- The part numbers shown in this booklet are for standard Buna N (Nitrile) valve seals which are recommended for petroleum based oils. For general usage, seal manufacturers recommend using Buna N within a temperature range of -30°F to +225°F (-35°C to +120°C). However, if your application runs continuously in excess of +200°F (+93°C), we recommend using seals made of Viton material.
- Viton seal material is recommended for use with most Phosphate Ester hydraulic fluids.
- A limited amount of Viton kits can be found at the end of this manual. For additional information on Viton seals, call Parker Hannifin Technical Services at (440) 366-5100.

Parker Hannifin Corporation
Hydraulic Valve Systems
Elyria, Ohio, USA

DVG18 - DKA18 - KA18 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911873123 3469149001	Section Seal Kit (Between Sections)	Worksections and Outlet Sections
3911873124 **3469149006**	Worksection Repair Kit (All Seals)	Standard Manual Worksections
3911823390	Worksection Repair Kit (All Seals)	Standard Remote Worksections
3469149025	Worksection Repair Kit (All Seals)	"GC" Type Worksections
3469149016	Transition Check Seal Kit	
3469149103	Spool Seal Kit	Standard Manual Worksections
3469149112	Complete Transition Check Kit	
3469149113	Main and Port Relief Seal Kit (All Serviceable Seals)	**3911873104**, 3469001001 3911873105, 3469002001 3911873106, 3469001003 3911873107, 3469002003 3911873125, 3469001003 3911873126, 3469002003 3469001006 3469002006 3469001007 3469002007
3469149115	Main/Port Relief Plug, Anti-Cav, Pressure Beyond Seal Kit	**3911873108**, 3469001002 3911873109 3911873225 3911873226
3459149133	DVG18 Mid-Inlet R/V Seal Kit KA10 Main R/V Seal Kit (All Serviceable Seals)	**3911873187**, 3459001001 3911873188, 3459002001
3469149124	Slug Adjusted Port Relief Seal Kit	3469001010 3469002010 3469003010
3459149001	Midsection Inlet Relief Seal Kit KA10 Main R/V (All Serviceable Seals)	**3911873187**, 3459001001 3911873188, 3459002001
3469149109	Lock Valve Seal Kit	**3911873192**, 3469000006 3911873193, 3469000012
3911873333 3469149060	Pneumatic Endcap Seal Kit	**3911873120**, 346 9149 023

Note: Bold part numbers are distributor program items.

Parker Hannifin Corporation
Hydraulic Valve Systems
Elyria, Ohio, USA

DVA20 - DVG20 - VA20 - VG20 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911873035 3911803055	Section Seal Kit (Between Sections)	Inlet Sections Parallel and Tandem Worksections Midsection Inlets
3911873083	Section Seal Kit (Between Sections)	Series Worksections
3912881220	Large Center Section Seal Only	Series Worksections
3911823001	Section Seal Kit (Between Sections)	Solenoid Spacer Plates
3911873036 3911803457	Worksection Repair Kit (All Seals)	Manual, Parallel and Tandem Worksections
3911823465	Worksection Repair Kit (All Seals)	Standard Remote Worksections
3911803448	Worksection Repair Kit (All Seals)	Old Style Remote Worksections One Piece Cast Iron Cap Design
3911803846	Spool Seal Kit	Standard Manual Worksections
3911873039 3911803469	Main Relief Seal Kit (All Serviceable Seals)	**3911873001, 3911873128** 3559107035, 3559001061
3911803674	Main Relief Plug Seal Kit Convertible Outlet Plug Seal Kit	**3911873002**
3911873042 **3911803737**	Screw Adjusted, Pilot Operated Port R/V with A/C, Seal Kit (All Serviceable Seals)	**3911873006**, 3559001115
3911823038	Port Accessory Seal Kit	**3911873006**, 3559001115 **3911873 007, 008, 009** **3911873010**, 3559001164 **3911873011**, 3912283075 355900X143
3911873037 **3911823122**	Slug Adjusted R/V Kit (All Serviceable Seals)	**3911873007, 008, 009** 355900X143
391 1823125	Unloader Port R/V Seal Kit	355 9109 027 (Refuse Rear Loader Applications)
3911873207 **3911803387**	Pneumatic Endcap Seal Kit (Commercial Intertech Design)	**3911873206**, 3911803553
391 1803 694	Pneumatic Endcap Seal Kit (Old RMH Design)	**3911873022**, 3911803606 3911803767
391 1823 393	Single Ended Solenoid Endcap Seal Kit (Both Solenoids In Same Cap)	
3961823455	AKO Seal Kit	

Note: Bold part numbers are distributor program items.

Parker Hannifin Corporation
Hydraulic Valve Systems
Elyria, Ohio, USA

A20 - C20 - A20 (1030) Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911873035 3911803055	Section Seal Kit (Between Sections)	Inlet Sections Parallel and Tandem Worksections Midsection Inlets
3911873083	Section Seal Kit (Between Sections)	Series Worksections
3912881220	Large Center Section Seal Only	Series Worksections
3911803059		Manual, Parallel and Tandem Worksections
3911803241	Work Section Repair Kit (All Seals)	Remote, Parallel and Tandem Worksections (Old Style, 1 PC Endcap Design)
3911803036	Work Section Repair Kit (All Seals)	Manual, Series Worksections
3911873039 3911803469	Main Relief Seal Kit (All Serviceable Seals)	**3911873001, 3911873128** 3559107035, 3559001061
3911803674	Main Relief Plug Seal Kit Convertible Outlet Plug Seal Kit	**3911873002**
3911803470	Screw Adjusted Port R/V Kit (All Seals)	3559107021, 022, 023
3911803413	Screw Adjusted Crossover Port R/V Kit (All Seals)	3559107018, 019, 020

Note: Bold part numbers are distributor program items.

Parker Hannifin Corporation
Hydraulic Valve Systems
Elyria, Ohio, USA

DVA35 - DVG35 - VA35 - VG35 - Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911873040 **3911803093**	Section Seal Kit (Between Sections)	Inlet Sections Parallel and Tandem Worksections Combined Flow Midsection Inlets Midsection Selectors
3911803150	Section Seal Kit (Between Sections)	Series Worksections Split Flow Midsection Inlets
3911873041 3911803722	Worksection Repair Kit (All Seals)	Manual, Parallel and Tandem Worksections
3911823121	Worksection Repair Kit (All Seals)	Manual, Series Worksections
3912881628	Large Center Section Seal Only	Series Worksections Split Flow Midsection Inlets
3911823146	Worksection Repair Kit (All Seals)	Remote, Parallel and Tandem Worksections
3911873044 3911803272	Main Relief Seal Kit (All Serviceable Seals)	**3911873003**, 3559107013 3911873004, 3559107085 3911873137, 3559107385
3911803682	Main Relief Plug Seal Kit Convertible Outlet Plug Seal Kit	**3911873005**
3911873042 **3911803737**	Screw Adjusted, Pilot Operated Port R/V with NS, Seal Kit (All Serviceable Seals)	**3911873006**, 3559001115
3911823038	Port Accessory Seal Kit (External Seals Only)	**3911873006**, 3559001115 3911873007, 008, 009 355900X143 3911873011, 3912283075
3911873037 3911823122	Slug Adjusted R/V Kit (All Serviceable Seals)	**3911873007, 008, 009** 355900X143
3911823125	Unloader Port R/V Seal Kit	3559109027 (Refuse Rear Loader Applications)
3911873207 3911803387	Pneumatic Endcap Seal Kit (Commercial Intertech Design)	**3911873203**, 3911803554
3911803695	Pneumatic Endcap Seal Kit (Old RMH Design)	**3911873029**, 3911803591
3961823318	Spool Seal Kit	All Work Sections

Note: Bold part numbers are distributor program items.

A35 - C35 - A35(1030) Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911873040 3911803093	Section Seal Kit (Between Sections)	Inlet Sections Parallel and Tandem Worksections Combined Flow Midsection Inlets Midsection Selectors
3911803150	Section Seal Kit (Between Sections)	Series Worksections Split Flow Midsection Inlets
3911803090	Worksection Repair Kit (All Seals)	Manual, Parallel and Tandem Worksections
3911803029	Worksection Repair Kit (All Seals)	Series Worksections
3912881628	Large Center Section Seal Only	Series Worksections Split Flow Midsection Inlets
3911873044 **3911803272**	Main Relief Seal Kit (All Serviceable Seals)	**3911873003**, 3559107013 **3911873004**, 3559107085 **3911873137**, 3559107385
3911803682	Main Relief Plug Seal Kit Convertible Outlet Plug Seal Kit	**3911873005**
3911803470	Screw Adjusted Port R/V Kit (All Seals)	3559107021, 022, 023
3911803413	Screw Adjusted Crossover Port R/V Kit (All Seals)	3559107018, 019, 020

Note: Bold part numbers are distributor program items.

DVG80 -VG80 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911873160 3911803484	Section Seal Kit (Between Sections)	Inlet Sections All Worksections
3911873161 3911803594	Worksection Repair Kit (All Seals)	Manual Worksections
3911823175	Worksection Repair Kit (All Seals)	Remote Worksections (Includes 4 Position Float)
3911823101	Main Relief Seal Kit (All Serviceable Seals)	3559001008, 031
3911803041	Main Relief Seal Kit (External Seals)	3559001008, 031
3911803054	Main R/V and Plug Seal Kit (External Seals)	**3911873146, 3911873147** 3559001103
3911803770	Main Relief Seal Kit (All Serviceable Seals)	**3911873146**, 3559001103
3911873042 3911803737	Screw Adjusted, Pilot Operated Port R/V with NC, Seal Kit (All Serviceable Seals)	**391187006**, 3559001115
3911823038	Port Accessory Seal Kit (Exter/Val Seals Only)	**3911873006**, 3559001115 3911873011, 3912283075 3911873010, 3559001164

Note: Bold part numbers are distributor program items.

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Hydraulic Valve Systems
Elyria, Ohio, USA

PC25 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911823288	Clipper Relief Seal Kit (All Serviceable Seals)	3559001305, 3559001306
	Clipper Relief Plug Seal Kit	3559000058
3911823397	Section Seal Kit (Between Sections)	All Worksections
3911823398	Section Seal Kit (Between Sections)	3639109001 Spacerplate
3911823280	Worksection Repair Kit (All Seals)	Manual Worksections
3911823292	Worksection Repair Kit (All Seals)	Remote Worksections
3911803846	Spool Seal Kit	Standard Manual Worksections
3911823329	QMET Seal Kit	3559000006
3911823281	QMET, QREG, and 1/L Check Seal Kit (One Worksection, All Three Checks)	3639000006, 007, 008, & 009
3911823293	Outlet Plug Seal Kit (All SAE Plugs)	Outlet Sections
3911823290	Load Sense Relief Seal Kit (All Serviceable Seals) Load Sense Relief Plug Seal Kit	3559001303
3911803737	Screw Adjusted, Pilot Operated Port R/V with NC, Seal Kit (All Serviceable Seals)	3559001115
3911823038	Port Accessory Seal Kit (External Seals Only)	3559001115 355900X143 3559001164 3912283075
3911823122	Slug Adjusted R/V Kit (All Serviceable Seals)	355900X143
3911823393	Single Ended Solenoid Endcap Seal Kit	3911803XXX, 3911823XXX
3911823395	Digitrak Endcap Seal Kit	3911823XXX
3911803387	Pneumatic Endcap Seal Kit	3911803553

PC55 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION
3911823438	Seals Between Inlet and Work Section
3911823436	Seals Between First Work Section and Continuing Sections (Section Face Only)
3911823288	Clipper Relief Valve Seals
3911823331	Inlet
3911823434	Manual Work Section
3911823336	Remote Work Section
3911823333	Work Sections and Interface Seals

D30 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911803039	Section Seal Kit (Between Sections)	Inlet Sections All Worksections
3911803057	D30 Spool Seal Kit (Exter/Valseals)	Manual Worksections (3D1, Etc.)
3911803183	D30 Worksection Repair Kit (All Seals)	Manual Worksections (3D1, Etc.)
3911803239	D30 Worksection Repair Kit (All Seals)	Remote Worksections (3DR5, Etc.)
3911803042	Inlet R/V and Port Accessory Seal Kit (Exter/Val Seals Only)	3559107170 3559107155, 157, 233, 234 355900X019 3559107197,198,239,240 3559001102 3559001104 3559001123
3911803255	Inlet and Port R/V Seal Kit (All Serviceable Seals)	3559107155, 155, 157, 233, 234 355900X019 3559107197, 198, 239, 240

D50 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911803039	Section Seal Kit (Between Sections)	Inlet Sections All Worksections
3911803038	D50 Spool Seal Kit	Manual Worksections (5D1, Etc.)
3911803098	D50 Worksection Repair Kit (All Seals)	Manual Worksections (5D1, Etc.)
3911803130	D50 Worksection Repair Kit (All Seals)	Remote Worksections (5DR1, Etc.)
3911803366	D50 Worksection Repair Kit (All Seals) *Note: Steel Spool Seal Back-Up Rings*	Remote Worksections (5DR1, Etc.)
3911803097	D50 Outlet Plug Seals	Pressure Beyond Outlet Plug (5Y1, Etc.)
3911803054	Main R/V and Plug Seal Kit (External Seals)	Inlet R/V Plug 3559107227, 230,276
3911803940	Main Relief Seal Kit (All Serviceable Seals)	3559107227, 230,276
3911803770	Main Relief Seal Kit (All Serviceable Seals)	3559001103
3911803937	Main Relief Seal Kit (All Serviceable Seals)	3559001107
3911803042	Port Accessory Seal Kit, R/V 'S, Etc. (External Seals Only)	3559107170 3559107155, 157, 233, 234 355900X019 3559107154 3559001102 3559001104 3559001123
3911803255	Port R/V Seal Kit (All Serviceable Seals)	3559107155, 157, 233, 234 355900X019 3559107, 198, 239, 240
3911803736	Port R/V Seal Kit (All Serviceable Seals)	3559001104 3559001123

D65 - D85 - D115- D125 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911803037	Section Seal Kit (Between Sections) All Worksections	Inlet Sections
3911823262	D65 Worksection Repair Kit (All Seals)	Manual Worksections (6D1, 6D5, Etc.) Also 8DS, Etc
3911823263	D65 Worksection Repair Kit (All Seals)	Remote Worksections (6DR1, 6DR5, Etc.)
3911803100	D85 Worksection Repair Kit (All Seals)	Manual Worksections (8D1, Etc.)
3911803283	D85 Spool Seal Kit	Manual Worksections (8D1, Etc.)
3911803132	D85 Worksection Repair Kit (All Seals)	Remote Worksections (8DR1, Etc.)
3911823428	D125 Worksection Repair Kit (All Seals)	Manual Worksections (12D1, Etc.)
3911823429	D125 Worksection Repair Kit (All Seals)	Remote Worksections (12DR1, Etc.)
3911803041	Main R/V and Plug Seal Kit (External Seals)	Inlet R/V Plug 3559001008, 031
3911823101	Main Relief Seal Kit (All Serviceable Seals)	355 9001 008, 031
3911803042	Port Accessory Seal Kit, R/V's, Etc. (External Seals Only)	3559107170 3559107155, 157, 233, 234 355900X019 3559107197, 198 ,239, 240 3559107154 3559001102 3559001104 3559001123
3911803255	Port R/V Seal Kit (All Serviceable Seals)	3559107155, 157, 233, 234 355900X019 3559107197, 198, 239, 240
3911803736	Port R/V Seal Kit (All Serviceable Seals)	3559001104 3559001123

D100 - D145 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911803172	Section Seal Kit (Between Sections) All Worksections	Inlet Sections
3911803171	D145 Worksection Repair Kit (All Seals)	Remote Worksections
3912883127	D100/D145 Endcap Shaft Seal	Aeroquip Part #AR100595, No Longer Available From Commercial, Source Replacement Through Local Seal Supplier
3911803041	Main R/V and Plug Seal Kit (Exter/Val Seals)	Inlet R/V Plug 355 9001 008, 031
3911823101	Main Relief Seal Kit (All Serviceable Seals)	3.559E+12
3911803042	Port Accessory Seal Kit, R/V's, Etc. (External Seals Only)	3559107170 3559107155, 157, 233, 234 355900X019 3559107197, 198, 239, 240 3559107154 3559001102 3559001104 3559001123
3911803255	Port R/V Seal Kit (All Serviceable Seals)	3559107155, 157, 233, 234 355900X019 3559107197, 198, 239, 240
3911803736	Port R/V Seal Kit (All Serviceable Seals)	3559001104 3559001123

Hydraulic Remote Controller Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911873084 3911803870	Worksection Seal Kit	Single Axis Stackable Controller Two Piece Aluminum and Cast Iron Body
3911873085 3911803871	Joystick Seal Kit	Dual Axis Controller Two Piece Plastic and Cast Iron Body
3911803235	Worksectlon Seal Kit	Single Axis Stackable Controller Old Style 100% Cast Iron One Piece Body
3911803234	Joystick Seal Kit	Dual Axis Controller Old Style 100% Cast Iron One Piece Body

Note: Bold part numbers are distributor program items.

Pneumatic Remote Controller Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911803820	Worksection Seal Kit (O-Rings and Diaphragms)	Single Axis Stackable Controller Or Dual Axis (Two Kits Required)

Note: Bold part numbers are distributor program items.

Parker Hannifin Corporation
Hydraulic Valve Systems
Elyria, Ohio, USA

(VITON) DVA20 - DVG20 - VA20 - VG20- Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911803970	Section Seal Kit (Between Sections)	Inlet Sections Parallel and Tandem Worksections Midsection Inlets
3911803872	Worksection Repair Kit (All Seals)	Manual, Parallel and Tandem Worksections
3912881619	Large Center Section Seal Only	Series Worksections
3911803465	Worksection Repair Kit (All Seals)	Standard Remote Worksections
3911803873	Main Relief Seal Kit (All Serviceable Seals)	3559107123
3911803866	Screw Adjusted, Pilot Operated Port R/V with A/C, Seal Kit (All Serviceable Seals)	3559001199
3911823040	Slug Adjusted R/V Kit (All Serviceable Seals) Port R/V Plug Seal Kit	3559001208

(VITON) DVA35 - DVG35 - VA35 - VG35 - Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911823041	Section Seal Kit (Between Sections)	Inlet Sections Parallel and Tandem Worksections Midsection Inlets
3911803865	Worksection Repair Kit (All Seals)	Manual, Parallel and Tandem Worksections
3911823121	Worksection Repair Kit (All Seals)	Manual, Series Worksections
3912881693	Large Center Section Seal Only	Series Worksections Split Flow Midsection Inlets
3911823042	Worksection Repair Kit (All Seals)	Remote Parallel and Tandem Worksections
3911803867	Main Relief Seal Kit (All Serviceable Seals)	
3911803866	Screw Adjusted, Pilot Operated Port R/V with A/C, Seal Kit (All Serviceable Seals)	3559001199
3911823040	Slug Adjusted R/V Kit (All Serviceable Seals) Port R/V Plug Seal Kit	3559001208

(VITON) VG80 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911803866	Screw Adjusted, Pilot Operated Port R/V with A/C, Seal Kit (All Serviceable Seals) Valve Seal Kits	3559001199
3911823196	Section Seal Kit (Between Sections)	Inlet Sections All Worksections
3911803986	Screw Adjusted, Pilot Operated Port R/V with A/C, Seal Kit (All Serviceable Seals)	355 9001 205, 237

(VITON) D50 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911823196	Section Seal Kit (Between Sections)	Inlet Sections All Worksections
3911823195	D50 Worksection Repair Kit (All Seals)	Remote Worksections (5DR1, Etc.)
3911823985	Pilot Operated Main Relief Seal Kit (All Serviceable Seals)	3559001223, 238
3911803986	Screw Adjusted, Pilot Operated Port R/V with A/C, Seal Kit (All Serviceable Seals)	3559001205, 237

(VITON) D65 - D85 - D115- D125 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911803986	Screw Adjusted, Pilot Operated Port R/V with A/C, Seal Kit (All Serviceable Seals)	355 9001 205, 237

(VITON) D100 - D145 Valve Seal Kits

PART NUMBER	KIT DESCRIPTION	APPLICATION / WHERE USED
3911803986	Screw Adjusted, Pilot Operated Port R/V with A/C, Seal Kit (All Serviceable Seals)	3559001205, 237

Parker Safety Guide for Selecting and Using Hydraulic Valves and Related Accessories

WARNING: Failure or improper selection or improper use of Parker Hydraulic Valve Systems (HVS) Valves or related accessories ("Products") can cause death, personal injury and property damage. Possible consequences of failure or improper use of these Products include but are not limited to:

- Valves or parts thereof thrown off at high speed
- High velocity fluid discharge
- Explosion or burning of the conveyed fluid
- Contact with suddenly moving or falling objects controlled by the Valve
- Injections by high-pressure fluid discharge
- Contact with fluid that may be hot, cold, toxic or otherwise injurious
- Injuries resulting from injection, inhalation or exposure to fluids
- Injury from handling a heavy item (dropped, awkward lift)
- Electric shock from improper handling of solenoid connections
- Injury from slip or fall on spilled or leaked fluid

Before selecting or using any of these Products, it is important that you read and follow the instructions below. In general, the Products are not approved for in-flight aerospace applications. Consult the factory for the few that are FAA approved.

1.0 **GENERAL INSTRUCTIONS**

1.1 **Scope:** This safety guide provides instructions for selecting and using (including assembling, installing and maintaining) these Products. For convenience all items in this guide are called "Valves". This safety guide is a supplement to and is to be used in conjunction with the specific Parker catalogs for the specific Valves and/or accessories being considered for use. See item 1.6 below for obtaining those catalogs.

1.2 **Fail-Safe:** Valves can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the Valve or Valve Assembly will not endanger persons or property.

1.3 **Safety Devices:** Never disconnect, override, circumvent or otherwise disable any safety lockout on any system whether powered by HVS Valves or any motion control system of any manufacturer. (e.g. Automatic shut-off on a riding lawn mower should the operator get out of the seat).

1.4 **Distribution:** Provide a copy of this safety guide to each person that is responsible for selecting or using HVS Valve Products. Do not select HVS Valves without thoroughly reading and understanding this safety guide as well as the specific Parker catalogs for the Products considered or selected.

1.5 **User Responsibility:** Due the wide variety of operating conditions and applications for Valves, HVS and its distributors do not represent or warrant that any particular Valve is suitable for any specific system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing is solely responsible for:
- Making the final selection of the Valve
- Assuring that the user's requirements are met and that the application presents no health or safety hazards.
- Providing all appropriate health and safety warnings on the equipment on which the Valves are used.
- Assuring compliance with all applicable government and industry standards.

1.6 **Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com , for the telephone numbers of the appropriate technical service department. For additional copies of this or any other Parker Safety Guide go to www.parker.com and click on the safety button on the opening page. Catalogs and/or catalog numbers for the various HVS Valve Products can be obtained by calling HVS at 440-366-5100. Phone numbers and catalog information is also available on the Parker website, www.parker.com.

2.0 **VALVE INSTRUCTIONS**

2.1 **Pressure:** Valve selection must be made so that the maximum working pressure of the Valve is equal to or greater than the maximum system pressure. Surge, impulse or peak transient pressures in the system must be below the maximum working pressure of the Valve. Surge, impulse and peak pressures can usually be determined by sensitive electrical instrumentation that measures and indicates pressures at millisecond intervals. Mechanical pressure gauges indicate only average pressure and cannot be used to determine surge, impulse or peak transient pressures. Burst pressure ratings if given or known are for manufacturing purposes only and are not an indication that the Product can be used in applications at the burst pressure or otherwise above the maximum working pressure.

2.2 **Temperature:** The fluid temperature must be regulated or controlled so that the operating viscosity of the fluid is maintained at a level specified for the particular Valve product. Such ranges are given in the product catalogs or can be obtained from the appropriate customer service department for the particular Valve product.

2.3 **Fluid Compatibility:** The fluid conveyed in Valves has direct implications on the Valve selection. The fluid must be chemically compatible with the Valve component materials. Elastomer seals, brass, cast iron, aluminum for example all are potentially affected by certain fluids. Additionally, fluid selection affects the performance of various Valves. Considerations relative to fluid selection are outlined in the specific HVS Valve product catalog. Of particular importance is that the fluid be for hydraulic use, contain the proper additives and wear inhibitors. See 1.6 "Additional Questions" above for information to obtain such HVS catalogs.

2.4 **Changing Fluids:** If a system requires a different fluid, it should be done with the guidance in number 2.3 above. Additionally, it may be necessary to flush the system (including the Valves) to remove any of the previous fluid. Consult Parker Valve Systems for guidance.

2.5 **Size:** Transmission of power by means of pressurized fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage due to heat generation or excessive fluid velocity.

2.6 **Placement:** Installation of Valves must take into account the orientation of the Valve and the proximity of the Valve to other parts of the system. This includes but is not limited to closeness to hot and cold areas, access for servicing and operation as well as orientation for proper connectors.

2.7 **Ports:** Connection of Valves in systems can be by threaded ports, sub-base surfaces, flanges and manifolds. In all cases, the proper fitting, surface or mounting hardware must be selected to properly seal and contain the system fluid so as to avoid the adverse conditions listed in the initial warning box above. Specifically, if using threaded ports, the designer must make sure that the mating fitting is of the compatible thread. Also, the instructions provided by the connector hardware supplier must be read and understood so as to properly assemble the connector. The Parker Safety Guide for using Hose, Tubing and Fittings and Related Accessories is but one reference to this end.

2.8 **Environment:** Care must be taken to insure that the Valve and Valve Assemblies are either compatible with or protected from the environment (that is, surrounding conditions) to which they are exposed. Environmental conditions including but not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals and air pollutants can cause degradation and premature failure.

2.9 **Electric Power:** For Valves requiring electric power for control, it is imperative that the electricity be delivered at the proper voltage, current and wattage requirements. To obtain the proper control requirements please refer to the respective Parker product catalog for the specific Valve that is intended for use. If further guidance is required, call the appropriate technical service department identified in the respective Parker product catalog.

2.10 **Specifications and Standards:** When selecting Valves, government, industry and Parker specifications and recommendations must be reviewed and followed as applicable.

2.11 **Accessories:** All accessories used in conjunction with any Parker Valve product must be rated to the same requirements of the Valve including but not limited to pressure, flow, material compatibility, power requirements. All of these items must be examined as stated in the "VALVE INSTALLATION INSTRUCTIONS" paragraph 3.0.

(continued on next page)

3.0 VALVE INSTALLATION INSTRUCTIONS

3.1 **Component Inspection:** Prior to use, a careful examination of the Valve(s) must be performed. The Valve intended for use must be checked for correct style, size, catalog number and external condition. The Valve must be examined for cleanliness, absence of external defects or gouges, cracked or otherwise deformed parts or missing items. The mounting surface or port connections must be protected and free of burrs, scratches, corrosion or other imperfections. Do NOT use any item that displays any signs of nonconformance. In addition, any accessory including but not limited to fittings, bolt kits, hoses, sub bases, manifolds, and electrical connectors must be subjected to the same examination.

3.2 **Handling Valves:** Many Valves whether HVS Valves or of another manufacturer can be large, bulky or otherwise difficult to handle. Care must be taken to use proper lifting techniques, tools, braces, lifting belts or other aids so as not to cause injury to the user, any other person or to property.

3.3 **Filtration:** Fluid cleanliness is a necessity in any hydraulic system. Fluid filters must be installed and maintained in the system to provide the required level of fluid cleanliness. Filters can be placed in the inlets, pressure lines and return lines. The level of cleanliness required is specified in the HVS product catalog for the specific Valve(s) selected or intended for use. For additional information on Filter selection contact Parker Filter Division at 800-253-1258 or 419-644-4311.

3.4 **Servo Valves:** Application of Servo Valves in general requires knowledge and awareness of "closed loop control theory" and the use of electronic controls for successful and safe operation. Individuals who do not have such experience or knowledge must gain training before use of such Products. Parker offers both classroom training as well as manuals to assist in gaining this knowledge. These aids can be obtained by contacting Hydraulic Valve Systems at 440-366-5100, calling the general Parker help line 800-CPARKER or going to the Parker web site at www.parker.com.

3.5 **Accessory Ratings:** All accessories used in combination with the selected or intended Valve product must be rated and compatible with the selected Valve. Specifically, the items must be of equal or greater rating including but not limited to pressure, flow, power, size, port style, thread connectors and material.

3.6 **Connection Styles:** It is the responsibility of the user of the Parker product to properly select connectors and accessories that match the connections on the sub plate, Valve, flange or threaded connection or manifold. It is also the responsibility of the installer to possess adequate skill and knowledge including but not limited to thread preparation, torque technique, hose assembly and inspection, tube preparation and assembly, and fitting installation. Parker Tube Fitting Division (www.parker.com/tfd) catalog 4300 and Parker Hose Products (www.parkerhose.com) catalog 4400 describe some basic technical information relative to proper fitting assembly.

3.7 **Electrical Connections:** All electrical connections must be made to the applicable codes and local safety requirements.

3.8 **Gauges and Sensors:** The user must install sufficient gauges and sensors in the system so as to be able to determine the condition of the system. This includes but is not limited to pressure gauges, flow meters, temperature sensors and site gauges. These are of utmost importance should removal or disassembly of a Valve, portion of a Valve or portion of the system become necessary. Refer to "VALVE MAINTENANCE AND REPLACEMENT INSTRUCTIONS" for details and especially item 4.8.

3.9 **System Checkout**: Once installed, the Valve installation must be tested to insure proper operation and that no external leakage exists. All safety equipment must be in place including but not limited to safety glasses, helmets, ear protection, splash guards, gloves, coveralls and any shields on the equipment. All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Valve maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potentially hazardous areas while testing and using.

4.0 VALVE MAINTENANCE AND REPLACEMENT INSTRUCTIONS

4.1 **Maintenance Program:** Even with proper installation, Valves and Valve System life may be significantly reduced without a continuing maintenance program. The severity of the application and risk potential must determine the frequency of the inspection and the replacement of the Products so that Products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at a minimum, must include instructions 4.2 through 4.10. An FMEA (Failure Mode and Effects Analysis) is recommended in determining maintenance requirements.

4.2 **Visual Inspection – Valves:** Any of the following conditions require immediate shut down and replacement of the Valve.
- Evidence that the Valve is in partial dis-assembly.
- Visible crack or suspicion of a crack in the Valve housing or bent, cracked or otherwise damaged solenoid.
- Missing or partially extending drive pin on a flow control knob.
- Missing, loose components, obstructions or other condition impeding the motion or function of the manual knob, lever, foot pedal or other mechanical operator of a hydraulic Valve.
- Any evidence of burning or heat induced discoloration.
- Blistered, soft, degraded or loose cover of any kind.
- Loose wire or electrical connector.

4.3 **Visual Inspection – Other:** The following conditions must be tightened, repaired, corrected or replaced as required.
1. Fluid on the ground must be cleaned immediately. Also, the source of the fluid must be determined prior to running the equipment again.
2. Leaking port or excessive external dirt build-up.
3. System fluid level is too low or air is entrapped or visible in the reservoir.
4. Equipment controlled by the Valve or Valve assembly has been losing power, speed, efficiency

4.4 **Filter Maintenance:** System filters must be maintained and kept in proper working order. The main service requirement is periodic replacement of the filter element or screen. Contact Parker Filter Division at 800-253-1258 or 419-644-4311 for further filter maintenance details.

4.5 **Functional Test:** See "System Checkout" number 3.9 above in "VALVE INSTALLATION INSTRUCTIONS".

4.6 **Replacement Intervals:** Valves and Valve Systems will eventually age and require replacement. Seals especially should be inspected and replaced at specific replacement intervals based on previous experience, government or industry recommendations, or when failures could result in unacceptable downtime, damage or injury risk. At a minimum seals must be replaced whenever service is rendered to a Valve product.

4.7 **Adjustments, Control Knobs, and Other Manual Controls**: System Pressure and Flow are typically adjusted by knobs and/or handles. A set-screw or lock-nut secures the adjustment device so as to maintain the desired setting. This set-screw or lock-nut must first be loosened prior to making any adjustments and re-tightened after adjustment on the HVS Valve. All adjustments must be made in conjunction with pressure gauges and/or flow meters (or by watching the speed of the actuator in the case of setting flow only). See paragraph "Gauges and Sensors" above in the section "VALVE INSTALLATION INSTRUCTIONS'. Under no circumstances should any control knob, adjustment stem, handle, foot pedal or other actuating device be forced beyond the mechanical stop(s) on the Valve. For example, the Parker Safety Notice Bulletin **HY14-3310-B1/US** for HVS Colorflow Valves specifically restricts the adjustment torque to "hand adjust" or "less than 10 ft/lbs" if it cannot be adjusted by hand. Failure to adhere to this may force the knob beyond the stop point allowing it to be ejected at high speed resulting in death, personal injury and property damage. For complete safety instructions on HVS Colorflow Valves, copies of Safety Notice Bulletin **HY14-3310-B1/US** can be obtained directly from the Hydraulic Valve Systems at 440-366-5100 or from the Parker web site at www.parker.com by selecting the "Safety" button. Parker help line 800-CPARKER is on call 24/7 as well should there be any question about the use of a HVS Valve. Additionally, when making adjustments, always adjust the Valve with all parts of your body to the side of the Valve (that is, the knob is not pointing toward you or anyone else).

4.8 **High pressure Warning:** Hydraulic power is transmitted by high-pressure fluids through hoses, fittings and valves, pumps and actuators. This condition can be dangerous and potentially lethal and, therefore, extreme caution must be exercised when working with fluids under pressure. From time to time, hoses, Valves, tubes or fittings fail if they are not replaced at proper time intervals. Typically these failures are the result of some form of misapplication, abuse, wear, or failure to perform proper maintenance. When such failure occurs, generally the high pressure fluid inside escapes in a stream which may or may not be visible to the user. Under no circumstances should the user attempt to locate the leak by "feeling" with their hands or any other part of their body. High-pressure fluids can and will penetrate the skin and cause severe tissue damage and possible loss of limb or life. Even seemingly minor hydraulic fluid injection injuries must be treated immediately by a physician with knowledge of the tissue damaging properties of hydraulic fluid.
If a hose, tube, fitting or Valve failure occurs, immediately shut down the equipment and leave the area until pressure has been completely released from the system. Simply shutting down the pump may or may not eliminate the pressure in the system. It may take several minutes or even hours for the pressure to be relieved so that the leak area can be examined safely. Once the pressure has been reduced to zero, the suspected leaking item can be taken off the equipment and examined. It must always be replaced if a failure has occurred. Never attempt to patch or repair a connector (especially a hose) or Valve that has failed. Consult the nearest Parker distributor or the appropriate Parker division for component replacement information. Never touch or examine a failed hydraulic component unless it is obvious that the item no longer contains fluid under pressure.

Notes

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Notes

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