



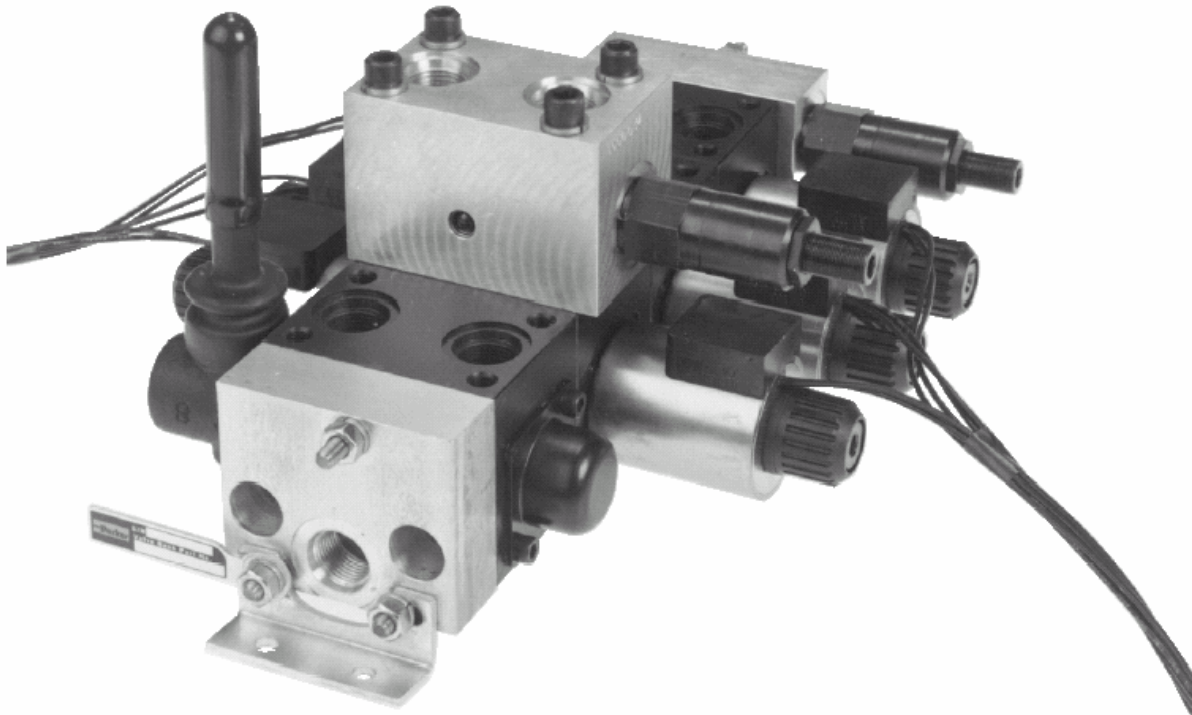
**Bulletin HY14-2401-M1/US  
Service Bulletin**

## **Bankable Control Valves**

BV06  
BVB06  
BVCS10  
BV10  
BV18

Effective: June 01, 2006  
Supersedes: Bull. 3123-M1/USA, 10/13/1995

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**Service Parts Information**

**BV06**..... 1  
 BV06 Single P.O. Check..... 2  
 BV06 Dual P.O. Check..... 2  
 BV06 Single Crossover Relief..... 3  
 BV06 Dual Crossover Relief ..... 3  
 BV06 Single Counterbalance ..... 4  
 BV06 Dual Counterbalance..... 4  
 BV06 Single Flow Control ..... 5  
 BV06 Dual Flow Control..... 5  
**BVB06**..... 6  
**BVCS10**..... 7  
**BV10**..... 8  
**BV18**..... 9  
 BV18 Inlet with Relief ..... 10  
 BV18 Lever..... 11  
 BV18 Detented Lever..... 12  
 BV18 Dual and Single Hydraulic Pilot..... 14  
 BV18 Dual Air Pilot..... 14  
 BV18 Single Air Pilot ..... 15  
**Operation/Trouble Shooting** ..... 16  
**Offer of Sale** ..... 17

**WARNING**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

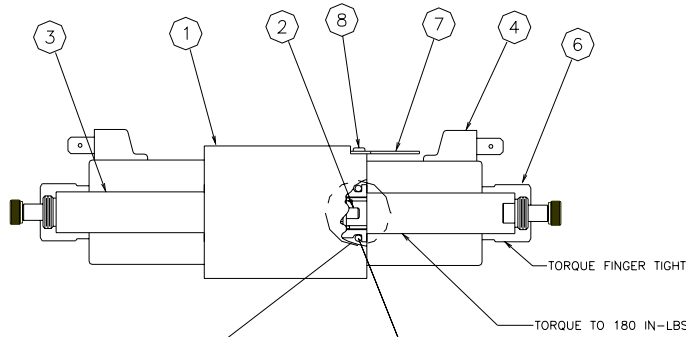
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**Offer of Sale**

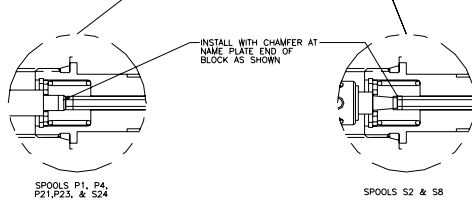
The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale".



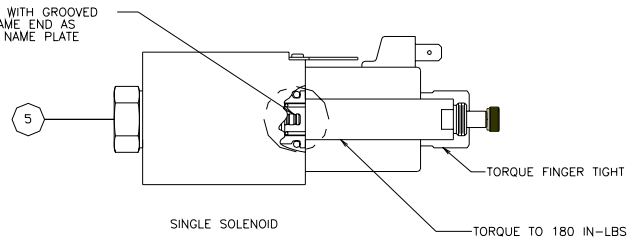


**BILL OF MATERIALS**

Item	Part Number	Description	Quantity
1	See Table Below	Body	1
2	See Table Below	Spool	1
3	See Table Below	Tube Assembly	2
4	See Table Below	Coil	2
5	See Table Below	Plug Assembly	1
6	118113-00	Retainer	2
7	See Table Below	Name Plate	1
8	1301066	Drive Screw	1



INSTALL SPOOL WITH GROOVED END AT THE SAME END AS SOLENOID AND NAME PLATE



**SPOOL - Item 2**

Spool Code	P/N
P1	118736-00
P4	118737-00
P11	118767-00
P20	118731-00
P21	118731-00
P23	118736-00
S2	710025-00
S8	710015-00
S24	710005-00

**TUBE ASSEMBLY - Item 3**

Spool Code	P/N
P1	1500257
P4	1500256
P11	1500257
P20	1500256
P21	1500256
P23	1500257
S2	1500256
S8	1500256
S24	1500256

**BODY - Item 1**

P/N	Description
BV06-6T	Individual Body - Series/Parallel
BV06-E6T	Inlet/Outlet Body - Parallel Only
BV06-M6T	Middle Body - Parallel Only
BV06-SI6T	Inlet Body - Series Only
BV06-SM6T	Middle Body - Series Only
BV06-SO6T	Outlet Body - Series Only

**PLUG ASSEMBLY - Item 5**

Spool Code	P/N
P21	710020-03
P23	710020-01
S24	710020-03

**NAMEPLATE - Item 6**

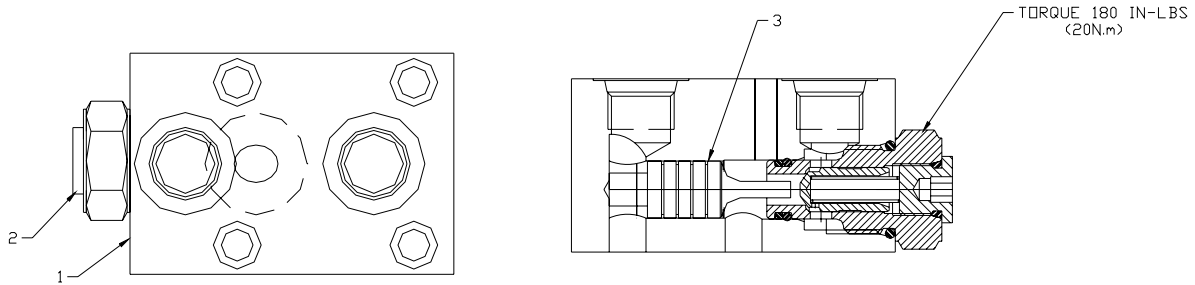
Spool Code	P/N	Spool Code	P/N
P1	1500011-C1	P21	1500011-F21
P4	1500011-M4	P23	1500011-CS23
P11	1500011-N11	S2	1500011-O2
P20	1500011-E20	S8	1500011-T8
		S24	1500011-TS24A

**COILS - Item 4**

P/N	DESCRIPTION	P/N	DESCRIPTION
851020-010VDC	10 VDC, 30 Watt DIN	851050-048VDC	48 VDC, 30 Watt Dual Spade
851020-012VDC	12 VDC, 30 Watt DIN	851052-010VDC	10 VDC, 30 Watt Dual Wire
851020-018VDC	18 VDC, 30 Watt DIN	851052-012VDC	120 VDC, 30 Watt Dual Wire
851020-024VDC	24 VDC, 30 Watt DIN	851052-018VDC	18 VDC, 30 Watt Dual Wire
851020-120VAC	120 VAC, 30 Watt DIN	851052-024VDC	24 VDC, 30 Watt Dual Wire
851020-120VDC	120 VDC, 30 Watt DIN	851052-036VDC	36 VDC, 30 Watt Dual Wire
851020-240VAC	240 VAC, 30 Watt DIN	851052-048VDC	48 VDC, 30 Watt Dual Wire
851050-010VDC	10 VDC, 30 Watt Dual Spade	851054-012VDC	12 VDC, 30 Watt Dual Screw
851050-012VDC	12 VDC, 30 Watt Dual Spade	851054-024VDC	24 VDC, 30 Watt Dual Screw
851050-018VDC	18 VDC, 30 Watt Dual Spade	851056-012VDC	12 VDC, 30 Watt Single Screw
851050-024VDC	24 VDC, 30 Watt Dual Spade	851056-024VDC	24 VDC, 30 Watt Single Screw
851050-036VDC	36 VDC, 30 Watt Dual Spade	1500189-12	12 VDC, 30 Watt 5" Weatherpack
		1500189-24	12 VDC, 30 Watt 5" Weatherpack



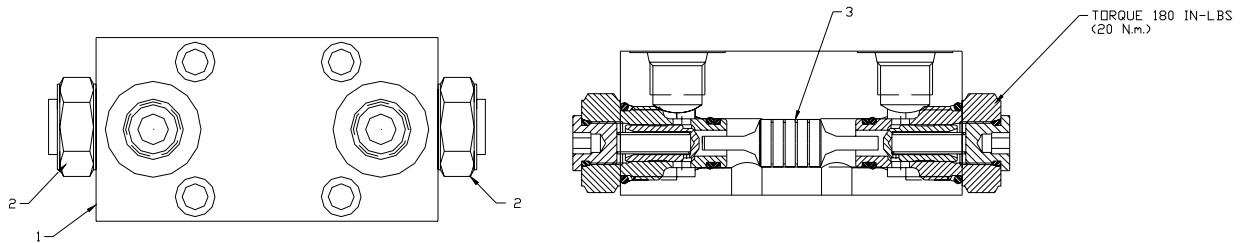
**BV06 Single PO Check**



**Bill of Materials**

Item	Part Number	Description	Qty
1	118778-01	Block	1
2	CVH081P**	Cartridge (CVH081P30 Standard)	1
3	118763-00	Piston	1

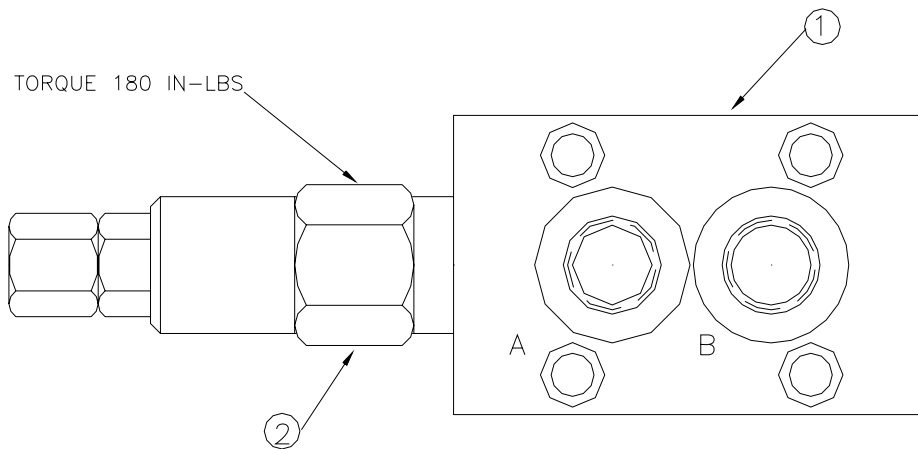
**BV06 Dual PO Check**



**Bill of Materials**

Item	Part Number	Description	Qty
1	118779-01	Block	1
2	CVH081P**	Cartridge (* = Cracking Pressure)	2
3	118764-00	Piston	1

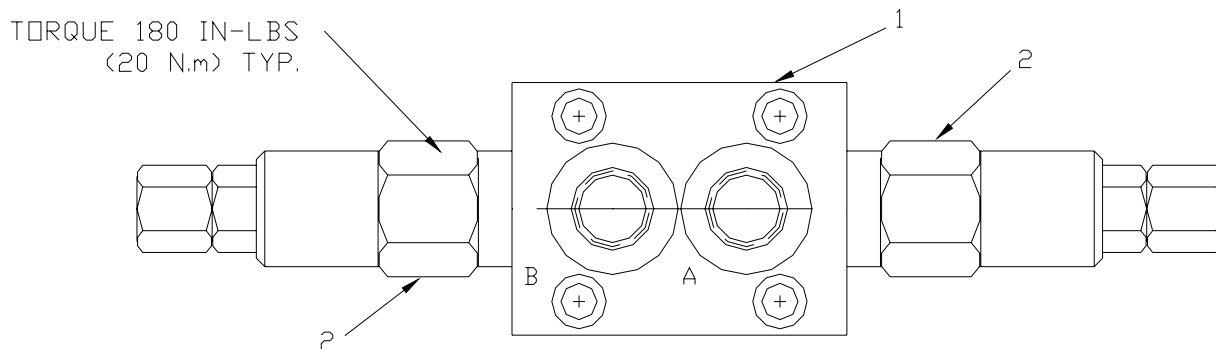
**BV06 Single Crossover Relief**



**Bill of Materials**

Item	Part Number	Description	Qty
1	118781-00	Block	1
2	RDH083*15	Cartridge (300 - 1500 PSI)	1
2	RDH083*30	Cartridge (1500 - 3000 PSI)	1

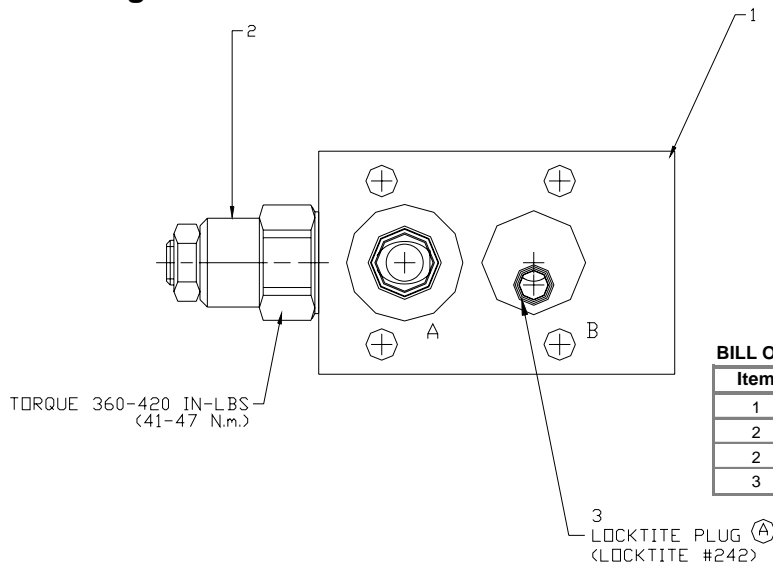
**BV06 Dual Crossover Relief**



**Bill of Materials**

Item	Part Number	Description	Qty
1	118781-00	Block	1
2	RDH083*15	Cartridge (300 - 1500 PSI)	2
2	RDH083*30	Cartridge (1500 - 3000 PSI)	2

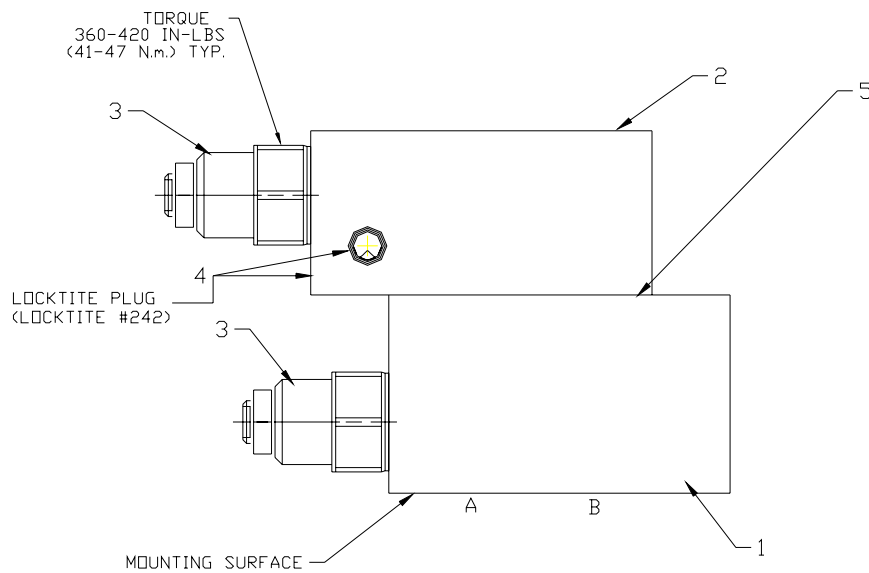
### BV06 Single Counterbalance Valve



#### BILL OF MATERIALS

Item	Part Number	Description	Quantity
1	118776-00	Block	1
2	Consult Factory	Cartridge 400 - 1500 PSI	1
2	Consult Factory	Cartridge 1000 - 3000 PSI	1
3	102X1	Plug	1

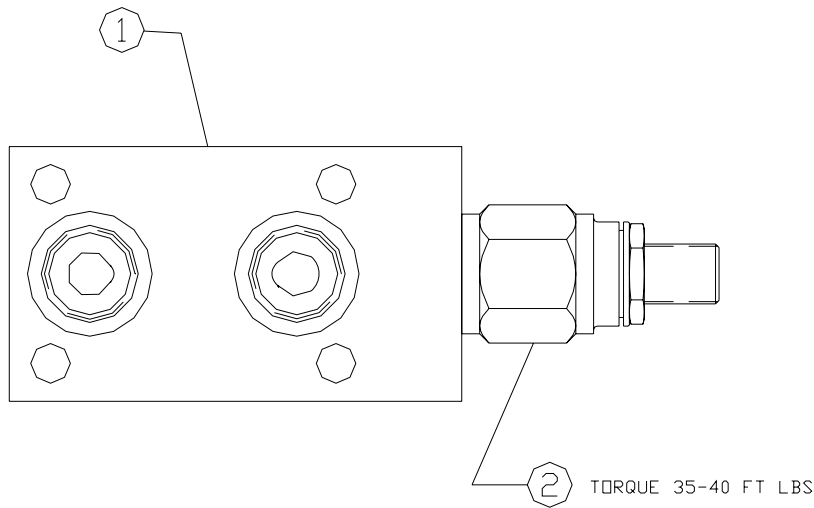
### BV06 Dual Counterbalance



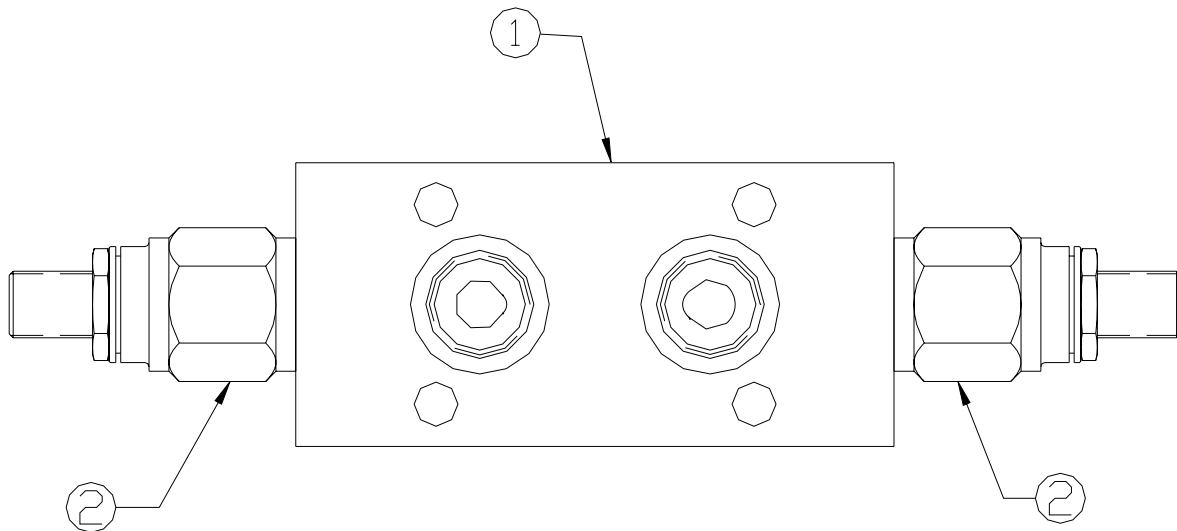
#### BILL OF MATERIALS

Item	Part Number	Description	Quantity
1	118776-00	Block	1
2	118777-00	Block	1
3	Consult Factory	Cartridge 400 - 1500 PSI	2
3	Consult Factory	Cartridge 1000 - 3000 PSI	2
4	102X1	Plug	2
5	2018N-7	O-Ring	2

**BV06 Single Flow Control**



**BV06 Dual Flow Control**



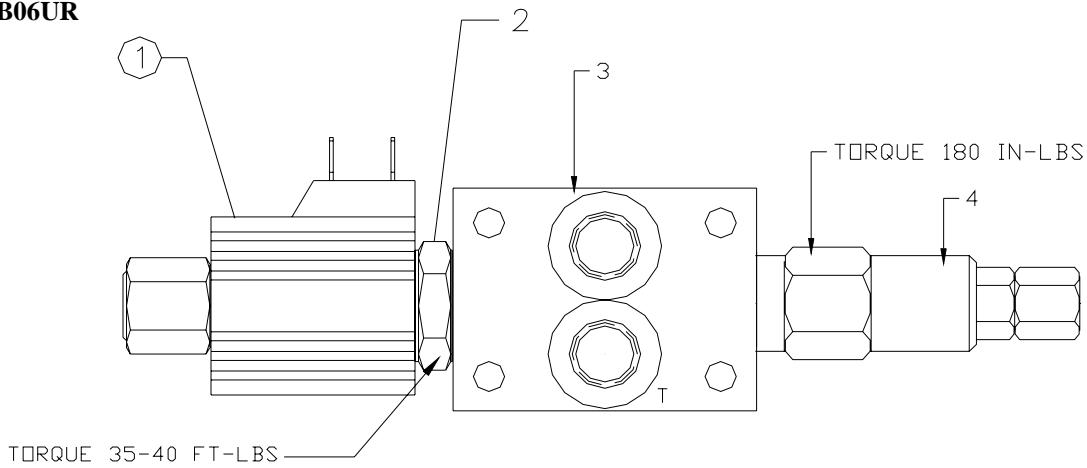
**Block - Item 1**

Part Number	Description
1550020	Dual, Meter-In
1550023	Dual, Meter-Out
1550026	Single, Meter-In
1550024	Single, Meter-Out

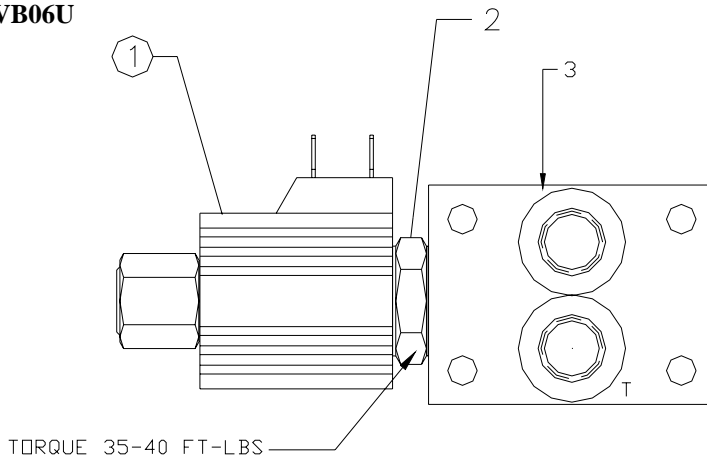
**Cartridge - Item 2**

Part Number	Description
FV101S	Non-Compensated
FC101S050	Compensated, .30 - 1.0 GPM (Pre-Set @ .5 GPM)
FC101S100	Compensated, .75 - 2.2 GPM (Pre-Set @ 1 GPM)
FC101S300	Compensated, 2.0 - 4.5 GPM (Pre-Set @ 3 GPM)
FC101S600	Compensated, 4.0 - 8.0 GPM (Pre-Set @ 6 GPM)

**BVB06UR**



**BVB06U**



**Coil Chart - Item 1**

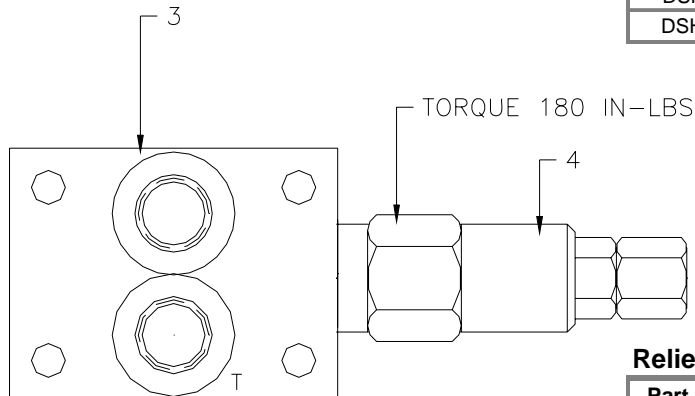
Code	Part Number
D	S8LDD***
P	S8LPD***
W	S8LWD***

\*\*\* Need to supply voltage

**Cartridge Solenoid Valve - Item 2**

Part Number	Description
DSH081N	No Manual Override
DSH081NE	Push-Type w/Extended Rod (N.O Only)
DSH081NM	Push-Type w/Flush Rod (N.O Only)

**BVB06MR**



**Block - Item 3**

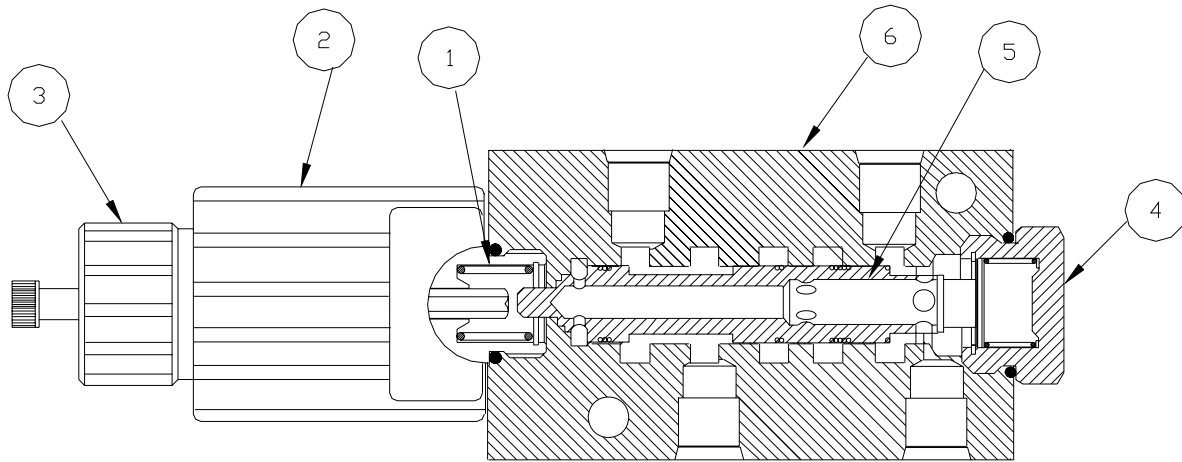
Code	Part Number
MR	BVB06MR-6T
U	BVB06U-6T
UR	BVB06UR-6T

**Relief Valve - Item 4**

Part Number	Description
RDH083S15	100 - 1500 PSI (Pre-Set @ 750 PSI)
RDH083S30	1000 - 3000 PSI (Pre-Set @ 1500 PSI)
RDH083K15	100 - 1000 PSI (Pre-Set @ 500 PSI)
RDH083K320	500 - 2000 PSI (Pre-Set @ 1000 PSI)



**BVCS10**



**BILL OF MATERIALS**

Item	Part Number	Description	Quantity
1	709298-00	Tuby Assembly	1
2	See Table Below	Coil	1
3	118378-00	Coil Retainer	1
4	711168-00	Adapter Assembly	1
5	118985-00	Spool	1
6	See Table Below	Block	1

**Coil**

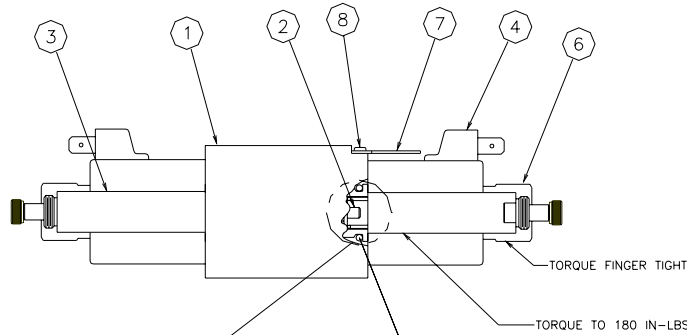
Code	Part number
PV	851060-***
W	851062-***
C	851057-***
D	851058-***

\*\*\* Need to supply voltage

**Block**

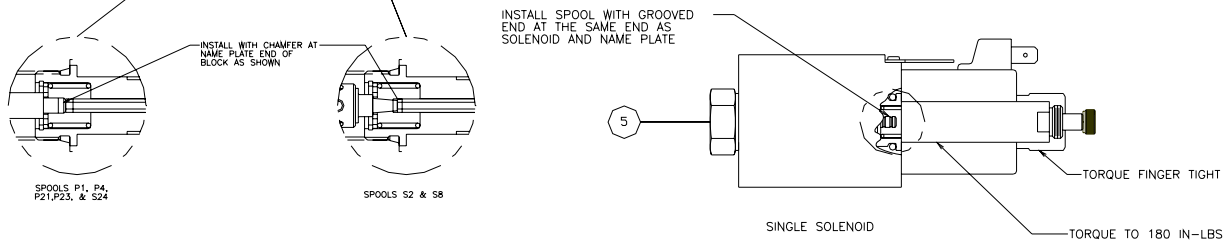
Part Number	Description
118947-00	BVCS10-6T
118944-00F	BVCS10-8B
118946-00	BVCS10-8T
118945-00	BVCS10-6B

**BV10 Single/Double**



**BILL OF MATERIALS**

Item	Part Number	Description	Quantity
1	See Table Below	Body	1
2	See Table Below	Spool	1
3	See Table Below	Tube Assembly	2
4	See Table Below	Coil	2
5	See Table Below	Plug Assembly	1
6	118113-00	Retainer	2
7	See Table Below	Name Plate	1
8	1301066	Drive Screw	1



**BODY - Item 1**

Code	P/N	Description
8T	118513-00	Individual Body - Series/Parallel
8TF	118513-00 w/ mtg kit	Individual Body w/ mtg kit- Series/Parallel
E8T	118511-00	End Body - Parallel Only
M8T	118515-00	Middle Body - Parallel Only
SM8T	118512-0	Middle Body- Series Only
SI8T	118516-00	Inlet Body - Series Only
SO8T	118526-05	Outlet Body - Series Only

**COILS - Item 4**

Code	P/N
PV	851060-****
W	851062-****
SV	851064-****
S1V	851065-****
C	851057-****
D	851058-****

\*\*\*\* - 012VDC, 024VDC

**SPOOL - Item 2**

Spool Code	P/N
P1	118517-00
P11	118630-00
P20	118519-00
P21	118519-00
P4	118518-00
S2	707378-00
S21	707378-00
S22	707378-00
S24	707377-00
S8	707377-00

**TUBE ASSEMBLY - Item 3**

Spool Code	P/N
P1	709294-00
P11	709294-00
P20	709294-00
P21	709294-00
P4	15000-47
S2	15000-47
S21	15000-47
S22	15000-47
S24	15000-47
S8	15000-47

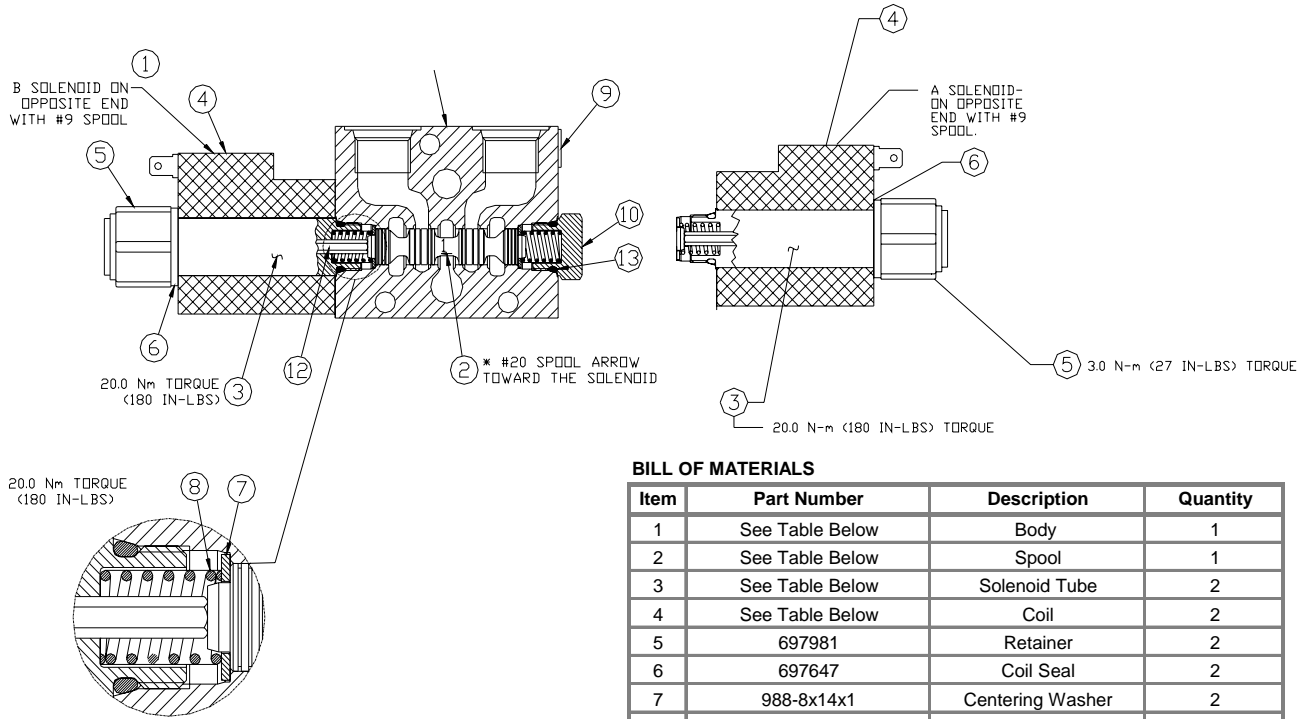
**PLUG ASSEMBLY - Item 5**

Spool Code	P/N
P20	709297-01
P21	709297-01
S21	709297-05
S22	709297-05
S24	709297-02

**NAMEPLATE - Item 6**

Spool Code	P/N	Spool Code	P/N
P1	1500011-C1	S2	1500011-O2
P4	1500011-M4	S8	1500011-T8
P11	1500011-N11	S24	1500011-TS24A
P20	1500011-E20	S21	1500011-O2
P21	1500011-F21	S22	1500011-O2
P23	1500011-CS23	S24	1500011-T8

BV18 Single/Double



**BILL OF MATERIALS**

Item	Part Number	Description	Quantity
1	See Table Below	Body	1
2	See Table Below	Spool	1
3	See Table Below	Solenoid Tube	2
4	See Table Below	Coil	2
5	697981	Retainer	2
6	697647	Coil Seal	2
7	988-8x14x1	Centering Washer	2
8	See Table Below	Centering Spring	2
9	See Table Below	Name Plate	1
10	697649	End Cap	1
11*	2013N-9	Section O-Ring	2
12	697627	Push Pin	2
13	3907N-9	O-Ring	2

\* Section O-Ring Not Shown

**BODIES - Item 1**

Part Number	Description
1550003	Individual Body - Series or Parallel
1550032	Individual Body - Series or Parallel w/added Tank Ports for Tank Port Reliefs

**SPOOLS - Item 2**

Spool Code	Spool
1	697601
2	697602
4	697604
9	1302128
11	697611
20	697620

**SPRING - Item 8**

Spool Code	Spring
1	697625
2	1550089
4	697625
9	1550089
11	697625
20	697625

**SOLENOID TUBES - Item 3**

Part Number	Description
697714	AC Tube Assembly
697717	DC Tube Assembly

**NAMEPLATES - Item 9**

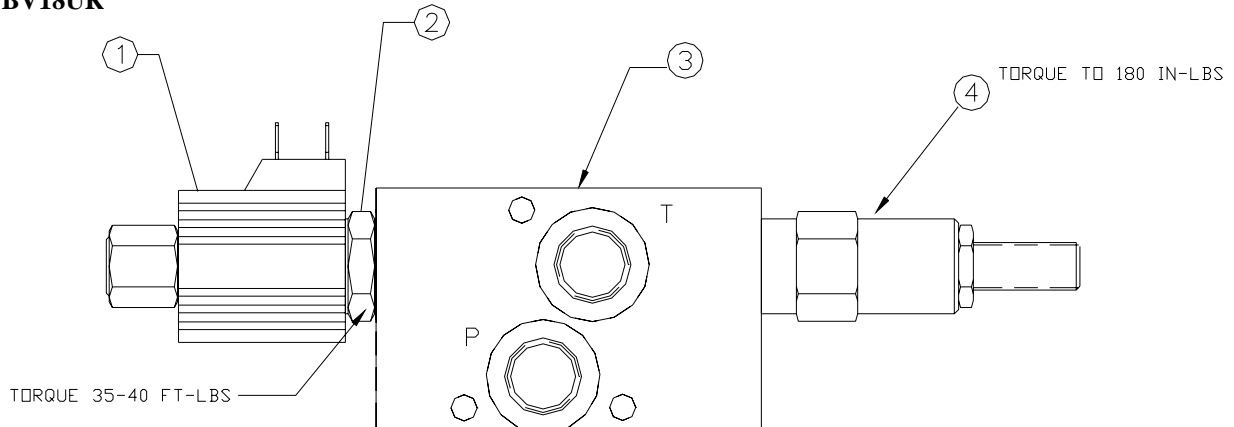
Spool Code	Nameplate	Spool Code	Nameplate
1	1550088-C1	9	1550088-T8
2	1550088-O2	11	1550088-N11
4	1550088-M4	20	1550088-E20

**COILS - Item 4**

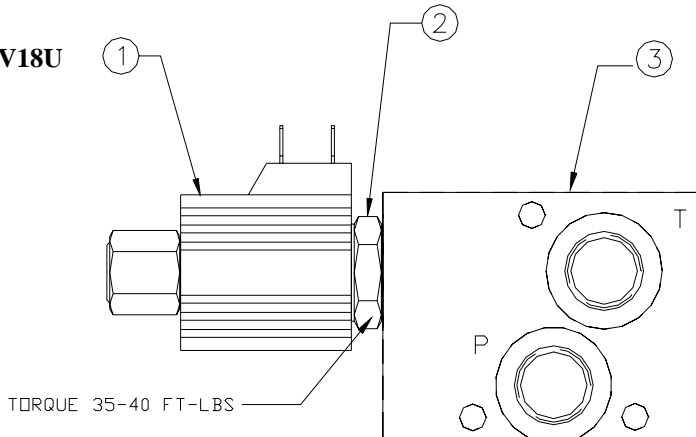
Part Number	Description
697228	120 VAC DIN
697229	240 VAC DIN
697458	24 VDC SPADE
1550090-10	10 VDC, 24 Watt Dual Spade Coil
1550090-12	12 VDC, 24 Watt Dual Spade Coil
1550090-24	24 VDC, 24 Watt Dual Spade Coil
1550091-10	10 VDC, 30 Watt Dual Spade
1550091-12	12 VDC, 30 Watt Dual Spade
1550091-24	24 VDC, 30 Watt Dual Spade
1550092-12	12 VDC, 24 Watt Dual Spade
1550092-24	24 VDC, 24 Watt Dual Spade
1550093-10	10 VDC, 30 Watt Dual Wire
1550093-12	12 VDC, 30 Watt Dual Wire
1550093-24	24 VDC, 30 Watt Dual Wire
1550094-12	12 VDC, 24 Watt DIN
1550094-24	24VDC, 24 Watt DIN
1550095-12	12 VDC, 30 Watt DIN
1550095-24	24 VDC, 30 Watt DIN
1550132-012VDC	12 VDC, Hvy Duty Single Screw
1550139-12	12 VDC, 30 Watt Double Screw
1550139-24	24 VDC, 30 Watt Double Screw



**BV18UR**



**BV18U**



**Coil Chart - Item 1**

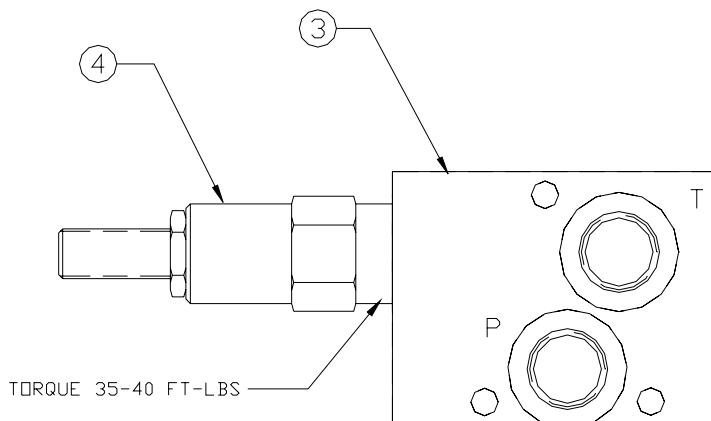
Code	Part number
D	S8LDD***
P	S8LPD***
W	S8LWD***

\*\*\* Need to supply voltage

**Cartridge Solenoid Valve - Item 2**

Part Number	Description
DSH081N	No Manual Override
DSH081NRE	Push-Type w/Extended Rod (N.O Only)
DSH081NRM	Push-Type w/Flush Rod (N.O Only)

**BV18MR**



**Block - Item 3**

Code	Part Number
MR	1550006
U	1550006
UR	1550010

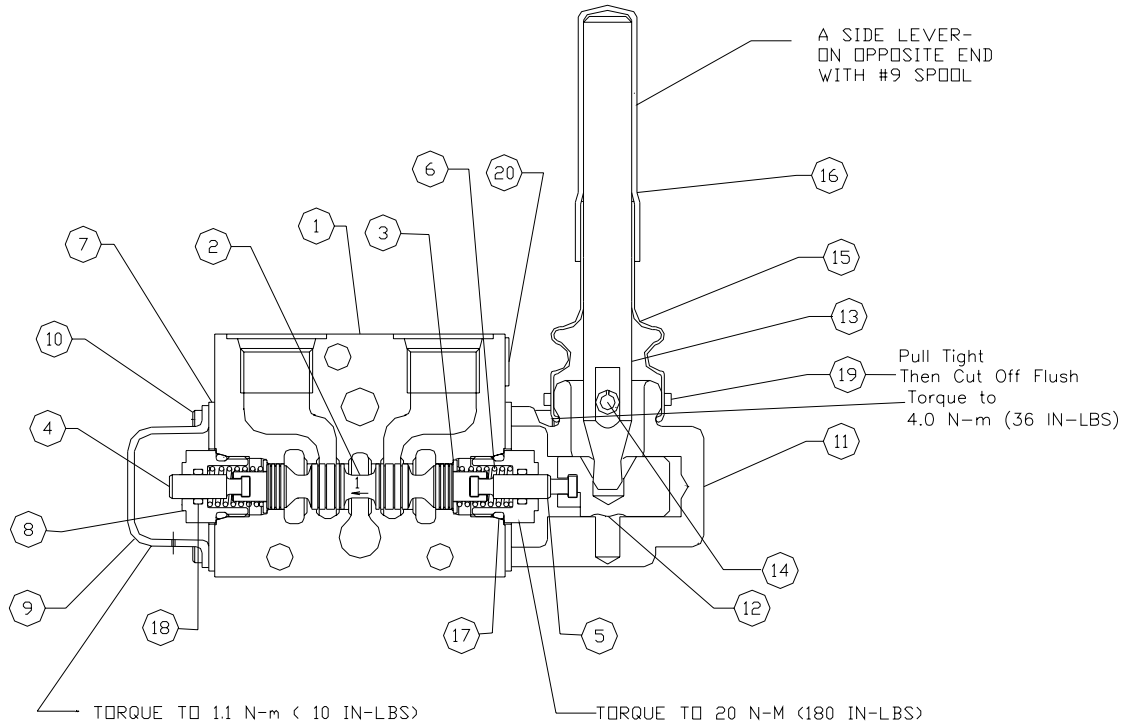
**Relief Valve - Item 4**

Part Number	Description
RDH103S10	100 - 1000 PSI (Pre-Set @ 500 PSI)
RDH103S20	500 - 2000 PSI (Pre-Set @ 1000 PSI)
RDH103S30	1000 - 3000 PSI (Pre-Set @ 1500 PSI)
RDH103S50	2000 - 5000 PSI (Pre-Set @ 2500 PSI)
RDH103K10	100 - 1000 PSI (Pre-Set @ 500 PSI)
RDH103K20	500 - 2000 PSI (Pre-Set @ 1000 PSI)
RDH103K30	1000 - 3000 PSI (Pre-Set @ 1500 PSI)
RDH103K50	2000 - 5000 PSI (Pre-Set @ 2500 PSI)

**O-Rings - Not Shown**

Part Number	Quantity
2019N-7	1
2013N-7	1

**BV18 Lever**



**BILL OF MATERIALS**

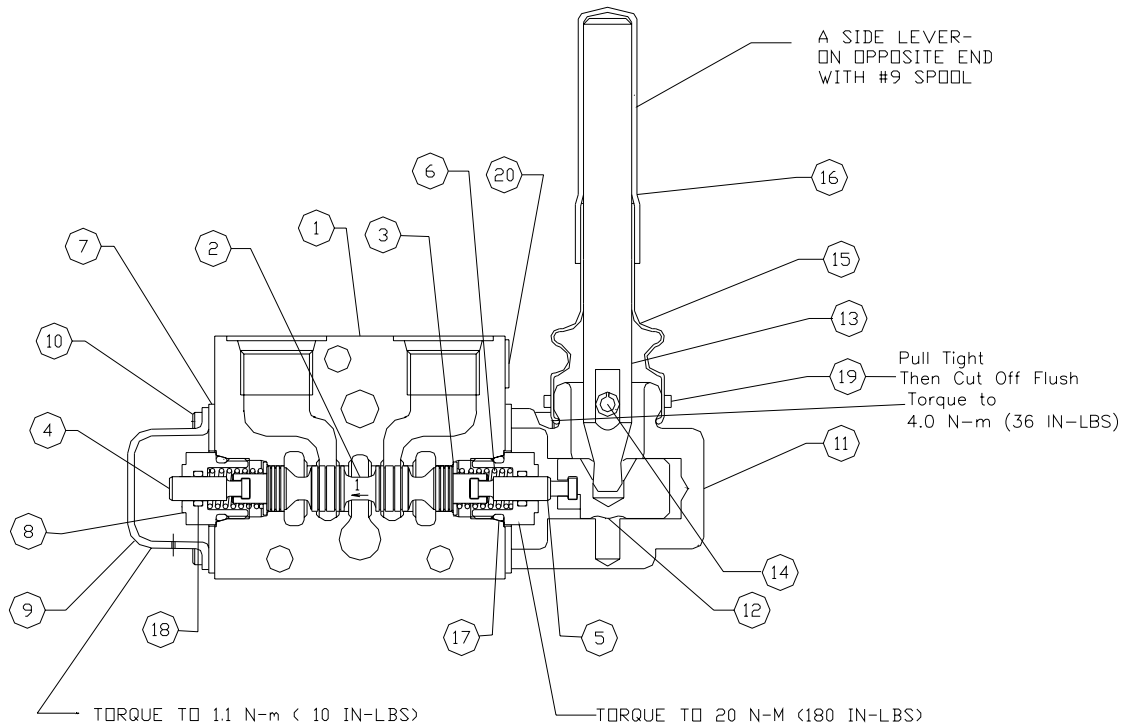
Item	Part Number	Description	Quantity
1	See Table 1	Body	1
2	See Table 1	Spool	1
3	988-8X14X1	Centering Washer	2
4	697667	Push Rod	1
5	697668	Push Rod	1
6	697666	Spring	2
7	697535	Gasket	2
8	697665	End Cap	2
9	1300807	Cover Plate	1
10	210X97	Cap Screw	8
11*	693205	Housing	1
12	697671	Actuator	1
13	1300990	Lever	1
14	99X131	Roll Pin	1
15	1300459	Boot	1
16	693208	Handle Grip	1
17	3907N-9	O-Ring	2
18	2010N-7	O-Ring	2
19	1300585	Cable Tie	1
20	See Table 1	Name Plate	1
21*	2013N-9	Section O-Ring	1

\* Section O-Ring Not Shown

**Table 1**

Spool Code	Tank Code	Spool	Body	Nameplate
1	Omit	697701	1550003	1550088-C1
1	T	697701	1550032	1550088-C1
2	Omit	697702	1550003	1550088-O2
2	T	697702	1550032	1550088-O2
4	Omit	697704	1550003	1550088-M4
4	T	697704	1550032	1550088-M4
9	Omit	697709	1550002	1550088-T8
9	T	697709	1550033	1550088-T8
11	Omit	697711	1550003	1550088-N11
11	T	697711	1550032	1550088-N11
20	Omit	697701	1550003	1550088-E20
20	T	697701	1550032	1550032-E20

**Detented Lever**



**BILL OF MATERIALS**

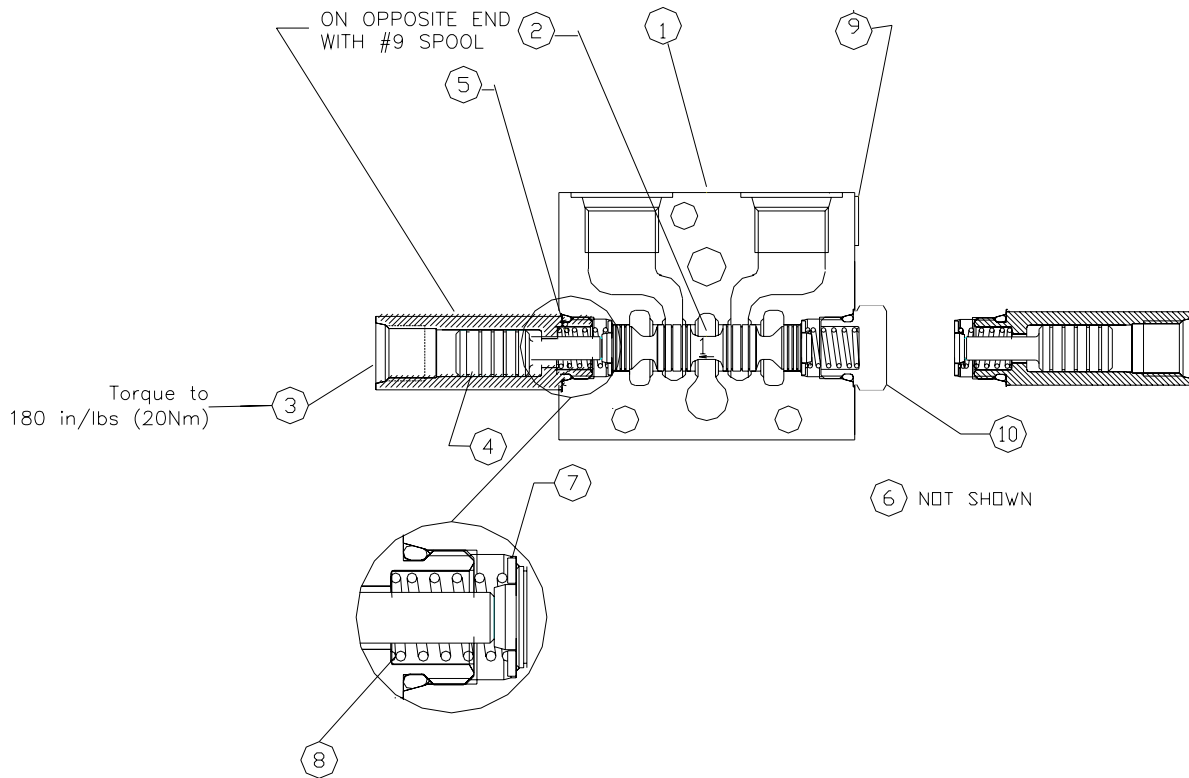
Item	Part Number	Description	Quantity
1	See Table 1	Body	1
2	See Table 1	Spool	1
3	988-8X14X1	Centering Washer	2
4	697667	Push Rod	1
5	697668	Push Rod	1
6	693021	Spring	2
7	697535	Gasket	2
8	1301946	End Cap	2
9	1300807	Cover Plate	1
10	210X97	Cap Screw	8
11*	693205	Housing	1
12	697669	Actuator	1
13	1300990	Lever	1
14	99X131	Roll Pin	1
15	1300459	Boot	1
16	693208	Handle Grip	1
17	3907N-9	O-Ring	2
18	2010N-7	O-Ring	2
19	1300585	Cable Tie	1
20	See Table 1	Name Plate	1
21*	2013N-9	Section O-Ring	1

\* Section O-Ring Not Shown

**Table 1**

Spool Code	Tank Code	Spool	Body	Nameplate
1	Omit	697701	1550003	1550088-C1
1	T	697701	1550032	1550088-C1
2	Omit	697702	1550003	1550088-O2
2	T	697702	1550032	1550088-O2
4	Omit	697704	1550003	1550088-M4
4	T	697704	1550032	1550088-M4
9	Omit	697709	1550002	1550088-T8
9	T	697709	1550033	1550088-T8
11	Omit	697711	1550003	1550088-N11
11	T	697711	1550032	1550088-N11
20	Omit	697701	1550003	1550088-E20
20	T	697701	1550032	1550032-E20

**Dual/Single Hydraulic Pilot**



**BILL OF MATERIALS**

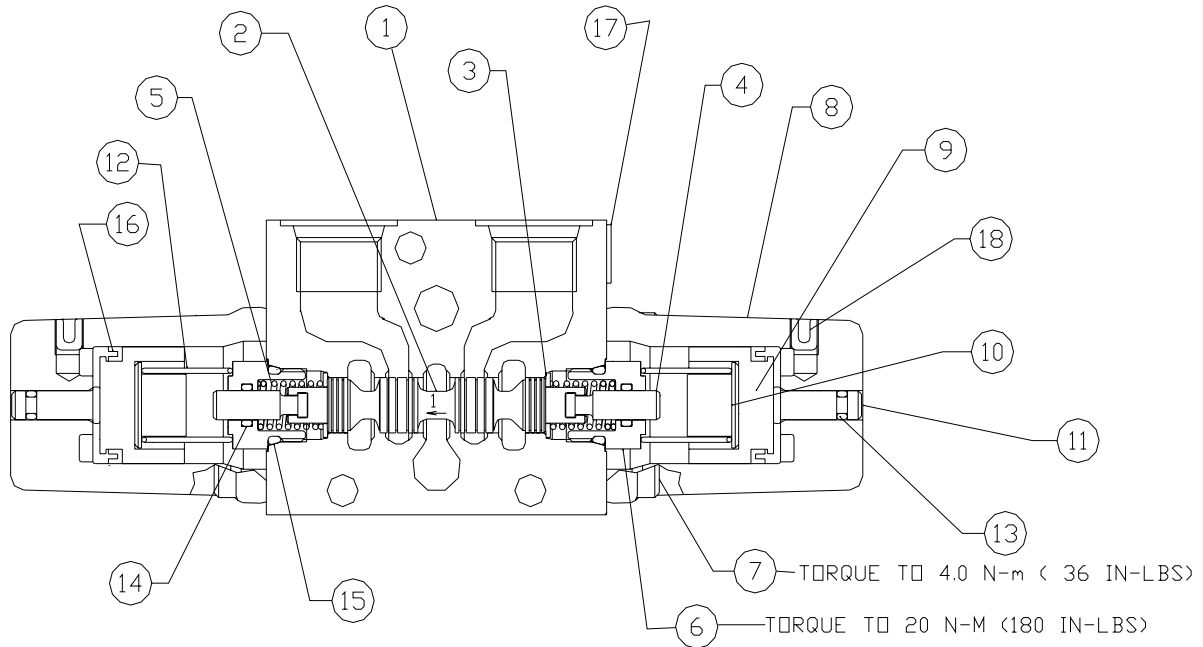
Item	Part Number	Description	Quantity
1	See Table 1	Body	1
2	See Table 1	Spool	1
3	1550087	Pilot Housing	2/1
4	1550085	Piston Pilot	2/1
5	3907N-7	O-Ring	2
6	2013N-9	Section O-Ring	2
7	988-8X14X1	Centering Washer	2
8	See Table 1	Centering Spring	2
9	See Table 1	Name Plate	1
10	697649	End Cap	1

\* Section O-Ring Not Shown

**Table 1**

Spool Code	Tank Code	Spool	Body	Nameplate	Spring
1	Omit	697601	1550003	1550088-C1	697625
1	T	697601	1550032	1550088-C1	697625
2	Omit	697602	1550003	1550088-O2	1550089
2	T	697602	1550032	1550088-O2	1550089
4	Omit	697604	1550003	1550088-M4	697625
4	T	697604	1550032	1550088-M4	697625
9	Omit	697609	1550002	1550088-T8	1550089
9	T	697609	1550033	1550088-T8	1550089
11	Omit	697611	1550003	1550088-N11	697625
11	T	697611	1550032	1550088-N11	697625
20	Omit	697620	1550003	1550088-E20	697626
20	T	697620	1550032	1550032-E20	697626

**Dual Air Pilot**



**BILL OF MATERIALS**

Item	Part Number	Description	Quantity
1	See Table 1	Body	1
2	See Table 1	Spool	1
3	988-8X14X1	Centering Washer	2
4	697667	Push Rod	2
5	697666	Spring	2
6	697665	End Cap	2
7	210X97	Cap Screw	8
8	693210	Housing	2
9	693028	Piston	2
10	693211	Piston Stop	2
11*	679365	Actuator Pin	2
12	693031	Spring	2
13	2006N-7	O-Ring	2
14	2010N-7	O-Ring	2
15	3907N-9	O-Ring	2
16	693212	U-Cup Seal	2
17	See Table 1	Name Plate	1
18	120x7	Cap Plug	2
19*	2013N-9	Section O-Ring	2

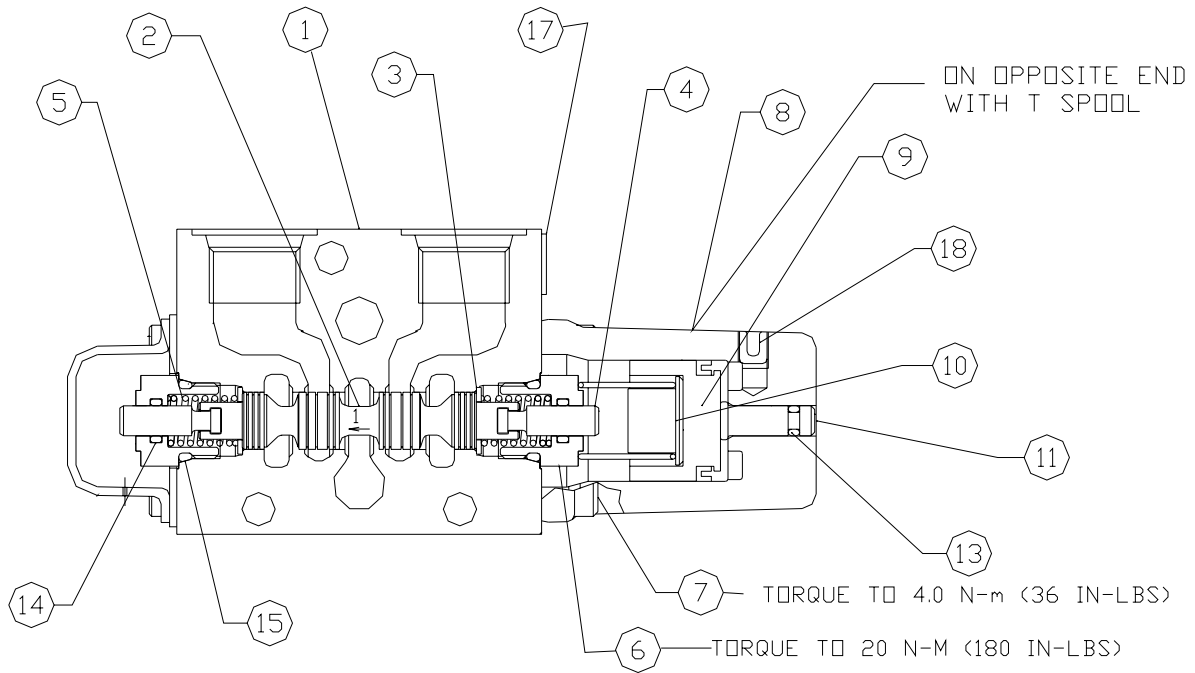
\* Section O-Ring Not Shown

**Table 1**

Spool Code	Tank Code	Spool	Body	Nameplate
1	Omit	697701	1550003	1550088-C1
1	T	697701	1550032	1550088-C1
2	Omit	697702	1550003	1550088-O2
2	T	697702	1550032	1550088-O2
4	Omit	697704	1550003	1550088-M4
4	T	697704	1550032	1550088-M4
9	Omit	1302128	1550002	1550088-T8
9	T	1302128	1550033	1550088-T8
11	Omit	697711	1550003	1550088-N11
11	T	697711	1550032	1550088-N11



**Single Air Pilot**



**BILL OF MATERIALS**

Item	Part Number	Description	Quantity
1	See Table 1	Body	1
2	See Table 1	Spool	1
3	988-8X14X1	Centering Washer	2
4	697667	Push Rod	2
5	697666	Spring	2
6	697665	End Cap	2
7	210X97	Cap Screw	8
8	693210	Housing	2
9	693028	Piston	2
10	693211	Piston Stop	2
11*	679365	Actuator Pin	2
12	693031	Spring	2
13	2006N-7	O-Ring	2
14	2010N-7	O-Ring	2
15	3907N-9	O-Ring	2
16	693212	U-Cup Seal	2
17	See Table 1	Name Plate	1
18	120X7	Cap Plug	2
19*	2013N-9	Section O-Ring	2
20	1300807	Cover Plate	1

\* Section O-Ring Not Shown

**Table 1**

Spool Code	Tank Code	Spool	Body	Nameplate
1	Omit	697701	1550003	1550088-C1
1	T	697701	1550032	1550088-C1
2	Omit	697702	1550003	1550088-O2
2	T	697702	1550032	1550088-O2
4	Omit	697704	1550003	1550088-M4
4	T	697704	1550032	1550088-M4
9	Omit	1302128	1550002	1550088-T8
9	T	1302128	1550033	1550088-T8
11	Omit	697711	1550003	1550088-N11
11	T	697711	1550032	1550088-N11

## Operation

Bankable valve sections consists of a body with internal passages which are connected and disconnected by a sliding spool in order to control flow entering and exiting the two control ports. This directional control valve in turn controls the forward and reverse motion of wither a hydraulic cylinder or motor. This valve uses either a single or dual solenoid actuator, a single or dual hydraulic pilot, a single or dual air pilot, or spring-return or detented lever to move the spool from one position to the other. The spool directs flow from the pump passage to one of the actuator passages when it is in one of the shifted positions. At the same time, the other actuator passage is connected to the tank port.

The bankable valve section can be used in either a two-position or three-position application. In the two-position configuration, the spool is spring offset to one of the flow positions and shifted to the opposite flow condition. In the three-position configuration, the spool is shifted from a neutral or center position to either of the flow positions. The neutral or center condition is determined by the type pf spool. Bankable valve sections can be banked together to form multi-spool valves (up to six sections). The complete assembly is either parallel or series. By parallel, all bankable spool sections have common pressure and tank lines. By series, the tank line of the first spool section goes directly to the pressure line of the second bankable spool section, and so forth. The entire assembly must be either parallel or series.

## Trouble-Shooting

Sympton	Cause	Solution
<b>Spool Doesn't Center</b>	<i>Return springs weak or broken</i>	Remove and replace springs
	<i>Contamination or burr on spool or bore of body</i>	Remove spool, clean and reassemble
	<i>Solenoid tube contamination</i>	Remove solenoid tube and flush with alcohol
<b>Spool doesn't shift correctly</b>	<i>Solenoid failure</i>	See solenoid burnout section before replacing solenoid coil
	<i>Body distortion</i>	Loosen and retorque tie rod bolts
	<i>Spool sticking</i>	Remove spool, clean, and reassemble
	<i>Contamination</i>	Dissamble and flush system
	<i>Solenoid tube contamination</i>	Remove solenoid tube and flush with alcohol
<b>Incorrect actuator response</b>	<i>Improperly installed electrical connection</i>	Check wiring diagram and rewire
	<i>Improperly installed pipe connections</i>	Check piping diagram and replumb
	<i>Solenoid tube contamination</i>	Remove solenoid tube and flush with alcohol
	<i>Improper pilot pressure</i>	Check pilot source and adjust
<b>Solenoid Burnout</b>	<i>Both solenoids energized at the same time</i>	Check wiring diagram and rewire
	<i>Low voltage</i>	Check line voltage
	<i>High voltage</i>	Check line voltage

**Notes:** When checking line voltage, always plug in as close to the solenoid coil as possible.  
 When removing a stick spool, exercise caution not to damage the spool bore (do not use a hammer, coat spool with clean oil before reassembly).

## Offer of Sale

Bankable Control Valves  
Series BV

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such items, when communicated to Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

**1. Terms and Conditions of Sale:** All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller.

Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute

such assent. **2. Payment:** Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

**3. Delivery:** Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

**4. Warranty:** Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from Parker Hannifin Corporation. **THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER**

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**6. Changes, Reschedules and Cancellations:** Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

**7. Special Tooling:** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially

converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

**8. Buyer's Property:** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property, Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

**9. Taxes:** Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold.

Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

**10. Indemnity For Infringement of Intellectual Property Rights:** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights. If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

**11. Force Majeure:** Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

**12. Entire Agreement/Governing Law:** The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years



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