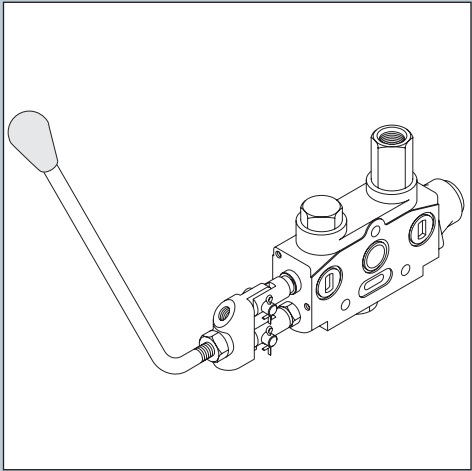
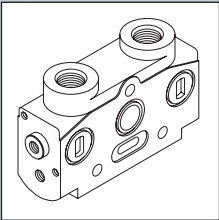
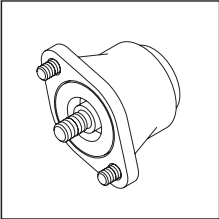
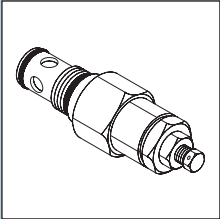


Directional Control Valve

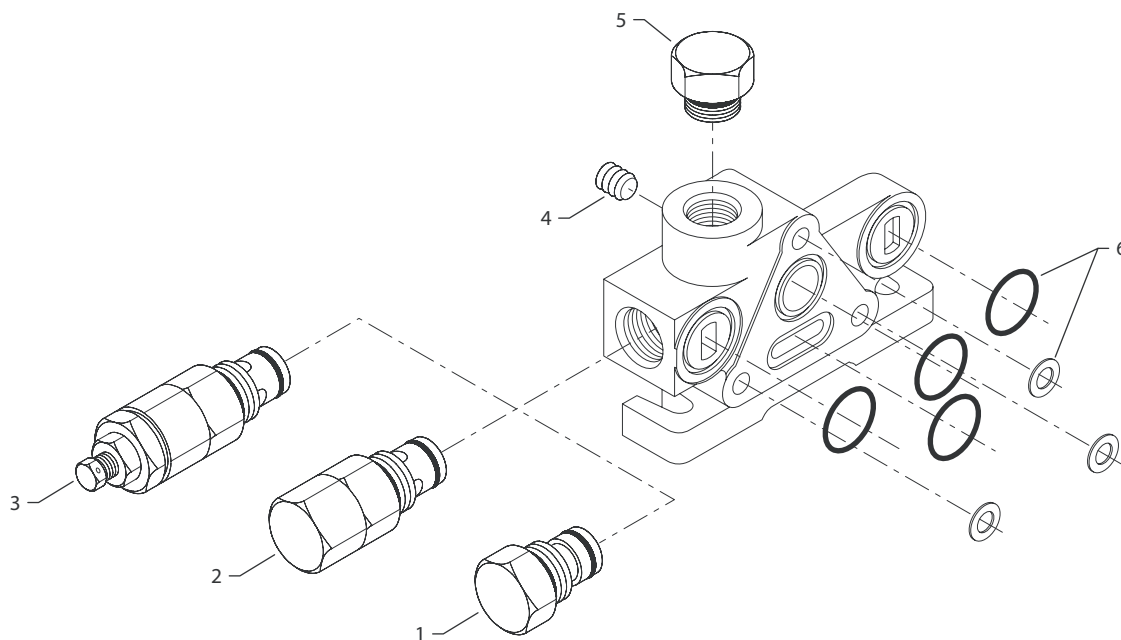
Service and Parts Manual



Directional Control Valves Service and Parts Manual: Contents

SERVICE PARTS	Inlet cover	3-4
	Outlet cover.....	5-6
	Standard section	7
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	Auxiliary valves	9
	Spool positioners	10-11
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	Enclosed handles	13
	Spool control and coils.....	14
	Cables and adaptors	15
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DISASSEMBLY AND ASSEMBLY	Directional control valve disassembly.....	19
	Directional control valve assembly.....	20
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INLET COVER



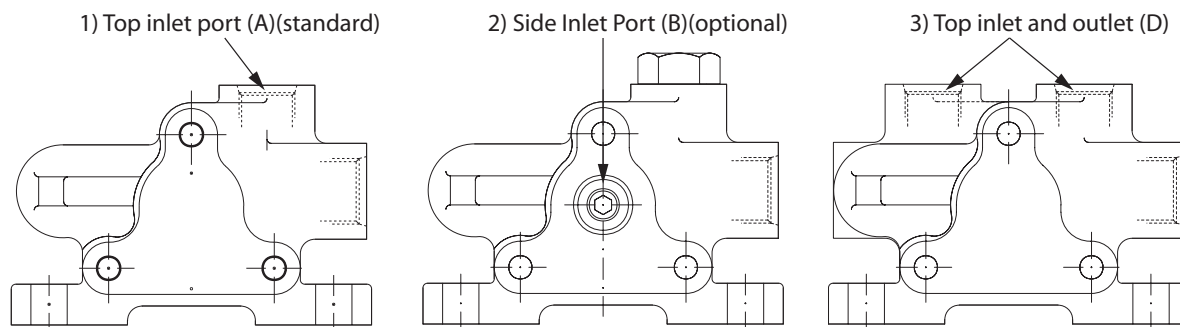
CDS 60 and CDS100

Item	Description	Part Number
1	Relief cavity plug	012743
2	Relief valve internal adjust	11178080 (20-110 bar)
		11178081 (111-250 bar)
3	Relief valve external adjust	11152145 (20-110 bar)
		11152146 (111-250 bar)
*	Relief valve for electrical sections	11182877 (20-110 bar)
		11167995 (111-250 bar)
	Seal kit for items 2 and 3	008095
4	Pressure port plug	11183085
5	Port plug	see page 17
6	Inlet seal kit, CDS60	CD018283
	Inlet seal kit, CDS100	018284

* not shown

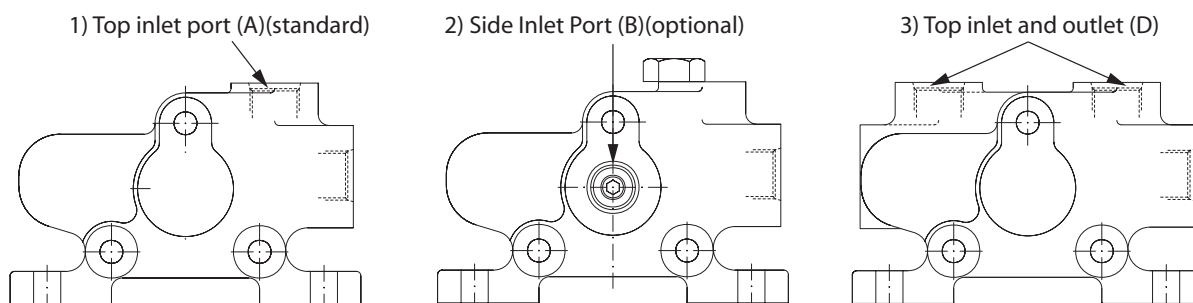
E101 460E

INLET COVER, E60



Item number	Model number	Part number	Top port inlet	Side port inlet top port plugged	Top port outlet	SAE #10
1	E60-AA2	036693	X			X
2	E60-BA2	044904		X		X
3	E60-DA2	041239	X		X	X

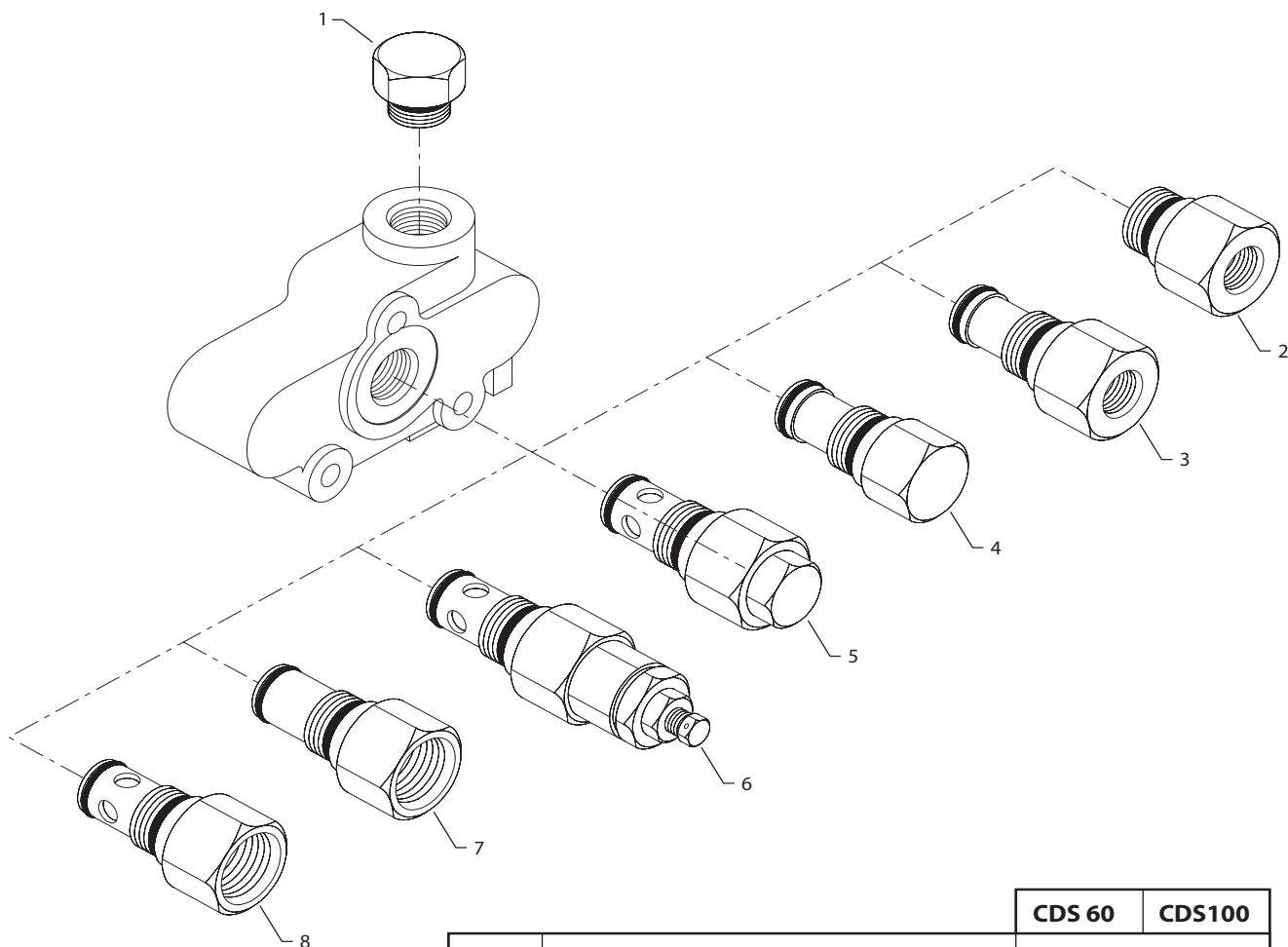
INLET COVER, E100



Item number	Model number	Part number	Top port inlet	Side port inlet top port plugged	Top port outlet	SAE #12
1	E100-AA3	036706	X			X
2	E100-BA3	036708		X		X
3	E100-DA3	041055	X		X	X

P106 301E

OUTLET COVER

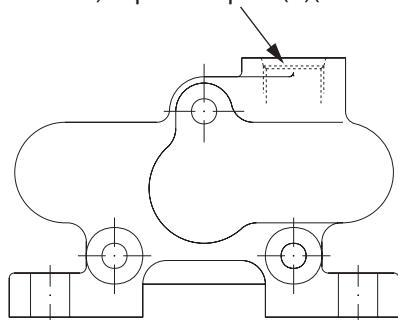


Item	Description	Part Number	
		CDS 60	CDS100
1	Port plug	see page 17	
2	Adaptor for side outlet	see page 16	
3	Power beyond sleeve	see page 16	
4	Close center plug	012840	013039
5	Fix valve for electrical option	11152132	11182880
6	Adjustable for electrical	11152064	11152134
7	Power beyond sleeve for electrical option	see page 16	
8	Side outlet port sleeve for electrical option	see page 16	

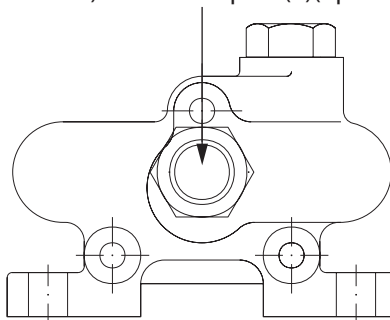
E101 461E

OUTLET COVER, S60

1) Top outlet port (A)(standard)



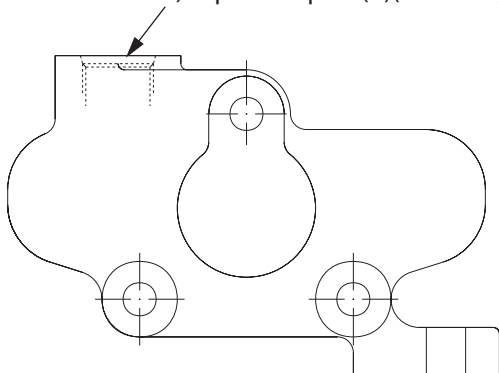
2) Side outlet port (B)(optional)



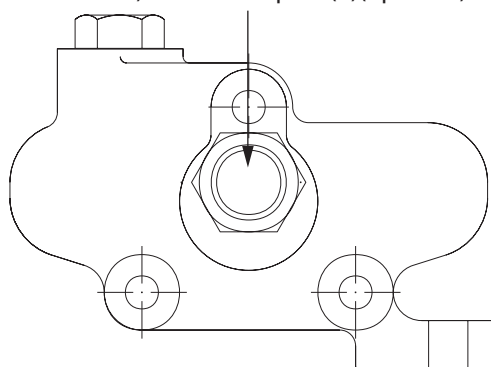
Item number	Model number	Part number	Top port outlet	Side port outlet	SAE #10
1	S60-A2	012036	X		X
2	S60-02	036719	X	X	X

OUTLET COVER, S100

1) Top outlet port (A)(standard)



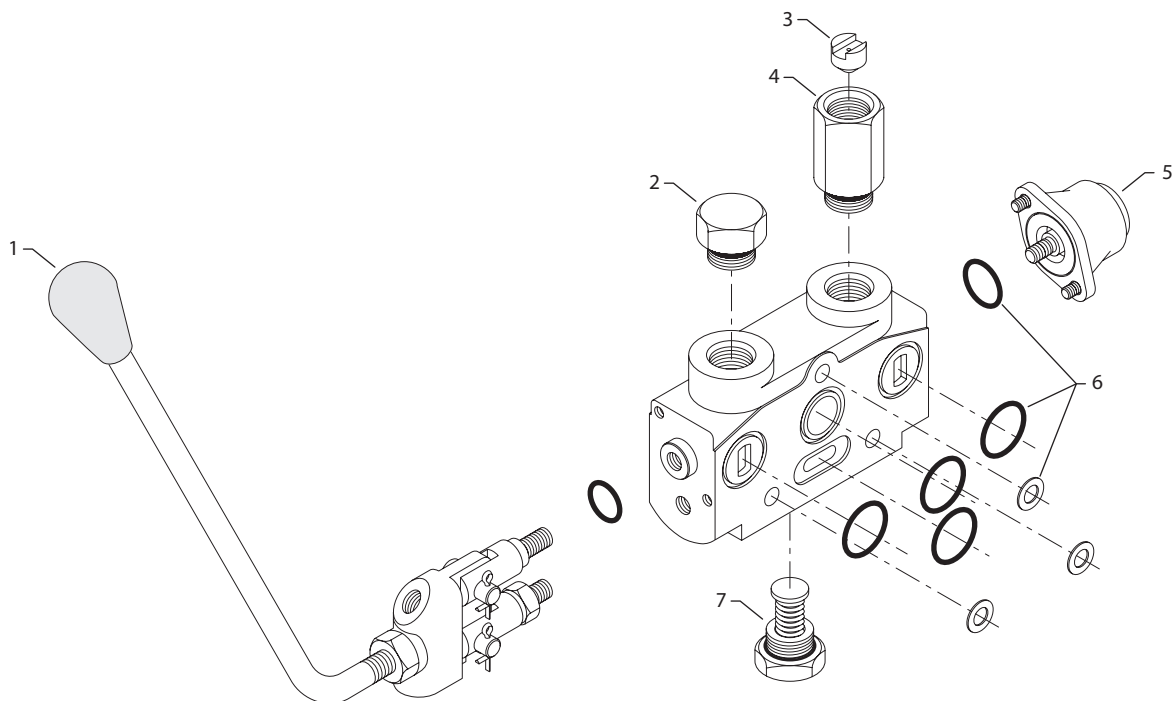
2) Side outlet port (B)(optional)



Item number	Model number	Part number	Top port outlet	Side port outlet	SAE #12
1	S100-A3	013020	X		X

*determined by type of modification.

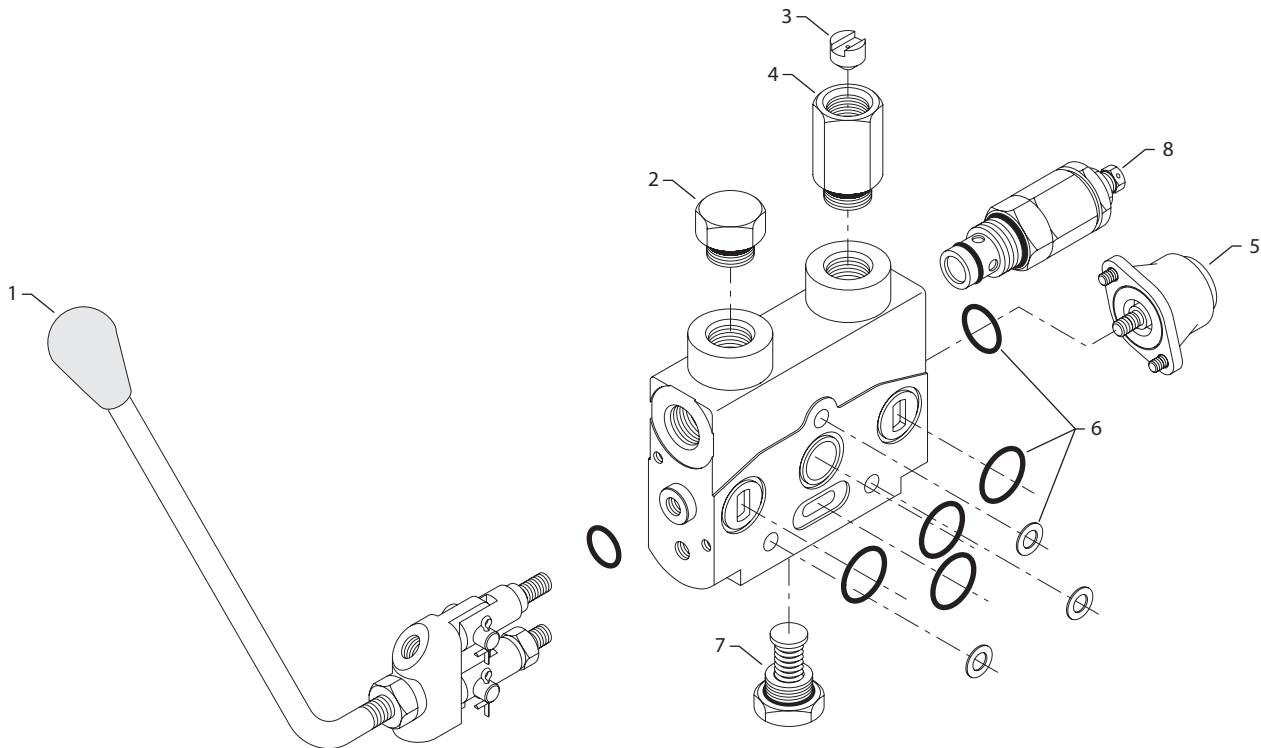
STANDARD SECTION



Item	Description	Part Number	
		CDS 60	CDS100
1	Spool control	see page 12-15	
2	Port plug	see page 17	
3	Orifice disc	see page 17	
4	Sleeve for orifice disc	see page 17	
5	Spool centering and detents	see page 10-11	
6	Work section seal kit	018285	018286
7	Load check kit	010915	012621

E101 466E

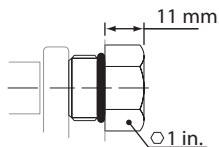
AUXILIARY SECTION



Item	Description	Part Number	
		CDS 60	CDS100
1	Spool control	see page 12-15	
2	Port plug	see page 17	
3	Orifice disc	see page 17	
4	Sleeve for orifice disc	see page 17	
5	Spool centering and detents	see page 10-11	
6	Work section seal kit	018285	018286
7	Load check kit	010915	012621
8	Auxiliary valves and plugs	see page 9	

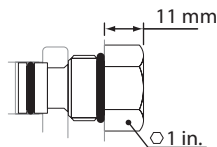
E101 463E

AUXILIARY VALVES



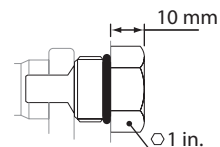
Used in place of relief valve for 3-way spool

J	Auxiliary plug	012353
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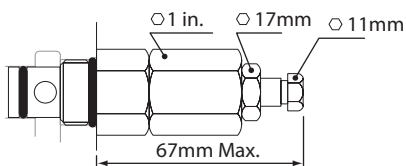
Cavity plug used in place of relief valve (options B, C, F, G, and I)

A	Cavity plug	012743
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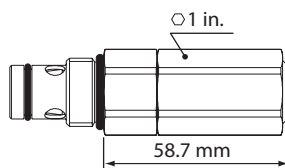
Used in place of check and flow control valve (options D and E)

K	Piston stop	CDS60	CDS100
		013637	042469



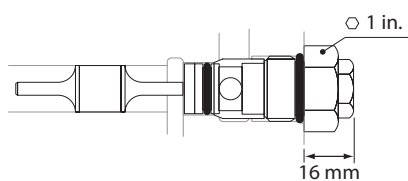
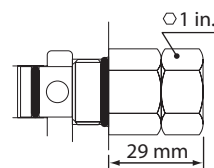
External adjust relief

B	20-110 bar [290-1595 psi]	11152145
	110-250 bar [1595-3625 psi]	11152146



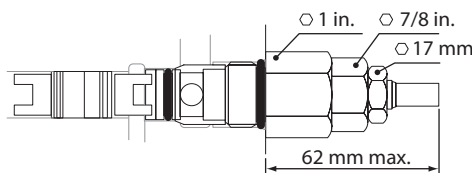
CDS60/CDS100

C	Fixed relief		Fixed relief for electrical	
	20-110 bar [290-1595 psi]	11178080	20-110 bar [290-1595 psi]	11182877
110-250 bar [1595-3625 psi]	11178081	110-250 bar [1595-3625 psi]	11167995	



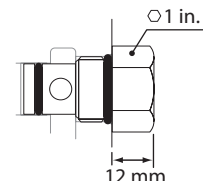
Pilot check valve

D		CDS60	CDS100
	Check valve	11161604	11182881
	Piston	11163639	11182892



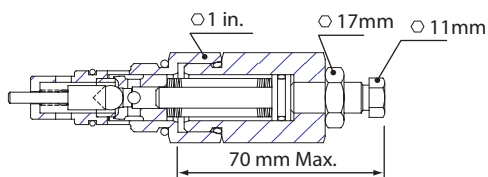
Flow control valve

E		CDS60	CDS100
	Control valve	11152059	11152063
	Piston	11182893	11184652



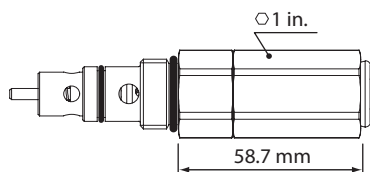
Anti-cavitation check valve

F		CDS60	CDS100
	Check valve	11152060	11152060



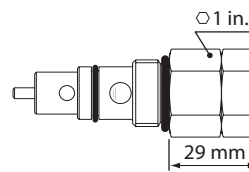
External adjust anti-cavitation relief

G	20-110 bar [290-1595 psi]	11178082
	110-250 bar [1595-3625 psi]	11152147



CDS60/CDS100

I	Fixed anti-cavitation relief		Fixed anti-cavitation relief for electrical	
	20-110 bar [290-1595 psi]	11178083	20-110 bar [290-1595 psi]	11182895
110-250 bar [1595-3625 psi]	11178084	110-250 bar [1595-3625 psi]	11182897	



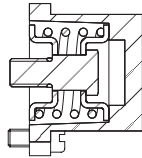
Note: Standard factory pressure setting for relief valves are as follows:

Range 20-110 Bar	55 Bar / 40 lpm
Range 110-250 Bar	180 Bar/ 40 lpm

Torque for all cartridges and plugs
27-34 N·m [20-25 lbf·ft]

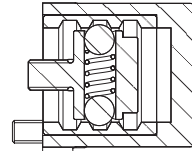
P106 305E

SPOOL POSITIONERS



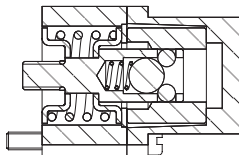
Spring center

A	CDS60	CDS100
	011869	012624



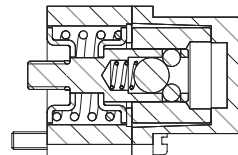
3-position detent

B	CDS60	CDS100
	012794	012990



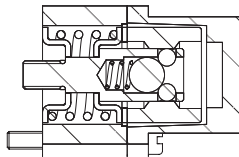
Detent spool out

C	CDS60	CDS100
	012791	012988



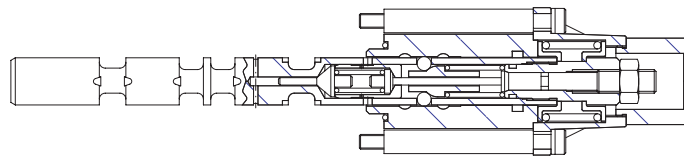
Detent spool in

D	CDS60	CDS100
	012792	012989



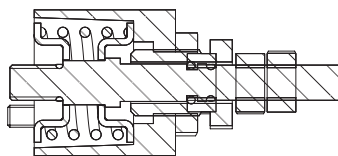
Detent in and out

E	CDS60	CDS100
	012793	012991



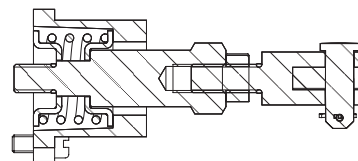
Hydraulic kickout (both directions)

F	CDS60	CDS100
	CD035310	CD035748



Spring center with adjust both directions

G	CDS60	CDS100
	022667	022877



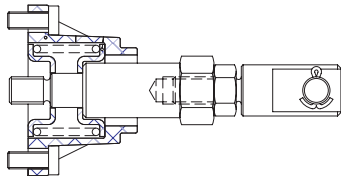
Spring center with female extension
(Can be used for dual handle option)

H		CDS60	CDS100
		021803	014390
	Handle kit	040022	037771

Screw and stem torque:

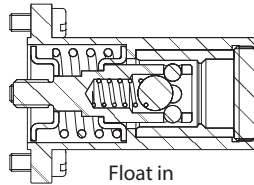
- CDS 60 2.7-4.0 N•m [2- 3 lbf•ft] using a 7/16 inch hex driver.
- CDS 100 4.0-5.4 N•m [3- 4 lbf•ft] using a 1/2 inch hex driver.

SPOOL POSITIONERS

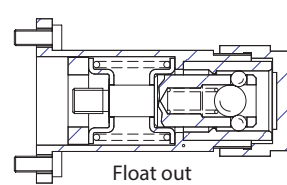


Spring center with male extension

I	CDS60	CDS100
	036662	031824



Float in

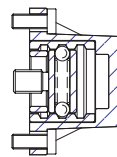


Float out

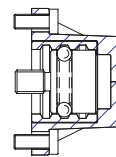
Spring center with 4th position detent float

J		CDS60	CDS100
	Out	037806	038658
	In	012345	012993

(For repair only, no conversions)



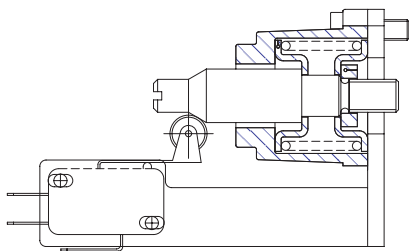
Detent in



Detent out

2-position detent

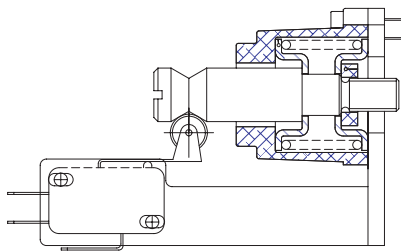
		CDS60	CDS100
N	In	033228	045153
O	Out	012238	024270



Activates in

P	CDS60	044417*
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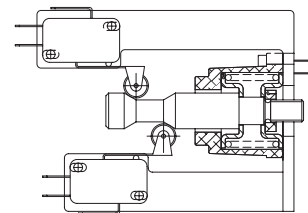
*Bracket only.
Switch sold separately.



Activates in and out

Q	CDS60	044418*
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*Bracket only.
Switch sold separately.



Activates two motors
one in and one out

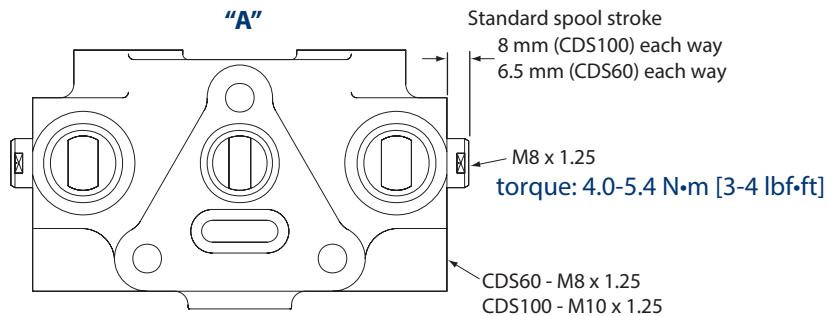
R	CDS60	044419*
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*Bracket only.
Switch sold separately.

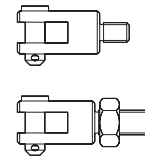
Screw and stem torque:

- CDS 60 2.7-4.0 N•m [2- 3 lbf•ft] using a 7/16 inch hex driver.
- CDS 100 4.0-5.4 N•m [3- 4 lbf•ft] using a 1/2 inch hex driver.

SPOOL CONTROL KITS

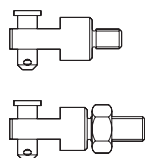


"B" Female end kit



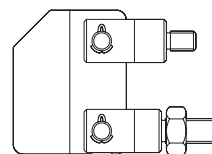
CDS60	CDS100
012790	012995

"C" Male end kit



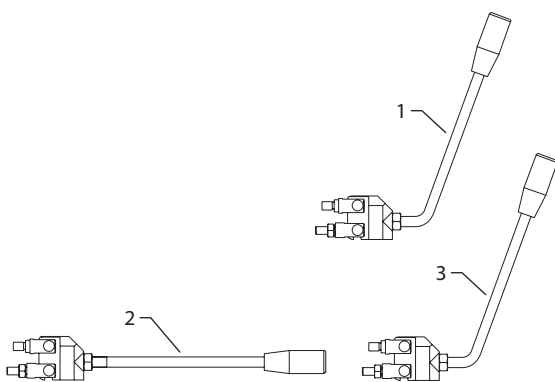
CDS60	CDS100
012789	012994

"D" Pivot block kit



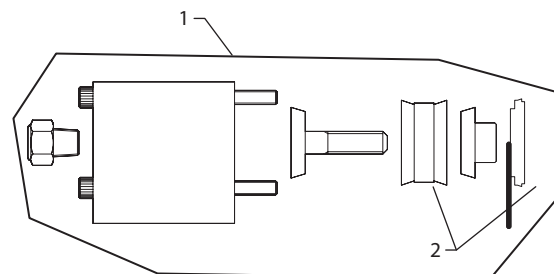
CDS60	CDS100
008492	012626

"E" Handle assembly kit



	CDS60	CDS100	Description
1	008490	012627	Bent handle kit
2	033273	11182102	Straight handle kit
3	014146	013292	Float "In" handle kit

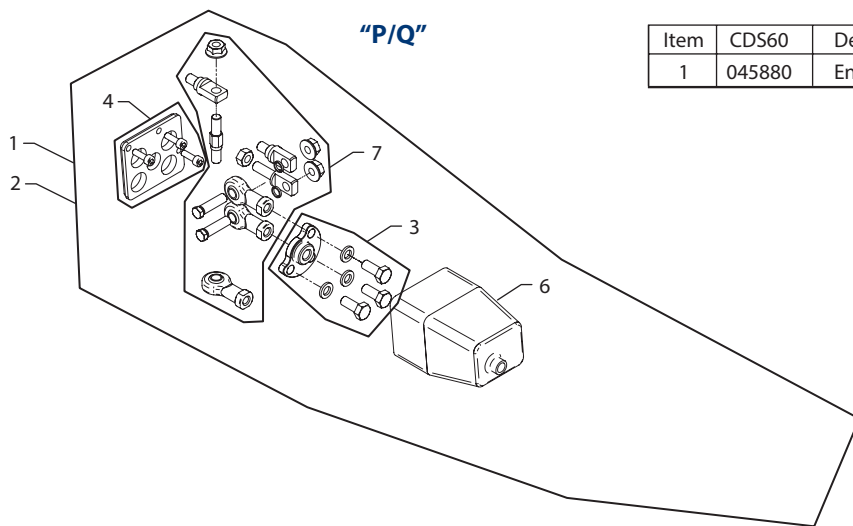
"F" Pneumatic control kit



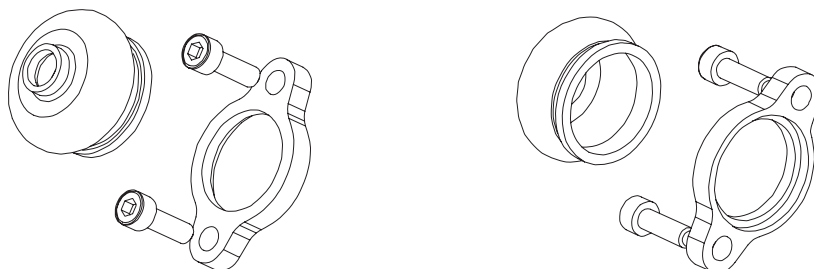
	Description	CDS60	CDS100
1	Control kit	013621	013344
2	Seal kit	013675	014100

Note: 1/8" pipe fitting required

ENCLOSED HANDLES



Item	CDS60	Description
1	045880	Enclosed joystick kit (standard and float "Out")

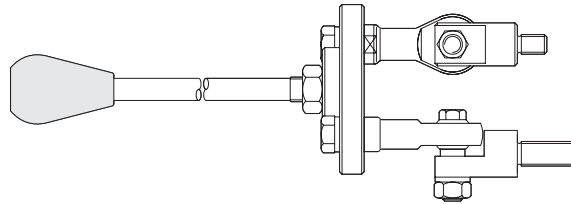


Spool boot

CDS60	CDS100
048296	040359

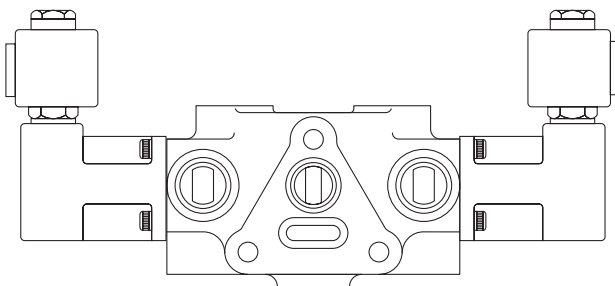
SPOOL CONTROL

“I/M” Mechanical joystick



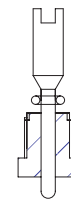
Description	CDS60	CDS100
Standard spool	021490	021489

“J” Electrical option



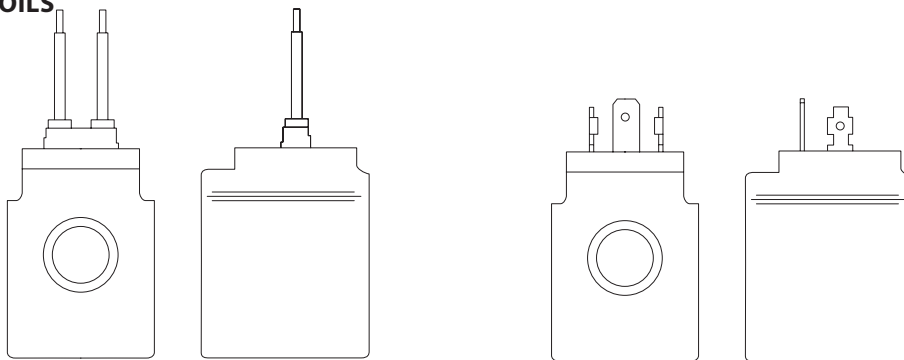
Description	CDS60	CDS100
Housing	041039	041040
Housing seal kit	037342	037343
Solenoid valve	11152158	11152158

(For repair only, no conversions)



Manual override

CDS60/CDS100 COILS



Flying leads

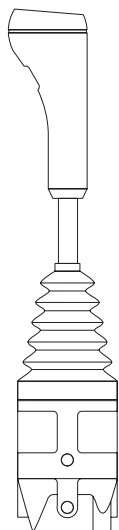
Din 43650

Coil type	Part number	Watts	Amps	Resistance
12 VCC - flying leads	11152004	21W	1.75 amp	6.85 ohm
24 VCC - flying leads	11152045	21W	0.88 amp	27 ohm
12 VCC - DIN	039756	21W	1.75 amp	6.85 ohm
24 VCC - DIN	039759	21W	0.88 amp	27 ohm

Note: For additional coil termination options, refer to the Cartridge Valves Technical Information Catalog (520L0588). The M13 coil and R13 coil options are interchangeable.

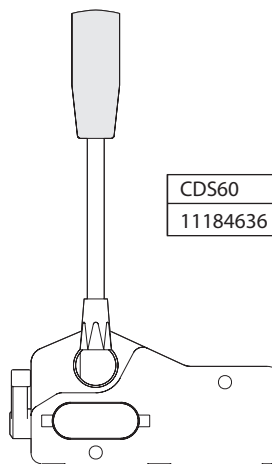
P106 309E

“H” Joystick for cable



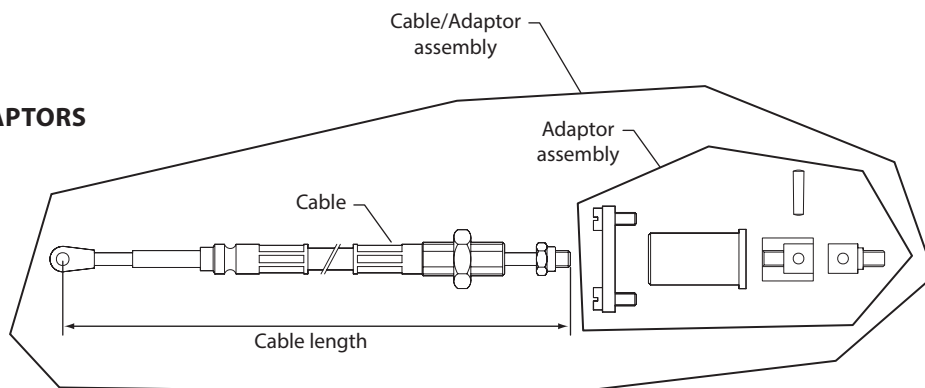
	Description	Part number
HA	No switch	11183083

“G” Cable handle control



CDS60	CDS100
11184636	11184636

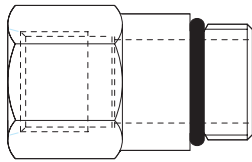
CABLES AND ADAPTORS



Cable Length meter [feet]	Cable part number	CDS60	CDS100
		Adaptor part number	Adaptor part number
1.00 [3.3]	11173594	11183087	11184637
1.25 [4.1]	11171744	11183087	11184637
1.50 [4.91]	11167997	11183087	11184637
1.75 [5.74]	11183082	11183087	11184637
2.00 [6.6]	11171745	11183087	11184637
2.50 [8.2]	11165320	11183087	11184637
3.00 [9.85]	11171826	11183087	11184637
3.25 [10.7]	11183086	11183087	11184637
3.50 [11.5]	11184653	11183087	11184637
4.0 [13.1]	11184654	11183087	11184637
4.5 [14.8]	11184655	11183087	11184637
5.0 [16.4]	11184656	11183087	11184637

VALVES, PLUGS AND ORIFICES

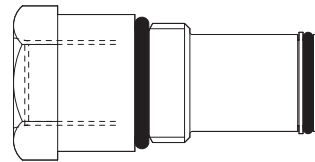
“B” Adaptor for side port



27-39 N•m
[20-25 lbf•ft]

	CDS60	CDS100
Threads	Adaptor part number	Adaptor part number
SAE #8	035692	-
SAE #10	035694	-
SAE #12	-	035703

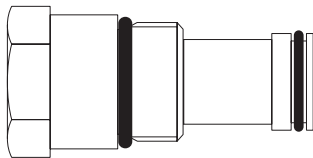
“C” & “I” Side port for power beyond



27-39 N•m
[20-25 lbf•ft]

	CDS60	CDS100
Threads	Adaptor part number	Adaptor part number
SAE #8	012827	-
SAE #10	012828	013037
SAE #12	-	013033

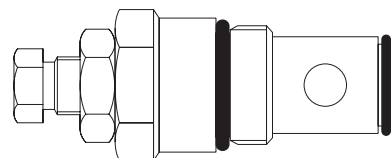
“D” Close center plug



27-39 N•m
[20-25 lbf•ft]

	CDS60	CDS100
Plug part number	Plug part number	Plug part number
012840		013039

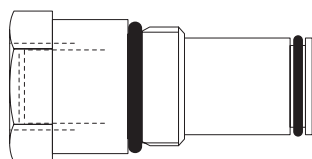
“E” Electrical option valve



27-39 N•m
[20-25 lbf•ft]

	CDS60	CDS100
Type	Valve part number	Valve part number
Fixed	11152132	11182880
Adjustable	11152064	11152134

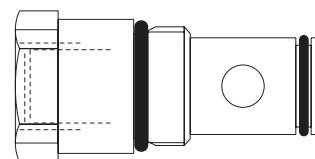
“F” & “L” Electrical option with power beyond



27-39 N•m
[20-25 lbf•ft]

	CDS60	CDS100
Threads	Adaptor part number	Adaptor part number
SAE #10	036540	036548
SAE #12	-	036525

“G” Electrical control for side outlet



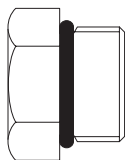
27-39 N•m
[20-25 lbf•ft]

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	CDS60	CDS100
Threads	Adaptor part number	Adaptor part number
SAE #10	036542	036549
SAE #12	-	036550

VALVES, PLUGS AND ORIFICES

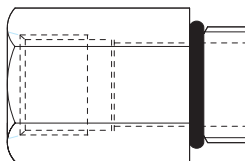
Plugs for ports



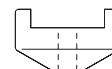
27-39 N•m
[20-25 lbf•ft]

Threads	Adaptor part number
SAE #8	010080
SAE #10	012353
SAE #12	012963

Orifice and adaptor for orifice



27-39 N•m
[20-25 lbf•ft]



Threads	Adaptor part number	Orifice diameter	Orifice part number
SAE #8	018251	2.00	11183063
		1.50	11171143
		1.00	11183064
SAE #10	014133	3.00	11183064
		2.50	11172305
		2.00	11183066
		1.50	11178571
		1.00	11183064
SAE #12	018252	2.50	11183067
		2.00	11183068
		1.50	11183069

See page 7 or 8, items 3 and 4 for example of assembly use.

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TIE ROD KITS

Standard

Number of sections	CDS60	CDS100
1	011923	012635
2	011924	012636
3	011925	012637
4	011926	012638
5	011927	012639
6	011928	012640
7	011929	012641
8	011930	012642
9	011931	012643
10	011932	012644
11	025255	021360
12	035348	036723

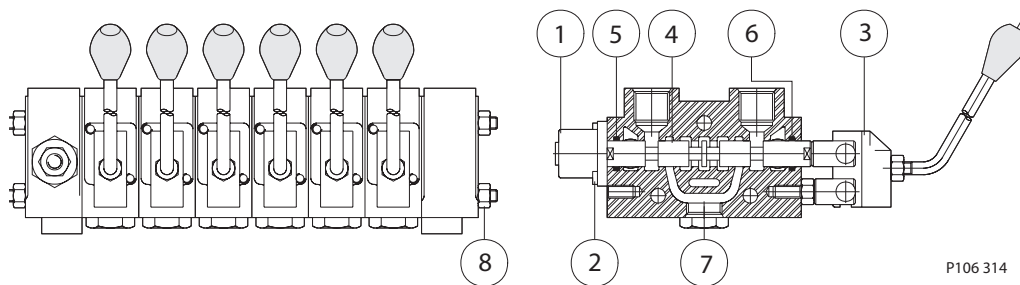
includes Mid combiner and divider

Tie rod information:

- CDS 60
18-20 N•m [13 - 14.5 lbf•ft]
8 mm rods, M8 x 1 threads
grade 8, stress proof

- CDS 100
25-27 N•m [18 - 20 lbf•ft]
10 mm rods, M10 x 1 threads
grade 8, stress proof

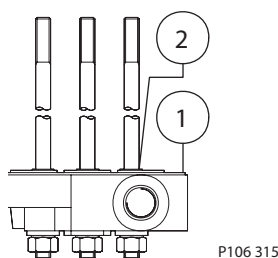
**DIRECTIONAL CONTROL
VALVE DISASSEMBLY
INSTRUCTIONS**



P106 314

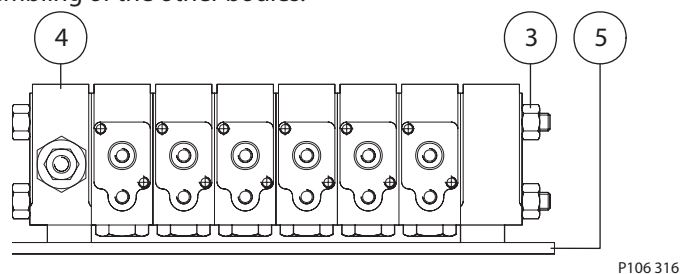
1. Remove the centered sets (1) from the spool, loosening the screws (2).
2. Remove the lever sets (3).
3. With a 1/2" open-wrench, hold the spool and remove the extension and the screw from the centering.
4. From the same side where the spool centering (4) was placed, press the reverser (1) to the inside until being able to remove the O-ring (5).
5. Remove the reverser (4) from the same side where the reverser centering was placed (it is recommended to identify it with its corresponding body).
6. Remove the O-rings (6) that are located on the same side where the levers were.
7. Remove the load detents (7).
8. Loosen the screw nuts from the rods (8) to separate the bodies/
9. Disassemble the valves.

DIRECTIONAL CONTROL VALVE ASSEMBLY INSTRUCTIONS

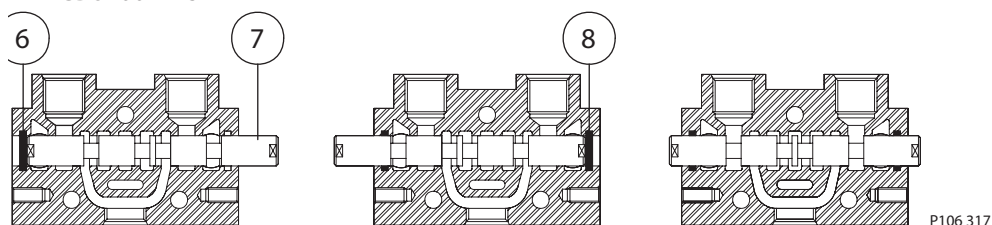


Before starting the assembly, make sure the work site and parts are perfectly clean.

1. Assemble the inlet body with the rods in a vertical position (according to the drawing above) to make it easier to assemble the O-rings (1) of the spacing washers (2) and the assembling of the other bodies.

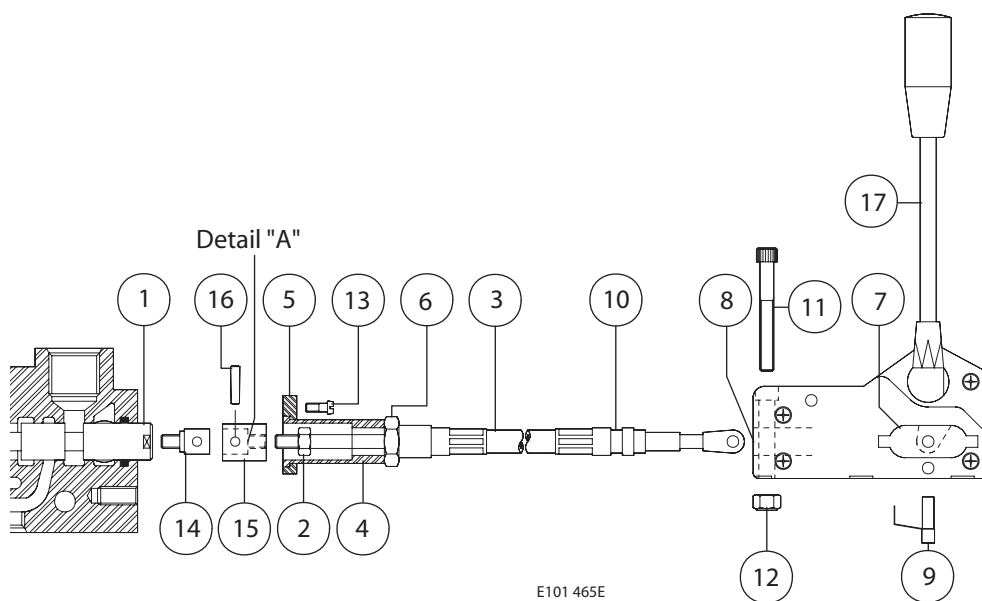


2. Assemble the control bodies, following the correct order.
3. Assemble the outlet body by putting the nuts and lock washers on the rods.
4. Put the control (4) on a flat support () horizontally, affix the supporting feet, and tighten the nuts (3) to the recommended torque.
 CDS60 = 18 N•m
 CDS100 = 25 N•m



5. Assemble the O-rings (6) on the bodies, on the same side where the lever will be placed and insert the spool (7) through the side opposite to the one where the first O-ring (6) was assembled. Insert the spool to the point it will allow you to set the second O-ring (8). Return the spool to the center position.
6. Assemble the centering sets of the spool applying Loctite™ 242 or equivalent on the screw nuts that assemble the reverser.
7. Assemble the lever sets, applying Loctite™ 242 or equivalent on the extension screw thread.
8. Assemble the levers that put the spool in motion, leaving the locknut loose.
9. Assemble the valves.

**REMOTE CABLE
CONTROL ASSEMBLY
INSTRUCTIONS**



E101 465E

1. Remove the cover (7) from the lever support.
2. Insert the cable (3) through the hole (8) and fasten it to the pin (9). Reinstall the cover (7).
3. Place the groove (10) on the lever support making certain it can be fastened by the screw (11) and the nut (12).
4. Through the other end, insert parts (6), (5), and (4) in this order as indicated, leaving loose at this time.
5. Screw the part (14) into the reverser (1). Tighten with a 1/2" open-end wrench on the reverser and a pin in the part (14).
6. Screw the part (15) to the cable end, making certain the cable does not extend beyond the internal side (see detail "A") of part (15). Tighten the nut (2) while holding part (15) with a pin in the hole.
7. Insert part (15) into part (14), joining them to part (16).
8. Screw part (4) ONLY up to the point it touches the front of the work section.

Caution:

If part (4) does not touch the work section, or if torque continues to be applied after the part touches the work section, the lever will be taken out of center, causing irregular functioning of the control.

9. Holding part (4) with a 7/8" open-end wrench, tighten part (6) by applying 7-8 N•m torque.
10. Screw part (5) into the control work section with two screws (13). Torque to 3-4 N•m.

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