

DENISON HYDRAULICS

Direct and Pilot Operated Check Valves

In-Line SAE Flanges

Series C5P



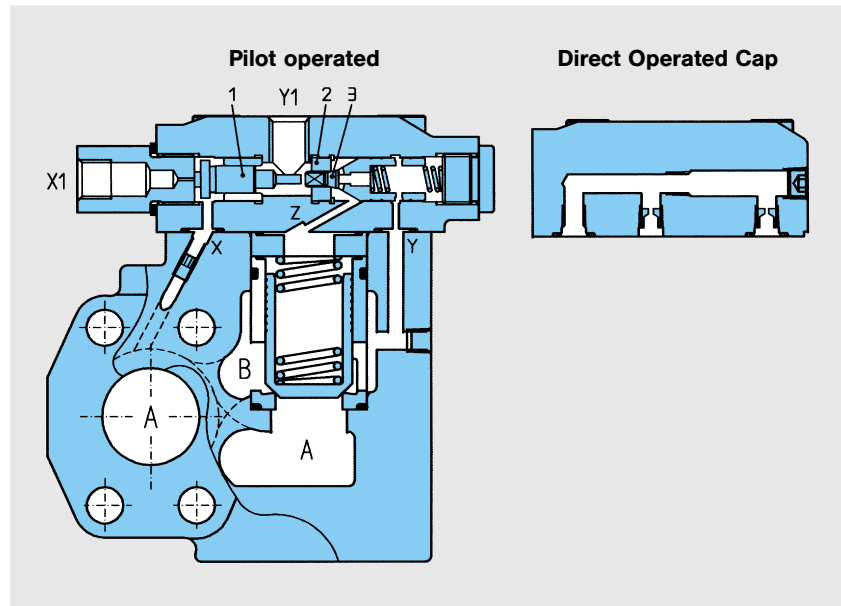
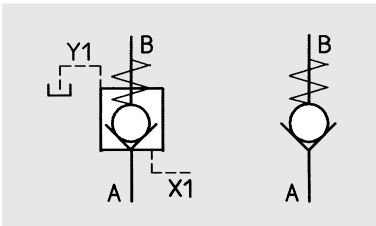
Publ. 6-EN 4700-A, replaces 6-EN 470-E

DENISON Hydraulics

FEATURES

- Flange mounted valves according to SAE 61, bolt on pumps or motors or bolt together with other flange valves.
- Flange mounted valves eliminate costly piping and reduce the numbers of locations with leakage.
- Up to 6 different springs are available to create a range of different cracking pressures.
- The DENISON high quality seat valve cartridge is used, thus offering increased reliability.
- For the pilot operated version only low pilot pressure is necessary to keep the valve in open position. Even in this position the valve function is extremely stable.
- Optional end position control is available for sizes 1" and 1 1/4". This control can be sandwiched between the pilot valve and the main body.
- The 2 Port In-Line flange mounted check valves illustrated in this bulletin increase the range of all the other DENISON flange mounted valves and may enable the realisation of smaller hydraulic control systems.

SYMBOLS



OPERATION

Free flow: The main spool is opened by flow from port A without pilot pressure in port X. The necessary cracking pressure A–B is selectable with six variants of springs for each valve size.

Blocked flow: This function is given when the operating pressure in port B exceeds the pressure in port A. This pressure is also available via passage Y at the upper side of the main spool and holds the spool in a closed position. The passage B–A consequently is closed and absolutely leak-free.

Unblocking to opposite flow direction: When an adequate pilot pressure p_x is applied to the pilot head via pilot port X1, the pilot cone (3) is moved from its seat (2) by the control piston (1). By that the pilot oil connection from B to Y is closed by item 3 and the pilot chamber of the main spool is vented via Z and Y1 to the tank.

The main spool is moved from its seat over the active ring area and flow can pass from B to A. The cracking pressure necessary at port X1 is determined by the selectable area ratio between the control piston (1) and the diameter of the seat (2) (opening ratio). With the pilot port X1 unloaded again, the valve closes and flow can pass again from port A to B only.

NOTE

With flow from B–A the cracking pressure in B conforms to the following relation:

$$p_B = 2.5 p_{Y1} + 1.5 (p_F - p_A)$$

p_{Y1} = active tank pressure (bar)

p_F = selected cracking pressure of the main spring (bar)

TECHNICAL DATA

GENERAL

- | | |
|--|--|
| <ul style="list-style-type: none"> • Type of unit • Design • Type of mounting • Port sizes • Mounting position • Direction of flow | Direct and Pilot Operated Check Valves
Poppet type
2 Port In-Line Flange (SAE 61)
3/4", 1", 1 1/4"
Optional
Optional, free flow from A→B
Pilot operated flow from B→A
– 20 ... + 60 °C
Consult DENISON |
| <ul style="list-style-type: none"> • Ambient temperature range • Suitability for special working conditions | – 20 ... + 60 °C
Consult DENISON |

HYDRAULIC CHARACTERISTICS

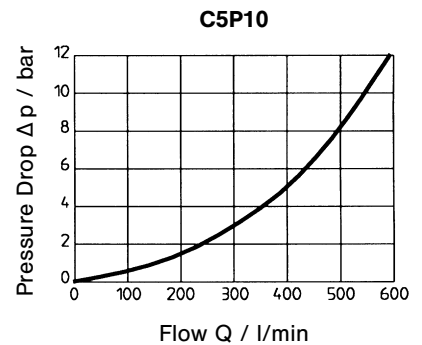
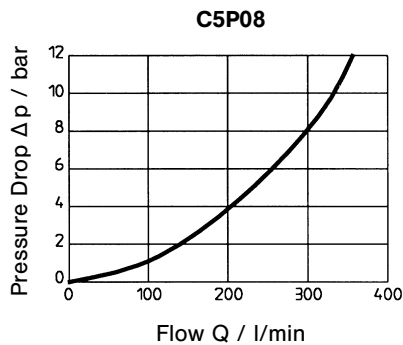
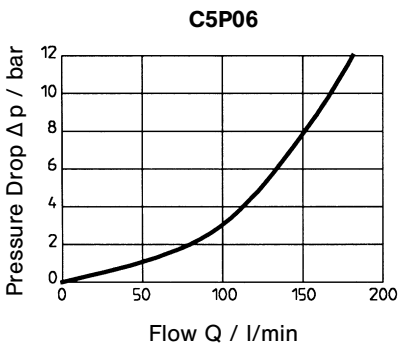
- | | | | | | | | | | | |
|--|---|----------------|------------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <ul style="list-style-type: none"> • Operating pressure range <ul style="list-style-type: none"> – min – max | 3.5 bar
350 bar for sizes 06 (3/4"), 08 (1")
280 bar for size 10 (1 1/4") | | | | | | | | | |
| <ul style="list-style-type: none"> • Nominal flow • Max. flow | <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">C5P06 (3/4")</td> <td style="width: 33%;">C5P08 (1")</td> <td style="width: 33%;">C5P10 (1 1/4")</td> </tr> <tr> <td>150 l/min</td> <td>270 l/min</td> <td>450 l/min</td> </tr> <tr> <td>180 l/min</td> <td>360 l/min</td> <td>600 l/min</td> </tr> </table> | C5P06 (3/4") | C5P08 (1") | C5P10 (1 1/4") | 150 l/min | 270 l/min | 450 l/min | 180 l/min | 360 l/min | 600 l/min |
| C5P06 (3/4") | C5P08 (1") | C5P10 (1 1/4") | | | | | | | | |
| 150 l/min | 270 l/min | 450 l/min | | | | | | | | |
| 180 l/min | 360 l/min | 600 l/min | | | | | | | | |
| <ul style="list-style-type: none"> • Fluid | Mineral oil according to DIN 51524/25
(other fluids on request) | | | | | | | | | |
| <ul style="list-style-type: none"> • Contamination level | Max. permissible contamination level according to NAS 1638 Class 8
(Class 9 for 15 Micron and smaller)
or ISO 17/14 | | | | | | | | | |
| <ul style="list-style-type: none"> • Fluid temperature range • Viscosity range | – 18 °C ... + 80 °C
10 ... 650 cSt; optimal 30 cSt | | | | | | | | | |

TYPE OF ACTUATOR

- | | | | | | | | | | | | |
|---|---|-------|---------------|---------|--------|---------|-------|---------|-------|---------|-------|
| <ul style="list-style-type: none"> • Hydraulically • Pilot pressure range | Pilot operated
5 ... 350 bar | | | | | | | | | | |
| <ul style="list-style-type: none"> • Pilot oil volume | <table border="0" style="width: 100%;"> <tr> <td></td> <td style="text-align: center;">Opening ratio</td> </tr> <tr> <td>0.64 ml</td> <td style="text-align: center;">10 : 1</td> </tr> <tr> <td>0.64 ml</td> <td style="text-align: center;">8 : 1</td> </tr> <tr> <td>0.26 ml</td> <td style="text-align: center;">3 : 1</td> </tr> <tr> <td>0.08 ml</td> <td style="text-align: center;">1 : 1</td> </tr> </table> | | Opening ratio | 0.64 ml | 10 : 1 | 0.64 ml | 8 : 1 | 0.26 ml | 3 : 1 | 0.08 ml | 1 : 1 |
| | Opening ratio | | | | | | | | | | |
| 0.64 ml | 10 : 1 | | | | | | | | | | |
| 0.64 ml | 8 : 1 | | | | | | | | | | |
| 0.26 ml | 3 : 1 | | | | | | | | | | |
| 0.08 ml | 1 : 1 | | | | | | | | | | |
| <ul style="list-style-type: none"> • Min. holding pressure for the pilot piston (independent of pressure at ports A & B) | <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">5 bar</td> <td style="width: 33%;">10 : 1</td> </tr> <tr> <td>5 bar</td> <td style="text-align: center;">8 : 1</td> </tr> <tr> <td>11 bar</td> <td style="text-align: center;">3 : 1</td> </tr> <tr> <td>21 bar</td> <td style="text-align: center;">1 : 1</td> </tr> </table> | 5 bar | 10 : 1 | 5 bar | 8 : 1 | 11 bar | 3 : 1 | 21 bar | 1 : 1 | | |
| 5 bar | 10 : 1 | | | | | | | | | | |
| 5 bar | 8 : 1 | | | | | | | | | | |
| 11 bar | 3 : 1 | | | | | | | | | | |
| 21 bar | 1 : 1 | | | | | | | | | | |

Δp-Q-CHARACTERISTICS

(without spring)



ORDERING CODE

Model Number: C5P . . - . . - . - . - A 1 -

Series _____
 C5P = Check Valve (direct and pilot operated)

Size _____
 06 = 3/4"
 08 = 1"
 10 = 1 1/4"

Max. pressure _____
 4 = 280 bar, size 10 only
 5 = 350 bar, sizes 06 / 08 only

Pilot ports _____
 Direct operated:
 4 = without X1 & Y1 ports
 Pilot operated:
 2 = X1 & Y1 ports = SAE-4 (7/16"-20 UNF)
 8 = X1 & Y1 ports = G 1/4"

Opening ratio _____
 0 = Direct operated
 Pilot operated:
 1 = 1:1
 3 = 3:1
 8 = 8:1
 9 = 10:1
 E = 1:1
 F = 3:1
 G = 8:1
 H = 10:1
 } and end position control incl. amplifier (for C5P08/10 only)

Cracking pressure (average value) _____

	Flow A → B	
	C5P06	C5P08 / 10
1 =	2.8 bar	3.5 bar
2 =	0.5 bar	0.5 bar
3 =	0.3 bar	0.3 bar
4 =	2.2 bar	2.2 bar
5 =	—	9.0 bar
6 =	1.2 bar	1.2 bar
7 =	3.0 bar	—

	Flow A → B		Flow B → A	
	C5P06	C5P08 / 10	C5P06	C5P08 / 10
2 =	1.0 bar	1.0 bar	1.5 bar	1.7 bar
4 =	4.0 bar	3.5 bar	5.5 bar	6.0 bar
6 =	2.0 bar	2.2 bar	3.0 bar	3.8 bar

Design letter _____

Seal class _____
 1 = N.B.R. (Buna N) Standard
 4 = E.P.R.
 5 = VITON®

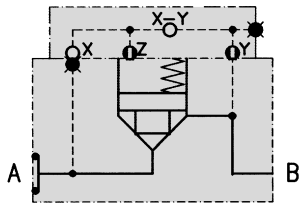
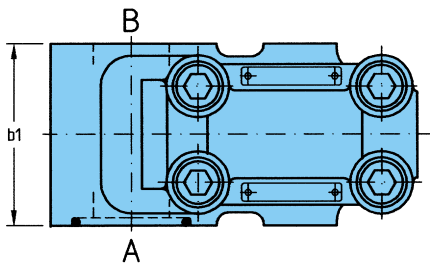
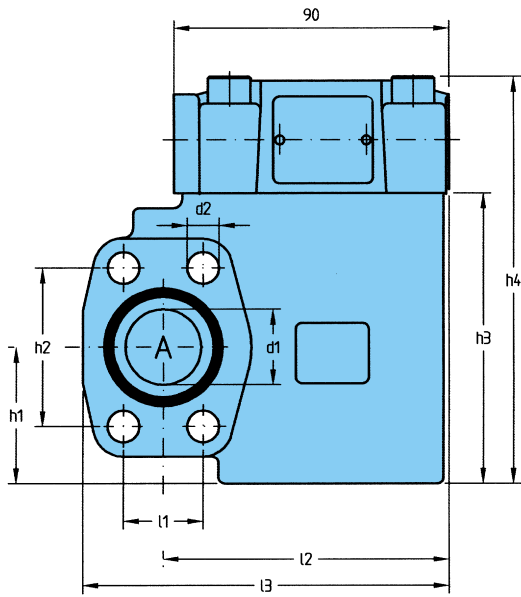
Modifications _____
 0013 = Cover for end position control (see page 6)

Note: Ensure that flanges meet pressure requirements.
 DENISON's supply meet rated pressure specified in this leaflet.

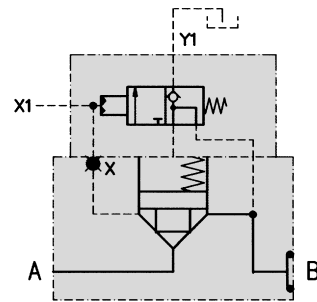
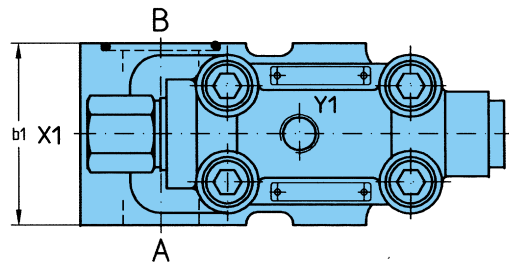
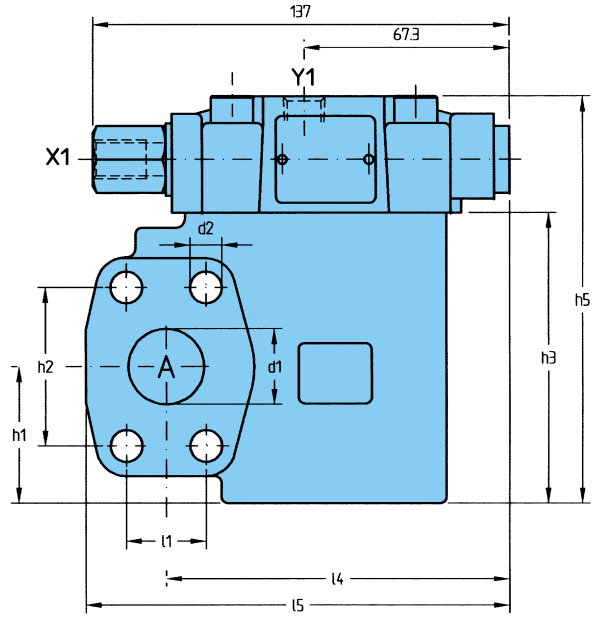
For 2 Port Pressure Valves R5* see publ. 3-EN 2850.
For 2 Port Seat Valves D5S see publ. 7-EN 520.

DIMENSIONS

Direct Operated



Pilot Operated



Ports

	Function	Port Sizes		
		C5P06	C5P08	C5P10
A	Inlet or outlet	3/4" SAE-61	1" SAE-61	1 1/4" SAE-61
B	Outlet or inlet	3/4" SAE-61	1" SAE-61	1 1/4" SAE-61
X1	external pilot port	G 1/4" or SAE-4		
Y1	external pilot drain	G 1/4" or SAE-4		

Dimensions

	l1	l2	l3	l4	l5	b1	h1	h2	h3	h4	h5	d1	d2	Weight
C5P06	22.2	76.9	100.9	95.8		60	37	47.6	90	127.6	128	19	10.5	3.6/3.9 kg
C5P08	26.2	94.0	120.5	112.9	139.4	60	45	52.4	96	133.6	134	25	10.5	4.1/4.4 kg
C5P10	30.2	94.0	128.0	112.9	146.9	75	48	58.7	109	146.6	147	32	12.0	5.4/5.7 kg

END POSITION CONTROL

Weight: 1.4 kg

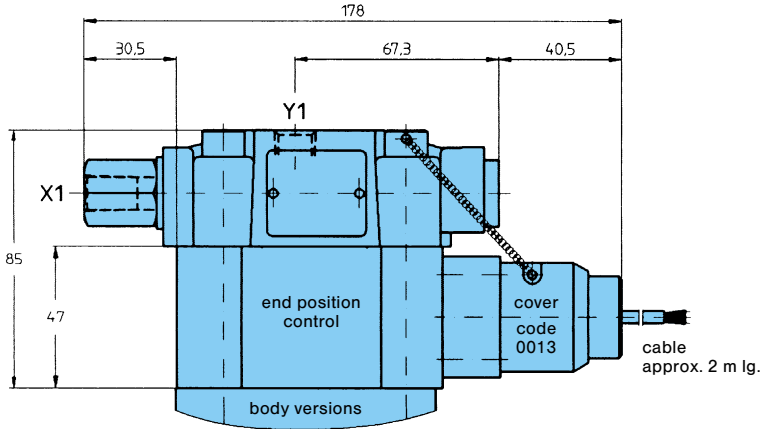
End position control by proximity switch (incl. amplifier).

Valve open: proximity switch activated.

This proximity switch is pressure proof and has no wearing parts.

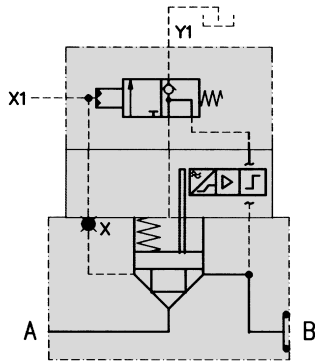
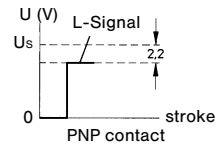
Note:

End position control for C5P08 & C5P10 only.

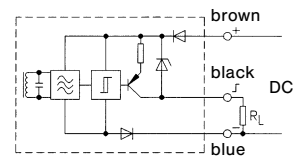


Technical Data (Proximity switch):

Function:	PNP, Contact
Supply voltage (U_s):	10...30 VDC
Supply voltage ripple:	$\leq 10\%$
Current consumption:	max. 8 mA
Residual voltage L-Signal:	$U_s - 2.2\text{ V}$ at I_{max}
Output current (I):	$\leq 200\text{ mA}$
Type of protection:	IP 67
Ambient temperature:	$-25 \dots +70\text{ }^\circ\text{C}$
Wire cross-sectional area:	$3 \times 0.5\text{ mm}^2$

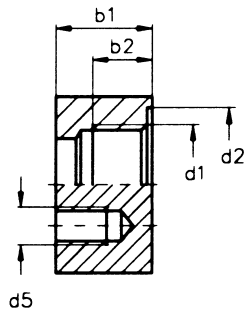
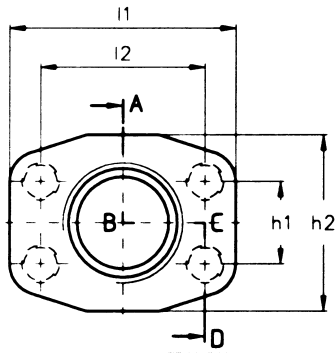


C5P08-52E-2-A1
10 48F 4
G 6
H

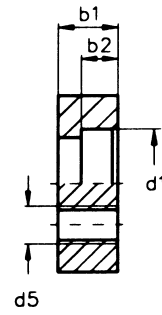


SAE-FLANGES 3000 PSI (210 BAR)

Inlet flange
(only for
pipe mounting)

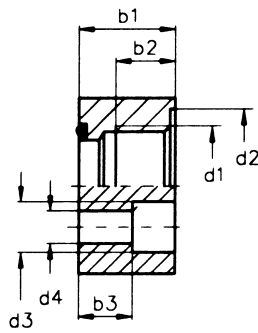
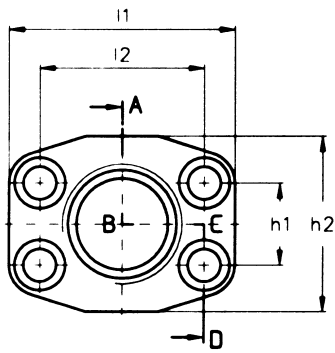


with G-thread

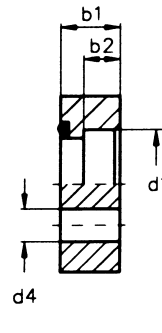


socket weld

Outlet flange



with G-thread

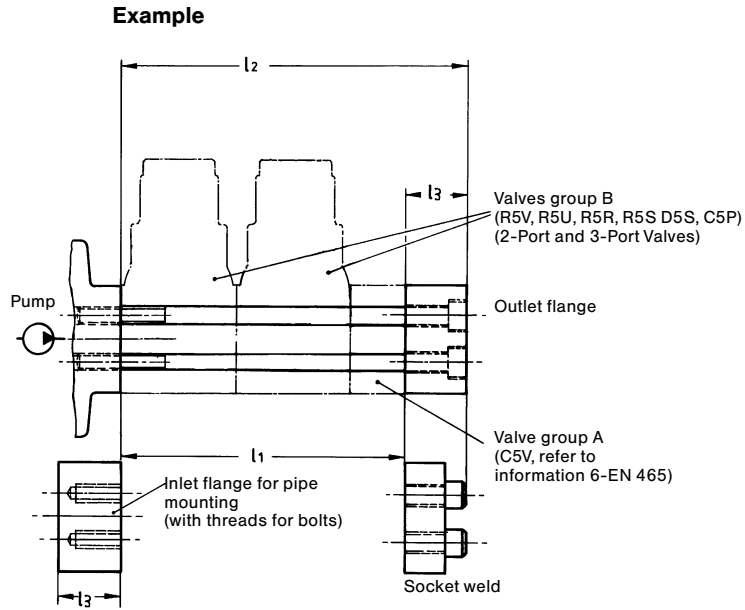


socket weld

Port sizes d ₁	Inlet flange (without screws*) only for pipe mounting	Outlet flange (without screws*)											
	Order No.	Order No.	l ₁	l ₂	b ₁	b ₂	b ₃	h ₁	h ₂	d ₂ ∅	d ₃ ∅	d ₄ ∅	d ₅
G 3/4" 3/4" socket weld	S16-86520-0	S16-86529-0	67	47.6	34	15.9	22	22.2	52	40	16.5	10.5	3/8" UNC
	S16-86519-0	S16-86528-0			19	12	—			—	—		
G 1" 1" socket weld	S16-86523-0	S16-86532-0	72	52.4	34	20	22	26.2	58	46	16.5	12.5	7/16" UNC
	S16-86522-0	S16-86531-0			24	14	—			—	—		
G 1 1/4" 1 1/4" socket weld	S16-86526-0	S16-86535-0	80	58.7	39	22	24	30.2	73	54	17.5	12.5	7/16" UNC
	S16-86525-0	S16-86534-0			24	14	—			—	—		

* see page 8 for screws

MOUNTING INSTRUCTION



	Qty. of valves and group for each stack	Mounting screws	Order No. for screws	l_1	l_2	l_3
3/4"	1 x A	3/8" UNC x 2 1/4"	358-16260-0	25.4	59.4	34.0
	1 x B	3/8" UNC x 3 3/4"	358-16350-0	60.0	94.0	
	(1 x A) + (1 x B)	3/8" UNC x 4 3/4"	358-16390-0	85.4	119.4	
	2 x B	3/8" UNC x 6"	358-16440-0	120.0	154.0	
	(1 x A) + (2 x B)	3/8" UNC x 7"	358-16480-0	145.4	179.4	
	3 x B	3/8" UNC x 8 1/2"	358-16540-0	180.0	214.0	
1"	1 x A	3/8" UNC x 2 3/4"	358-16300-0	30.7	64.7	34.0
	1 x B	3/8" UNC x 3 3/4"	358-16350-0	60.0	94.0	
	(1 x A) + (1 x B)	3/8" UNC x 5"	358-16400-0	90.7	124.7	
	2 x B	3/8" UNC x 6 1/4"	358-16450-0	120.0	154.0	
	(1 x A) + (2 x B)	3/8" UNC x 7 1/2"	358-16500-0	150.7	184.7	
	3 x B	3/8" UNC x 8 1/2"	358-16540-0	180.0	214.0	
1 1/4"	1 x A	7/16" UNC x 3"	358-18320-0	35.0	74.0	39.0
	1 x B	7/16" UNC x 4 1/2"	358-18380-0	75.0	114.0	
	(1 x A) + (1 x B)	7/16" UNC x 6"	358-18440-0	110.0	149.0	
	2 x B	7/16" UNC x 7 1/2"	358-18500-0	150.0	189.0	
	(1 x A) + (2 x B)	7/16" UNC x 9"	358-18560-0	185.0	224.0	
	3 x B	7/16" UNC x 10 1/2"	358-18590-0	225.0	264.0	

Tightening torque: 3/8" UNC = 34 Nm
7/16" UNC = 54 Nm