

—— Hydraulic Fluids ——

1. Fluid Types

Any type of hydraulic fluid, listed in the table below can be used.

Petroleum based oil	Use fluids equivalent to ISO VG32 or VG46.
Synthetic fluids	Use phosphate ester or polyol ester fluid. When phosphate ester fluid is to be used, prefix "F-" to the model number because a special seal (fluororubber) will be used.
Water containing fluids	Use water - glycol fluid.

Note: For use with hydraulic fluids other than those listed above, please consult your SEWON representatives in acvance.

2. Recommended Fluid Viscosity and Temperature

Use under conditions where the viscosity and temperature of the hydraulic fluid remain in the ranges indicated in the following table.

Name	Viscosity	Temperature	
Remote Control Relief Valves H Type Presure Control Valves			
Direct Type Relief Valves	HC Type Pressure Control Valves		
Pilot Operated Relief Valves	Pressure Reducing Valves	$15\sim400 \text{mm}^2/\text{s}\{cSt\}$	-15~+70℃
Low Noise Type Pilot Operated Relief	Valves Pressure Reducing and Check Valves		
Solenoid Controlled Relief Valves	Pressure Reducing and Relieving Valves		

^{*} If the valve is provided with a vent ristrictor (ex.: A-BSG-03), the viscosity range should be 15-200cSt (80-900 SSU).

3. Control of Contamination

Due caution must be paid to maintaining control over contamination of the hydraulic fluids which may otherwise lead to breakdowns and shorten the life of the valve. Please maintain the degree of contamination within NAS 1638-Grade 11. Use 25μ m or finer line filter.

4. Drain Piping

Drain port must be connected directly to the tank in condition back pressure is lower than the atmospheric pressure. That line pressure can be increased infinitely can be caused a serious accident.

H Type Pressure

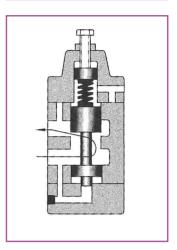
■ H Type Pressure Control Valves

These valves are hydraulically damped, direct operated, pressure control valves which can be actuated by internal or external pilot pressure. There are various types of valve including sequence, unloading and low pressure relief valves, all of which are operated by a pressure rise in the circuit, sensed either internally or remotely.

■ Ratings

Model Number	S	Max. Operating	Max. Flow	Ma kį	
Threaded Connection	1 Connection Sub-Plate Mounting		1/min	HT type	HG type
HT-03- * * - * - 22	HG-03- * * - * - 22		50	3.7	4.0
HT-06- * * - * - 22	HG-06- * * - * - 22	21 {214}	125	6.2	6.1
HT-10- * * - * - * - 22			250	12.0	11.0



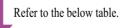


■ Model Number Designation

Н	T	-03	-C	3	-P	-22
Series Number	Type of Mounting	Vave Size	Pres. Adj. Range MPa{kgf/cm²}	Valve Type ^{★1}	With Auxiliary*2 Pilot Pressure	Design Number
	 T :	03				22
•	Threaded	06	L: 0.25~0.45{2.6~4.6} M: 0.45~0.9{4.6~9.2} N: 0.9~1.8{9.2~18.4}	1	P:	22
H:	Connection	10		2		22
H Type Pressure Control Valves	G:	03	A: 1.8~3.5{18.4~35.7}	3	With Auxiliary Pilot Pressure	22
Control varves	Sub-Plate	06	B : 3.5~7.0{35.7~71.4} C : 7.0~14{71.4~143}	4		22
	Mounting					22

- ★1. For the details of valve types, see the following page.★2. Models with auxiliary Pilots are used where
- valves must be operated under a lower external pilot pressure than the adjusted pressure (types N,A and B: about1/8 of adjusted pressure; type C: about 1/16).

This does not apply to pressure adjustment ranges L and M and valve type1.



Pres. Adj. Range & "P" Aux. Pilot Table

Valve Type	Type 1		Type 2 Type 3				Type 4		
Pres. Adj. Range	Aux.	Normal	Aux.	Normal	Aux.	Normal	Aux.		
L	0	-	0	-	0	-	0	-	
M	0	-	0	1	0	-	0	-	
N	-		0	0	0	0	0	0	
A	-		0	0	0	0	0	0	
В	-		0	0	0	0	0	0	
С	_		0	0	0	0	0	0	

■Valve Types

Valve Type	Type1: Low Pres. Relief Valve	Type2: Sequence Valve	Type3: Sequence Valve	Type4: Unloading Valve		
Pilot-Drain Type	Internal Pilot-Internal Drain	Internal Pilot-External Drain	External Pilot-External Drain	External Pilot-Internal Drain		
Operations						
KS Graphic Symbols		With auxiliary pilot port				
Descriptions	Can be used as low-pressure relief valve, but be careful to occurence of surge pressure.	Used to control the operational sequence of 2 or more actuators. If primary pressure setting, effective fluid is delivered to the secondary side.	Used for the same purposes as for the type 2. Operated by external pilot pressure irrespective of primary pressure.	Used as unloading valve. If external pilot pressure exceeds the pressure setting, the pump is turned no-load by releasing all fluid to the tank.		

Introductions

- To adjust the pressure, loosen the lock nut and turn the pressure adjustment screw slowly clockwise for higher pressures or anticlockwise for lower pressure. After adjustments, do not forget to tighten the lock nut.
- Connect the secondary side pressure ports of types 1 and 4(internal drain) and the drain ports of types 2 and3(external drain) directly to the tanks with a back pressure close to the atmospheric pressure.

Attachment

Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw
HG-03	M10×50L·····4pcs
HG-06	M10×50L4pcs
HG-10	M10×50L6pcs

■Sub-Plate

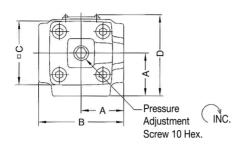
Model Numbers	Sub-Plate Model Numbers	Piping Size	Mass kg
HG-03- * * -22	HGM-03-20	Rc 3/8	1.6
110-03- % %-22	HGM-03X-20	Rc 1/2	1.0
HG-03- ** **-P-22	HGM-03-P-20	Rc 3/8	2.0
110-03- % %-1-22	HGM-03X-P-20	Rc 1/2	2.0
HG-06- * * -22	HGM-06-20	Rc 3⁄4	2.4
110-00- 🗴 🔉 -22	HGM-06X-20	Rc 1	3.0
HG-06- * * -P-22	HGM-06-P-20	Rc 3⁄4	2.4
110-00- % %-1-22	HGM-06X-P-20	Rc 1	3.0
HG-10- * * -22	HGM-10-20	Rc 11/4	4.8
по-10- ж ж-22	HGM-10X-20	Rc 1½	5.7
HG-10- * * -P-22	HGM-10-P-20	Rc 11/4	4.8
110-10- % %-1-22	HGM-10X-P-20	Rc 1½	5.7

Sub-Plates are available, Specify sub-plate model from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

HT-03,06,10

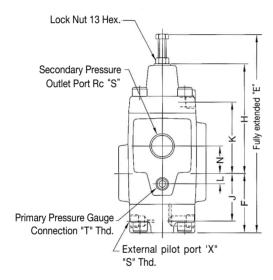
Type 3: Sequence Valve

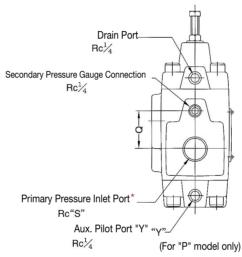
(External Pilot, External Drain)



★There are two threaded connection pressure ports.

They can be cinnected each other in-line: one as inlet and the other as outlet or the valve can be used by plugging one of the pressure ports.

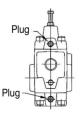




Model Numbers	Α	В	С	D	E	F	Н	J	K	L	N	Q	S
HT-03	41	82	60	74	191	57	106	43	70	0	28	28	3/8
HT-06	48	96	73	87	221	64.5	123.5	50.5	80.5	9	33	42	3/4
HT-10	66	132	86	112	272	84	149	66	98	12	40	52	11/4

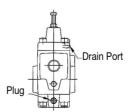
Type1: Low Pressure Relief Valve

(Internal Pilot, Internal Drain)



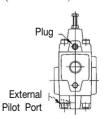
Type2:Sequence Valve

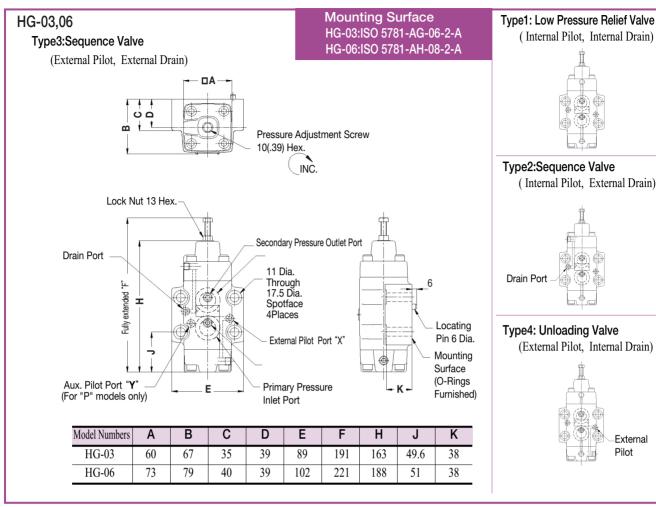
(Internal Pilot, External Drain)

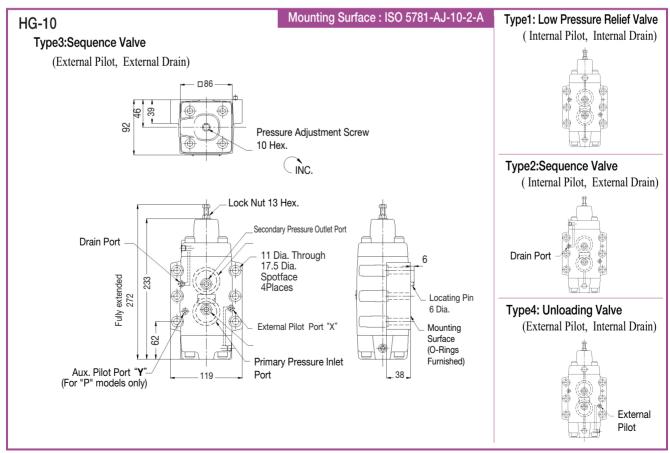


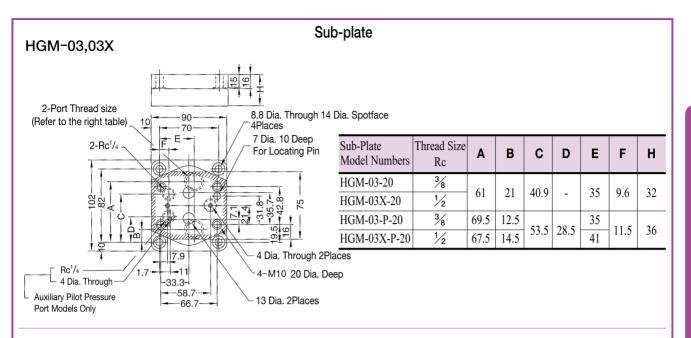
Type3: Unloading Valve

(External Pilot, Internal Drain)

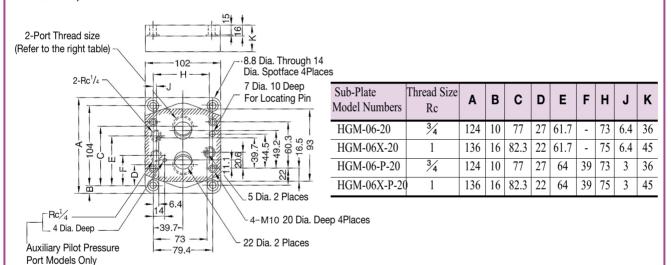




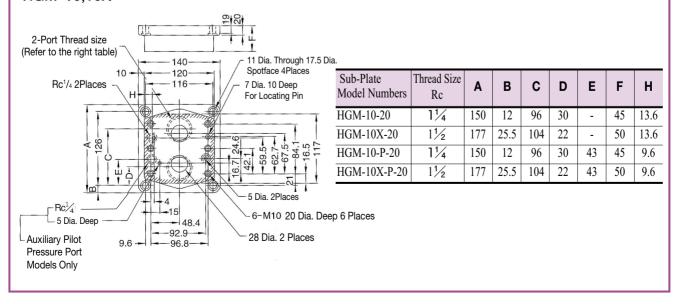




HGM-06,06X

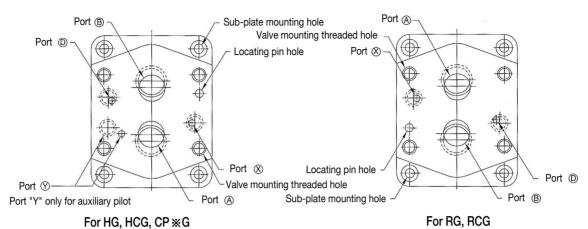


HGM-10,10X



How use HGM Sub-plates in other control valves

To use HGM sub-plates in other control valves, follow the descriptions in the table below.



How to use ports

For RG, RCG

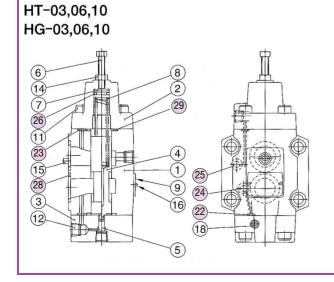
Valve Model	Name of Valve			Name of Ports		
Numbers	Name of valve	Port "A"	Port "B"	Port "D"	Port "X"	Port "Y"
03 HG - 06 10	H Type Pressure Control Valves	Primary Pressure port	Secondary pressue port	Drain port	External pilot port	Auxiliary pilot port (Model Number "P")
HCG - 06 10	HC Type Pressure Control Valves	Primary Pressure portor free flow outlet port	Secondary pressue port or free flow inlet port	Drain port	External pilot port	Auxiliary pilot port (Model Number "P")
R G - 06 10	Pressure Reducing Valves	Primary Pressure port	Secondary pressue port	Not used	Drain port	
RCG - 06 10	Pressure Reducing and Check Valves	Primary Pressure portor free flow outlet port	Secondary pressue port or free flow inlet port	Not used	Drain port	
O3 CP **G - 06 10	Pilot Controlled Check Valves	Free flow inlet or reversed controlled flow outlet port	Free flow outlet or reversed controlled flow inlet port	Drain port*	Pilot port	

[★]If this sub-plate is used in the internal drain type of a pilot operated chenk valve, be sure to drain port"D" of the sub-plate.

■List of Seals

CAUTION

When making replacement of seals, please do it carefully after reading through the relevant instructions in the Operator's Manual.



	Name of	I	Part Number	S	Quant	ity
Item	Parts	HT ₋₀₃	HT ₋₀₆	HT HG-10	HT- **	HG- ※
22	O-Ring	JIS B 2401 -1B-P4	JIS B 2401 -1B-P4	JIS B 2401 -1B-P4	-	3 [*]
23	O-Ring	JIS B 2401 -1B-P6	JIS B 2401 -1B-P6	JIS B 2401 -1B-P6	4	4
24	O-Ring	JIS B 2401 -1B-P9	JIS B 2401 -1B-P9	JIS B 2401 -1B-P9	-	1*
25	O-Ring	JIS B 2401 -1B-P9	JIS B 2401 -1B-P9	JIS B 2401 -1B-P9	-	2
26	O-Ring	JIS B 2401 -1A-P11	JIS B 2401 -1A-P15	JIS B 2401 -1A-P20	1	1
28	O-Ring	JIS B 2401 -1B-P18	JIS B 2401 -1B-P28	JIS B 2401 -1B-P32	-	2
29	O-Ring	JIS B 2401 -1A-P22	JIS B 2401 -1B-P28	JIS B 2401 -1B-P36	2	2

[★]Used only for HG type auxiliary pilot(P).

■HC Type Pressure Control Valves

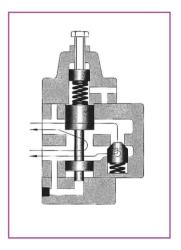
These valves are hydraulically damped, direct operated, pressure control valves which can be actuated by internal or external pilot pressure. They are available with integral check valves for use when free reverse flow from the secondary port to the primary port is desired. There are various types of valve including sequence, counterbalance valves, all of which are operated by a pressure rise in the circuit, sensed either internally or remotely.

■ Ratings

Model Number	rs	Max. Operating Pres.	Max. Flow	Mas kg	
Threaded connection	Sub-Plate Mounting	MPa {kgf/cm²}	L/min	HCT type	HCG type
HCT-03- * * - * - 22	HCG-03- * * - * - 22		50	4.1	4.8
HCT-06- * * - * - 22	HCG-06- * * - * - 22	21{214}	125	7.1	7.4
HCT-10- * * - * - 22	HCG-10- * * - * - 22		250	13.8	13.8

[•] For check valve pressure drops, see free flow pressure drop characteristics.





■ Model Number Designation

HC	T	-03	-C	3	-P	-22
Series Number	Type of Mounting	Valve Size	Prel. Adj. Range MPa{kgf/cm²}	Valve Type *1	With Auxiliary*2 Pilot Pressure	Design Number
HC: HC Type Pressure Control Valves	T:	03				22
	Threaded Connection	06	L: 0.25~0.45{2.6~4.6} M: 0.45~0.9{4.6~9.2} N: 0.9~1.8{9.2~18.4} A: 1.8~3.5{18.4~35.7} B: 3.5~7.0{35.7~71.4} C: 7.0~14{71.4~143}	1	P:	22
		10		2		22
		03		3	With Auxiliary Pilot Pressure	22
	Sub-Plate	06		4		22
	Mounting	10				22

- ★1. For details of valve types, see the following
- ★2. Models with auxiliary pilots are used where valves must be operated under a lower external pilot pressure than the adjusted pressure (types N,A and B: above 1/8 of adjusted pressure; type C: above 1/16). This does not apply to pressure adjustment ranges L and M and valve type 1.

Refer to the table below.

Pres. Adj. Range & "P" Aux. Pilot Table

Valve Type	Type 1		Type 2		Type 3		Type 3	
Pres. Adj. Range	PΧ	PO	PΧ	PO	РX	PO	PХ	PO
L	0	-	0	-	0	-	0	-
M	0	-	0	-	0	-	0	-
N	0	0	0	0	0	0	0	0
A	0	0	0	0	0	0	0	0
В	0	0	0	0	0	0	0	0
С	0	0	0	0	0	0	0	0

■Valve Types

Valve Type	Type1: Counterbalance Valve	Type2: Sequence and check Valve	Type3: Sequence and check Valve	Type4: Counterbalance Valve		
Pilot-Drain Type	Internal Pilot-Internal Drain	Internal Pilot-External Drain	External Pilot-External Drain	External Pilot-Internal Drain		
Operations						
KS Graphic Symbols	With auxiliary pilot port	With auxiliary pilot port	With auxiliary pilot port	With auxiliary pilot port		
Descriptions	Used to prevent gravitational falls by generating a pressure on the actuator return side. If primary pressure exceeds the pressure setting, fluid is released to keep the pressure constant.	Used to control the operating sequence of 2 or more actuators. If primary pressure exceeds the pressure setting, effective fluid is delivered to the secondary side. Reveresed flow is free by check valve.	Used for the same purposes as for the type 2. Operated by external pilot pressure irrespective of primary pressure.Reveresed flow is free by check valve.	Used for the same purposes as for the type 1. Operated by external pilot pressure irrespective of primary pressure. Reveresed flow is free by check valve.		

Introductions

- To adjust the pressure, loosen the lock nut and turn the pressure adjustment screw slowly clockwise for higher pressures or anticlockwise for lower pressures.
 - After adjustments, do not forget to tighten the lock nut.
- Connect the secondary side pressure ports of types 1 and 4(internal drain) and the drain ports of types 2 and3(external drain) directly to the tanks with a back pressure close to the atmospheric pressure.

■ Attachment

Mounting Bolts

• Mounting Do	
Valve Model Numbers	Socket Head Cap Screw
HCG-03	M10×70L4pcs
HCG-06	M10×80L4pcs
HCG-10	M10×90L6pcs

■Sub-Plate

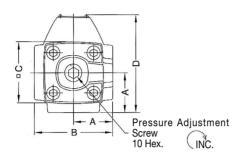
Model Numbers	Sub-Plate Model Numbers	Piping Size	Mass kg
HCG-03- ** **-22	HGM-03-20	Rc 3/8	1.6
11CO-05- X X-22	HGM-03X-20	Rc ½	1.0
HCG-03- ** **-P-22	HGM-03-P-20	Rc 3/8	2.0
11CU-03- % %-1 -22	HGM-03X-P-20	Rc ½	2.0
HCG-06- ** **-22	HGM-06-20	Rc 3/4	2.4
11CU-00- % %-22	HGM-06X-20	Rc 1	3.0
HCG-06- * * -P-22	HGM-06-P-20	Rc 3⁄4	2.4
11CU-00- % %-1 -22	HGM-06X-P-20	Rc 1	3.0
HCG-10- ** **-22	HGM-10-20	Rc 11/4	4.8
11CO-10- % %-22	HGM-10X-20	Rc 1½	5.7
HCG-10- ** **-P-22	HGM-10-P-20	Rc 11/4	4.8
11CG-10- % %-1 -22	HGM-10X-P-20	Rc 1½	5.7

- Sub-Plates are available, Specify sub-plate model from the table above.
 When sub-plates are not used, the mounting surface should have a good machined finish.
- Sub-plates are those for H type pressure control valves. For dimensions, see page C-29.

HCT-03,06,10

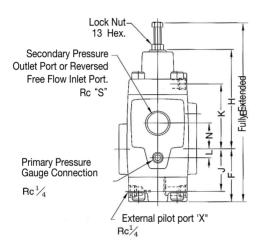
Type 3: Sequence and Check Valve

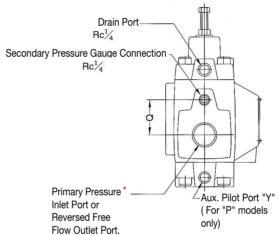
(External Pilot, External Drain)



★There are two threaded connection pressure ports.

They can be cinnected each other in-line: one as an inlet and the other as outlet or the valve can be used by plugging one of the pressure ports.

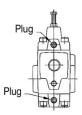




Model Number	rs A	В	С	D	E	F	Н	J	K	L	N	Q	S
HCT-03	41	82	60	96	191	57	106	43	70	0	28	28	3/8
HCT-06	48	96	73	116	221	64.5	123.5	50.5	80.5	9	33	42	3/4
HCT-10	66	132	86	152	272	84	149	66	98	12	40	52	11/4

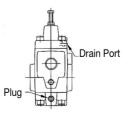
Type1: Counterbalance Valve

(Internal Pilot, Internal Drain)



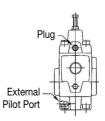
Type2:Sequence and Check Valve

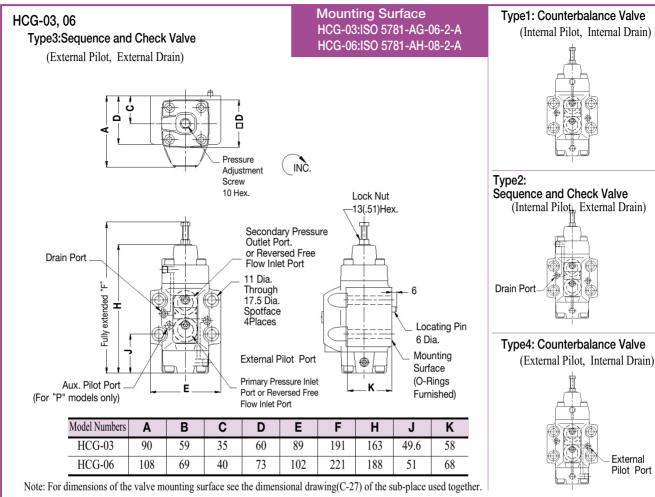
(Internal Pilot, External Drain)

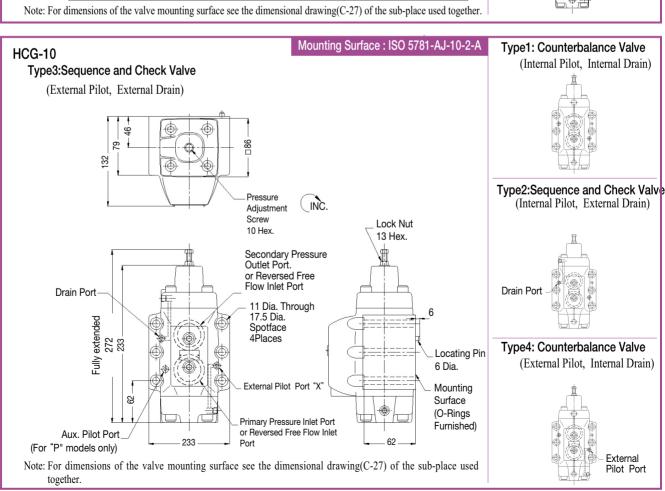


Type4: Counterbalance Valve

(External Pilot, Internal Drain)







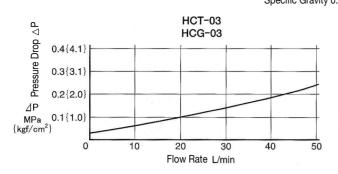
External

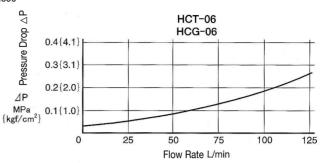
Pilot Port

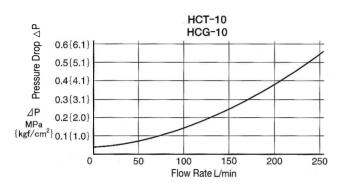
PRESSURE CONTROL

■ Pressure Drop for Free Flow

Hydraulic fluid: Viscosity 35mm²/s{cSt} Specific Gravity 0.850







• For any other viscosity, multiply the factors in the table below.

				1 ,							
Viscosity	$mm^2/s\{cSt\}$	15	20	30	40	50	60	70	80	90	100
	SSU	77	98	141	186	232	278	324	371	417	464
Factor 0.81		0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30	

• For any other specific gravity(G), the pressure drop $(\triangle P')$ may be obtained from the fomula below.

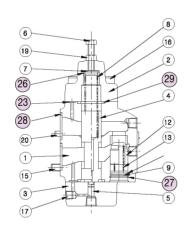
$$\Delta P' = \Delta P (G'/0.850)$$

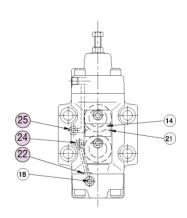
CAUTION

When making replacement of seals, please do it carefully after reading through the relevant instructions in the Operator's Manual.

■List of Seals

HCG-03,06





Ψ.	Name of		Quantity			
Item	Parts	HCT ₋₀₃	401-1B-P 4 JIS B 2401-1B-P 4 J 401-1B-P 6 JIS B 2401-1B-P 6 J 401-1B-P 9 JIS B 2401-1B-P 9 J 401-1B-P 9 JIS B 2401-1B-P 9 J 401-1A-P11 JIS B 2401-1A-P15 J 401-1B-P12 JIS B 2401-1B-P18 J	HCT ₁₀	НСТ- Ж	HCG- **
22	O-Ring	JIS B 2401-1B-P 4	JIS B 2401-1B-P 4	JIS B 2401-1B-P 4	-	3*
23	O-Ring	JIS B 2401-1B-P 6	JIS B 2401-1B-P 6	JIS B 2401-1B-P 6	4	4
24	O-Ring	JIS B 2401-1B-P 9	JIS B 2401-1B-P 9	JIS B 2401-1B-P 9	-	1*
25	O-Ring	JIS B 2401-1B-P 9	JIS B 2401-1B-P 9	JIS B 2401-1B-P 9	-	2
26	O-Ring	JIS B 2401-1A-P11	JIS B 2401-1A-P15	JIS B 2401-1A-P20	1	1
27	O-Ring	JIS B 2401-1B-P12	JIS B 2401-1B-P18	JIS B 2401-1B-P22A	1	1
28	O-Ring	JIS B 2401-1B-P18	JIS B 2401-1B-P28	JIS B 2401-1B-P32	-	2
29	O-Ring	JIS B 2401-1B-P22	JIS B 2401-1B-P28	JIS B 2401-1B-P36	2	2

★ Used only for HCG type auxiliary pilot (P).





