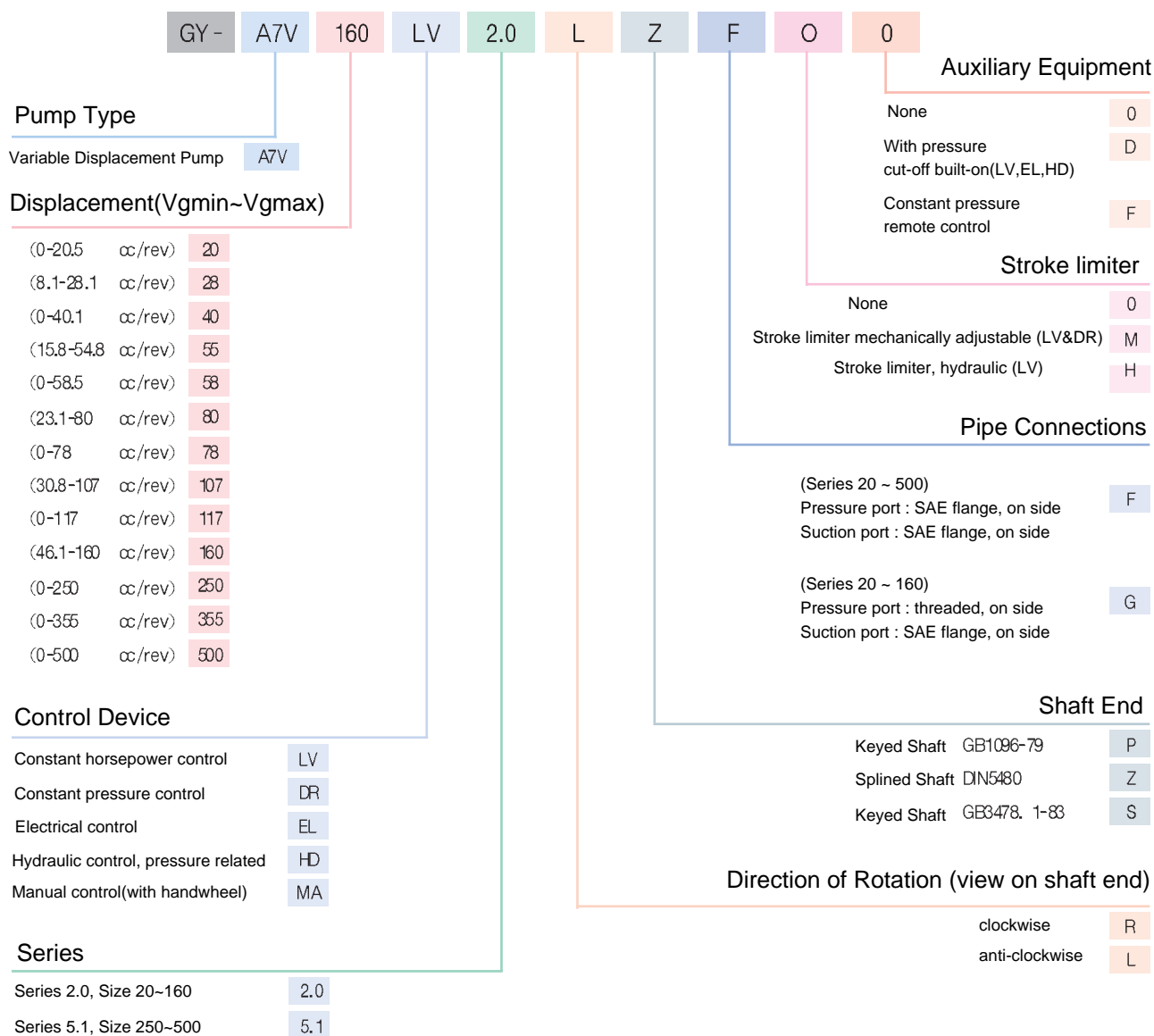


A7V Variable Displacement Pump(2.0 5.1 Series)

Type Code



Type Code Example GY-A7V, 160, LV, 2.0, L, Z, F, O, 0

A7V Variable Displacement, Displacement160, Constant horsepower control LV, Series 2.0, anti-clockwise L, Splined Shaft Z, Pressure port : SAE flange, on side, Auxiliary Equipment none

M
A
7
V

A7V Variable Displacement Pump(2.0 5.1 Series)

Technical data Form

Size		20	28	40	55	58	80	78	107	117	160	250	355	500	
Direction of Rotation (R or L)		L	R	L	R	L	R	L	R	L	R	L	R	L	R
Control Device	LV Constant horsepower control	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	DR Constant pressure control	●	●		●	●		●	●		●	●		●	●
	EL Electrical control	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	HD Hydraulic control, pressure related	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	MA Manual control(with handwheel)	●	●	●	●	●	●	●	●	●	●	●	●		
Displacement	Vgmax (cc/rev)	20.5	28.1	40.1	54.8	58.5	80	78	107	117	160	250	355	500	
	Vgmin (cc/rev)	0	8.1	0	15.8	0	23.1	0	30.8	0	46.	0	0	0	
Max. speed 3)	0.09MPa 1) $\eta_{ma} \times 0.09$ (r/min)	3800	2800	3200	2360	2850	2120	2540	1900	2240	1650	1400	1250	1120	
	0.10MPa 1) $\eta_{ma} \times 0.10$ (r/min)	4100	3000	3400	2500	3000	2240	2700	2000	2360	1750	1500	1320	1200	
	0.15MPa 1) $\eta_{ma} \times 0.15$ (r/min)	4750	3600	3750	3000	3350	2750	3000	2450	2650	2100	1850	1650	1500	
Max. flow 2)	$\eta_{ma} \times 0.09$ $Q_{ma} \times 0.09$ (l/min)	76	76	124	125	162	165	192	197	254	256	340	430	543	
	$\eta_{ma} \times 0.10$ $Q_{ma} \times 0.10$ (l/min)	82	82	132	133	170	174	204	208	268	272	364	455	582	
	$\eta_{ma} \times 0.15$ $Q_{ma} \times 0.15$ (l/min)	94	98	146	160	191	213	227	254	301	326	449	568	728	
Max. power $\Delta P=35MPa$	$Q_{ma} \times 0.09$ $P_{ma} \times 0.09$ (kW)	46	46	75	75	97	99	115	119	153	154	204	259	327	
	$Q_{ma} \times 0.10$ $P_{ma} \times 0.10$ (kW)	49	49	79	80	102	105	122	125	161	164	219	274	350	
	$Q_{ma} \times 0.15$ $P_{ma} \times 0.15$ (kW)	57	59	89	96	115	128	137	153	181	196	270	342	438	
flow Q 2) power P	$\eta_E=1450r/min$ (l/min)	28.8	39.5	56.4	77.1	82.3	112.5	110	150.5	164.6	225	351.6	499	703	
	$\eta_E=1450r/min$ (kW)	17	24	34	46	50	68	66	91	99	135	211	300	423	
$\Delta P=35MPa$															
Torque M	Vgmax (N·m/10MPa)	32.6	44.7	63.8	87.1	93	127.2	124	170.1	186	254.4	397.5	564.5	795	
	$\Delta P=10MPa$ Vgmin (N·m/10MPa)	-	12.9	-	25.1	-	36.7	-	49	-	73.3	-	-	-	
Max. Torque $\Delta P=35MPa$	Vgmax (N·m)	114	156	233	305	326	445	434	595	651	890	1391	1976	2783	
	Vgmin (N·m)	-	45	-	88	-	129	-	171	-	275	-	-	-	
Monent	J (kgm ²)	0.0017	0.0017	0.0052	0.0052	0.0109	0.0109	0.0167	0.0167	0.0322	0.0322	0.088	0.160	0.270	
Wight	(kg)	19	19	28	28	44	44	53	53	76	76	105	165	245	

* NOTICE : 1) The values shown are valid for Vgmax, with an absolute pressure at suction inlet S and when operated on mineral oil.

2) Caudated with a volumetric efficiency of 97%.

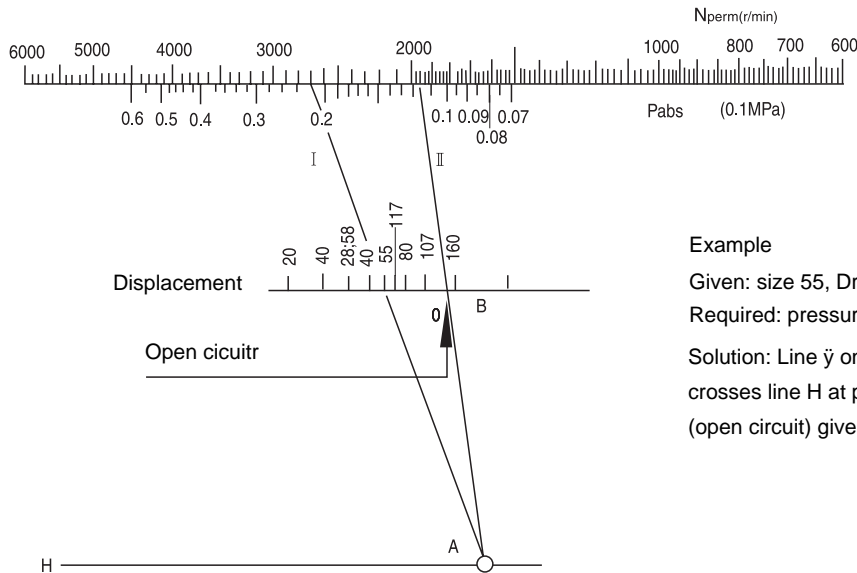
3) Pump's speed don't exceed the permissible max. speed at 0.15MPa in suction s. on those sizes with Vgmin>0, however the maximum speeds can be increased to the values for those size with Vgmin=0 by reducing the displacement(Vg<Vgmax) and maintaining max. flow the relevant sizes are 28~20, 50~40, 80~58,107~78, 160~117

For example size 28, Vgmax=28.1 ml/r, reduced the displacement to 20.5 ml/r and keep the max. flow is 94L/min, the max. speed can be from 3600r/min to increase 4750r/min.

A7V Variable Displacement Pump(2.0 5.1 Series)

Permissible speed N_{perm} and suction pressure P_{abs} can be read from the nomograph, However, the max. speeds (see table) and min. nad max. suction pressure must be taken into account.

Nomograph



Example

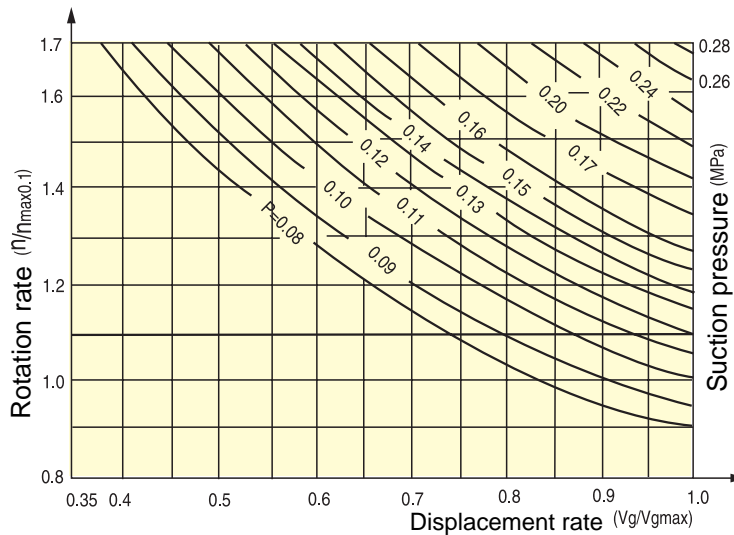
Given: size 55, Drive speed 2700 r/min

Required: pressure P_{abs} at the suction Inlet S

Solution: Line \ddot{y} on scale n_{perm} drawn toward size 55 crosses line H at point A. line \ddot{y} from point A to point B (open circuit) gives the result: $P_{abs}=0.117\text{MPa}$.

size 250~500

Calculation of Inlet Pressure P_{abs} at Suction Inlet S and of Reduction in Displacement at Increased Speeds.



Example:

Given: Size 500, Drive speed 1320rpm

Required: Pressure P_{abs} at suction inlet S

Soulution: Speed ratio $n/n_{max0.1}=1320/1200=1.1$ gives an inlet pressure of $P_{abs}=0.12\text{MPa}$ at full swivel.

If for example free flow is only possible with $P_{abs}=0.1\text{MPa}$, the displacement must be reduced 87.6%.

A7V Variable Displacement Pump(2.0 5.1 Series)

Calculation of Size

$$\text{Swept Volume } Q = \frac{V_g \cdot n \cdot \eta_v}{1000} \quad (\text{l/min})$$

$$\text{Drive Torque } M = \frac{1.59 \cdot V_g \cdot \Delta P}{10 \cdot \eta_m} \quad (\text{N} \cdot \text{m})$$

$$\text{Drive Power } P = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta P}{60 \cdot \eta} \quad (\text{kW})$$

V_g =max geometric displacement [ml/r], ΔP =differential pressure [MPa]

n =speed [r/min], η_v =volumetric efficiency

η_m =mechanical-hydraulic efficiency, η =overall efficiency

Operating Pressure Range

Inlet Operating Pressure at port s

Pabs min.....0.08MPa

Pabs max.....0.2MPa

Pressure at ports A or B

Nominal pressure..... $P_N=35\text{MPa}$

Peak pressure..... $P_{max}=40\text{MPa}$

Fluid Temperature Range

t_{min}-25°C

t_{max}+80°C

Viscosity Range

t_{min}10 cSt

t_{min}(for short periods)1000 cSt

Optimum Operating Viscosity: 16~25 $\text{mPa}\cdot\text{s}$

Fluid Recommendation: 40 low-solidfing

Filtration of Hydraulic Fluid

Recommended filtration 10 μm . Coarser filtration of 25 to 40 μm is possible. However longer service life is achieved with filtration of 10 μm (reduce wear)

Flow Direction

Clockwise: S to B Anti-Clockwise: S to A

Mounting position

Optional. Pump's housing must be filled with oil

Drive shaft on top of oil tank

For this case a model with ports U1 and U2 must be ordered (indicate in clear text:"with ports U1 and U2"). The minimum oil level must not fall below the "A" line. as shown in Fig. 1

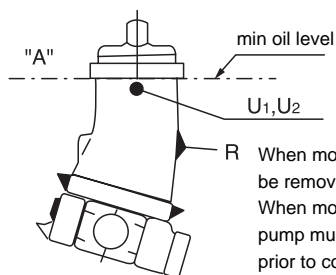


Fig. 1

When mounting within tank, plug must be removed from ports U1, U2 and R
When mounting outside a tank, the pump must be bled at port U1 or U2 prior to commissioning.

Mounting on top of oil tank

Mounting of A7V pump above tank must be considered as a special pump installation and should only be realized under specific conditions.

1)With various control device, pump's angle is max.(V_{gmax}) before start. Further to adjustment from V_{gmin} before start($V_{gmin}=0$). The min. flow screw limiter must be operation at $Q=0$.

2)Pump equipped at top of oil tank, when ordering need description "use for set on oil tank".

3)Pump's suction port should be located up. And also the suction pipe is possible shorter. The pipe end should be low 200mm than oil.

The flow speed in suction pipe should keep speed between 0.8~1.0 m/s. Mounting as Fig 2.

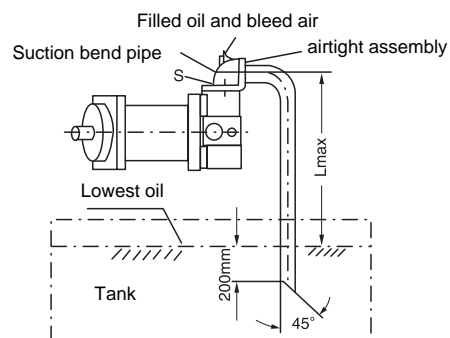


Fig. 2

A7V pump 2.0 series, mounting on top of tank, different size and speed, pipe length and watch for inner Diameter

Size	Max. speed n_{max} (r/min)	Max. length of suction pipe L_{max} (mm)	Calculated suction pipe(mm) at flow velocity $v=0.9\text{m/s}$ and V_{gmax}	
			Speed $n_{max}(r/min)$	Speed $n_{E=450}(r/min)$
20	3610	600	41.8	26.5
28	2660	600	42.3	26.5
40	3040	750	53.6	37
55	2240	750	53.8	43.3
58	2700	750	61.3	45
80	2015	750	61.6	52
78	2410	750	66.6	51.6
107	1800	750	67.5	60.5
117	2125	850	76.6	63.3
160	1565	850	77	74

Note : Viewed Values are suction absolute pressure 0.09MPa.

A7V Variable Displacement Pump (2.0 5.1 Series)

Constant Horsepower Control LV

LV Constant horsepower control regulates flow in relation to pressure and makes out-put power constant that is :

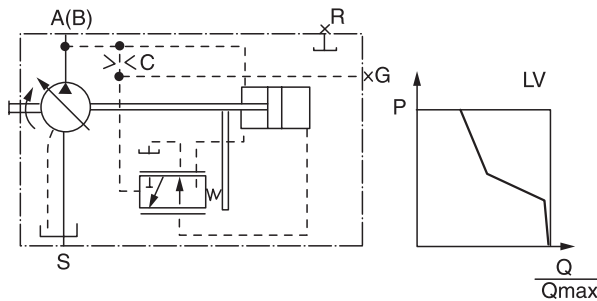
$$P = \frac{\Delta P \cdot Q}{60} = \text{Constance}$$

* at the table : P : Power (kW), ΔP : Pressure Difference (MPa), Q : Flow (L/min)

Hydraulic pilot force acts on a side of pilot piston. When it overcomes a pilot spring force arranged on the other side of the pilot piston, the pilot oil is fed into the cave of control piston. The pump swivel angle from V_{gmax} to V_{gmin} swing. Then the displacement will be reduced (Viewed on page two Section)

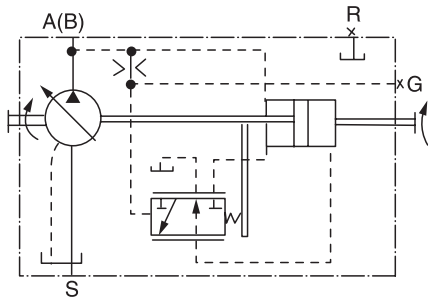
Start of controlled constnat out-put power LV at 5MPa

Through port G via throttle port C can carry on high pressure control (sumation HP control)



Constnat HP control with stroke limiter

By means of a mechanical stroke limiter. The max. displacement can be infinitely varied or limited. Adjusted range from V_{gmax} to V_{gmin}



Size	20	40	58	78	117	250	355	500
Number of screw rotation	23	21	28	31	26	21,25	24	25
Moment (Approx.) N·cm	80	140	500	500	630	-	-	-

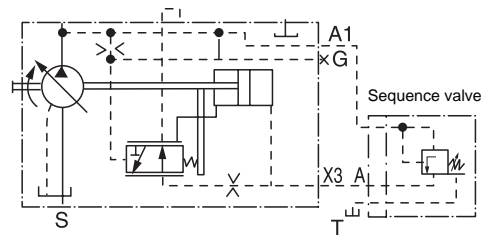
Constant HP control with pressure cut-off

Be used for all kinds of size $V_{gmin}=0$

Pressure cut-off is base on constant horsepower control carry on a constant pressure control. It ealized operating by order valve. When pressure up to setting pressure (max.)(adjusting pressure range to 31.5MPa), the order valve will be opened, then the flow will be reduced to $Q=0$.

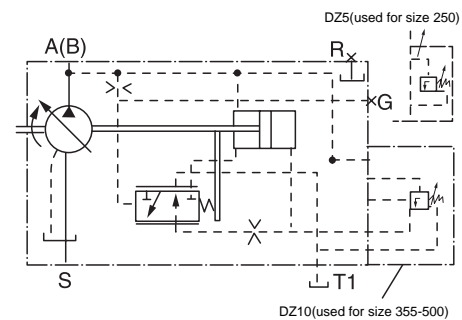
Order valve and pump separately fixed

Size 20-117



Mounting the pump directly with sequence valve

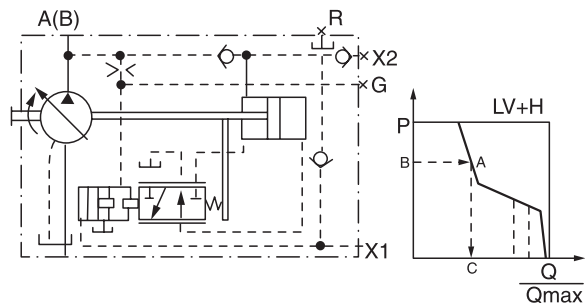
Size 250-500



* Note : Order valve port T and pilot valve port T1 must be connected with oil tank (cooler)

Constnat HP control with hydraulic stroke limiter

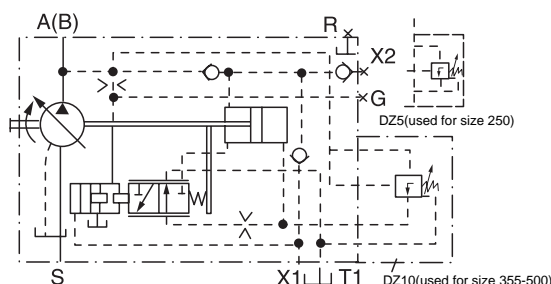
A pilot pressure (port X1) of at least 10% of the operating pressure is required for the hydraulic stroke limiter, max. permissible pressure at port X1=20MPa(for all sizes). If it is required to limit the flow at an operating pressure < 5MPa then a boost pressure of min. 5MPa must be applied port X2 (at port X1 then, min. 10%=0.5MPa)



A7V Variable Displacement Pump (2.0 5.1 Series)

Constant HP control LV with Flow Cut-Off and Hydraulic Stroke Limiter

Mounting the pump directly with sequence valve

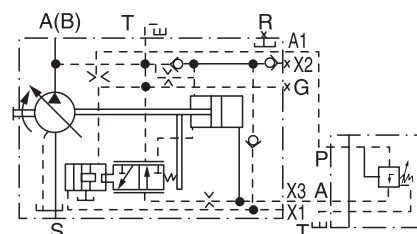


Constant Input control LV with Input Current <Remote> and Hydraulic Stroke Limiter

The sequence valve is mounted separately from the pump in any suitable location on a subplate (remote control).

The max. single pipe length must not exceed 5m. Order sequence valve and subplate separately.

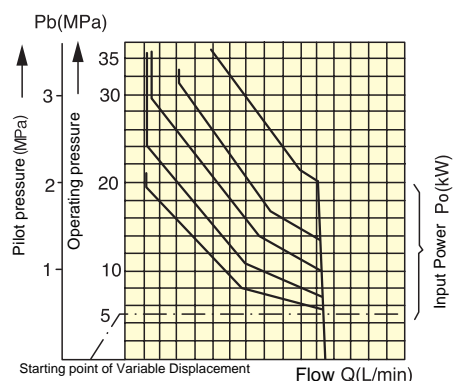
Mounting separately sequence valve and pump size 20-117



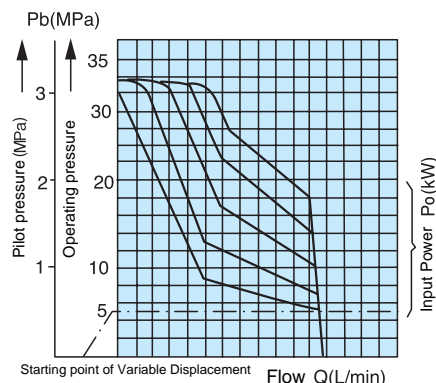
Oil Port

A, B	Operating port	S	Suction port
G	Summation HP control port	T1	Pilot port
X1	Pilot pressure port	X2	Remote pressure Port
R	Drain port		

Characteristic of P-Q of the LV Constant horsepower control ;
without Flow Cut-off



with Flow Cut-off



Size		20	28	40	55	58	80	78	107	117	160	250	355	500		
Rotation Speed		no r/min	1450	1450	1450	1450	1450	1450	1450	1450	1450	980	9800	980		
Max. Flow		Q L/min	29	39	56	77	83	113	110	150	165	225	237	337	475	
Input Power Range	without Flow Cut-off	Pomin	3	4	5.5	7.5	7.5	11	15	15	22	22	30	45		
		Pomax	11	15	18.5	30	30	37	37	45	55	75	90	102	200	
Po(kW)	with Flow Cut-off	Pomin	3	-	5.5	-	7.5	-	11	-	15	-	22	30	45	
		Pomax	10	-	18.5	-	27	-	37	-	55	-	90	132	200	

* Note : 1. Value in the table is that of the working fluid when the temperature is 50 °C approximation.

2. Except in terms of n0, in terms of the rotational speed n is as follows.

$$\text{Rotation Power Efficiency } P = P_o \frac{n}{n_o} \text{ (kW)}$$

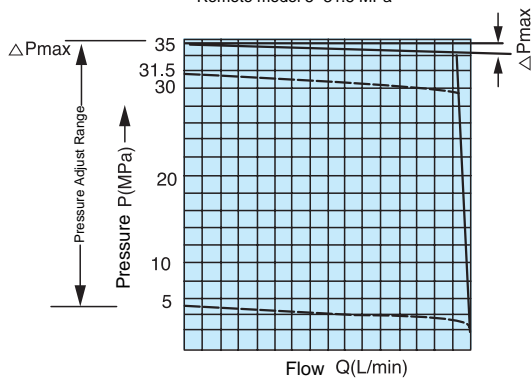
$$\text{Flow } Q_n = Q \frac{n}{n_o} \text{ (L/min)}$$

A7V Variable Displacement Pump (2.0 5.1 Series)

Constnat Pressure Control DR

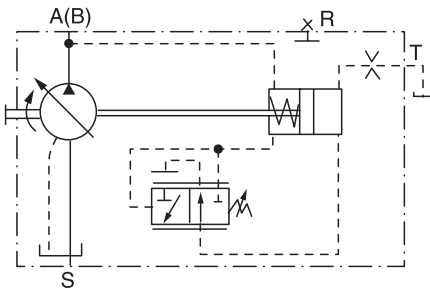
The constant pressure control remains the pressure in a hydraulic system constant within its control range in spite of changing pump flow requirements, the variable pump supplies only the volume of fluid required by the services. Should operating pressure exceed the set pressure, the pump automatically swivelled back to a smaller angle. The required pressure is set either direct at the pump (valve built-in, standard model) or at the separate sequence valve for the model with remote control

Pressure Setting Range : Standard model 5~35 MPa
Remote model 5~31.5 MPa

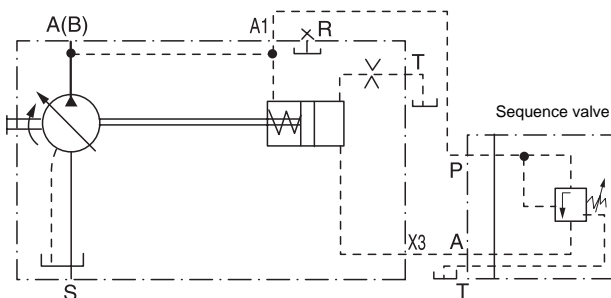


Size	20-117	250-500
ΔPmax(MPa)	1	1.4

Standard model of the Constant Pressure Control DR (valve built-in)



Remote control(F) of the Constant Pressure Control DR



* Note: Order sequence valve and subplate separately.
Port T from the sequence valve must be piped separately to tank.
A pressure relief valve installed in the system for protection of the max. pressure must be set 2 MPa above the setting of the constant pressure control.
The max. single pipe length should not exceed 5m

Adjustment Range of Size 20-117

Size	20	40	58	78	117
Vgmin-Vgmax te (s)	0.16	0.2	0.25	0.25	0.3
Pressure unloading 35-5MPa					
Vgmax- Vg min te (s)	0.03	0.04	0.05	0.05	0.06
Pressure built-up 5-35MPa					

The valve in the table are increased by 3 times for remote

Parallel Operation

For parallel operation of several A7V pumps with constant pressure control, a steeper curve is used for the constant pressure control (yP=1.5MPa). Please indicate this requirement in text after the type code when ordering "parallel operation"

Stroke Limiter

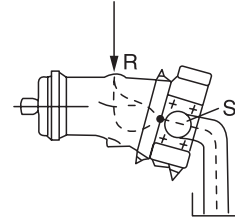
The max. displacement can be steplessly limited between Vgmax to Vgmin. by means of a mechanical stroke limiter. For details see control device LV.

Continuous Operation in zero Position

The indicated values applicable at the pump speed of 1450 r/min. zero stroke operation without flushing of housing as below. zero discharge continuous operation time, max. pressure and permission temperature is as below

Short period rotation < 10min		Long period rotation	
Max. permission pressure	Max. Permission temperature	Max. permission pressure	Max. Permission temperature
Pmax(MPa)	tmax(°C)	Pmax(MPa)	tmax(°C)
31.5	50	20	50

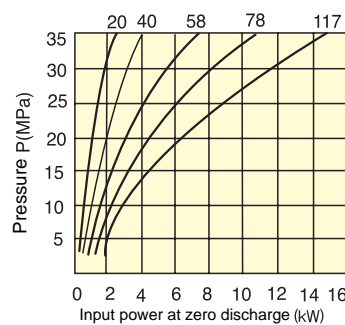
Connection for flushing fluid



Size	20	40	58	78	117	250	355	500
Flushing flow (L/min)	2	4	6	8	12	12.5	16	25

Tank temperature must be below than temperature of flushing fluid

Performance curve at 1500r/min rotation speed, 50degree oil temperature (size 20~117)



Oil Port

A, B	Operating port
S	Suction port
R	Drain port
A1, X3	Remote control Port
T	Discharge port

SEWON Hydraulics

A7V Variable Displacement Pump(2.0 5.1 Series)

Electric Proportional Control EL

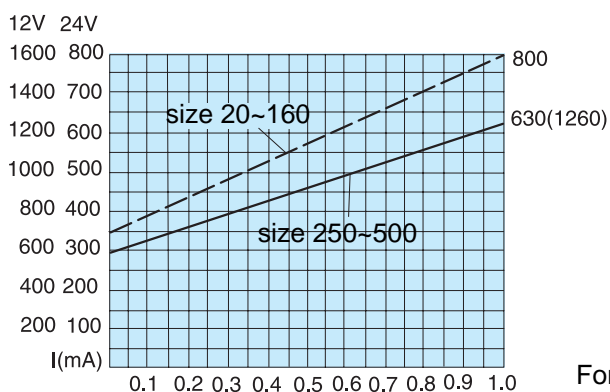
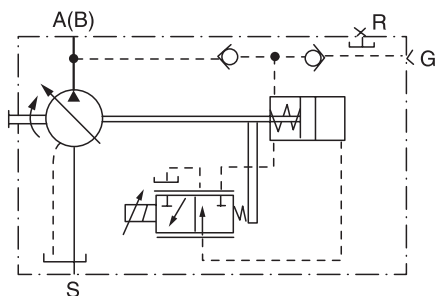
The electric control permits stepless and programmable adjustment of the pump displacement. Pump displacement is proportional to the solenoid force. I.E the strength of solenoid current

For to size 20~160

Control solenoid valve need a DC24V(12V) and current 300~630mA (600~1260mA). Start of control approx.300mA(600mA). End of control current approx.630mA(1260mA)

For to size 250~500

Control solenoid valve need a DC24V and current 350~800mA. Start of control approx.350mA. End of control current approx.800mA. Control adjust from V_{gmax} . If need anti-control (from V_{max} to V_{min}) please inquiry from Liyuan company. If pump is to moved out of the zero position ($V_g=0$) or the operating pressure $< 4MPa$, a pilot pressure of 4MPa is necessary at port G.



Time for adjustment is V_{gmin}

Rate of discharging quantity $\frac{V_g}{V_{gmax}}$

Time for adjustment

Size	20	40	58	78	117
	28	55	80	107	160
$V_{gmin}-V_{gmax}$ $t_{min}(s)$	0.16	0.2	0.25	0.25	0.3
$V_{gmax}-V_{gmin}$ $t_{min}(s)$	0.12	0.16	0.2	0.2	0.25

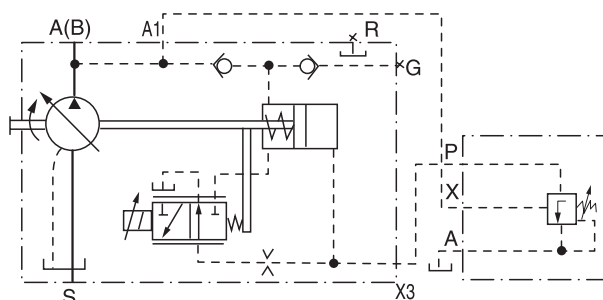
Note: The viewed time in to from is pump's operating pressure $P_b=20MPa$

Hysteresis

A hysteresis of $\pm 2.5\sim 4\%$ (approx.) is present in the control because of the electric/hydraulic control (referred to the complete adjustment range V_{gmin} to V_{gmax}). The repeatability of the pump position. When starting from the same direction is around 2~4%.

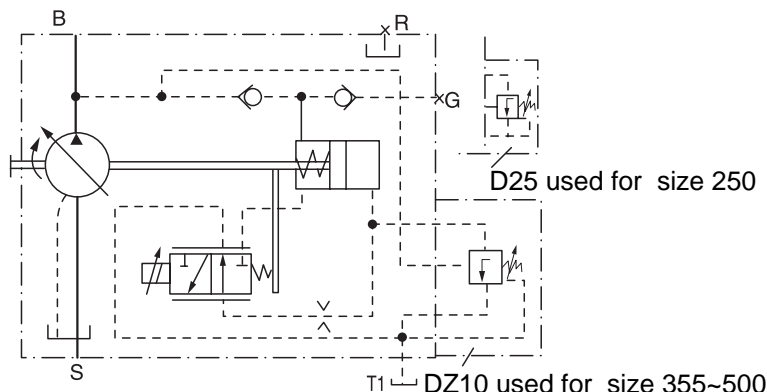
For all sizes with $V_{min}=0$, for description see control device HD, Order sequence valve and subplate separately.

For sizes 20~160



Note: Port A from the sequence must be piped separately to tank (cooler)

For sizes 250~500



For details see constant pressure control DR

Oil port

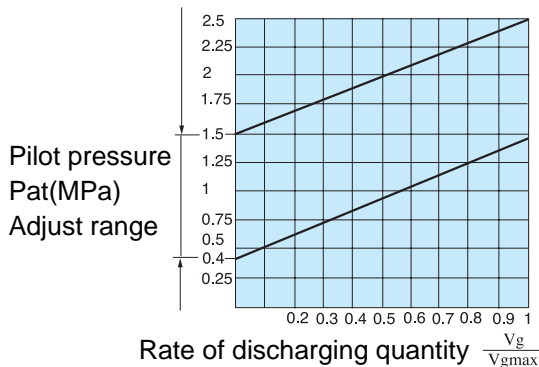
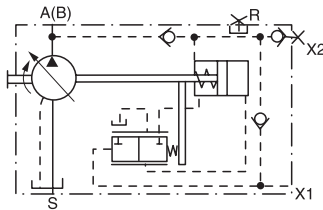
A, B	Operating port
S	Suction port
R	Port to drain air
A1, X3	Port for remote control valve
G	Remote pressure port
T	Pilot port

A7V Variable Displacement Pump

A7V Variable Displacement Pump(2.0 5.1 Series)

Hydraulic control, pressure related HD

Adjustment is proportional to the pilot pressure at port X1. The increase in pilot pressure over the complete adjustment range is 1MPa. The setting range for commencement of control of is 0.4MPa to 1.5MPa. The necessary control is taken from the high pressure circuit, and a minimum operating pressure of 4MPa is required. If necessary apply pilot pressure of 4MPa at port X2. The oil flow at pilot X1 is approx. 0.5L/min.

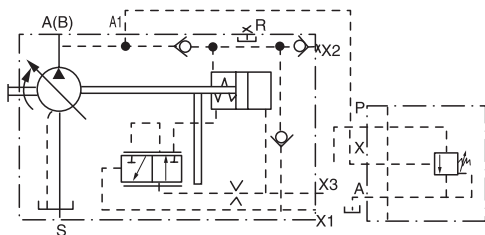


Hydraulic control, pressure related with cut-off

For all sizes with $V_{gmin}=0$

This function is not carried out by a sequence valve. One reaching the set max. pressure (adjustment range up to 31.5MPa), the valve opens and the flow is automatically reduced to $Q=0$. The sequence valve is mounted separately from the pump in any suitable location by means of a single pipe length should not exceed 5m.

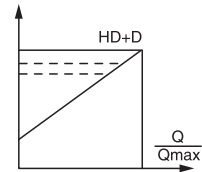
Used for size 20~117



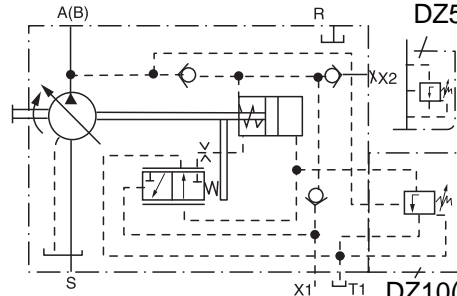
Note: Port A from the sequence must be piped separately to tank (cooler)

Used for size 250~500

Sequence valve must be piped separately to tank



DZ5(used for size 250)



DZ10(used for size 355~500)

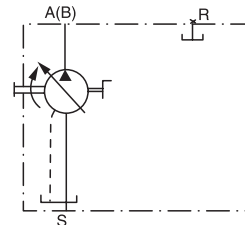
For details see constant pressure control DR

Oil port

A, B Operating port X1 Pilot pressure port
A1, X2 Remote control port T1 Tank port
X2 Remote pressure port R Drain port

Manual Control, MA

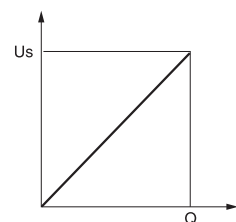
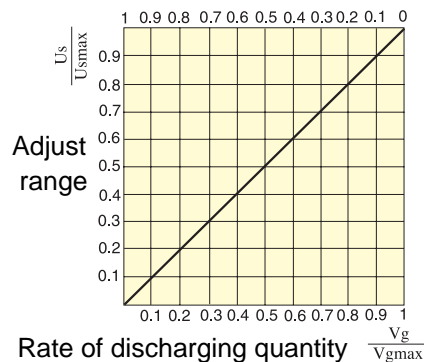
By turning the handwheel, a piston is moved in an axial direction by means of a threaded spindle. A carrier pin moves the port plate on its sliding plate thus permitting stepless variation of the pump displacement a the range V_{gmin} to V_{gmax} .



Oil port

A, B Operating port
S Suction port
R Drain port

Size	20	40	58	78	117	250	355	500
Handle rotation number (adjust range)	28	55	80	107	160	250	355	500
$V_{gmin} \sim V_{gmax}$ Usmax	23.5	24.5	28	26	30	25	24	25



SEWON Hydraulics

A7V Variable Displacement Pump(2.0 5.1 Series)

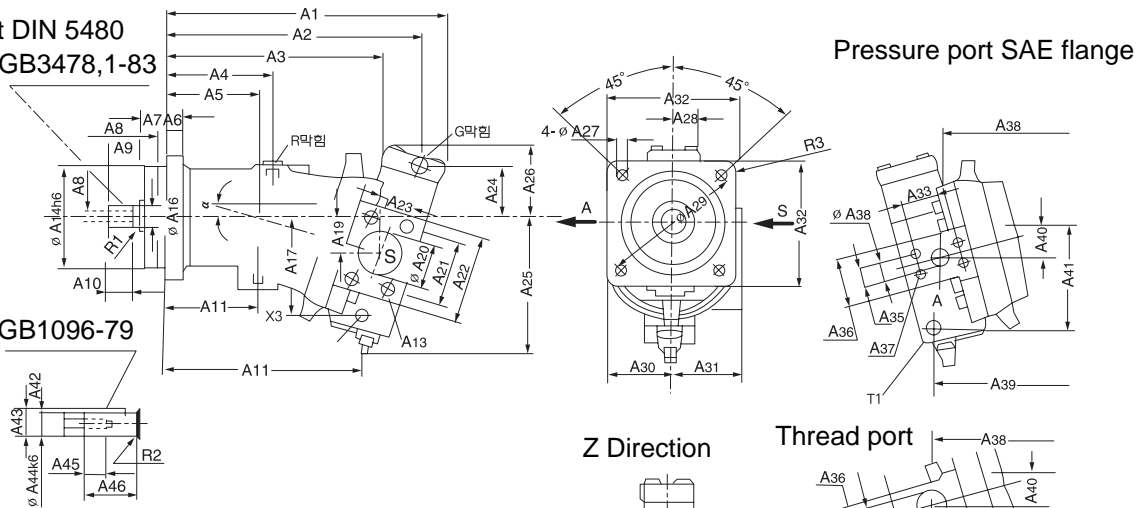
Unit Dimensions Series 2.0 size 20~160

Control horsepower control LV

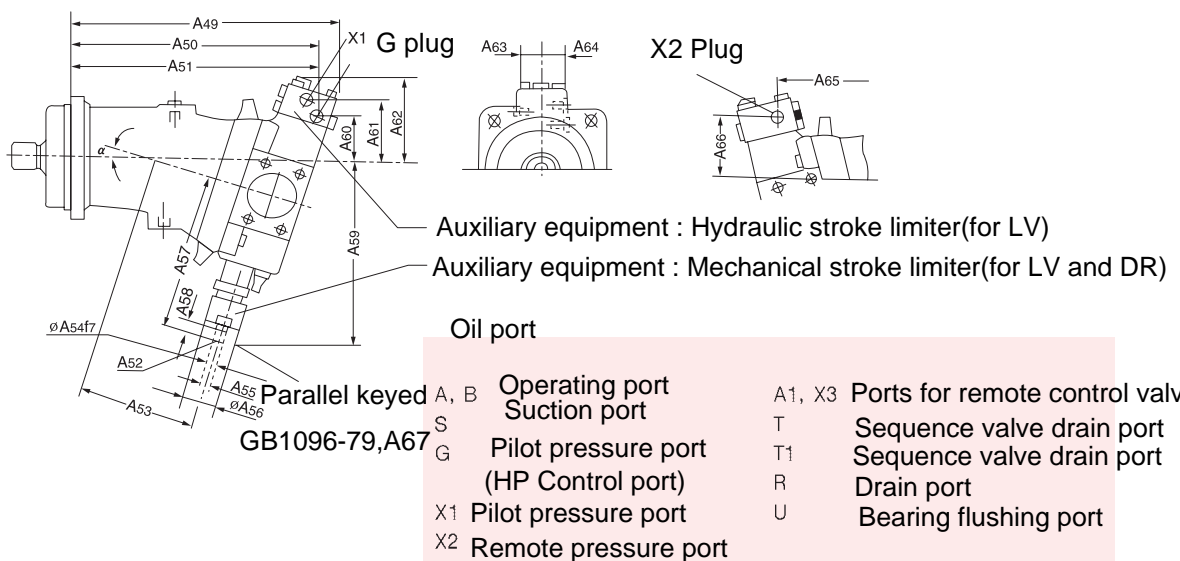
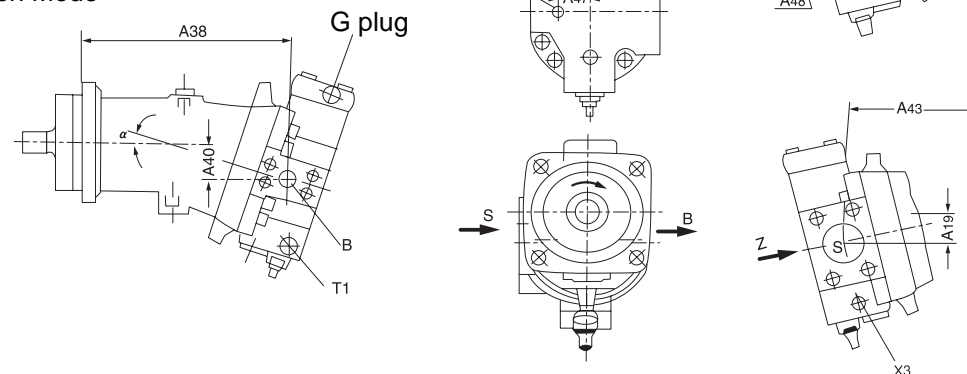
Anti-clockwise Rotation Mode

Z splined shaft DIN 5480
S splined shaft GB3478,1-83

Parallel keyed GB1096-79



Clockwise Rotation Mode



A7V Variable Displacement Pump(2.0 5.1 Series)

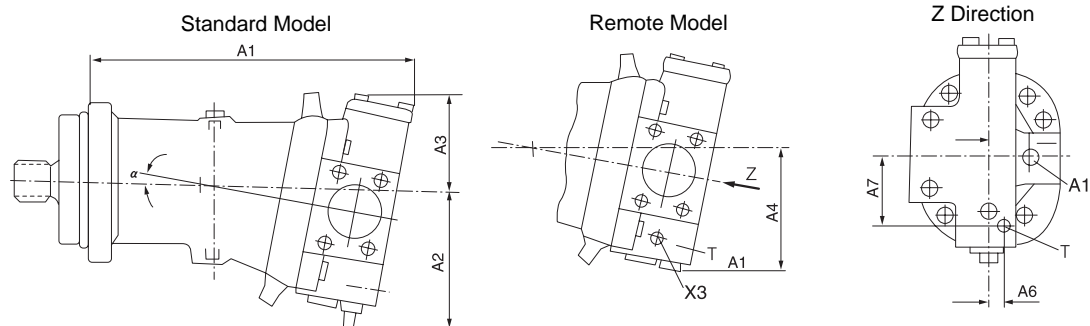
Constant horsepower control LV 2.0 Series 20~160 Data Form

Size	α°	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	Deep	A ₁₄	A ₁₅	A ₁₆	A ₁₇	A ₁₈	A ₁₉	A ₂₀
20	9	251	224	199	107	75	16	25	8	43	28	80	160	M12	20	100	M8	21.5	85	52	20	38
28	16	260	232	195	107	75	16	25	8	43	28	80	149	M12	20	100	M8	21.5	95	50	34	38
40	9	317	287	255	123	108	20	32	10	35	28	123	244	M12	20	125	M12	25	95	63	23	50
55	16	327	296	251	123	108	20	32	10	35	28	123	-	M12	20	125	M12	25	-	63	41	50
58	9	374	337	304	152	137	23	32	10	40	33	152	295	M12	18	140	M12	30	106	77	26.5	63
80	16	385	351	300	152	137	23	32	10	40	33	152	-	M12	18	140	M12	30	-	77	48	63
78	9	381	347	310	145	130	25	40	10	45	37.5	145	298	M12	17	160	M12	35	113	80	29	63
107	16	393	358	305	145	130	25	40	10	45	37.5	145	-	M12	17	160	M12	35	-	80	50	63
117	9	443	402	364	214	156	28	40	12	50	43	174.5	350	M16	24	180	M16	40	130	93	33	75
160	16	454	414	359	213	156	28	40	12	50	43	174.5	-	M16	24	180	M16	40	-	88	58	75
Size	A ₂₁	A ₂₂	A ₂₃	A ₂₄	A ₂₅	A ₂₆	A ₂₇	A ₂₈	A ₂₉	A ₃₀	A ₃₁	A ₃₂	A ₃₃	A ₃₄	A ₃₅	A ₃₆	A ₃₇	Deep	A ₃₈	A ₃₉	A ₄₀	A ₄₁
20	69.9	94	35.7	78	132	95	11	23.5	125	58	58	118	50.8	19	23.8	46	M10	17	193	-	19	-
28	69.9	94	35.7	59	145	80	11	23.5	125	58	58	118	50.8	19	23.8	46	M10	17	189	-	33	-
40	77.8	102	42.9	87	166	109	13.5	29	160	71	81	150	50.8	19	23.8	53	M10	17	253	261	23	98
55	77.8	102	42.9	64	182	91	13.5	29	160	71	81	150	50.8	19	23.8	53	M10	17	249	-	40	-
58	88.9	115	50.8	93	168	113	13.5	33	180	86	92	165	57.2	25	27.8	64	M12	18	301	313	26	109
80	88.9	115	50.8	68	194	-	13.5	33	180	86	92	165	57.2	25	27.8	64	M12	17	300	-	48	-
78	88.9	115	50.8	101	180	120	17.5	34	200	89	93	190	57.2	25	27.8	64	M12	17	306	318	28	119
107	88.9	115	50.8	73	200	98	17.5	34	200	89	93	190	57.2	25	27.8	64	M12	17	301	-	49	-
117	106.4	135	61.9	114	195	137	17.5	36	224	104	113	210	66.7	32	31.8	70	M14	19	359	369	32	136
160	106.4	135	61.9	83	212	112	17.5	36	224	104	113	210	66.7	32	31.8	70	M14	19	354	-	57	-
Size	A ₄₂	A ₄₃	A ₄₄	A ₄₅	A ₄₆	A ₄₇	A ₄₈	A ₄₉	A ₅₀	A ₅₁	A ₅₂	Deep	A ₅₃	A ₅₄	A ₅₅	A ₅₆	A ₅₇	A ₅₈	A ₅₉	A ₆₀	A ₆₁	
20	M8	27.9	25	19	50	38	M27 x2	247	226	230	M3	9	108	8	8.8	42	161	14	176	77	104	
28	M8	27.9	25	19	50	38	M27 x2	269	234	242	M3	9	108	8	8.8	42	161	14	186	58	84	
40	M12	33	30	28	60	40	M33 x2	323	290	279	M4	10	134	10	11.2	-	184	16	204	85	117	
55	M12	33	30	28	60	40	M33 x2	337	299	292	M4	10	134	10	11.2	-	184	16	215	62	98	
58	M12	38	35	28	70	62	M42 x2	378	344	330	M5	12	155.5	16	18	52	228	24	251	91	116	
80	M12	38	35	28	70	62	M42 x2	391	354	343	M5	12	155.5	16	18	52	228	24	265	65	91	
78	M12	43	40	28	80	55	M42 x2	385	352	338	M5	12	169	16	18	52	236	24	261	99	124	
107	M12	43	40	28	80	55	M42 x2	400	363	351	M5	12	169	16	18	52	236	24	276	71	97	
117	M16	48.5	45	36	90	65	M48 x2	445	408	384	M5	12.5	192	16	18	65	266	24	294	111	137	
160	M16	48.5	45	36	90	65	M48 x2	461	420	399	M5	12.5	192	16	18	65	266	24	310	79	108	
Size	Keyed A ₆₇										Keyed		Splined		Splined							
	A ₆₂	A ₆₃	A ₆₄	A ₆₅	A ₆₆	GB1096-79		GB1096-79		DIN5480		GB3478.1-83						R ₁	R ₂	R ₃		
20	129	35	30	228	92	Keyed 2×10		Keyed 8×40		W25×1.25×18×9g		EXT18Z×1.25m×30R×5f						1.2	0.8	12		
28	114	35	30	228	73	Keyed 2×10		Keyed 8×40		W25×1.25×18×9g		EXT18Z×1.25m×30R×5f						1.2	0.8	12		
40	147	30	30	276	104	Keyed 3×10		Keyed 8×50		W30×2×14×9g		EXT14Z×2m×30R×5f						1.6	1.5	16		
55	128	30	30	288	83	Keyed 3×10		Keyed 8×50		W30×2×14×9g		EXT14Z×2m×30R×5f						1.6	1.5	16		
58	142	33	33	328	104	Keyed 5×16		Keyed 10×56		W35×2×16×9g		EXT16Z×2m×30R×5f						1.6	1.6	16		
80	120	33	33	339	80	Keyed 5×16		Keyed 10×56		W35×2×16×9g		EXT16Z×2m×30R×5f						1.6	1.6	16		
78	150	33	33	336	112	Keyed 5×16		Keyed 12×63		W40×2×18×9g		EXT18Z×2m×30R×5f						2.5	1.6	20		
107	126	33	33	348	86	Keyed 5×16		Keyed 12×63		W40×2×18×9g		EXT18Z×2m×30R×5f						2.5	1.6	20		
117	164	34	34	382	125	Keyed 5×16		Keyed 14×70		W45×2×21×9g		EXT21Z×2m×30R×5f						2.5	2.5	20		
160	137	34	34	396	96	Keyed 5×16		Keyed 14×70		W45×2×21×9g		EXT21Z×2m×30R×5f						2.5	2.5	20		
Size	Port										Weight											
	X ₁ , X ₂	A ₁ , X ₃		T		T ₁		R		G		A, B		S								
20	M14×1.5	M12×1.5		M12×1.5		M12×1.5		M16×1.5		M14×1.5		SAE 3/4" ㄴ M27×2		SAE 1 1/2"		19						
28	M14×1.5	M12×1.5		M12×1.5		M12×1.5		M16×1.5		M14×1.5		SAE 3/4" ㄴ M27×2		SAE 1 1/2"		19						
40	M14×1.5	M18×1.5		M12×1.5		M18×1.5		M18×1.5		M14×1.5		SAE 3/4" ㄴ M33×2		SAE 2"		28						
55	M14×1.5	M18×1.5		M12×1.5		M18×1.5		M18×1.5		M14×1.5		SAE 3/4" ㄴ M33×2		SAE 2"		28						
58	M14×1.5	M18×1.5		M12×1.5		M18×1.5		M18×1.5		M14×1.5		SAE 1" ㄴ M42×2		SAE 2 1/2"		44						
80	M14×1.5	M18×1.5		M12×1.5		M18×1.5		M18×1.5		M14×1.5		SAE 1" ㄴ M42×2		SAE 2 1/2"		44						
78	M14×1.5	M18×1.5		M12×1.5		M18×1.5		M18×1.5		M14×1.5		SAE 1" ㄴ M42×2		SAE 2 1/2"		53						
107	M14×1.5	M18×1.5		M12×1.5		M18×1.5		M18×1.5		M14×1.5		SAE 1" ㄴ M42×2		SAE 2 1/2"		53						
117	M14×1.5	M20×1.5		M12×1.5		M18×1.5		M22×1.5		M14×1.5		SAE 1 1/2" ㄴ M48×2		SAE 3"		76						
160	M14×1.5	M20×1.5		M12×1.5		M18×1.5		M22×1.5		M14×1.5		SAE 1 1/2" ㄴ M48×2		SAE 3"		76						

A7V Variable Displacement Pump(2.0 5.1 Series)

Unit Dimensions Series 2.0 Size 20~160

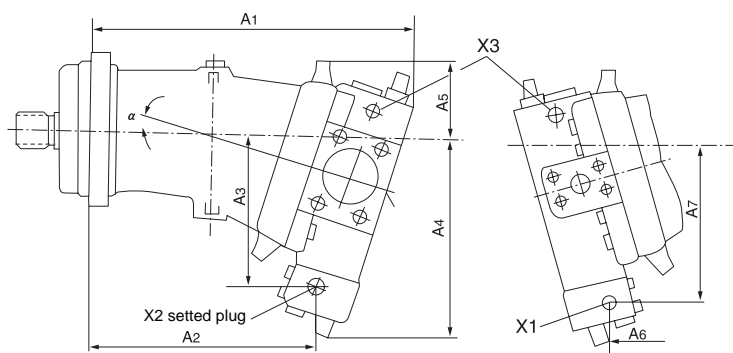
Constant pressure Control DR



Size 20 A1 and X3 used for with pressure cut-off only
Other sizes A1 and X3 used for remote control

Size	α°	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇
20	9	251	134	95	106	38	-	-
40	9	315	166	107	127	40	14	53
58	9	372	160	107	138	62	15	69
78	9	390	180	114	147	60	14	70
117	9	441	199	132	165	65	14	83

Hydraulic Control HD

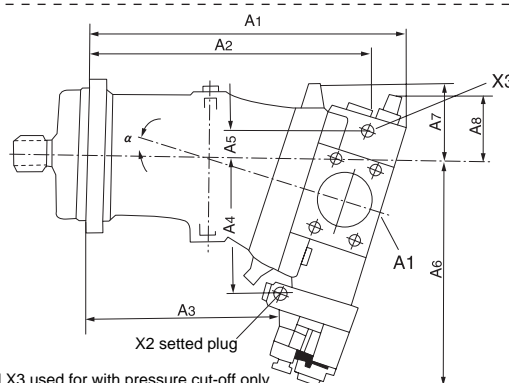


A1 and X3 used for with pressure cut-off only

Size	α°	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇
20	9	248	175	132	182	75	190	147
28	16	253	158	143	195	75	172	160
40	9	312	236	151	206	110	233	166
55	16	318	217	166	220	84	212	180
58	9	367	287	158	213	110	285	170
90	16	373	266	175	232	105	263	186
78	9	375	292	107	225	122	290	182
107	16	382	270	188	245	106	266	200
117	9	434	333	188	250	132	331	200
160	16	442	308	209	272	114	305	220

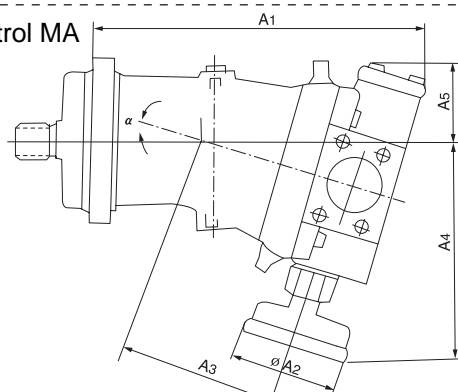
Electric proportional Control EL

Size	α°	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈
20	9	248	182	144	113	54	216	75	91
28	16	252	188	130	121	41	229	75	-
40	9	312	267	201	130	49	234	-	110
55	16	318	271	184	140	29	249	-	84
58	9	367	320	249	141	52	245	110	-
80	16	373	325	231	154	29	264	105	-
78	9	374	325	254	153	55	257	122	-
107	16	381	330	234	167	31	277	106	-
117	9	434	381	294	172	64	279	132	-
160	16	442	387	272	187	36	297	114	-



Size 20 A1 and X3 used for with pressure cut-off only
Other sizes A1 and X3 used for remote control

Manual Control MA

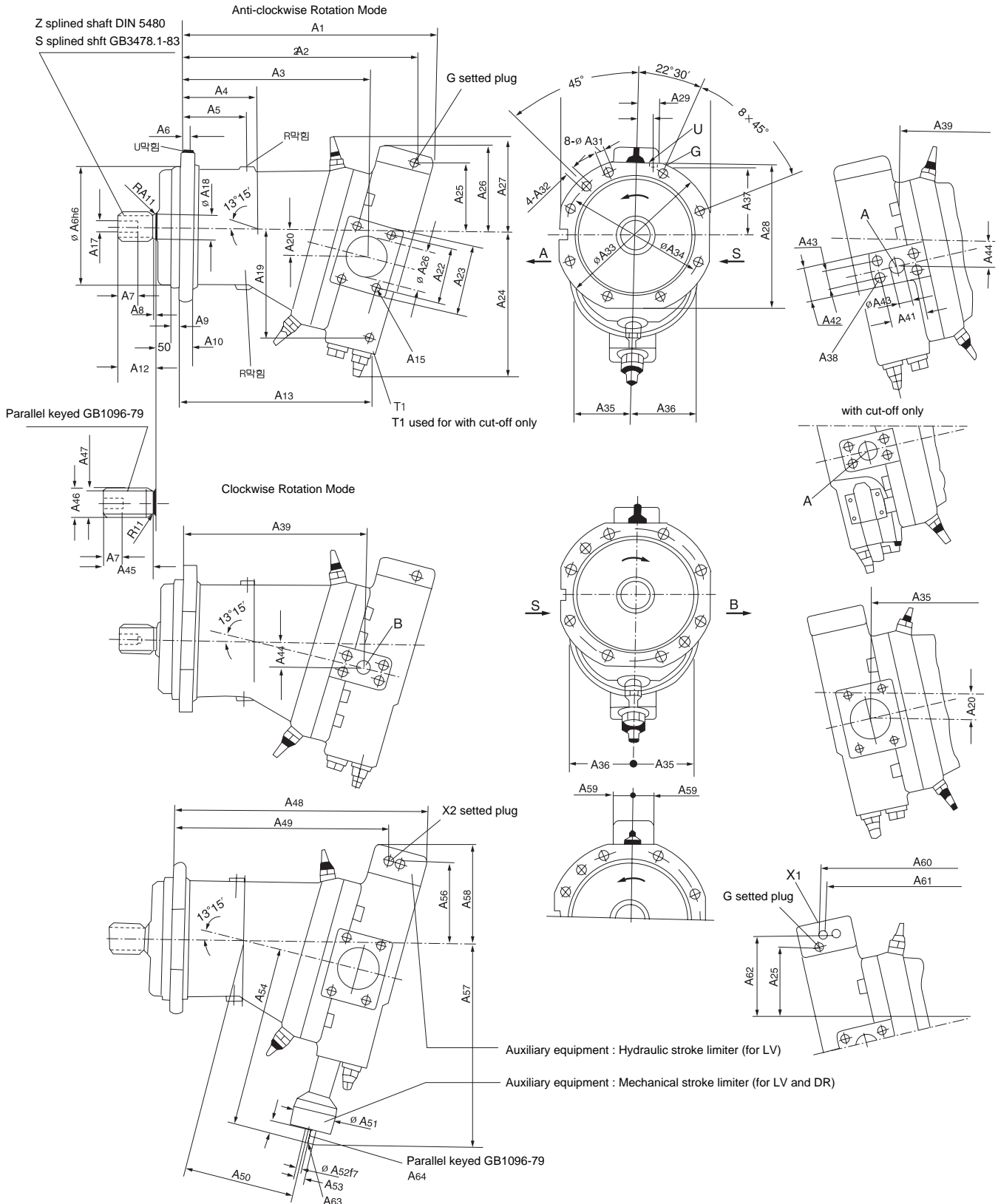


Size	α°	A ₁	A ₂	A ₃	A ₄	A ₅
20	9	251	100	108	175	95
28	16	260	100	108	190	80
40	9	315	102	134	197	107
55	16	323	102	134	215	89
58	9	372	102	155.5	215	107
80	16	380	102	155.5	235	86
78	9	380	125	169	246	114
107	16	390	125	169	270	92
117	9	441	125	192	261	132
160	16	450	125	192	285	107

A7V Variable Displacement Pump(2.0 5.1 Series)

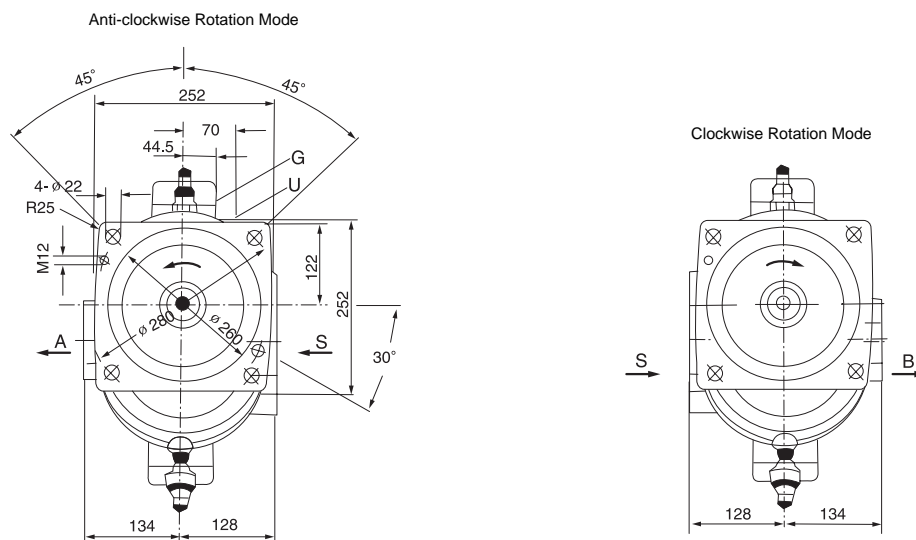
Unit Dimensions Series 5.1 Size 250~500

Constant horsepower control LV



A7V Variable Displacement Pump(2.0 5.1 Series)

Unit Dimensions Series 5.1 Size 250~500



Constant HP control Series 5.1 Size 250~500 Table of Values for Unit Dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	Deep	A ₁₄	A ₁₅	A ₁₆	A ₁₇	A ₁₈	A ₁₉
250	491	450	364	134	120	13	36	6	12	25	1.2	58	371	77.8	M16	21	224	M16	45	223
355	552	511	412	160	142	13	42	8	15	28	1.6	82	427	77.8	M16	21	280	M20	55	240
500	615	563	465	194	175	15	42	8	15	30	1.6	82	464	92.1	M16	24	315	M20	63	252

Size	A ₂₀	A ₂₁	A ₂₂	A ₂₃	A ₂₄	A ₂₅	A ₂₆	A ₂₇	A ₂₈	A ₂₉	A ₃₀	A ₃₁	A ₃₂	A ₃₃	A ₃₄	A ₃₅	A ₃₆	A ₃₇	A ₃₈	Deep
250	54	100	130.2	180	296	145	179	198	252	44.5	70	-	-	-	-	-	-	-	M14	19
355	59	100	130.2	162	328	157	194	206	335	48.5	35	18	M16	360	320	130	140	166	M16	21
500	68	125	152.4	185	343	194	230	-	375	53	35	22	M20	400	360	144	150	186	M16	24

Size	A ₃₉	A ₄₀	A ₄₁	A ₄₂	A ₄₃	A ₄₄	A ₄₅	A ₄₆	A ₄₇	A ₄₈	A ₄₉	A ₅₀	A ₅₁	A ₅₂	A ₅₃	A ₅₄	A ₅₅	A ₅₆	A ₅₇	A ₅₈
250	354	32	66.7	95	31.8	51	82	53.5	50k6	498	411	223	90	16	18	366	24	175	407	210
355	407	40	79.4	80	36.5	58	105	64	60m6	562	470	252	90	16	18	397	24	187	444	225
500	446	40	79.4	80	36.5	64	105	74.5	70m6	617	513	271	100	18	20.5	418	22	215	471	240

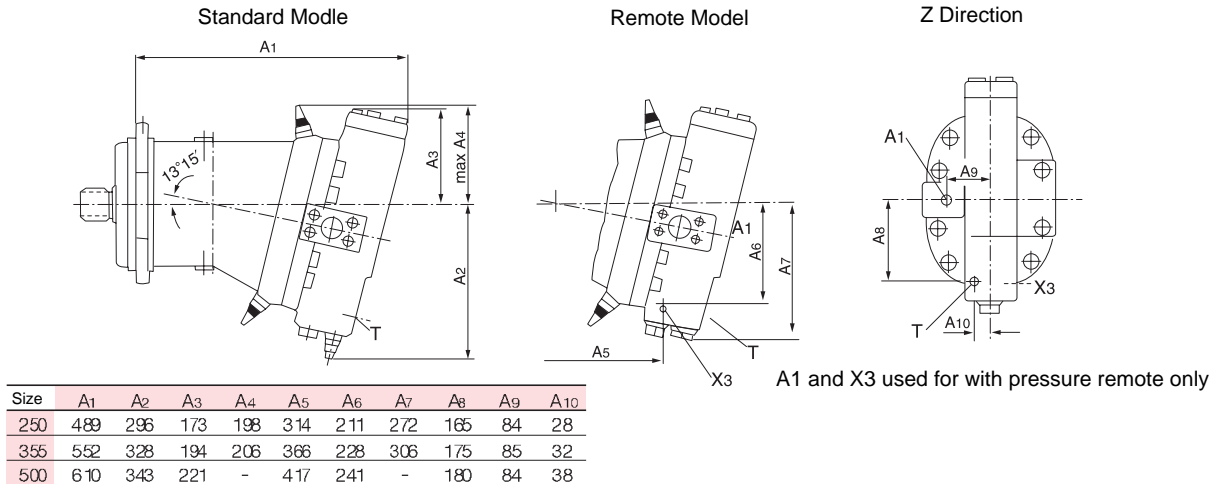
Size	A ₅₉	A ₆₀	A ₆₁	A ₆₂	A ₆₃	A ₆₄	Keyed A64	Keyed	Splined	Oil port		
							GB1096-79	GB1096-79	DIN5480	A, B	S	G
250	44.5	450	433	169	M5	12.5	7 5×16	7 14×80	W50×2×24×9g	SAE1 1/2"	SAE4"	M14×1.5
355	48.5	511	492	182	M5	12.5	7 5×16	7 18×100	W60×2×28×9g	SAE1 1/2"	SAE4"	M16×1.5
500	53	/	535	210	M6	16	7 5×16	7 20×100	W20×3×22×9g	SAE1 1/2"	SAE5"	M16×1.5

Size	Oil port						Weight kg
	X ₁ , X ₂	A ₁ , X ₃	T	T ₁	R	U	
250	M14×1.5	M16×1.5	M16×1.5	M22×1.5	M22×2	M14×1.5	105
355	M16×1.5	M22×1.5	M16×1.5	M33×1.5	M22×2	M14×1.5	165
500	M16×1.5	M22×1.5	M16×1.5	M33×1.5	M22×2	M18×1.5	245

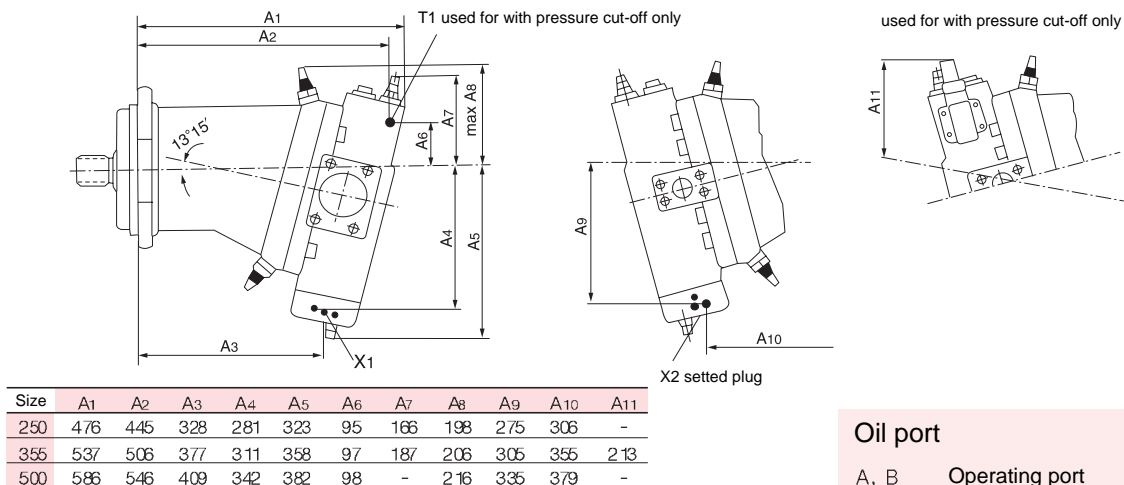
A7V Variable Displacement Pump(2.0 5.1 Series)

Unit Dimensions Series 5.1 Size 250~500

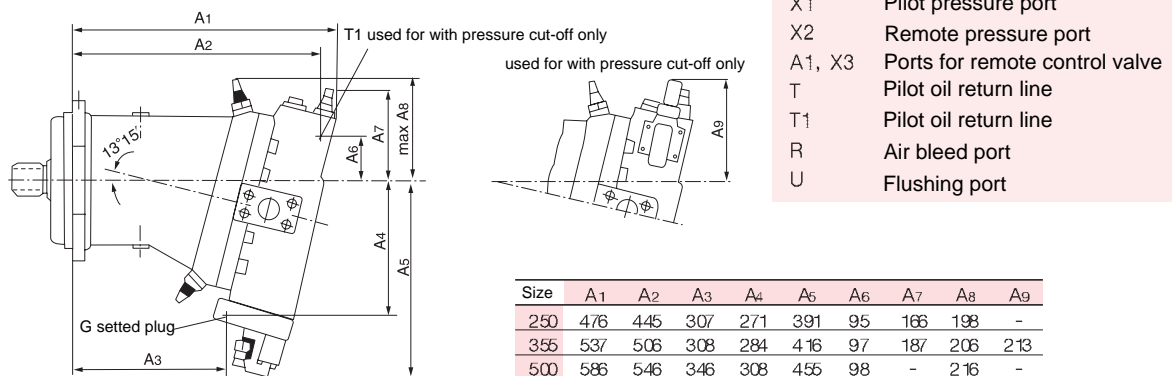
Control Pressure Control DR



Hydraulic Control, Pressure Related, HD



Electric Proportional Control EL



Oil port

- A, B Operating port
- S Suction port
- G Remote pressure port
- X1 Pilot pressure port
- X2 Remote pressure port
- A1, X3 Ports for remote control valve
- T Pilot oil return line
- T1 Pilot oil return line
- R Air bleed port
- U Flushing port