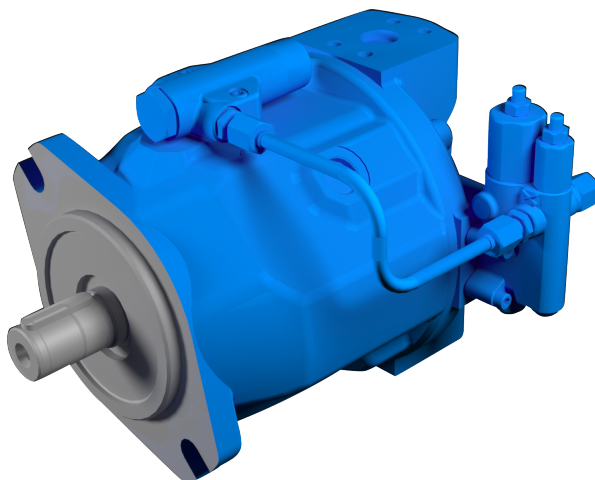




**AXIAL PISTON VARIABLE PUMP**

**A10V(S)O SERIES 31**



[WWW.OLEODINAMICAMOZIONI.IT](http://WWW.OLEODINAMICAMOZIONI.IT)

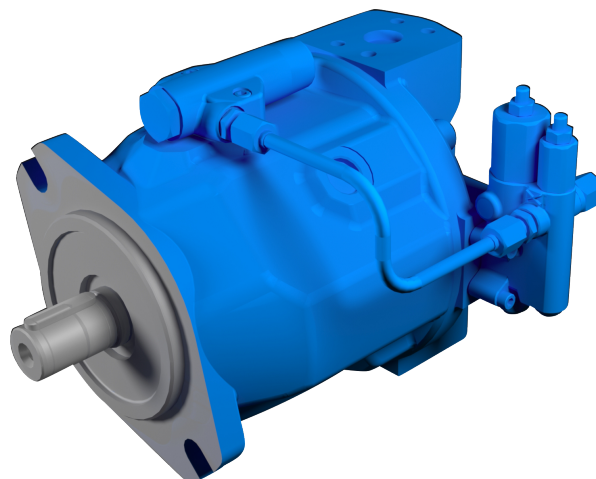
# AXIAL PISTON VARIABLE PUMP

## A10V(S)O SERIES 31



### A10V(S)O SERIES 31 INTRODUCTION

- VARIABLE PUMP WITH AXIAL PISTON ROTARY GROUP IN SWASHPLATE DESIGN FOR HYDROSTATIC DRIVES IN OPEN CIRCUIT.
- THE FLOW IS PROPORTIONAL TO THE DRIVE SPEED AND DISPLACEMENT.
- THE FLOW CAN BE INFINITELY VARIED BY ADJUSTING THE SWASHPLATE ANGLE.
- 2 DRAIN PORTS
- EXCELLENT SUCTION PERFORMANCE
- LOW NOISE LEVEL
- LONG SERVICE LIFE
- FAVORABLE POWER/WEIGHT RATIO
- VERSATILE CONTROLLER RANGE
- SHORT CONTROL TIME
- THE THROUGH DRIVE IS SUITABLE FOR ADDING GEAR PUMPS AND AXIAL PISTON PUMPS UP TO THE SAME SIZE, I.E., 100% THROUGH DRIVE.



### A10V(S)O SERIES 31 TECHNICAL DATA

SIZE		NG		18	28	45	71	88	100	140
DISPLACEMENT, GEOMETRIC, PER REVOLUTION		AT $V_{G \text{ MAX}}$	CM <sup>3</sup>	18	28	45	71	88	100	140
ROTATIONAL SPEED MAXIMUM <sup>1)</sup>	AT $V_{G \text{ MAX}}$	$N_{\text{NDM}}$	RPM	3300	3000	2600	2200	2100	2000	1800
	AT $V < V_{G \text{ MAX}}$ <sup>2)</sup>	$N_{\text{MAX PERM}}$	RPM	3900	3600	3100	2600	2500	2400	2100
FLOW	AT $N_{\text{NDM}}$ AND $V_{G \text{ MAX}}$	$Q_{V \text{ MAX}}$	L/MIN	59	84	117	156	185	200	252
	AT $N_E = 1500 \text{ RPM}$ AND $V_{G \text{ MAX}}$	$Q_{VE \text{ MAX}}$	L/MIN	27	42	68	107	132	150	210
POWER AT $\Delta P = 280 \text{ BAR}$	AT $N_{\text{NDM}}$ , $V_{G \text{ MAX}}$	$P_{\text{MAX}}$	KW	28	39	55	73	86	93	118
	AT $N_E = 1500 \text{ RPM}$ AND $V_{G \text{ MAX}}$	$P_{E \text{ MAX}}$	KW	12.6	20	32	50	62	70	98
TORQUE AT $V_{G \text{ MAX}}$ AND	$\Delta P = 280 \text{ BAR}$	$T_{\text{MAX}}$	NM	80	125	200	316	392	445	623
	$\Delta P = 100 \text{ BAR}$	$T$	NM	30	45	72	113	140	159	223
ROTARY STIFFNESS OF DRIVE SHAFT	S	C	NM/RAD	11087	22317	37500	71884	71884	121142	169437
	R	C	NM/RAD	14850	26360	41025	76545	76545	—	—
	U	C	NM/RAD	8090	16695	30077	52779	52779	91093	—
	W	C	NM/RAD	—	19898	34463	57460	57460	101847	165594
MOMENT OF INERTIA FOR ROTARY GROUP		$J_{\text{TW}}$	KGM <sup>2</sup>	0.00093	0.0017	0.0033	0.0083	0.0083	0.0167	0.0242
MAXIMUM ANGULAR ACCELERATION <sup>1)</sup>		A	RAD/S <sup>2</sup>	6800	5500	4000	2900	2600	2400	2000
CASE VOLUME		V	L	0.4	0.7	1.0	1.6	1.6	2.2	3.0
WEIGHT WITHOUT THROUGH DRIVE (APPROX.)		M	KG	12.9	18	23.5	35.2	35.2	49.5	65.4
WEIGHT WITH THROUGH DRIVE (APPROX.)				13.8	19.3	25.1	38	38	55.4	74.4

1) THE DATA ARE VALID FOR VALUES BETWEEN THE MINIMUM REQUIRED AND MAXIMUM PERMISSIBLE ROTATIONAL SPEED. IT APPLIES FOR EXTERNAL STIMULI (E. G. DIESEL ENGINE 2 TO 8 TIMES ROTARY FREQUENCY, CARDAN SHAFT TWICE THE ROTARY FREQUENCY). THE LIMIT VALUE IS ONLY VALID FOR A SINGLE PUMP. THE LOAD CAPACITY OF THE CONNECTING PARTS MUST BE CONSIDERED.

# AXIAL PISTON VARIABLE PUMP

## A10V(S)0 SERIES 31

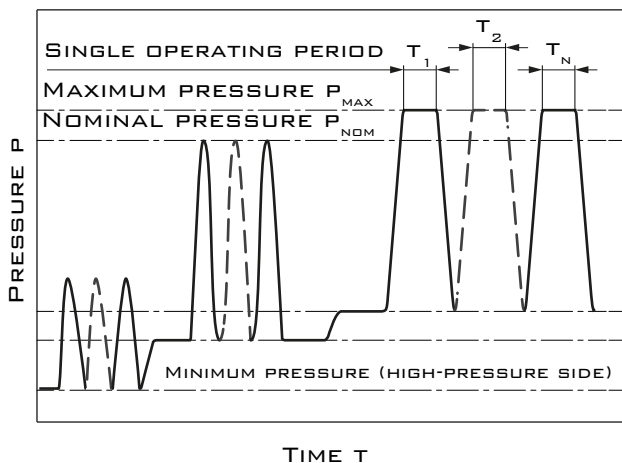
### WORKING PRESSURE RANGE

PRESSURE AT WORKING PORT B		DEFINITION
NOMINAL PRESSURE $P_{NOM}$	280 BAR	THE NOMINAL PRESSURE CORRESPONDS TO THE MAXIMUM DESIGN PRESSURE.  THE MAXIMUM PRESSURE CORRESPONDS TO THE MAXIMUM WORKING PRESSURE WITHIN THE SINGLE OPERATING PERIOD. THE SUM OF THE SINGLE OPERATING PERIODS MUST NOT EXCEED THE TOTAL OPERATING PERIOD.
MAXIMUM PRESSURE $P_{MAX}$	350 BAR	
SINGLE OPERATING PERIOD	2 MS	
TOTAL OPERATING PERIOD	300 H	
MINIMUM PRESSURE $P_{B\ ABS}$ (HIGH-PRESSURE SIDE)	10 BAR <sup>1)</sup>	MINIMUM PRESSURE ON THE HIGH-PRESSURE SIDE (B) WHICH IS REQUIRED IN ORDER TO PREVENT DAMAGE TO THE AXIAL PISTON UNIT.
RATE OF PRESSURE CHANGE $R_{A\ MAX}$	16000 BAR/S	MAXIMUM PERMISSIBLE SPEED OF PRESSURE BUILD-UP AND REDUCTION DURING A PRESSURE CHANGE ACROSS THE ENTIRE PRESSURE RANGE.

PRESSURE AT SUCTION PORT S (INLET)			
MINIMUM PRESSURE $P_{S\ MIN}$	STANDARD	0.8 BAR ABSOLUTE	MINIMUM PRESSURE AT SUCTION PORT S (INLET) THAT IS REQUIRED IN ORDER TO AVOID DAMAGE TO THE AXIAL PISTON UNIT. THE MINIMUM PRESSURE DEPENDS ON THE ROTATIONAL SPEED AND DISPLACEMENT OF THE AXIAL PISTON UNIT.
MAXIMUM PRESSURE $P_{S\ MAX}$		10 BAR ABSOLUTE <sup>2)</sup>	

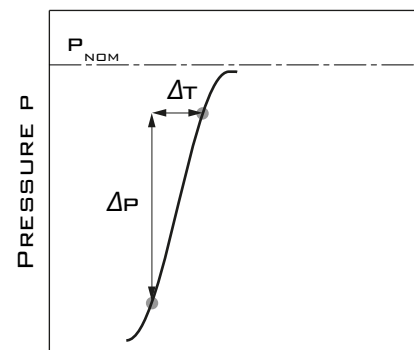
LEAKAGE PRESSURE AT PORT L, L1		
MAXIMUM PRESSURE $P_{L\ MAX}$	2 BAR ABSOLUTE <sup>2)</sup>	MAXIMUM 0.5 BAR HIGHER THAN INLET PRESSURE AT PORT S, BUT NOT HIGHER THAN $P_{L\ MAX}$ . A CASE DRAIN LINE TO THE RESERVOIR IS REQUIRED.

#### PRESSURE DEFINITION



TIME T

#### RATE OF PRESSURE CHANGE $R_{A\ MAX}$



TIME T

$$\text{TOTAL OPERATING PERIOD} = T_1 + T_2 + \dots + T_N$$

- 1) LOWER PRESSURE IS TIME-DEPENDENT, PLEASE CONTACT US
- 2) OTHER VALUES ON REQUEST

# AXIAL PISTON VARIABLE PUMP

## A10V(S)O SERIES 31

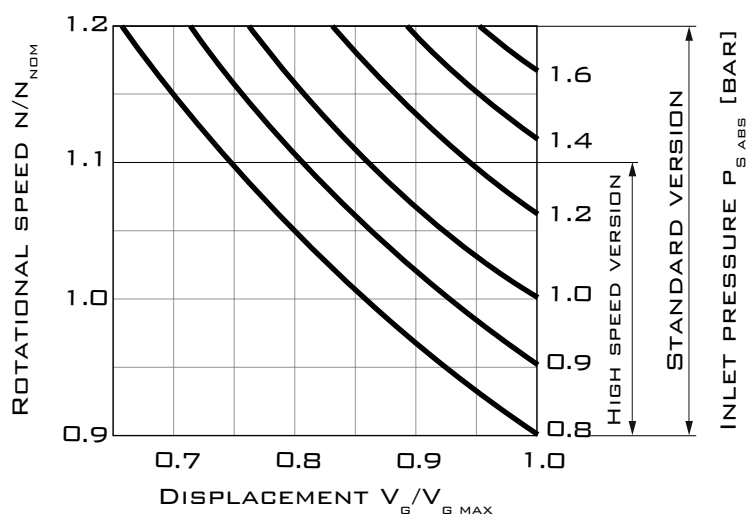


### NOTICE

WORKING PRESSURE RANGE VALID WHEN USING HYDRAULIC FLUIDS BASED ON MINERAL OILS.  
PLEASE CONTACT US FOR VALUES FOR OTHER HYDRAULIC FLUIDS.

### MINIMUM PERMISSIBLE INLET PRESSURE AT SUCTION PORT S WITH SPEED INCREASE

IN ORDER TO AVOID DAMAGE TO THE PUMP (CAVITATION), A MINIMUM INLET PRESSURE MUST BE GUARANTEED AT SUCTION PORT S. THE MINIMUM INLET PRESSURE LEVEL DEPENDS ON THE ROTATIONAL SPEED AND THE DISPLACEMENT OF THE VARIABLE PUMP.



DURING CONTINUOUS OPERATION IN OVERSPEED OVER  $N_{NOM}$ , A REDUCTION IN OPERATIONAL SERVICE LIFE IS TO BE EXPECTED DUE TO CAVITATION EROSION.

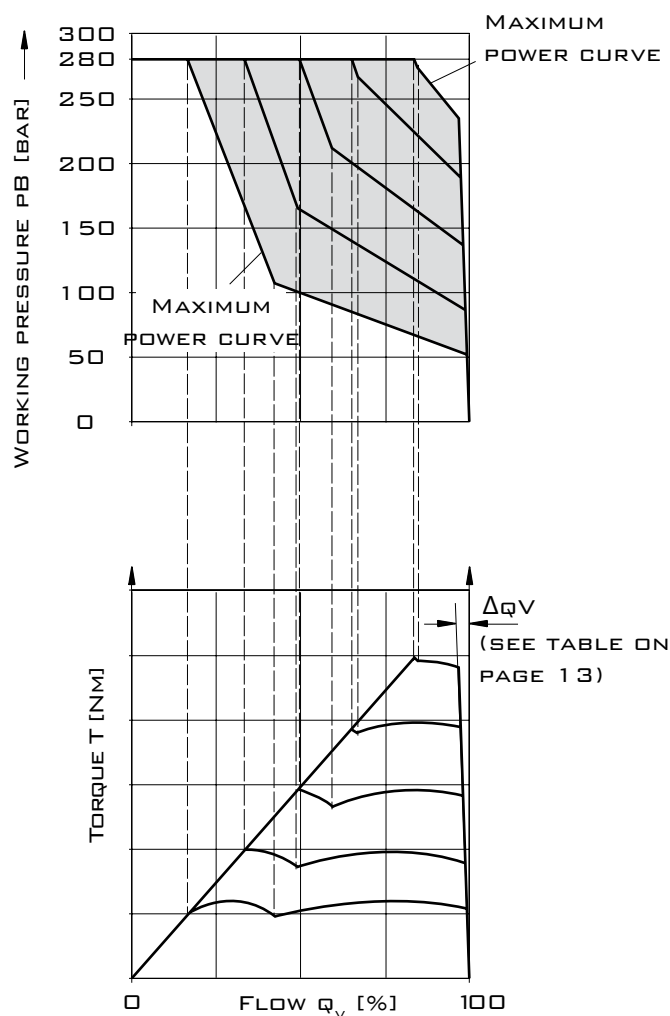
# AXIAL PISTON VARIABLE PUMP

## A10V(S)0 SERIES 31

### DFLR – PRESSURE, FLOW AND POWER CONTROL

PRESSURE CONTROLLER EQUIPPED LIKE DR(G), SEE PAGE 11 (12). FLOW CONTROLLER EQUIPPED LIKE DFR, DFR1, SEE PAGE 13. IN ORDER TO ACHIEVE A CONSTANT DRIVE TORQUE WITH VARYING WORKING PRESSURES, THE SWIVEL ANGLE AND WITH IT THE OUTPUT FLOW FROM THE AXIAL PISTON PUMP IS VARIED SO THAT THE PRODUCT OF FLOW AND PRESSURE REMAINS CONSTANT. FLOW CONTROLLER IS POSSIBLE BELOW THE POWER CONTROL CURVE.

#### CHARACTERISTIC CURVE AND TORQUE CHARACTERISTIC



BEGINNING OF CONTROL 50 BAR

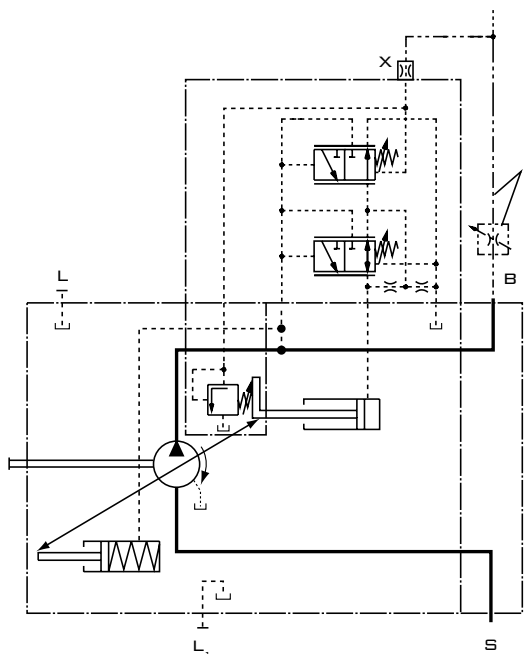
WHEN ORDERING PLEASE STATE THE POWER CHARACTERISTICS TO BE SET AT THE FACTORY IN PLAIN TEXT, E.G. 20 KW AT 1500 RPM.

# AXIAL PISTON VARIABLE PUMP A10V(S)O SERIES 31

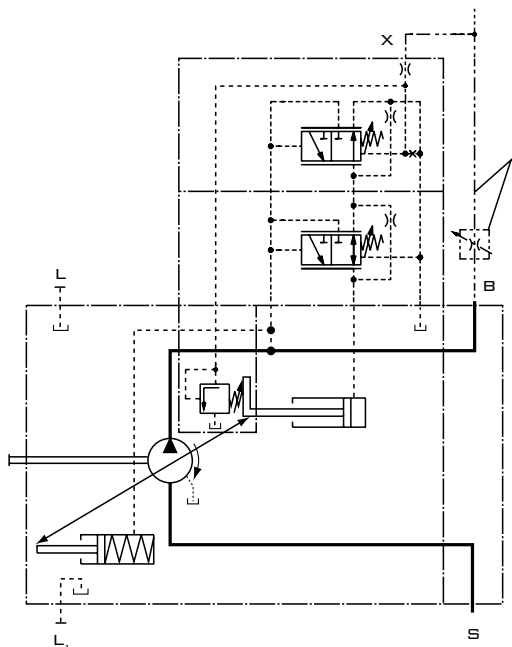


## DFLR – PRESSURE, FLOW AND POWER CONTROL

CIRCUIT DIAGRAM, SIZES 28 TO 100



CIRCUIT DIAGRAM, SIZE 140



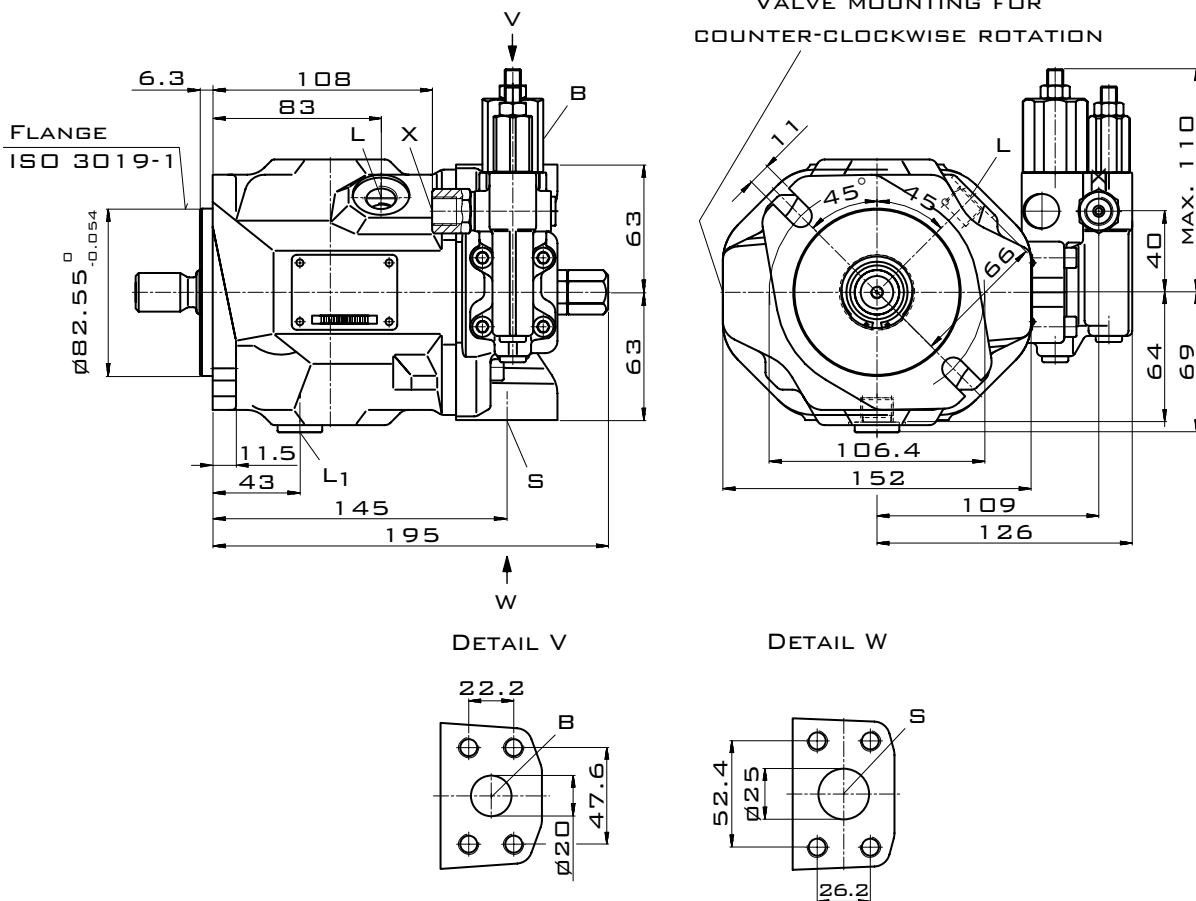
1 THE METERING ORIFICE (CONTROL BLOCK) AND THE LINE IS NOT INCLUDED IN THE SCOPE OF DELIVERY.

# AXIAL PISTON VARIABLE PUMP

## A10V(S)O SERIES 31

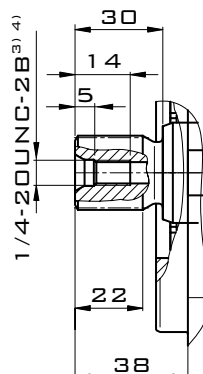
### DIMENSIONS, SIZE 18

#### PORT PLATE 12



#### SPLINED SHAFT 3/4 IN (SAE J744)

S - 11T 16/32DP<sup>1)</sup>



1) INVOLUTE SPLINE ACCORDING TO ANSI B92.1A, 30° PRESSURE ANGLE, FLAT ROOT, SIDE FIT, TOLERANCE CLASS 5

3) THREAD ACCORDING TO ASME B1.1

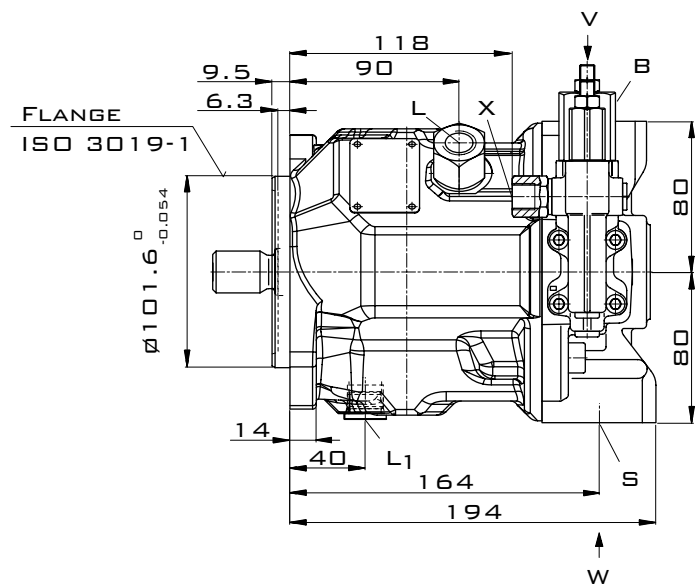
4) FOR NOTES ON TIGHTENING TORQUES, SEE THE INSTRUCTION MANUAL

# AXIAL PISTON VARIABLE PUMP A10V(S)O SERIES 31

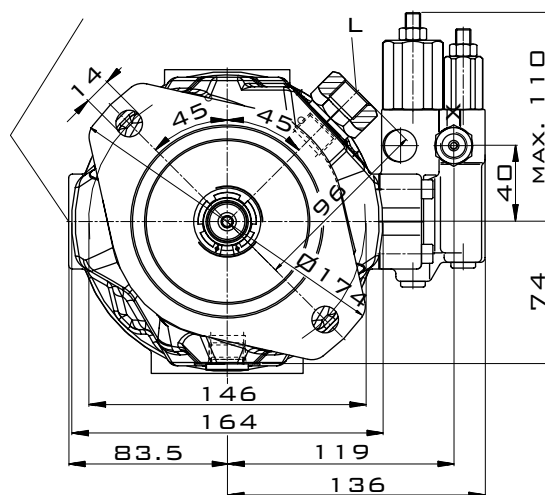


## DIMENSIONS, SIZE 28

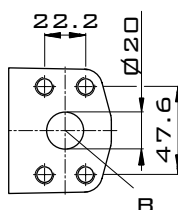
PORT PLATE 12



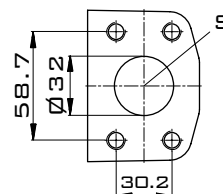
VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



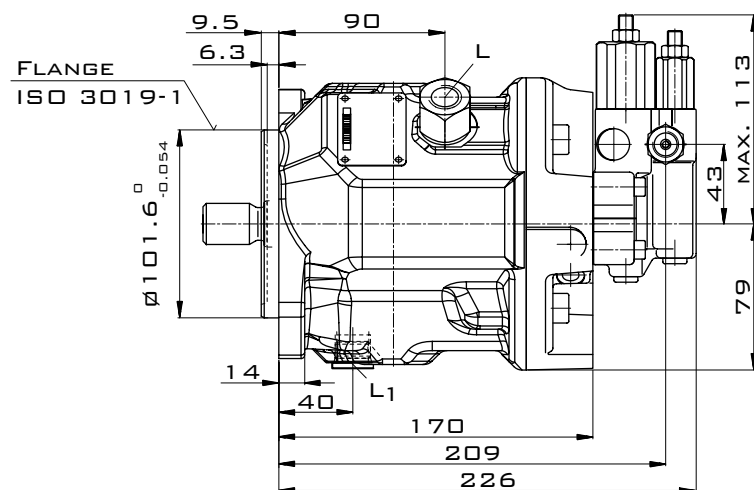
DETAIL V



DETAIL W

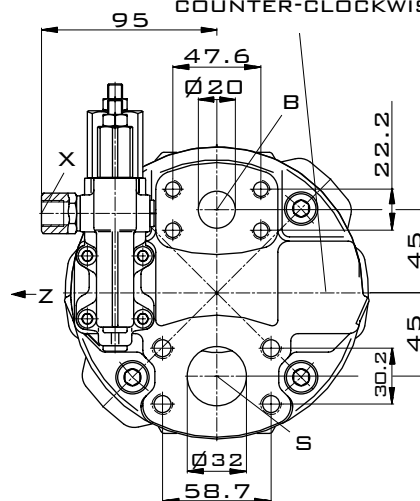


PORT PLATE 11



VIEW Z

VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION





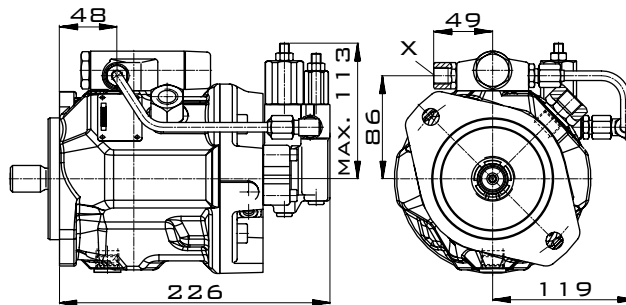
# AXIAL PISTON VARIABLE PUMP

## A10V(S)O SERIES 31

**DFLR – PRESSURE, FLOW AND POWER CONTROLLER**

**PORT PLATE 11 (61)**

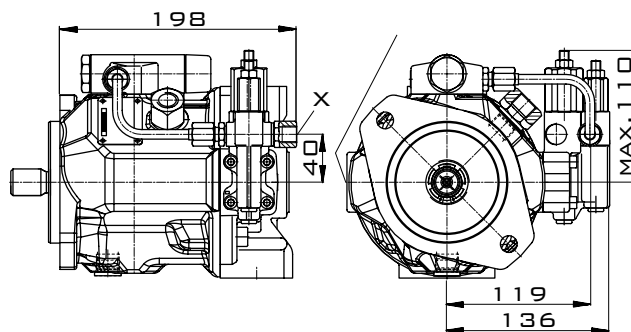
VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



**DFLR – PRESSURE, FLOW AND POWER CONTROLLER**

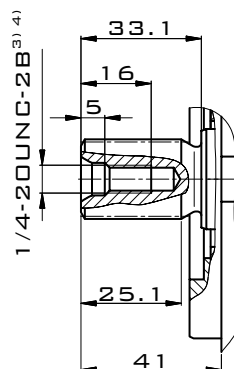
**PORT PLATE 12 (62)**

VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



**SPLINED SHAFT 7/8 IN (SAE J744)**

**S - 13T 16/32DP<sup>1)</sup>**



1) INVOLUTE SPLINE ACCORDING TO ANSI B92.1A, 30° PRESSURE ANGLE, FLAT ROOT, SIDE FIT, TOLERANCE CLASS 5

3) THREAD ACCORDING TO ASME B1.1

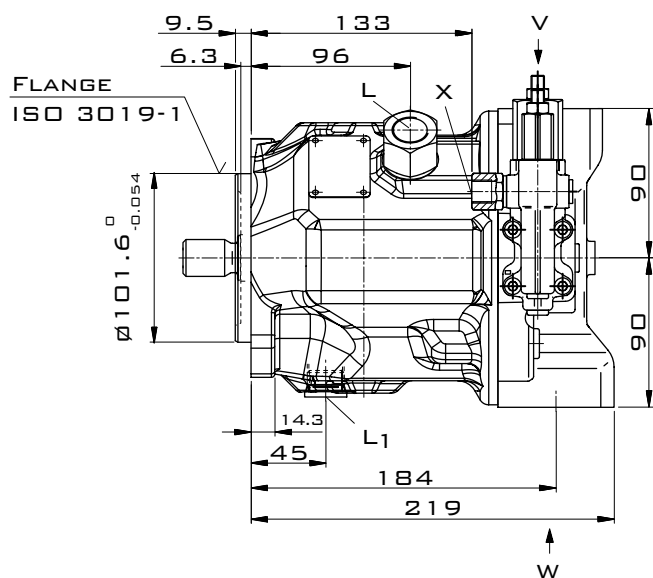
4) FOR NOTES ON TIGHTENING TORQUES, SEE THE INSTRUCTION MANUAL

# AXIAL PISTON VARIABLE PUMP A10V(S)O SERIES 31

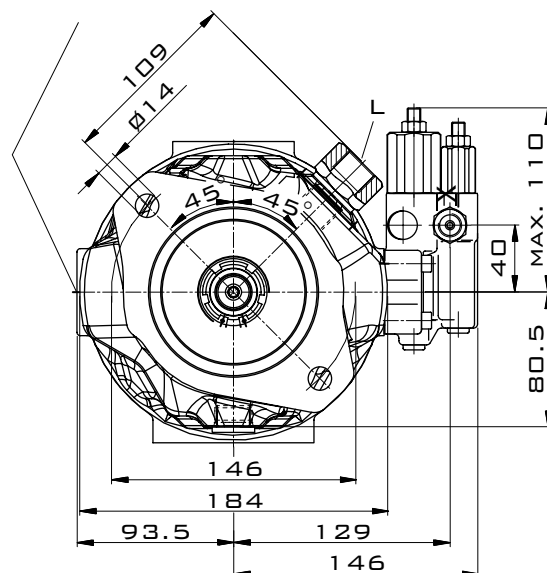


## DIMENSIONS, SIZE 45

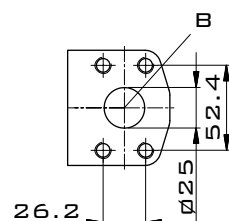
PORT PLATE 12



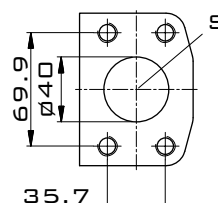
VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



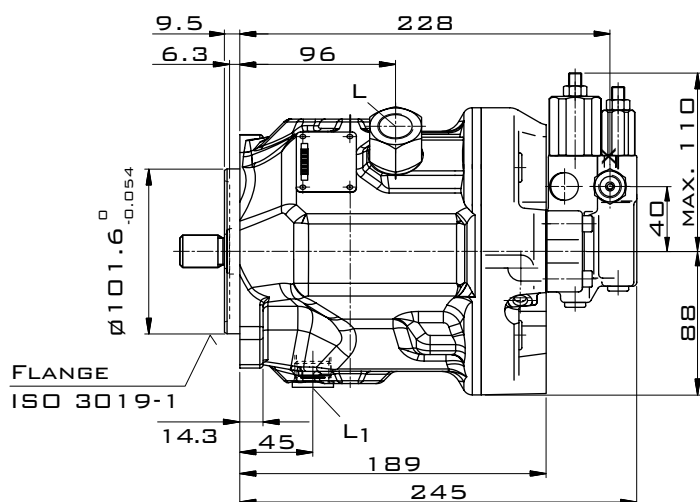
DETAIL V



DETAIL W

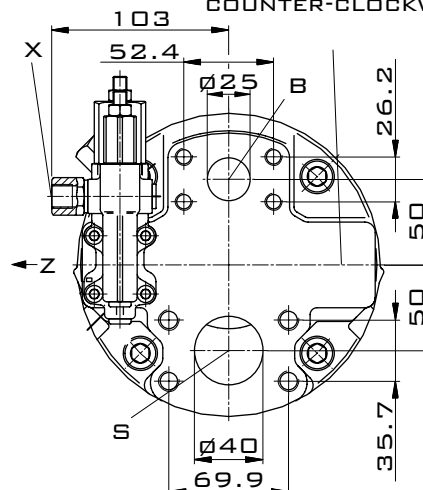


PORT PLATE 11



VIEW Z

VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



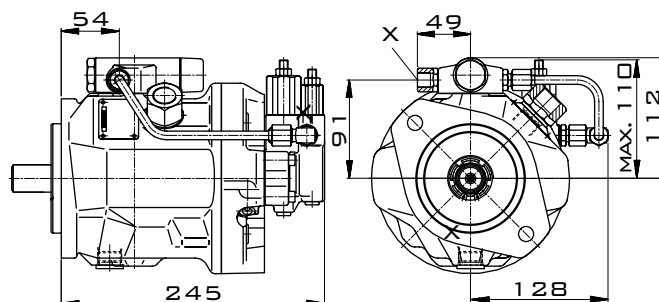
# AXIAL PISTON VARIABLE PUMP

## A10V(S)O SERIES 31

**DFLR – PRESSURE, FLOW AND POWER CONTROLLER**

**PORT PLATE 11 (61)**

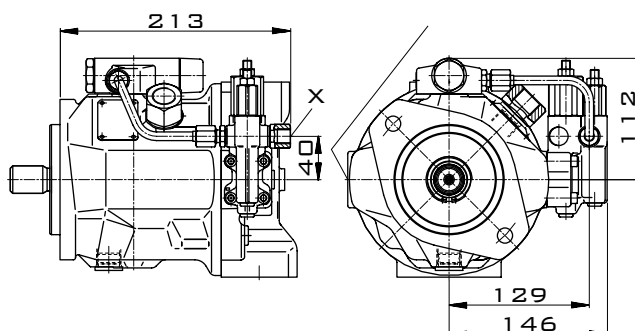
VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



**DFLR – PRESSURE, FLOW AND POWER CONTROLLER**

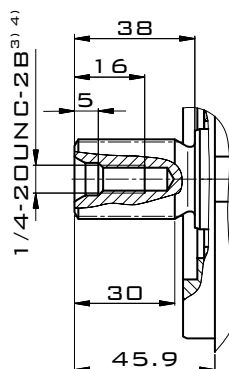
**PORT PLATE 12 (62)**

VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



**SPLINED SHAFT 1 IN (SAE J744)**

**S - 15T 16/32DP<sup>1)</sup>**



1) INVOLUTE SPLINE ACCORDING TO ANSI B92.1A, 30° PRESSURE ANGLE, FLAT ROOT, SIDE FIT, TOLERANCE CLASS 5

3) THREAD ACCORDING TO ASME B1.1

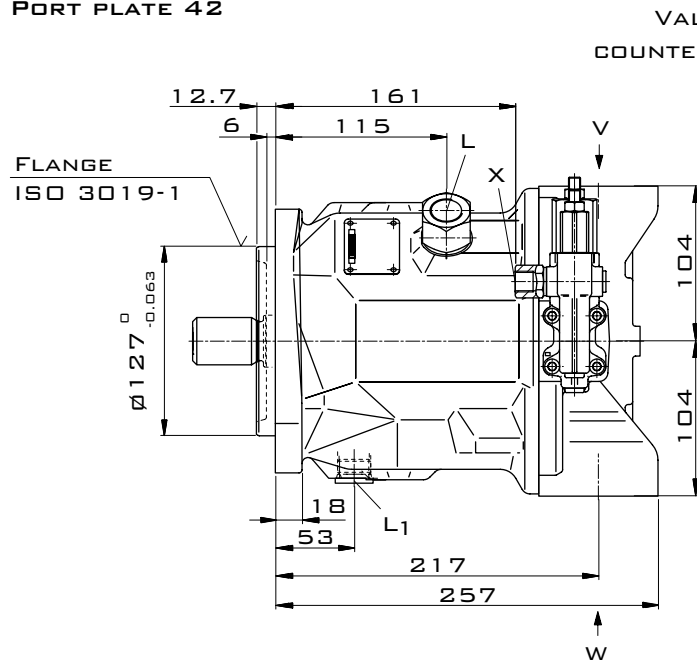
4) FOR NOTES ON TIGHTENING TORQUES, SEE THE INSTRUCTION MANUAL

# AXIAL PISTON VARIABLE PUMP A10V(S)O SERIES 31

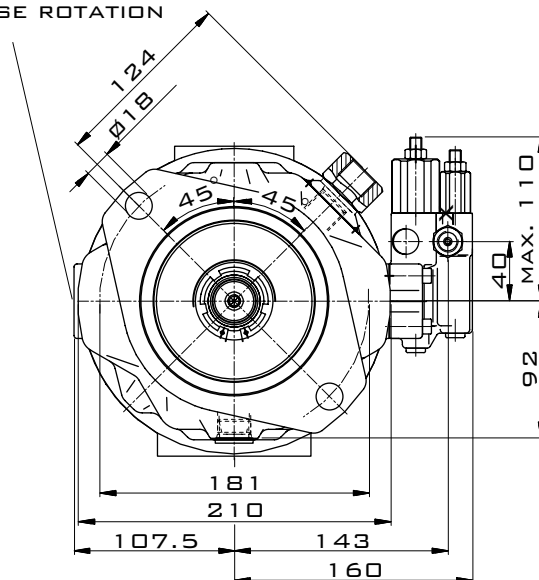


## DIMENSIONS SIZES 71 AND 88

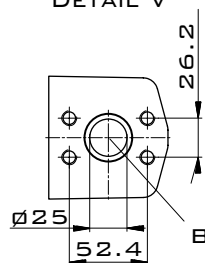
PORT PLATE 42



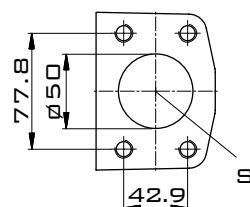
VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



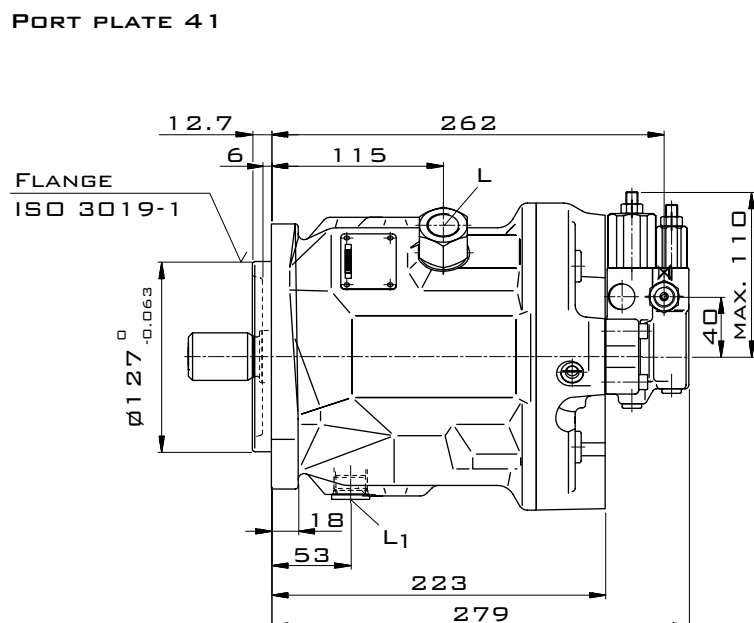
DETAIL V



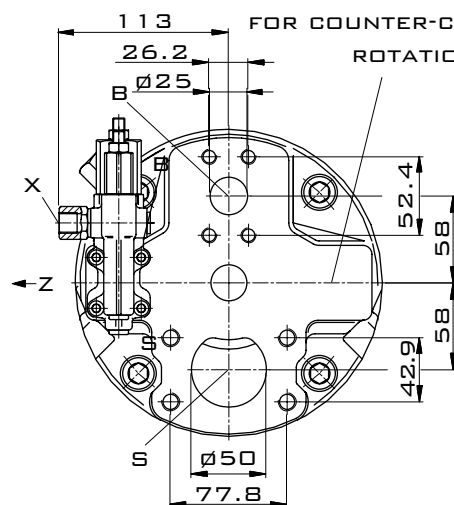
DETAIL W



PORT PLATE 41



VIEW Z VALVE MOUNTING  
FOR COUNTER-CLOCKWISE  
ROTATION



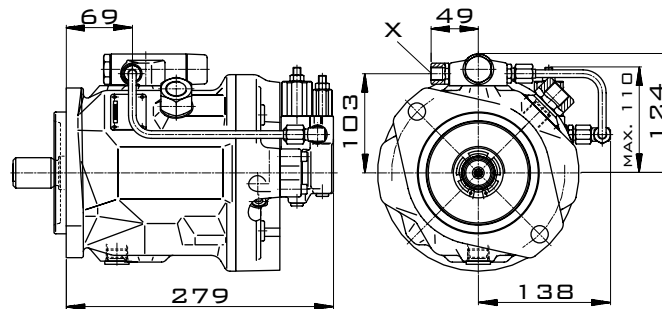
# AXIAL PISTON VARIABLE PUMP

## A10V(S)O SERIES 31

**DFLR – PRESSURE, FLOW AND POWER CONTROLLER**

**PORT PLATE 41 (91)**

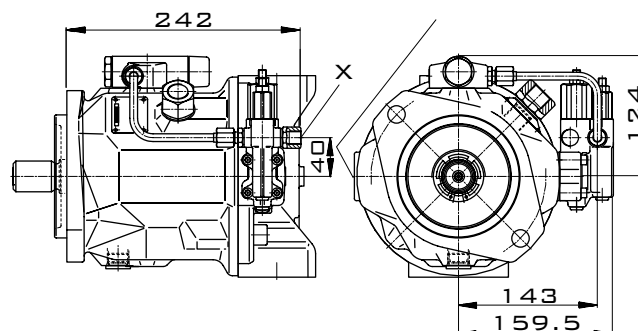
VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



**DFLR – PRESSURE, FLOW AND POWER CONTROLLER**

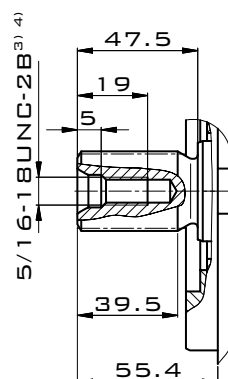
**PORT PLATE 42 (92)**

VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



**SPLINED SHAFT 1 1/4 IN (SAE J744)**

**S - 14T 12/24DP<sup>1)</sup>**



1) INVOLUTE SPLINE ACCORDING TO ANSI B92.1A, 30° PRESSURE ANGLE, FLAT ROOT, SIDE FIT, TOLERANCE CLASS 5

3) THREAD ACCORDING TO ASME B1.1

4) FOR NOTES ON TIGHTENING TORQUES, SEE THE INSTRUCTION MANUAL



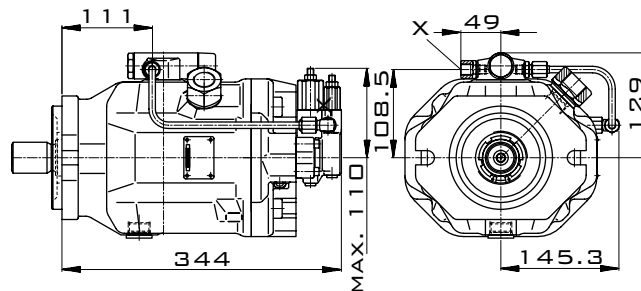
# AXIAL PISTON VARIABLE PUMP

## A10V(S)O SERIES 31

### DFLR – PRESSURE, FLOW AND POWER CONTROLLER

#### PORT PLATE 11 (61)

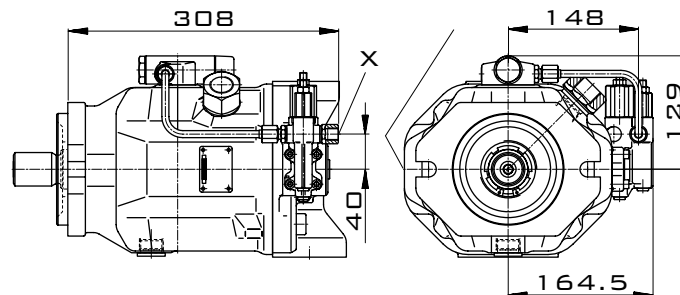
VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



### DFLR – PRESSURE, FLOW AND POWER CONTROLLER

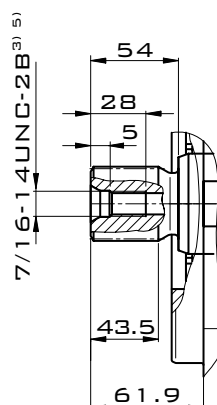
#### PORT PLATE 12 (62)

VALVE MOUNTING FOR  
COUNTER-CLOCKWISE ROTATION



### SPLINED SHAFT 1 1/2 IN (SAE J744)

S - 17T 12/24DP<sup>1)</sup>



1) INVOLUTE SPLINE ACCORDING TO ANSI B92.1A, 30° PRESSURE ANGLE, FLAT ROOT, SIDE FIT, TOLERANCE CLASS 5

3) THREAD ACCORDING TO ASME B1.1

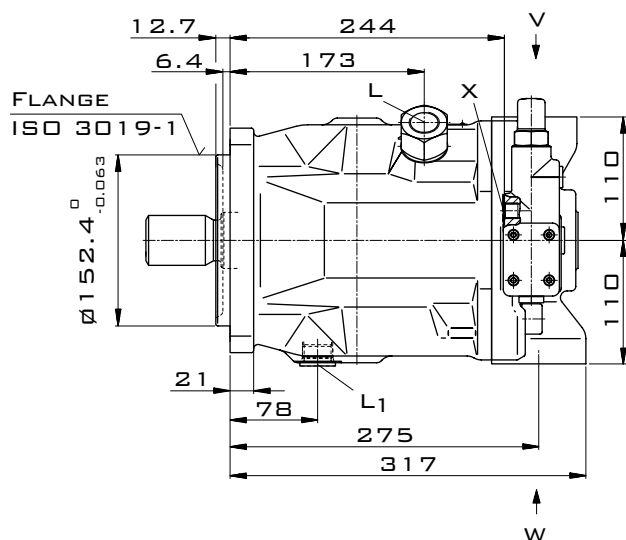
4) FOR NOTES ON TIGHTENING TORQUES, SEE THE INSTRUCTION MANUAL

# AXIAL PISTON VARIABLE PUMP A10V(S)O SERIES 31

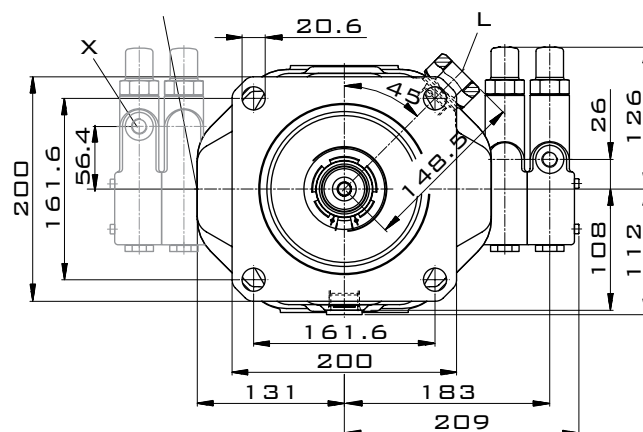


## DIMENSIONS, SIZE 140

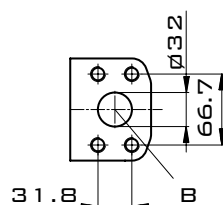
PORT PLATE 12



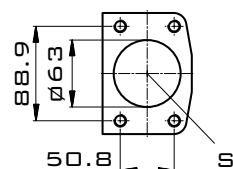
VALVE MOUNTING FOR  
COUNTER-CLOCKWISE  
ROTATION



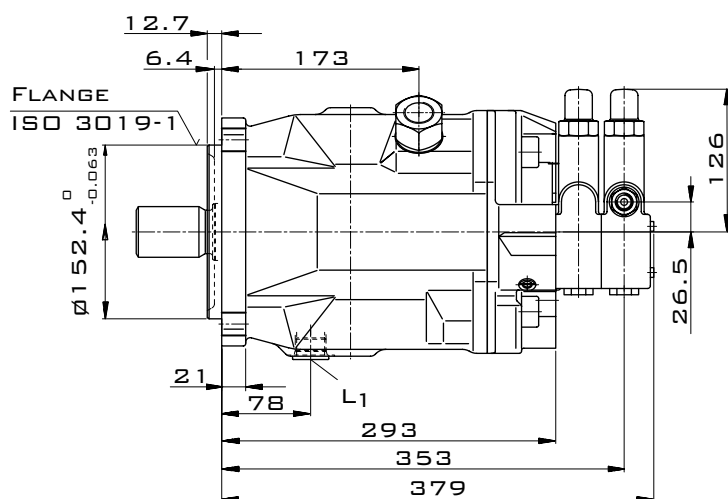
DETAIL V



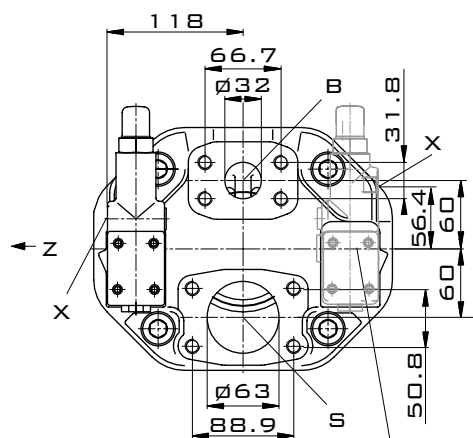
DETAIL W



PORT PLATE 11



VIEW Z



VALVE MOUNTING  
FOR COUNTER-CLOCKWISE  
ROTATION



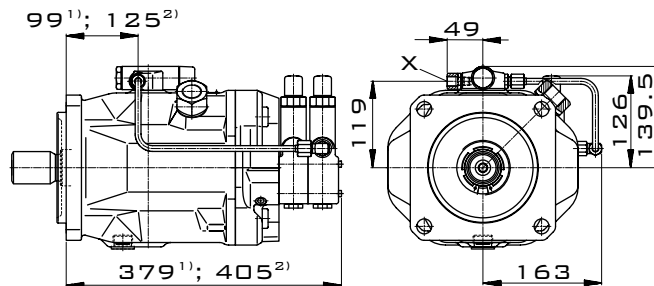
# AXIAL PISTON VARIABLE PUMP

## A10V(S)O SERIES 31

### DFLR – PRESSURE, FLOW AND POWER CONTROLLER

#### PORT PLATE 11 (61)

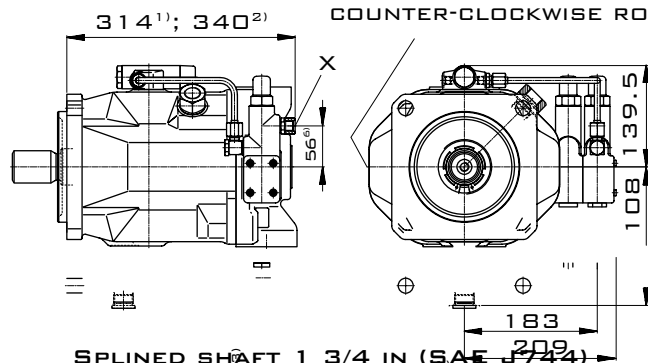
#### VALVE MOUNTING FOR COUNTER-CLOCKWISE ROTATION



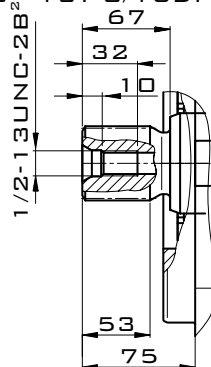
### DFLR – PRESSURE, FLOW AND POWER CONTROLLER

#### PORT PLATE 12 (62)

#### VALVE MOUNTING FOR COUNTER-CLOCKWISE ROTATION



SPLINED SHAFT 1 3/4 IN (SAE J744) 50<sup>4)</sup> 13T 8/16DP



1) INVOLUTE SPLINE ACCORDING TO ANSI B92.1A, 30° PRESSURE ANGLE, FLAT ROOT, SIDE FIT, TOLERANCE CLASS 5

3) THREAD ACCORDING TO ASME B1.1

4) FOR NOTES ON TIGHTENING TORQUES, SEE THE INSTRUCTION MANUAL

# AXIAL PISTON VARIABLE PUMP

## A10V(S)O SERIES 31



### OVERVIEW OF MOUNTING OPTIONS

#### SAE – MOUNTING FLANGE

THROUGH DRIVE4)		MOUNTING OPTIONS – 2ND PUMP				
FLANGE ISO 3019-1	HUB FOR SPLINED SHAFT	CODE	A10V(S)O/31 NG (SHAFT)	A10V(S)O/5x NG (SHAFT)	EXTERNAL GEAR PUMP DESIGN (SIZE)	THROUGH DRIVE AVAILABLE FOR SIZE
82-2 (A)	5/8 IN	K01	18 (U)	10 (U), 18 (U)	SERIES F	18 TO 140
	3/4 IN	K52	18 (S, R)	10 (S) 18 (S, R)	—	18 TO 140
101-2 (B)	7/8 IN	K68	28 (S, R) 45 (U, W) <sup>1)</sup>	28 (S, R) 45 (U, W) <sup>1)</sup>	SERIES N/G	28 TO 140
	1 IN	K04	45 (S, R) —	45 (S, R) 60, 63, 72 (U, W) <sup>2)</sup>	—	45 TO 140
127-2 (C)	1 1/4 IN	K07	71 (S, R) 88 (S, R) 100 (U, W) <sup>3)</sup>	85 (U, W) <sup>3)</sup> 100 (U, W)	—	71 TO 140
	1 1/2 IN	K24	100 (S)	85 (S) 100 (S)	—	100 TO 140
152-4 (4-HOLE D)	1 3/4 IN	K17	140 (S)	—	—	140

### COMBINATION PUMPS A10VO + A10VO

BY USING COMBINATION PUMPS, IT IS POSSIBLE TO HAVE INDEPENDENT CIRCUITS WITHOUT THE NEED FOR SPLITTER GEARBOXES. WHEN ORDERING COMBINATION PUMPS, THE TYPE DESIGNATIONS OF THE 1ST AND 2ND PUMPS MUST BE LINKED BY A “+”.

#### ORDER EXAMPLE:

**A10VO100DFR1/31R-VSC12K04+A10VO45DFR/31R-VSC12N00**

IF NO FURTHER PUMPS ARE TO BE MOUNTED AT THE FACTORY, THE SIMPLE TYPE DESIGNATION IS SUFFICIENT. IT IS PERMISSIBLE TO USE A COMBINATION OF TWO SINGLE PUMPS OF THE SAME NOMINAL SIZE (TANDEM PUMP) CONSIDERING A DYNAMIC MASS ACCELERATION OF MAXIMUM 10 G (= 98.1 M/S<sup>2</sup>) WITHOUT ADDITIONAL SUPPORT BRACKETS. EACH THROUGH DRIVE IS PLUGGED WITH A **NON-PRESSURE-RESISTANT COVER**. BEFORE COMMISSIONING THE UNITS, THEY MUST THEREFORE BE EQUIPPED WITH A PRESSURE-RESISTANT COVER. THROUGH DRIVES CAN ALSO BE ORDERED WITH PRESSURE-RESISTANT COVERS. PLEASE SPECIFY IN PLAIN TEXT. FOR COMBINATION PUMPS CONSISTING OF MORE THAN TWO PUMPS, THE MOUNTING FLANGE MUST BE RATED FOR THE PERMISSIBLE MASS TORQUE (PLEASE CONTACT US).

1) NOT FOR MAIN PUMP NG28 WITH K68

2) NOT FOR MAIN PUMP NG45 WITH K04

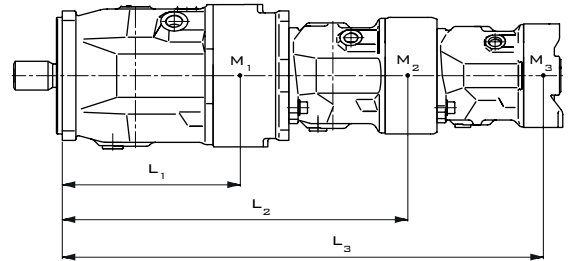
3) NOT FOR MAIN PUMP NG71 AND NG88 WITH K07

# AXIAL PISTON VARIABLE PUMP A10V(S)O SERIES 31

$M_1, M_2, M_3$  WEIGHT OF PUMP [KG]

$L_1, L_2, L_3$  DISTANCE, CENTER OF GRAVITY [MM]

$$T_M = (M_1 \times L_1 + M_2 \times L_2 + M_3 \times L_3) \times \frac{1}{102} \text{ [NM]}$$



## PERMISSIBLE MASS MOMENT OF INERTIA

SIZE			18	28	45	71	88	100	140	
STATIC	$T_M$	NM	500	880	1370	2160	2160	3000	4500 <sup>1)</sup>	3000 <sup>2)</sup>
DYNAMIC AT 10 G (98.1 M/S <sup>2</sup> )	$T_M$	NM	50	88	137	216	216	300	450 <sup>1)</sup>	300 <sup>2)</sup>
WEIGHT WITHOUT THROUGH DRIVE AND NDD	M	KG	12.9	18	23.5	35.2	35.2	49.5	65.4	
WEIGHT WITH THROUGH DRIVE AND K..			13.8	19.3	25.1	38	38	55.4	74.4	
DISTANCE, CENTER OF GRAVITY WITHOUT THROUGH DRIVE NDD	$L_1$	MM	92	100	113	127	127	161	159	
DISTANCE, CENTER OF GRAVITY WITH THROUGH DRIVE K..	$L_1$	MM	98	107	120	137	137	178	180	

1) 4-HOLE FLANGE (D)

2) 2-HOLE FLANGE (C)

	A10V(S)	0		/31	- v				
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4 - HOLE = D - ONLY FOR SIZE 140

FASTENING THREAD,  
NOT FOR THROUGH DRIVE = 61  
UNF; REAR = 91