



PATRIOT
PHDA10V SERIES
QUICK REFERENCE GUIDE



Driven by Innovation
Power Precision Performance
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PHDA10V Description

The PHDA10V replacement pump series features a variable displacement axial piston design with a swashplate configuration, ideal for open-circuit hydrostatic drives. Flow output is proportional to drive speed and can be infinitely adjusted via the swashplate angle for precise control. The design incorporates a hydrostatically unloaded cradle bearing, contributing to low noise operation, excellent suction performance, and long service life. Additional benefits include a strong power-to-weight ratio, fast response times, and a versatile range of control options. The unit also includes dual leakage ports and offers through-drive capability, allowing multiple pumps of the same nominal size to be mounted in tandem for increased system flexibility.



Working port

				18	28	45	71	88	100	140	
10	SAE flange ports according to J518	Fastening thread metric ; rear	not for through drive	-	●	●	-	-	●	●	11
				-	-	-	●	●	-	-	41
	Working ports metric	Fastening thread metric ; lateral top bottom	for through drive	●	●	●	-	-	●	●	12
				-	-	-	●	●	-	-	42
	SAE flange ports according to J518	Fastening thread UNF ; rear	not for through drive	-	●	●	-	-	●	●	61
				-	-	-	●	●	-	-	91
Working ports UNF	Fastening thread UNF ; lateral top bottom	for through drive	●	●	●	-	-	●	●	62	
			-	-	-	●	●	-	-	92	

Through drive (for mounting options, see page 53)

				18	28	45	71	88	100	140		
11	Flange ISO 3019-1	Hub for splined shaft ²⁾										
	Diameter	Diameter										
	without through drive			●	●	●	●	●	●	●	N00	
	82-2 (A)	5/8 in	9T 16/32DP		●	●	●	●	●	●	●	K01
		3/4 in	11T 16/32DP		●	●	●	●	●	●	●	K52
	101-2 (B)	7/8 in	13T 16/32DP		-	●	●	●	●	●	●	K68
		1 in	15T 16/32DP		-	-	●	●	●	●	●	K04
	127-2 (C)	1 1/4 in	14T 12/24DP		-	-	-	●	●	●	●	K07
		1 1/2 in	17T 12/24DP		-	-	-	-	-	●	●	K24
	152-4 (D)	1 3/4 in	13T 8/16DP		-	-	-	-	-	-	●	K17

Connectors for solenoids³⁾

				18	28	45	71	88	100	140	
12	Without connector (without solenoid, with hydraulic control only, without code)			●	●	●	●	●	●	●	
	DEUTSCH - molded connector, 2-pin, without suppressor diode			●	●	●	●	●	●	●	P

● = Available ○ = On request - = Not available

Notice

- ▶ Note the project planning notes on page 59.
- ▶ In addition to the type code, please specify the relevant technical data when placing your order.



Technical data, standard unit

Size	NG	18	28	45	71	88	100	140	
Displacement, geometric, per revolution	$V_{g \max}$ cm ³	18	28	45	71	88	100	140	
Rotational speed maximum ¹⁾	at $V_{g \max}$	n_{nom} rpm	3300	3000	2600	2200	2100	2000	1800
	at $V_g < V_{g \max}$ ²⁾	$n_{\text{max perm}}$ rpm	3900	3600	3100	2600	2500	2400	2100
Flow	at n_{nom} and $V_{g \max}$	$q_{v \max}$ gpm	15.59	22.19	30.91	41.21	48.87	52.83	66.57
	at $n_E = 1500$ rpm and $V_{g \max}$	$q_{vE \max}$ gpm	7.13	11.10	17.96	28.27	34.87	39.63	55.48
Power at $\Delta p = 280$ bar	at n_{nom} , $V_{g \max}$	P_{\max} kW	28	39	55	73	86	93	118
	at $n_E = 1500$ rpm and $V_{g \max}$	$P_{E \max}$ kW	12.6	20	32	50	62	70	98
Torque at $V_{g \max}$ and	$\Delta p = 280$ bar	T_{\max} Nm	80	125	200	316	392	445	623
	$\Delta p = 100$ 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_{TW} kgm ²	0.00093	0.0017	0.0033	0.0083	0.0083	0.0167	0.0242	
Maximum angular acceleration ³⁾	α rad/s ²	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	

Determining the operating characteristics

$$\text{Flow } q_v = \frac{V_g \times n \times \eta_v}{1000} \quad [\text{l/min}]$$

$$\text{Torque } T = \frac{V_g \times \Delta p}{20 \times \pi \times \eta_{hm}} \quad [\text{Nm}]$$

$$\text{Power } P = \frac{2 \pi \times T \times n}{60000} = \frac{q_v \times \Delta p}{600 \times \eta_t} \quad [\text{kW}]$$

Key

V_g Displacement per revolution [cm³]

Δp Differential pressure [bar]

n Rotational speed [rpm]

η_v Volumetric efficiency

η_{hm} Hydraulic-mechanical efficiency

η_t Total efficiency ($\eta_t = \eta_v \times \eta_{hm}$)

1) The values are applicable:

- At absolute pressure $p_{\text{abs}} = 1$ bar at suction port **S**
- For the optimal viscosity range of $\nu_{\text{opt}} = 36$ to 16 mm²/s
- For hydraulic fluid based on mineral oils

2) For a speed increase up to $n_{\text{max perm}}$, please observe the diagram on page 6.

Notice

- ▶ Theoretical values, without efficiency and tolerances; values rounded
- ▶ Operation above the maximum values or below the minimum values may result in a loss of function, a reduced service life or in the destruction of the axial piston unit.

3) 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.



Technical data, high-speed version

Size		NG		45	71	100	140
Displacement, geometric, per revolution		$V_{g \max}$	cm ³	45	71	100	140
Rotational speed maximum ¹⁾	at $V_{g \max}$	n_{nom}	rpm	3000	2550	2300	2050
	at $V_g < V_{g \max}$ ²⁾	$n_{\text{max perm}}$	rpm	3300	2800	2500	2200
Flow	at n_{nom} and $V_{g \max}$	$q_{v \max}$	gpm	35.66	47.03	60.76	75.81
Power	at n_{nom} , $V_{g \max}$ and $\Delta p = 280$ bar	P_{max}	kW	63	83	107	134
Torque	$\Delta p = 280$ bar	T_{max}	Nm	200	316	445	623
	at $V_{g \max}$ and $\Delta p = 100$ bar	T	Nm	72	113	159	223
Rotary stiffness of drive shaft	S	c	Nm/rad	37500	71884	121142	169537
	R	c	Nm/rad	41025	76545	–	–
	U	c	Nm/rad	30077	52779	91093	–
	W	c	Nm/rad	34463	57460	101847	165594
Moment of inertia for rotary group		J_{TW}	kgm ²	0.0033	0.0083	0.0167	0.0242
Maximum angular acceleration ³⁾		α	rad/s ²	4000	2900	2400	2000
Case volume		V	l	1.0	1.6	2.2	3.0
Weight without through drive (approx.)			kg	23.5	35.2	49.5	65.4
Weight with through drive (approx.)		m	kg	25.1	38	55.4	74.4

Notice

- ▶ Theoretical values, without efficiency and tolerances; values rounded
- ▶ Operation above the maximum values or below the minimum values may result in a loss of function, a reduced service life or in the destruction of the axial piston unit.

1) The values are applicable:

- At absolute pressure $p_{\text{abs}} = 1$ bar at suction port **S**
- For the optimal viscosity range of $\nu_{\text{opt}} = 36$ to 16 mm²/s
- For hydraulic fluid based on mineral oils

2) For a speed increase up to $n_{\text{max perm}}$, please observe the diagram on page 6.

3) 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.

