

**RE 51 145/09.02**

Replaces: 12.98

**Power module  
Type UPE 5**

Drive powers from 1.5 kW to 4.0 kW

Series 1X

Maximum operating pressure 250 bar



05-97

Type UPE 5-1X/...V7/10-20-AN-H-1

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**Features**

- 100% duty
- Compact design
- Low noise
- High cooling capacity
- Wide area of application
- Large range of variants
- Various mounting possibilities
- A complete hydraulic control is possible
- Ready for connection

**Application possibilities**

- Machine tools
- Lifting platforms
- Transport systems
- Test rigs
- Winding machines



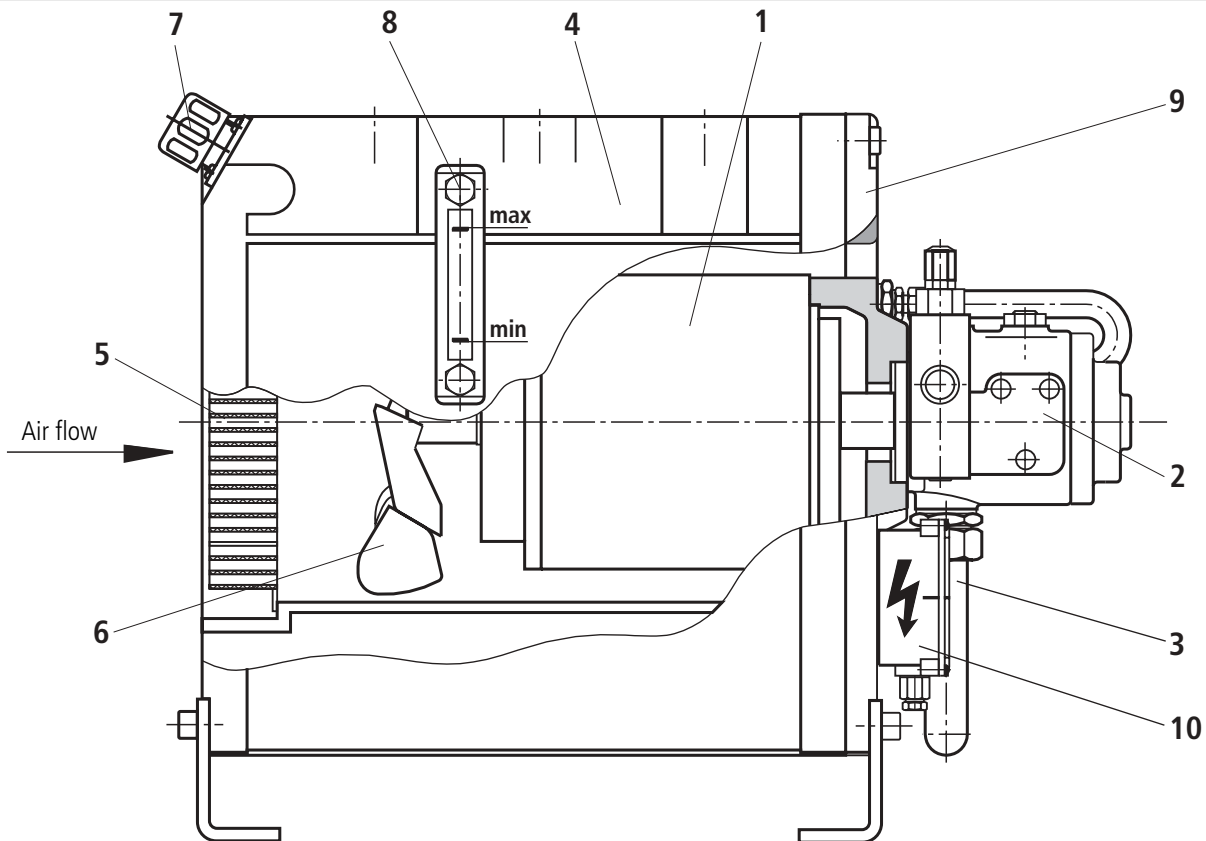
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## Description



The UPE 5 power module can, due to its design, be very compactly built. The pump (2) is driven with the aid of the electric motor (1). The electric motor is connected to the pump without the use of a coupling. The pump shaft fits into the hollow electric motor drive shaft. The length of the motor/pump assembly is thereby held very short. Via the suction hose (3) the pump (2) draws the pressure fluid from the reservoir (4) and passes it onto the hydraulic control. The returning pressure fluid from the control can be passed, via connections K1 and K2, through the oil/air cooler (5). The cooled pressure fluid is then returned to the reservoir. With the aid of the axial fan (6), which is fitted onto the electric motor, cold air is drawn through the oil/air cooler (5). The pressure fluid and electric motor are thereby cooled. The reservoir (4) can be filled via the filler/breather filter (7). The oil level can be monitored via the oil level gauge (8). The reservoir is

closed via a reservoir cover (9). The motor pump assembly (1; 2) and the terminal box (10) are fitted to this cover. The power module is supplied ready to connect.

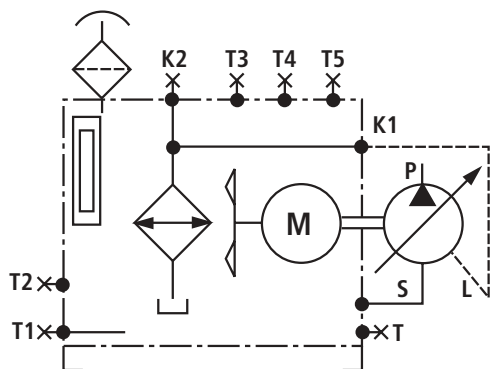
Optionally the power module can be fitted with electrical fluid level, oil temperature monitoring as well as a complete hydraulic control (see RE 51 149), e.g. filter, accumulator and valves.

The following are also available on request, oil water cooling, drip tray to the Water Protection Act (WHG), double pumps as well as an additional reservoir.

**⚠ Attention!** The power module can heat up during operation  
→ **Danger of injury!**

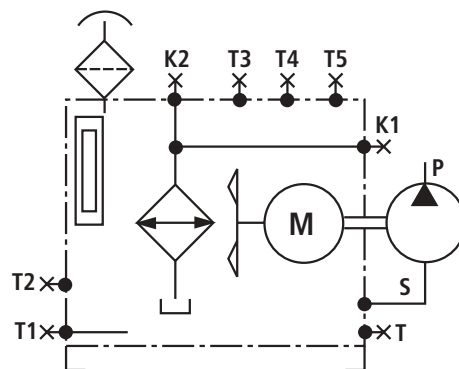
## Symbols

Symbol for variable displacement pumps (A10VSO, V7)



K1 = G1/2	T3 = G1
K2 = G1/2	T4 = G1/2
T1 = G1	T5 = G1
T2 = G1/2	T = G1/2

Symbol for fixed displacement pumps (GF2, G2)



K1 = G1/2	T3 = G1
K2 = G1/2	T4 = G1/2
T1 = G1	T5 = G1
T2 = G1/2	T = G1/2

## Ordering details

UPE 5 – 1X /		-	-	-	*
Series 10 to 19 (10 to 19: unchanged installation and connection dimensions)	= 1X				Further details in clear text
<b>Drive power</b>					<b>Fitting a hydraulic control</b> (also see RE 51 149)
1.50 kW	= 1,5			0 =	<b>Without</b> hydraulic control
2.20 kW	= 2,2			1 =	<b>With</b> hydraulic control
3.00 kW	= 3,0				<b>Mounting variants</b>
4.00 kW	= 4,0			H =	Horizontal mounting
<b>Pumps</b>				S =	Vertical mounting
<b>Variable displacement axial piston pumps</b>				W =	Wall mounting
A10VSO10DR/52R-PPA14N00 (RE 92 713)	= A10VSO10				<b>Oil monitoring</b>
A10VSO18DR/31R-PPA12N00 (RE 92 712)	= A10VSO18			A =	Oil level gauge
<b>Internal gear pumps</b> (RE 10 213)				AN =	Oil level gauge with level switch
PGF2-2X/006RE01VE4	= GF2/006			AT =	Oil level gauge with temperature switch
PGF2-2X/008RE01VE4	= GF2/008			ANT =	Oil level gauge with level and temperature switch
PGF2-2X/011RE01VE4	= GF2/011				
PGF2-2X/013RE01VE4	= GF2/013				
PGF2-2X/016RE01VE4	= GF2/016				
<b>External gear pumps</b> (RE 10 030)					
1PF2G2-4X/004RA01MB	= G2/004				
1PF2G2-4X/005RA01MB	= G2/005				
1PF2G2-4X/008RA01MB	= G2/008				
1PF2G2-4X/011RA01MB	= G2/011				
1PF2G2-4X/016RA01MB	= G2/016				
<b>Vane pumps</b>					
PV7-1X/10-14RE01MC0-16	= V7/10-14				
PV7-1X/10-20RE01MC0-10	= V7/10-20	RE 10 515			
PV7-1X/16-20RE01MC0-16	= V7/16-20				
PV7-1X/06-10RA01MA0-10	= V7/06-10	RE 10 520			
PV7-1X/06-14RA01MA0-07	= V7/06-14				
PV7-2X/20-20RA01MA0-10	= V7/20-20	RE 10 521			
PV7-2X/20-25RA01MA0-10	= V7/20-25				

## Technical data (for applications outside these parameters, please consult us!)

### Hydraulic

Pressure fluid		Mineral oil HLP to DIN 51 524 part 2 <b>Please take our specifications stated in catalogue sheet RE 07 075 into account!</b>
Pressure fluid temperature range	°C	-10 to +70 (take the permissible viscosity range of the pump and valves into account!)
Viscosity range	mm <sup>2</sup> /s	See the viscosity range of the pump and valves
Degree of contamination		Maximum permissible degree of contamination of the pressure fluid is to NAS 1638 class 10. We therefore recommend a filter with a minimum retention rate of $\beta_{20} \geq 100$ . To ensure a long service life we recommend a maximum permissible degree of contamination to NAS 1638 class 9. For this we recommend a filter with a minimum retention rate of $\beta_{10} \geq 100$ .
Direction of rotation		Clockwise
Weight (without pressure fluid and pump <sup>1)</sup> )	kg	75

<sup>1)</sup> For pump weights see data sheets RE 10 030, RE 10 213, RE 10 515, RE 10 520, RE 10 521, RE 92 712 and RE 92 713.

**Selection table for pump and electric motor at  $n = 1450 \text{ min}^{-1}$**

Variable displacement axial piston pumps <sup>1)</sup>	$q_{V\max}$ L/min	$p_{\max}$ bar	$P$ kW	
A10VSO10DR/52R-PPA14N00 Max. operating pressure $p_{\max} = 250 \text{ bar}$	15.0	45	1.50	
		70	2.20	
		95	3.00	
		125	4.00	
	3.0 4.0 5.5 7.5	250	1.50	2.20
			3.00	4.00
			1.50	2.20
			2.20	3.00
A10VSO18DR/31R-PPA12N00 Max. operating pressure $p_{\max} = 250 \text{ bar}$	27.0	25	1.50	
		40	2.20	
		50	3.00	
		70	4.00	
	3.0 4.0 5.5 7.5	250	1.50	2.20
			3.00	4.00
			1.50	2.20
			2.20	3.00
Internal gear pumps	$q_{V\max}$ L/min	$p_{\max}$ bar	$P$ kW	
PGF2-2X/006RE01VE4	9.4	75	1.50	
		110	2.20	
		150	3.00	
		200	4.00	
PGF2-2X/008RE01VE4	11.9	60	1.50	
		90	2.20	
		120	3.00	
		160	4.00	
PGF2-2X/011RE01VE4	16.0	45	1.50	
		65	2.20	
		90	3.00	
		120	4.00	
PGF2-2X/013RE01VE4	19.3	35	1.50	
		55	2.20	
		75	3.00	
		100	4.00	
PGF2-2X/016RE01VE4	23.2	30	1.50	
		45	2.20	
		60	3.00	
		80	4.00	

External gear pumps	$q_{V\max}$ L/min	$p_{\max}$ bar	$P$ kW
1PF2G2-4X/004RA01MB	5.8	120	1.50
		180	2.20
		245	3.00
		250	4.00
1PF2G2-4X/005RA01MB	7.9	90	1.50
		130	2.20
		180	3.00
		250	4.00
1PF2G2-4X/008RA01MB	11.8	60	1.50
		90	2.20
		120	3.00
		160	4.00
1PF2G2-4X/011RA01MB	16.0	45	1.50
		65	2.20
		90	3.00
		120	4.00
1PF2G2-4X/016RA01MB	23.2	30	1.50
		45	2.20
		60	3.00
		80	4.00

<sup>1)</sup> The variable displacement pumps can be operated within their maximum values (e.g. A10VSO10DR/52R-PPA14N00,  $p_{\max} = 250 \text{ bar}$ ,  $q_{V\max} = 15 \text{ L/min}$ ) and with optional values (e.g. A10VSO10DR/52R-PPA14N00,  $p_{\max} = 180 \text{ bar}$ ,  $q_{V\max} = 8 \text{ L/min}$  and  $P_{\text{motor}} = 3.0 \text{ kW}$ ), when the permissible loading of the electric motor is not exceeded.

**Selection table for pump and electric motor at  $n = 1450 \text{ min}^{-1}$**

Vane pumps <sup>1)</sup>	$q_{V\max}$ L/min	$p_{\max}$ bar	$P$ kW	
PV7-1X/10-14RE01MC0-16 Max. operating pressure $p_{\max} = 160 \text{ bar}$	21.0	35	1.50	
		50	2.20	
		65	3.00	
		90	4.00	
	4.5	160	1.50	1.50
			2.20	2.20
			3.00	3.00
12.0		4.00	4.00	
PV7-1X/10-20RE01MC0-10 Max. operating pressure $p_{\max} = 100 \text{ bar}$	29.0	25	1.50	
		35	2.20	
		50	3.00	
		65	4.00	
	7.0	100	1.50	1.50
			2.20	2.20
			3.00	3.00
19.0		4.00	4.00	
PV7-1X/16-20RE01MC0-16 Max. operating pressure $p_{\max} = 160 \text{ bar}$	29.0	25	1.50	
		35	2.20	
		50	3.00	
		65	4.00	
	4.5	160	1.50	1.50
			2.20	2.20
			3.00	3.00
12.0		4.00	4.00	
PV7-1X/06-10RA01MA0-10 Max. operating pressure $p_{\max} = 100 \text{ bar}$	14.5	50	1.50	
		70	2.20	
		100	3.00	
		100	4.00	
	7.0	100	1.50	1.50
			2.20	2.20
			3.00	3.00
14.5		4.00	4.00	
PV7-1X/06-14RA01MA0-07 Max. operating pressure $p_{\max} = 70 \text{ bar}$	20.0	35	1.50	
		50	2.20	
		70	3.00	
		70	4.00	
	10.5	70	1.50	1.50
			2.20	2.20
			3.00	3.00
20.0		4.00	4.00	

Vane pumps <sup>1)</sup>	$q_{V\max}$ L/min	$p_{\max}$ bar	$P$ kW	
PV7-2X/20-20RA01MA0-10 Max. operating pressure $p_{\max} = 100 \text{ bar}$	29	25	1.50	
		35	2.20	
		50	3.00	
		65	4.00	
	7.0	100	1.50	1.50
			2.20	2.20
			3.00	3.00
19.0		4.00	4.00	
PV7-2X/20-25RA01MA0-10 Max. operating pressure $p_{\max} = 100 \text{ bar}$	36	20	1.50	
		30	2.20	
		40	3.00	
		55	4.00	
	7.0	100	1.50	1.50
			2.20	2.20
			3.00	3.00
19.0		4.00	4.00	

<sup>1)</sup> The vane pumps can be operated within their maximum values (e.g. PV7-1X/10-14RE01MC0-16,  $p_{\max} = 160 \text{ bar}$ ,  $q_{V\max} = 21 \text{ L/min}$ ) and with optional values (e.g. PV7-1X/10-14RE01MC0-16,  $p_{\max} = 80 \text{ bar}$ ,  $q_V = 13 \text{ L/min}$  and  $P_{\text{motor}} = 2.2 \text{ kW}$ ), when the permissible loading of the electric motor is not exceeded.

## Electric motor

The electric motor is laid out for the continuous operating mode type S1 to VDE 0530 part 1 (EN 60 034) within the range of its nominal power. The electric motor conforms to the isolation class F and to the protection type IP 55.

The electric motor is to be so connected that it has clockwise rotation. It can be used on power circuits with a frequency of 50 Hz or 60 Hz without any changes.

### Technical data (for applications outside these parameters, please consult us!)

Voltage (other voltages on request)	$U$	V	400 / 690 $\pm 6\%$ $\Delta/Y$
Frequency	$f$	Hz	50 / 60
Operating mode	S1 continuous		
Isolation class	F (winding)		
Protection to VDE 0530 / EN 60034	IP 55		
No. of poles	4		

#### Frequency 50 Hz

Power kW	RPM $\text{min}^{-1}$	Power factor $\cos \varphi$	Nom. current at 400 Volt
1.5	1450	0.73	3.7 A
2.2	1440	0.77	5.2 A
3.0	1415	0.76	7.0 A
4.0	1390	0.73	9.8 A

#### Frequency 60 Hz

Power kW	RPM $\text{min}^{-1}$	Power factor $\cos \varphi$	Nom. current at 400 Volt
1.5	1730	0.79	3.4 A
2.2	1710	0.84	4.8 A
3.0	1700	0.83	6.4 A
4.0	1680	0.77	9.3 A

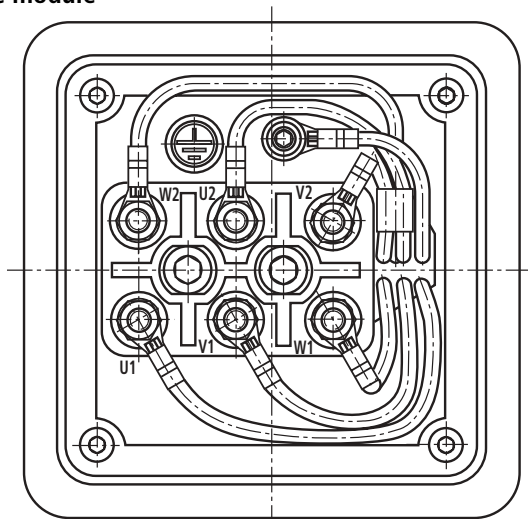
## Electro-magnetic compatibility of components (EMVG, EMC)

The power module is with reference to the „Directive covering the electro-magnetic compatibility of components“ (§2, section 4) and directive 89/336 EWG not a component that is ready for operation.

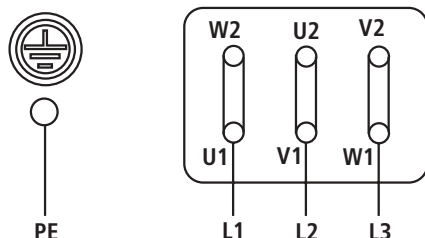
In order to prevent any electro-magnetic interference from occurring, it is recommended that a suppressor, e.g. 23 050, 3 x 400 VAC, 50 - 60 Hz, manufacturer Murr-Elektronik (D-71570 Oppenweiler) is fitted.

## Terminal allocation

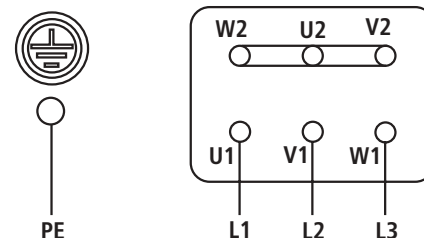
### Terminal allocation within the drive module terminal box:



Customer side:  $\Delta$  delta  $U = 400$  V



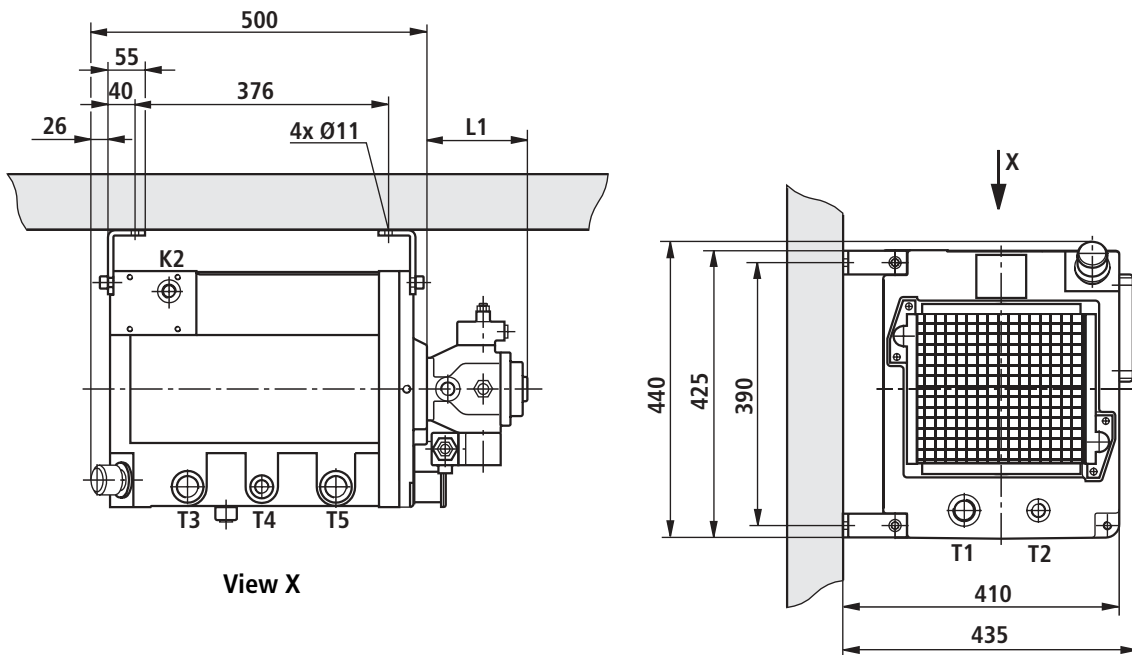
Customer side: Y star  $U = 690$  V





## Unit dimensions (dimensions in mm)

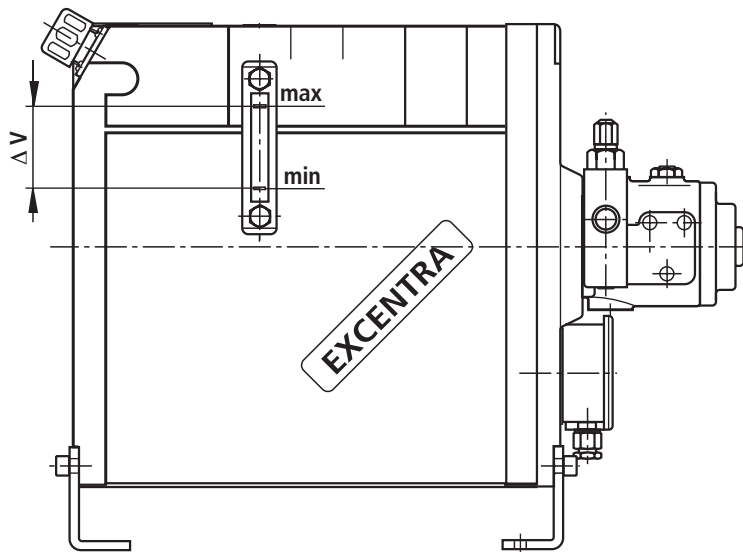
### Mounting variant: Wall mounting



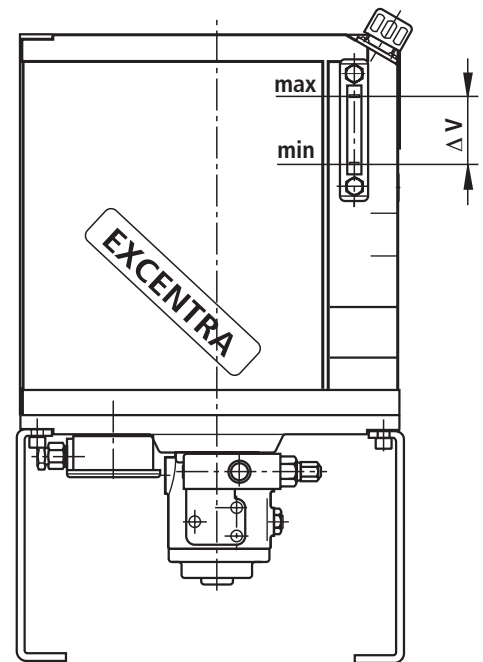
Pump type:	L1	L2	L3
<b>Axial piston pump</b>			
A10VSO10DR/52R-PPA14N00	164	725	755
A10VSO18DR/31R-PPA12N00	195	705	735
<b>Internal gear pump</b>			
PGF2-2X/006RE01VE4	114	630	660
PGF2-2X/008RE01VE4	117,5	705	735
PGF2-2X/011RE01VE4	123	705	735
PGF2-2X/013RE01VE4	128	705	735
PGF2-2X/016RE01VE4	133	705	735
<b>External gear pump</b>			
1PF2G2-4X/004RA01MB	88	630	660
1PF2G2-4X/005RA01MB	93	630	660
1PF2G2-4X/008RA01MB	93	630	660
1PF2G2-4X/011RA01MB	98	630	660
1PF2G2-4X/016RA01MB	108	630	660
<b>Vane pump</b>			
PV7-1X/10-14RE01MC0-16	149	705	735
PV7-1X/10-20RE01MC0-10	149	705	735
PV7-1X/16-20RE01MC0-16	165	725	755
PV7-1X/06-10RA01MA0-10	101	630	660
PV7-1X/06-14RA01MA0-07	101	630	660
PV7-2X/20-20RA01MA0-10	135	705	735
PV7-2X/20-25RA01MA0-10	135	705	735



## Filling and withdrawal volumes



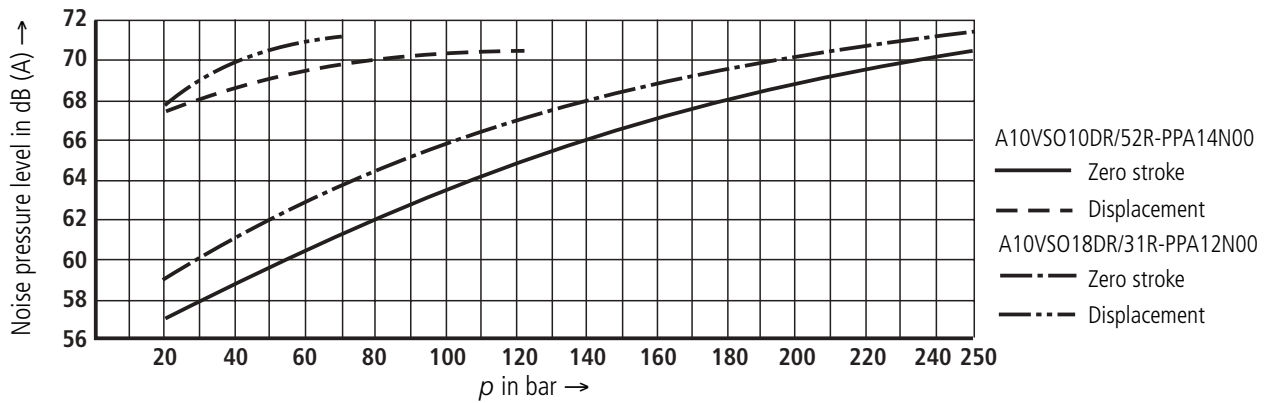
Mounting variants: Horizontal mounting and wall mounting



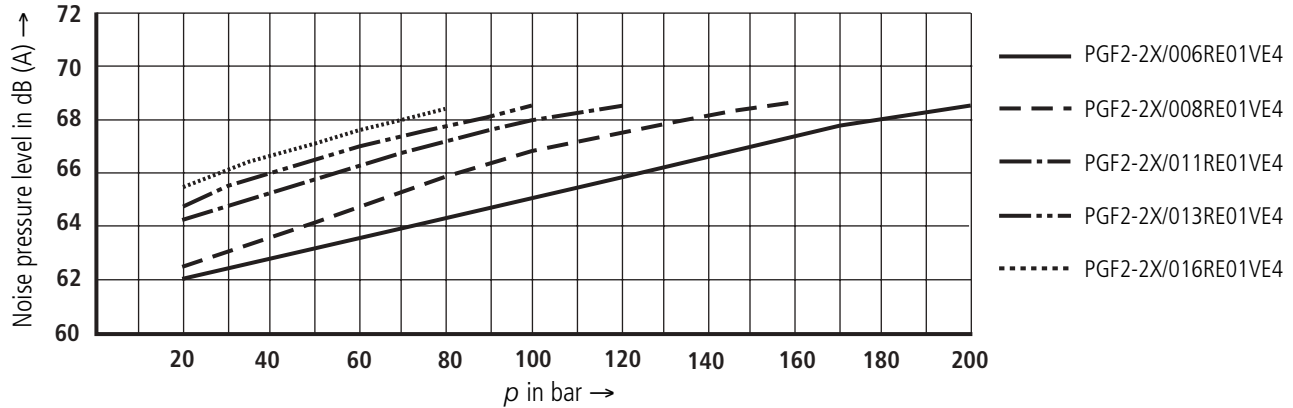
Mounting variant: Vertical mounting

	Mounting variants: Horizontal mounting and wall mounting	Mounting variant: Vertical mounting
Filling volume in litres	23	26
Withdrawal volume in litres	4.5	3.5
Withdrawal volume in litres oil level switch switching point	3.5	2.0

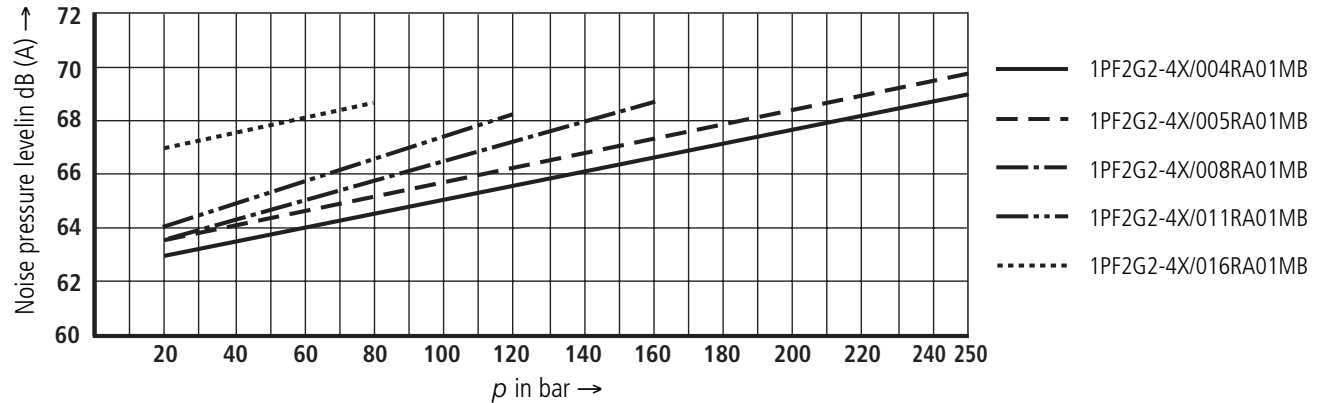
**Noise pressure level for the variable displacement axial piston pump type A10VSO (RE 92 712, RE 92 713)**



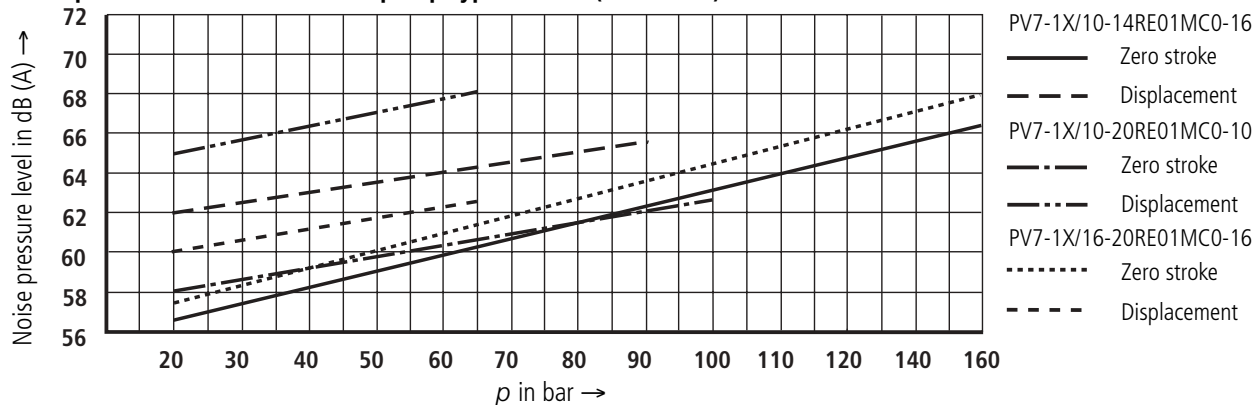
**Noise pressure level for the internal gear pump type PGF2-2X (RE 10 213)**



**Noise pressure level for the external gear pump type 1PF2G2-4X (RE 10 030)**

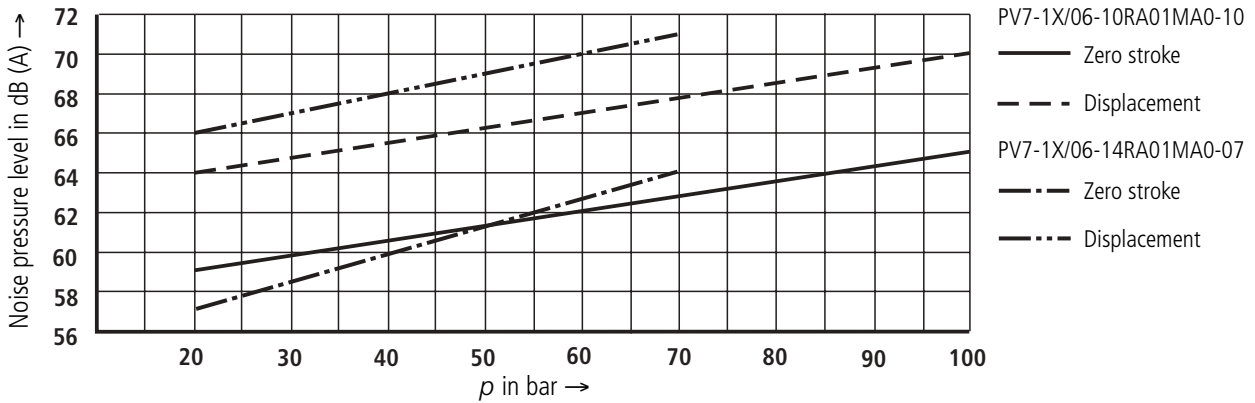


**Noise pressure level for the vane pump type PV7-1X (RE 10 515)**

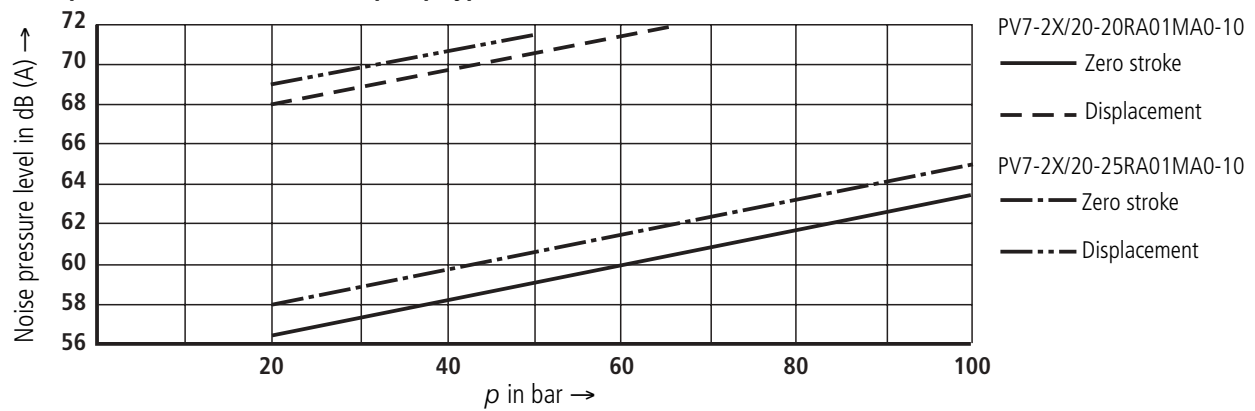


**Noise pressure level** (measured at  $n = 1450 \text{ min}^{-1}$ ,  $v = 41 \text{ mm}^2/\text{s}$  and  $\vartheta = 50 \text{ }^\circ\text{C}$ )

**Noise pressure level for the vane pump type PV7-1X (RE 10 520)**



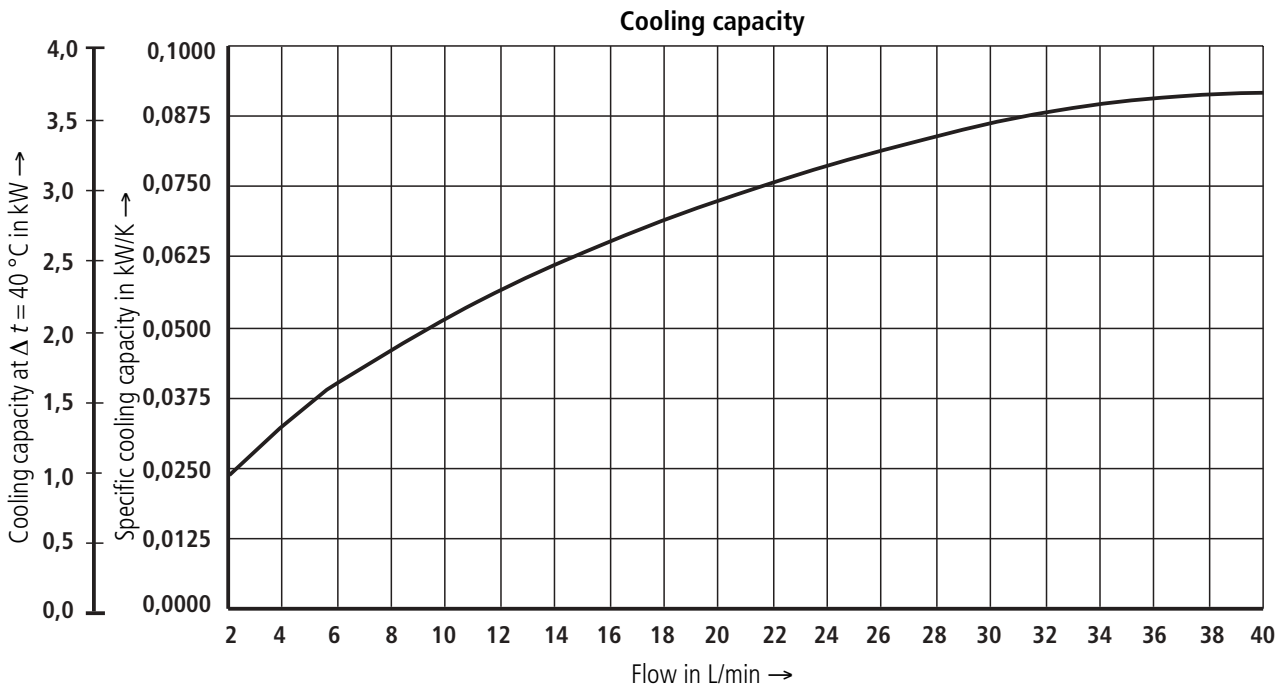
**Noise pressure level for the vane pump type PV7-2X (RE 10 521)**



**Oil/air cooler** <sup>1)</sup>

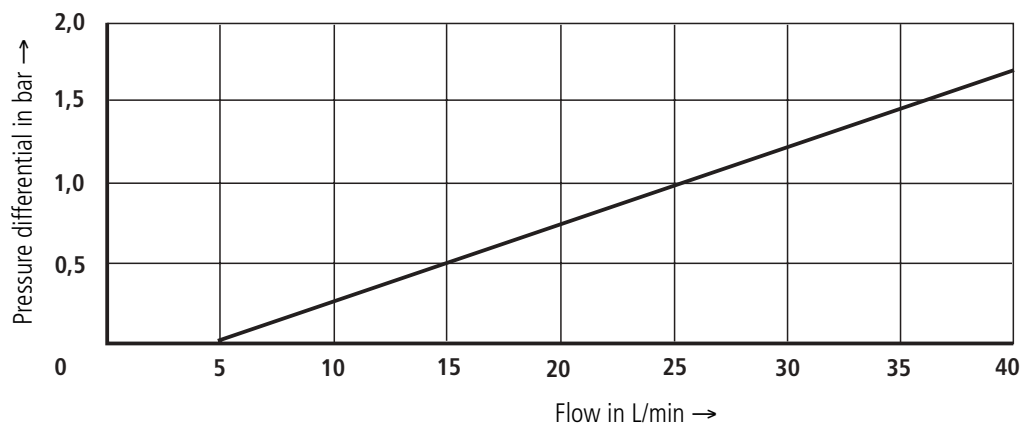
With the aide of the oil/air cooler a high power density has been achieved (relationship between drive power and reservoir size) for the UPE 5 power module.

Therefore, the power module with oil/air cooler can be used for continuous operation. The maximum operating pressure of the oil/air cooler is  $p_{\text{max}} = 10 \text{ bar}$ .



<sup>1)</sup> An oil/water cooler is available on request!

## $\Delta p - q_v$ characteristic curve (measured at $v = 41 \text{ mm}^2/\text{s}$ and $\vartheta = 50 \text{ }^\circ\text{C}$ )

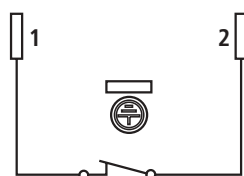


## Level switch (optional)

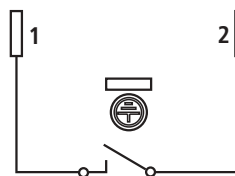
### Description

The pressure fluid level is electrically monitored by the level switch. When the minimum oil level is reached the contact opens and thereby gives a signal to the control.

### Terminal allocation



Maximum level



Minimum level

### Technical data

Maximum voltage	V	50 AC/DC
Maximum current consumption	A	0.25
Maximum power consumption	W	3.0
Protection		IP 65
Contact type		NC

## Temperature switch (optional)

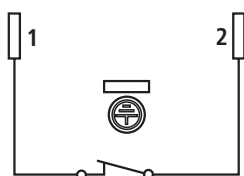
### Description

With the aid of the temperature switch the power module is protected against unpermissibly high oil temperatures. The temperature switch has a fixed switching point which switches at an oil temperature of

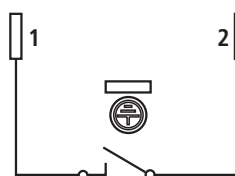
70 °C. The rest hysteresis is approx. 15 K.

The temperature switch is screwed into port T2 of the reservoir.

### Klemmenbelegung



Temperature  $\leq 70 \text{ }^\circ\text{C}$



Temperature  $> 70 \text{ }^\circ\text{C}$

### Technical data

Maximum voltage	V	230
Maximum current consumption	A	2
Protection		IP 65
Contact type		NC

## Commissioning guidelines

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- Check to ensure that the power module has been correctly connected to the machine which is to be driven (hydraulically and electrically).
- When connecting the electric motor the washers and connection bridges, which are within the scope of supply, must be used.
- The electric motor must be protected by suitable means which incorporates an overload relay.  
This must be set to the nominal current which is stated on the name plate / power name plate.
- When installing the power module particular attention must be given to the electric motor direction of rotation, see direction of rotation arrow.  
(Practical check: hold a piece of paper against the cooler, this must be sucked against the cooler.)
- Only fill the pressure fluid via a filter which has the applicable retention rate.
- Only fill the drive unit up to the upper edge of the sight glass.
- Under no circumstances allow the pump to run without any pressure fluid.
- Start the pump without load and allow it to displace for a few seconds at zero pressure so that adequate lubrication is ensured.
- The power module must only be applied using the permissible data. It must also only be used in good condition.
- If any work is to be carried out on the power module, then the system must be switched to zero pressure and flow.
- Changes and conversions done by yourselves which affect the safety and function are not permitted.
- Protective measures which are provided must not be removed.
- The general safety and accident prevention regulations are to be taken into account and must be adhered to.
- Keep the oil/air cooler clean and do not cover as, otherwise the pressure fluid and electric motor will over heat.
- The oil/air cooler maximum operating pressure must not be exceeded.

### Notes with regard to the EC machinery directive 89/392 EWG, annex II, section B:

The sub-assemblies are manufactured to conform with the harmonised standards prEN 982, prEN 983, DIN EN 292 and DIN EN 60 204-1.

The commissioning cannot be carried out until it has been confirmed that the machine, to which the sub-assemblies are to be fitted, conforms to the EC guidelines.

### Attention!

The drive module can heat up during operation.  
→ **Danger of injury!**

Adjustments, maintenance and service of the power module must only be carried out by authorised, trained and instructed personnel.

**Only use original Bosch Rexroth spare parts when carrying out repairs!**

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