

### Oil-Sealed Rotary Vane Pumps



P 4 Z | 322002

#### Advantages

- high water vapour tolerance for chemical applications
- compact, robust and functional construction
- low noise emission
- no oil contamination of the chamber by migration or suck-back
- high pumping speed
- free of non ferrous metals
- low, ultimate pressures are reached quickly
- long service intervals
- low energy consumption
- designed for permanent operation
- rotary vanes made of a special plastic which are not affected by corrosion or damaged by dirt particles and have very good sliding properties

#### Scope of Delivery

- rotary vane vacuum pump ready-to-use with oil charging
- motor protection switch, main power switch, mains cable and plug
- centering ring and clamping ring for inlet and exhaust
- gas ballast valve
- carrying handle
- special oils available on request

#### Range of Applications

- vacuum drying
- freeze drying
- vacuum concentration
- Schlenk lines
- backing turbomolecular pumps

#### Fully reliable rotary vane pumps

The two-stage rotary vane pumps of the P - Z series from Welch are characterized by their high water vapour tolerance and reliability. Welch Rotary Vane Pumps are designed to withstand large amounts of water vapour in the vacuum pump's inlet vapour stream. This "water vapour tolerance" is the maximum inlet pressure point at which the pump is able to operate with pure water / fluids and at the same time prevents them of condensing inside the pump.

Due to their low weight, high pumping speed and compact housing construction for wipe cleaning these pumps are ideally suited for use in laboratories for applications within rough and fine vacuum ranges from 1 to  $10^{-3}$  mbar.

### Fully accessorized Packages

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Two Stage direct-driven rotary vane pump lab & freeze dryer packages



P 4 Z SL package | 330041

#### P 4 Z

- bench top with Dewar vessel, 77l/min,  $2 \times 10^{-3}$  mbar, 230V, 50/60Hz, 1 Ph with Schuko, UK and US plug leads
- CAT. No. 110009

#### P 6 Z FD package

- with oil mist filter AKD, 2-way ball valve, hose adapter, PVC vacuum hose (1.5m), oil drain kit, 1 Liter spare oil
- CAT. No. 330036

#### P 8 Z FD package

- with oil mist filter AKD, 2-way ball valve, hose adapter, PVC vacuum hose (1.5m), oil drain kit, 1 Liter spare oil
- CAT. No. 330037

#### P 12 Z FD package

- with oil mist filter AKD, 2-way ball valve, hose adapter, PVC vacuum hose (1.5m), oil drain kit, 1 Liter spare oil
- CAT. No. 330038

#### P 4 Z VC package

- with oil mist filter AKD, inlet Separator, hose adapter, vacuum hose rubber red DN10 (3m), 1 Liter spare oil and oil drain kit
- CAT. No. 330039

#### P 6 Z SL package

- with PIZA 111 cr-gold, 2-way ball valve, oil mist filter OME 10/16, T-piece, hose adapter and rubber vacuum hose (3m), oil drain kit
- CAT. No. 330040

#### P 4 Z SL package

- with PIZA 111 cr-gold, 2-way ball valve, oil mist filter OME 10/16, T-piece, hose adapter and rubber vacuum hose (3m), oil drain kit
- CAT. No. 330041

\* FD - Freeze Dryer, VC- Vacuum Concentrator, SL - Schlenk Line

## Connection Kits

### Kit 3, 4 Freeze Dryer Adapter Kits

- All in one kit for connection to freeze dryer
- Adapter kits include 2-way ball valve, hose connector, hinged clamping ring, centering ring, AKD oil mist separator and 1.5m vacuum hose



Kit 3 | DN 16 | Cat. No. 330031  
Kit 4 | DN 25 | Cat. No. 330032

### Kit 7, 8 Vacuum Measurements Packages

- Reliable and accurate measuring for a wide range of application
- Vacuum measurement package includes PIZA 111 cr-gold handheld gauge with stand, T-connection, hinged clamping rings and centering rings



Kit 7 | DN 16 | Cat. No. 330051  
Kit 8 | DN 25 | Cat. No. 330052

### Kit 9, 10 Vacuum Control Packages

- A cost-effective package for controlling vacuum pressure up to  $10^{-3}$  mbar (0.001 torr). Easy to adapt to two-stage rotary vane pumps.
- Vacuum control package includes MRV 100 gauge with PIZA 111 cr-gold vacuum sensor, T-connection, solenoid valve, hinged clamping rings and centering rings



Kit 9 | DN 16 | Cat. No. 330053  
Kit 10 | DN 25 | Cat. No. 330054

### Kit 11, 12 Vacuum Pump Protection Package

- Protect your rotary vane pump from harmful vapours by trapping them in Dewar vessels
- Vacuum pump protection package includes AKS inlet separator, 2 Dewar vessels, connectors and flexible steel hose

Kit 11 | DN 16 | Cat. No. 330055  
Kit 12 | DN 25 | Cat. No. 330056

### Kit 13, 14 Chemical Trap Packages

- Protect your rotary vane pump from harmful vapours using acid neutralisation trap
- Chemical trap package includes acid neutralisation trap, elbow connection, hinged clamping ring and centering rings

Kit 13 | DN 16 | Cat. No. 330057  
Kit 14 | DN 25 | Cat. No. 330058

### Kit 15 Vacuum Oven Kit

- For easy connection of rotary vane pump to vacuum oven
- Vacuum oven kit includes 2.5m vacuum hose, hose connectors, hose clamps, oil mist filter, 1 litre Labovac 10 oil, hinged clamping rings and centering rings

Kit 15 | DN 16 | Cat. No. 330059

### Kit 16 Hose Kit with Hose Adapter

- Hose kit for connection of rotary vane pump to various apparatus
- Hose kit includes 8mm ID and 20mm ID vacuum hose (1.5m length each), hose connectors and hose clamps

Kit 16 | DN 16 | Cat. No. 330060

## Chemvac



6 Z-101 | 109030



12 Z-301 | 109031  
23 Z-301 | 109032

### Chemvac

The combination of a diaphragm pump with a rotary vane pump was developed to take advantage of the strong points of each type of pump. The two stage chemical duty diaphragm pump can withstand corrosive gasses and remove the resulting condensate prior to its absorption in the two stage rotary vane pump oil by constantly distilling the oil during operation. The rotary vane pump provides a much lower ultimate vacuum and will have a long life with the pump oil being free of contaminants.

### Advantages

- corrosion optimised combination system
- minimal oil contamination
- extended oil life
- high chemical resistance
- Labovac 14 oil for pumping solvent vapours

### Scope of Delivery:

- rotary vane & diaphragm combination vacuum pump ready-to-use with oil charging
- motor protection switch, main power switch, mains cable and plug
- centering ring and clamping ring for inlet and exhaust
- safety valve
- oil mist separator
- dial vacuum gauge for oil box
- solvent trap

### Packages & Accessoires

Accessoires	CAT.No.
Kit 5, Freeze Dryer & Vacuum Concentrator Adapter kit for Chemvac, DN 16 KF	330044
Kit 6, Freeze Dryer & Vacuum Concentrator Adapter kit for Chemvac, DN 25 KF	330045
Replacement Filter Element	800160
Labovac 10 oil, 1 litre (see page 37 for all vacuum pump oils)	800135

## RVP-Trolley

### RVP-Trolley

The mobile laboratory rotary vane pump system has been specifically designed for use in chemistry laboratories. Its construction has intentionally been kept simple, compact and clearly arranged.

The upstream cold traps enable even larger quantities of condensable vapours to be pumped without any additional pump load. A PIZA 111 cr-gold Multi-Range Vacuum Gauge for measuring the pressure can be easily attached to the to the stand rod.

### Advantages

- trolley mounted for portability
- Dewar vessels to protect pump from chemical vapours
- AKD oil mist separator to capture any oil mist

### Scope of Delivery:

- rotary vane vacuum pump ready-to-use with oil charging and mounted on the trolley
- motor protection switch, main power switch, mains cable and plug
- gas ballast valve
- oil mist separator
- two Dewar vessels
- PIZA 111 cr-gold handheld gauge (selected models)
- connectors, flanges and flexible steel hose



Rotary Vane Pump System, mobile

### Types

Description	CAT.-No.
P 4 Z - trolley with Dewar vessel, 77l/min, $2 \times 10^{-3}$ mbar, 230V, 50/60Hz, 1 Ph with Schuko, UK and US plug leads	110008
P 4 Z - trolley system with Dewar vessel and vacuum gauge PIZA 111 cr-gold, 77l/min, $2 \times 10^{-3}$ mbar, 230V, 50/60Hz, 1 Ph with Schuko, UK and US plug leads	110008-01
Trolley system with Dewar vessel and vacuum gauge PIZA 111 cr-gold for various rotary vane pump sizes (use your own or choose one from our range)	110008-02
Trolley system with Dewar vessel for various rotary vane pump sizes (use your own or choose one from our range)	110008-03
*Trolley Systems are equipped with the new advanced chemical resistant vacuum gauge PIZA 111 cr-gold	

## Technical Data

### Two-Stage Direct-Driven Rotary Vane Pumps



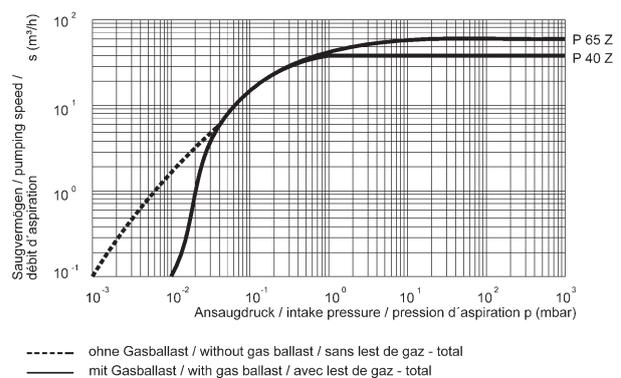
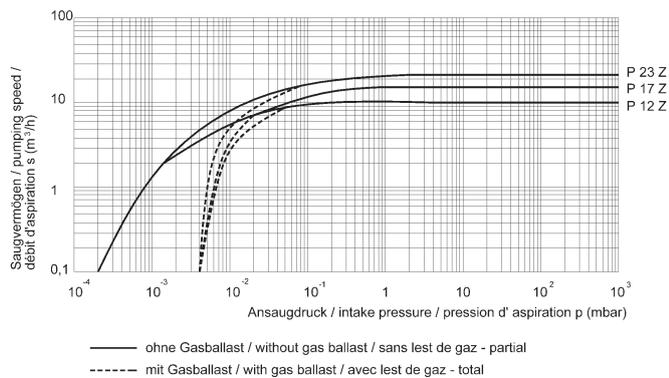
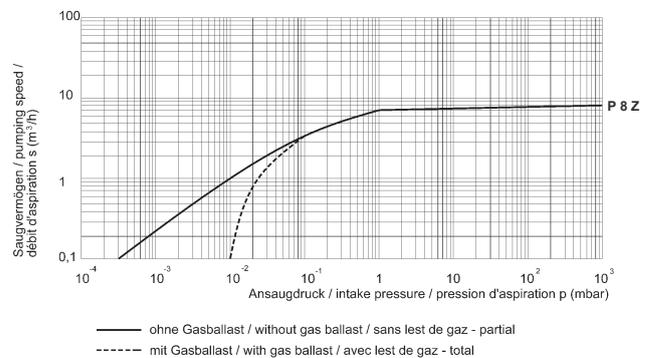
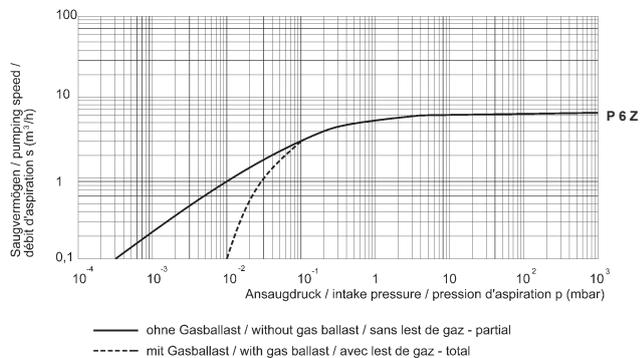
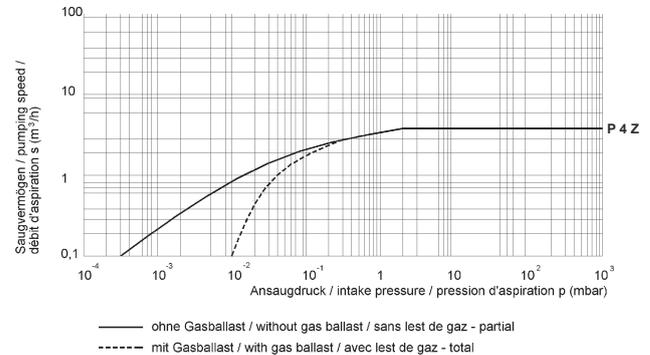
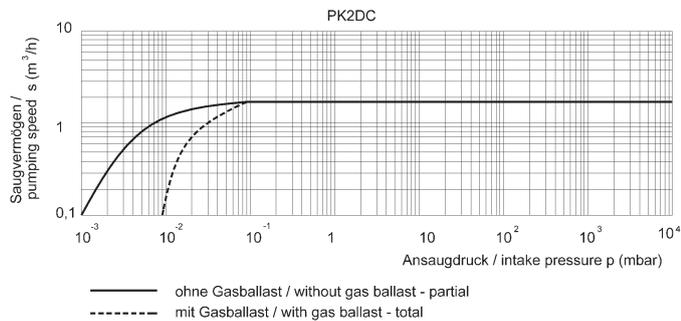
Parameter	Unit	PK 2DC	P 4Z	P 6Z	P 8Z	P 12Z	P 17Z	P 23Z	P 40Z	P 65Z
<b>Pumping speed 50/60 Hz</b> <i>to DIN 28426 part 1 (pneurop)</i>	m <sup>3</sup> /h l/min	1,8 / 2,2 30 / 36	4,6 / 5,5 77 / 92	5,8 / 7,0 97 / 116	7,2 / 8,6 120 / 144	11,0 / 13,2 183 / 220	16,0 / 19,2 267 / 320	21,0 / 25,2 350 / 420	38 / 45,6 633 / 760	60 / 72 1000/1200
<b>Ultimate pressure @ 50 Hz</b>										
- without gas ballast total	mbar	1 x 10 <sup>-2</sup>	2 x 10 <sup>-3</sup>	2 x 10 <sup>-3</sup>	2 x 10 <sup>-3</sup>	2 x 10 <sup>-3</sup>	2 x 10 <sup>-3</sup>	2 x 10 <sup>-3</sup>	4 x 10 <sup>-4</sup>	4 x 10 <sup>-4</sup>
- with gas ballast total		0,5	1 x 10 <sup>-2</sup>	1 x 10 <sup>-2</sup>	1 x 10 <sup>-2</sup>	3 x 10 <sup>-3</sup>	3 x 10 <sup>-3</sup>	3 x 10 <sup>-3</sup>	1 x 10 <sup>-2</sup>	1 x 10 <sup>-2</sup>
<b>Water vapour tolerance</b>	mbar	33	60	60	60	35	35	35	33	50
<b>IN connection</b>		DN 16 KF	DN 16 KF	DN 16 KF	DN 25 KF	DN 25 KF	DN 25 KF	DN 25 KF	DN 40 KF	DN 40 KF
<b>EX connection</b>	-	DN 16 KF	DN 16 KF	DN 16 KF	DN 25 KF	DN 25 KF	DN 25 KF	DN 25 KF	DN 25 KF	DN 40 KF
<b>Sound level</b>	dB (A)	< 40	< 48	< 48	< 48	< 50	< 50	< 50	< 52	< 56
<b>Oil filling</b>	ml	250	530	550	600	1000	800	820	1800	5500
<b>Frequency</b>	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
<b>Dimensions (W/D/H)</b>	mm	330 / 165 / 170	415 / 150 / 235	430 / 150 / 235	445 / 150 / 235	540 / 170 / 260	540 / 170 / 260	540 / 170 / 260	565 / 205 / 296	738 / 280 / 423
<b>Weight</b>	kg	8,0	17,5	19,5	21,5	35,0	37,0	38,0	39,0	83,0
<b>Ordering information</b>										
100/115/230V	-	-	322002	322003	322004	322005	322006	322007	-	-
300/400V	-	-	322002-01	322003-01	322004-01	322005-01	322006-01	322007-01	322008	322009
230V		322001	-	-	-	-	-	-	-	-
115V		322001-03	-	-	-	-	-	-	-	-
• Seal kit		302011	302081	302081	302081	302082	302082	302082	340006	340008
• Service kit	-	302012-1	302075	302076	302077	302079	302080	302080	340007	340009
<b>Accessories</b>										
• Separator AKD (pressure side)		-	320015	320015	320017	320017	320017	320017	-	-
• Separator AKS (suction side)		-	320016	320016	320018	320018	320018	320018	-	-
• Oil mist filter OME (pressure)		700010	700010	700010	700011	700011	700011	700011	700013	700009
• Freeze Dryer Adapter Kit	-	330044	330031	330031	330032	330032	330032	330032	-	-

### Chemvac pumps



Parameter	P 6 Z - 101	P 12 Z - 301	P 23 Z - 301
Number of heads/stages	2/2	2/2	2/2
Free Air Displacement, m <sup>3</sup> /h	5,8	11	21
Free Air Displacement, l/min	97	183	350
Ultimate pressure, mbar	2x10 <sup>-3</sup>	2x10 <sup>-3</sup>	2x10 <sup>-3</sup>
Water vapor tolerance, mbar	70	80	45
Intake/Exhaust connection	DN 16 KF	DN 25 KF	DN 25 KF
Sound level, dB	50	50	50
Dimensions (W/D/H), mm	500/330/340	590/345/420	590/345/420
Weight, kg	25,5	42,5	46
<b>Ordering Information</b>			
230V 50/60Hz	109030	109031	109032

# Intake Pressure / Pumping Speed - Diagrams



## Accessories

Description	Size	CAT. No.
Oil Mist Separator AKD 16	DN 16 KF	320015
Oil Mist Separator AKD 25	DN 25 KF	320017



Description	Size	CAT. No.
Inlet Condensor AKS 16	DN 16 KF	320016
Inlet Condensor AKS 25	DN 25 KF	320018



Description	Size	CAT. No.
Oil Mist Filter OME 10/16	DN 16 KF	700010
Oil Mist Filter OME 10/25	DN 25 KF	700011



Description	Size	CAT. No.
Condenser SS, water cooling	SKS 40/25	700066
Condenser SS, water cooling	SKS 40/16	700261



Description	Size	CAT. No.
Hose Connector Adapter SS	DN 16 KF - DN 12	701702
Hose Connector Adapter SS	DN 25 KF - DN 20	701704
Hose Connector Adapter SS	DN 25 KF - DN 12	710209
Hose Connector Adapter SS	DN 16 KF - DN 20	701712-02



Description	Size	CAT. No.
Fine Vacuum Adsorption Trap, SOF 16	DN 16 KF	705179
Fine Vacuum Adsorption Trap, SOF 25,	DN 25 KF	705180



Description	Size	CAT. No.
Exhaust Separator with Oil Return Kit	DN 16 KF	705181
Exhaust Separator with Oil Return Kit	DN 25 KF	705182



Description	Size	CAT. No.
Male Hose Adapter Al	DN 16 KF / 16mm I.D. for PVC Hose	710052
Male Hose Adapter Al	DN 25 KF / 25mm I.D. for PVC Hose	710053



Description	Size	CAT. No.
PVC Cord-Reinforced Flexible Vacuum Hose, DN 16	16mm ID, 3.5mm wall thickness	710058
PVC Cord-Reinforced Flexible Vacuum Hose, DN 25	25mm ID, 5mm wall thickness	710059



Description	CAT. No.
Replacement element for OME 10/16, OME 10/25, AKD 16 and AKD 25	800160
Oil Drain/Change Starter Kit for One and Two-stage Rotary Vane Pumps (P*Z and P*E line)	340003



## Labovac

Use Welch pump oils to reduce oil change cycles and maximize performance. The warranty is only effective when using Welch qualified vacuum pump oils.

Please note that for demanding applications not all types of Welch vacuum pump oil can be used. please contact your local Welch representative for further details.

### Labovac 10 - Mineral oil

Standard oil for One and Two-Stage Welch Rotary Vane Pumps and chemvac's . To pump air, inert gas and noble gas.

Remarks:

Oil service cycles can be extended by using an oil filter.

### Labovac 11 - Synthetic oil

Used for high operating temperatures > 100°C, specially in One-Stage rough vacuum rotary vane pumps.

Remarks:

Do not pump any inorganic acids. Ultimate pressure up to 0.5 mbar.

### Labovac 12S - Paraffin based mineral oil

For pumping air, chemically inert permanent gases - water vapour, solvent vapors.

Remarks:

Oil service cycles can be extended by using a chemical oil-filter. Pump should operated with a cold trap.

### Labovac 13 - PFPE oil

For pumping strong oxidants like oxygen, ozone and reactive substances (halogens).

Remarks:

Mixing with other types of oil must be absolutely avoided. we recommend to order the rotary vane pump directly with these vacuum oil to ensure best performance.

### Labovac 14 - Polyalphaolefin oil (PAO)

For pumping of chemically inert permanent gases - water vapor and solvent vapors. Improved cold starting at low temperatures.

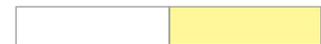
Remarks:

A oil-filter is strongly recommend. Ultimate pressure up to 10<sup>-2</sup>mbar.

### Vacuum Pump Oil Condition Color

Vacuum Pump oil can become contaminated with ingested fluids and vapors. Use recommended pump oil and change your pump oil regularly. Cloudy and discolored oil will lead to premature pump failure. Make the clear choice and change your oil regularly.

Good



Bad (Possible Pump Damage)



## Ordering information

	Labovac 10 Mineral oil	Labovac 11 Synthetic oil	Labovac 12S Paraffin based mineral oil	Labovac 13 PFPE oil	Labovac 14 Polyalphaolefin (PAO) oil
1 Liters (1.1qt)	800122	800125	800128	800131	800135
2 Liters (2.1qt)	-	-	-	800132	800136
5 Liters (3.5qt)	800120	-	-	800133	800137
10 Liters (10.6qt)	800123	800126	800129	800134	800138
20 Liters (21.2qt)	800124	800127	800130	-	-
200 Liters (1.2ba)	800119	-	-	-	-