

**AERZEN**

## **POSITIVE DISPLACEMENT BLOWERS**

for conveying of air and neutral gases for high vacuum



**AERZEN**

**AERZENER MASCHINENFABRIK  
GMBH**

G1-090 | 01 | EN

1000 6.2005

## Customers' benefit due to technical progress

Since 1868 the Aerzener Maschinenfabrik has been manufacturing Positive Displacement blowers (Roots type). It is one of the oldest and largest manufacturers and is market leader in Europe. Especially in vacuum technology Aerzen has experience of more than 60 years. Technical know-how, experienced personnel and a constant dialogue with the customers are the basis for successful new developments from Aerzen.

Customers' benefit is of prime importance. By means of innovative products the Aerzener Maschinenfabrik guarantees to plant manufacturers and – users to secure their lasting success on the market.

## Fields of application and use

The blowers made by Aerzener series HV have been designed for conveying air and neutral gases and are especially used in industrial High Vacuum technology. With a total of 19 sizes the blowers cover theoretical nominal intake volume flows from 180 to 97.000 m<sup>3</sup>/h and pressure ranges from 10<sup>-3</sup> mbar abs. up to approx. 200 mbar abs.

Examples for the various fields of application:

- coating technology
- chemistry- and process technology
- metallurgy / construction of melting furnaces
- packing industry
- central vacuum plants
- helium leakage detection units
- manufacture of lamps and tubes
- drying technology
- machine construction
- electronics
- automobile industry
- etc.



▲ 4-stage vacuum plant with 2 x 30.000 m<sup>3</sup>/h intake volume in steel degassing ▼

▼ 3-stage pumping set for 2 x 12.000 m<sup>3</sup>/h in inscription technology ▼



## Design and construction

The vacuum blower made by Aerzener distinguishes itself by O-ring-seals on the housing flanges, vacuum-tightness and air cooling of the blower stage. The lube oil supply is effected by splash lubrication. As lubricant mineral oil as well as Anderol and PFPE-oil mostly used for conveying oxygen can be used. The series HV is equipped with a special oil slinger-piston ring-labyrinth seal between conveying chamber and bearing chambers. In addition a largely dimensioned neutral chamber with condensate channels is installed. Furthermore the neutral chamber can be purged with seal gas, in order to achieve an increased purging effect. The sealing of the driving shaft is guaranteed by double radial seal rings with an oil chamber.

The blower is driven by direct coupling with motor, alternatively in case of high volume flows with spur gear. It is even possible to use a narrow V-belt drive in case of limited differential pressure. The driving unit consists of a cast connection piece with perforated plate cover, flexible coupling and flanged B5-motor, equipped as per IEC-standard and additionally with 3 PTC-resistors. As standard EFF1- or EPACT-motors are used for highest energy efficiency. The drive is suitable for frequency converter.

## Modifications: Options

- ATEX-approval for zones 0 (internal), 1 (internal + external), 2 (internal + external)
- Design of the housing parts made of nodular cast iron
- Rotary pistons and housing parts made of steel casting and CrNi-steel casting
- Pressure-proof housing
- Heatable blowers series wHV
- Gastightly closed rotary pistons
- Water-cooled seal ring housings
- Use of oxygen-compatible lubricants and seals approved for oxygen
- Teflon sealed housing flange connections
- Special designs for helium-applications
- Use of canned motors (can even be retrofitted)



## Advantages for the customer

- Largest vacuum blower series with 19 sizes and volume flows of 180 m<sup>3</sup>/h up to 97.000 m<sup>3</sup>/h
- ATEX-certification even for zone 0 (internal)
- Energy saving by EFF1-/EPACT-motors
- Best selection possibilities due to fine-structured steps of volume flows
- Due to high mechanical loading capacity (stage up to 200 mbar – in case of drive depending on selected motor rating up to 140 mbar) considerable reduction of pumping-down times
- Variable adaptation to special applications by manifold modification possibilities
- Vertical and horizontal installation position
- Variable direction of flow (up to 2.800 m<sup>3</sup>/h even both-sided)
- Aerzen's reliability and experience (more than 15.000 vacuum blowers in use worldwide)
- Worldwide Sales- and service system
- Excellent price-/performance ratio

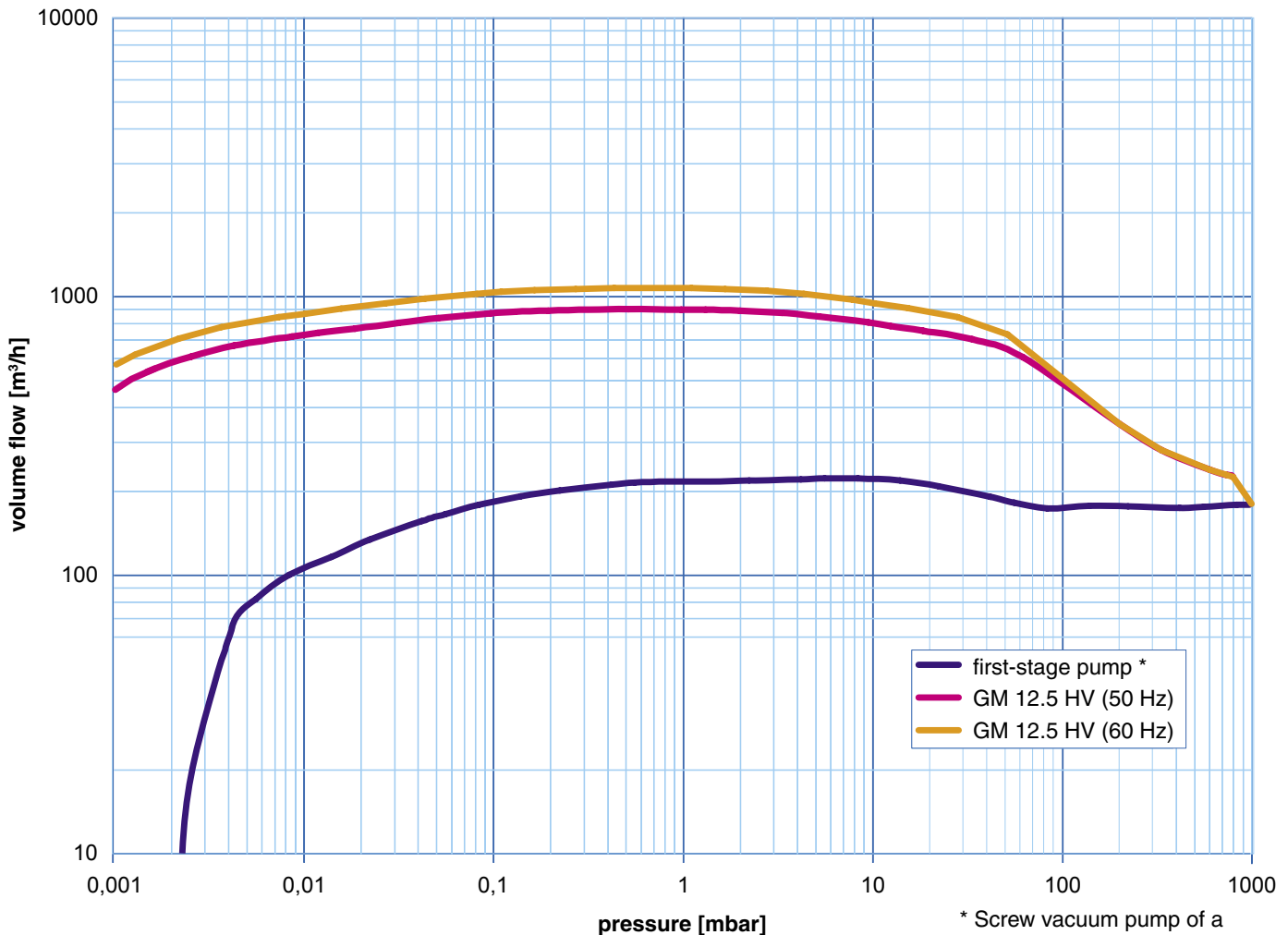
## ATEX

The Aerzen vacuum blowers series HV as well as blowers with canned motor drive series CM are type-tested (according to guideline 95/9/EG) and certified for ATEX-zone 0 (internal), temperature class T3 (200 °C).

Externally the blowers are approved for zone I, temperature class T4 (135 °C).



## Achievable effective suction curves with Aerzen blowers with canned motor type HV



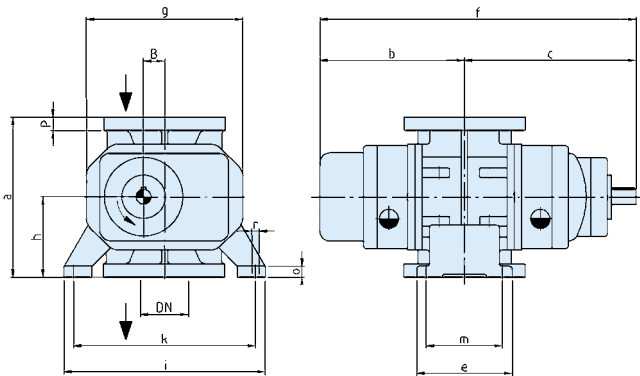
\* Screw vacuum pump of a foreign manufacturer



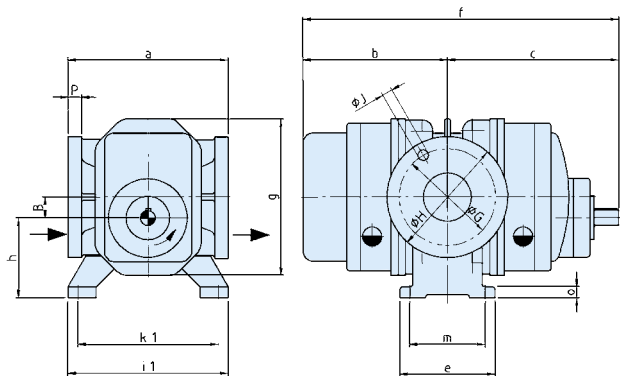
## Operating- and Performance Diagrams for Aerzen High Vacuum Blowers

For sizes	50 Hz - operation			60 Hz - operation		
	Suction volume $S_{th}$ [m <sup>3</sup> /h]	Speed [1/min]	Drawing.-no. Performance diagram	Suction volume $S_{th}$ [m <sup>3</sup> /h]	Speed [1/min]	Drawing.-no. Performance diagram
GMa / GLa 10.0 HV	180	2950	4 TG - 4161	215	3600	4 TG - 4169
GMa / GLa 10.1 HV	240	2950	4 TG - 3708	295	3600	4 TG - 4136
GMa / GLa 10.2 HV	365	2950	4 TG - 4149	440	3600	4 TG - 4145
GMa / GLa 11.3 HV	500	2950	4 TG - 3709	600	3600	4 TG - 4137
GMa / GLa 11.4 HV	730	2950	4 TG - 4150	880	3600	4 TG - 4146
GMa / GLa 12.5 HV	1000	2950	4 TG - 3710	1200	3600	4 TG - 4138
GMa / GLa 12.6 HV	1400	2950	4 TG - 4151	1700	3600	4 TG - 4147
GMa / GLa 13.f7 HV	2010	2950	4 TG - 3711	2420	3600	4 TG - 4139
GMa / GLa 13.8 HV	2840	2950	4 TG - 4152	3420	3600	4 TG - 4148
GMb / GLb 14.9 HV	1915	1470		2350	1800	4 TG - 3858
GMb / GLb 14.9 HV	3850	2950	4 TG - 3712	4700	3600	4 TG - 3859
GMb / GLb 15.10 HV	2750	1470	4 TG - 4174	3300	1800	4 TG - 4206
GMb / GLb 15.10 HV	5500	2950	4 TG - 3713	6650	3590	4 TG - 4052
GMb / GLb 15.11 HV	3750	1470	4 TG - 4216	4500	1800	4 TG - 4007
GMb / GLb 15.11 HV	7350	2950	4 TG - 3714	8950	3590	4 TG - 4053
GMb / GLb 16.12 HV	5330	1470	4 TG - 3715	6500	1800	4 TG - 4208
GMb / GLb 16.f13 HV	8000	1470	4 TG - 3716	9800	1800	4 TG - 4209
GMb / GLb 16.13 HV	9535	1470	4 TG - 3717	11600	1800	4 TG - 4210
GMb 17.15 HV	10135	950		12800	1200	4 TG - 4215
GMb 17.15 HV	15685	1470	4 TG - 3718	19050	1800	4 TG - 4211
GMb 18.17 HV	20800	950		26280	1200	4 TG - 4255
GMb 18.17 HV	32200	1470				
GMb 19.19 HV	37565	950		47450	1200	
GMb 20.21 HV	97000	950				

## Dimensions of Aerzen Vacuum Blower stages Type . . . HV



Type of construction GMa / GMb . . . HV



Type of construction GLa / GLb (to size 16.13)

Type of construction	a	b	c	e	f	g	h	i	i1	k	k1	m	o	r	B	DN	G	H	P	weight approx. kg
GMa/GLa 10.0	264	224	262	152	486	258	132	332	264	300	232	120	18	M12	34	50	125	165	18	70
GMa/GLa 10.1	264	239	283	157	522	258	132	332	264	300	232	125	18	M12	34	80	160	200	22	80
GMa/GLa 10.2	264	287	324	239	611	258	132	332	264	300	232	207	18	M12	34	80	160	200	22	90
GMa/GLa 11.3	320	280	324	200	604	295	160	390	300	350	260	150	20	M16	426	100	180	220	22	115
GMa/GLa 11.4	320	330	374	290	704	295	160	390	300	350	260	245	24	M16	426	100	180	220	22	135
GMa/GLa 12.5	360	325	380	260	705	360	180	440	336	400	296	210	30	M16	533	100	180	220	22	175
GMa/GLa 12.6	360	381	436	340	817	360	180	500	396	460	356	290	27	M16	533	150	240	285	24	215
GMa/GLa 13.f7	400	383	423	330	806	436	200	570	440	510	380	270	35	M20	675	150	240	285	24	260
GMa/GLa 13.8	400	453	493	470	946	436	200	570	440	510	380	410	27	M20	675	150	240	285	24	360
GMb/GLb 14.9	500	470	510	350	980	538	250	652	484	600	432	290	35	M20	84	200	295	340	26	435
GMb/GLb 15.10	630	468	545	360	1013	652	315	800	588	720	508	280	50	M20	106	200	295	340	26	610
GMb/GLb 15.11	630	533	610	490	1143	652	315	800	588	720	508	410	50	M20	106	250	350	395	26	680
GMb/GLb 16.12	710	506	603	442	1109	810	355	910	640	830	560	297	30	M24	135	250	350	395	24	970
GMb/GLb 16.f13	710	620	717	670	1337	810	355	910	640	830	560	525	30	M24	135	300	400	445	24	1120
GMb/GLb 16.13	710	685	782	800	1467	810	355	910	640	830	560	655	30	M24	135	300	400	445	24	1160
GMb 17.15	1000	782	825	855	1607	1005	500	930		810		725	50	M30	1675	350	460	505	24	2020
GMb18.17	1120	950	994	1120	1944	1240	560	1160		1050		900	50	M30	210	500	620	670	34	3400
GMa 19.19	1420	1075	1079	1270	2154	1518	710	1320		1200		1010	50	M30	264	600	725	780	36	5070
GMa 20.21 T	1800	1567	1468	1965	3039	1879	630	1640		1500		1615	50	M30	320	800	950	1015	44	10400

Admissible mechanical loading capacity acc. to sheet 4 TG - 3381, 4TG - 3382 and 4 TG - 4218

Socket flanges drilled acc. to DIN 2532 resp. 2533



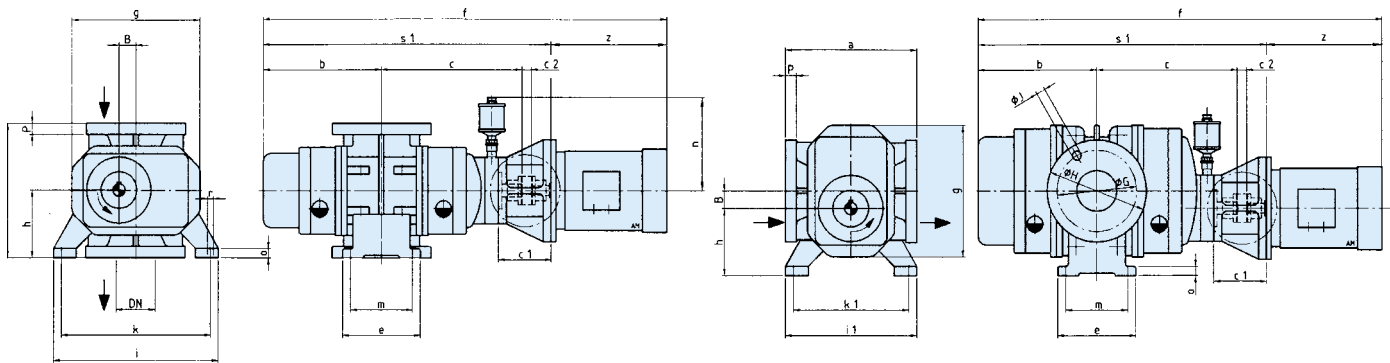
### Technical data of Aerzen High vacuum Blower units HV

Tape of construction		Theor. intake volume flow $S_{in}$ in case of operation with 50 Hz/60 Hz [ m <sup>3</sup> /h ]	Max. admissible differential pressure in case of motor rating [ mbar ]	Oil filling quantities for		Motor rating at 50 Hz / 60 Hz [ kW ]	Motor size	Speeds at 50 Hz / 60 Hz [ 1/min ]	System voltages at	
				GMa/b	GLa/b				50 Hz	60 Hz
				[ litre ]	[ litre ]				[ V ]	[ V ]
GMa / GLa	10.0 HV	180 / 220	130	0,9	0,7	0,75 / 0,85	80	3000 / 3600	230/400	440 - 480
GMa / GLa	10.1 HV	250 / 300	140	0,9	0,7	1,1 / 1,32	80	3000 / 3600	230/400	440 - 480
GMa / GLa	10.2 HV	365 / 450	130	0,9	0,7	1,5 / 1,8	90 S	3000 / 3600	230/400	440 - 480
GMa / GLa	11.3 HV	500 / 600	140	1,1	0,8	2,2 / 2,6	90 L	3000 / 3600	230/400	440 - 480
GMa / GLa	11.4 HV	750 / 900	130	1,1	0,8	3 / 3,6	100 L	3000 / 3600	400/690	440 - 480
GMa / GLa	12.5 HV	1000 / 1200	130	1,5	1,1	4 / 4,8	100 L	3000 / 3600	400/690	440 - 480
GMa / GLa	12.6 HV	1430 / 1700	130	1,5	1,1	5,5 / 6,3	112 M	3000 / 3600	400/690	440 - 480
GMa / GLa	13.7 HV	2000 / 2400	110	2,5	2,1	7,5 / 8,8	132 S	3000 / 3600	400/690	440 - 480
GMa / GLa	13.8 HV	2900 / 3450	100	2,5	2,1	11 / 12,5	160 M	3000 / 3600	400/690	440 - 480
GMb / GLb	14.9 HV	3900 / 4700	80	7	3,5	11 / 12,5	160 M	3000 / 3600	400/690	440 - 480
GMb / GLb	15.10 HV	5600 / 6700	80	12	5,4	15 / 17	160 M	3000 / 3600	400/690	440 - 480
GMb / GLb	15.11 HV	7500 / 9000	80	12	5,4	18,5 / 21,0	160 L	3000 / 3600	400/690	440 - 480
GMb / GLb	16.13 HV	8150 / 9800	75	11	7,6	18,5 / 21,0	180 M	1500 / 1800	400/690	440 - 480
GMb / GLb	16.13 HV	9750 / 11700	75	11	7,6	22 / 25	180 L	1500 / 1800	400/690	440 - 480
GMb / GLb	17.15 HV	16000 / 18825	60	18,5	---	30 / 36	200 L	1500 / 1800*	400/690	440 - 480

Different motor size possible

\* = only with rotary pistons made of EN-GJS-400-15 (GGG-40)

### Dimensions



Type of construction GMa / GMB

Type of construction GLa / GLb

Tape of construction	a	b	c	c 1	e	f	g	h	i	i 1	k	k 1	m	n	s 1	z	DN	G	H	Weight approx. kg	
GMa / GLa	10.0 HV	264	224	262	106	152	780	258	132	332	264	300	232	120	250	544	236	50	125	165	95
GMa / GLa	10.1 HV	264	239	283	106	157	816	258	132	332	264	300	232	125	250	580	232	80	160	200	105
GMa / GLa	10.2 HV	264	287	324	116	239	933/958	258	132	332	264	300	232	207	250	679	254/279	80	160	200	125
GMa / GLa	11.3 HV	320	280	324	134	200	951	295	160	390	300	350	260	150	250	672	279	100	180	220	150
GMa / GLa	11.4 HV	320	330	374	146	290	1100	295	160	390	300	350	260	245	250	784	316	100	180	220	180
GMa / GLa	12.5 HV	360	325	380	186	260	1118	360	180	440	336	400	296	210	250	785	333	100	180	220	230
GMa / GLa	12.6 HV	360	381	436	206	340	1289	360	180	500	396	460	356	290	250	917	372	150	240	285	295
GMa / GLa	13.7 HV	400	375	423	206	330	1276	436	200	570	440	510	380	270	250	907	372	150	240	285	345
GMa / GLa	13.8 HV	400	445	493	234	470	1560	436	200	570	440	510	380	410	250	1075	488	150	240	285	485
GMb / GLb	14.9 HV	500	470	510	263	350	1606	538	250	652	484	600	432	290	260	1118	488	200*	295	340	580
GMb / GLb	15.10 HV	630	468	545	281	360	1629	652	315	800	588	720	508	280	270	1151	486	200*	295	340	770
GMb / GLb	15.11 HV	630	533	610	281	490	1813	652	315	800	588	720	508	410	270	1281	532	250*	350	395	840
GMb / GLb	16.13 HV	710	620	717	297	670	2036	810	355	910	640	830	560	525	290	1482	554	300*	400	445	1350
GMb / GLb	16.13 HV	710	685	717	297	800	2204	810	355	910	640	830	560	655	290	1612	592	300*	400	445	1400
GMb / GLb	17.15 HV	1000	782	825	297	855	2421	1005	500	930	920	810	810	725	290	1752	669	350*	460	505	2300

Socket flanges drilled acc. to DIN 2533 / \* = DIN 2532