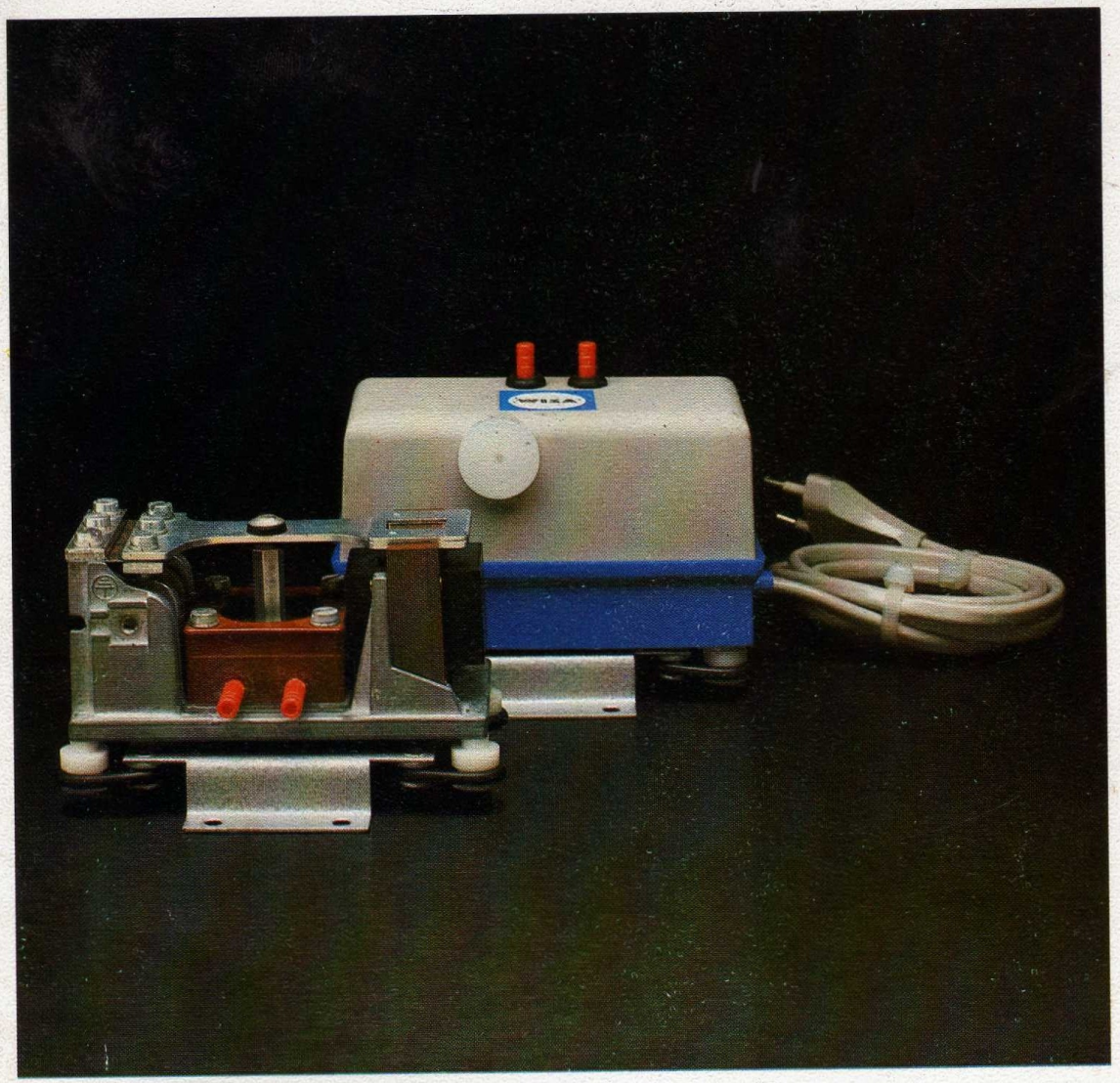
This is a 1990 technical information catalog from WISA for the 100 to 1000 series air pumps. WISA 300 air pumps were sold as an aftermarket updates to the ET-2 and 2.5 series of air bearing tonearms under the trade name “Airtech” along with a surge tank. We do not supply parts for these pumps. This catalog provides some technical and maintenance information for owners of the model 300 air pumps. Parts of the manual are omitted related to the 100,200, and 1000 series pumps.



'WISA'

AIR PUMPS
METERING GAS PUMPS

LIST OF CONTENTS

Technical data, list of types, pictures and drawings (dimensions)

3. SUMMARY OF OUTPUT RANGES

WISA diaphragm pumps operate in the following output range.
(See also Technical Data, Performance Diagrams, and Installation Dimensions.)

3.1 Pressure pumps

Type	old * marking:	max. pressure: ± 10 % mWG/(bar)	free output: ± 10 % l/min
1110	M 110	2,8/(0,27)	2,8
1111	M 110 vD	3,5/(0,34)	4,5
1210	M 120	2,8/(0,27)	2,8
2010	M 200	3,5/(0,34)	4,5
2011	M 200 vD	4,5/(0,44)	4,8
3010	M 300	5,0/(0,49)	6,5
3011	M 300 vD	6,8/(0,67)	8,5
3018	M 300 vD-H	11,0/(1,0)	4,0
5040	M 1000	5,1/(0,5)	20,5

3.2 Vacuum pumps

Type	old* marking:	max. pressure: ± 10 % mWG/(bar)	free output: ± 10 % l/min
1130	M 110 VDS	-2,8/(0,27)	4,0
1131	M 110 VDS vD	-4,4/(0,43)	3,4
1230	M 120 VDS	-2,8/(0,27)	3,0
1231	M 120 VDS vD	-4,4/(0,43)	3,3
2030	M 200 VDS	-3,0/(0,29)	4,5
2031	M 200 VDS vD	-4,5/(0,44)	5,4
3030	M 300 VDS	-4,2/(0,41)	5,5
3031	M 300 VDS vD	-5,5/(0,54)	6,5
5040	M 1000	-3,7/(0,36)	20,5

*Don't use old marking in case of order

3.3 Running noise

One of the reasons of the success of WISA diaphragm pumps is their very quiet running.

However, the running noise can be greatly modified by resonance phenomena. It is therefore important, when installing the pumps, to make sure that they do not stand on a base which can readily vibrate. Unsatisfactory installations can cause rattling or squeaking noises which do not originate in the pump.

With the pump standing on a firm base, the following noise levels were found at a distance of 1 m from it in the noise measuring cubicle (approx. readings); the gas connections were taken outside the cubicle

Series 110, 120, 200 and 300
Normal output, with casing
40 to 43 dB, with free exhaust

Series 1000
Normal output, with steel-sheet casing
51 to 53 dB, with free exhaust.

4. ELECTRICAL AND MECHANICAL DESIGN

4.1 Connections to the electric mains

WISA diaphragm pumps are only designed for one mains frequency. If, for instance, a pump designed for 60 Hz is run off the 50 Hz mains, a considerable drop in performance is unavoidable.

The mains voltages of the standard models are listed in our tables. The models of series 110, 120 and 300 are also available with an electronic chopper for 12 V, d.c.

4.2 Electric connecting equipment

Almost all of the usual types of flex or cable with plugs can be used. Pumps without casing are usually ordered with permanently wired flex (e.g. about 30 cm long) without plug. We can also equip our pumps with simple terminal strips. For a complete summary see the list of types. We are quite willing to make models differing from our standard types, even in small batches, if the connecting means are made available to us.

We try to use for connection to the mains only flexible cable approved by the official testing stations of the various countries.

4.3 Casing and installation systems

WISA diaphragm pumps can be purchased with or without casing. Exceptions from this rule depend on the function of the pump and are marked in the type lists.

We distinguish between the following arrangements:

1. with casing, with rubber feet
2. with casing, with 4 mm threaded bore (M 4) in lower casing part, for antivibration mounting,
3. with casing, with suspension system,
4. without casing,
5. without casing, with suspension system.

The inexpensive suspension system is recommended in particular if the vibration to be submitted to other components of an installation is to be reduced to a minimum. The pump is suspended from four rubber O rings. (See Installation Dimensions and Installation System). If larger batches are ordered, the suspension system can be adapted to your design requirements. We shall be pleased to submit ideas for transport guards and stops, if these are required for built-in pumps.

People try sometimes to suspend the pumps from steel helical springs or mount them on specially designed vibration tables. This may affect the service life of the system. The vibrations of the armature arm excite vibrations of the suspension system.

This may cause the pump output to fall or the leaf spring to fracture (resonance fracture).

Customers developing their own suspension system should make sure it is tuned to very low naturral frequencies, and well damped.

5. ADJUSTMENT OF DELIVERY

The delivery of WISA diaphragm pumps can be adjusted in various ways (see Type List).

5.1 Magnetic shunt (slider system)

In some variants of Model 300, the flux in the air gap of the magnet can be reduced (Fig. 2). The position of the magnetic shunt is changed by means of a sliding rod projecting on the side.

The range of settings can be taken from the performance diagrams (see Technical Data). This method of adjustment is very robust and reliable.

5.2 Magnetic shunt (fixed system)

In the case of Models 110, 120, and 200 without casing, the delivery can be altered by means of a fixable magnetic shunt (Fig. 3). The working setting of the pump is set up at the makers' works can be altered by the customer. This arrangement is particularly suitable for users who use one type of pump for several types of equipment operating at different deliveries.

5.3 Adjustment with potentiometer

Gas or air output of the pumps or max. pressure can be adjusted by a serie resistance. With relationship to electrical power input, following variable resistances may be used.

Model 110/120	–	15 to 22 k Ohm/3 - 5 Watt
Model 300	–	12 k Ohm/10 Watt

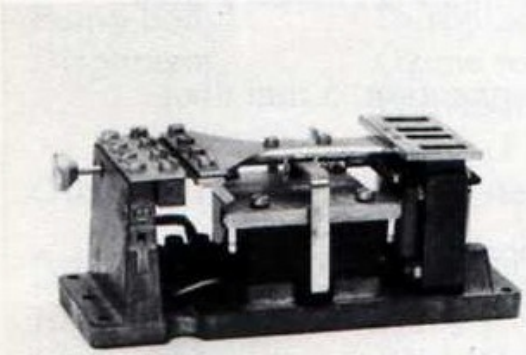


Fig. 2

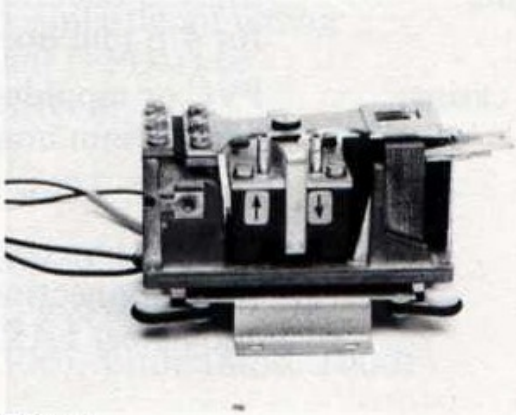


Fig. 3

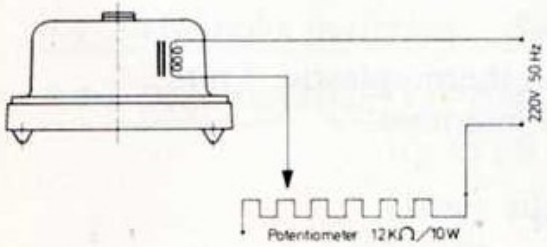


Fig. 4 Adjustment of output with potentiometer.
Principles of electrical connections. – WISA 300

6. AIR/GAS PATHS

6.1 Air/gas filter

The air or metered gas sucked into the pump must first be purified so as not to impair the valve functions. Normally a simple cotton wool filter in the gas path is adequate. However, regular maintenance is necessary, depending on the quantity of dust collected. In some pressure pumps with casing, the suction filters are mounted in the cover.

Small gas filters are listed in our programme of accessories (Section 12)

6.2 Air/gas connections

The air/gas connections of our pumps are arranged as follows:

Models 120, 200, and 300:

with casing:	Brass connection, 5 mm dia., nickel plated for 4/6 mm hose
without casing:	PVC or moulded connection, 5 mm dia., for 4/6 mm hose

Exception:

Model 300	with casing, corrosion resistant Hose connection, 6 mm dia. alloy steel 1.4571
Model 1000	
with casing:	Delivery connection St 37 steel, nickel plated, 7 mm dia. Suction connection in thermoplastic.
without casing:	Hose connection in thermoplastic, 7 mm 7 mm dia., for 6/9 mm hose.
Model 1000	
with casing:	Corrosion resistant Delivery connection 8 mm dia., alloy steel 1.4571

6.2.1 Special types of gas connections

The following special types of gas connectors for model 300 can be supplied:

Ermeto GE-6LLR galvanised, 1/8", straight
Ordering code to be added: 106, see Type List
or
Ermeto WE-6LLR galvanised, 1/8", angle
Ordering code to be added: 107, see Type List

6.3 Corrosion resistance of gas paths

WISA diaphragm pumps ara available in three corrosion resistance classes:

6.3.1 Standard type

Hose connector:	Nickel-plated brass
Inner tube:	Soft PVC
Pump body:	Duroplast 31.5 plastic moulding
Diaphragm:	Ozone resistant (EPDM) or Perbunan (NBR) (to be used if there are mineral oil vapours).
other parts:	St 37 steel.

6.3.2 Conditionally corrosion resistant

Hose connector:	PVC
Inner tube:	PVC soft
Pump body:	Duroplast 31.5 plastic moulding
Diaphragm:	Ozone resistant (EPDM) or Perbunan (NBR) or Viton (FKM)
Other parts:	Alloy steel 1.4571

6.3.3 Corrosion resistant (only models 300 and 1000)

Hose connector:	Alloy steel or PVC
Inner tube:	PVC (Mod. 300), Viton (Mod. 1000)
Pump body:	PVC hard
Other parts:	Alloy steel 1.4571

6.4 Diaphragm materials – Summary of chemical resistance

6.4.1 Ozone resistant (EPDM)

Up to 60 °C resistant to:

Ozone admixtures
Steam
Carbon monoxide
Hydrochloric acid vapour
Ammonia, damp
Ammonia, dry
Hydrogen sulphide

not resistant to

Petrol
Fuel oil
White mineral oil

Excellent resistance to alternating mechanical loads (fatigue loads).

6.4.2 Perbunen (NBR)

Up to 60° C resistant to

Fuel oil
Petrol

but not to

Benzene

Has less fatigue strength than other diaphragm materials.

6.4.3 Viton (FKM)

Up to 60° C resistant to

Ozone admixtures
Hydrogen sulphide
Hydrochloric acid vapours
Sulphuric acid vapours
Petrol
Fuel oil
White mineral oil

Not resistant to

Ammonia.

Good resistance to alternating mechanical load, not suitable for low temperatures. Performance reduced by about 10 %.

If you have any doubt, tell us about the suspected corrosive constituents in your metering gas so that we can make up a suitable combination of materials.

7. Accessory - (Dimensions section 12)

Please state how many you require:		Accessory Part No.
Antivibration mounting – external thread 2 x M 4		200
Antivibration mounting, 1 x external, 1 x internal thread M 4		201
Wall bracket	66 x 55 mm	202
	86 x 65 mm	203
	110 x 75 mm	204
Gas filter	metal	205
	plastic	206

Product tests

All WISA pumps for industrial use are intensively tested and carefully inspected, normally as follows:

1. Adjustment
2. Running test of at least 15 hours
3. Checking performance data (each pump)
4. Final inspection (each pump).

At request we can also check the leakage rates of the valve, or of the entire pump system.

9. EXAMPLES OF APPLICATIONS

WISA diaphragm pumps are used in many applications, as a separate piece of equipment or (without casing) as a built-in part of larger equipment. We can list here only a selection of the fields where they are in successful use.

WISA diaphragm pumps can be adapted to your requirements to a considerable extent, as far as their design and performance is concerned.

We supply special models to customer's requirements to all countries.

You will find our diaphragm pumps in the following fields:

Industrial equipment

Photocopying plant
Level controls (wells, settling tanks)
Sewing pit monitoring
Repro cameras
Flow soldering equipment
Vacuum forceps
Photoprinters
Aeration of plating baths.

Medical engineering

Drainage of wounds
Aerosol apparatus
Measurement of blood pressure
Alternating pressure mattresses (bedsore mattresses)
Blood corpuscle counters

Chemical engineering

Gas chromatographs
Gas analysers
Exhausters for photometer dishes
Laboratory pumps

Safety engineering

Fire alarms
Oil tank monitors
Smoke monitors
Motor vehicle exhaust monitors

There are limits to the performance of our pumps. If your experiments with a WISA diaphragm pump are unsuccessful, why not have a confidential discussion with us about your problem?

10. INTERNATIONAL EQUIVALENT OF UNITS OF MEASUREMENT

WISA diaphragm pumps are built to many specifications. Our technical data and performance diagrams use the following units:

Delivery:	l/min	(litres/minute)
Pressure:	m WG	(metres water gauge or column) or bars

For conversion to other units use:

Performance:	1 l/min = 0.264 US gallons/min. or 0.22 UK gal/min.
Pressure:	1 bar = 10.2 m WG = 750.06 mm Hg = 14.7 psi

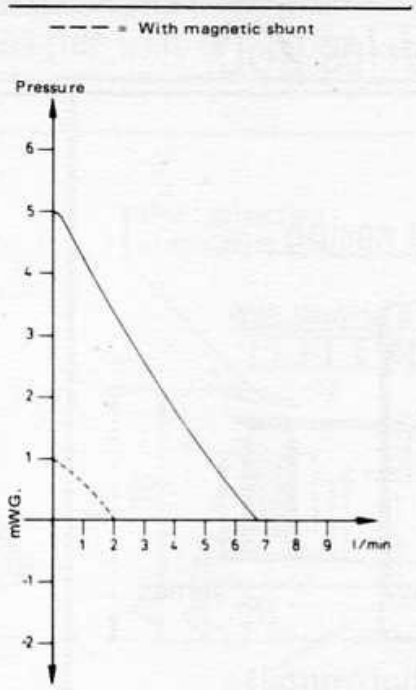


Fig. 23
– Performance curve
TYPE 3 0 1 0 x x x x x x
Pressure pump, standard performance

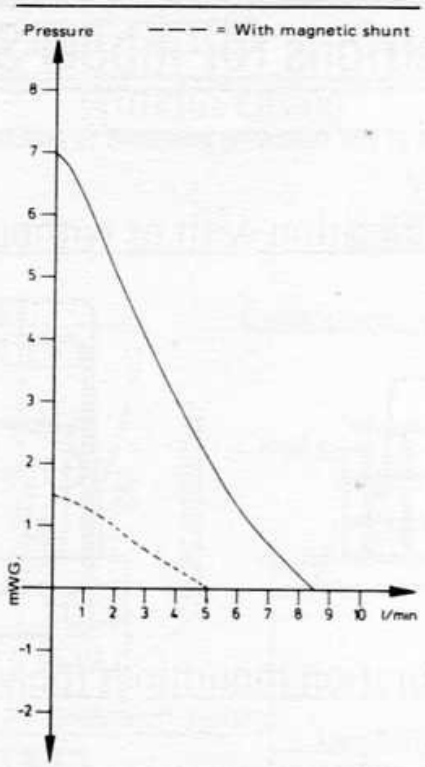


Fig. 24
– Performance curve
TYPE 3 0 1 1 x x x x x x
Pressure pump, boosted performance

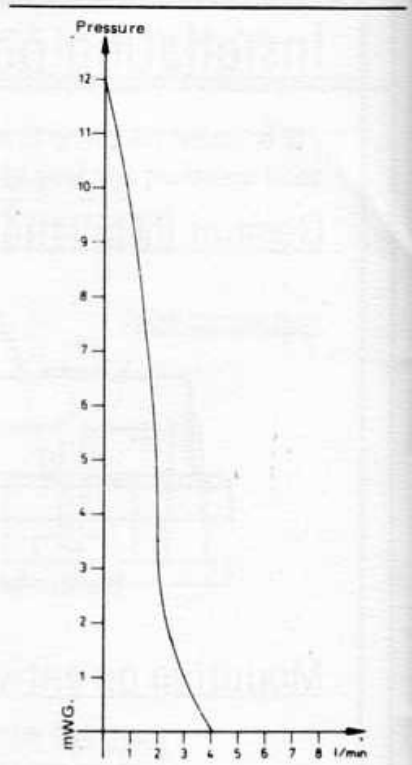


Fig. 25
– Performance curve
TYPE 3 0 1 8 x x x x x x
High-pressure pump

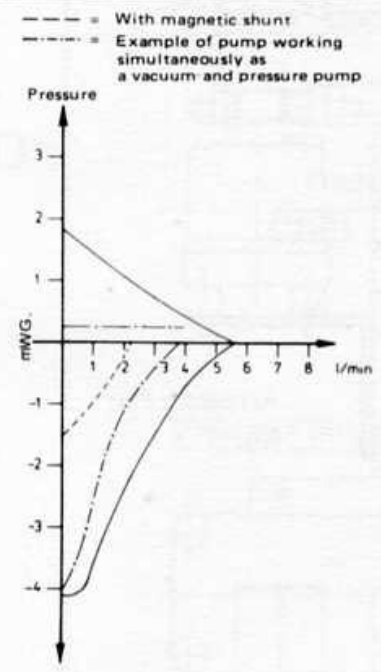


Fig. 26
– Performance curve
TYPE 3 0 3 0 x x x x x x
Vacuum pump, standard performance

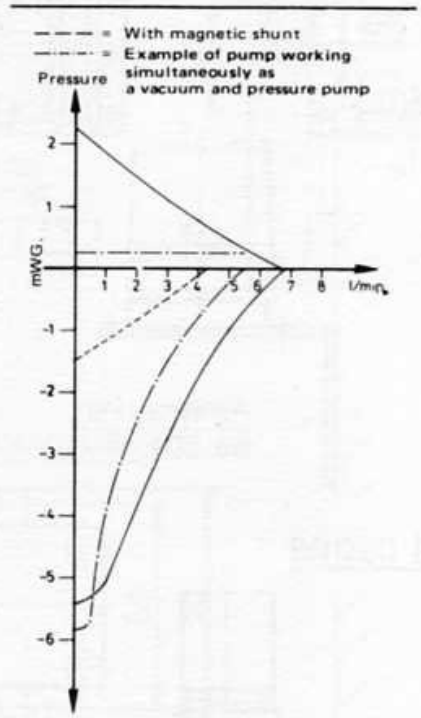


Fig. 27
– Performance curve
TYPE 3 0 3 1 x x x x x x
Vacuum pump, boosted performance

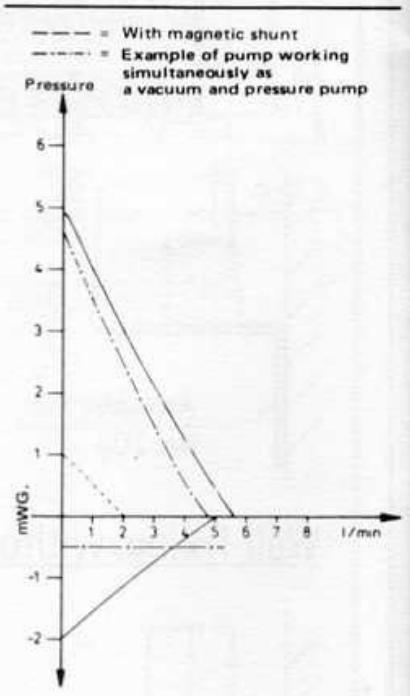


Fig. 28
– Performance curve
TYPE 3 0 2 0 x x x x x x
Pressure pump, outlet and inlet connections, normal performance

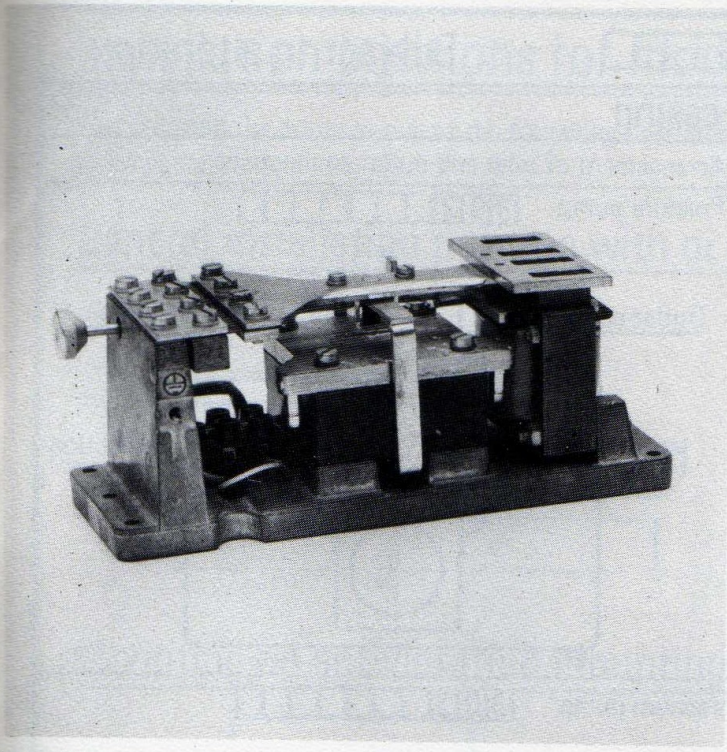


Fig. 29
TYPE 3 0 3 0 x 8 1 1 x x
Vacuum pump, inlet and outlet connections, terminal block for connection to electric mains, no casing, with output adjuster

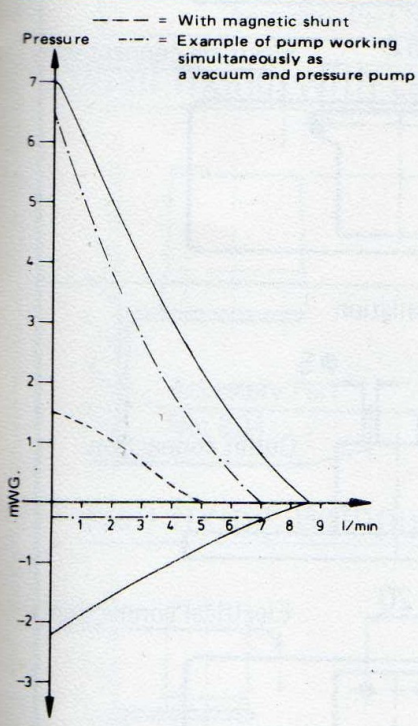


Fig. 30
– Performance curve
TYPE 3 0 2 1 x x x x x x
Pressure pump with outlet and inlet connections, boosted performance

16.

TECHNICAL DATA

Model series 300

Performance, pressure loading:
See normal performance curve

Performance tolerances:
± 10 % stated values

Mains voltage:
See List of Types

Rating:
7 W up to approx. 60 mA at 220 V, 50 Hz

Electrical connections:
See List of Types

Pipe connections:
See Sect. 6.2

Material of gas passages:
See Sect. 6.3

Casing:
Aluminium pressure casting, enamelled, hammer finish, grey

Dimensions:
See Installation dimensions, next pag

Weight:
2.2 kg with casing

Enclosure:
With casing, Pressure pump with inlet filter: IP 50
Vacuum pump: IP 54

Max. ambient temperature:
40 °C with casing,
50 °C without casing

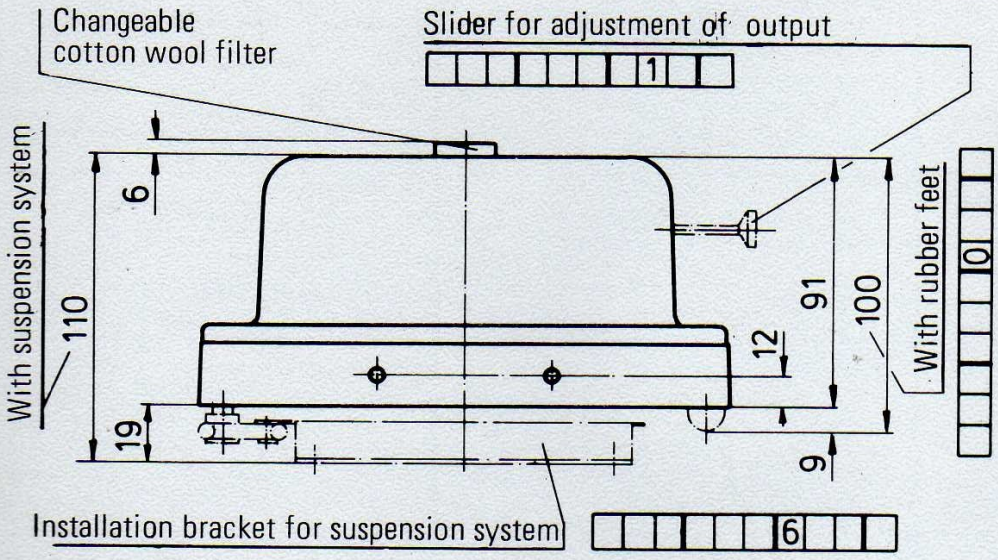
Avoid directly radiated heat

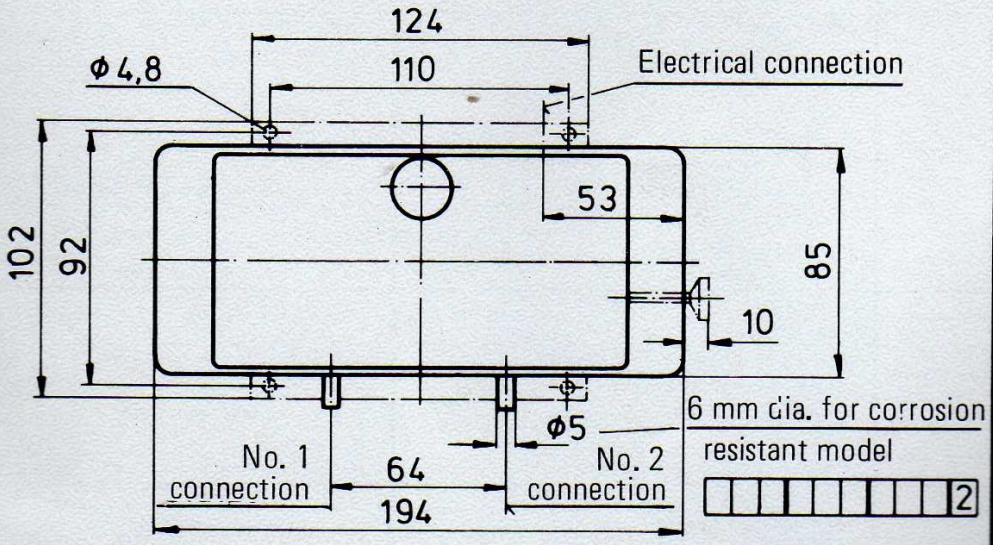
Basic model	Performance	Mains voltage	Type of connection	Casing	Adjustability	Diaphragm	Gas passages	Accessory Part No.	Model series 300 List of Types (Positions as at 19-7-77)	Exclusions and Notes
300									Not applicable	
1									Pressure pump, pressure connection only	Only with casing, filter in the cover
2									Pressure pump, pressure and vacuum connections	
3									Vacuum pump, vacuum and pressure connections	
5									Vacuum pump, with a vacuum connection	Only with casing
6									Vacuum pump, typ for installation in equipment	Only without casing, vacuum and pressure connections
9									Type of pump and connection to special specification	State No. of specification if known
	0								Standard performance for continuous operation	See performance curves
	1								Boosted performance for continuous operation	only without adjustment, not for 12 V DC
	2								Boosted performance, not continuous operation	not for 12 V DC
	3								Spare	
	8								High pressure model	Only with casing, Type 301.8xx.x0.0.
	9								Design of pump and performance to special specification	State No. of specification if known
		0							Mains voltage 220 V, 50 Hz	
		1							240 V, 50 Hz	
		2							110 V, 50 Hz	
		3							24 V, 50 Hz	
		5							220 V, 60 Hz	
		6							110 V, 60 Hz	
		7							24 V, 60 Hz	
		8							DC, 12 V (only for normal performance)	Not with output adjuster
		9							Special voltage to special specification	State No. of specification if known
			0						Earthed plug with 1 m of cable	Germany, Netherlands, Denmark, Austria
			1						Swiss plug with 1 m of cable	SEV (Swiss standards)
			2						Australian plug with 1 m of cable	
			3						CSA plug, with 1.40 m of cable	UL-USA, Canada
			4						CEE plug with 1 m of cable	France, Belgium
			5						Connecting cable, 30 cm long, 3-core, with plug	Only without casing
			6						Euro plug, flat, with 1 m of 2-core cable	Not permitted according to VDE (Germany)
			7						Not applicable	
			8						connecting via terminal block	Only without casing
			9						Connecting to special specification	State No. of specification if known
				0					Aluminium casing with rubber feet	
				1					Without casing	
				5					Without casing, but with suspension system	Antivibration system for installation
				6					With casing and with suspension system	Antivibration system for installation
				7					Aluminium casing with M 4 threated holes	Thread for antivibration mounting
				8					Not applicable	
				9					Casing and installation equipment to special specification	State No. of specification if known
					0				Without output adjuster	
					1				Output adjustment by slider	Magnetic shunt, not for boosted performance
					3				Spare	
					9				Flow adjustment to special specification	State No. of specification if known
						0			Diaphragms: Ozone resistant (EPDMP)	
						1			Not applicable	
						2			Perbunan (NBR)	For measuring gases, with mineral oil vapours
						3			Viton (FKM)	Performance reduced by about 10 %
						4			Spare	
						9			According to special specification	State No. of specification if known
							0		No special arrangement	
							1		Gas passages conditionally corrosion resistant	See Prospectus
							2		Gas passages corrosion resistant	See Prospectus
							3		Spare	
							9		Gas passages to special specification	State No. of specification if known
								102	Tropicalised coil	
								103	Viton valve disc	on request, only for non-Viton diaphragm
								104	Switch in connecting cable	
								105	Not applicable	
								106	Ermeto GE-6 LLR galvanised 1/8" gas connector	
								107	Ermeto WE-6 LLR glavanised 1/8" gas connector	
									Example: Model 300 vacuum pump with vacuum and pressure connections, rated for continuous operation, boosted output, 220 V, 50 Hz, CSA plug, casing	with rubber feet, output not adjustable, Viton diaphragm, corrosion resistant, tropicalised coil, switch in cable. Type No. 303.103.003.2 –102 –104

Dimensions of pumps of model Series 300

Type N

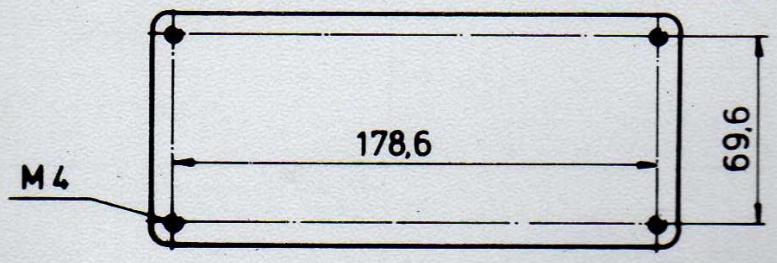
With casing



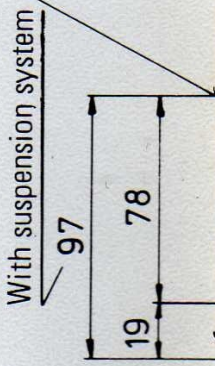


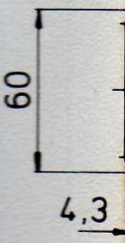
Type of pump	Type No.	Outlet connection No.	Inlet connection No.
Pressure pump	301	1	-
	302	1	2
	3018	2	-
Vacuum pump	303	2	1
	305	-	1

View showing holes of casing with M 4 threaded holes 7

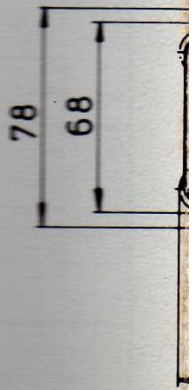


Max. deflection of armature arm





Sizes with suspen



lo. as per List of Types □□□□□□□□ Subject to alteration

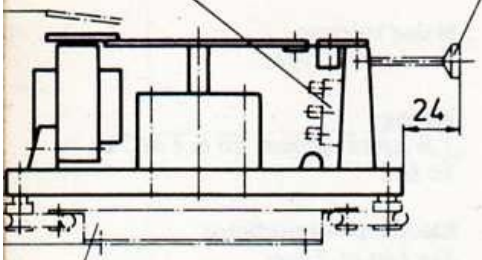
Without casing

Slider for adjustment of output

□□□□□□1□□

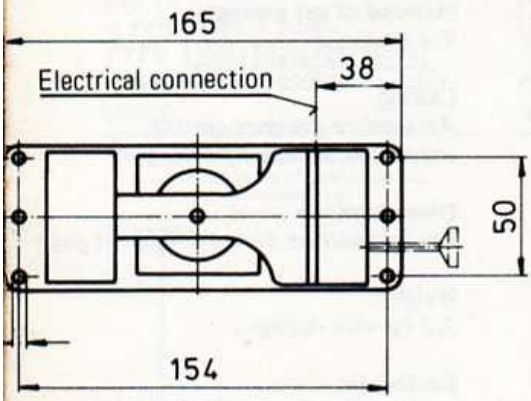
With terminal block

□□□□8□□□

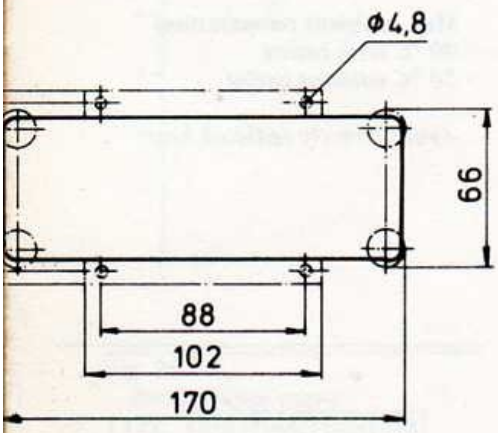


Installation bracket for suspension system

□□□□□5□□

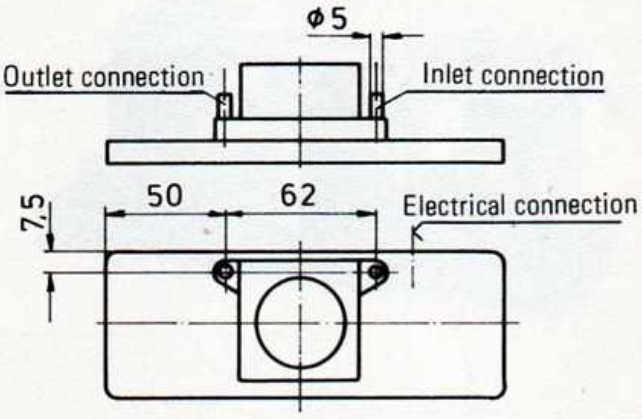


sion system

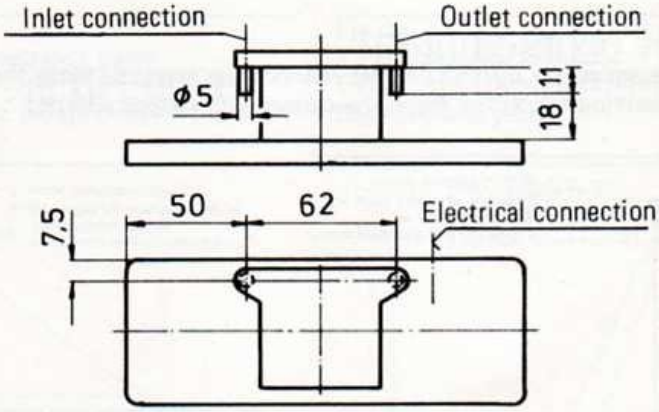


Arrangement of inlet and outlet connections

Pressure pump 302□□□□□□



Vacuum pump 303□□□□□□



Vacuum pump, typ for installation

306□□□□□□