

# Liquid Ring Pump



VACUUM EXPERT



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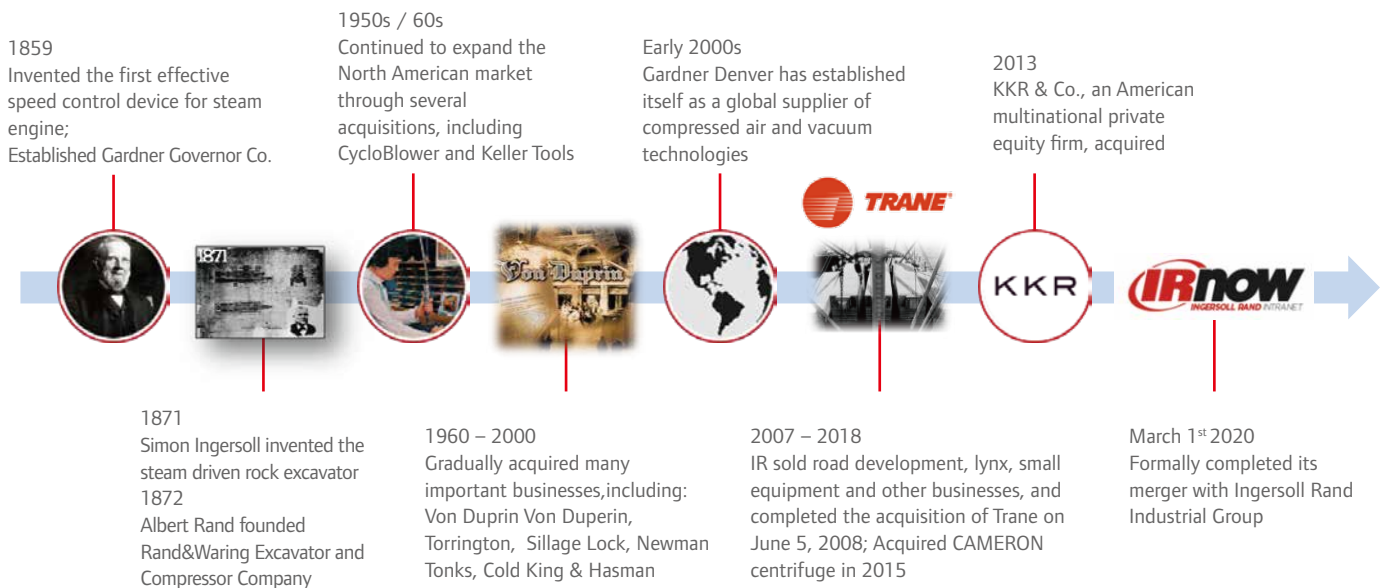


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## Ingersoll Rand

Ingersoll Rand Inc. (NYSE:IR), driven by an entrepreneurial spirit and ownership mindset, is dedicated to Making Life Better for our employees, customers, shareholders, and planet. Customers lean on us for exceptional performance and durability in mission-critical flow creation and industrial solutions. Supported by over 80+ respected brands, our products and services excel in very complex and harsh conditions. Our employees develop customers for life through their daily commitment to expertise, productivity, and efficiency. For more information, visit [www.IRco.com](http://www.IRco.com).

Ingersoll Rand's brands include Ingersoll Rand, Gardner Denver, Elmo Rietschle, Robuschi and dozens of other well-known enterprises in the field of air compressors, blowers and vacuum pumps.



## Elmo Rietschle

Elmo was granted the imperial patent for the world's first liquid ring vacuum pump: just three years later a smaller Elmo vacuum pump was used in Germany's first vacuum cleaner

The first side channel blower was introduced in 1963 and greatly revolutionized the vacuum and pressure market. Elmo had always been focusing on professionalism and dedication, as it designed and manufactured the highest-quality machine and provide engineering support

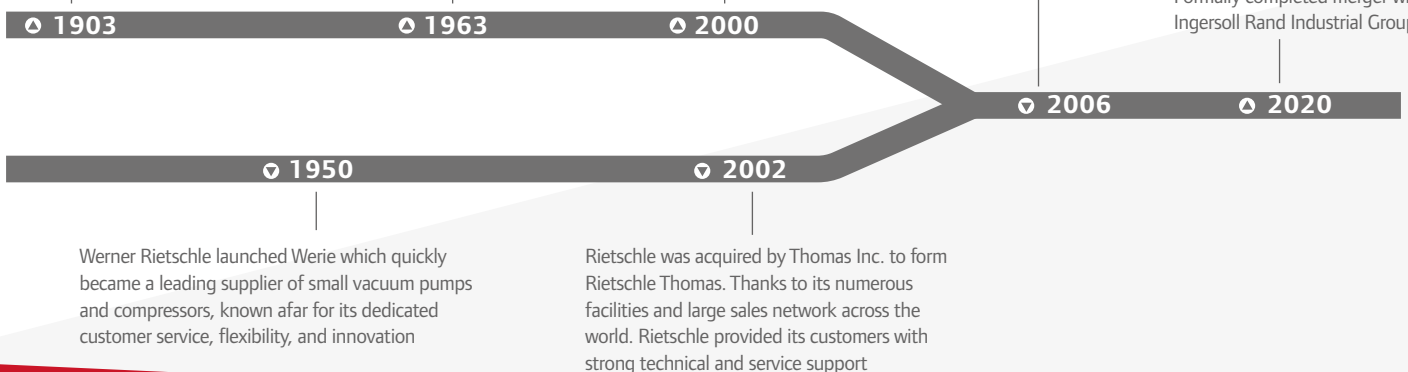
After splitting from Siemens. Elmo joined Nash Inc. to form Nash Elmo



In 2006, Gardner Denver acquired Elmo and Rietschle to launch the Elmo Rietschle brand name



Formally completed merger with Ingersoll Rand Industrial Group







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## The Liquid Ring Pump Principle

The working principle of a liquid ring pump is based on a round pump body and an eccentric rotor: As the rotor spins, the seal liquid inside the pump forms a rotating liquid ring on the inner surface of the body, forming the “liquid ring.”

With every rotation of the rotor, the chambers between the rotor blades plunges into and out of the liquid ring: on the suction side, the volume of the rotor chamber increases and gas streams in through the suction port. As the rotor spins past the inlet port, the chambers between the rotor blades fill up with a volume of gas. The gas is compressed inside the chambers – with the liquid ring acting like pistons while the rotor chambers act like cylinders. When each chamber reaches the discharge port opening, the compressed gas escapes into the discharge port.

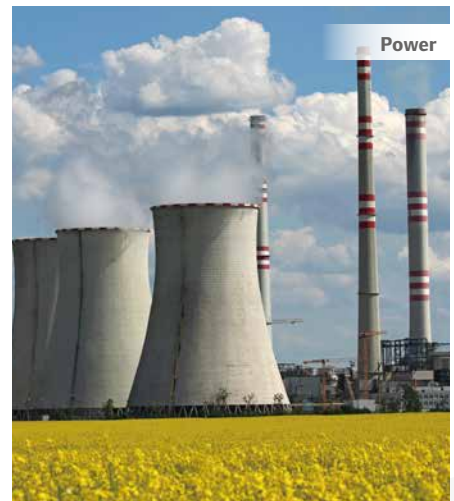
## Applications



F&B



Chemical



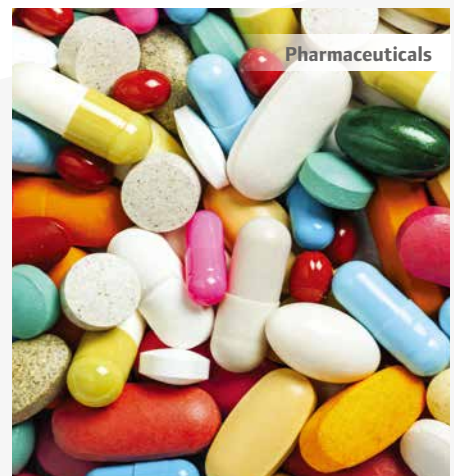
Power



Shipping



Mining



Pharmaceuticals



Oil and Gas



Textile



Pulp and Paper

## 2BV Series Technical Advantages

Elmo Rietschle 2BV vacuum pumps are suitable for evacuating gases and wet vapors down to inlet pressures of 33 mbar(A) ( 97% vacuum ). All these vacuum pumps are supplied with built-in cavitation protection. For long-term operation below 80 mbar(A) the cavitation protection should be connected for protecting the pump. An inlet pressure of 10 mbar(A) can be achieved by connecting a gas ejector. The gas ejector can be mounted directly onto the vacuum pump.

### **Monoblock Design**

- Easy to install
- Small footprint
- Easy maintenance

### **Unique flexible exhaust port design**

- Achieving optimal work efficiency

### **100% Oil-free Design**

- Environmentally friendly
- Improve efficiency

### **Self priming function**

- Operating friendly





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### **Bronze impeller - The only rotating component**

- Available in stainless steel
- Enhanced corrosion and erosion resistance
- No wear
- Long service life
- No maintenance required



### **Mechanical seal**

- Prevent leakage
- Reduce maintenance costs

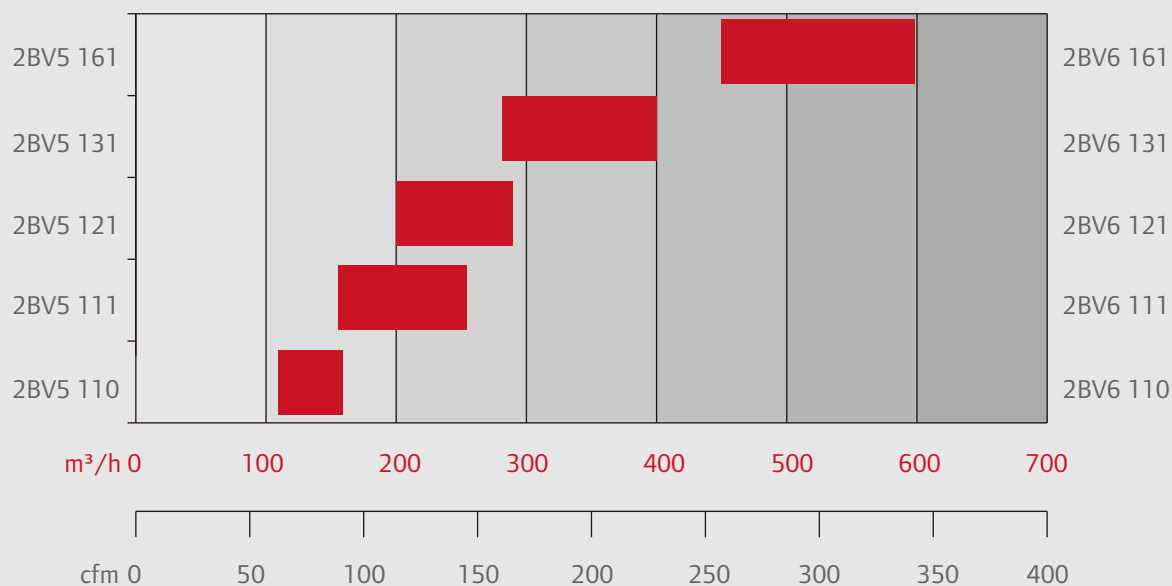
### **Less noise**

- Smooth operation
- Reduce operating costs
- Secure communication environment

### **Performance**

- Inlet Pressure: 33mbar(A)
- An inlet pressure of 10 mbar(A) can be achieved by connecting a gas ejector.
- 2,600 mbar(A) can be achieved by used as a compressor

## Specification



Elmo Rietschle 2BV vacuum pumps consists of 2BV5 and 2BV6 series.

The 2BV5 series are especially space saving units in monoblock design (degree of protection IP55).

The 2BV6 range is in close-coupled design with drive motor.

The block pumps of the 2BV series are characterized by a very high suction volume of up to 600 m³/h with suction pressures of up to 33 mbar abs. and are primarily used for applications with large quantities of liquids. The sound pressure level remains under 73 dB(A) and therefore fulfils even the strictest noise stipulations. The compact construction reduces the space required for the installation of the pumps compared to conventional machines.





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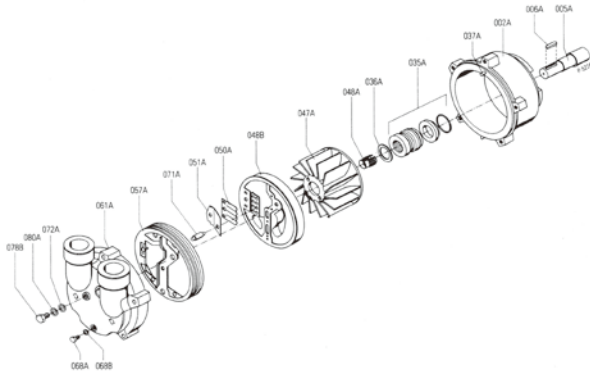
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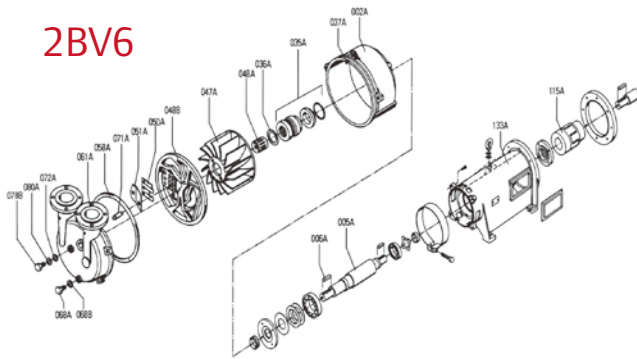
## Spare Parts List

### 2BV5



Part No.	Name	Part No.	Name
002A	Casing	051A	Intercepting plate
005A	Motor shaft	057A	Sealing ring
006A	Feather key	061A	Endshield
035A	Mechanical seal	068A	Plug screw
036A	Washer	068B	Sealing ring
037A	Set screw	071A	Pipe for cavitation protection
047A	Impeller	072A	Washer for cavitation protection
048A	Tolerance ring for impeller	078B	Plug screw
048B	Port plate	080A	Sealing ring
050A	Valve plate		

### 2BV6



Part No.	Name	Part No.	Name
002A	Casing	058A	O-ring
005A	Motor shaft	061A	Endshield
006A	Feather key	068A	Plug screw
035A	Mechanical seal	068B	Sealing ring
036A	Washer	071A	Pipe for cavitation protection
037A	Set screw	072A	Washer for cavitation protection
047A	Impeller	078B	Plug screw
048A	Tolerance ring for impeller	080A	Sealing ring PTFE
048B	Port plate	115A	Flexible coupling
050A	Valve plate	133A	Support
051A	Intercepting plate		

### 2BV5 Main distinction between cast iron version and stainless steel version

Main Parts	Iron casting parts materials type	Stainless steel parts materials type
*Pump casing	GB 9439 HT250	BS EN 10283 1.4581
*Pump Cover	GB 9439 HT200	BS EN 10283 1.4581
*Motor shaft	GB/T 1220 20Cr13	GB/T 1220 S31603
*impeller	EN 1982-CC333G	BS EN 10283 1.4581
*Port plate	GB 9439 HT200	BS EN 10283 1.4581
*Variport Valve	PTFE	PTFE
*O-ring/sealant	NBR / Loctite 587	FEP Wrapped / HT 300
*Mechanical seal brand	AESSEAL Brand	JOHN CRANE Brand
*Mechanical seal	Carbon/Ceramic/FPM/316	Carbon/SiC/FFKM&PTFE/316

### 2BV6 Main distinction between cast iron version and stainless steel version

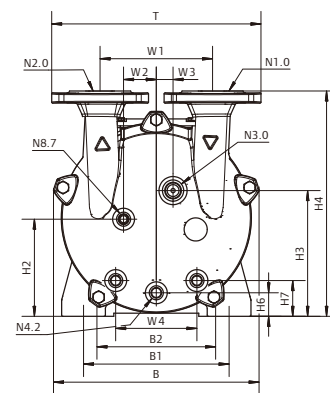
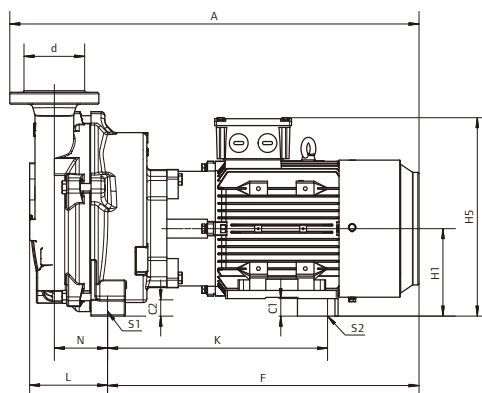
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*Motor shaft	GB/T 1220 20Cr13	GB/T 1220 S31603
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*Variport Valve	PTFE	PTFE
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*Mechanical seal brand	AESSEAL Brand	JOHN CRANE Brand
*Mechanical seal	Carbon/Ceramic/FPM/316	Carbon/SiC/FFKM&PTFE/316



## Dimensions

### 2BV5

- N1.0 Suction connection  
N2.0 Discharge connection  
N3.0 Operating liquid connection  
N4.2 Drain and sealant supply  
N8.7 Cavitation protection (built-in)



Type	A	B	B1	B2	C1	C2	H1	H2	H3	H4	H5	H6	H7	K	L
2BV5 110	709	325	255	190	33	26	140	156	202	361	328	38	57	342	130
2BV5 111	721	325	265	216	36	26s	150	166	212	371	363	48	68	348	130
2BV5 121	821	347	265	216	36	26	150	167	217	385	363	39	60	430	147
2BV5 131	849	377	300	254	35	30	175	194	249	427	435	53	76	468	147
2BV5 161	1100	478	370	389	52	30	210	225	303	521	485	51	90	632	201

Type	F	N	S1	S2	T	d1	d2	d3	d4	d5
2BV5 110	537	92	Φ12×23-	Φ12	340	19	160	123	97	52
2BV5 111	549	92	Φ12×23-	Φ12	340	19	160	123	97	52
2BV5 121	633	97	Φ12×23-	Φ12	381.5	19	182	142	125	66.6
2BV5 131	655	103	Φ15×25-	Φ14	381.5	19	182	142	125	66.5
2BV5 161	862	138	Φ15×27-	Φ14	450	22	200	156	130	80

Type	W1	W2	W3	W4	d(N1.0,N2.0)	N3.0	N4.2	N8.7
2BV5 110	180	52	27	130	DN50	3/4"	G 3/8"	G 3/8"
2BV5 111	180	52	27	130	DN50	3/4"	G 3/8"	G 3/8"
2BV5 121	200	57	29	142	DN65	3/4"	G 3/8"	G 3/8"
2BV5 131	200	57	29	154	DN65	3/4"	G 3/8"	G 3/8"
2BV5 161	250	81	41	200	DN80	3/4"	G 3/8"	G 3/8"

- All measurements are millimeters.

- This table is the iron cast version. The dimensions and connections of stainless steel version are slightly different from the cast iron version. Please consult our sales for specific information.







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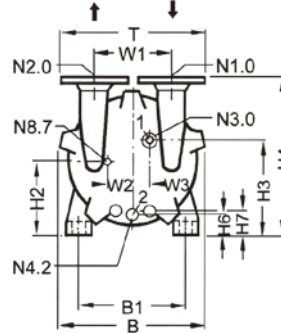
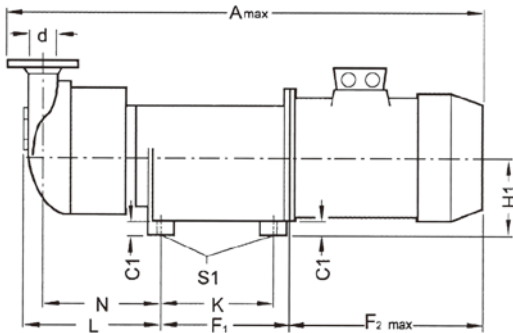


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## 2BV6



N1.0 Suction connection  
N2.0 Discharge connection  
N3.0 Operating liquid connection  
N4.2 Drain and sealant supply  
N8.7 Cavitation protection (built-in)

Type	A max	B	B1	C1	F1	F2 MAX	H1	H2	H3	H4	H6	H7	K	L	N
2BV6 110-OK...	1255	330	255	26	291	515	160	173	223	381	58	77	250	319	281
2BV6 111-OK...	1277	330	279	26	360	510	180	196	242	401	78	97	320	365	327
2BV6 121-OK...	1408	351	279	26	360	615	180	197	247	415	69	90	320	384	342
2BV6 131-OK...	1495	382	320	26	461	585	215	234	287	467	93	116	414	405	357
2BV6 161-OK...	1625	484	320	26	461	640	215	230	310	526	56	85	414	480	416

Type	W1	W2	W3	S1	T	d1	d2	d3	d4	d5
2BV6 110-OK...	180	52	27	Φ13×23-	340	19	160	123	97	52
2BV6 111-OK...	180	52	27	Φ13×23-	340	19	160	123	97	52
2BV6 121-OK...	200	57	29	Φ13×23-	381.5	19	181.5	142	125	66.5
2BV6 131-OK...	200	62.5	32	Φ15×27-	381.5	19	181.5	142	125	66.5
2BV6 161-OK...	250	81	41	Φ15×27-	450	22	200	156	130	80

Type	d(N1.0,N2.0)	N3.0	N4.2	N8.7
2BV6 110-OK...	DN50	G 3/4"	G 3/8"	G 3/8"
2BV6 111-OK...	DN50	G 3/4"	G 3/8"	G 3/8"
2BV6 121-OK...	DN65	G 3/4"	G 3/8"	G 3/8"
2BV6 131-OK...	DN65	G 3/4"	G 3/8"	G 3/8"
2BV6 161-OK...	DN80	G 3/4"	G 3/8"	G 3/8"

- All measurements are millimeters.

- This table is the iron cast version. The dimensions and connections of stainless steel version are slightly different from the cast iron version. Please consult our sales for specific information.

## 2BE Series Technical Advantages

### Gases handled

Beside air, Elmo Rietschle liquid ring pumps are able to handle a lot of different gases: gasoline vapor, sulfur dioxide, chlorine, hydrogen sulfide, or vinyl chloride monomers, just to mention a few.

### Operating liquids

Depending on the process and the gas handled, a seal liquid other than water may be needed. Many liquids can be used as a seal, including acetic acid, acetone, glycol, xylene and many other chemicals

### Field of application

Due to the compression inside the pump, the gases handled may condense. In contrast to other technologies, this additional wetness is no problem for liquid ring pumps. Some important – but not only – fields of application are processes that handle wet, aggressive and explosive media, fluids and gases.



- Almost isothermal compression
- No metal-to-metal contact of components
- Only one moving part
- No internal lubrication necessary
- Accepts liquid carryover
- Pulsation free conveyance
- Non-sensitive to wetness and condensation
- Long service life and reliability





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## Specification

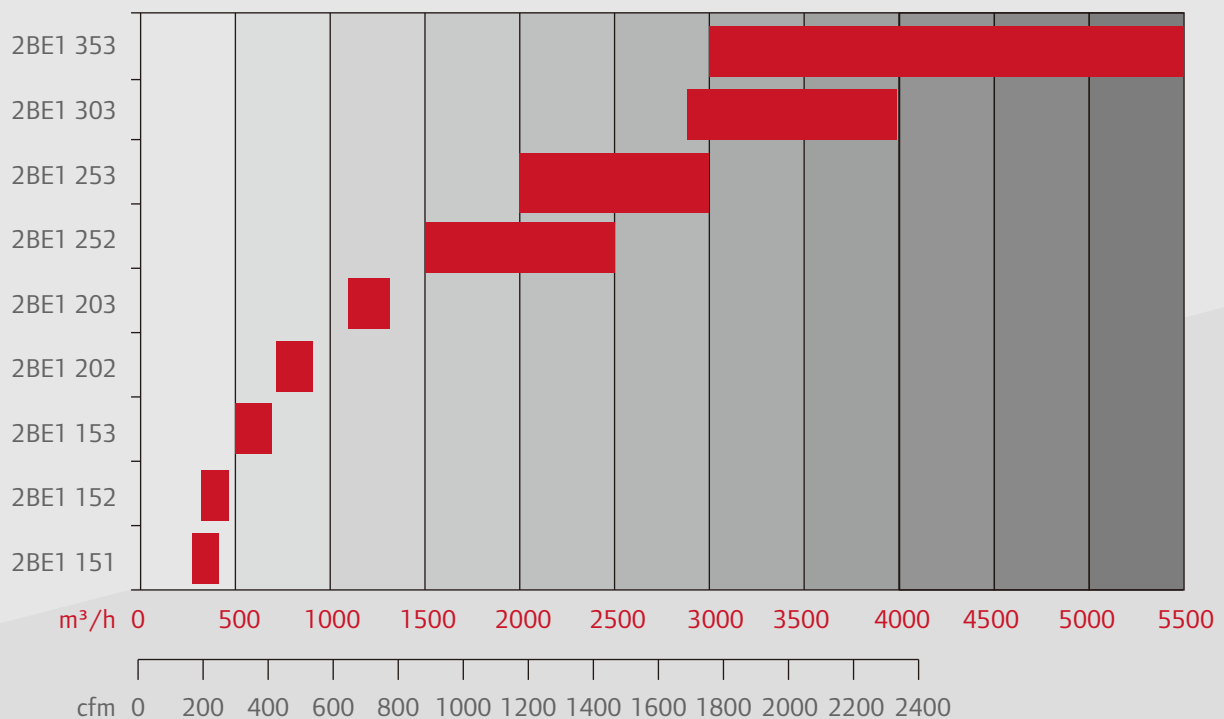
### 2BE Series



Large Series



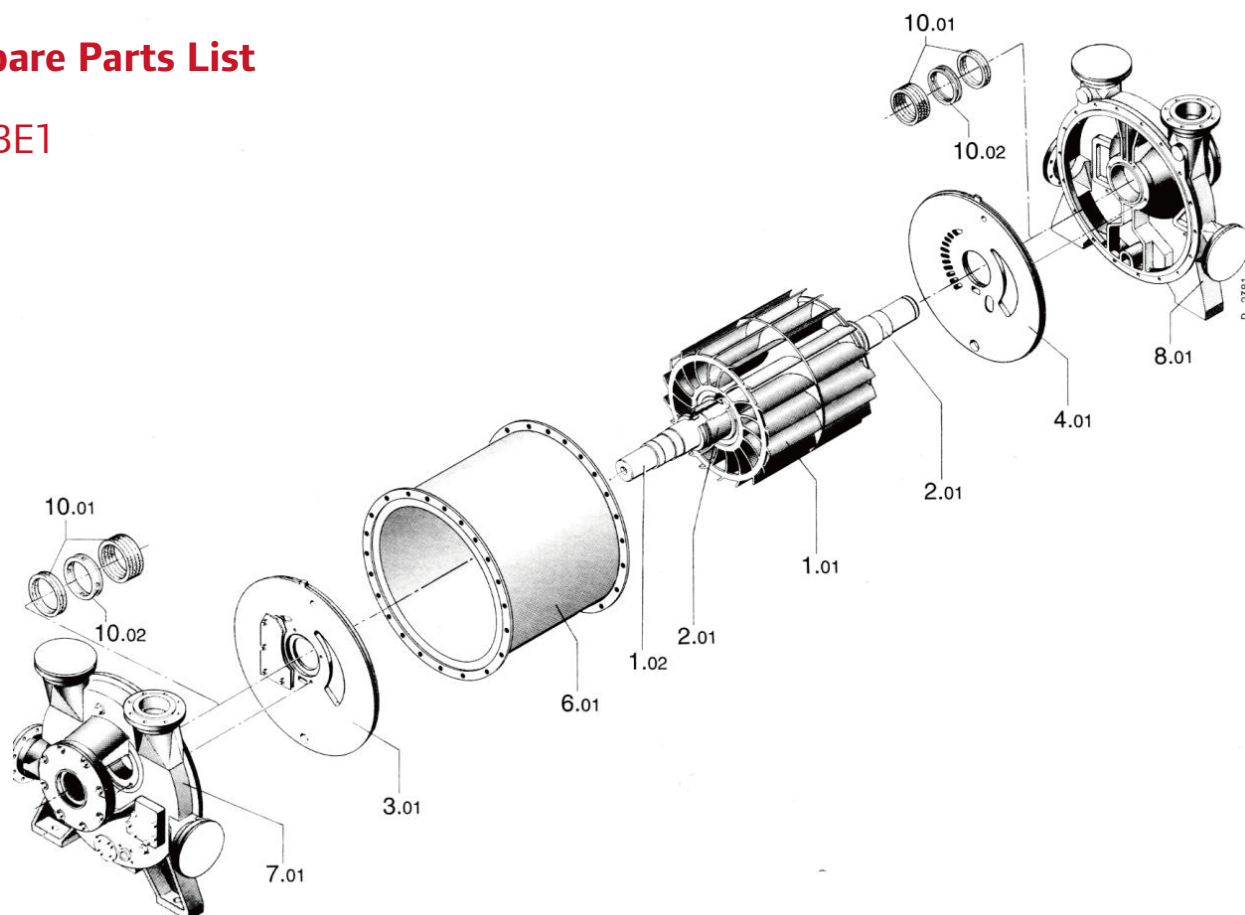
Small Series



- **Vacuum Range:** to 33 mbar abs. (to 1 in HgA)
- **Suction Pressure:** to 1,200 mbar abs. (to 17.4 psi)
- **Maximum Discharge Pressure:** 3.5 bar abs. (36 psig)
- **Differential Pressure:** to 2.6 bar (to 38 psi)
- **Shaft Sealing(for small series):** Single acting Mechanical Seal (standard), Stuffing box, double acting Mechanical Seal on request
- **Shaft Sealing(for large series):** Stuffing box (standard), Mechanical Seals (single acting / double acting) on request
- **Materials:** Cast Iron, Stainless Steel, Combination of both materials

## Spare Parts List

2BE1



Part No.	Description	Material of construction	Grey cast iron	Grey cast iron / Bronze	SS / Grey cast iron	SS casting / Grey cast iron
1.01	Impeller	Spheroidal graphite cast iron ASTM A 536 Grade 60-40-18		Aluminium bronze (ASTM B148-74)	Stainless steel ASTM A 276 316Ti	
1.02	Shaft	Carbon steel ASTM A 572 Grade 50				
2.01	Shaft bushing	Stainless steel centrifugal casting ASTM 532 III A 25% Cr				
3.01 4.01	Port plates	Carbon steel ASTM A 283 Grade C		Stainless steel ASTM A 276 316L		Carbon steel ASTM A 283 Grade C
6.01	Casing	Grey cast iron ASTM A 48 Class 40 B		Grey cast iron ASTM A 48 Class 40 B lined with stainless steel ASTM A 283 Grade C + ASTM A 276 316Ti		Grey cast iron ASTM A 48 Class 40 B
7.01 8.01	End shields	Grey cast iron ASTM A 48 Class 30 B				
10.01	Packing ring	Ramie-fibre with PTFE				
10.02	Sealing water distribution ring	Fiber reinforces plastic				







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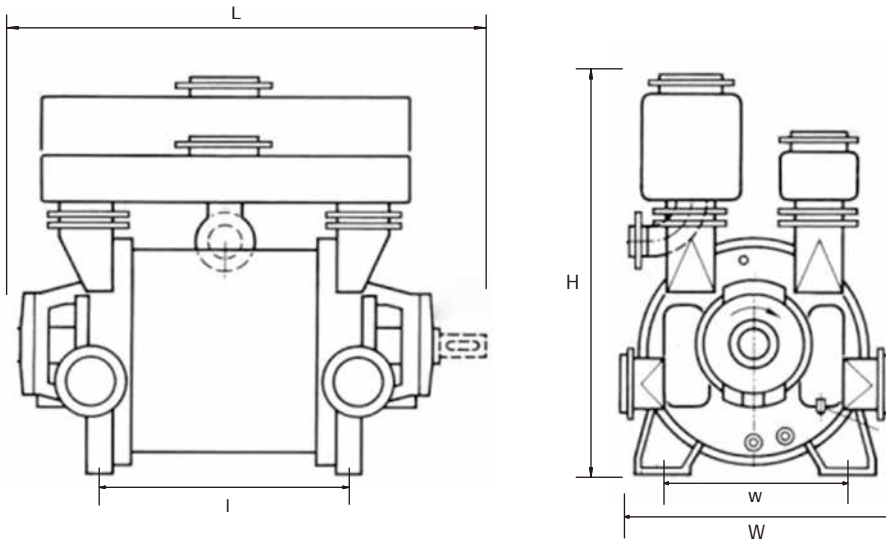


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## Dimensions



Type	L	I	W	w	H
2BE1 151	800	295	550	260	745
2BE1 152	825	320	550	260	745
2BE1 153	885	380	550	260	745
2BE1 202	975	395	700	340	985
2BE1 203	1,095	515	700	340	985
2BE1 252	1,225	525	800	465	1,245
2BE1 253	1,375	675	800	465	1,245
2BE1 303	1,840	790	1,100	670	1,360
2BE1 353	1,745	1,000	1,160	800	1,570

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## After-sales Service

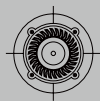
**We Keep An Eye on every machine in use**

**We Pay Great Attention To use experience of every customer**

**We Care About on the return on use of every plant**

Ingersoll Rand provides comprehensive after-sales services, including but not limited to preventative & scheduled maintenance program, genuine parts, onsite inspection, expert maintenance, customer visits and effective professional training, just to make sure that every product runs well at optimal performance for your peace of mind.





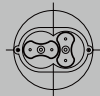
G-Series Side Channel



L-Series Liquid Ring



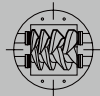
V-Series Rotary Vane



R-Series Roots



C-Series Claw



S-Series Screw



X-Series Syetems

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