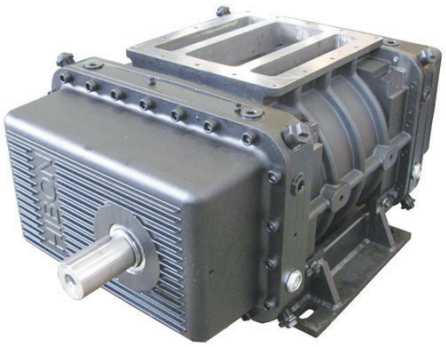
80448236
Revision D
November 2014

VTB.XL Blowers

VTB 805.XL, VTB 807.XL, VTB 810.XL, VTB 820.XL, VTB 822.XL



VTB 840.XL, VTB 8602.XL, VTB 8702.XL, VTB 8902.XL

Installation, Operation and Maintenance

- EN Installation, Operation and Maintenance
- ES Instalación, operación y mantenimiento
- FR Installation, fonctionnement et entretien
- DE Installation, Betrieb und Wartung
- IT Installazione, funzionamento e manutenzione

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CE

DECLARATION OF INCORPORATION
(as defined by the EU Machinery Directive 2006/42/EC Appendix II 1B)

DÉCLARATION D'INCORPORATION
(comme définie par la directive européenne 2006/42/CE appendice II 1B relative aux machines)

WE, / NOUS,

INGERSOLL RAND AIR SOLUTIONS HIBON

Declare that, under our sole responsibility, the partly completed machinery:
Déclarons que, sous notre seule responsabilité, la presque-machine :

Description : Air Positive Displacement Blower Air End
Year of Manufacturing : 2014/2015

Model	Serial Number
VTB 805.XL	From 14570000 To 14579999
VTB 807.XL	From 14690000 To 14699999
VTB 810.XL	From 15690950 To 15699999
VTB 820.XL	From 15573519 To 15579999
VTB 822.XL	From 16570000 To 16579999

Model	Serial Number
VTB 840.XL	From 17570000 To 17579999
VTB 8602.XL	From 17690277 To 17699999
VTB 8702.XL	From 18570000 To 18579999
VTB 8902.XL	From 18690000 To 18699999

Has been designed, manufactured and tested in accordance with the requirements of directive 2006/42/EC and the relevant technical documentation is compiled in accordance with annex VII B:

A été concue, fabriquée et testée en accord avec les exigences de la directive 2006/42/CE et que le dossier technique relatif a été construit en accord avec l'annexe VII B:

This partly completed machinery must not be put in service until the final machinery into which is to be incorporated has been declared in conformity with the provisions of this directive

Cette presque-machine ne doit pas être mise en service tant que l'ensemble dans lequel elle doit être intégrée n'a pas été déclaré conforme aux dispositions de la directive ci-dessus

The partly completed machinery to which this declaration relates is also in conformity with the following principal standards / normative:

La Presque-machine à laquelle se réfère cette déclaration est également conforme aux principaux standards et normes suivants:

EN 1012-1 **EN 1012-2** **EN ISO 12100:2010** **EN 13463-1:2001** **EN 13463-5:2003**

We undertake to transmit, in response to a reasoned request by national authorities, relevant information on the partly completed machinery to which this declaration relates.

Nous nous engageons à transmettre, en réponse à une demande adéquatement motive des autorités nationales, les informations appropriées concernant la Presque-machine à laquelle se réfère cette déclaration.

Wasquehal, 01st January 2014/2015

Judicaël DE MEYERE

The signer of this Declaration of Incorporation is also the person authorized to compile the relevant technical documentation.

Le signataire de cette Déclaration d'Incorporation est aussi la personne autorisée à élaborer le dossier technique approprié.

CONTENTS

1. INTRODUCTION

1.1 Scope and definitions

This manual provides installation, operation and maintenance instructions for the **Ingersoll Rand** VTB.XL Air Injection Blowers, abbreviated to "VTB.XL blowers", or "blowers" in the remainder of this manual. You must use the blower as specified in this manual.

Read this manual before you install and operate your blower. Important safety information is highlighted as WARNING and CAUTION instructions; you must obey these instructions. The use of WARNINGS and CAUTIONS is defined below.

⚠ WARNING

Warnings are given where failure to observe the instruction could result in injury or death to people.

⚠ CAUTION

Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process.

The identification and rating plate (Figure 2, item 13) provides specific details about the blower.

The following warning and other symbols are on the blower :

Warning – refer to accompanying documentation.

Warning – hot surfaces.

Protective earth (ground).

Ear defenders must be worn.

The units used throughout this manual conform to the SI international system of units of measurement.

Equivalent values in imperial are also included.

1.2 Description

1.2.1 Introduction

Refer to Figure 2. The VTB.XL is positive displacement blowers, which incorporate two three-lobe rotors (8). One of the rotors is driven by the drive shaft (5). The other rotor is maintained in the correct phase relation by timing gears. The timing gears and the bearings on the rotors and drive shaft are lubricated by oil in the drive end cover (4) and non-drive end cover (12).

The blowers are supplied in 'bareshaft' form. You must connect your own coupling or belt drive system (see Section 3.7) to the drive shaft (5) in order to operate the blower.

The blowers are cooled by fresh air injection see Section 1.2.2 for more information.

All of the VTB.XL blowers are suitable for pressure or vacuum operation: see Figure 6 and Figure 7 - and Section 4 for more information.

The blowers are available in 8 different configurations, depending:

- Flow direction.
- Shaft position.
- Direction of rotation.

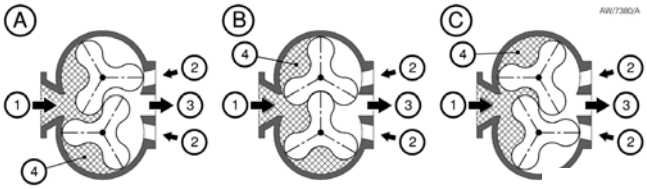
Refer to Section 2.8 and Figure 3 for the item numbers of the different blower versions.

1.2.2 Principle of operation

Refer to Figure 1. During operation, the inlet gas stream (1) to be pumped/compressed enters the blower at the inlet.

As the two contra-rotating rotors turn (as in the sequence shown in details A, B and C):

- The inlet gas is trapped in the chambers (4) between the rotors and the blower-body, and is forced out of the blower at the discharge (outlet) (3).
- Ambient injection air (2) is drawn into the blower (through the injection ports: see Figure (6). This air cools the blower during operation.



1. Inlet gas stream

2. Injection air

3. Discharge (outlet) gas stream

4. Chambers

Figure 1 - Principle of operation

1.2.3. Standard/ATEX-compliant blowers

The following positive displacement blower models are available:

- Standard blowers: these are suitable only for the pumping/compression of surrounding air, as well as gas, gaseous mixtures and uninflammable dust.
- Category 2 or 3 ATEX-compliant blowers: these comply with the ATEX European directive and are suitable for the pumping/compression of gas, gaseous mixtures and uninflammable or flammable dust. For more information, refer to sections 1.2.5 and 1.3.

1. INTRODUCTION

1.2.4. ATEX certification and compliance (ATEX-compliant blowers only)

All the category 2 ATEX-compliant blowers have been specially developed to pump/compress a flammable atmosphere, classified as an internal zone 1 or 2, without needing to install protective devices such as flame guards.

The blowers have also been designed to function in an exterior flammable environment classified as zone 1/21 or 2/22. The blowers are certified (according to directive 94/9/CE) as category 2 or 3 equipment according to the European ATEX directive. For this certification to be valid, blowers must be installed and used exactly as specified in this manual.

The blowers have been designed following the rules of safety construction, which ensure the elimination of potential sources of ignition, even if there are disturbances and frequent malfunctions.

The blowers are suitable for pumping/compressing a wide range of flammable gasses and vapors, subject to the restrictions specified in section 1.2.7.

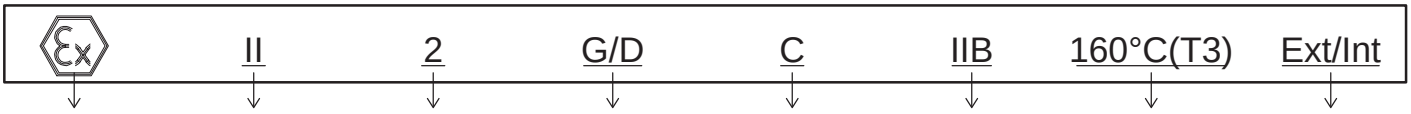
1.2.5 ATEX Directive (94/9/CE): Europe only (ATEX-compliant blowers only).

- **1.2.5.1 Introduction**

The category 2 or 3 ATEX-compliant blowers must be built into a larger system whose internal atmosphere is classified as zone 1/21 or 2/22. These systems will be certified according to the above¬mentioned directive and must have an ATEX identification label affixed to them.

For the certification to be valid, the blowers must be installed exactly as specified in this manual.

The blowers carry an ATEX identification label which contains the following information:



EU Explosive atmosphere symbol	Equipment Group	Equipment Category	Gas/Dust Zones		Safety Construction Protection Strategy	Gas Group Gas Group/Sample		Max. Surface temp.	External or/ and internal protection
	I. Mining	2:High Protection	1	21		I	Methane		
	II : Non-Mining	3:Normal protection	2	22		IIA	Propane		
						IIB	Ethylene		
						IIC	Hydrogen		

- **1.2.5.2 Temperature classification**

⚠ CAUTION

The category 2 or 3 ATEX-compliant blowers must be operated according to the procedures described in section 4 in order to prevent exceeding the temperature classification.

The temperature classification that applies to the category 2 or 3 ATEX-compliant blowers refers to the spontaneous combustion temperature of flammable materials that can be pumped/compressed, or that may be present in the external atmosphere.

The temperature classification of the ATEX-compliant blowers is 160°C (T3) (320°F) for gaseous/dusty internal and external atmospheres. For dusty external atmospheres, you should provide an appropriate security margin for using the blower according to the type/composition of the dust and the thickness of the dust layers.

Note: *The ATEX-compliant blowers cannot function (under pressure) at a differential pressure greater than the values specified in section 2, at the risk of exceeding the temperature classification.*

Refer to section 2 of this manual for the required operating conditions of the blowers.

1.2.6. Normal operations

⚠ CAUTION

The category 2 or 3 ATEX-compliant blowers are based on the safety construction principle for the safe pumping/compressing of flammable materials. Under normal operating conditions, as defined in this manual, they can safely pump/compress flammable materials as long as particles (of more than 25 µm) cannot penetrate, which would cause a risk of potential ignition.

The category 2 or 3 ATEX-compliant blowers are based on the safety construction principle for the safe pumping/compressing of flammable gasses and vapors. In order to abide by the safety construction requirements, it is your responsibility to prevent any particles of more than 25 µm from penetrating blower.

If such a risk is not present, the blower can be used to pump/compress gas group IIB flammable materials (example given in table 1), under normal operating conditions as set forth in this manual.

The materials from which the positive displacement blowers are constructed are specified in section 2.7. Before using blower, you must ensure that these materials are compatible with the gasses and vapors that could be present in the external atmosphere.

1. INTRODUCTION

1.2.7. Faulty operations

⚠ CAUTION

It is strictly forbidden to use the category 2 or 3 ATEX-compliant blowers under the following conditions.

- Pumping/compression of gas or gaseous mixtures having a temperature greater than the system's temperature classification.
- Pumping/compression of gas or gaseous mixtures having a spontaneous combustion temperature less than the system's temperature classification (see section 1.2.5.2).
- Pumping/compression of hydrocarbon oxides.
- Pumping/compression of pyrophoric gas.
- Usage with oxygen-rich atmospheres.
- Using the positive displacement blower under ambient conditions other than those specified in Table 1.

1.3 Applications

The VTB.XL blowers are suitable for use in a wide range of applications. You must ensure that your blower is suitable for your application.

The blowers are suitable for pumping/compressing ambient air, and non-flammable gases, gas mixtures and dusts. The blowers are not suitable for pumping/compressing flammable or pyrophoric gases, gas mixtures and dusts.

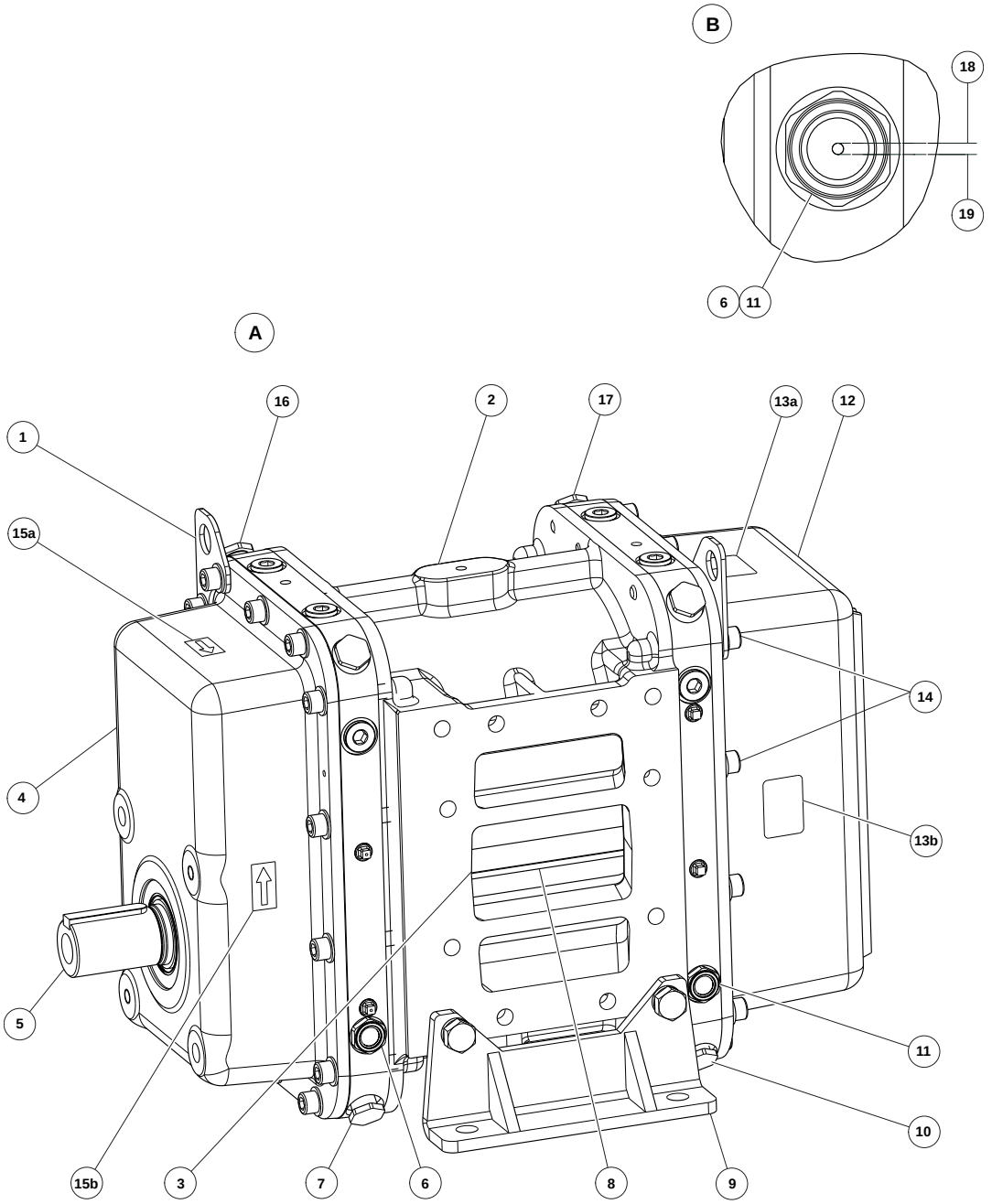
The materials of construction of the blowers are specified in Section.2.7. Before you use the blower, you must ensure that

these materials are compatible with the gases and vapors which you will pump/compress or which may exist in the external atmosphere.

You must ensure that your blower is suitable for your application.

If you have any doubts as to the suitability of the blower for your application, contact your supplier or **Ingersoll Rand** for advice.

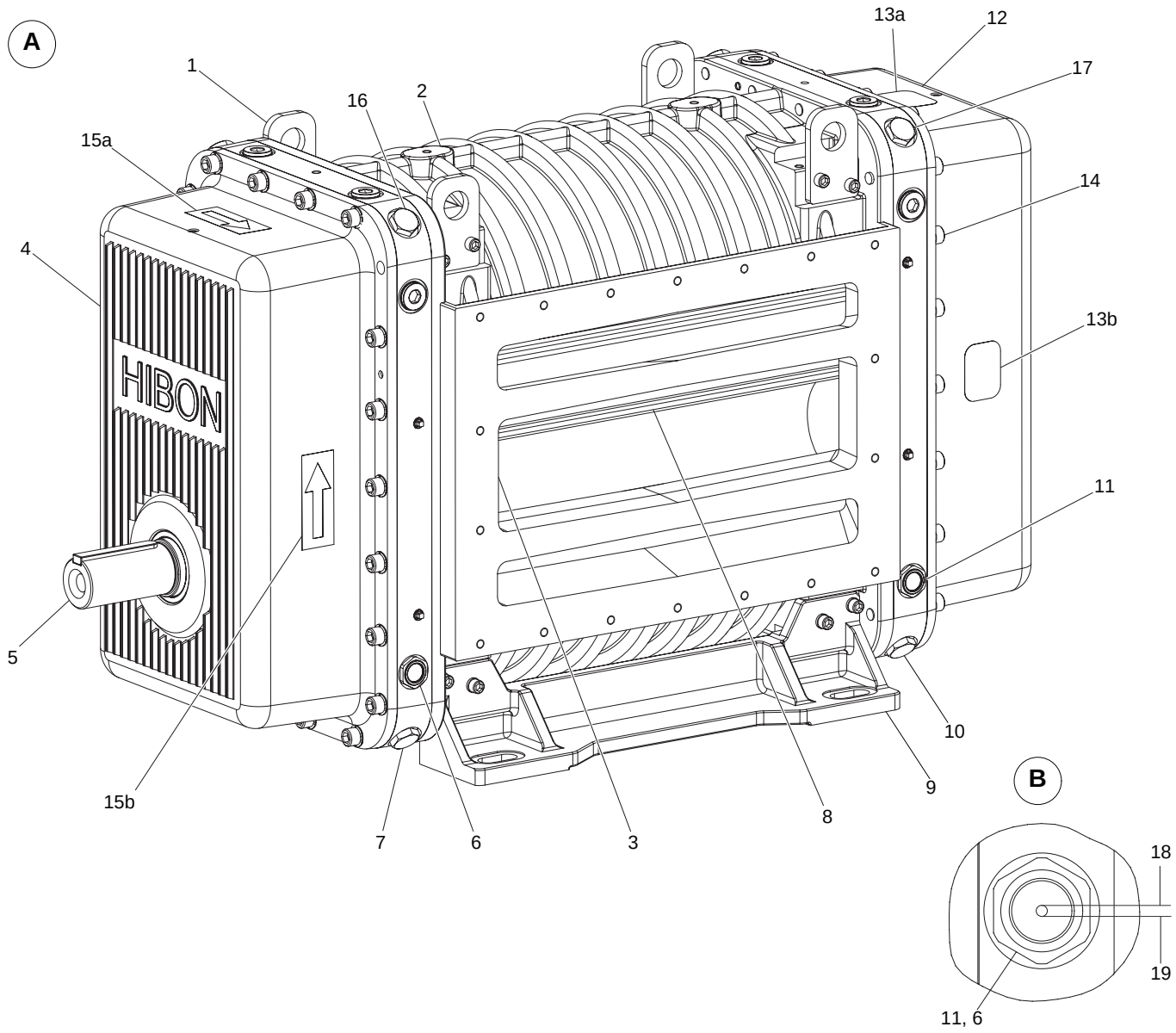
1. INTRODUCTION



1. Lifting lugs
2. Inlet (behind blower)
3. Discharge (outlet)/injection ports
4. Drive end cover
5. Drive shaft
6. Oil level sight glass (drive head plate)
7. Drive end oil drain plug
8. Rotors
9. Mounting Feet
10. Non drive end oil drain plug
11. Oil-level sight glass (non-drive head plate)
12. Non-drive end cover
13a. Identification and rating plate (vertical position)
13b. Identification and rating plate (horizontal position)
14. Head plate bolts
15a. Direction of rotation arrow (vertical position)
15b. Direction of rotation arrow (horizontal position)
16. Oil filler plug (drive head plate)
17. Oil filler plug (nondrive head plate)
18. Maximum oil level
19. Minimum oil level

Figure 2.a. – VTB 805/807/810/820/822 .XL blowers

1. INTRODUCTION



1. Lifting lugs
2. Inlet (behind blower)
3. Discharge (outlet)/injection ports
4. Drive end cover
5. Drive shaft
6. Oil level sight glass (drive head plate)
7. Drive end oil drain plug
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9. Mounting Feet
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12. Non-drive end cover
13a. Identification and rating plate (vertical position)
13b. Identification and rating plate (horizontal position)
14. Head plate bolts
15a. Direction of rotation arrow (vertical position)
15b. Direction of rotation arrow (horizontal position)
16. Oil filler plug (drive head plate)
17. Oil filler plug (nondrive head plate)
18. Maximum oil level
19. Minimum oil level

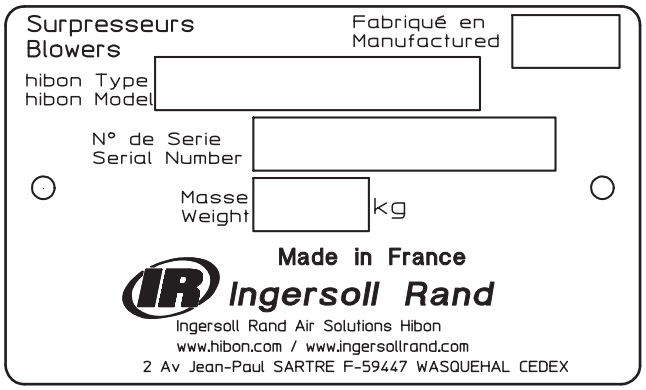
Figure 2.b. - VTB 840/8602/8702/8902 .XL blowers

1. INTRODUCTION

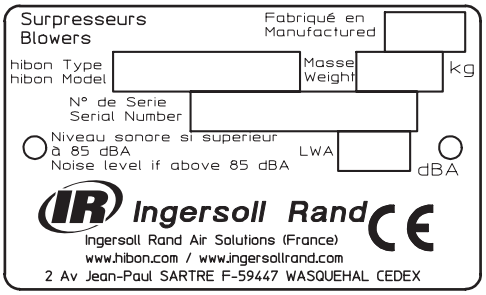
Identification and rating plate

The following positive displacement blower models are available:

- Standard blowers: one standard rating plate (Figure 2 items 13.a. / 13.b.):



- Category 2 or 3 ATEX-compliant blowers: two rating plates (Figure 2 items 13.a. / 13.b.):



2. TECHNICAL DATA

2.1 Operating and storage conditions

Ambient operating temperature range	-20 to 40 °C, -4 to 104 °F
Ambient storage temperature range	-20 to 80 °C, -4 to 176 °F
Maximum ambient operating humidity	90%
Maximum operating altitude	3000 m, 9842 ft.
Maximum particle size (in pumped/compressed gases)	25 µm, 0.00098 inch
Maximum dust to gas ratio (in pumped/ compressed gases)	200 mg/m^3 , 0.25 oz $ft.^{-3}$

Table 1 - Operating and storage conditions

For operating data above the values indicated in table 1, please contact **Ingersoll Rand.**

2.2 Performance

Maximum outlet (discharge) pressure	Atmospheric pressure + maximum differential pressure
Maximum inlet pressure	Atmospheric pressure
Maximum outlet vacuum	Atmospheric pressure
Maximum inlet vacuum	100 mbar, 1 x 10^4 Pa, 75.75 Torr
Maximum differential pressure (inlet/outlet)	1200 mbar, 1.2 x 105 Pa, 900 Torr (VTB 840.XL, VTB 8602.XL, VTB 8702.XL, VTB 8902.XL) 1100 mbar, 1.1 x 10^5 Pa, 825 Torr (VTB 805.XL, VTB 807.XL) 1000 mbar, 1.0 x 10^5 Pa, 750 Torr (VTB 810.XL, VTB 820.XL, VTB 822.XL)
Vacuum performance	See Table 3
Rotational speed range	See Table 3
Nominal shaft power (vacuum operation)	See Table 3
Maximum absorbed shaft power (pressure operation)	29 kW, 38.87 hp (VTB805.XL)
	45 kW, 60.32 hp (VTB807.XL)
	55 kW, 73.76 hp (VTB810.XL)
	84 kW, 112.65 hp (VTB820.XL)
	120.2 kW, 161.2 hp (VTB 822.XL)
	230 kW, 308.44 hp (VTB 840.XL)
	280 kW, 375.49 hp (VTB 8602.XL)
	350 kW, 469.36 hp (VTB 8702.XL)
	400 kW, 536.41 hp (VTB 8902.XL)

Table 2 – VTB.XL Performance data

2. TECHNICAL DATA

Blower	Speed (RPM)	9" HG		12" HG		15" HG		18" HG		21" HG		24" HG		26" HG		27" HG	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
VTB 805.XL (605 CFM)*	2600	262	7	250	9	226	11	203	13	171	15	67	17	-	-	-	-
	2900	297	8	285	10	262	12	240	15	207	17	102	19	-	-	-	-
	3200	332	9	320	11	299	14	277	16	243	19	137	21	29	24	-	-
	3500	367	10	355	13	336	15	313	18	279	21	172	23	64	26	-	-
	3800	402	11	391	14	372	17	350	20	315	23	207	26	100	28	-	-
	4000	425	12	414	15	397	18	374	21	339	24	231	27	124	30	-	-
	4200	448	13	437	16	421	19	399	22	363	25	254	28	148	32	13	33
	4400	471	14	461	17	446	20	423	24	387	27	277	30	172	33	40	34
	4600	495	14	484	18	470	21	448	25	411	28	301	31	195	35	67	36
	4800	518	15	508	19	495	22	472	26	435	29	324	33	219	37	94 **	38 **
VTB 807.XL (942 CFM)*	2600	409	10	389	13	352	17	317	20	266	24	104	26	-	-	-	-
	2900	463	12	444	16	409	19	374	23	322	27	159	30	-	-	-	-
	3200	518	14	499	18	466	22	431	26	379	30	214	33	44	37	-	-
	3500	572	16	554	20	523	24	488	28	435	33	268	36	100	40	-	-
	3800	626	18	609	22	580	26	545	31	491	36	323	40	156	44	-	-
	4000	662	19	645	24	619	28	583	33	529	38	359	42	193	47	-	-
	4200	699	20	682	25	657	30	622	35	566	40	396	44	230	49	21	51
	4400	735	21	719	27	695	31	660	37	604	42	432	46	267	52	63	54
	4600	771	22	755	28	733	33	698	38	641	43	469	49	305	55	105	56
	4800	807	24	792	30	771	34	736	40	679	45	505	51	342	57	147 **	59 **

Blower	Speed (RPM)	30% vacuum		40% vacuum		50% vacuum		60% vacuum		70% vacuum		80% vacuum		87% vacuum		90% vacuum	
		m^3/ h	kW	m^3/ h	kW	m^3/ h	kW	m^3/ h	kW	m^3/ h	kW	m^3/ h	kW	m^3/ h	kW	m^3/ h	kW
VTB 805.XL (1028 m^3/h)*	2600	446	5	424	6	383	8	345	10	290	11	114	13	-	-	-	-
	2900	505	6	484	7	446	9	408	11	351	13	173	14	-	-	-	-
	3200	564	7	544	8	508	10	470	12	413	14	233	16	48	18	-	-
	3500	623	8	604	10	570	11	532	14	474	16	292	17	109	19	-	-
	3800	683	8	663	11	633	13	594	15	535	17	352	19	170	21	-	-
	4000	722	9	703	11	674	13	636	16	576	18	392	20	210	22	-	-
	4200	761	10	743	12	716	14	677	17	617	19	431	21	251	24	23	24
	4400	801	10	783	13	757	15	719	18	658	20	471	22	292	25	69	26
	4600	840	11	823	13	799	16	761	18	699	21	511	23	332	26	114	27
	4800	880	11	863	14	840	16	802	19	740	22	551	24	373	27	160 **	28 **
VTB 807.XL (1570 m^3/h)*	2600	695	8	661	10	598	12	538	15	452	18	177	20	-	-	-	-
	2900	787	9	754	12	695	14	635	17	548	20	270	22	-	-	-	-
	3200	879	10	848	13	792	16	732	19	643	22	363	25	76	27	-	-
	3500	972	12	941	15	889	18	830	21	739	24	456	27	170	30	-	-
	3800	1064	13	1034	17	986	20	927	23	834	27	549	30	265	33	-	-
	4000	1125	14	1096	18	1051	21	991	25	898	28	611	31	328	35	-	-
	4200	1187	15	1159	19	1116	22	1056	26	962	29	673	33	391	37	36	38
	4400	1249	16	1221	20	1180	23	1121	27	1026	31	734	35	454	39	107	40
	4600	1310	17	1283	21	1245	24	1186	29	1089	32	796	36	518	41	178	42
	4800	1372	18	1345	22	1310	26	1250	30	1153	34	858	38	581	43	250 **	44 **

2. TECHNICAL DATA

Blower	Speed (RPM)	9" HG		12" HG		15" HG		18" HG		21" HG		24" HG		27" HG	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
VTB 810.XL (1119 CFM)*	2200	573	15	558	18	535	21	503	25	458	29	336	33	97	37
	2600	700	18	686	22	665	26	634	31	593	35	478	39	231	44
	2800	764	19	750	24	731	28	699	33	661	38	548	42	298	48
	3000	827	21	814	26	796	30	765	36	729	41	619	46	365	52
	3200	891	22	878	28	861	32	830	39	797	44	690	49	432	56
	3400	955	24	942	30	927	35	896	42	864	47	760	53	499	60
	3600	1019	26	1007	32	992	38	961	45	932	51	831	56	566**	63**
	3800	1082	28	1071	35	1057	40	1027	49	1000	54	902**	60**	-	-
VTB 820.XL (1661 CFM)*	2200	785	22	764	28	728	35	673	41	608	45	505	49	152	53
	2600	948	27	955	33	894	41	843	48	778	54	683	58	290	63
	2800	1030	29	1042	36	978	44	928	52	864	58	772	63	360	68
	3000	1111	31	1128	39	1061	48	1014	55	949	62	861	67	429	74
	3200	1193	34	1215	42	1144	51	1099	59	1035	67	950	72	498	79
	3400	1275	36	1302	45	1227	55	1184	63	1120	71	1039	77	567	84
	3600	1356	39	1389	49	1310	58	1269	67	1205	76	1128	83	637**	90**
	3800	1438	42	1476	52	1393	62	1354	70	1291	80	1217**	87**	-	-
VTB 822.XL (2729 CFM)*	1600	1241	30	1178	38	1136	48	1050	58	907	67	691	77	452	86
	1800	1426	34	1363	43	1316	54	1231	65	1090	75	856	86	582	97
	2000	1610	37	1548	48	1496	60	1412	72	1273	84	1021	96	711	108
	2200	1795	41	1733	53	1676	66	1593	79	1456	92	1186	105	841	119
	2400	1979	45	1918	58	1855	72	1773	86	1639	101	1351	115	970	129
	2600	2164	49	2103	62	2035	78	1954	93	1822	109	1515	125	1100	140
	2800	2348	52	2288	67	2215	84	2135	101	2005	117	1680	134	1229**	151**
	3000	2533	56	2473	72	2395	90	2316	108	2188	126	1845**	144**	1358**	162**

2. TECHNICAL DATA

Blower	Speed (RPM)	30% vacuum		40% vacuum		50% vacuum		60% vacuum		70% vacuum		80% vacuum		90% vacuum	
		m^3/ h	kW	m^3/ h	kW	m^3/ h	kW	m^3/ h	kW	m^3/ h	kW	m^3/ h	kW	m^3/ h	kW
VTB 810.XL (1901 m^3/h)*	2200	973	11	947	14	908	16	855	19	778	22	571	24	164	28
	2600	1189	13	1165	16	1130	19	1077	23	1008	26	812	29	392	33
	2800	1298	14	1274	18	1241	21	1188	25	1123	28	932	32	506	36
	3000	1406	16	1383	19	1352	22	1300	27	1238	31	1052	34	620	39
	3200	1514	17	1492	21	1463	24	1411	29	1353	33	1172	37	734	42
	3400	1622	18	1601	22	1574	26	1522	31	1468	35	1292	39	848	44
	3600	1730	19	1710	24	1685	28	1633	34	1583	38	1412	42	962**	47**
	3800	1839	21	1819	26	1796	30	1744	36	1698	41	1532**	45**	_	_
VTB 820.XL (2822 m^3/h)*	2200	1333	17	1297	21	1237	26	1143	30	1032	34	858	36	258	40
	2600	1611	20	1576	25	1520	31	1433	36	1322	40	1160	43	493	47
	2800	1750	22	1715	27	1661	33	1577	39	1467	43	1311	47	611	51
	3000	1888	23	1854	29	1802	36	1722	41	1613	46	1463	50	729	55
	3200	2027	25	1993	31	1943	38	1867	44	1758	50	1614	54	846	59
	3400	2166	27	2132	34	2085	41	2012	47	1903	53	1765	58	964	63
	3600	2304	29	2272	36	2226	44	2156	50	2048	56	1916	62	1082**	67**
	3800	2443	31	2411	39	2367	46	2301	52	2193	60	2067**	65**	_	_
VTB 822.XL (4636 m^3/h)*	1600	2109	22	2002	29	1930	36	1784	43	1541	50	1175	57	768	64
	1800	2423	25	2316	32	2235	40	2091	48	1852	56	1455	64	988	72
	2000	2736	28	2630	36	2541	45	2398	54	2163	63	1735	71	1208	80
	2200	3050	31	2944	39	2847	49	2706	59	2474	69	2015	79	1428	88
	2400	3363	34	3259	43	3152	54	3013	64	2785	75	2295	86	1648	96
	2600	3677	36	3573	46	3458	58	3320	70	3095	81	2575	93	1868	105
	2800	3990	39	3887	50	3764	63	3628	75	3406	88	2855	100	2088**	112,5**
	3000	4304	42	4201	54	4070	67	3935	80	3717	94	3134,8**	107,1**	2308**	120,5**

* Volume displacement at maximum speed

** For intermittent use only (15 min / hour)

Table 3 - Vacuum performance data

2.3 Mechanical data

Dimensions				
Left and Right Hand blowers		See figure 4		
Top and Bottom Shaft blowers		See figure 5		
Discharge/injection ports		See Figure 3		
Mass				
VTB805.XL	**VTB807.XL**	**VTB810.XL**	**VTB820.XL**	**VTB822.XL**
127 kg	157 kg	221 kg	263 kg	540 kg
280 lb	346 lb	487 lb	580 lb	1190 lb

VTB840.XL	VTB8602.XL	VTB8702.XL	VTB8902.XL
775 kg	1036 kg	1250 kg	1487 kg
1708 lb	2284 lb	2756 lb	3278 lb

Table 4 - Mechanical data

2.4 Lubrication data

On standard applications, you can use oil which complies with the 'standard use' specification given in Table 5. You must use an oil which complies with the 'special use' specification in Table 5:

- If you use the blower with an acoustic enclosure.
- If you use the blower in ambient temperatures of 0 ° C (32 ° F) or below.
- If you use the blower with a power input that exceeds 2/3 of the maximum power input (see Table 2).

Parameter	Standard use	Special use
Density (at 15 °C, 59 °F)	0.89	0.86
Mean pour point	21 °C (70 °F)	45 °C (113 °F)
Mean flash point	224 °C (435 °F)	260 °C (500 °F)
Viscosity: at 20 °C (68 °F)	8.09 x 10^{-4} m^2 s^{-1} (809 cSt)	6.04 x 10^{-4} m2 s^{-1} (640 cSt)
at 40 °C (104 °F)	2.2 x 10^{-4} m^2 s^{-1} (220 cSt)	2.18 x 10^{-4} m2 s^{-1} (218 cSt)
at 100 °C (212 °F)	1.8 x 10^{-5} m^2 s^{-1} (18 cSt)	2.7 x 10^{-5} m2 s^{-1} (27 cSt)
Mean viscosity index	93	149
Recommended oil	Hibon Lub	Contact factory

Table 5 – Lubricating oil specifications

2. TECHNICAL DATA

	VTB 805.XL	VTB 807.XL	VTB 810.XL	VTB 820.XL	VTB 822.XL	VTB 840.XL	VTB 8602.XL	VTB 8702.XL	VTB 8902.XL
Drive end cover	0.83 liters	0.83 liters	1.50 liters	1.50 liters	2.41liters	6.50 liters	6.50 liters	9.20 liters	9.20 liters
	0.22 US gal	0.22 US gal	0.40 US gal	0.40 US gal	0.66 US gal	1.72 US gal	1.72 US gal	2.43 US gal	2.43 US gal

	VTB 805.XL	VTB 807.XL	VTB 810.XL	VTB 820.XL	VTB 822.XL	VTB 840.XL	VTB 8602.XL	VTB 8702.XL	VTB 8902.XL
Non-drive end cover	1.13 liters	1.13 liters	2.1 liters	2.1 liters	3.84 liters	6.00 liters	6.00 liters	9.40 liters	9.40 liters
	0.30 US gal	0.30 US gal	0.55 US gal	0.55 US gal	1 US gal	1.59 US gal	1.59 US gal	2.49 US gal	2.49 US gal

Table 6 – Left and Right Hand blower oil capacities

	VTB 805.XL	VTB 807.XL	VTB 810.XL	VTB 820.XL	VTB 822.XL	VTB 840.XL	VTB 8602.XL	VTB 8702.XL	VTB 8902.XL
Drive end cover	0.5 liters	0.5 liters	0.9 liters	0.9 liters	1.45 liters	3.80 liters	3.80 liters	5.60 liters	5.60 liters
	0.13 US gal	0.13 US gal	0.24 US gal	0.24 US gal	0.38 US gal	1.00 US gal	1.00 US gal	1.48 US gal	1.48 US gal

	VTB 805.XL	VTB 807.XL	VTB 810.XL	VTB 820.XL	VTB 822.XL	VTB 840.XL	VTB 8602.XL	VTB 8702.XL	VTB 8902.XL
Non-drive end cover	0.75 liters	0.75 liters	1.3 liters	1.3 liters	2.3 liters	4.40 liters	4.40 liters	5.70 liters	5.70 liters
	0.2 US gal	0.2 US gal	0.34 US gal	0.34 US gal	0.61 US gal	1.16 US gal	1.16 US gal	1.51 US gal	1.51 US gal

Table 7 – Top and Bottom Shaft blower oil capacities

2.5 Noise and vibration data

Note: *The noise and vibration data values given below are maximum values (without noise treatment). The actual values will depend on the operating conditions.*

	VTB 805.XL	VTB 807.XL	VTB 810.XL	VTB 820.XL	VTB 822.XL	VTB 840.XL	VTB 8602.XL	VTB 8702.XL	VTB 8902.XL
Noise level: dB(A)	110	113	121	127	129	124	124	124	125
Vibration level	4.5 $mm.s^{-1}$	5 $mm.s^{-1}$	5.5 $mm.s^{-1}$	6.5 $mm.s^{-1}$	7 $mm.s^{-1}$	7,5 $mm.s^{-1}$	7,5 $mm.s^{-1}$	7,5 $mm.s^{-1}$	7,5 $mm.s^{-1}$
	0.18 inch s^{-1}	0.2 inch s^{-1}	0.22 inch s^{-1}	0.25 inch s^{-1}	0.28 inch s^{-1}	0.30 inch s^{-1}	0.30 inch s^{-1}	0.30 inch s^{-1}	0.30 inch s^{-1}

Table 8 - Noise and vibration data

2.6 Connections

See figure 4 & 5

* Recommended size; the manifold is not supplied with the blower.

2.7 Materials of construction

Head Plates and Oil casings	EN GJL 250 grey cast iron
Casings	EN GJL 200 grey cast iron (VTB 805.XL, 807.XL, 810.XL, 820.XL) EN GJL 250 grey cast iron (VTB 822.XL, 840.XL, 8602.XL, 8702.XL, 8902.XL)
Rotors	EN GJS 400-15 spheroidal graphite cast iron
Shafts	EN GJS 400-15 spheroidal graphite cast iron, (VTB 805.XL, 807.XL, 810.XL, 820.XL, 822.XL) C 45E Steel, (VTB 840.XL, VTB 8602.XL, VTB 8702.XL, VTB 8902.XL)
Bearings	100Cr6 steel
Piston rings	Cast iron
Piston rings holder	C 45E Steel
Gaskets	Klingerit® C4430
O-rings	Nitrile

Table 9 - Construction materials data

2. TECHNICAL DATA

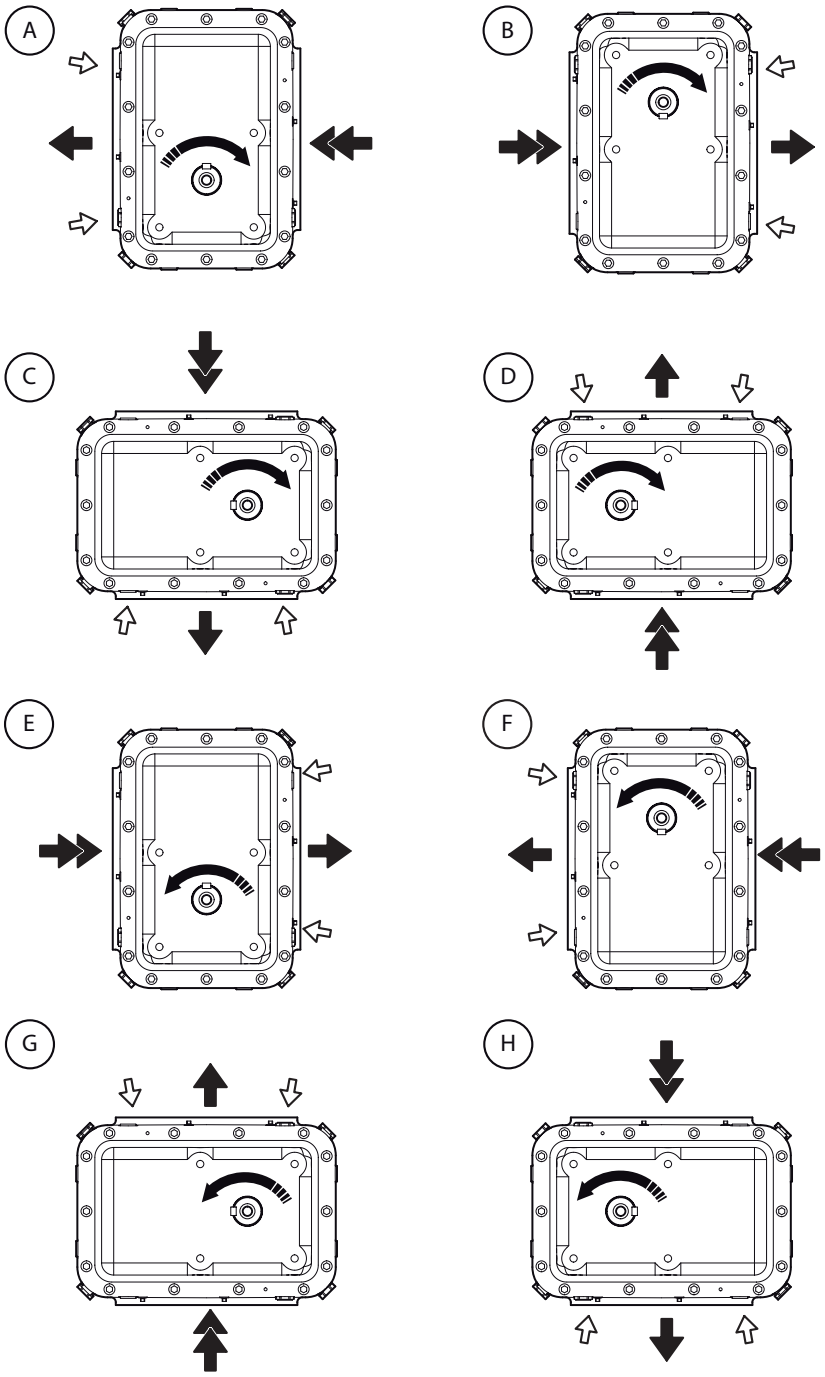


Figure 3 - Ordering configurations

Inlet gas stream

Discharge (outlet) Gas stream

Air injection

Direction of shaft rotation

Note: *Refer to Table 10 for the item numbers of blowers with the configurations shown in the figure*

2. TECHNICAL DATA

2.8 Item Numbers

Blower model	Shaft position	Rotation direction	Standard blowers			
			Without Feet		With Feet	
VTB 805.XL	Bottom	Counter clockwise	F014570110	E	F0145701101	E
	Bottom	Clockwise	F014570111	A	F0145701111	A
	Left	Counter clockwise	F014570100	H		
	Left	Clockwise	F014570101	D		
	Top	Counter clockwise	F014570120	F	F0145701201	F
	Top	Clockwise	F014570121	B	F0145701211	B
	Right	Counter clockwise	F014570130	G		
	Right	Clockwise	F014570131	C		
VTB 807.XL	Bottom	Counter clockwise	F014690110	E	F0146901101	E
	Bottom	Clockwise	F014690111	A	F0146901111	A
	Left	Counter clockwise	F014690100	H		
	Left	Clockwise	F014690101	D		
	Top	Counter clockwise	F014690120	F	F0146901201	F
	Top	Clockwise	F014690121	B	F0146901211	B
	Right	Counter clockwise	F014690130	G		
	Right	Clockwise	F014690131	C		
VTB 810.XL	Bottom	Counter clockwise	F015690110	E	F0156901101	E
	Bottom	Clockwise	F015690111	A	F0156901111	A
	Left	Counter clockwise	F015690100	H		
	Left	Clockwise	F015690101	D		
	Top	Counter clockwise	F015690120	F	F0156901201	F
	Top	Clockwise	F015690121	B	F0156901211	B
	Right	Counter clockwise	F015690130	G		
	Right	Clockwise	F015690131	C		
VTB 820.XL	Bottom	Counter clockwise	F015570110	E	F0155701101	E
	Bottom	Clockwise	F015570111	A	F0155701111	A
	Left	Counter clockwise	F015570100	H		
	Left	Clockwise	F015570101	D		
	Top	Counter clockwise	F015570120	F	F0155701201	F
	Top	Clockwise	F015570121	B	F0155701211	B
	Right	Counter clockwise	F015570130	G		
	Right	Clockwise	F015570131	C		
VTB 822.XL	Bottom	Counter clockwise	F016570110	E	F0165701101	E
	Bottom	Clockwise	F016570111	A	F0165701111	A
	Left	Counter clockwise	F016570100	H	F0165701001	H
	Left	Clockwise	F016570101	D	F0165701011	D
	Top	Counter clockwise	F016570120	F	F0165701201	F
	Top	Clockwise	F016570121	B	F0165701211	B
	Right	Counter clockwise	F016570130	G	F0165701301	G
	Right	Clockwise	F016570131	C	F0165701311	C

.

2. TECHNICAL DATA

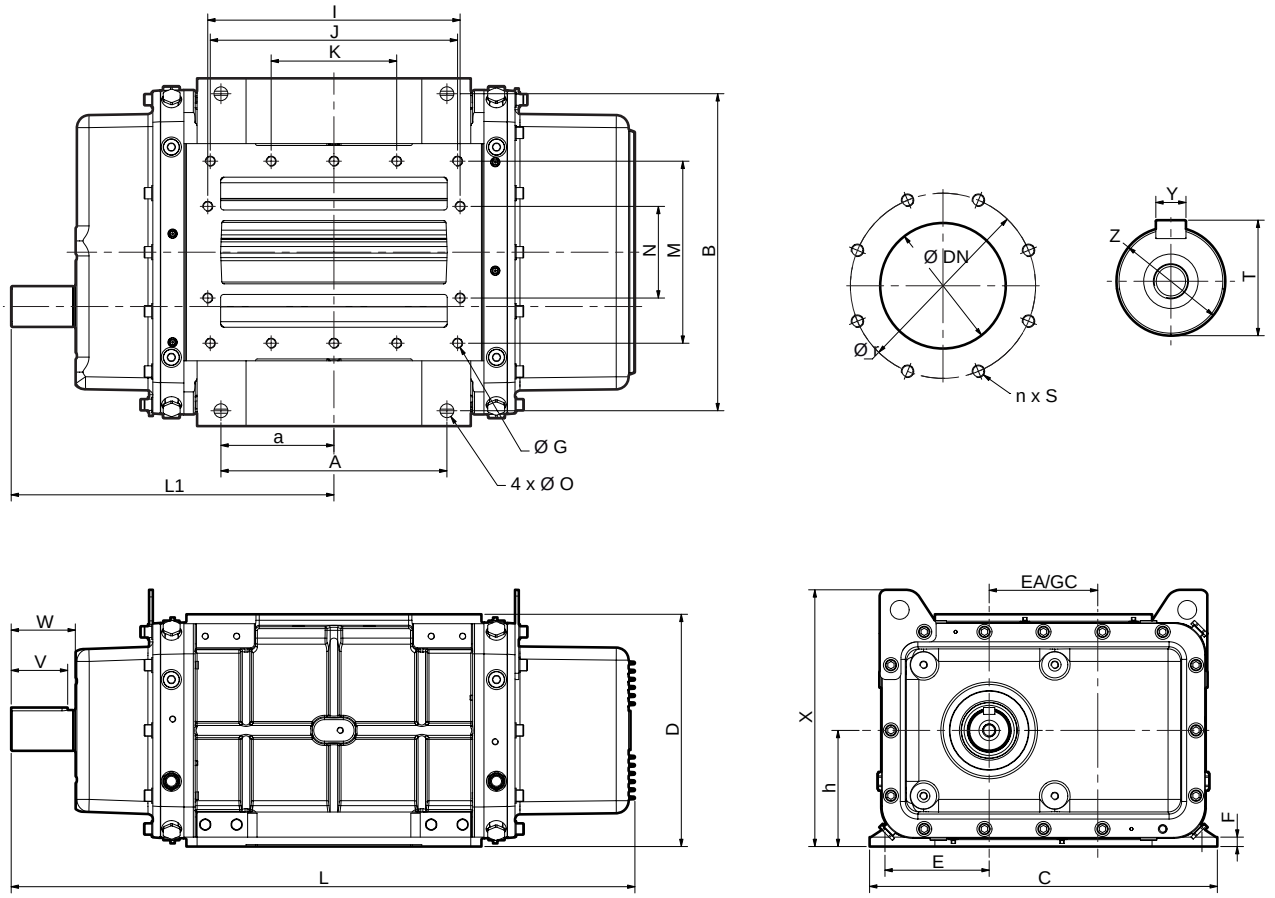
2.8 Item Numbers *(Continued..)*

Blower model	Shaft position	Rotation direction	Standard blowers			
			Without Feet		With Feet	
VTB 840.XL	Bottom	Counter clockwise	-	-	F0175701101	E
	Bottom	Clockwise	-	-	F0175701111	A
	Left	Counter clockwise	-	-	F0175701001	H
	Left	Clockwise	-	-	F0175701011	D
	Top	Counter clockwise	-	-	F0175701201	F
	Top	Clockwise	-	-	F0175701211	B
	Right	Counter clockwise	-	-	F0175701301	G
	Right	Clockwise	-	-	F0175701311	C
VTB 8602.XL	Bottom	Counter clockwise	-	-	F0176901101	E
	Bottom	Clockwise	-	-	F0176901111	A
	Left	Counter clockwise	-	-	F0176901001	H
	Left	Clockwise	-	-	F0176901011	D
	Top	Counter clockwise	-	-	F0176901201	F
	Top	Clockwise	-	-	F0176901211	B
	Right	Counter clockwise	-	-	F0176901301	G
	Right	Clockwise	-	-	F0176901311	C
VTB 8702.XL	Bottom	Counter clockwise	-	-	F0185701101	E
	Bottom	Clockwise	-	-	F0185701111	A
	Left	Counter clockwise	-	-	F0185701001	H
	Left	Clockwise	-	-	F0185701011	D
	Top	Counter clockwise	-	-	F0185701201	F
	Top	Clockwise	-	-	F0185701211	B
	Right	Counter clockwise	-	-	F0185701301	G
	Right	Clockwise	-	-	F0185701311	C
VTB 8902.XL	Bottom	Counter clockwise	-	-	F0186901101	E
	Bottom	Clockwise	-	-	F0186901111	A
	Left	Counter clockwise	-	-	F0186901001	H
	Left	Clockwise	-	-	F0186901011	D
	Top	Counter clockwise	-	-	F0186901201	F
	Top	Clockwise	-	-	F0186901211	B
	Right	Counter clockwise	-	-	F0186901301	G
	Right	Clockwise	-	-	F0186901311	C

Table 10 - Item Numbers

* Installation configuration: see the corresponding detail in Figure 3

2. TECHNICAL DATA

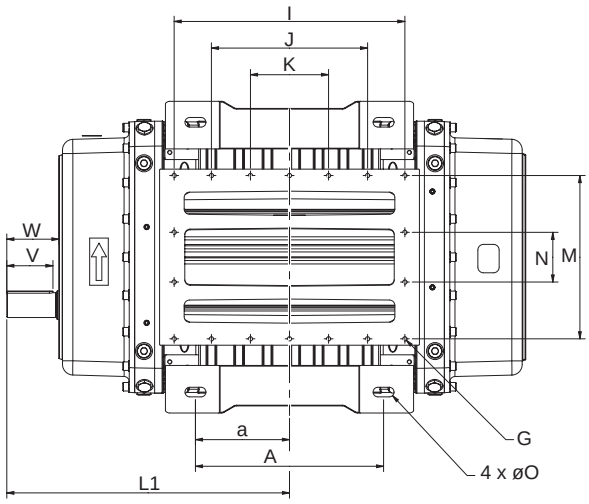


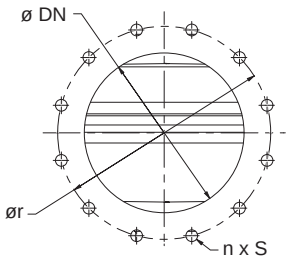
Key	Dimensions									
	VTB 805.XL		VTB 807.XL		VTB 810.XL		VTB 820.XL		VTB 822.XL	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
A	/		/		/		/		360	14.17
a	/		/		/		/		180	7.09
B	/		/		/		/		505	19.88
C	346	13.62	346	13.62	425	16.73	425	16.73	554	21.81
D	252	9.92	252	9.92	310	12.20	310	12.20	370	14.57
E	/		/		/		/		166	6.54
F	/		/		/		/		15	0.59
GC/EA	106	4.17	106	4.17	135	5.31	135	5.31	173	6.81
G	8 x M12		8 x M12		8 x M16		8 x M16		14 x M16	
h	126	4.96	126	4.96	155	6.10	155	6.10	185	7.28
I	150	5.91	198	7.80	179	7.05	230	9.06	402	15.83
J	64	2.52	120	4.72	90	3.54	100	3.94	394	15.51
K	/		/		/		/		200	7.87
L	555	21.85	650	25.59	672	26.46	792	31.18	994	39.13
L1	280	11.02	328	12.91	368	14.49	427.5	16.83	514	20.24
M	256	10.08	268	10.55	254	10.00	254	10.00	290	11.42
N	120	4.72	128	5.04	120	4.72	120	4.72	146	5.75
ØO	/		/		/		/		22	0.87
Ør	180	7.09	210	8.27	210	8.27	240	9.45	295	11.61
n x S	4 x M14		4 x M14		4 x M16		4 x M20		8 x M20	
T	45	1.77	45	1.77	51.5	2.03	51.5	2.03	69	2.72
ØDN	100	3.94	125	4.92	125	4.92	150	5.91	200	7.87
V	50	1.97	50	1.97	70	2.76	70	2.76	90	3.54
W	57	2.24	57	2.24	81	3.19	81	3.19	102	4.02
X	274	10.79	274	10.79	330	12.99	330	12.99	409	16.10
Y	12	0.47	12	0.47	14	0.55	14	0.55	18	0.71
ØZ*	42	1.65	42	1.65	48	1.89	48	1.89	65	2.56

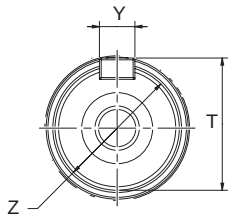
* Fitting tolerance range: m6.

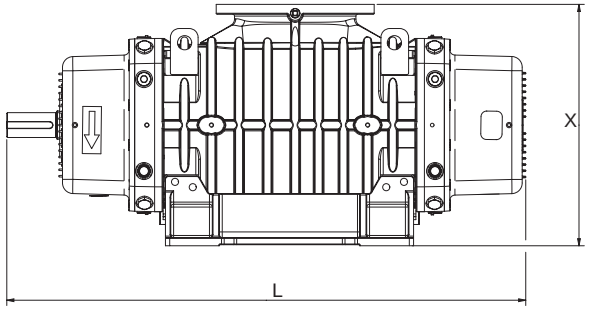
Figure 4.a. - VTB.XL blower dimensions in Left Hand and Right Hand positions

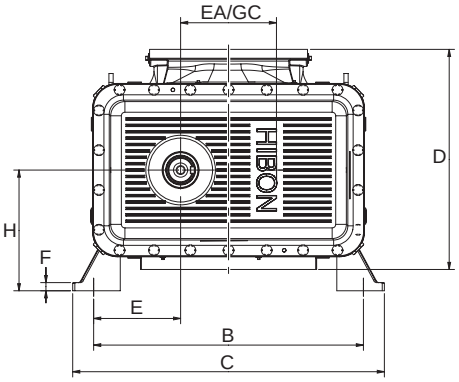
2. TECHNICAL DATA









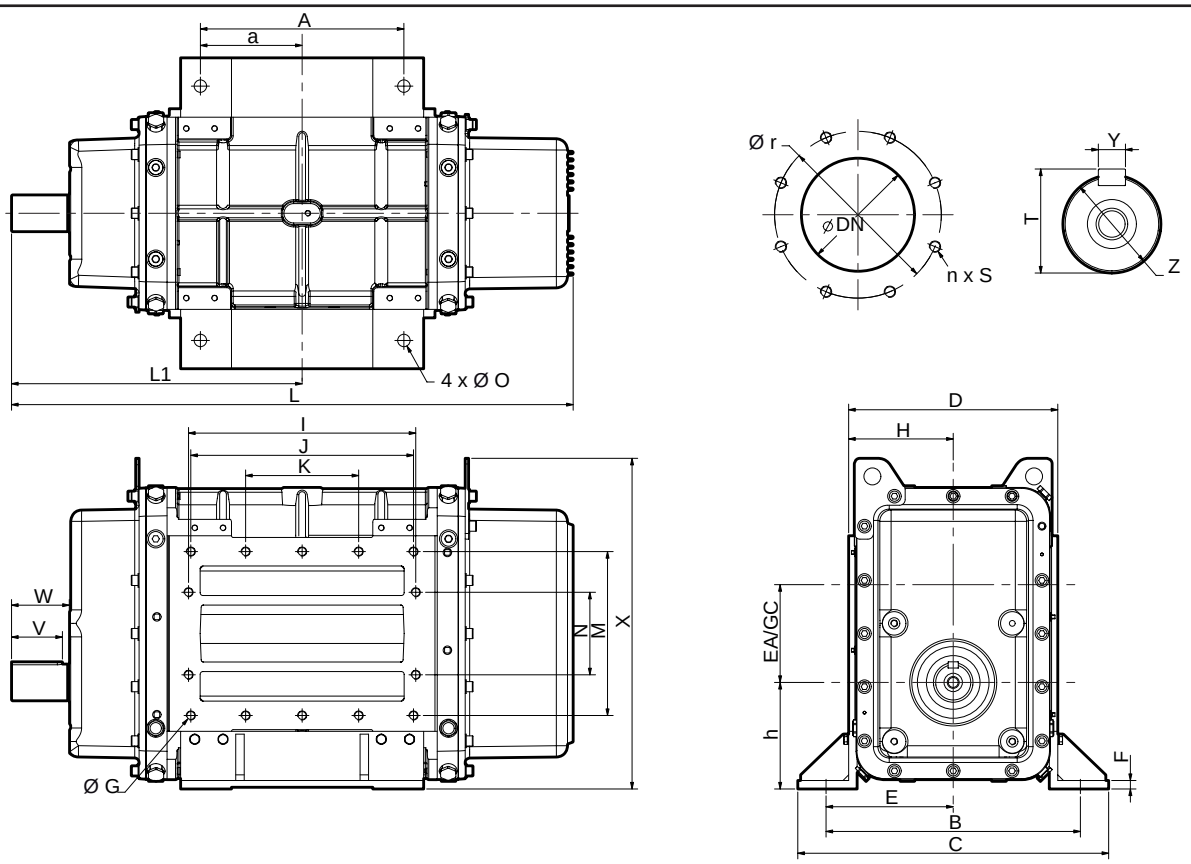


Key	Dimensions							
	VTB 840.XL		VTB 8602.XL		VTB 8702.XL		VTB 8902.XL	
	mm	inch	mm	inch	mm	inch	mm	inch
A	375	14.76	450	17.72	430	16.93	530	20.87
a	217.5	8.56	225	8.86	229	9.02	281	11.06
B	600	23.62	672	26.46	710	27.95	760	29.92
C	667	26.26	739	29.09	830	32.68	878	34.57
D	460	18.11	460	18.11	620	24.41	620	24.41
E	191.5	7.54	227.5	8.96	220	8.66	245	9.65
F	21	0.83	23	0.91	23	0.91	23	0.91
GC/EA	217	8.54	217	8.54	270	10.63	270	10.63
G	16 x M12		14 x M12		14 x M12		18 x M12	
h	270	10.63	270	10.63	340	13.39	340	13.39
I	/		/		/		650	25.59
J	424	16.69	498	19.61	498	19.61	440	17.32
K	212	8.35	250	9.84	250	9.84	220	8.66
L	1159	45.63	1287	50.67	1316	51.81	1462	57.56
L1	660	25.98	694	27.32	737	29.02	812	31.97
M	385	15.16	460	18.11	460	18.11	460	18.11
N	192	7.56	140	5.51	140	5.51	140	5.51
ØO	27	1.06	27	1.06	27	1.06	27	1.06
Ør	350/400	13,78/15,75	400	15.75	400	15.75	400	15.75
n x S	24 x M20		12 x M20		12 x Ø22		12 x Ø22	
T	65	2.56	74.5	2.93	74.5	2.93	74.5	2.93
ØDN	250	9.84	300	11.81	300	11.81	300	11.81
V	105	4.13	106	4.17	130	5.12	130	5.12
W	125	4.92	125	4.92	147	5.79	147	5.79
X	500	19.68	505	19.88	680	26.77	680	26.77
Y	18	0.71	20	0.79	20	0.79	20	0.79
ØZ*	65	2.56	70	2.76	70	2.76	70	2.76

* Fitting tolerance range: m6.

Figure 4.b. - VTB.XL blower dimensions in Left Hand and Right Hand positions

2. TECHNICAL DATA

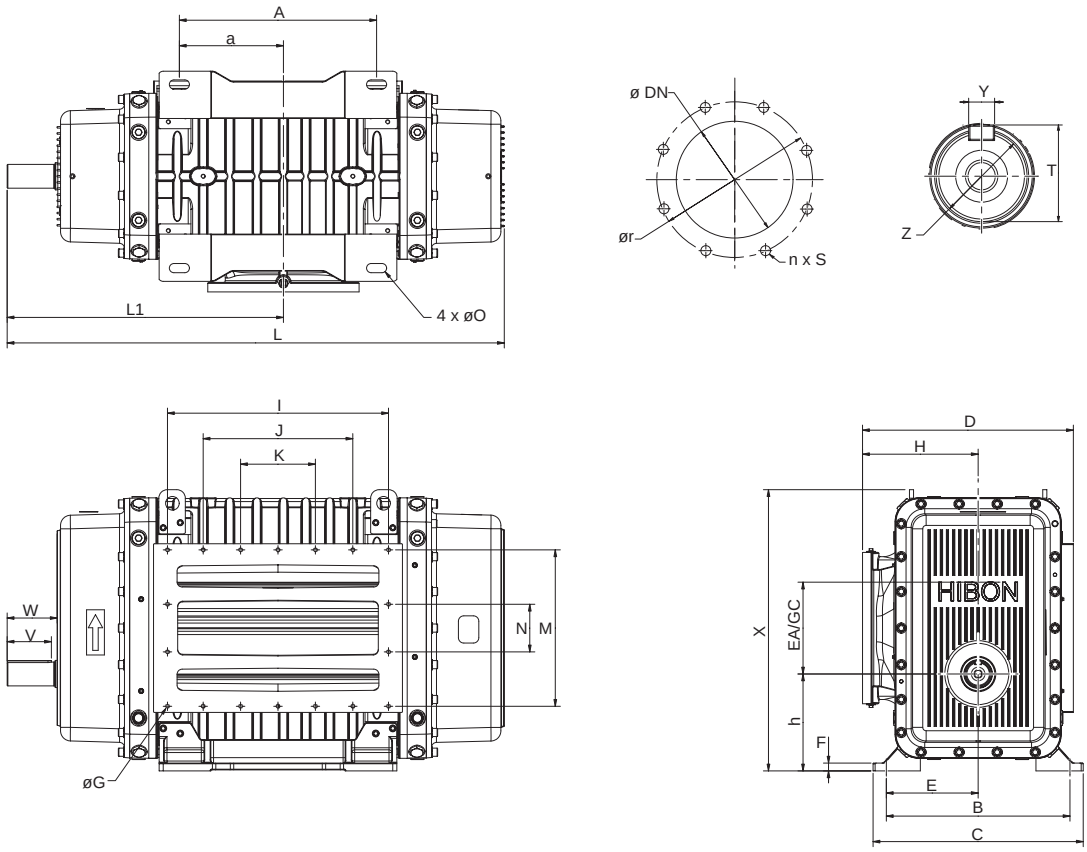


Key	Dimensions									
	VTB 805.XL		VTB 807.XL		VTB 810.XL		VTB 820.XL		VTB 822.XL	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
A	128	5.04	205	8.07	185	7.28	300	11.81	360	14.17
a	64	2.52	102.5	4.04	92.5	3.64	150	5.91	180	7.09
B	316	12.44	316	12.44	370	14.57	370	14.57	450	17.72
C	362	14.25	362	14.25	418	16.46	418	16.46	550	21.65
D	252	9.92	252	9.92	310	12.20	310	12.20	370	14.57
E	158	6.22	158	6.22	185	7.28	185	7.28	225	8.86
F	10	0.39	10	0.39	10	0.39	10	0.39	15	0.59
GC/EA	106	4.17	106	4.17	135	5.31	135	5.31	173	6.81
G	8 x M12		8 x M12		8 x M16		8 x M16		14 x M16	
H	126	4.96	126	4.96	155	6.10	155	6.10	185	7.28
h	129	5.08	129	5.08	150	5.91	150	5.91	188.5	7.42
I	150	5.91	198	7.80	179	7.05	230	9.06	402	15.83
J	64	2.52	120	4.72	90	3.54	100	3.94	394	15.51
K	/	/	/	/	/	/	/	/	200	7.87
L	555	21.85	650	25.59	672	26.46	792	31.18	994	39.13
L1	280	11.02	327.5	12.89	368	14.49	427.5	16.83	514	20.24
M	256	10.08	268	10.55	254	10.00	254	10.00	290	11.42
N	120	4.72	128	5.04	120	4.72	120	4.72	146	5.75
ØO	18	0.71	18	0.71	18	0.71	18	0.71	22	0.87
Ør	180	7.09	210	8.27	210	8.27	240	9.45	295	11.61
n x S	4 x M14		4 x M14		4 x M16		4 x M20		8 x M20	
T	45	1.77	45	1.77	51.5	2.03	51.5	2.03	69	2.72
ØDN	100	3.94	125	4.92	125	4.92	150	5.91	200	7.87
V	50	1.97	50	1.97	70	2.76	70	2.76	90	3.54
W	57	2.24	57	2.24	81	3.19	81	3.19	102	4.02
X	382	15.04	382	15.04	462	18.19	462	18.19	585	23.03
Y	12	0.47	12	0.47	14	0.55	14	0.55	18	0.71
ØZ*	42	1.65	42	1.65	48	1.89	48	1.89	65	2.56

* Fitting tolerance range: m6.

Figure 5.a. - VTB.XL blower dimensions In Bottom Shaft and Top Shaft positions

2. TECHNICAL DATA



Key	Dimensions							
	VTB 840.XL		VTB 8602.XL		VTB 8702.XL		VTB 8902.XL	
	mm	inch	mm	inch	mm	inch	mm	inch
A	375	14.76	450	17.72	430	16.93	580	22.83
a	217.5	8.56	225	8.86	229	9.02	290	11.42
B	460	18.11	482	18.98	540	21.26	540	21.26
C	530	20.87	552	21.73	600	23.62	618	24.33
D	460	18.11	460	18.11	620	24.41	620	24.41
E	230	9.06	241	9.49	270	10.63	270	10.63
F	23	0.91	23	0.91	23	0.91	23	0.91
GC/EA	217	8.54	217	8.54	270	10.63	270	10.63
G	16 x M12		14 x M12		14 X M12		18 X M12	
H	230	9.06	230	9.06	340	13.39	340	13.39
h	235	9.25	285	11.22	285	11.22	285	11.22
I	/		/		/		650	25.59
J	424	16.69	498	19.61	498	19.61	440	17.32
K	212	8.35	250	9.84	250	9.84	220	8.66
L	1159	45.63	1287	50.67	1316	51.81	1462	57.56
L1	660	25.98	694	27.32	737	29.02	812	31.97
M	385	15.16	460	18.11	460	18.11	460	18.11
N	192	7.56	140	5.51	140	5.51	140	5.51
ØO	27	1.06	27	1.06	27	1.06	27	1.06
Ør	350/400	13,78/15,75	400	15.75	400	15.75	400	15.75
n x S	24 x M20		12 x M20		12 x Ø 22		12 x Ø 22	
T	69	2.72	74.5	2.93	74.5	2.93	74.5	2.93
ØDN	250	9.84	300	11.81	300	11.81	300	11.81
V	105	4.13	106	4.17	130	5.12	130	5.12
W	125	4.92	125	4.92	147	5.79	147	5.79
X	681	26.81	737	29.02	827	32.56	827	32.56
Y	18	0.71	20	0.79	20	0.79	20	0.79
ØZ*	65	2.56	70	2.76	70	2.76	70	2.76

* Fitting tolerance range: m6.

Figure 5.b. - VTB.XL blower dimensions In Bottom Shaft and Top Shaft positions

3. INSTALLATION

⚠ CAUTION

Ingersoll Rand will accept no liability or warranty claims if your installation includes any modifications or additions to the blower without the prior written approval of Ingersoll Rand, or if the blower is incorrectly installed.

3.1. ATEX compliant blower installation requirements

⚠ CAUTION

The category 2 or 3 ATEX-compliant positive displacement blowers must be installed according to the conditions stipulated in this section.

The category 2 or 3 ATEX-compliant positive displacement blowers must be installed according to the instructions set forth in this manual in order to ensure the validity of the ATEX category 2 or 3 certification.

The following conditions must be met:

- The design of your system must meet the conditions specified in section 3.3.
- Your system must be designed in such a way as to protect the positive displacement blower against penetration by particles of more than 25 µm (9.84 x 10 inch). If this is not the case, use the appropriate filters.

3.2 Installation safety

⚠ WARNING

Obey the safety instructions listed below and take note of appropriate precautions when you install the blower.

- A suitably trained and supervised technician must install the blower.
- Ensure that debris and dust does not get into the blower or the system pipelines when you install it.
- Check that all of the required components and tools are available and of the correct type before you start to install the blower.
- Use new suitable gaskets/seals to connect the blower into your system. Do not re-use old gaskets/seals.
- If you will fit the blower into an existing system, disconnect the power from the drive system before you start installation so that the drive system cannot be operated accidentally.

3.3 System design and safety

⚠ CAUTION

Ensure that the maximum differential pressure across the blower specified in Section 2.2 cannot be exceeded. If it is, the drive will trip and the blower will stop.

3.3.1 General requirements

Your system must be suitably designed for correct operation of the blower. We recommend that you configure your system as shown in Figure 6 and Figure 7. Note that:

- You must design a suitable pipeline to fit the blower inlet connection. Refer to Section 2.6 and to Figures 4 and 5 for the dimensions of the blower inlet connections.
- You must buy the Hibon manifold or design a suitable manifold (Figure 6 and Figure 7, item 3) to fit the discharge (outlet)/ injection connections. Refer to Section 2.6 and to Figure 4 and 5 for the dimensions of these connections.
- Your system design must ensure that, when the blower is in its final operating location, you can see the oil-level sight-glasses and can access the oil filler and drain plugs.
- Your system must incorporate a suitable mounting platform: see Section 3.5 for more details.
- The blower must be sufficiently level for correct operation: see Section 3.5 for more details.
- There must be at least 150 mm (6 inches) of free space around the blower, for adequate cooling-air circulation.
- The gases which enter the blower must not contain solid particulates larger than 25 l.lm (9.84 x 10^{-5} inch) in size and must not contain more than 200 mg/m^3 (1.37 x 10^{-5} lb/ft^3) of dust. Incorporate suitable filters to prevent the ingress of solids into the blower.
- The temperature of the gases which enter the blower must not exceed the temperature rating of the blower.

3.3.2 System safety

- Your system design must ensure that the blower cannot be operated with the inlet or discharge (outlet) pipelines obstructed.
- Ensure that the blower cannot operate with the incorrect direction of rotation (see Section 3.9).
- We also recommend that your system incorporates an emergency stop facility which, once activated, must be manually reset before the blower can be operated again.
- Your system must incorporate non-return valves (check valves), to prevent reverse rotation of the blower when it is switched off.
- Your system must incorporate a pressure relief valve in the outlet pipeline (for pressure operation) and/or incorporate a vacuum relief valve in the inlet pipeline (for vacuum operation), to ensure that the design capability of the blower cannot be exceeded during operation. The relief valve(s) must be suitably rated/sized for the performance of the blower

3. INSTALLATION

- We recommend that you incorporate silencers, to attenuate the pulsations in the inlet/outlet gas streams
- If required, install your own acoustic enclosure around the blower or ensure that people wear suitable protective equipment (such as ear defenders) when they are close to the operating blower (See section 2.5). If you install an acoustic enclosure, ensure that there is sufficient space for cooling-air flow around the blower. See above
- Your design must ensure that people are protected from accidental contact with the blower or the outlet pipelines. During blower operation, the temperature of the blower and the outlet pipelines will be above 70 °C (158 °F). If necessary, fit suitable guards.
- Your design must ensure that materials or substances which are flammable at temperatures of 70 °C (158 °F) or above are not close to, or in contact with, the hot blower or outlet pipelines.
- If you pump/compress flammable or toxic gases, you must take suitable precautions to prevent the discharge of the gases to the surrounding atmosphere.

Note: *Filters, pressure/vacuum relief valves, non-return (check) valves, acoustic enclosures and silencers are available from* ***Ingersoll Rand****: contact your supplier or* ***Ingersoll Rand*** *for advice.*

⚠ WARNING

The category 2 or 3 ATEX-compliant positive displacement blowers must be installed in a system that complies with the conditions set out below.

- Your system must be designed in such a way that the positive displacement blower cannot function when the suction or discharge pipelines are obstructed
- Gases that penetrate the positive displacement blower cannot contain solid particles of more than 25 µm (9.84 x 10^{-5} inch). Install the appropriate filters to prevent any penetration of solid particles into the positive displacement blower.
- The temperature of gasses exiting the positive displacement blower must not exceed the temperature classification (see section 1.2.5.2).
- Make sure that the positive displacement blower cannot rotate in the wrong direction (see section 3.9).

3.4 Unpack and inspect

⚠ WARNING

Use suitable lifting equipment to move the blower. If you do not, you can injure yourself or damage the blower. Refer to Section 2.3 for the mass of the blower.

1. Use a suitable fork-lift truck or pallet truck to move the blower, on its pallet, close to where you will install it.
2. Remove all packing materials and protective covers and check the blower. If the blower is damaged, notify your supplier and the carrier in writing within three days; state the Item Number of the blower together with your order number and your supplier's invoice number. Retain all packing materials for inspection. Do not use the blower if it is damaged.
3. Check that you have received the items listed in Table 11. If any item is missing, notify your supplier in writing within two days
4. Look at the blower rating and identification plate (Figure 2, item 13) and check that the blower is suitable for use in your system. If the blower is not suitable for use in your system, do not continue to install the blower: Contact your Supplier or **Ingersoll Rand**.

If the blower is not to be used immediately, replace the protective covers. Store the blower in suitable conditions, as described in Section 6.1.

Quantity	Description	Check (3)
1	VTB.XL blower	o
1	Air injection gasket	o
*	Oil Hibon Lub	o

* If you have ordered oil, you will receive sufficient quantity of oil to fill the blower: see Section 2.4.

Table 11 - Checklist of items

3.5 Prepare, locate and connect the blower

3.5.1 Introduction

Take note of the following when you connect the blower into your system:

- For optimum performance, ensure that the system pipelines connected to the blower are as short as possible.
- Support your system pipelines and other components, to prevent loading of the inlet and discharge (outlet)/ injection flanges on the blower.
- Incorporate flexible components in your system, to minimize noise and vibration.
- Use gaskets/seals which are compatible with the gases which will be pumped/compressed, and with the operating conditions. (Note that a gasket is supplied with the blower for the discharge (outlet)/injection connection.)
- The leak tightness of your system connections must be in accordance with the requirements of your applications.

Use the following procedure to connect the blower into your system:

1. Use a suitable gasket/seal to connect your inlet pipeline to the blower inlet (Figure 2, item 2).
2. Use the gasket supplied to connect your manifold (Figure 6 and Figure 7, item 3) to the blower discharge (outlet)/air injection connections (Figure 2, item 3).

3. INSTALLATION

Note that blowers can be:

- Installed directly in your system. You must ensure that your system pipelines can support the blower. Prepare, locate and connect blower as described in Section 3.5.2.
- Supported by mounting feet; prepare, locate and connect blowers as described in Section 3.5.3.

Note that the blowers are supplied with either lifting bolts fitted (as shown in Figure 1) or with lifting lugs fitted. Where necessary in Sections 3.5.2 or 3.5.3, attach your lifting equipment to these lifting bolts/lugs.

3.5.2 Prepare, locate and connect a blower installed directly in your system

⚠ WARNING

Use suitable lifting equipment to move the blower. If you do not, you can injure yourself or damage the blower. Refer to Section 2.3 for the mass of the blower.

Ensure that the operating location is clean and free from debris and oil.

You must ensure that when the blower is in its required operating location:

- Both of the mounting plates are flat on the platform.
- The blower is sufficiently level. (The blower can operate with a maximum slope of 12° in any of the horizontal mounting axes.)

Note: *The following procedure assumes that your system inlet pipeline will support the blower. If your blower will be supported by your system outlet pipeline, reverse Steps 4 and 5 below.*

Use the following procedure to locate and prepare the blower:

1. Use a suitable cleaning solution (such as alcohol or white spirit) to clean the rotors:
   - Moisten a suitable clean, lint-free cloth with the cleaning solution.
   - Clean the rotors (Figure 2, item 8) which are visible through the inlet port.
   - Turn the blower drive shaft as necessary to access the other rotors.
2. Refer to Figure 2. Attach suitable lifting equipment to the four lifting-lugs (1), then use the lifting equipment to move the blower to its required operating location.
3. While it is supported by the lifting equipment, adjust the position of the blower so that the blower inlet and outlet are correctly aligned with the connections in your system inlet and outlet pipelines.
4. Fit a suitable gasket/seal* to the blower inlet (Figure 2, item 2), then use the correct number and size of bolts to connect the blower inlet flange to your system inlet pipeline.
5. Fit a suitable gasket/seal* to your system outlet pipeline, then use the correct number and size of bolts to connect the blower to the manifold or if the manifold is already installed, connect the outlet and injection flange to your system outlet pipeline.
6. Disconnect your lifting equipment from the lifting¬lugs. If required, remove the lifting-lugs from the blower.

***Note:** Gaskets are available from **Ingersoll Rand**: Contact your supplier or **Ingersoll Rand** for advice*

3.5.3 Prepare, locate and connect a blower supported by mounting feet

⚠ WARNING

Use suitable lifting equipment to move the blower. If you do not, you can injure yourself or damage the blower. Refer to Section 2.3 for the mass of the blower.

Ensure that the operating location is clean and free from debris and oil.

You must ensure that when the blower is in its required operating location:

- Both of the mounting plates are flat on the platform.
- The blower is sufficiently level. (The blower can operate with a maximum slope of 12° in any of the horizontal mounting axes).
- You must ensure that when the blower is in its required operating location, all of the mounting feet (1, 2 or 4, depending on the blower model) are flat on the mounting platform to within 0.1 $mm.m^{-1}$ (0.0013 $inch.ft^{-1}$).

Use the following procedure to locate and prepare the blower:

1. Refer to Figure 2. Attach suitable lifting equipment to the four lifting-lugs (1), then use the lifting equipment to move the blower to its required operating location.
2. Disconnect your lifting equipment from the blower. If required, remove the lifting-bolts from the blower.
3. Fit suitable bolts through the fixing holes in the mounting feet (Figure 2, items 9), to secure the blower in position.
4. Clean the rotors: refer to Step 1 of Section 3.5.2.
5. Use a suitable gasket/seal* to connect your inlet pipeline to the blower inlet (Figure 2, item 2).
6. Use a suitable gasket/seal* to connect the manifold to the blower and to connect your outlet and injection pipeline to the blower manifold (Figure 2, item 3).

***Note:** Gaskets are available from **Ingersoll Rand**: Contact your supplier or **Ingersoll Rand** for advice*

3. INSTALLATION

3.6 Fill the blower with oil

⚠ WARNING

Ensure that you use the correct grade of oil and that the oil levels are correct (Refer to section 5.3). If you do not, surfaces in the blower may get hot and become potential sources of ignition.

1. Drain the protective oil from the drive end and non-drive end covers: refer to Section 5.6.
2. Refer to Figure 2. Fill the drive end cover (4) with oil: refer to Section 5.5.1.
3. Fill the non-drive end cover (12) with oil: refer to Section 5.5.2.

3.7. Connecting the blower to earth (ground) (ATEX-compliant blowers only).

⚠ CAUTION

You must connect the positive displacement blower to the earth (ground) in order to prevent ignition by static electricity.

⚠ WARNING

Make sure you use a suitable oil quality and that the oil levels of the positive displacement blower are appropriate. If you do not follow this instruction, you could damage the positive displacement blower during operation or affect its performance.

1. Refer to figure 2. Connect one end of an appropriate earth-continuity conductor to one of the terminal blocks.
2. Connect the other end of the conductor to an appropriate earth connection (ground) of your system.
3. Make sure there is electrical continuity between the new connection and the block.

3.8 Fit the drive/transmission

⚠ WARNING

You must fit suitable guards to protect people from rotating/moving parts.

⚠ WARNING

Your drive and transmission system design must ensure that the maximum blower rotational speeds specified in Section 2.2 cannot be exceeded, otherwise the blower will be damaged, or may not operate correctly.

You must use a suitable coupling or a belt drive and transmission system to connect your drive to the blower.

Your drive and transmission system design must ensure that the radial and axial loadings on the blower drive shaft are as low as possible.

Note: *For this, the blower pulley diameter must be above diameters specified in Table 12, linear speed of belts should not exceed 31 m/s and transmission safety factor should be between 1.4 and 1.7.*

Connect the components of the drive and transmission system to the blower drive shaft (Figure 2, item 5) as described in the manufacturer's instructions supplied with the components.

Blower	Minimum pully diameter for specified differential pressure : mm (inch)															
	400 mbar		500 mbar		600 mbar		700 mbar		800 mbar		900 mbar		1000 mbar		1100 mbar	
	4 x 10^4 Pa		5 x 10^4 Pa		6 x 10^4 Pa		7 x 10^4 Pa		8 x 10^4 Pa		9 x 10^4 Pa		10 x 10^4 Pa		11 x 10^4 Pa	
	5,8 psi		7,25 psi		8,7 psi		10,15 psi		11,6 psi		13,05 psi		14,5 psi		15,95 psi	
VTB 805.XL	100	(3.94)	100	(3.94)	110	(4.33)	110	(4.33)	125	(4.92)	125	(4.92)	150	(5.91)	170	(6.69)
VTB 807.XL	100	(3.94)	112	(4.41)	112	(4.41)	125	(4.92)	150	(5.91)	170	(6.69)	170	(6.69)	180	(7.09)
VTB 810.XL	140	(5.51)	140	(5.51)	150	(5.91)	150	(5.91)	160	(6.30)	170	(6.69)	180	(7.09)	-	-
VTB 820.XL	150	(5.91)	170	(6.69)	180	(7.09)	180	(7.09)	200	(7.87)	200	(7.87)	212	(8.35)	-	-
VTB 822.XL	170	(6.69)	180	(7.09)	200	(7.87)	200	(7.87)	212	(8.35)	212	(8.35)	224	(8.82)	-	-
VTB 840.XL	200	(7.87)	212	(8.35)	212	(8.35)	224	(8.82)	250	(9.84)	300	(11.81)	300	(11.81)	335	(13.19)
VTB 8602.XL	212	(8.35)	212	(8.35)	224	(8.82)	250	(9.84)	300	(11.81)	300	(11.81)	335	(13.19)	335	(13.19)
VTB 8702.XL	212	(8.35)	212	(8.35)	224	(8.82)	250	(9.84)	300	(11.81)	300	(11.81)	335	(13.19)	335	(13.19)
VTB 8902.XL	224	(8.82)	224	(8.82)	250	(9.84)	300	(11.81)	300	(11.81)	335	(13.19)	335	(13.19)	-	-

Table 12 - Minimum Pulley Diameter (mm).

3. INSTALLATION

3.9 Check the direction of rotation

⚠ WARNING

Ensure that the blower rotates in the correct direction. If it does not, your system will not operate correctly.

⚠ WARNING

If you remove a guard during the following procedure, ensure that you do not come into contact with the shaft, the coupling/belt or the drive system when you operate the blower. If you do, you may be injured by the rotating components.

After you have connected the drive/transmission, check the direction of rotation of the blower as follows:

1. Ensure that isolation valves in the blower inlet and outlet pipelines are in the correct 'open' positions.
2. If necessary (that is, to make it easier to see the blower drive shaft), temporarily remove any guard over the drive coupling or belt.
3. Refer to Figure 2. Watch the blower drive shaft (5) while you start up the blower (refer to Section 4.2), then shut down the blower (refer to Section 4.3) after two seconds or so.
4. Check that the blower drive shaft (5) rotated correctly in the expected direction. (This depends on your application and installation configuration: see Figure 2 item 15a or b)
5. If the direction of rotation was incorrect:
   - Check the installation of the drive and transmission system and reconfigure as appropriate.
   - Perform the direction of rotation check from Step 2 again, to ensure that the blower now rotates in the correct direction.
6. If you have removed the guard over the drive coupling or belt (as in Step 1 above), refit the guard.

3.10 Commissioning the blower

After you have installed the blower, use the following procedure to commission it and prepare it for subsequent operation:

1. Ensure that isolation valves in the blower inlet and outlet pipelines are in the correct 'open' positions.
2. Ensure that all other components in the system pipelines (such as filters) have been correctly installed and configured for operation.
3. Engage your drive and transmission system to start the blower.
4. Operate the blower, with no gas load, for at least 15 minutes. During this time:
   - Monitor the external surfaces of the blower and check for 'hot spots' (that means, areas which are unusually hot).
   - If any hot spots persist at the end of the 15 minutes, contact your supplier or **Ingersoll Rand** for advice.
5. Continue to operate the blower with a representative gas load, and check that it operates correctly and provides the required performance. If necessary, refer to Section 5.7 if any fault conditions occur.
6. Disengage your drive and transmission system to stop the blower.
7. Wait until you can hear that the blower has stopped before you close any isolation valves in the blower inlet and outlet pipelines.

The blower is now ready for normal operation

4. OPERATION

⚠ CAUTION

Ingersoll Rand will accept no liability or warranty claims if your blower is used on applications or in a way prohibited in this manual, or not specified in this manual.

Note: *The procedures in the following sections assume that your system is configured as shown in Figure 6 and Figure 7.*

4.1 General operational safety

⚠ WARNING

Obey the safety instructions and precautions listed below. If you do not, there may be a risk of injury or death to people, or damage to the blower.

- You must use an ATEX-compliant positive displacement blower with the vanes open/closed as specified in section 4.2, failing which the temperature classification of the positive displacement blower will be exceeded (see section 1.2.5.2).
- Do not operate the blower when the cooling-air flow around the blower is restricted (see Section 3.3.1 If you do not follow this instruction, the positive displacement blower can overheat and (if it is an ATEX-compliant positive displacement blower), its temperature classification can be exceeded (see section 1.2.5.2).
- Do not expose any part of your body to vacuum. If you do, you may be injured.
- Do not operate the blower when the cooling air flow around the blower is restricted (see Section 3.3.1). If you do, the blower may overheat.
- Do not operate the blower with the blower suction inlet or discharge (outlet)/injection connections open to the atmosphere. If you do, your fingers or other parts of your body or clothing may get trapped, and you may be injured by the rotating mechanisms in the blower.
- Do not operate the blower with the guards removed from the blower drive shaft, the coupling/belt or the drive system. If you do, your fingers or other parts of your body or clothing may get trapped, and you may be injured by the rotating components.
- Prevent accidental contact with the hot blower, and do not place flammable materials on the blower. During operation, the temperature of external parts of the blower can exceed 70° C (158° F).
- Never disconnect any of the connecting pipelines (for example, the pipeline connected to the inlet) when the blower is operating.
- During pressure operation, prevent accidental contact with the discharged (outlet) gas stream. This gas stream will be at high pressure and will be hot and can cause burn injury.
- Do not attempt to use the blower to pump/ compress liquids. The blowers are not designed for this application.
- Where necessary (for example, if you have not fitted an acoustic enclosure), wear suitable ear defenders. The blower can be noisy during operation (refer to Section 2.5).

4.2 Start-up

⚠ CAUTION

Ensure that the oil levels in the blower are correct. If you do not, the blower will probably be damaged during operation, or its performance may be affected.

4.2.1 Pressure operation

1. Check the oil-levels in the blower: refer to Section 5.3.
2. Refer to Figure 6. Ensure that the valves in your system are in the correct positions:

Valve	Position
V1	Closed
V2	Closed
V3	Closed
V4	Open
V5	Open

3. Engage your drive and transmission system to start the blower.
4. Leave the blower to operate until the temperature of the discharge (outlet) gas stream is 85 ° C (185 ° F). (This may take up to 10 minutes, depending on your system design.)

You can now use the blower as required in your application.

4.2.2 Vacuum operation

⚠ WARNING

Do not expose any part of your body to vacuum. If you do, you may be injured.

1. Check the oil-levels in the blower: refer to Section 5.3.
2. Refer to Figure 7 -. Ensure that the valves in your system are in the correct positions:

Valve	Position
V1	Open
V2	Open
V3	Open
V4	Closed
V5	Closed

3. Engage your drive and transmission system to start the blower.
4. Slowly close valve V3 (the system inlet/outlet isolation valve) to obtain a vacuum level of approximately 500 mbar (5×10^4 Pa, 375 Torr).
5. Leave the blower to operate for 10 minutes or more.
6. Fully open valve V3 (the system inlet/outlet isolation valve).

You can now use the blower as required in your application.

4. OPERATION

4.3 Shut-down

4.3.1 Pressure operation

Refer to Figure 6 and shut down the blower as follows:

1. Slowly close valve V4 (the inlet bypass valve).
2. Disengage the drive and transmission system to stop the blower within 1 minute: see Warning above.

4.3.2 Vacuum operation

⚠ WARNING

Do not expose any part of your body to vacuum. If you do, you may be injured.

Refer to Figure 7 - and shut down the blower as follows:

1. Slowly close valve V3 (the system inlet/outlet isolation valve).
2. Leave the blower to operate for sufficient time to purge any gases from the blower.
3. Disengage the drive and transmission system to stop the blower.

4. OPERATION

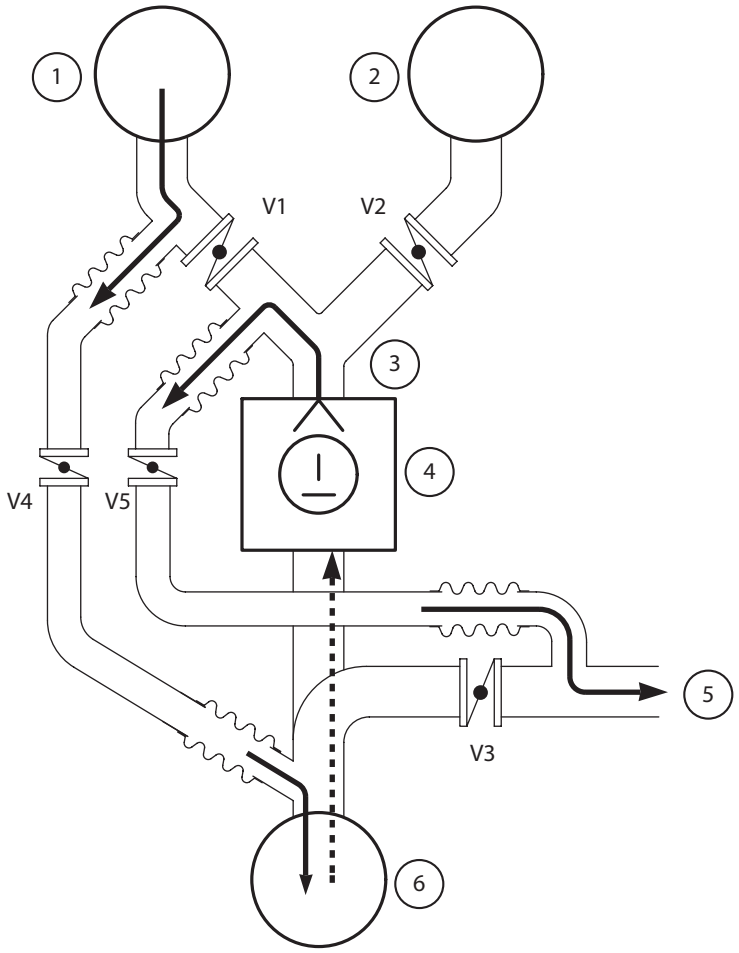


Figure 6 - Recommended system configuration: pressure operation

1. Inlet/outlet silencer
2. Air injection silencer/filter
3. Discharge (outlet)/injection manifold
4. VTB.XL blower
5. System inlet/outlet
6. Filter *

V1 Inlet/outlet silencer isolation valve

V2 Injection isolation valve

V3 System inlet/outlet isolation valve

V4 Inlet bypass valve

V5 Discharge bypass valve

- *Optional for standard blowers.

Valve settings for correct operation

Valve	Position
V1	Closed
V2	Closed
V3	Closed
V4	Open
V5	Open

Note: On ATEX compliant blowers, valves V4 and V5 must always be open when V2 is closed, in order to ensure that the temperature classification is not exceeded.

4. OPERATION

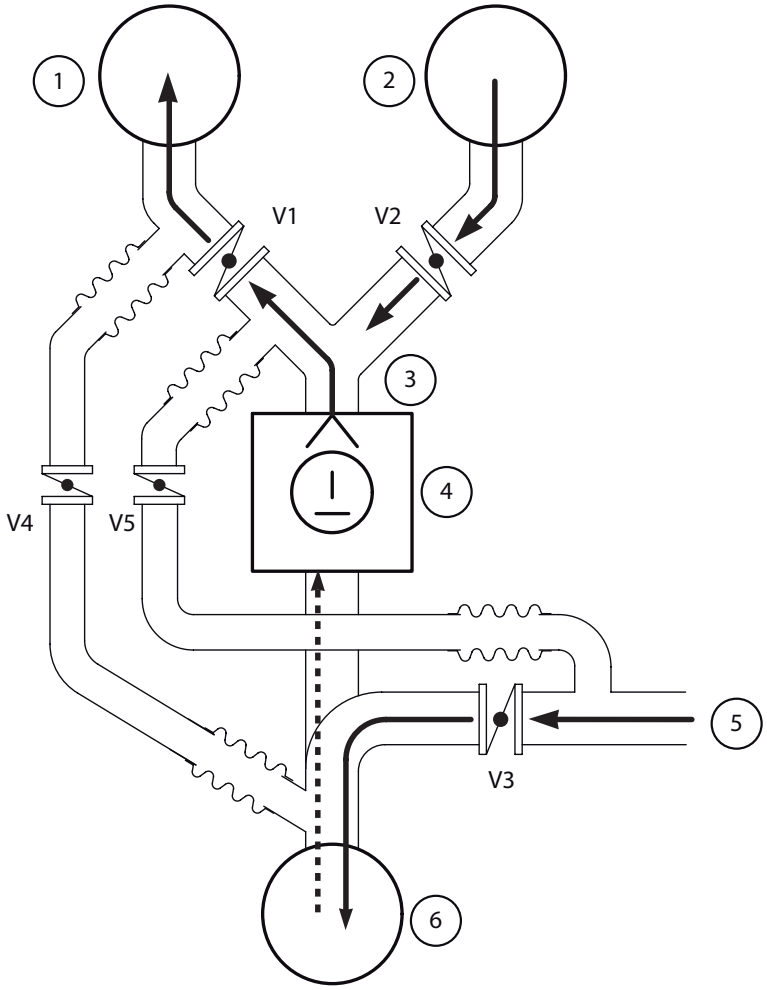


Figure 7 - Recommended system configuration: vacuum operation

1. Inlet/outlet silencer
2. Air injection silencer/filter
3. Discharge (outlet)/injection manifold
4. VTB.XL blower
5. System inlet/outlet
6. Filter *

V1 Inlet/outlet silencer isolation valve
V2 Injection isolation valve
V3 System inlet/outlet isolation valve
V4 Inlet bypass valve
V5 Discharge bypass valve

Valve settings for correct operation

Valve	Position
V1	Open
V2	Open
V3	Open
V4	Closed
V5	Closed

Note: On ATEX compliant blowers, valves V4 and V5 must always be closed when V2 is open, in order to ensure that the temperature classification is not exceeded.

- *Optional for standard blowers.

5. MAINTENANCE

5.1 Safety information

⚠ WARNING

Obey the safety instructions given below and take note of appropriate precautions. If you do not, you can cause injury to people and damage to equipment.

- A suitably trained and supervised technician must maintain the blower. Obey your local and national safety requirements.
- Ensure that the maintenance technician is familiar with the safety procedures which relate to the gases pumped/compressed by the system in which the blower is installed.
- Allow the blower to cool to a safe temperature before you start maintenance work.
- Isolate the blower from the drive system so that it cannot be operated accidentally.
- Recheck the blower rotation direction (see Section 3.9) if the drive and transmission system has been disconnected and then reconnected.
- Take care to protect sealing faces from damage.
- Do not reuse seals/gaskets if they are damaged.
- Do not touch or inhale the thermal breakdown products of fluorinated materials which may be present if the blower has been heated to 260°C (500° F) and above. These breakdown products are very dangerous. Fluorinated materials in the blower include seals. The blower may have overheated if it was misused, if it malfunctioned or if it was in a fire. **Ingersoll Rand** Material Safety Data Sheets for fluorinated materials used in the blower are available on request: contact your supplier or **Ingersoll Rand**.
- Check the tightness of the system connections after maintenance work is complete if you have connected or disconnected any suction inlet or discharge (outlet)/injection joints. The tightness of the system connections must be in accordance with the requirements of your applications.

5.2 Maintenance plan

The plan in Table 13 details the maintenance operations required to maintain the blower in normal operation. Instructions for each operation are given in the section shown.

Note that:

- If you use a mineral oil in the blower: you must change the oil every 2000 hours of operation or once a year.
- If you use a synthetic oil in the blower, you must change the oil every 12 months.
- If you use a Hibon Lube in the blower and you operate the blower with a discharge (outlet) temperature above 120 ˚ C (248 ˚ F), you must change the oil every 12 months.
- If you use a Hibon Lube in the blower and you operate the blower with a discharge (outlet) temperature below 120 ˚ C (248 ˚ F), you must change the oil every two years.

When you maintain the blower, use **Ingersoll Rand** spares: refer to Section 7.3.

Note: *For category 2 or 3 ATEX-compliant positive displacement blowers, you must maintain the positive displacement blower according to the schedule set forth in table 35 (or even more frequently) in order to ensure the ATEX compliance.*

Operation	Frequency	Refer to Section
Check the oil levels	Weekly	5.3
Inspect the system installation	Monthly	5.4
Change the oil	Refer to section 5.5*	5.5
Overhaul the blower	5 yearly**f	5.6

* After blower installation, the oil must be changed after 200 hours of running

** For category 2 or 3 ATEX-compliant blowers, overhaul frequency is 2 yearly

Table 13 - Maintenance Plan.

5.3 Check the oil levels

⚠ CAUTION

Ensure that you use the correct grade of oil and that the oil levels in the blower are correct. If you do not, the blower will probably be damaged during operation, or its performance may be affected.

5.3.1 Inspect the oil-level sight-glasses

1. Refer to Figure 2. Look at the oil-level sight-glass (6) on the drive head plate (4):
   - If the sight-glass is dirty, use a suitable cloth to wipe it clean.
   - If the sight-glass is damaged (that is, scratched, cracked or corroded), or if there are signs of oil leakage from the sight-glass, you must replace it: contact your supplier or **Ingersoll Rand**.
2. Look at the oil-level sight-glass (11) on the non-drive head plate :
   - If the sight-glass is dirty, use a suitable cloth to wipe it clean.
   - If the sight-glass is damaged (that is, scratched, cracked or corroded), or if there are signs of oil leakage from the sight-glass, you must replace it: contact your supplier or **Ingersoll Rand**.

5. MAINTENANCE

5.3.2 Drive Head Plate

1. Refer to Figure 2, detail B. Look at the oil level in the sight-glass (6) on the drive head plate (4):
   - If the oil level is below the minimum level mark (19), continue at Step 2 to add more oil.
   - If the oil level is above the maximum level mark (18), drain oil from the blower until the level is correct: refer to Section 5.5.
2. Refer to Figure 2. Remove the oil filler-plug (16) from the filler port on the top of the drive head plate (4).
3. For new oil of the correct type (see Section 2.4) through the filler port and into the head plate until the oil-level reaches the maximum level mark (detail B, item 18). If the oil level goes above the maximum level mark (18), drain oil from the blower until the level is correct: refer to Section 5.5.
4. Refit the oil filler-plug (16) to the filler port on the top of the drive head plate (4).

5.3.3 Non-drive Head Plate

1. Refer to Figure 2, detail B. Look at the oil level in the sight-glass (11) on the non-drive head plate (12):
   - If the oil level is below the minimum level mark (19), continue at Step 2 to add more oil.
   - If the oil level is above the maximum level mark (18), drain oil from the blower until the level is correct: refer to Section 5.5.
2. Refer to Figure 2. Remove the oil filler-plug (17) from the filler port on the top of the non-drive head plate (12).
3. For new oil of the correct type (see Section 2.4) through the filler port and into the head plate until the oil-level reaches the maximum level mark (detail B, item 18).
   - If the oil level goes above the maximum level mark (18), drain oil from the blower until the level is correct: refer to Section 5.5.
4. Refit the oil filler-plug (17) to the filler port on the top of the nondrive head plate (12).

5.4 Inspect the system installation

Note: *Where possible, we recommend that you investigate the cause of any damage or corrosion, and implement corrective measures to prevent any future damage of components.*

Use the following procedure to inspect the system connections:

1. Inspect all of the system pipelines and connections and check that they are not damaged or corroded and that they are sufficiently leak tight. Repair or replace any damaged or corroded component and seal any leak found.
2. Inspect the drive/transmission system and adjust, repair or replace as necessary: refer to the manufacturer's instructions supplied with your drive/transmission system.
3. For category 2 or 3 ATEX-compliant positive displacement blowers only: make sure that the connection to earth (ground) is properly affixed (see section 3.7). If necessary, re-install it or make a new connection.

5.5 Change the oil

⚠ WARNING

You must take care about oil temperature. Please wait at least two hours after the last running of the blower to empty the oil casings to let the oil cool down.

⚠ CAUTION

Ensure that you use the correct grade of oil and that the oil levels in the blower are correct (Refer to section 5.3.1). If you do not, the blower will probably be damaged during operation, or its performance may be affected.

5.5.1 Drive Head Plate

1. Refer to Figure 2. Remove the oil filler-plug (16) from the filler port on the top of the drive head plate (4).
2. Refer to Figure 2. Place a suitable container under the drain plug (7) on the drive head plate. The container must have a maximum capacity as specified in Table 6 or Table 7.
3. Remove the oil drain plug (7) from the end cover, and allow the oil to drain from the end cover into the container.
4. Refit the oil drain plug (7) to the drive head plate (4).
5. Dispose of the oil: refer to Section 6.2.
6. Fill the drive end cover with new oil of the correct type and grade: refer to Section 5.3.2.

5.5.2 Non-drive Head Plate

1. Refer to Figure 2. Remove the oil filler-plug (17) from the filler port on the top of the nondrive head plate (12).
2. Refer to Figure 2. Place a suitable container under the drain plug (10) on the non-drive head plate. The container must have a maximum capacity as specified in Table 6 or Table 7.
3. Remove the oil drain plug (10) from the end cover, and allow the oil to drain from the head plate into the container.
4. Refit the oil drain plug (10) to the non-drive head plate (12).
5. Dispose of the oil: refer to Section 6.2.
6. Fill the non-drive end cover with new oil of the correct type and grade: refer to Section 5.3.3.

5.6 Overhaul the blower

The blower must be regularly overhauled, as specified in Table 13. As part of the overhaul, the bearings in the blower must be replaced. We recommend that you contact your supplier or **Ingersoll Rand** to arrange for an overhaul of the blower.

5. MAINTENANCE

5.7 Fault finding

A guide to fault conditions and their possible causes is provided in Table 14 to assist you in basic fault finding.

If you are unable to rectify a fault when you use this guide, call your supplier or your nearest **Ingersoll Rand** Service Centre for advice.

Note: *If you have been approved to carry out strip-down, repair and reassembly of your blower, refer to the Service Manual supplied separately for detailed procedures.*

Symptom	Check	Actions
The blower will not start, or seizes during operation.	Are the rotors touching ?	Check the rotor clearances and adjust as necessary.
	Has the blower been overloaded ?	Check the required operating conditions and specified performance of the blower (see Section 2).
	Has debris or foreign material entered the blower ?	Strip down, clean and repair the blower as necessary.
	Is the drive/transmission system faulty ?	Check that your drive and transmission system is operating correctly, and that it is correctly fitted to the blower: refer to Section 3.8 and to the manufacturer's instructions.
The blower is noisy during operation.	Are the rotors touching ?	Check the rotor clearances and adjust as necessary.
	Are the gear and/or bearing clearances incorrect ?	Check the clearances and adjust as necessary.
	Are the rotors unbalanced ?	Clean the rotors and rotor housing, then check the rotor clearances and adjust as necessary.
The blower overheats.	Is the suction inlet filter blocked ?	Clean or replace the filter.
	Is the differential pressure across the blower too high ?	Check that your system design complies with the requirements of Section 3.3, and that the blower is suitable for use in your application.
	Is an oil level too high, or has the incorrect grade of oil been used ?	Check the oil levels (refer to Section 5.3) or drain the blower and fill with the correct grade of oil (refer to Section 5.5).
	Are the rotor or rotor/casing clearances incorrect ?	Contact your supplier or **Ingersoll Rand** for advice.
	Does your enclosure provide inadequate cooling ?	If you have fitted an acoustic enclosure around the blower: • Ensure that the enclosure cooling vents/louvers are unobstructed. • Ensure that the enclosure cooling/ extraction fan is operating correctly. • Ensure that there is sufficient clearance for cooling air flow around the blower: refer to Section 3.3.
There is oil in the gas stream from the blower.	Is an oil level too high ?	Check the oil level and if necessary drain oil from the blower: (refer to Section 5.5).
	Have the sealing rings failed ?	Contact your supplier or **Ingersoll Rand** for advice.
There is a low volume flow through the blower.	Is the suction filter blocked ? Is the blower worn or damaged ?	Clean or replace the filter. Contact your supplier or **Ingersoll Rand** for advice.
	Is the blower unsuitable for your application ?	If necessary, redesign your system to comply with the capabilities of the blower, or fit a different blower which provides the necessary performance.
Absorbed power is too high.	Is the blower unsuitable for your application ?	If necessary, redesign your system to comply with the capabilities of the blower, or fit a different blower which provides the necessary performance.
	Is the suction filter blocked ?	Clean or replace the filter.
The blower rotates in reverse direction when you stop it.	Is your non-return valve defective ?	Check that the non-return valve between the manifold and the discharge (outlet) filter operates correctly. Repair or replace as necessary.
		If you have made the checks/actions as described above and you still cannot identify the cause of a fault, or if you cannot rectify a fault, contact your supplier or **Ingersoll Rand** for advice.

Table 14 - Fault finding

6. STORAGE AND DISPOSAL

6.1 Storage

⚠ WARNING

Use suitable lifting equipment to move the blower. If you do not, you can injure yourself or damage the blower. Refer to Section 2.3 for the mass of the blower.

6.1.1 Preparation

1. Shut down the blower as described in Section 4.3.
2. If necessary, disconnect the drive and transmission system from the blower drive shaft: refer to the manufacturer's instructions supplied with your transmission system.
3. If necessary, purge your system and the blower with dry air, and disconnect the blower from your system pipelines.
4. Place and secure protective covers over the blower suction inlet, discharge (outlet) and injection inlet flanges.
5. Use suitable lifting equipment to move the blower to its storage area: refer to Section 3.5.
6. If you will store the blower for longer than six weeks, refer to the requirements in Section 6.1.2.
7. Store the blower in clean, dry conditions in a well-ventilated place that is free from vibration or shocks.

6.1.2 Long-term storage

⚠ WARNING

When driveshaft of the blower (refer item 5 Figure 1) is manually rotated, keep away from flanges (items 2 and 3 figure 1) your fingers or other parts of your body or clothing may get trapped, and you may be injured by the rotating components.

⚠ WARNING

Use suitable lifting equipment to move the blower. If you do not, you can injure yourself or damage the blower. Refer to Section 2.3 for the mass of the blower.

If the blower is to be stored for longer than six weeks:

1. Drain the oil from the drive end and non-drive end covers: refer to Section 5.5.
2. Fill the drive end and non-drive end covers with a suitable protective oil (see Table 15): use the method in Section 5.3.
3. Turn the blower drive shaft by hand through three or four revolutions, to turn the blower and prevent seizure.
4. Spray a suitable protective oil (see Table 15) through the inlet and into the blower.
5. If required, spray a suitable protective oil (see Table 15) on the outer surfaces of the blower, to inhibit corrosion.

External components	Internal components
Rust Ban 324 (Esso)	Mobilarma 523/524 (Mobil)
V Product 9703 (Shell)	Esso Lub MZ 20E/20 (Esso)
Mobilarma 778 (Mobil)	Ensis Motor Oil 20 (Shell)

Table 15 - Suitable protective oils

During storage, every 6 weeks or less, turn the blower drive shaft by hand through a quarter of a revolution, to turn the blower and prevent seizure or degradation of the bearings.

When required for use after storage:

1. Drain the protective oil from the drive end and non-drive end covers, then fill the end covers with new oil: refer to Section 5.5.
2. Use a suitable cleaning solution (such as alcohol or white spirit) to clean the rotors:
   - Moisten a suitable clean, lint-free cloth with the cleaning solution.
   - Clean the rotors which are visible through the inlet port.
   - Turn the blower drive shaft as necessary to access the other rotors.
3. Prepare and install the blower as described in Section 3.

6.2 Disposal

⚠ CAUTION

Ensure that you wear the appropriate Personal Protective Equipment (PPE) when you handle contaminated oil or contaminated components.

Safely dispose of the blower, used oil and any components in accordance with all local and national safety and environmental requirements.

Take particular care with the following:

- Used oil that has been contaminated with dangerous substances.
- Components that have been contaminated with dangerous substances.

7. SERVICE, SPARES AND ACCESSORIES

7.1 Introduction

Ingersoll Rand products, spares and accessories are available from **Ingersoll Rand** companies in Belgium, Brazil, China, France, Germany, Israel, Italy, Japan, Korea, Singapore, United Kingdom, USA and a world-wide network of distributors. The majority of these employ service engineers who have undergone comprehensive **Ingersoll Rand** training courses.

Order spare parts and accessories from your nearest **Ingersoll Rand** company or distributor. When you order, please state for each part required:

- Model and Item Number of your equipment
- Serial number (if any)
- Item Number and description of the part

7.2 Service

⚠ WARNING

Except for oil replacement, the servicing for the category 2 or 3 ATEX compliant blower must be effectuated directly by Ingersoll Rand or an authorized service center. To know the authorized service center, please contact Ingersoll Rand.

Ingersoll Rand products are supported by a worldwide network of **Ingersoll Rand** Service Centers. Each Service Center offers a wide range of options including: equipment decontamination; service exchange; repair; rebuild and testing to factory specifications. Equipment which has been serviced, repaired or rebuilt is returned with a full warranty.

Your local Service Center can also provide **Ingersoll Rand** engineers to support on-site maintenance, service or repair of your equipment.

For more information about service options, contact your nearest Service Center or other **Ingersoll Rand** company.

7.3 Spares and accessories

The spares and accessories available for the blowers are shown in Table 16.

Contact your supplier or **Ingersoll Rand** for more information.

Spare	Item Number
Oil Hibon LUB: 2 liters (0.53 US gal)	LUB0000002
Oil Hibon LUB: 5 liters (1.32 US gal)	LUB0000005

Blower	Standard maintenance kit		Piston Ring Holder Kit		Gears		Discharge/injection manifold gaskets	
	Hibon number	CCN	Hibon number	CCN	Hibon number	CCN	Hibon number	CCN
VTB 805.XL	R014210100	47002407	R014092100	47002449	P148502042	47004692	P145006916	24814584
VTB 807.XL	R014210100	47002407	R014092100	47002449	P148502042	47004692	P145016916	24814592
VTB 810.XL	R015210100	47002258	R015092100	47002266	P158502042	47004957	P152266916	46080412
VTB 820.XL	R015210100	47002258	R015092100	47002266	P158502042	47004957	P152126916	46080404
VTB 822.XL	R016210100	47003348	R016092100	47003355	P168502042	23874423	P162126916	46080420
VTB 840.XL	R017210100	47007984	R017092100	47008008	P178502042	24648073	P172266916	46080438
VTB 8602.XL	R017210100	47007984	R017092100	47008008	P178502042	24648073	P182266916	46080446
VTB 8702.XL	R018210100	47007992	R018092100	47007976	P178502042	23992811	P182266916	46080446
VTB 8902.XL	R018210100	47007992	R018092100	47007976	P178502042	23992811	P182126916	46080453

Table 16 - Spares and accessories

RETURN OF Ingersoll Rand EQUIPMENT - PROCEDURE

Introduction

Before you return your equipment you must warn your supplier if the substances you used (and produced) in the equipment can be dangerous. You must do this to comply with health and safety at work laws.

You must complete the Declaration on the next page and send it to your supplier before you dispatch the equipment. If you do not, your supplier will assume that the equipment is dangerous and he will refuse to accept it. If the Declaration is not completed correctly, there may be a delay in processing your equipment.

Guidelines

Take note of the following guidelines:

- Your equipment is '**uncontaminated**' if it has not been used or if it has only been used with substances that are not dangerous. Your equipment is '**contaminated**' if it has been used with any dangerous substances.
- If your equipment has been used with radioactive substances, you must decontaminate it before you return it to your supplier. You must send independent proof of decontamination (for example a certificate of analysis) to your supplier with the Declaration (HS2). Phone your supplier for advice.
- We recommend that contaminated equipment is transported in vehicles where the driver does not share the same air space as the equipment.

PROCEDURE

Use the following procedure:

1. Contact your supplier and obtain a Return Authorization Number for your equipment.
2. Turn to the next page(s), photocopy and then complete the Declaration.
3. Remove all traces of dangerous gases: pass an inert gas through the equipment and any accessories which will be returned to your supplier. Drain all fluids and lubricants from the equipment and its accessories.
4. Disconnect all accessories from the equipment. Safely dispose of the filter elements from any oil mist filters.
5. Seal up all of the equipment's inlets and outlets (including those where accessories were attached). You may seal the inlets and outlets with blanking flanges or heavy gauge PVC tape.
6. Seal contaminated equipment in a thick polythene bag. If you do not have a polythene bag large enough to contain the equipment, you can use a thick polythene sheet.
7. If the equipment is large, strap the equipment and its accessories to a wooden pallet. Preferably, the pallet should be no larger than 510mm x 915mm (20" x 35"); contact your supplier if you cannot meet this requirement.
8. If the equipment is too small to be strapped to a pallet, pack it in a suitable strong box.
9. If the equipment is contaminated, label the pallet (or box) in accordance with laws covering the transport of dangerous substances.
10. Fax or email of the Declaration to your supplier. The Declaration must arrive before the equipment.
11. Give a copy of the Declaration to the carrier. You must tell the carrier if the equipment is contaminated.
12. Seal the original Declaration in a suitable envelope; attach the envelope securely to the outside of the equipment package. **WRITE YOUR RETURN Authorization NUMBER CLEARLY ON THE OUTSIDE OF THE ENVELOPE OR ON THE OUTSIDE OF THE EQUIPMENT PACKAGE.**

RETURN OF Ingersoll Rand EQUIPMENT - DECLARATION

	Return Authorization Number:

You must:
Know about all of the substances which have been used and produced in the equipment before you complete this Declaration

- Read the Procedure on the previous page before you attempt to complete this Declaration
- Contact your supplier to obtain a Return Authorization Number and to obtain advice if you have any questions
- Send this form to your supplier before you return your equipment

SECTION 1 : EQUIPMENT

Equipment model _____

Serial Number _____

Has the equipment been used, tested or operated?

Yes ☐ Go to Section 2 No ☐ Go to Section 4

FOR SEMICONDUCTOR APPLICATIONS ONLY :

Tool Reference Number _____

Process _____

Failure Date _____

Serial Number of Replacement Equipment _____

SECTION 2 : SUBSTANCES IN CONTACT WITH THE EQUIPMENT

Are any of the substances used or produced in the equipment

- Radioactive ☐
- Biologically active ☐
- Dangerous to human health and safety? ☐

If you have answered 'no' to all of these questions, go to Section 4.

Your supplier will not accept delivery of any equipment that is contaminated with radioactive substances, unless you:

- Decontaminate the equipment
- Provide proof of decontamination

YOU MUST CONTACT YOUR SUPPLIER FOR ADVICE BEFORE YOU RETURN SUCH EQUIPMENT

SECTION 3 : LIST OF SUBSTANCES IN CONTACT WITH THE EQUIPMENT

Substance name	Chemical symbol	Precautions required (for example, use protective gloves, etc.)	Action required after spillage or human contact
1.			
2.			
3.			
4.			
5.			
6.			

SECTION 4 : RETURN INFORMATION

Reason for return and symptoms of malfunction: _____

_____

If you have a warranty claim:

- Who did you buy the equipment from ? _____
- give the supplier's invoice number _____

SECTION 5 : DECLARATION

Print your name: _____ Print your job title: _____

Print your organization _____

Print your address _____

_____

Telephone number : ____ _____ Date of equipment delivery: _____

I have made reasonable enquiry and I have supplied accurate information in this Declaration. I have not withheld any information. I have followed the Return of **Ingersoll Rand** Equipment Procedure on the previous page.

Signed: _____ Date: _____

FRASERWOODS
FABRICATION & MACHINING LTD.

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Service & Repair Facility
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