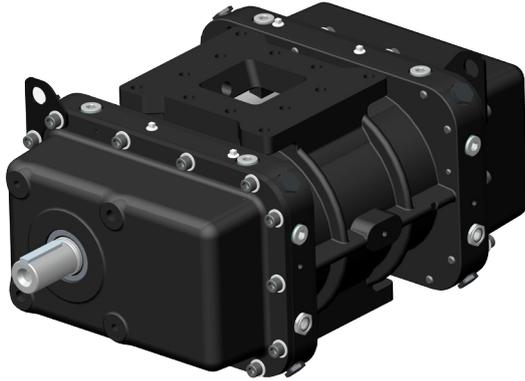




47553223001  
Revision A  
November 2015

## TS.XL Blowers TS 7.XL , TS 10.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



**Save These Instructions**



**Authorized Hicon Distributor, Service & Repair Facility**

120 – 10293 276 ST, Acheson, Alberta, Canada T7X 6A5  
T: 780.962.1827 F: 780.962.1830 E: sales@fraserwoods.ca  
[www.fraserwoods.ca](http://www.fraserwoods.ca)



**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 : 2015/2016**

Model	Serial Number
TS 7.XL	From RBA1085590 to RBAXXXXXXX
TS 10.XL	From RBA1084805 to RBAXXXXXXX

*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 conçue, 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 motivée des autorités nationales, les informations appropriées concernant la Presque-machine à laquelle se réfère cette déclaration.*

**Wasquehal, 30th October 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

<b>1. INTRODUCTION</b> .....	<b>4</b>	<b>4. OPERATION</b> .....	<b>18</b>
1.1 Scope and definitions .....	4	4.1 General operational safety .....	18
1.2 Description .....	4	4.2 Start-up .....	18
• 1.2.1 Introduction .....	4	4.3 Shut-down .....	18
• 1.2.2 Principle of operation .....	4	<b>5. MAINTENANCE</b> .....	<b>19</b>
1.3 Applications .....	4	5.1 Safety information .....	19
<b>2. TECHNICAL DATA</b> .....	<b>6</b>	5.2 Maintenance plan .....	19
2.1 Operating and storage conditions .....	6	5.3 Check the oil levels .....	19
2.2 Mechanical data .....	6	• 5.3.1 Inspect the oil-level sight-glasses .....	19
2.3 Performance .....	6	• 5.3.2 Drive Head Plate .....	19
2.4 Noise and vibration data .....	8	• 5.3.3 Non-drive Head Plate .....	20
2.5 Lubrication data .....	8	5.4 Inspect the system installation .....	20
2.6 Materials of construction .....	8	5.5 Change the oil .....	20
2.7 Item Numbers .....	9	• 5.5.1 Drive Head Plate .....	20
2.8 Connections .....	11	• 5.5.2 Non-drive Head Plate .....	20
<b>3. INSTALLATION</b> .....	<b>14</b>	5.6 Overhaul the blower .....	20
3.1 Installation safety .....	14	5.7 Fault finding .....	21
3.2 System design and safety .....	14	<b>6. STORAGE AND DISPOSAL</b> .....	<b>23</b>
• 3.2.1 General requirements .....	14	6.1 Storage .....	23
• 3.2.2 System safety .....	14	• 6.1.1 Preparation .....	23
3.3 Unpack and inspect .....	15	• 6.1.2 Long-term storage .....	23
3.4 Prepare, locate and connect the blower .....	15	6.2 Disposal .....	23
• 3.4.1 Introduction .....	15	<b>7. SERVICE AND SPARES</b> .....	<b>24</b>
• 3.4.2 Prepare, locate and connect blowers installed directly in your system .....	15	7.1 Introduction .....	24
• 3.4.3 Prepare, locate and connect a blower supported by mounting feet .....	16	7.2 Service .....	24
3.5 Fill the blower with oil .....	16	7.3 Spares and repair kits .....	24
3.6 Fit the drive/transmission .....	16	<b>RETURN OF Ingersoll Rand EQUIPMENT - PROCEDURE</b> .....	<b>25</b>
3.7 Check the direction of rotation .....	17	<b>RETURN OF Ingersoll Rand EQUIPMENT - DECLARATION</b> .....	<b>26</b>
3.8 Commissioning the blower .....	17		

## 1. INTRODUCTION

### 1.1 Scope and definitions

This manual provides installation, operation and maintenance instructions for the **Ingersoll Rand** TS.XL Blowers, which may be abbreviated to “blowers” in the remainder of this manual. You must use the blowers 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 1, item 13) provides specific details about the blower, such as its Item Number and so on.

The following warning symbols may be fitted to the blower or associated equipment:



**Warning – refer to accompanying documentation.**



**Warning – hot surfaces.**



**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 units are also included.

### 1.2 Description

#### 1.2.1 Introduction

Refer to Figure 1. The TS.XL blowers are 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 3.6) to the drive shaft (5) in order to operate the blower.

The blowers are available in eight different positions depending:

- Flow direction
- Shaft position
- Direction of rotation

Refer to Section 2.7 and figure 2 for the Item Numbers of the different blower versions.

#### 1.2.2 Principle of operation

During operation, the inlet gas stream to be pumped/compressed enters the blower at the inlet (2).

As the two contra-rotating rotors turn, the inlet gas is trapped in the chambers formed between the rotors and the blower-body, and is eventually forced out of the blower at the outlet (3).

### 1.3 Applications

All of the TS.XL blowers are suitable for pressure or vacuum operation.

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 2.6. 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

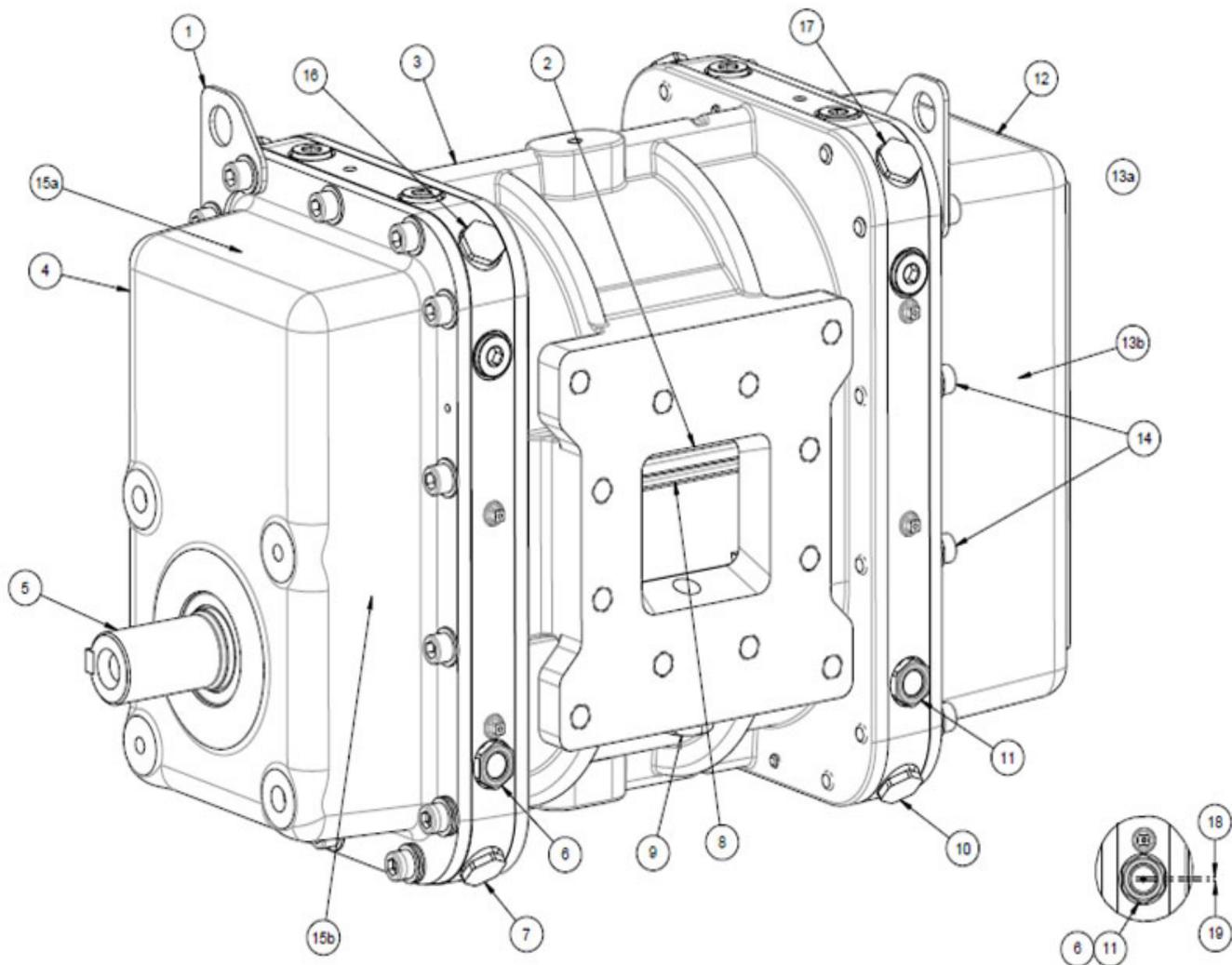


Figure 1 – Components of the TS.XL blower

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

## 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 <sup>3</sup> , 0.25 oz ft <sup>-3</sup>

Table 1 – Operating and storage conditions

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

### 2.2 Mechanical data

Dimensions		
Left and Right Hand blowers	See Figure 3	
Top and Bottom Shaft blowers	See Figure 4	
Mass	TS 7.XL	TS 10.XL
	200 kg	225 kg
	441 lb	496 lb

Table 2 – Mechanical data

### 2.3 Performance

**Notes:** The “given pressures” specified in Tables 4 and 5 are the differential pressures across the blower (that is, the differential pressures between the blower inlet and outlet)

The “r.p.m/r min<sup>-1</sup>” rotation speeds specified in Tables 4 and 5 are provided for information only, to identify blower performance at the specified speed. During operation, the rotation speed of the blowers need not be limited to these specified speeds.

The maximum vacuum values given in Table 3 are for a flow through the blower.

All of the throughput and power values given in Table 3 have a tolerance of ± 5%.

You must not exceed these values, otherwise the blower may be damaged and/or seize.

“Maximum differential pressure (inlet/outlet)”	1200 mbar, 1.2 x 10 <sup>5</sup> Pa, 900 Torr (continuous operation)
	1400 mbar, 1.4 x 10 <sup>5</sup> Pa, 1050 Torr (intermittent operation)
Pressure performance	See table 4
Rotational speed range	See table 4
Nominal shaft power	See table 4
“Maximum absorbed shaft power (pressure operation)”	70.2 kW / 94.1 hp (TS 7.XL)
	85.9 kW / 115.2 hp (TS 10.XL)

Table 3 – Performance data

## 2. TECHNICAL DATA

Blower	"rpm/ r.min <sup>-1</sup> "	Throughput (m <sup>3</sup> /h) and absorbed power (kW) at given pressure at 1013 mbar and 20°C									
		500 mbar		800 mbar		1000 mbar		1200 mbar		1400 mbar**	
		5 x 10 <sup>4</sup> Pa		8 x 10 <sup>4</sup> Pa		10 x 10 <sup>4</sup> Pa		12 x 10 <sup>4</sup> Pa		14 x 10 <sup>4</sup> Pa	
		m <sup>3</sup> /h	kW	m <sup>3</sup> /h	kW	m <sup>3</sup> /h	kW	m <sup>3</sup> /h	kW	m <sup>3</sup> /h	kW
TS 7.XL (1543 m <sup>3</sup> /h)*	1800	468	9.9	398	16.3	356	20.5	318	25.2	286	29.5
	2200	639	13.4	570	21.0	528	26.0	489	31.5	462	36.5
	2600	809	16.8	743	25.7	700	31.5	660	37.7	638	43.5
	3000	980	20.2	915	30.4	872	37.0	831	44.0	814	50.5
	3400	1150	23.6	1087	35.2	1045	42.5	1002	50.3	989	57.6
TS 10.XL (2098 m <sup>3</sup> /h)*	1800	637	13.5	541	22.2	484	27.8	432	34.3	389	40.1
	2200	868	18.2	776	28.6	718	35.3	665	42.8	628	49.7
	2600	1100	22.8	1010	35.0	952	42.8	897	51.3	867	59.2
	3000	1332	27.4	1244	41.4	1186	50.3	1130	59.8	1106	68.7
	3400	1564	32.1	1478	47.8	1421	57.8	1363	68.3	1345	78.3

Blower	"rpm/ r.min <sup>-1</sup> "	Throughput (cfm) and absorbed power (h.p.) at given pressure at 14,7 psi and 68°F									
		7 psi		12 psi		15 psi		18 psi		20 psi**	
		CFM	hp	CFM	hp	CFM	hp	CFM	hp	CFM	hp
TS 7.XL (908 CFM)*	1800	278	13.3	13.3	231	206	27.5	183	39.6	165	39.6
	2200	379	17.9	17.9	331	305	34.8	282	49.0	266	49.0
	2600	480	22.5	22.5	431	405	42.2	380	58.4	368	58.4
	3000	582	27.1	27.1	531	505	49.6	479	67.8	469	67.8
	3400	683	31.6	31.6	631	604	57.0	578	77.2	571	77.2
TS 10.XL (1235 CFM)*	1800	378	18.1	18.1	314	280	37.3	249	53.8	224	53.8
	2200	516	24.4	24.4	450	415	47.4	383	66.6	362	66.6
	2600	653	30.6	30.6	586	551	57.4	517	79.4	500	79.4
	3000	791	36.8	36.8	722	686	67.4	652	92.2	638	92.2
	3400	928	43.0	43.0	858	822	77.5	786	105.0	776	105.0

\* Volume displacement at maximum speed

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

Table 4 – Pressure performance data

## 2. TECHNICAL DATA

### 2.4 Noise and vibration data

**Note:** The noise and vibration data values given below are maximum values. The actual values are given according to our test bench and will depend on the installation and the operating conditions.

Noise level	TS 7.XL	TS 10.XL
	100	104
Vibration level	5,5 mm.s <sup>-2</sup>	5,5 mm.s <sup>-2</sup>
	0,22 inch.s <sup>-2</sup>	0,22 inch.s <sup>-2</sup>

Table 5 – Noise and vibration data

### 2.5 Lubrication data

On standard applications, you can use an oil which complies with the 'standard use' specification given in Table 6. You must use an oil which complies with the 'special use' specification in Table 6:

- 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 3).

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 <sup>-4</sup> m <sup>2</sup> s <sup>-1</sup> (809 cSt)	6.04 x 10 <sup>-4</sup> m <sup>2</sup> s <sup>-1</sup> (640 cSt)
at 40 °C (104 °F)	2.2 x 10 <sup>-4</sup> m <sup>2</sup> s <sup>-1</sup> (220 cSt)	2.18 x 10 <sup>-4</sup> m <sup>2</sup> s <sup>-1</sup> (218 cSt)
at 100 °C (212 °F)	1.8 x 10 <sup>-5</sup> m <sup>2</sup> s <sup>-1</sup> (18 cSt)	2.7 x 10 <sup>-5</sup> m <sup>2</sup> s <sup>-1</sup> (27 cSt)
Mean viscosity index	93	149
Recommended oil	Hibon Lub	Contact factory

Table 6 – Lubricating oil specifications

Drive end cover	TS 7.XL	TS 10.XL
	1,50 liters	1,50 liters
0,40 US gal	0,40 US gal	
Non-drive end cover	2,10 liters	2,10 liters
	0,55 US gal	0,55 US gal

Table 7 – Left and Right Hand blower oil capacities

Drive end cover	TS 7.XL	TS 10.XL
	0,9 liters	0,9 liters
0,24 US gal	0,24 US gal	
Non-drive end cover	1,30 liters	1,30 liters
	0,34 US gal	0,34 US gal

Table 8 – Top and Bottom Shaft blower oil capacities

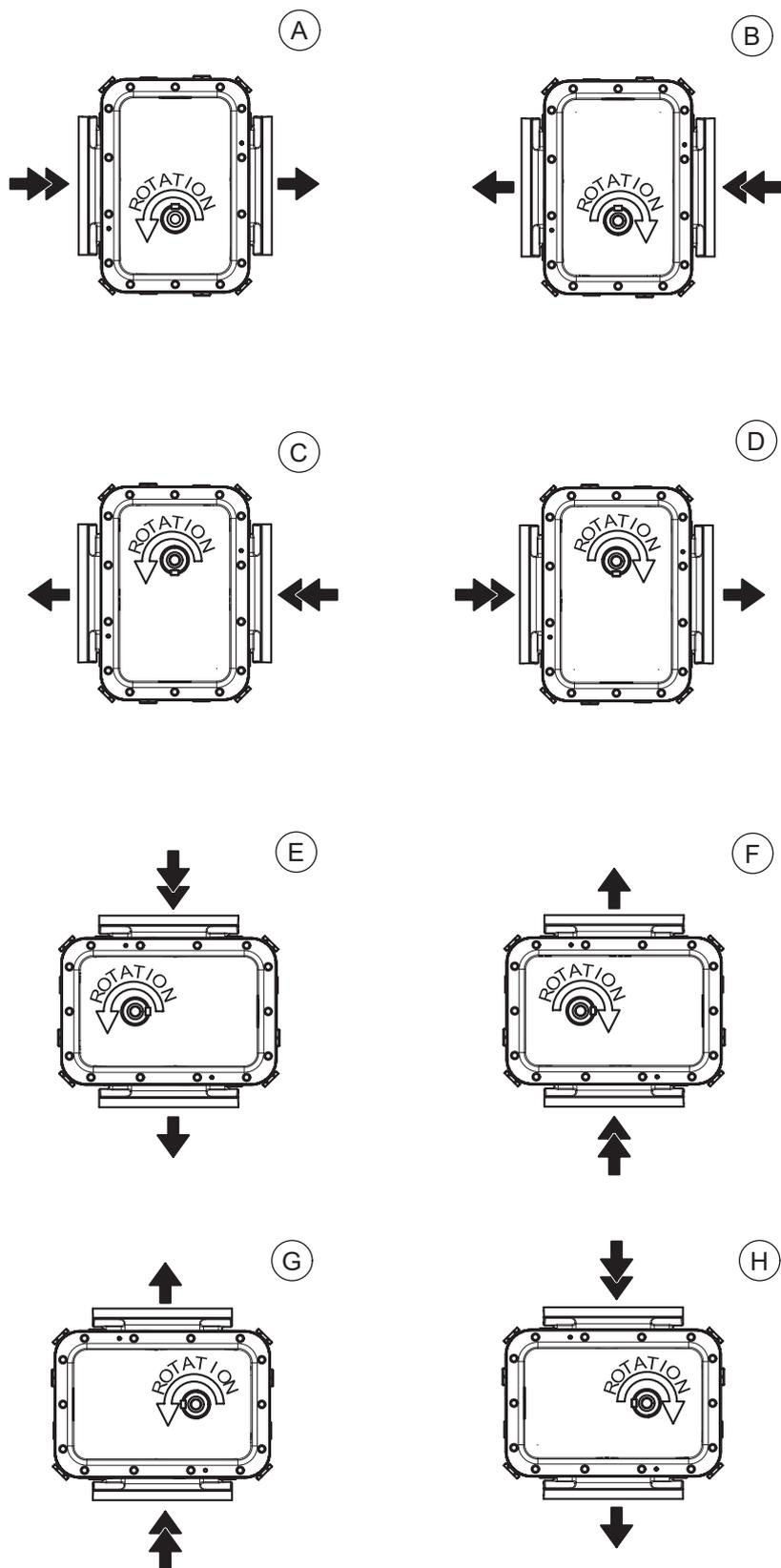
### 2.6 Materials of construction

Head Plates and End Covers	EN GJL 200 grey cast iron
Casings	EN GJL 200 grey cast iron
Rotors	EN GJS 400-15 spheroidal graphite cast iron
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

### 2.7 Item Numbers



- ➡➡ Inlet gas stream
- ➡ Discharge (outlet) Gas stream

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

## 2. TECHNICAL DATA

Blower model	Shaft position	Rotation direction	Standard blowers	
			Item Number	"Configuration: See Figure 2"
			Hibon Number	
TS 7.XL	Bottom	Anticlockwise	F015510201	A
	Bottom	Clockwise		B
	Top	Anticlockwise	F015510202	C
	Top	Clockwise		D
	Left	Anticlockwise	F015510200	E
	Left	Clockwise		F
	Right	Anticlockwise	F015510203	G
	Right	Clockwise		H
TS 10.XL	Bottom	Anticlockwise	F015520201	A
	Bottom	Clockwise		B
	Top	Anticlockwise	F015520202	C
	Top	Clockwise		D
	Left	Anticlockwise	F015520200	E
	Left	Clockwise		F
	Right	Anticlockwise	F015520203	G
	Right	Clockwise		H

Table 10 - Item Numbers

## 2. TECHNICAL DATA

### 2.8 Connections

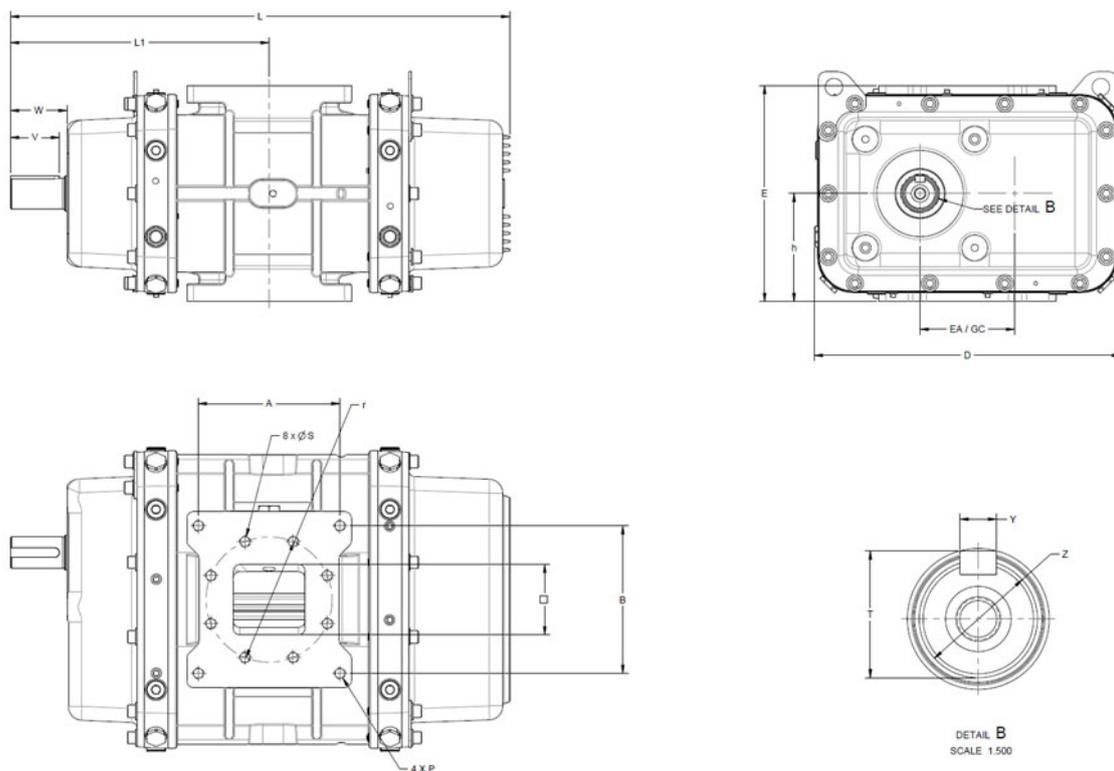


Figure 3 - Left and Right Hand blower dimensions

Figure 3 Key	Dimensions			
	TS 7.XL		TS 10.XL	
	mm	inch	mm	inch
A	135	5.31	202	7.95
B	232	9.13	212	8.35
D	437	17.20	437	17.20
E	307	12.09	310	12.20
GC	135	5.31	135	5.31
h	155	6.10	155	6.10
L	635	25.00	712	28.03
L1	330	12.99	369	14.53
T	48.5	1.91	48.5	1.91
V	70	2.76	70	2.76
W	80	3.15	80	3.15
Y	14	0.55	14	0.55
ØZ*	45	1.77	45	1.77
Ør	180	7.09	180	7.09
□	101 x 101	3,98 x 3,98	101 x 101	3,98 x 3,98
ØP	4 x M16		4 x M16	
ØS	8 x M16		8 x M16	

\* Fitting tolerance range : m6

Table 11 - Left and Right hand blower dimensions

2. TECHNICAL DATA

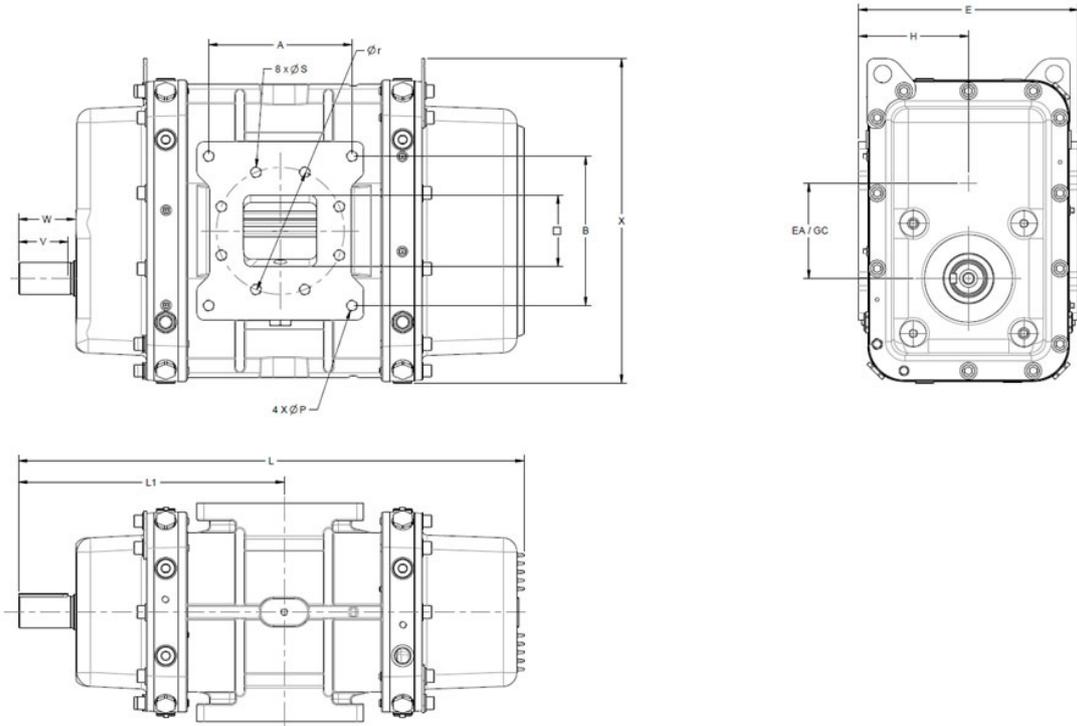


Figure 4 -Top and Bottom Shaft blower dimensions

## 2. TECHNICAL DATA

Figure 4 Key	Dimensions			
	TS 7.XL		TS 10.XL	
	mm	inch	mm	inch
A	135	5.31	202	7.95
B	232	9.13	212	8.35
E	307	12.09	310	12.20
GC	135	5.31	135	5.31
H	155	6.10	155	6.10
L	635	25.00	712	28.03
L1	330	12.99	369	14.53
T	48.5	1.91	48.5	1.91
V	70	2.76	70	2.76
W	80	3.15	80	3.15
X	460	18.11	461	18.15
Y	14	0.55	14	0.55
ØZ*	45	1.77	45	1.77
Ør	180	7.09	180	7.09
□	101 x 101	3,98 x 3,98	101 x 101	3,98 x 3,98
ØP	4 x M16		4 x M16	
ØS	8 x M16		8 x M16	

\* Fitting tolerance range : m6, .

Table 12 -Top and Bottom Shaft blower dimensions

### 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 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 the blower.
- Check that all of the required components and tools are available and of the correct type before you start to install the blower.
- Use suitable new 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.

#### 3.2 System design and safety

#### ⚠ WARNING

**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. Obey the safety instructions listed below when you design and build your system:**

##### • 3.2.1 General requirements

Your system must be suitably designed for correct operation of the blower. *Note that:*

- You must design a suitable pipeline to fit the blower inlet/outlet connections. refer to Section 2.8 and to Figures 3 and 4 for the dimensions of the blower 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 3.4 for more details.
- The blower must be sufficiently level for correct operation: see Section 3.4 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  $\mu\text{m}$  (9.84 x 10<sup>-5</sup> inch) in size and must not contain more than 200 mg/m<sup>3</sup> (1.37 x 10<sup>-5</sup> lb/ft<sup>3</sup>) 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.

##### • 3.2.2 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 3.7).
- 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.
- 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 2.4). 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.

## 3. INSTALLATION

### 3.3 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 2.2 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 two 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. If any item is missing, notify your supplier in writing within two days
4. Look at the blower rating and identification plate (Figure 1, 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.

### 3.4 Prepare, locate and connect the blower

#### • 3.4.1 Introduction

Take note of the following when you locate the blower and connect it 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 outlet ports on the blower.
- Incorporate flexible components in your system, to minimize noise and vibration.
- Where necessary, use gaskets/seals which are compatible with the gases which will be pumped/compressed, and with the operating conditions.
- The leak tightness of your system connections must be in accordance with the requirements of your applications.

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 3.4.2.
- Supported by mounting feet; prepare, locate and connect blowers as described in Section 3.4.3.

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 3.4.2 or 3.4.3, attach your lifting equipment to these lifting bolts/lugs.

#### • 3.4.2 Prepare, locate and connect blowers 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 2.2 for the mass of the blower.**

**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 prepare, locate and connect 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 1, 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 1. Attach suitable lifting equipment to the blower, 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 1, 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 outlet flange to your system outlet pipeline.
6. Disconnect your lifting equipment from the blower.

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

### 3. INSTALLATION

#### 3.4.3 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 2.2 for the mass of the blower.

You must provide a firm, level platform for 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, all of the mounting feet (1, 2 or 4, depending on the blower model) are flat on the mounting platform to within  $0.1 \text{ mm.m}^{-1}$  ( $0.0013 \text{ inch.ft}^{-1}$ ).

Use the following procedure to prepare, locate and connect the blower:

1. Refer to Figure 1. Attach suitable lifting equipment to the four lifting-bolts (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 1, items 9), to secure the blower in position.
4. Clean the rotors: refer to Step 1 of Section 3.4.2.
5. Use a suitable gasket/seal\* to connect your inlet pipeline to the blower inlet (Figure 1, item 2).
6. Use a suitable gasket/seal\* to connect your outlet pipeline to the blower outlet (Figure 1, item 3).

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

#### 3.5 Fill the blower with oil

##### 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.

1. Drain the protective oil from the drive end and non-drive end covers: refer to Section 5.5.
2. Refer to Figure 1. 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.

#### 3.6 Fit the drive/transmission

##### WARNING

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

##### CAUTION

Your drive and transmission system design must ensure that the maximum blower rotational speeds specified in Section 2.3 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 13, linear speed of belts should not exceed  $31 \text{ m/s}$  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 1, item 5) as described in the manufacturer's instructions supplied with the components.

Blower	Minimum pulley diameter for specified differential pressure : mm (inch)									
	"300 mbar $3 \times 10^4 \text{ Pa}$ 4,35 psi"	"400 mbar $4 \times 10^4 \text{ Pa}$ 5,8 psi"	"500 mbar $5 \times 10^4 \text{ Pa}$ 7,25 psi"	"600 mbar $6 \times 10^4 \text{ Pa}$ 8,7 psi"	"700 mbar $7 \times 10^4 \text{ Pa}$ 10,15 psi"	"800 mbar $8 \times 10^4 \text{ Pa}$ 11,6 psi"	"900 mbar $9 \times 10^4 \text{ Pa}$ 13,05 psi"	"1000 mbar $1 \times 10^5 \text{ Pa}$ 14,5 psi"	"1100 mbar $1,1 \times 10^5 \text{ Pa}$ 15,95 psi"	"1200 mbar $1,2 \times 10^5 \text{ Pa}$ 17,4 psi"
<b>TS 7.XL</b>	140 (5.51)	140 (5.51)	150 (5.90)	150 (5.90)	160 (6.30)	170 (6.69)	180 (7.09)	180 (7.09)	200 (7.87)	200 (7.87)
<b>TS 10.XL</b>	170 (6.69)	170 (6.69)	180 (7.09)	200 (7.87)	212 (8.35)	212 (8.35)	224 (8.82)	224 (8.82)	250 (9.84)	250 (9.84)

Table 13 - Minimum drive shaft pulley diameters

## 3. INSTALLATION

### 3.7 Check the direction of rotation

#### 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.**

#### CAUTION

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

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 guard over the drive coupling or belt.
3. Refer to Figure 1. 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.
4. Check that the blower drive shaft (5) rotated correctly in the expected direction. (This depends on your application and installation configuration: see Figure 1 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.

### 3.8 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

### WARNING

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.

### 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.**

- 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 3.2). If you do, the blower may overheat.
- Do not operate the blower with the blower inlet or outlet ports 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.
- Never disconnect any of the connecting pipelines (for example, the pipeline connected to the inlet) when the blower is operating.
- 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).
- 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 2.4).
- 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.

### 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.**

1. Ensure that any isolation valves in the blower inlet and outlet pipelines are in the correct 'open' positions.
2. Check the oil-levels in the blower: refer to Section 5.3.
3. Engage your drive and transmission system to start the blower.

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

### 4.3 Shut-down

1. Disengage the drive and transmission system to stop the blower.
2. Wait until you can hear that the blower has stopped before you close any isolation valves in the blower inlet and outlet pipelines.

## 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 3.7) if the drive and transmission system has been disconnected and then reconnected.
- Take care to protect the inlet/outlet port sealing faces from damage.
- Do not re-use seals/gaskets if they are damaged.
- 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 14 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.

Operation	Frequency	Refer to Section
Check the oil levels	Weekly	5.3
Inspect the system installation	Monthly	5.4
Change the oil	See Section 5.2	5.5
Overhaul the blower	4 yearly	5.6

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

Table 14 – 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 1. 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 (12):
  - 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**.

#### 5.3.2 Drive Head Plate

1. Refer to Figure 1, 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 1. 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 2.6) 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. MAINTENANCE

### 5.3.3 Non-drive Head Plate

1. Refer to Figure 1, 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 1. 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 2.6) 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 non-drive 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.

### 5.5 Change the oil

#### 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.**

#### WARNING

**You must take care about the 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.**

### 5.5.1 Drive Head Plate

1. Refer to Figure 1. Remove the oil filler-plug (16) from the filler port on the top of the drive head plate (4).
2. Refer to Figure 1. 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 7 or Table 8.
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 5.3.1.

### 5.5.2 Non-drive Head Plate

1. Refer to Figure 1. Remove the oil filler-plug (17) from the filler port on the top of the non-drive head plate (12).
2. Refer to Figure 1. 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 7 or Table 8.
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 5.3.2.

### 5.6 Overhaul the blower

The blower must be regularly overhauled, as specified in Table 14. 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 15 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
<b>The blower will not start, or seizes during operation.</b>	<p>Are the rotors touching ?</p> <p>Has the blower been overloaded ?</p> <p>Has debris or foreign material entered the blower ?</p> <p>Is the drive/transmission system faulty ?</p>	<p>Check the rotor clearances and adjust as necessary.</p> <p>Check the required operating conditions and specified performance of the blower (see Section 2).</p> <p>Strip down, clean and repair the blower as necessary.</p> <p>Check that your drive and transmission system is operating correctly, and that it is correctly fitted to the blower: refer to Section 3.6 and to the manufacturer's instructions.</p>
<b>The blower is noisy during operation.</b>	<p>Are the rotors touching ?</p> <p>Are the gear and/or bearing clearances incorrect ?</p> <p>Are the rotors unbalanced ?</p>	<p>Check the rotor clearances and adjust as necessary.</p> <p>Check the clearances and adjust as necessary.</p> <p>Clean the rotors and rotor housing, then check the rotor clearances and adjust as necessary.</p>
<b>The blower overheats.</b>	<p>Is the inlet filter blocked ?</p> <p>Is the differential pressure across the blower too high ?</p> <p>Is an oil level too high, or has the incorrect grade of oil been used ?</p> <p>Are the rotor or rotor/casing clearances incorrect ?</p> <p>Is there inadequate clearance around the blower ?</p>	<p>Clean or replace the filter.</p> <p>Check that your system design complies with the requirements of Section 3.2, and that the blower is suitable for use in your application.</p> <p>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).</p> <p>Contact your supplier or <b>Ingersoll Rand</b> for advice.</p> <p>Ensure that there is sufficient clearance around the blower to provide for free circulation of ambient cooling air.</p>
<b>The blower overheats (continued).</b>	<p>Does your enclosure provide inadequate cooling ?</p>	<p>If you have fitted an acoustic enclosure around the blower:</p> <p>Ensure that the enclosure cooling vents/louvers are unobstructed.</p> <p>Ensure that the enclosure cooling/extraction fan is operating correctly.</p> <p>Ensure that there is sufficient clearance for cooling air flow around the blower: refer to Section 3.2.</p>
<b>There is oil in the gas stream from the blower.</b>	<p>Is an oil level too high ?</p> <p>Have the sealing rings failed ?</p>	<p>Check the oil levels and if necessary drain oil from the blower: refer to Section 5.3.</p> <p>Contact your supplier or <b>Ingersoll Rand</b> for advice.</p>

## 5. MAINTENANCE

Symptom	Check	Actions
<b>There is a low volume flow through the blower.</b>	<p>Is the inlet filter blocked ?</p> <p>Is the blower worn or damaged ?</p> <p>Is the blower unsuitable for your application ?</p>	<p>Clean or replace the filter.</p> <p>Contact your supplier or <b>Ingersoll Rand</b> for advice.</p> <p>If necessary, redesign your system to comply with the capabilities of the blower, or fit a different blower which provides the necessary performance.</p>
<b>Absorbed power is too high.</b>	<p>Is the blower unsuitable for your application ?</p> <p>Is the inlet filter blocked ?</p>	<p>If necessary, redesign your system to comply with the capabilities of the blower, or fit a different blower which provides the necessary performance.</p> <p>Clean or replace the filter.</p>
<b>The blower rotates in reverse direction when you stop it.</b>	<p>Is the nonreturn valve defective ?</p>	<p>If you have fitted a nonreturn valve in your outlet pipeline, check that the nonreturn valve operates correctly. Repair or replace as necessary.</p>
-	-	<p>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 <b>Ingersoll Rand</b> for advice.</p>

Table 15 – Fault finding

## 6. STORAGE AND DISPOSAL

### 6.1 Storage

#### 6.1.1 Preparation

**WARNING**

**Use suitable lifting equipment to move the blower. If you do not, you can injure yourself or damage the blower. Refer to Section 2.2 for the mass of the blower.**

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 inlet and outlet connections.
5. Use suitable lifting equipment to move the blower to its storage area.
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 2.2 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 16): 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 16) through the inlet and into the blower.
5. If required, spray a suitable protective oil (see Table 16) on the outer surfaces of the blower, to inhibit corrosion.

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.

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 16 – Suitable protective oils

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

**WARNING**

**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, cleaning materials, 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 AND SPARES

### 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, U.S.A and a world-wide network of distributors. The majority of these centers 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, state for each part required:

- Model and Item Number of your equipment
- Serial number
- Item Number and description of part.

### 7.3 Spares and repair kits

The spares and repair kits available for the blowers are shown in Tables 17 and 18.

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

Table 17 – Spares Item Numbers

Blower	Standard maintenance kit	Piston Ring Holder Kit	Gears	Fuse plugs
	Hibon number	Hibon number	Hibon number	Hibon number
<b>TS 7.XL</b>	R015210100	R015092100	P158502042	R015110100
<b>TS 10.XL</b>				

Table 18 – Repair Kits Item Numbers

## 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: \_\_\_\_\_



A series of horizontal lines for writing, spanning the width of the page.



**Authorized Hibon Distributor, Service & Repair Facility**

120 – 10293 276 ST, Acheson, Alberta, Canada T7X 6A5

T: 780.962.1827 F: 780.962.1830 E: sales@fraserwoods.ca

**www.fraserwoods.ca**