

## Nitrogen Booster X serie

aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
**hydraulics**  
pneumatics  
process control  
sealing & shielding



ENGINEERING YOUR SUCCESS.

## Booster X Series

Questi booster sono dei moltiplicatori di pressione a doppio singolo effetto. Significa che ogni cilindro Hp prende la pressione in ingresso del gas qualsiasi essa sia e la porta in un'unica fase di compressione alla pressione desiderata. Nella serie X questo avviene in entrambi i lati sfruttando così in modo efficace tutta l'aria utilizzata per muovere il pistone a bassa pressione.

L'aria utilizzata per pilotare il Booster, prima di venire espulsa viene fatta espandere nella camera di raffreddamento del cilindro che sfruttandone l'espansione, raffredda il cilindro HP in una prima fase, la testata in una seconda. I Booster Parker sono caratterizzati dalle basse temperature di esercizio e questo è particolarmente evidente anche dopo lunghe ore consecutive di lavoro.

E' noto che uno dei pericoli nelle fasi di compressione dell'azoto è l'incremento della temperatura e quindi il modo in cui è progettato e realizzato il Booster Parker lo rende assolutamente unico e sicuro. Nell'utilizzo con altri gas, le basse temperature di esercizio, fanno sì di diminuire gli interventi di manutenzione.

Abbiamo inoltre realizzato il Booster in modo che ci sia una separazione fisica tra l'aria di alimentazione che potrebbe contenere inquinanti e il gas puro ad alta pressione in modo da evitare auto inneschi nell'ossigeno e danneggiare il Booster.

Per proteggere l'operatore da esplosioni causate da accidentale ingresso di inquinanti nella linea HP Ossigeno abbiamo posto un anello antideflagrazione alla base del cilindro HP e praticato due fori di sfogo sovrappressione alla base. Questi ultimi possono essere utilizzati per convogliare eventuali perdite di gas, lontano dall'ambiente di lavoro o possono essere utilizzati per rilevare quando è tempo di sostituire le tenute del pistone nell'utilizzo con gas inerti.

Sulla testata si può notare un foro indicato con un triangolo di Attenzione. Attraverso questo foro si sfoga la sovrappressione di Gas che, nel caso di rottura della guarnizione di testata, previene il contatto dell'ossigeno con parti sporche o comunque non Ossigeno dedicate.

I Booster Parker sono quindi la giusta risposta per chi cerca sicurezza, affidabilità e robustezza in un prodotto di alta tecnologia.

	C2X	C4X	C4X I 3
Rapporto compressione	25/1	39/1	40/1 - 64/1
Corsa pistone	2 x 60 mm	2 x 120 mm	2 x 120 mm
Massima pressione	(S)330 bar	(S)340 bar (Pro) 500 Bar	(S)340 Bar (Pro)800 Bar
Minima velocità pompaggio	15 cicli/minuto	15 cicli / minuto	15 cicli / minuto
Pressione alimentazione	9-14 bar	5 - 14 bar	5 - 14 bar
Cilindrata	2 - 20 cc	2 x 40 cc	2 x 40 cc - 60 cc
Pressione minima di aspirazione Gas	5 bar	5 bar	5 bar
Massima velocità di pompaggio	140 cicli / minuto	110 cicli/ minuto	60 cicli/ minuto
Dimensioni	32x18x12 cm	66x24x14 cm	67x26x18 cm



## TECHNICAL DATA

### **Booster Dimensions**

Width: 14 cm

Length: 63 cm

Height: 23 cm

Weight: 18 Kg

### **Pressurized Air Supply**

Only use dry and filtered air (40 microns).

The admissible temperature range for pressurized air is -5 °C to 40 °C.

### **Additional Data**

Suitable for oxygen, helium, argon and nitrogen. Other gases on request.

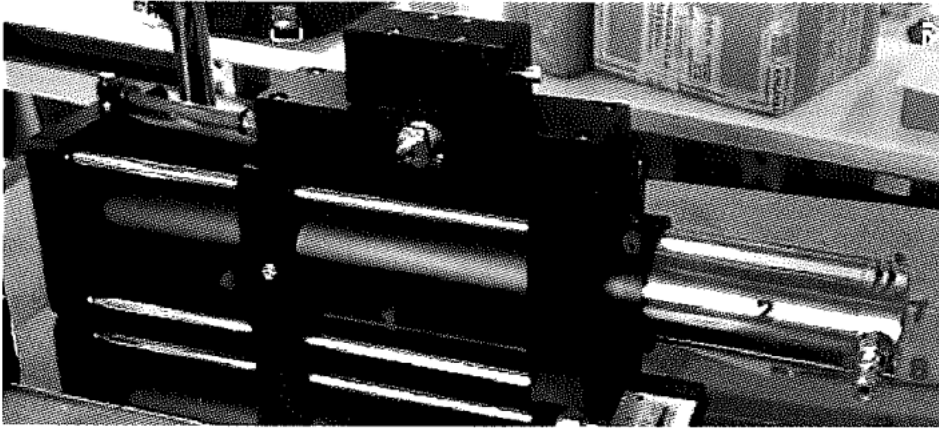
- Compression ratio: 1:78
- Working air pressure: 5 - 14 bar
- Piston stroke: 120 mm
- Displacement: 38 cm<sup>3</sup>
- Maximum pressure of compressed gas: 600 bar
- Minimum suction pressure: 5 bar
- Maximum pumping speed: 110 cycles/minute
- Minimum pumping speed: 15 cycles/minute
- Connections Gas ¼" BSP – Drive Air ½" BSP

### **Noise Generation**

The noise generation of the booster does not exceed 70 dB. Thus, no noise dampening and no ear protection is necessary.

### **Identification Plate**

The booster can be identified via its identification plate. This plate also shows basic information for operation and air supply.

**GENREAL DESCRIPTION**

1. Low pressure Cilinder
2. High pressure cilinder (gas)
3. Connection Drive Air ½"
4. Discharge Air 2<sup>nd</sup> cilinder
5. High pressure connection
6. High pressure cylinder socket with safety release
7. Muffler and pressure-based cooling system
8. High pressure safety release Head Seal ring

**Safety Devices**

This product provides a device to ensure the user safety even in the case of a booster failure.

**ATTENTION**

**THE EFFICIENCY OF THE SAFETY DEVICE CAN ONLY BE GUARANTEED, IF THE BOOSTER IS OPERATED ACCORDING TO THE TERMS AND CONDITIONS IN THIS MANUAL. ABOVE ALL, THE MAINTENANCE PROCEDURES EXPLAINED IN THE RELEVANT SECTIONS OF THIS MANUAL MUST BE CARREID OUT THOROUGHLY AND UNALTERED.**

This picture shows a safety valve at the position marked with

This valve is set and calibrated during production, to avoid exceeding the allowed maximum pressure.

This valve functions as follows:

If the maximum gas pressure is reached, so is the maximum working pressure.

Thus, exceeding the maximum gas pressure can be avoided by setting the safety valve to the maximum working pressure.

## **PROPER AND IMPROER USE OF THE BOOSTER**

### **Proper Use**

This booster has been designed solely as a pressure multiplier for the following gases:

Nitrogen

For every booster, the manufacturer uses seals that are especially adapted to the gases named on the identification plate.

During all operation phases, only the operator may be present. During operation, the operator must not stay near the booster, but wait nearby, to be able to take immediate action when necessary. This safety distance is not required, when the booster has been built into a frame that offers additional protection.

This booster was designed to compress only the gases named on the identification plate. Compressing other gases with this booster is not allowed.

If the booster is used as a standalone model, all safety devices defined by the manufacturer must be present and ready for operation.

If the booster is used as a standalone model, you must implement a filter for the working air (or use filtered and dry pressurized air), to ensure the trouble-free operation.

### **Improper Use**

Operating the booster in violation of section **PROPER USE** in this manual is not allowed.

The following is strictly prohibited:

- Using the product or its components for a purpose not authorized by the manufacturer.
- Using the booster to fill invalid tanks (see **PROPER USE**)
- Exchanging booster parts for parts not authorized by
- Using the booster in insufficiently ventilated areas
- Using the booster for gases not mentioned on the identification plate
- Using the booster in connection with unsuitable devices or components

### HANDLING

During reception, check the integrity of the booster and its parts. In case of problems and damages, contact the supplier/manufacturer BEFORE operating the booster.

#### Transporting the Booster

The booster may only transported when mounted (as a single unit).



**DANGER**

**OBSERVE THE SAFETY PROCEDURES WHEN HANDLING THE BOOSTER.**

#### Next Steps

After the initial installation, it might be necessary to relocate the booster due to production, logistics or other reasons. In this case, observe the following information.



**DANGER**

**MAYBE YOU HAVE CHANGED THE CONFIGURATION DESCRIBED IN THIS MANUAL DURING THE USE PERIOD.**

**BEFORE RELOCATING THE BOOSTER, DEFINE THE IMPACT OF THESE CHANGES WHEN VALIDATING THE WEIGHT AND WHEN CARRYING OUT THE RELOCATION.**

#### Manual Relocation

The weight of the booster can be found in this manual and on the identification plate. The mounted booster can be relocated at will, if the specifications of decree 81/08 on maximum weights in working areas are met. The following table contains detailed information on this topic:

Age	Men		Women	
	Occasionally	Frequently	Occasionally	Frequently
16 - 18	19	14	12	9
18 - 20	23	17	14	10
20 - 35	25	19	15	11
35 - 50	21	16	13	10
More than 50	16	12	10	7
<b>Pregnant Women</b>				
<i>During the first 6 months of pregnancy</i>			10	5
<i>From the 7th month on</i>			0	0

**Rules on maximum weight (kg) for frequent and occasional maintenance.**

### **Relocation with hoisting device (amount)**

#### **Safety Regulations**

During lifting and transporting the booster, only the required personnel may be present.

All personnel involved in the relocation must wear the personal protective equipment defined in the safety rules - especially gloves, helmet and safety shoes.

During lifting, all personnel must observe a safety distance. It is not allowed to step under the lifted device.

If corrections are necessary/if an intervention can be made by a single person, the load must be placed safely on the ground. After that, repeat the lifting.

In the lifting area, all personnel involved must be visible to the lifting device operator at all times. These persons must not interfere with the lifting procedure independently, in order to adjust or guide the lifted object.

Before lifting, all foreign objects must be removed from the ground. The ground must be cleaned to avoid a slipping risk.

Check the lifting height and make sure, that there is sufficient space for the personnel.

Make especially sure, that there are no live electrical connectors in the lifting area.

#### **Preliminary Checks**

Check the following, before moving the booster :

- All booster parts are fixed, to avoid falling parts during lifting.
- There are no loose objects on the booster.
- The target area is big enough to place the booster.
- The ground/placing surface supports the booster weight (see **TECHNICAL DATA**).

#### **Booster Weight**

The booster weight can be found in section **TECHNICAL DATA** of this manual and on the identification plate.

#### **Lifting the Booster**

- Use four ropes and a steel support (or the dedicated support) on the upper part of the booster/the packaging. Provide a photo showing how to mount the ropes on the booster.
- Make sure that the ropes are strong enough.
- You may now lift the booster and relocate it.
- To be complemented.

### **VALID ENVIRONMENTAL CONDITIONS**

#### **Temperature**

- In service: -5 °C to 40 °C
- Out of service: -5 °C to 40 °C
- Storage until installation: -5 °C to 40 °C

#### **Relative humidity (non-condensing)**

- In service: 30 % to 80 % ± 5 %.
- Out of service: 30 % to 80 % ± 5 %
- Storage until installation: 30 % to 80 % ± 5 %



**Height**

- In service: 0 m to 2.000 above sea level
- Out of service: 0 m to 2.000 above sea level
- Storage until installation: 0 m to 2.000 above sea level

**CONNECTING****Warning**

Every booster is checked before delivery and tuned to the customer requirements. When connecting the booster, these checking conditions must be duplicated.

The booster may only be connected by competent, authorized and trained personnel.

Before putting the booster into service, all protection and packaging material must be removed completely.

**Installation Area**

The installation area must meet the following requirements:

- The chosen installation area must leave a sufficient safety distance for the operator.
- The connections must not be placed flat on the floor. They must be fixed sufficiently to allow for a simple inspection.
- The booster position must be chosen in a way, that does not obstruct the escape route.
- The complete pneumatic system must be grounded. Operation of the plant is restricted to qualified personnel.
- It is recommended to keep a suitable distance between the storage tanks and the tanks to be filled.

Consult an expert or a specialized study, to correctly place the booster according to local regulations.

**Lighting Conditions**

The lighting (natural or artificial) in the installation area must meet the following conditions:

In the working area:	200 Lux
On the panel/near gauges	200 Lux
On other components during maintenance and inspection	200 Lux

**Floor/Surface Features**

The floor/surface must be as even as possible.

**Floor/Surface Capacity**

The floor/surface must make sure the following:

- The load capacity must match the total booster weight (see **TECHNICAL DATA**) and the dynamic strain.

**How to Proceed in Case of Damages**

If you discover a damage, shut down the booster immediately. Inform the safety inspector and the operations manager immediately.

### Checking the Grounding

Before putting the booster into service, the correct grounding must be checked.



#### ATTENTION

**THE GROUNDING CHECK MUST BE CARRIED OUT BY A QUALIFIED ELECTRICIAN.**

### First Use

The manufacturer cannot be held liable for the booster operation, if the booster is operated by personnel not familiar with the manual.

After activating the pressurized air supply, check the function of all safety devices (automatic or manually actuated).

Before starting the booster, all parts of the protection foil and the packaging must be removed.

### Interventions

For all kinds of interventions, the booster must be deactivated. Information on these admissible interventions can be found in the manual.



#### DANGER

**PLEASE NOTE, THAT SOME BOOSTER PARTS CAN HEAT UP DURING OPERATION.**

If an intervention is carried out by several persons, they must be able to communicate with each other at all times. Additionally, these persons must know each other.

**Multiple interventions must be carried out separately (not at the same time).**

Only use suitable tools.

After an intervention, make sure that the frame and the safety devices are put back and secured.

Make sure, that no tools and other objects remain in the booster.

A slippery floor, humidity and grease could create a slip hazard.

Clean the installation surface of the booster after an intervention thoroughly, to remove liquids and greases.

After an intervention, make sure that all removed safety devices are in place and operational.

***Interventions***

Before every intervention, the booster must be separated from the air supply. The gas supply must also be interrupted. Information on these admissible interventions can be found in the manual.

**Interventions on inner parts of the booster are restricted to an authorized**

After an intervention, check, if all screws are tightened correctly.  
Make sure, that no tools and other objects remain in the booster.

**Control Device**

**Introduction**

This part of the manual must be completed by the booster owner. Describe the booster's control devices. Provide photos, a description and an explanation of the functions. Every control must be marked with its function. The labeling must be made in local language.



**DANGER**

*IT IS FORBIDDEN TO MANIPULATE THE CONTROL SYSTEM. TECHNOLOGY CANNOT BE HELD LIABLE FOR DAMAGES AND CONSEQUENCES, ARISING OUT OF IMPROPER, NOT AUTHORIZED BOOSTER USE AND OUT OF MANIPULATION OR NEGLIGENCE.*

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**DANGER**

*EVERY BOOSTER OPERATOR MUST HAVE READ THE MANUAL AND MUST BE FAMILIAR WITH OPERATION AND CONTROL.*

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## **USING THE BOOSTER**

### **Tank Connection**

Describe how to connect the tank to be filled. Add photos, if required.

### **Starting**

Describe, how to start the booster. Describe the steps required to start the booster.

### **Normal Stop**

Describe how to stop the booster normally. A normal stop is carried out at the end of the filling phase and before deactivating the booster. Add a photo.

### **Emergency Stop**

The booster might be equipped with a XXX button (*see Residual Risk and Controls*). If this button is pressed, the booster C2 is stopped immediately and the air supply is interrupted.

This button may only be used in case of a serious problem, putting the system and/or the operator in danger.

Describe, how to reset the XXX button after pressing it.

### **Deactivation**

Describe, how to deactivate the booster. Add a photo.

### **Programming**

### **Settings**

### **Detailed descriptions for all persons involved**

Create detailed instructions for the operator.

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## REGULAR MAINTENANCE

### Safety

Maintenance is restricted to qualified and authorized personnel.

You need to observe the warnings regarding certain safety standards for the operation of the booster in chapter **GENERAL SAFETY INFORMATION**

For all kinds of interventions, the booster must be deactivated. Information on these admissible interventions can be found in the manual.



### **DANGER**

***BEFORE CLEANING OR SERVICING THE BOOSTER, DISCONNECT THE BOOSTER FROM THE SYSTEM AND INTERRUPT THE AIR AND GAS SUPPLY.***



### **DANGER**

***PRODUCT COMPONENTS THAT CAN GET HOT DURING OPERATION ARE MARKED ACCORDINGLY. BEFORE ALL MAINTENANCE WORK, MAKE SURE THAT THESE COMPONENTS HAVE BEEN COOLING DOWN SUFFICIENTLY.***

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During servicing, setting, mounting, removal etc. of the booster, the information in this manual and the safety rules for the installation area must be observed.

Describe in detail the routine maintenance. Describe, what commercially available parts must be replaced. Add explaining illustrations. Describe the electrical, mechanical and hydraulic maintenance.

**INTERVALLO MANUTENZIONE**

**Tipo di Manutenzione**

<i>Before and after each operation</i>	1	<i>Perform a general visual inspection of the system</i>
	2	<i>Drain and clean the air filter cup (fixed installation if present)</i>
	3	<i>Clean the cylinder connections and the plugs of the connections</i>
<i>Every 3-6 months or 40,000 cycles (Version with cycle counter)</i>	1	<i>Inspect and re-lubricate the O-ring della ISO valve air drive section (replace if necessary)</i>
	2	<i>Check the Booster for any loss of oxygen from safety discharge external and overall performance losses</i>
	3	<i>Check tightening cylinder head bolts, functioning safety valve and speed control valve</i>
<i>Every 6 Months</i>	1	<i>Testing and calibration gauges</i>
	2	<i>Oxygen filter replacement</i>
<i>Every 12 Months</i>	1	<i>Inspection of operation pipes and whips of all the pressure system</i>
	2	<i>Test relief valve. Recalibrate if necessary (fixed installations)</i>
<i>Every 500 hours of work, or 12-18 months</i>	1	<i>Ordinary maintenance and replacement Gas Section, Section Air drive, if necessary</i>

*Greasing*

Only authorized technical

*Other possible maintenance tasks*

**Exceptional Maintenance**

An exceptional maintenance is required after a failure/a defect or after improper use of the booster.

Such an exceptional situation cannot be foreseen. For this reason, the required maintenance cannot be described here.

Please contact the customer service.

The personnel charged with the intervention needs sufficient expertise in this area. Complement your descriptions with illustrations, when needed.

Before an intervention, always contact the manufacturer, to confirm the planned work.

**All interventions (mechanical, pneumatic, normal or exceptional) are restricted to qualified personnel**

**DECOMMISSIONING**

**Deactivation**

This booster was designed for robustness, longevity and flexibility. Thus, it can be used for years. After the technical and operational use period, the booster must be decommissioned, since its function can no longer be guaranteed. Now, it can only be recycled.

In the following cases, observe the information on deactivating the booster:

- Decommissioning the booster before a longer phase of inactivity
- Decommissioning before storage
- Removing and dismantling the booster

**NOTE**

**THE MANUFACTURER CANNOT BE HELD LIABLE FOR DAMAGES AND INURIES DUE TO RE-USING OF BOOSTER PARTS OR DUE TO DEVIATIONS FROM THE ORIGINAL CONFIGURATION. THE MANUFACTURER MAKES NO STATEMENT (NEITHER IMPLICIT NOR EXPLICIT) REGARDING THE SUITABILITY OF DISMANTELED PARTS FOR CERTAIN PURPOSES.**

**Steps for Deactivation**

Proceed as follows to deactivate the booster:

- Make sure, the air supply is deactivated.
- Release the pressure from the pneumatic system.
- Make sure, the gas supply is deactivated.
- Release the pressure from the high-pressure part of the pneumatic system.
- Disconnect the lines from the booster.
- Cover all line openings and the inlets/outlets on the booster, to avoid contamination (e. g. by grease, metal particles, dirt etc.).
- Combine all cables and secure these on the booster, so they do not create a problem during relocation.
- Protect uncovered parts, if the booster is not scrapped.
- Relocate the booster according to **Section 3 - Handling**.

**Deactivation by Relocation**

This procedure is valid for removal, decommissioning, storage and scrapping.

**Handling**

For relocation and transport of the booster, observe the instructions in section **HANDLING**.