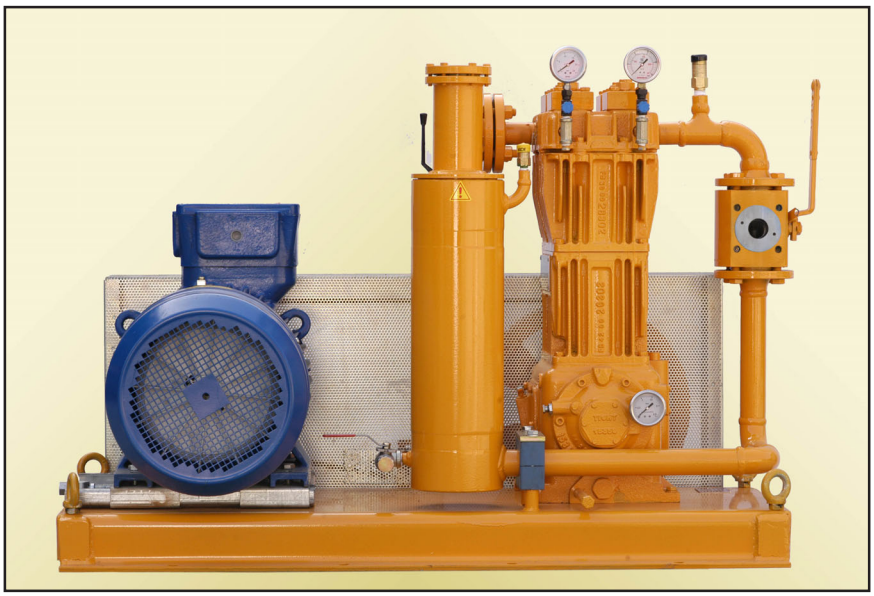
TIGHT

USE AND MAINTENANCE MANUAL COMPLYING WITH CE STANDARDS

ELECTRO COMPRESSOR TIGHT



Version 2.0
2004

INTRODUCTION

EDITION: 2004

VERSION: 02.04

The Manufacturer shall not be held responsible for the consequences arising from misuse of the system.

All data and information included in this instruction manual may be modified or updated without futher notice or obligation.

PUBLISHER'S NOTE

This document was expressly conceived for technicians; therefore, some information that could be easily understood by reading the texts and by studying the drawings may not be further specified.
The Publisher shall in no way be held responsible for the information and the data included in this instruction manual: information herewith was provided, checked and approved during general inspection by the Manufacturer/Mandatee. The Publisher shall not be held responsible for the consequences arising from possible misuse.

ELECTROCOMPRESSOR

Model : TIGHT .....

Compressor : .....

Power : .....

For fluid type:.....

Assembly serial number : .....

TIGHT

tight@polaris.it

OIL-FREE GAS COMPRESSOR
COMPRESSORE A SECCO PER GAS

Model / Modello

Serial number / Matricola n°

Tecnogas s.r.l. PARMA - ITALY

The **TIGHT** compressors are produced by:

Tecnogas s.r.l.
43036 Fidenza (Parma)
Via Chiusa Ferranda, 15/A
ITALY

HOW TO USE AND KEEP THE INSTRUCTIONS:

- **The instructions must follow the compressor and remain at the user's disposal**
- **The instructions must be kept on site, suitably protected by the atmospheric agents.**

Introduction

General remarks

The Machine ensures a good production quality provided that all work instructions, recommendations and servicing described in this instruction manual are observed.
To obtain the best results, the MANUFACTURER recommends keeping the system always in its best working and cleaning conditions. These operations shall be carried out regularly, making sure that the personnel in charge of the system is well trained and compliant with all working procedures and safety rules indicated in this instruction manual.
The instruction manual section concerning “Servicing” includes the forms of the “System Maintenance Book”. The MANUFACTURER strongly recommends that the user keeps this book carefully updated with all the servicing executed. This will allow the user to have a perfectly updated history of the system and will allow our Technical Support Department to offer a better technical service so that the system preserves the best working conditions.

Instruction manual structure

This instruction manual has a structure allowing the user to find the information needed for system use and maintenance in a very simple and immediate way.
This instruction manual includes a set of symbols to allow the user a quick identification of the most important aspects.

To simplify the search for a specific topic, the general index and the analytic index were included at the beginning and at the end of the instruction manual respectively.
The user shall read the instruction manual carefully in its entirety and make sure that all information is perfectly understood.

Furthermore, the instruction manual shall be used as a reference document at any time it is necessary to remind a procedure or an operation, thus it will be useful to keep one copy of the instruction manual available to the personnel so that they can check it at any time.

Instruction manual update

According to the regulations in force, if any relevant change was made to the system by the users, the latter can ask for the update of the instruction manual at their charge. In this case, they will have to send the “System Maintenance Book” form to the manufacturer by indicating all the changes that have been introduced, as well as all the necessary documents so that the instruction manual can be properly updated.

Graphic symbols used in the instruction manual

This symbol is used to warn the user of the existence of important instructions concerning the ELECTRIC SYSTEM.

This symbol is used to warn the user of the existence of important instructions concerning the OPERATOR'S SAFETY.

This symbol is used to warn the user of the existence of important GENERAL INFORMATION.

This symbol is used to warn the user of the existence of important instructions concerning the LUBRICATION.

This symbol is used to warn the user of the existence of important instructions concerning the maintenance of MECHANICAL PARTS.

This symbol is used to warn the user that when CLEANING water shall not be used.

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1

General information

General warning for operator's safety

We suggest that you carefully read all the instructions contained in this manual for an in-depth knowledge of the different machine operation modes. Only by carefully reading this manual you will be able to take advantage of the different performances and operation modes of the system.
First of all, you have to consider that the safety devices installed on the system by the manufacturer represent a protection against the accidents that may arise during the normal use of the machine.
The purchaser of the machine, as well as the personnel involved in its use, maintenance and servicing, as well as in any other work that has to be done on the system, can avoid accidents by properly using the machine.
Therefore, the purchaser has to make sure that all personnel involved in these operations is aware of the general, safety standards for a better use and maintenance of the machine. The purchaser shall also make sure that these standards are observed at any time.

GENERAL SAFETY RULES

• This system works at 380/400 V 50 Hz (according to the CENELEC HD 472S1-04/11/1988 Regulation on the "Standardization of electric circuits within European countries").
• It is strictly forbidden to cut out the electric and mechanical safety devices; or to dismantle the protections created by the manufacturer to ensure safety working conditions, guaranteed by the manufacturer.
• Make sure that all safety prescriptions are known by all the personnel involved in the system use, cleaning and maintenance. Moreover, make sure that all safety rules are observed.
• Do not allow unqualified personnel to use or access the electric panel or any other electric equipment.
• Do not carry out maintenance or cleaning operations without cutting out the general power switch in the electric panel.
Use any safety device to lock the general switch to avoid that somebody can cut it in by mistake.
• The owner shall be liable for keeping all the plates showing the danger signs and the systema data in perfect visibility and readability conditions. All damaged plates may be ordered at the Spare Part Department at any time.

SAFETY RULES DURING INSTALLATION

• The system installation may be executed by internal technicians or by MANUFACTURER'S technicians in cooperation with the buyer's personnel. In any case and by means of precaution, before starting the installation we recommend that all system parts and equipment are checked while they are still packed to make sure that there are no damages caused in transit.
• If the packaging is damaged, immediately inform both the freight forwarder and the machine's manufacturer.
• If the machine is stored for a certain time, waiting to be installed, follow the relevant instructions contained within this manual's section.

1

SAFETY RULES DURING OPERATION

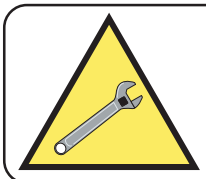
• Never use the system equipment for other uses differing from those expressly conceived.
• The operator has to make sure that no other people are working on the system while this is ON and that the system is never left without supervision while working.
• Make sure that the personnel using the system was previously trained and that they are aware of all the instructions, as well as physically and mentally suitable to work.
• Never let untrained personnel use the machine, as well as people under the influence of alcohol and drugs.
• Make sure that all the personnel involved in the installation knows and observes the SAFETY RULES.
• Never turn on the machine without activating the protections. Do not disable safety devices.
• Before starting the machine, make sure that all objects, tools or obstacles that may disturb the production operations are removed. The operator should remove jewelry, rings or necklaces, etc. that could get caught in the machine during normal working.
• Never touch, nor approach any body part to the machines while working.

SAFETY RULES DURING CLEANING

• Do not carry out cleaning while the system is working.
• Before cleaning make sure that the system general switch on the electric panel and the electric power plug are disconnected. Never wash the electric components with water or other liquids.
• Always wear specific protections, such as clothing, gloves, helmet, glasses resistant to highly-corrosive cleaning products, etc.

SAFETY RULES DURING MAINTENANCE

• No unauthorized personnel should adjust or service the machine, or replace parts; make sure that the personnel using the system observes all the manual section concerning maintenance and safety rules.
• The operator should remove jewelry, rings or necklaces, etc. that could get caught in the machine during servicing. The operator shall wear work clothing complying with EN standards.
• Do not carry out maintenance operations while the machine is working. All maintenance operations shall be executed with disconnected pressure and electric power. To avoid starting the machine unintentionally, lock the general electric switch.
• The maintenance of electric parts shall be executed by specialized personnel only.
• Always use original TIGHT spare parts to replace broken parts or worn equipment. The use of non original spare parts can cause irreversible damages to the system and to the personnel in charge of operation and maintenance. The manual includes a complete list of original spare parts and an order form that shall be used to place orders.



WARNING! All control, adjustment and maintenance operations shall be carried out by qualified personnel only

For further information please contact TIGHT Technical Department at Tecnogas.

Suggested qualification level

• First-level line operator

Unqualified personnel performing simple tasks only, such as controlling the machine by the push-button panel and the production operation with installed protection and enabled safety devices (not qualified to use the machines while jogging with disabled protections).

The first-level line operator shall not keep the keys of the switch disabling protections (if existing).

• Second-level line operator

Unqualified personnel performing the same tasks as the first-level operator, but with a certain experience. Previously trained to carry out operations with disabled protections in case the system stops after product jamming.

The second-level operator keeps the keys to enable the line AUTOMATIC operation mode with open protections and disabled safety devices.
In this case the person in charge of the building shall make sure that all second-level operators carry out, in AUTOMATIC operation mode and with disabled protections, only the set actions, except servicing or difficult operations for which specific qualifications are required.

• Mechanic maintenance technicians

Qualified technicians able to control the line in normal conditions, to make it work in AUTOMATIC mode with disabled protections, to act on the mechanic members for adjustment, maintenance and repair.
Usually they are not qualified to work on live electric systems.

• Electric maintenance technicians

Qualified technicians able to control the line in normal conditions, to make it work in AUTOMATIC mode with disabled protections. They are in charge of all electric operations for adjustment, maintenance and repair. They are able to work on live boxes and connector blocks

• **Manufacturer's technicians**
Qualified technicians working for the manufacturer, available for difficult operations or for operations agreed with the user. The **manufacturer's** technicians carefully analyzed the operations concerning every single step of the line production cycle and matched the right number and type of people to use.

If the indicated personnel was not used or a different number of people was called, **TIGHT** shall not be liable for accidents or damages caused to the machine or the system.

How to read and use this instruction and maintenance manual

The system was implemented in compliance with the EC standards concerning the free circulation of industrial products within the EEC countries. (See "Machine directive 98/37").
Therefore, the system is provided with the necessary documentation.
The instruction and maintenance manual is an integral part of it and includes all the information needed for a proper use of the system, with particular attention to operator safety.

MANUAL IMPORTANCE
This manual shall be kept for the entire life of the system and transferred to any other user or purchaser.
All the instructions contained in this manual shall be used by to the operator and the qualified technician to carry out the installation, starting, use and maintenance of the system in a correct and safe way.

HOW TO KEEP THE MANUAL
We recommend that you use the manual with care so that its content is not damaged.
Do not take away, tear or rewrite any part of the instruction manual, for any reason.
Keep the manual away from heat and humidity.
The instruction manual shall be kept near the machine for quick consultation.
This place shall be easily identified and known to all operators working on the machine.
After consultation, the manual shall be put back in its original location.

MANUAL CONSULTATION
The manual is essentially divided into:
- introduction and general safety pages
- analytic index by topic
- system description and instruction
- spare parts
- annexes

Reference to standards

The machine was designed and built to avoid risks due to moving members in compliance with the following standards:
a) all protections and protection devices against risks due to moving members involved in working comply with Directive 98/ 37/CEE, in terms of:
A. transmission moving members
B. moving members involved in working
b) all protections and protection devices are fixed and well secured. They can be fixed only by

means of tools.
c) All protections and protection devices
- are made of strong materials.
- do not cause any additional risk
- cannot be easily avoided or eliminated
- are located at a sufficient distance from the dangerous area
- do not limit the observation of the work cycle
- allow fundamental operations for installation and/or replacement of tools, as well as for maintenance actions, by limiting however the access to the sector undergoing the work, without disassembling the protection or the protection device.
d) All protection devices are included in the control system so that:
- moving members may not be started until the operator can reach them
- the protection device adjustment needs a voluntary action
- the malfunction of one of their elements prevents starting or stops the moving members.
e) Risks due to installation or re-installation mistakes of certain parts are minimized thanks to their proper designing or to the indications specified on parts and/or casings. Further recommendations are included in the operator's manual.

Reference to standards on noise exposure risks

Work in the palletization area, where the noise level inside the building is rarely lower than 90 dB (A), shall be controlled by considering the significat risk factor of auditory and extra-auditory type, in compliance with all the state and local standards. It is thus necessary that the department manager:
- provides the personnel with the specific protections;
- informs the personnel about the safety standards and the risks taken when not using the necessary precautions.
- carries out periodical checks on the personnel auditory capabilities or on the side effects that the line noise can cause.
Moreover, we suggest that the operators who can carry out their tasks in isolated places are moved away from the maximum noise-level area, as well as those whose hearing is partially weakened.

RESULTS:
a) Maximum noise detected at 1 mt. from the system area: 80 dB(A) Leq.
b) Noise in the operator's position: 78 dB(A) Leq.

PRECAUTIONS TO AUDITORY RISKS:
The chapter including the safety devices also describes the devices to deal with auditory risks (see paragraph "SAFETY DEVICES").

Map of plates, designation and CE marking

The map of plates includes all the safety plates and designation of the machine. It is better to remember that plates must be kept in good condition and easily readable.

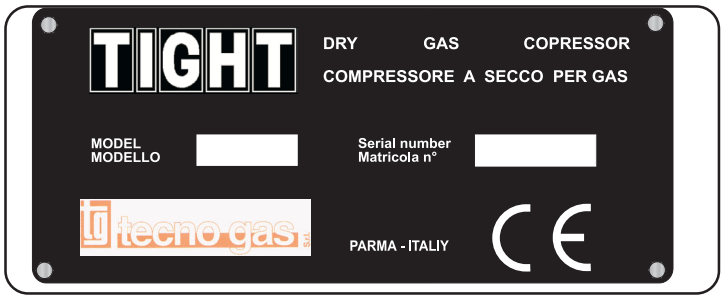
IDENTIFICATION PLATES

CE MARKING plates
The plate indicating the CE marking is placed in a visible part of the machine and bears its serial number, model and year of manufacture.

1

Every time you need information from the manufacturer or you want to order spare parts, please refer to the said figures.

The machine safety and designation plates belong to the safety system and shall not be, for any reason, removed from the machine itself.



EXAMPLES OF PLATES APPLIED ON THE SYSTEM:

Test notes

All the machines of the MANUFACTURER are carefully checked before delivery by specialized personnel, with working tests simulating normal working conditions.

The test working allows to verify:

- that the machine features correspond with those of the project.
- its good working in general.
- the calibration of safety devices.
- the calibration of adjustment and control systems.
- the sealing efficiency.

However, when starting, after installing the machine, it would be better to test the real working conditions of the machine, with one of our technicians who is going to verify the proper execution of connections and installation, providing explanations and instructions to use and maintenance personnel, referring to what is contained in this Use and Maintenance manual.

If the customer does not see as useful the presence of our technician when setting at work and testing the machine, the MANUFACTURER declines any responsibility for any damage to person or property resulting from non compliance with the instructions included in this manual.

Demolition and disposal

To comply with the relevant standards (see section “Declaration of conformity” in this chapter), in case of demolition and disposal of the machine, it is necessary to follow different procedures according to the material to be disposed. Please find below the materials used in the construction of the different machine parts, in order to follow the proper disposal procedure by complying with the standards in force.

1 – The machine contains lubrication oils: drain them in order to dispose them separately.
2 – Electric components: proceed to dismantle the electric system (devices, cables, protection sheaths, pipes, electromotives, etc.) for separate disposal.
3 – Plastic components: proceed to separate disposal of all plastic parts.
4 – The machine was built with the following materials, in different quantities:
- Steel FE 360
- Iron

5 – Other construction materials in lower quantities:
- Bronze
- Copper
- Cast iron
- Stainless Steel
- Aluminium

All these materials shall be eliminated according to the standards in force within the country of disposal. For places and methods, please refer to the relevant authorities.

Declaration of conformity

1 The machine shall be accompanied not only by the present technical documentation, but also by the “EC Declaration of Conformity”, the copy of which is enclosed in this page.

DECLARATION OF CONFORMITY
TO THE MACHINE DIRECTIVE (98/37/CE)

OUR REF.: .....

DECLARATION OF CONFORMITY

YOUR REF.: ..... DTD : ..... / ..... / .....

WE THE UNDERSIGNED **TECNOGAS** S.R.L.
Via Chiusa Ferranda 15/A
43036 Fidenza (Parma) Italy

DECLARE ON OUR OWN RESPONSIBILITY THAT THE COMPRESSOR:

- MODEL .....
- TYPE .....
- SERIAL NO. .....
- SOLD IN .....
- OVERHAULED ON .....-.....

as described in the attached documents is in conformity with the **98/37/CE** Machine Directive

Fidenza, ...

.....
The Legal Representative
Sig.Vettori Carlo

TIGHT
43036 Fidenza (Parma) Italy, Via Chiusa Ferranda 15/A
Tel.:0039-0524 532111 Fax.:0039-0524 532197 tight@polaris.it

Drawing no.: DIC-002

DECLARATION OF CONFORMITY TO THE MACHINE DIRECTIVE

N.B. – We keep the ownership of this drawing according to the law and forbid the possibility to copy it or to make it known to third parties or competitors without our approval

	Date	Signatures
Checked on	14/01/04	
Seen on	14/01/04	

Warranty

Warranty terms and conditions are established as follows, if not otherwise specified in the order confirmation:

Subject-matter of the warranty
The MANUFACTURER guarantees the good quality and construction of their machines and undertakes, during the warranty period, to repair or replace at no charge the broken or worn out parts provided that this is due to the bad quality of used materials, to working or installation defects.

The warranty is deemed to be void when parts are broken or worn out because of:
- **Non** compliance with the instructions included in the Use and Maintenance manual.
- **Non** performed or incorrect maintenance.
- **Non** performed or incorrect cleaning of all the system members that need to be cleaned on a regularly basis.
- **N**egligence of the user concerning level control, filter cleaning, auxiliary services, compress air inlet, electric power.
- **U**se of tools being not suitable for routine and extraordinary maintenance.
- **C**hanges or alterations made by the user or by a third party, without approval by the MANUFACTURER.
- **U**se of non original spare parts.

Warranty life
The warranty life is 24 MONTHS starting from the date when the machinery is taken on charge, and in any case it does not last more than 18 months from delivery. The term is one and may not be postponed after replacements or repairing during this period of time.

Application mode
To establish the causes and apply the warranty, it is necessary that the parts to be replaced under the warranty are sent to the MANUFACTURER.
Repairing or replacing under the warranty will be carried out by the MANUFACTURER'S workshops, by a third party or on site. As far as on-site operations are concerned, energy sources, extraordinary equipment, auxiliary personnel as well as travelling expenses, board and lodging of the MANUFACTURER'S personnel are at customer charge.

Material return
Before sending to the MANUFACTURER the parts to be replaced or repaired under warranty, it is necessary to proceed to relevant communications and to ask for the approval of the MANUFACTURER'S Customer care service. All parts shall be properly packed to avoid damages due to transport and provided with the following information:
- machine type
- Machine serial number
- year of construction
- Part reference number
- Thorough description of the defect and of how it occurred.

The parts that will be accepted under the warranty will be delivered FOB; replaced parts will be the property of the MANUFACTURER and they will be returned FOB.

Electric material
The MANUFACTURER undertakes, during the warranty life, to repair or replace at no charge the broken or worn out parts provided that this is due to the bad quality of used materials, to working or installation defects.
The warranty is deemed to be void when parts are broken or worn out because of:

Exclusions and limitations
• All parts subject to normal wear and tear such as gaskets, seals, belts, etc. as well as parts whose life may not be previously established such as lamps, fuses, etc. are excluded from the warranty.
• Electric power lines of the building are excluded from the warranty.
• For all components and accessories bought by external suppliers, the MANUFACTURER passes on to the supplier the same warranty given by the suppliers to the MANUFACTURER

1

Chapter 2

Instructions for transportation and installation

General conditions
Transportation, handling and storage
Instructions for installation

Connections and adjustments

System connections
Access to internal parts
Adjustments

2

Instructions for transportation and installation

General conditions

Before installation, the system and its equipment shall be stored indoor, in a clean and not explosion-risk environment .

Before installing the system, make sure that the path and the installation areas are free from any obstacle and that nobody stands in the range of action of the means of transport.

Environmental conditions

The whole system shall be installed in a place complying with the environmental conditions agreed with the manufacturer (see page 45).
If the environmental conditions of installation are very different from those agreed upon, it is necessary to contact the manufacturer to establish new requirements.

Lighting

The lighting system of the building is of paramount importance for people's safety and work quality.
It is required indeed a lighting system ensuring the perfect visibility of the symbols and of the specific signals (from 300 to 500 lux).

WARNING! All the transportation and handling activities indicated in this chapter shall be carried out by highly specialized personnel. The people in charge have to know the weight of the different components, how to use a crane and lift trucks, the accident-prevention rules and have to verify that the components of the hoisting equipment (cables, hooks, bands, etc.) are suitable for lifting the required load.

2

Transportation, handling and storage

WARNING! Before starting the handling operations, make sure that the path and the installation areas are free from any obstacle.

Reception and control

After the machine has left **Tecnogas S.r.l.** premises any potential damage may be attributed to the carrier, being it either a forwarding agent or the buyer's carrier.

If the machine is delivered with serious damages, please contact **Tecnogas S.r.l.** as soon as possible.

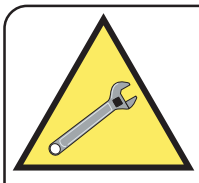
Upon delivery, you need to check:

- that the packing list effectively corresponds to the delivered package.
- the integrity of the package in all its parts (identify any damage due to the carrier).
- the whole system carefully.

Unloading and handling

The machine could be sent to the customer in a wooden case, wrapped in a plastic film or in cartons.

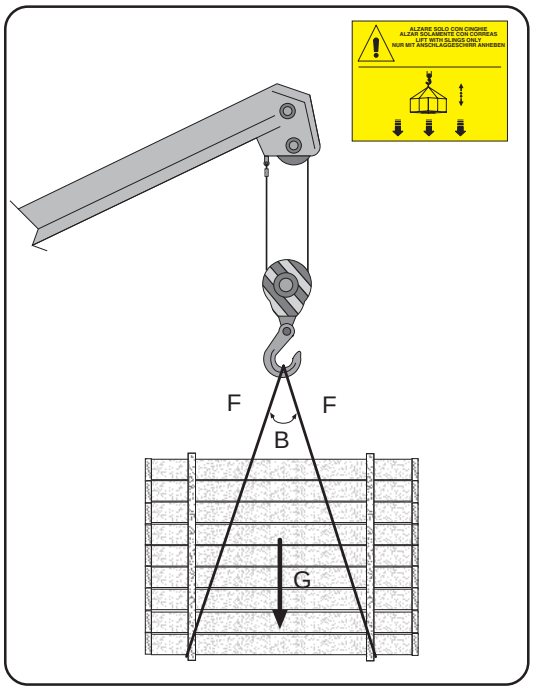
The machine shall be unloaded from the means of transport by using appropriate lift trucks, cranes or bridge cranes.



During handling and positioning the specialized operator onboard of the machine in charge of unloading must be helped by another operator who stands on the ground since the overall dimensions of the machine may not ensure the onboard operator a perfect visibility.

If the machine is delivered in a wooden case:

The picture in this page shows how the lifting cables shall be placed in case some parts of the system are delivered in wooden cases.
Use cranes or bridge cranes:
Pass the lifting cables under the case structure to lift it in a balanced way (see figure in this page).
It is very important to consider that the center of gravity (G) of the load corresponds to its exact center (see figure in this page).
To ensure a safe and balanced transportation, all cables or lifting bands shall be long enough, or in any case, not forming an angle with the vertical higher than 45° (B), to avoid transversal stress (see figure in this page). In these conditions, every cable or band is stressed by a static traction force (F) equal to the total weight of the system divided by the number of cables or bands used.

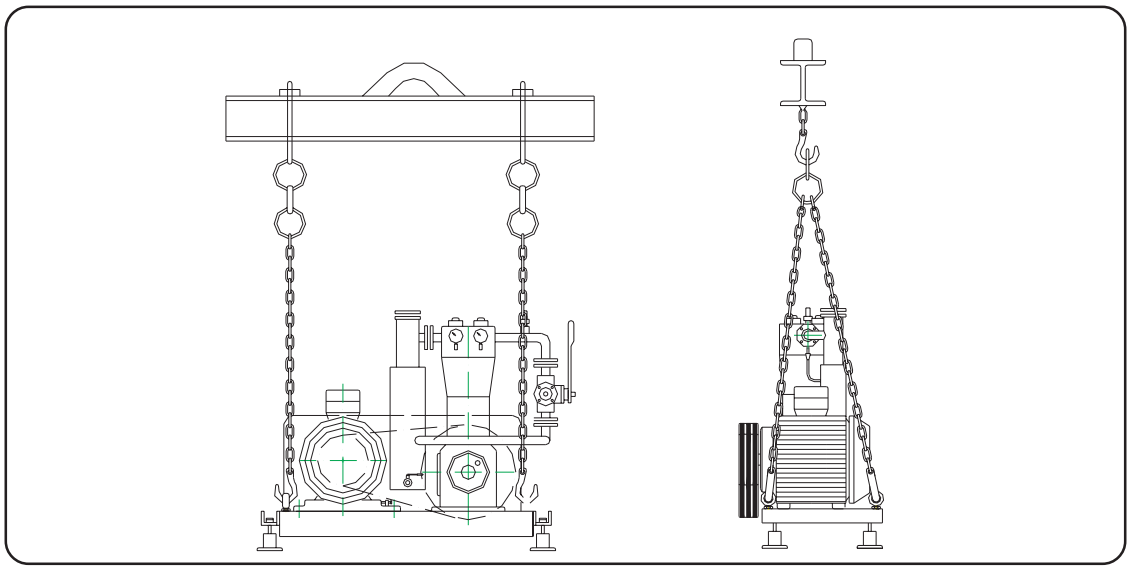


If the machine is delivered wrapped in a plastic film:

The cables or bands used to lift the different machine parts shall be placed in a way preventing any risk of unbalancing the part itself (see figure in these pages)

The machine and the supports used for shipment are provided with eyebolts in order to simplify the anchoring of hoisting equipment.

WARNING: Before positioning the machine check the weigths of the relevant assemblies on this manual.



2

In case of handling by lift truck, it is necessary to put the truck forks under the pallet to which the machine is secured. Place the duly spaced forks (according to the width of the section to be handled) whose length has to be suitable to support the entire chassis base (see examples on this page).
Slowly lift it with the assembly center of gravity (G) placed at the center of lifting forks.

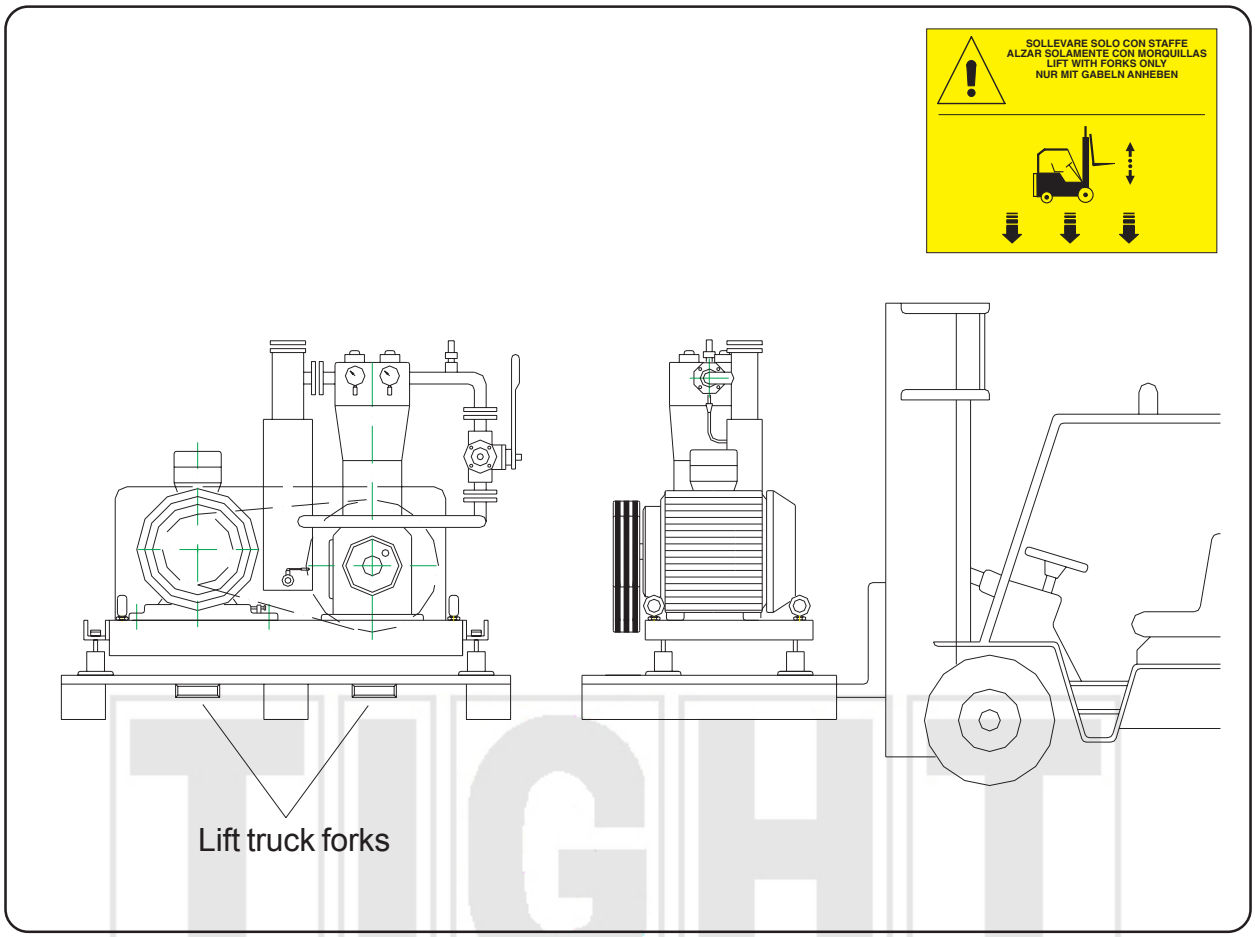


Table of machine assemblies weights

	Complete assembly	Compressor bare axle
TIGHT 32	360kg	176kg
TIGHT 48	380kg	176kg
TIGHT 60	410kg	176kg
TIGHT 32 DT	420kg	236kg
TIGHT 48 DT	440kg	236kg
TIGHT 60 DT	470kg	236kg
TIGHT 80	640kg	250kg
TIGHT 100	650kg	250kg
TIGHT 108	650kg	250kg

Storage

Prior to installation, the system and its equipment stored be kept in a closed and clean place, protected from rain and humidity.
The user shall take these precautions to protect the system from serious deterioration or electric damages.
In case it will be encessary to store the system outdoor for a short period protect it with a waterproof cover to prevent dust, humidity, rain, etc. from damaging it. The system shall not be left outdoor for long periods even if it is well protected.
The electric parts sensitive to humidity and low temperatures shall be protected with special care.

If storage does not comply with these instructions, the system may be affected by early deterioration.

If the system storage time prior to installation exceeds three months, it is compulsory to keep the system in a closed, clean place protected from weathering, dust or humidity.

The storage temperature must range between 0°C and 50 °C.
Avoid stress due to vibrations.

Tecnogas S.r.l. declines any responsibility for the damages caused to the machine and its components arising from a storage not complying with what described in these pages.

2 Instructions for installation

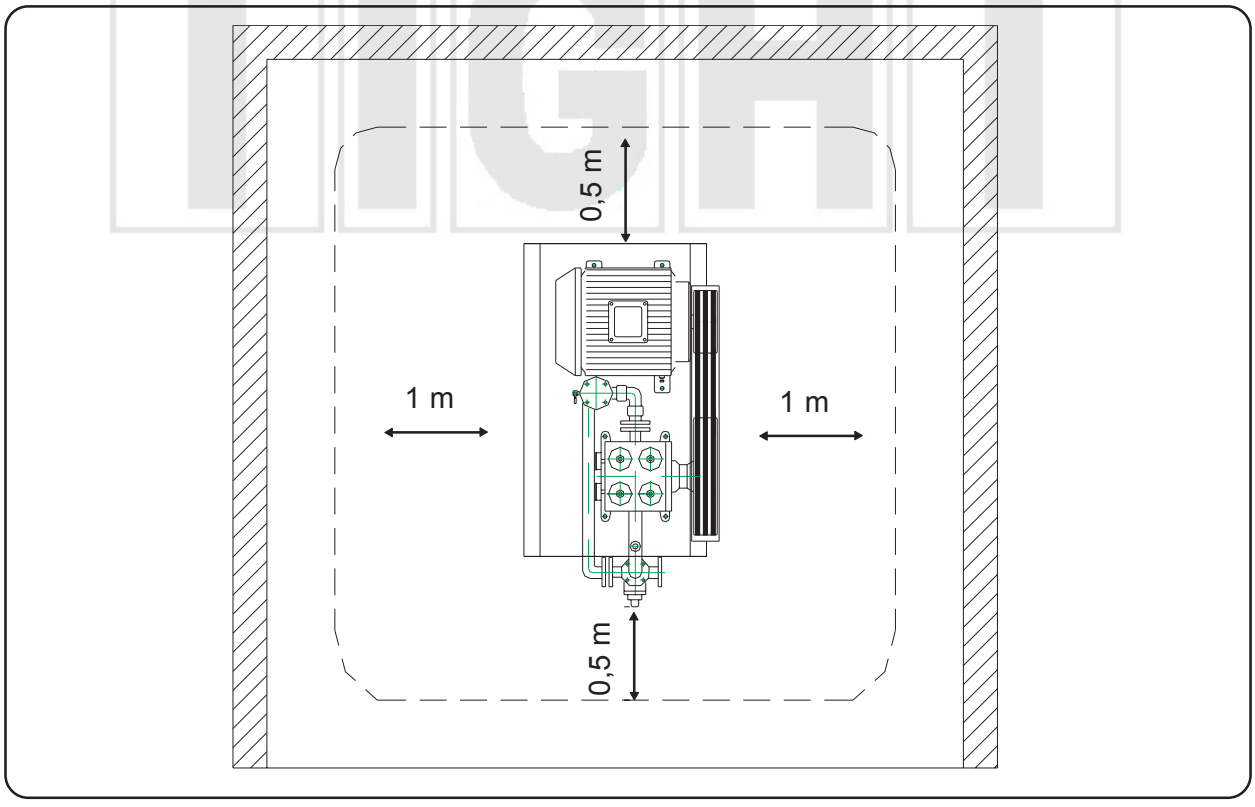
Positioning

The right positioning of the compressor allows its ideal operation and its accessibility for cleaning and routine maintenance (and extraordinary). It is necessary to respect a surrounding area, according to the size of the machine, to simplify the activities of the personnel in charge of installation.

Moreover, the machine shall be protected from weathering in a well leveled position (ideally under a roof).

We also recommend installing it inside a reinforced concrete building of at least 3x3m (wall thickness of at least 20 cm) with a side completely open (see figure in this page). The building roofing shall be made of fireproof and explosion-proof material and shall be slightly tilted and project from the open side of at least 50 cm.

The floor on which the compressor is placed (inside the building) has to be suitable for supporting its weigth (see the specific section on machine weights, in this chapter). The building floor shall have a slight slope (1-2%) towards the outside and be 20 cm higher than the adjoining floor.When position for the TIGHT compressor inside the building, comply with the minimum distances necessary for its cooling (see figure in this page).

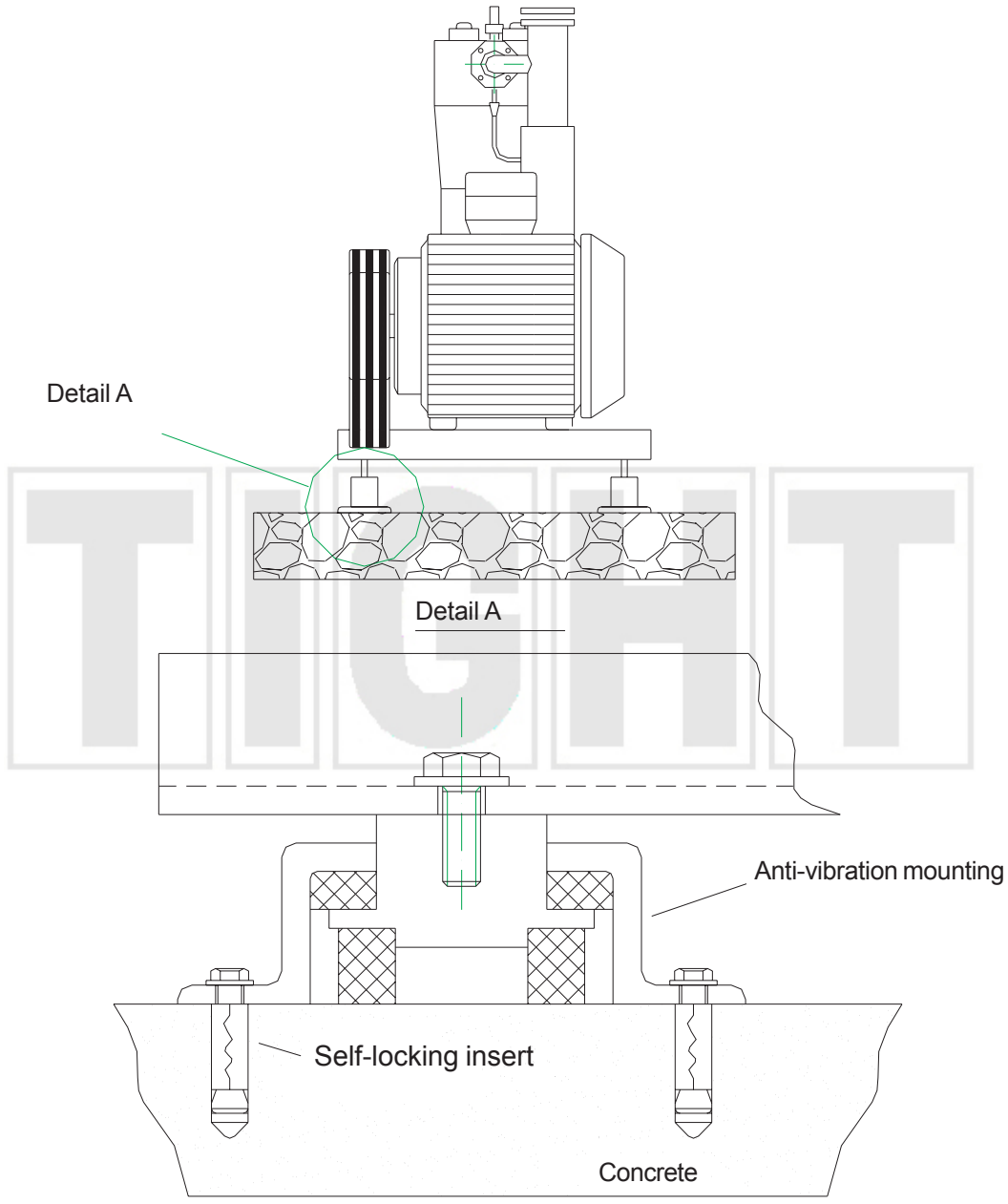


Floor anchorage

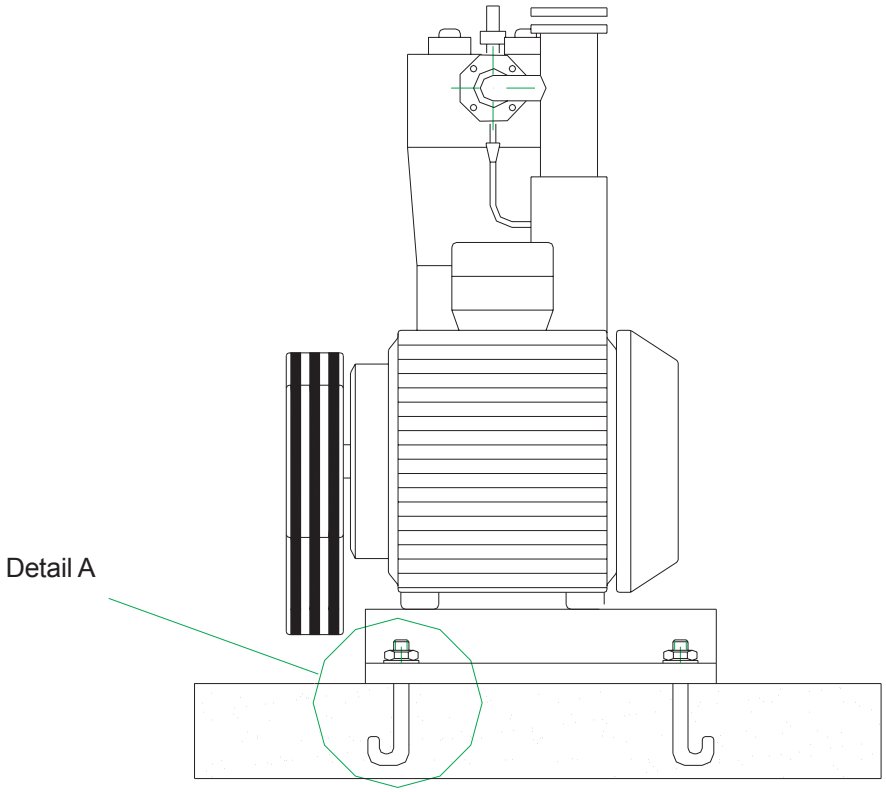
The anchorage of the compressor to the floor can be implemented in two ways:
a) Floor anchorage
b) Anchorage with anti-vibration mountings.

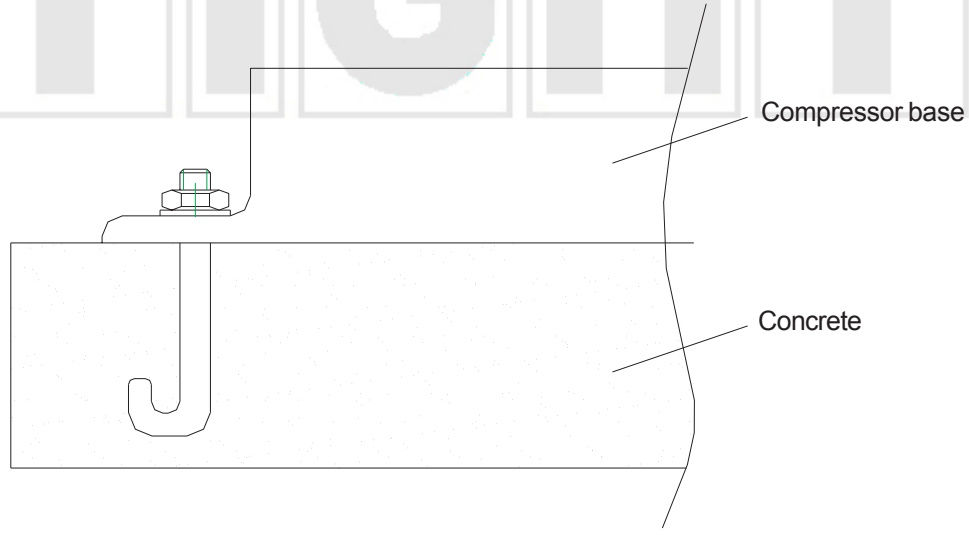
See the pictures below:

a)



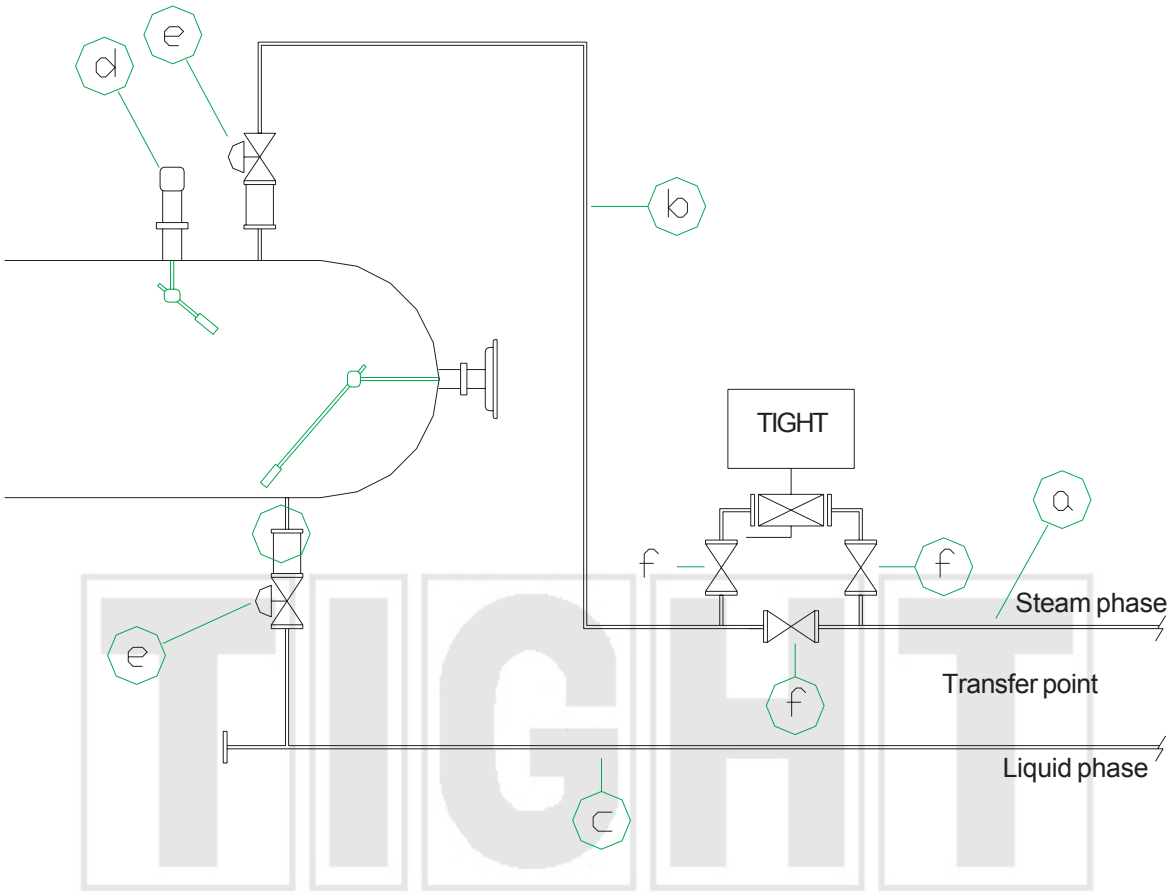
b)





Example of installation scheme on a two-phase gas storage and transfer system

Please find below an example of an installation of TIGHT compressor on a storage and transfer system for two-phase gas .



DESCRIPTION:
a – Gaseous phase piping from the transfer point
b – Gaseous phase piping from the tank
c – Liquid phase piping between tank and transfer
d – Tank maximum filling limiting device
e – On-off valve with pneumatic control
f – Manual valves

2 Connections and adjustments

Compressor connections

Electric connections

The user is responsible for the dimensioning of the power line and the grounding wire of the machine, as well as for the choice of the relevant protections against short-circuits and contact voltage.
As for the system electric features and the connection diagrams, refer to the electric specifications and to the wiring diagrams included in the booklet of the enclosed wiring diagrams.
The system was conceived and built to prevent, by “Grounding”, any risk arising from the formation of dangerous electrostatic charges.
The operator is in charge of the electric connection of the compressor that will be controlled from within a complete system.
Therefore, the machine grounding has to be prepared.
This machine is powered by electric energy and is designed, built and equipped to prevent any risk deriving from electric energy.

The system was built according to the following indications:

- directive 73/23/CEE “LOW VOLTAGE DIRECTIVE”;
- directive 89/336/CEE “ELECTROMAGNETIC COMPATIBILITY”;
- Standard CENELEC EN 60204 - 1 version OCTOBER 1992 and its assimilationin Italy:
- C.E.I. standards 44 – September 5th 1993.
- Atex standards

FOR GROUNDING PROCEED AS FOLLOWS:

Firmly connect the machine basement to the grouding ring of the system by means of an appropriate wire (see diagrams that are attached in this manual, chap 8).

WARNING!!
This operation shall be executed by specialized personnel only, after turning the power off.

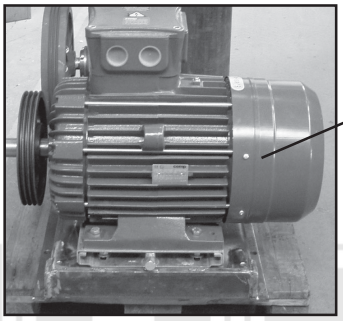
Motor rotation direction

Carry out all control operations in compliance with the safety rules.

WARNING!!
Before starting the motor, make sure that only the personnel in charge of installation stands near the system, in any case without being in contact with it.

Check motor rotation direction

If the rotation direction is not correct, invert two of the three phases.
After checking the motor rotation direction, disconnect the electric power by turning the general switch to “0” (placed on the panel controlling the whole system) before carrying out the remaining connections.



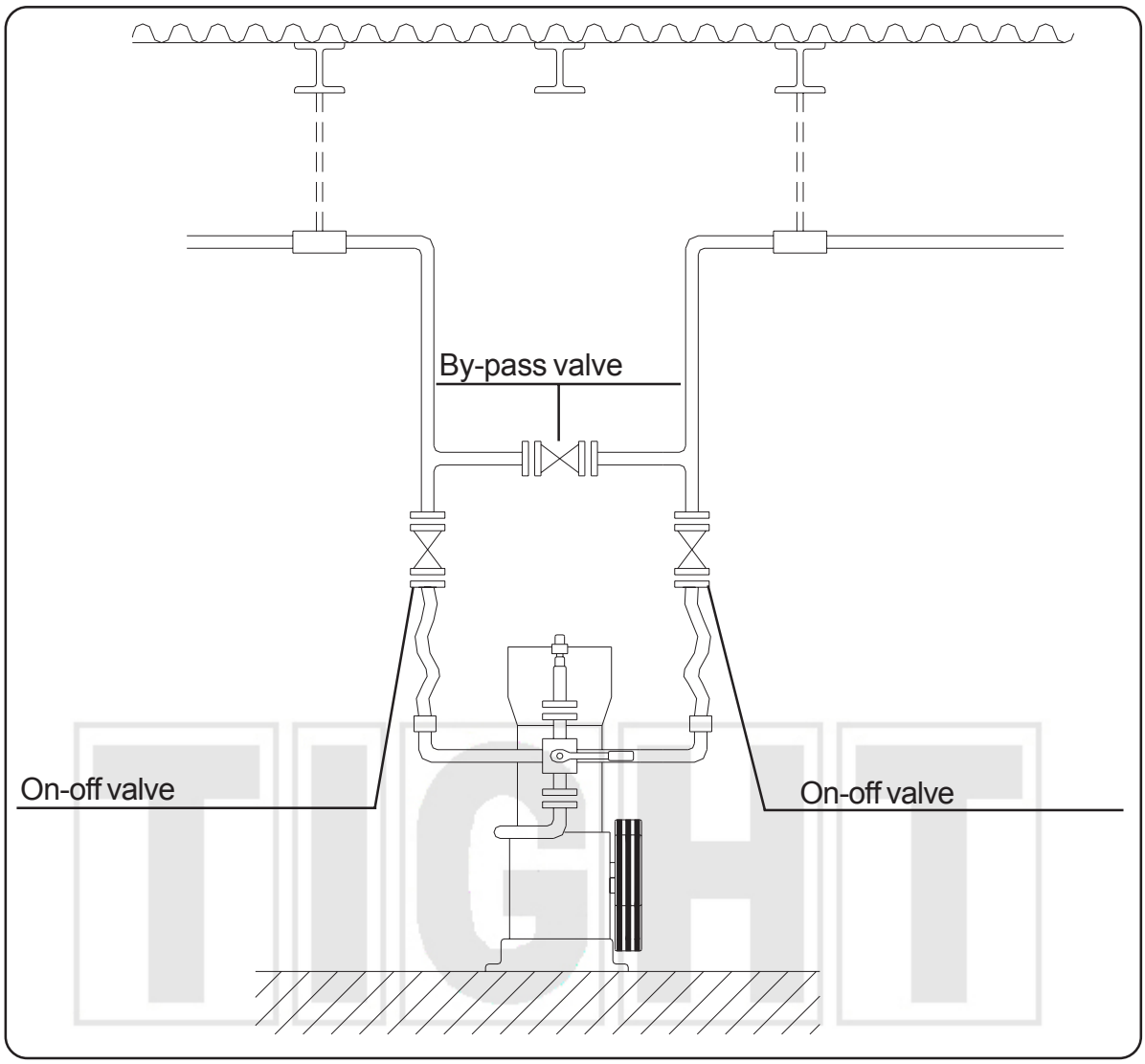
A sticker representing an arrow showing the correct rotation direction is applied on the motor

WARNING!
If the direction of rotation is not correct and the machine keeps on working, the pressure inside the lubrication system drops thus causing serious damages to the machine.

2 Compressor connections

Connection of the compressor to the system

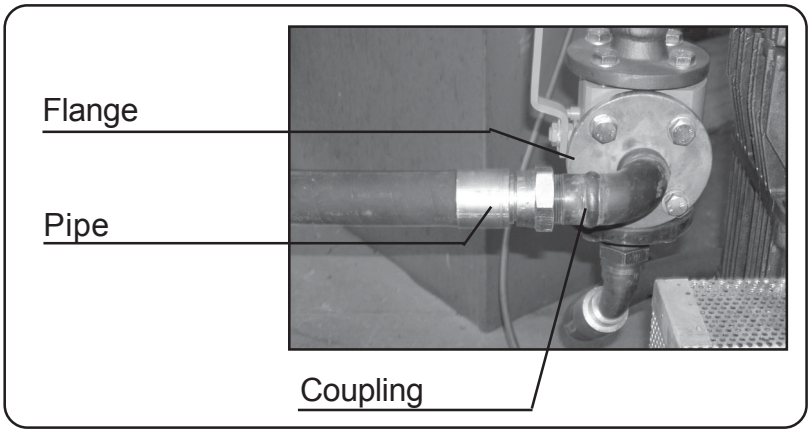
The compressor is connected to the system by the 4-way valve.
The connection diagram is indicated in the picture on this page:



A long section of the last part of the piping connected to the 4-way valve shall be made of a flexible material in order to reduce the machine vibrations inside the system, see drawing.

The compressor by-pass is mainly necessary at the beginning of the working cycle to allow the machine to carry out some warming-up cycles excluding other parts of the system.

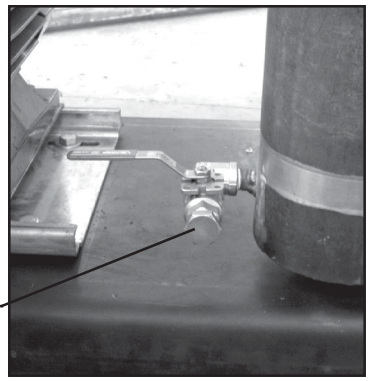
The 4-way valve is equipped with a flanged connection:



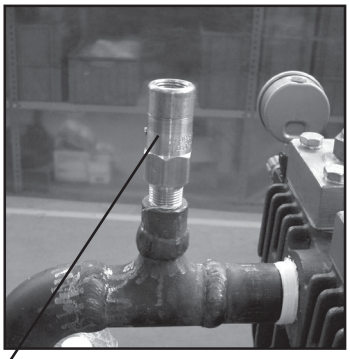
For correct sizes of piping, see table at page 35

2

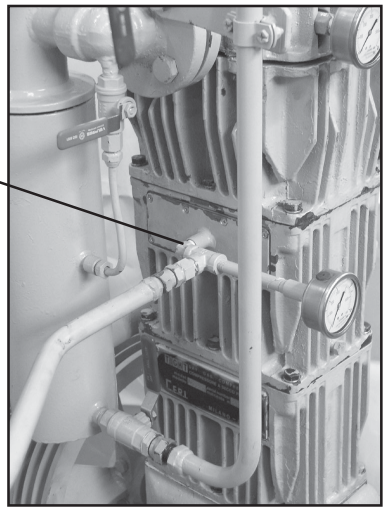
Drainage
Connect the drain valve, installed in the lower part of the barrel, to a 1/2” piping
in order to drain (or even recover) the accumulated liquid.



Safety valve
The exhaust of the safety valve is piped through a ½ ” piping, to bring its flow to a safe area, away from the compressor.



Gas recovery valve (fitted only in the version with “double seal”)
In the “DS” version the machines are already equipped with a valve that allows gas to be discharged in case of leakage.
For the gas recovery it is necessary to fit a connection to the valve. See the picture below.



Warning for piping installation and dimensioning

The customer is responsible for the installation of piping connecting the system.

To prevent vibrations transmission between the compressor and the electric cables, it is necessary to fit a section of a suitable flexible pipe with a metallic core between the out let of the piping cable and the inlet of the pipe inside the motor housing (with sealing joint).

It is necessary to install sealing joints on the inlet and outlet pipes of the explosion-proof housings to prevent dangerous mixtures from reaching areas where such dangers are not expected and to stop the fire propagation.

Pipes dimensioning depends on their length.
The total drop of fluid charge should limit the pressure difference shown by the suction and the delivery manometer (installed on the compressor) of maximum 2 or 4 bars.
If this differentiated pressure is higher, this means that pipes and their valves are underdimensioned.

As a reference, please use this table

Since the compression heat simplifies the transfer speed, the delivery line of the compressor should be thermally isolated.

If the winter temperature is very low and/or pipes longer than 10 meters, it is necessary to thermally isolate the compressor at suction to prevent the gas condensate from entering the compressor.

PIPE DIAMETER TABLE

Model	Ø 4-way valve	Ø flexible pipes	Ø system piping Gas	Liquid	
A668-A668DT A938	1” 1/2 2”	=>1” 1/2 =>2”	=>2” =>3”	=>3” =>4”	

2 Accessories (available on demand) the user shall install to comply with the specific regulations (EC countries)

The machine is supplied without some of the components necessary for installation on a system.
The customer shall install a set of components (with specific characteristics) to comply with the Machine Directive 89/37/CE.

WARNING!
Please find below a list of components with their characteristics.
Customers are asked to install these devices having such characteristics; otherwise, they will be held responsible for accidents to people or property.

COMPONENT	TECHNICAL FEATURES
Flexible joints	– Burst working pressure minimum 80bars - Length: Second diagram used - A668: Min. diameter: 1” 1/2” Inlet/outlet flange: DN 32/25 - A938: Min. diameter: 3” Inlet/outlet flange: DN 40
Minimum pressure switch: at Suction explosion-proof in compliance with CENELEC EN 50014/50018 standard	- Eexd IIC T6 construction - Max pressure: 20 bars - Adjustment range: 0,1/10 bars - Differential: 0,15/0,35 bars - Process connection: F 1/4” NPT - Electric connection: F 1/4” NPT - Suggested calibration: 0,3 bar gauge pressure
Maximum pressure switch at Delivery explosion-proof in compliance with CENELEC EN 50014/50018 standard	- Eexd IIC T6 construction - Max pressure: 100 bars - Adjustment range: 6/8 bars - Differential: 0,7max 1,4 bars - Process connection: F 1/4” NPT - Electric connection: F 1/4” NPT - Suggested calibration: 16 bar gauge pressure

WARNING!
All equipment shall be suitable to the processed fluid.

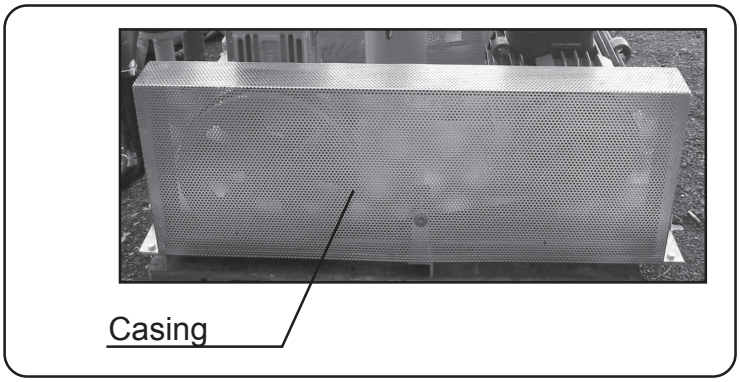
Access to internal parts

2

The machine is provided with an external wire netting casing that allows:

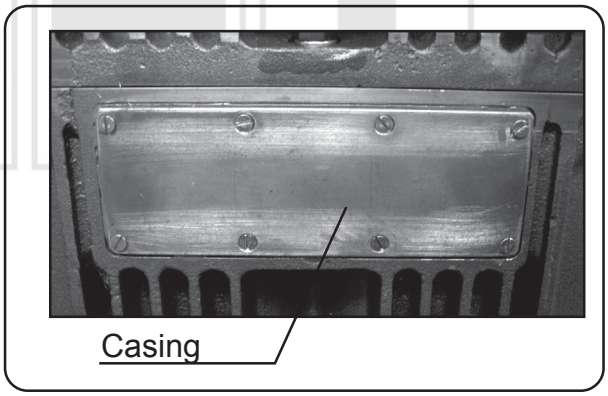
- the protection of internal parts for machine operation (belt, pulleys, etc.)
- the protection of operators from the moving and live parts, which could jeopardize the personnel safety.
– safe inspection of moving parts (machine OFF) of the machine.

Remove the casing only when the machine is not working and the main switch is padlocked.



Moreover, the machine is equipped with a metal casingarter that allows:
- the protection of internal elements for machine operation (seals)
- the protection of operators from the moving and live parts, which could jeopardize the personnel safety.
- the adjustment of the internal parts of the machine.

Remove the casing only when the machine is not working and the main switch is padlocked.



Adjustments

The machine is adjusted by the manufacturer’s technicians before its setting at work.

Chapter 3

System description

Expected use
Data and technical features
Operation description
Safety devices

3

System description

Expected use

DEFINITION OF THE USE FOR WHICH THE SYSTEM WAS CONCEIVED

This machine was conceived to transfer a given product (from one tank into another) by means of the different pressure inside the two tanks.

This machine was designed to be operated within a whole plant.

The machine cannot be used without installing the components needed for connections.

The system shall not be used for any purpose differing from the original ones. The manufacturer shall not be liable for damages caused to persons or property due to system misuse.

USE

This machine (once it is started) does not need the presence of an operator, apart from check operations.

WARNING: The operators, needed only for manual operations required in extraordinary situations, shall have to be properly trained in order to avoid situations that can be dangerous for themselves and for the system!

3

Misuse

After analyzing the “expected use” described in the previous page, please consider the possible misuses and the rules to be observed:

WARNING!
The manufacturer declines any responsibility for damages caused to persons or property arising from the non-compliance with these rules.

- The machine shall be used exclusively for the purposes agreed in the project and in the specific supply agreement. For any other use, please refer to TIGHT.
- It is forbidden to use the machine for operations not included in the project.
- It is forbidden to install on the machine components differing from those specified in this manual.
- It is forbidden to climb on the structures of the system.
- It is forbidden to tamper with safety devices.
- It is forbidden to inspect the machine while working.
- It is forbidden to sit over the machine components.
- Adjustment and maintenance operations shall be executed by one person only and during their execution the access to the machine shall be restricted to authorized people.
- It is forbidden to modify machine parts.
- It is forbidden to install further unspecified devices on the machine.
- It is forbidden to use any type of solvent (alcohol, petrol or diluents) to clean its surfaces.
- It is forbidden to let disabled people run this machine.
- It is forbidden to let minors run this machine.
- It is forbidden to use this machine when the operators are under the influence of alcohol, drugs or psychotropic drugs.

Data and technical features

PRODUCT
Fluid: L.P.G.

WORK LOCATIONS AND ENVIRONMENTAL CONDITIONS
The machine shall be used inside a work location of appropriate size, which does not expose it to bad weather conditions (see paragraph “Installation” and “Positioning” in this manual).

Use temperatures: from a minimum of -10°C to a maximum of +60°C

For technical data please check the following table:

Compressor Model	TIGHT 32 A668 A668 DT	TIGHT 48 A668 A668 DT	TIGHT 60 A668 A668 DT	TIGHT 80 A938	TIGHT 100 A938	TIGHT 108 A938
Stroke bore (mm)	108x73	108x73	108x73	120x83	120x83	120x83
Power (kW)	5,5	7,5	11	18,5	22	22
RPM	400	580	730	710	890	975
Movement Vol. (m^3/h)	32	48	60	80	100	110
Pul. compr. øp (mm)	408	408	408	413	413	413
Pul. motor øp (mm)	112	160	200	200	250	280
Belts	B71	B75	B78	3/Spz 2500	3/Spz 2500	3/Spz 2500

Operation description

Transfer principle of technical gases in the presence of liquids

During transfer, which is based on the principle of communicating vessels, the gaseous phase is sucked out from one tank (receiving tank) and is compressed into a second tank (giving tank).
The pressure difference created between the giving tank (higher pressure) and the receiving tank (lower pressure) makes the product flow through the piping of the liquid phase.
The compressor, acting on the gaseous phase during compression, increases the pressure inside the giving tank, thus creating a liquid phase flow from giving tank to receiving tank.
During compression, the gas is heated up thus increasing the vapor pressure of the fluid, the pressure difference and the product flow.

Principle of residual gas recovery

After transferring the liquid, the residual gas recovery is started, following the opposite procedure compared to that described.
It is carried out by keeping the line for the liquid passage closed and by sucking out the gas inside the tank that one wants to degas.
The recovered gas (from giving tank) should be sent to the other tank (receiving) by putting it inside the piping of the liquid phase so that the differential pressure remains low.

WARNING!
The single-stage TIGHT compressor shall work with an "**effective compression ratio"** between the delivery pressure and the suction pressure (in absolute bars) of maximum 4 bars, with further limitation so that the discharge pressure does not exceed the calibration pressure of the safety valve.

The following page shows some examples:

Operation examples:

Example 1

Suction pressure	3 bars (r)
Delivery pressure	8 bars (r)
(8+1)/(3+1)= 2,25	Proper operation

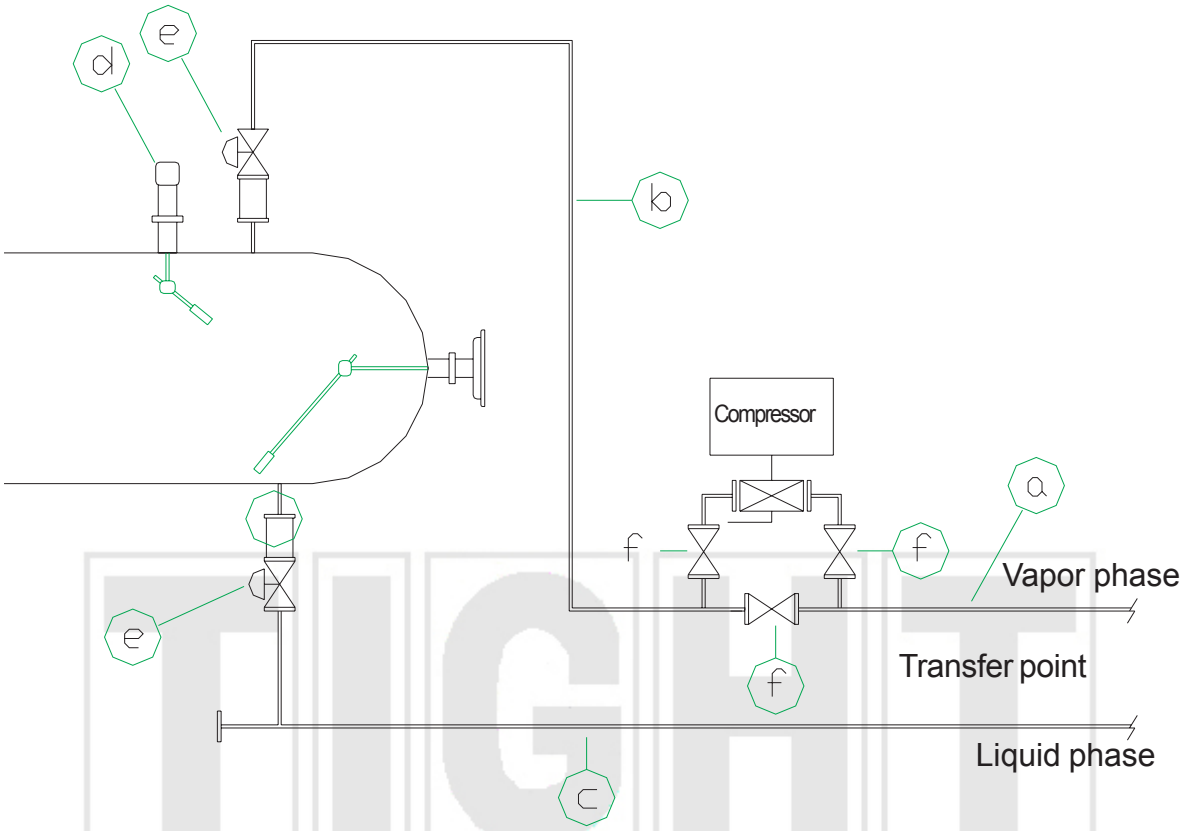
Example 2

Suction pressure	0 bar (r) = atmospheric
Delivery pressure	4 bars (r)
(4+1)/(0+1)= 5	Wrong operation

We recommend that you DO NOT use the single-stage TIGHT compressor for the total gas recovery from the tank truck: to do so, it will be COMPULSORY to use a double-stage TIGHT compressor.

It's anyway forbidden to exceed the pressure as specified on the "CE declaration of conformity" in this manual N° DIC - 001.

OPERATION DIAGRAM



a – Gaseous phase piping from the transfer point
b – Gaseous phase piping from the tank
c – Liquid phase piping between tank and transfer
d – Maximum filling limiting device
e – On-off valve with pneumatic control
f – Manual valves

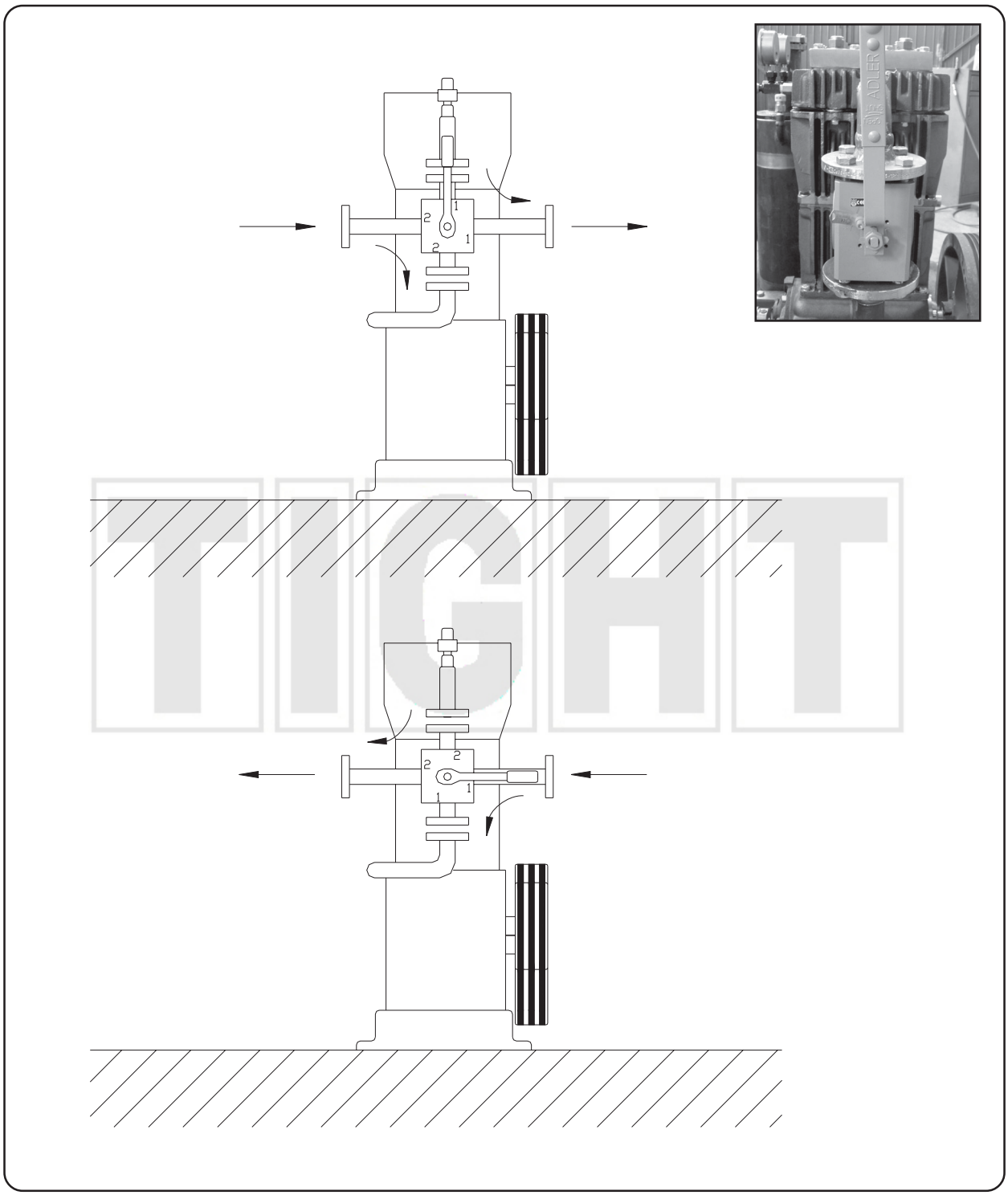
Description of used components

3

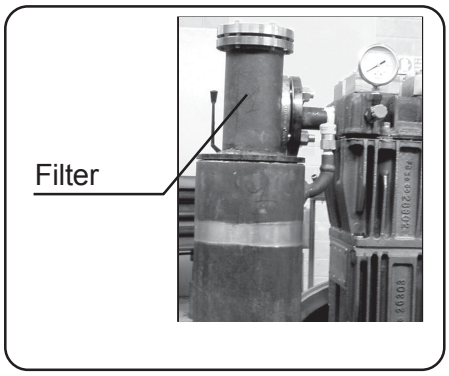
4-way valve

The steel flanged 4-way valve allows to easily invert the gas flow by rotating the control lever.
The following figure shows the flow direction according to the 4-way valve positioning

Filter

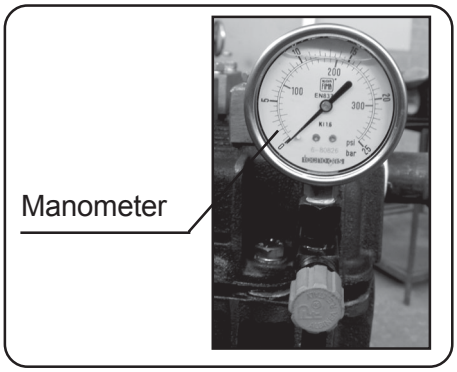


A filter with stainless steel mesh was installed on thesuction side of the outlet compressor.
The filter's aim is to prevent impurities contained inside the piping or the new systems from entering into the machine. For the cleaning procedure refer to the "Cleaning" section of this manual.



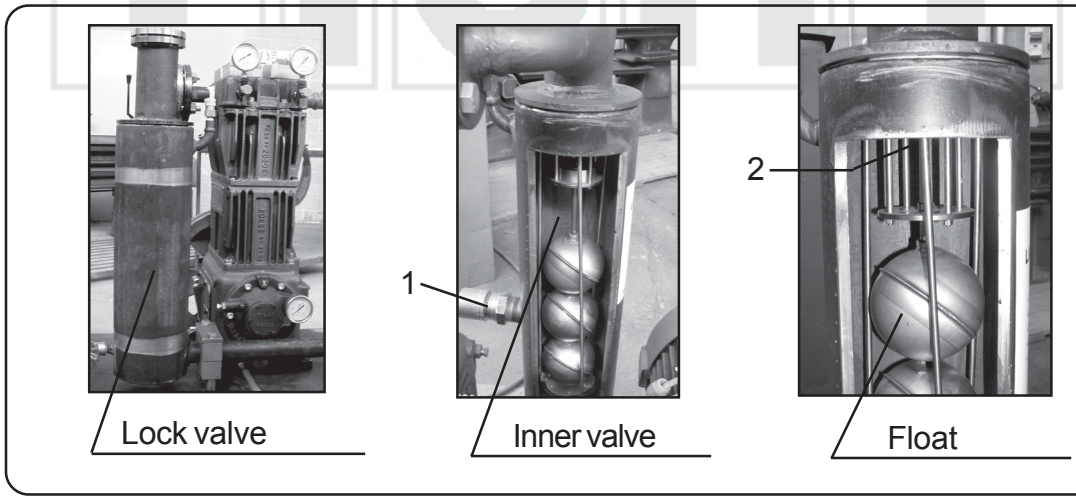
Delivery and suction manometer

The compressor is provided with two manometers showing the delivery and suction pressure of the machine. The two manometers are provided with two manual valves to isolate the respective manometer for replacement.



Liquid lock valve

The "TIGHT" liquid lock valve on the suction side (patent no. 693434) prevents the liquid from reaching the compressor and damaging it (for two-phase liquids only).
The gas enters the barrel from the specific piping (1) and then comes out from the higher part (2); if some liquid entered the pipe together with the gas, the float would rise and obstruct, with a buffer, the outlet pipe.



3

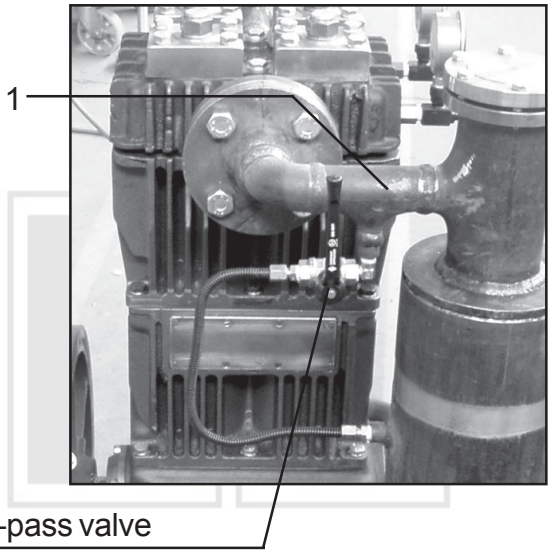
By-pass valve

When the liquid gets into the liquid lock valve, the buffer, linked to the float, stops the suction. Through suction the compressor creates a vacuum inside the piping (1) thus blocking the buffer to the closing position.

After draining the liquid from the lock valve, you can open the by-pass valve in order to remove the depression inside the pipeline (1), thus allowing the float to go back to its normal position.

After closing the by-pass valve the machine can be restarted.

It is extremely important that during normal operation of the machine, this valve remains closed.



Safety devices

The machine was equipped with safety devices that preserve the operator from dangerous situations.

The safety devices of the system are divided into two types:
- Protection devices that, being part of the machine itself, are supplied by the supplier.
- Devices, precautions or protections that must be supplied directly by the customer.

Protection devices integrated with the machine

The installed safety devices protect both the operator and the machine (thus avoiding dangerous situations).
A careful planning as well as the choice of proper components (both entail big safety margins) according to the operation speed reached by the system and by the operations executed may prevent sudden breakdowns.
A set of plates affixed on to the machine warns the operators about dangerous maneuvers, which could endanger their safety, other people's safety and the machine itself.

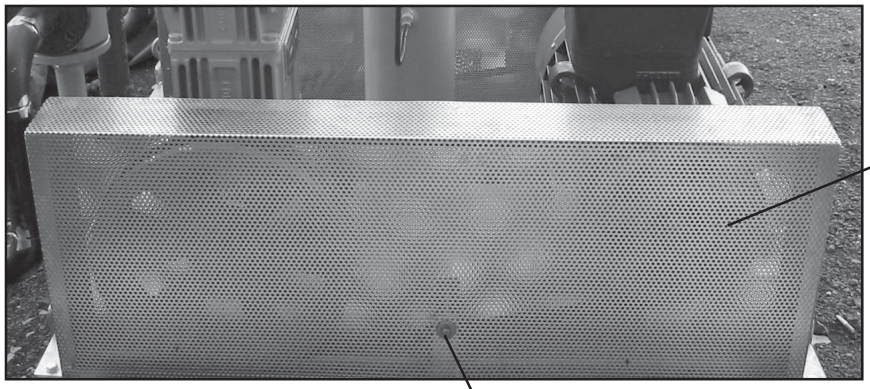
The installed devices are:

1 – Wirenetting casings for the moving members of the machine.
2 - Liquid lock valve
3 – Maximum delivery valve
4 – Safety valve of lock valves.
5 – Specific protections on the electric motor.
6 – Bedplate breather.
7 – Minimum oil pressure switch (optional)
8 – Double seal in cases
9 – Temperature probe in electrical winding (optional)

3

Protection wirenetting casings

The machine protection wirenetting casings completely cover the moving members thus ensuring big safety margins.
Wirenetting casings are provided with clamping screws that can be removed every time it is necessary to adjust, clean and service the inner parts.

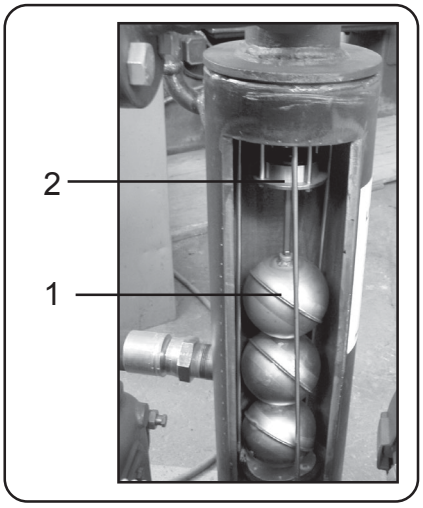


WARNING:
When the machine is working without protections, the operators near the system could accidentally get in touch with the moving members.

WARNING:
It is forbidden to disassemble the casings when the machine is working. The manufacturer declines any responsibility for accidents caused while the machine was working without casings!

Liquid lock valve

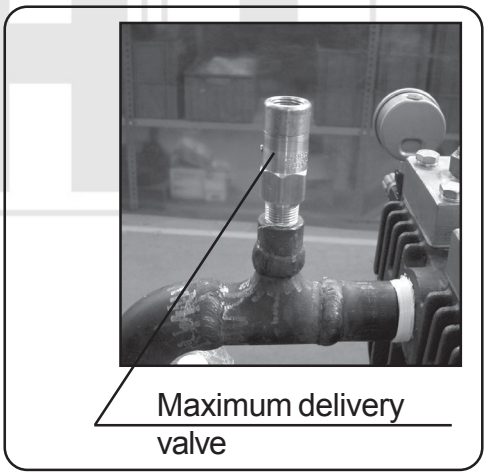
The “TIGHT” liquid lock valve on the suction side (patent no. 693434) prevents the liquid from reaching the compressor and damaging it (for two-phase liquids only). The gas entering the barrel from the specific piping comes out from the higher part of the piping itself; if some liquid entered the pipe together with the gas, the liquid, having a higher specific weight, would sediment on the bottom thus rising the float (1) linked to a buffer (2), which would prevent the liquid fromenter ing inside the compressor. (see page 49)



Delivery safety valve

Pipelines downstream the compressor may happen to be clogged. In this case, the continuous compression by the compressor would cause an excessive pressure.
The safety valve on the delivery side is thus used as a breather in case of an excessive pressure increase.

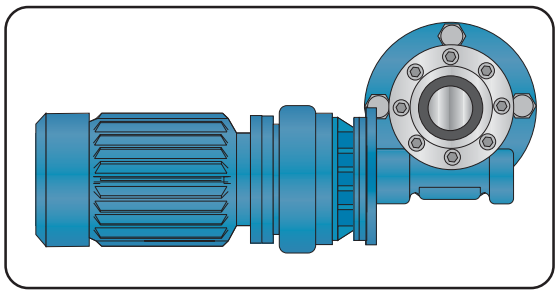
The safety valve is opened at 17,65 bars (for GPL-type products. For other products see on page 3 in this manual) and is not regulated so as to dispose of all the compressor capacity, but only short time excessive pressure values. Following an increase in the delivery pressure exceeding the limit, the machine shall be immediately stopped since a high delivery pressure can overheat the machine.



3 Specific protections on the electric motor

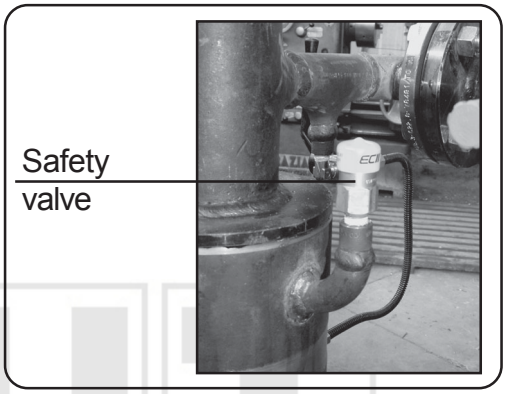
The electric motor is explosion-proof and must be protected by specific magneto thermal protections provided by the installer.

For motor features please refer to the section “Technical data” in this chapter.
For any specific case of protections intervention, refer to the “Troubleshooting” section.



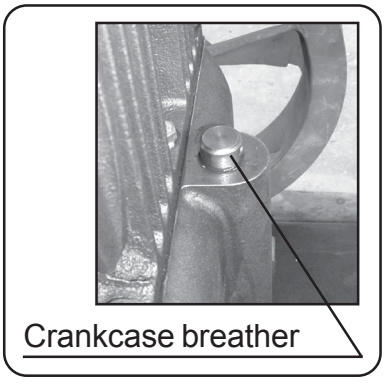
Safety valve of lock valves

The installation of a safety valve on the liquid lock valve was deemed opportune since it could be necessary in case some liquid enters the lock valve.
This valve is a pressure breather that is opened when the pressure exceeds 17,65 bars.



Bedplate breather

A possible leakage in the sealing gaskets (previously described) could cause a gas transfer inside the sump containing oil.
This breather allows the gas to come out from the protection casing.

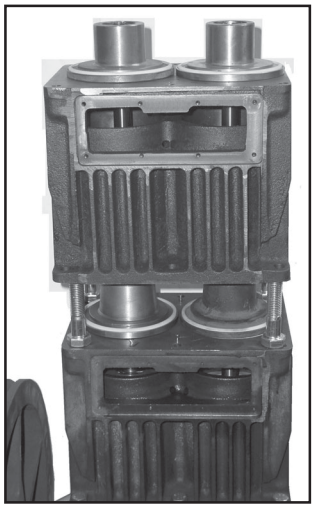


Manostat for minimum oil pressure (optional)

This device stops the machine when the oil pressure is lower than 0.6 bar.

Double seal on rods Double seal

Machines with double seal on rods (DS) should be used in case of operation with a particularly hazardous or toxic fluid.



Temperature probe in electrical winding (optional)

The temperature probe fitted in the motor electrical winding blocks the machine if the temperature increases beyond 130 Cº.

3 Devices or protections that must be supplied directly by the user.

It is extremely important that the user complies with the general accident-prevention rules and with the provisions included in the European directive 89/391/CEE concerning “Safety and hygiene in work places”.

The devices are:

1 – Signals of danger, prohibition or indications
2 – Personal protection devices
3 – Floor signaling
4 – Emergency push-button and main switch (padlockable)
5 – Safety pressure switches (only for EC nations)

Signals of danger, prohibition and indications

The person in charge with safety shall hang on all necessary signals for dangerous areas and for “no entry” or “no stopping or standing” signals in those areas particularly dangerous for the user’s safety.

Use signals:
TRIANGULAR for danger signaling
ROUND for obligation or prohibition signaling
RECTANGULAR for information signaling

EXAMPLES OF PLATES TO BE USED WITHIN OR NEARBY THE WORKING AREAS

Danger

Obligation or prohibition

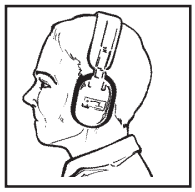
Information

3

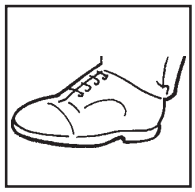
Personal protection equipment

The safety devices installed on the machine may sometimes not be enough for the complete protection of operators.
While working (adjustment, installation, maintenance, etc.) near the system, it is therefore necessary to wear personal protection equipment.

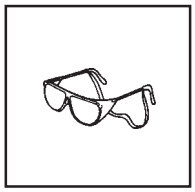
WARNING!
The machine noise DOES NOT exceed 80 dB A.
In compliance with the regulation in force (Legislative Decree D. lgs. no. 277/1991) workers are compelled to use personal protection equipment (hearing protection headset, sound filters, etc.) when the machine's noise exceeds 85 dB A.



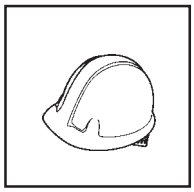
Always wear hearing protection headset against noise



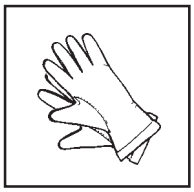
Always wear work shoes



Always wear protection glasses



Always wear protection helmet



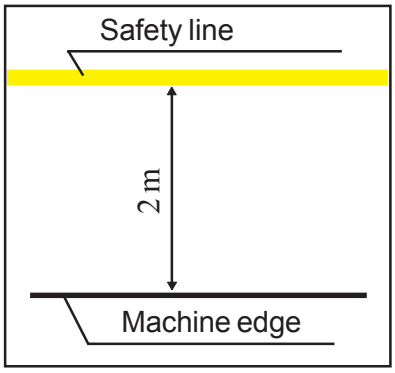
Always wear protection gloves

Floor signaling

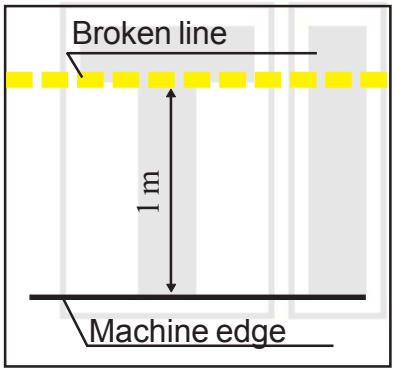
According to the regulations, the user shall draw a line on the floor having the following characteristics:

- Minimum width: 10 cm
- Color: yellow

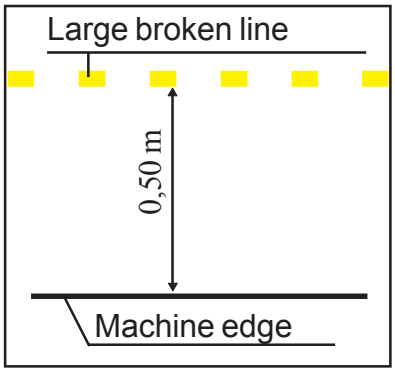
This signaling is necessary to immediately identify the areas prohibited for personnel stopping/standing and entry. The line will be interrupted by a broken line having the same length and color.



The continuous safety line will flank the area of the machine at a distance of 2 meters.
Inside the line personnel stopping and material storage are prohibited.
The area shall always be cleared.



The broken safety line shows the pedestrian crossing. This line shall have the same sizes as the continuous one and be distant from the machine edge at least 1 meter. This line shall be drawn in front of the electric panel.
The area shall always be cleared.



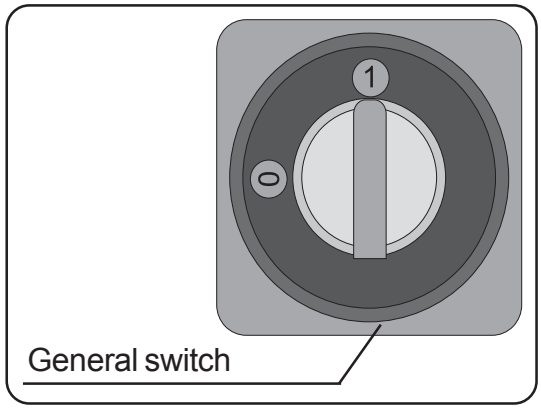
The broken line showing the lift truck crossing shall have a double length of the empty space compared to that in color and shall be distant from the working point of the machine at least 0,50 m.
The trucks maneuvering shall take place in compliance with the safety rules and in the shortest delay.
The area shall always be cleared.

3

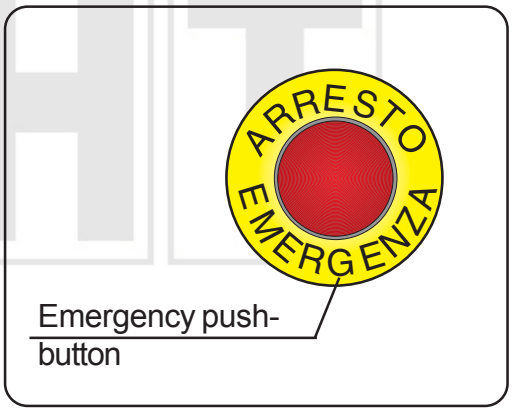
Padlockable main switch and emergency push-button

According to the regulations, the user shall foresee an electric panel containing a padlockable main switch and an emergency push-button:

The main switch shall be provided with a safety device: indeed, when the machine is started (general switch on “1”), the panel is automatically locked. The access to the internal part of the panel is allowed only when the general switch is on “0”. This switch may be used as an emergency device to interrupt the power supply if needed.



The mushroom head push-button shall be highlighted by a specific color, according to the regulation in force concerning the emergency push-buttons. Once pressed the emergency push-button, this is held in the lower position. To restore its operation, it is necessary to rotate the push-button clockwise to bring it back to its original position. Once every 300 hours verify the functionality of every single emergency push-button. These devices (general switch and emergency push-button) allow to stop the machine immediately, as soon as a dangerous situation arises both for the personnel and the machine itself (operational defect, weird noise, breakdown possibility, etc.)



Chapter 4

Description of controls and use procedures

General safety warning
Work conditions
Controls
Start and end working procedures

4

Controls description

General safety warning

• Never use the machine and its components for uses differing from those for which they have been expressly designed.
• The operator has to make sure that there are no other people nearby the machine while it is working and that the system is never left without supervision while working.
• Make sure that the personnel using the system was previously trained and is thus aware of all the instructions contained in this manula; also make sure that the personnel is physically and mentally suitable to work and that the work is properly carried out .
• Never let untrained personnel or people under the influence of alcohol and drugs use the machine.
• Make sure that all the personnel involved in the installation knows and observes the SAFETY RULES.
• Never turn on the machine without activating the protections. Do not disable safety devices.
• Before starting the machine, make sure that all objects, tools or obstacles that may disturb the production operations are removed. The operator should remove jewelry, rings or necklaces, etc. that can get stuck in the machine during ordinary functioning.
• Never touch, nor approach any body part to the machine moving members while the machine is working.
• The electric system shall not originate a voltage drop exceeding 2% and the automatic switch shall be carefully calibrated so as to intervene at the current value specified by the producer of the electric motor.

All safety rules shall be observed at any time during the operations described in this chapter and during machine use as required by the regulations in force.

4 Work conditions

This electro compressor is an automatic machine that was conceived for a quick transfer of a liquid product from one container to another (by gas compression).
The machine shall be used only for this purpose!
The machine is made of several components, which shall not be used with other systems for different purposes.

WARNING!
Using the machine for purposes differing from the original ones may cause serious damages to persons and/or property.
TIGHT declines any responsibility for damages caused by possible misuse of the machine

Controls

The electric panel, the emergency push-button and the machine-system management controls are installed by the customer.

The **electric panel** shall include the possibility of a double remote control!
The customer has to install the controls (power on button, power off button, emergency pushbutton) both near the machine and on the remote electric panel.

The **electric panel** shall be provided with pilot lights concerning the protections!

The **remote control panel** shall be provided with two pilot lights:
- START (red)
- Supply voltage (green).

4 Start and end working procedures

Please find below the instructions for a correct commissioning and powering off of the machine.

Setting at work of a new compressor

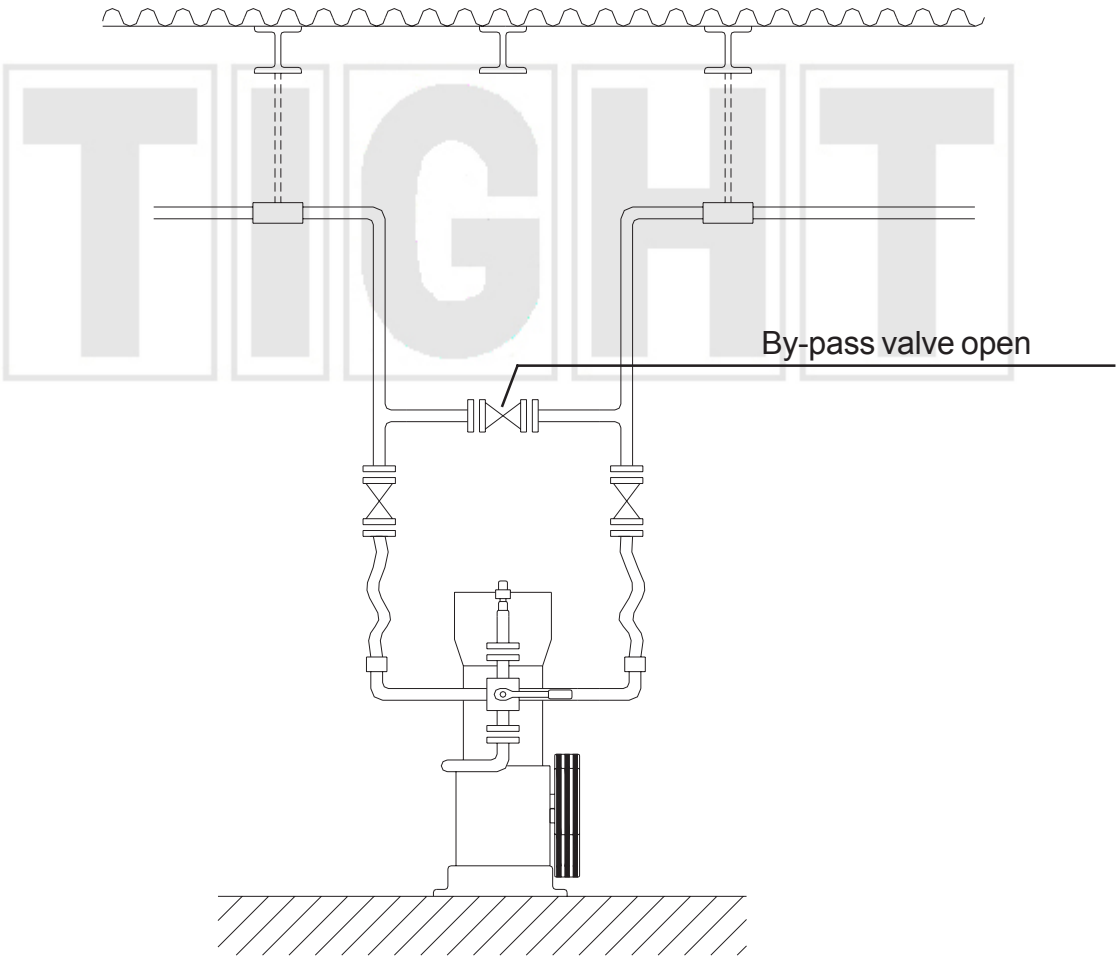
After installing a new compressor, it is necessary to follow these indications:

1- Make the compressor and the connection piping lengths (or if necessary the whole line) inert by injecting nitrogen from the suction side manometer connector and by blowing it out from the flanges connecting the system upstream and downstream the machine, after previously loosening them. Continue for at least two minutes or more according to the length of the said pipes. Tighten again and reassemble the manometer.

2- Check the perfect alignment of the compressor and motor pulleys (see sect.. “Maintenance” in this manual).

3- Check the oil level in the sump (See section “Lubrication” in chapter 5).
The manufacturer usually provides the machine with oil AGIP DICREA 68 in winter and AGIP DICREA 150 in summer.
If for any reason oil was missing, follow the filling instructions included in this manual.

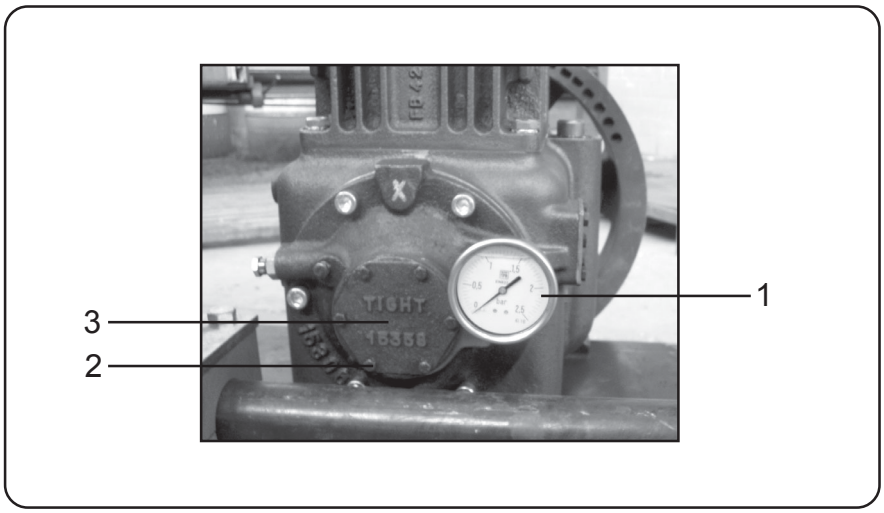
4- Open the by-pass valve in the circuit.



5- Start the compressor and check the oil pressure inside the carter. After 30 seconds the manometer (1) of the oil pressure should indicate roughly 0.8 bars. If this does not happen, proceed as follows:

- Slightly loosen the bolts (2) of the oil pump cover (3).
- Add up some oil with the specific pump.
- Tighten the cover and make the compressor run.
- Check that the oil pressure reaches the desired value.

Otherwise repeat the operation.

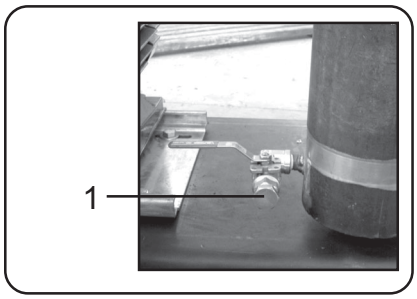


6- Check that belts are tensioned in the appropriate way (see paragraph “MAINTENANCE” in this manual).

4

Daily starting

Before starting the machine, after a short period of inactivity, even of one night, proceed as follows:



1- Make sure that, due to the cold of the night or to wrong maneuvers, there is no liquid phase on the inlet piping or in the lock valve.
If there is some liquid, drain it through the specific valve (1) placed in the lower part of the barrel (see paragraph "Routine maintenance" of this manual.

2- Check the oil level. If this is lower than the desired level, proceed as follows:
- Take some oil having the same characteristics as those of the existing one.
- Top up the oil level from the hole in the dipstick.
- Make sure you reached the maximum level (top notch on the dipstick).
- An excessive level may seriously damage the machine.

3- Start the machine unloaded (keep the by-pass valve open).

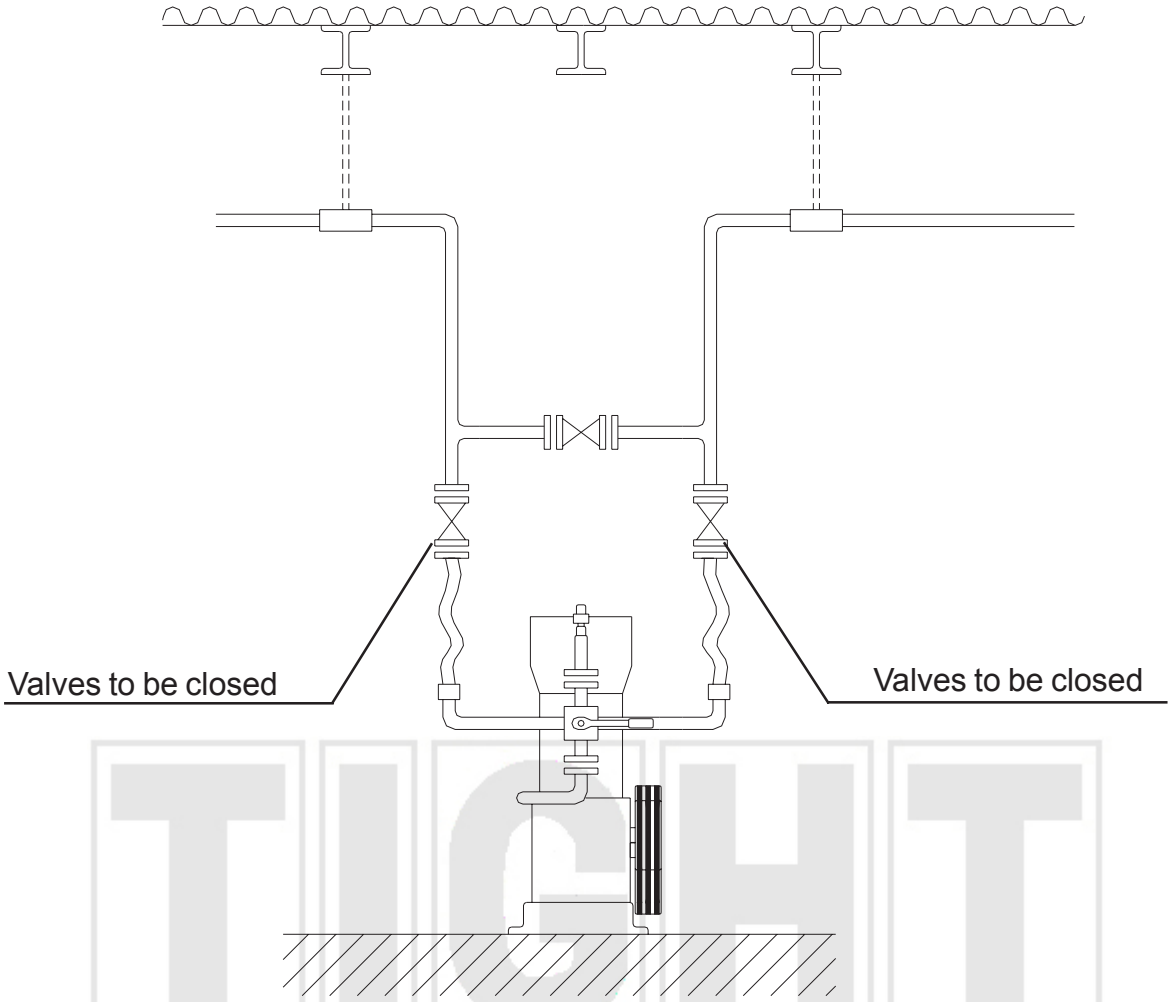
4- Check oil pressure, letting the machine on for some minutes (warm-up phase).

WARNING!
When temperatures are lower than 10 °C activate the warm-up phase every time the machine cools down.

End production maneuvers

After ending the daily work, turn off the machine for some hours and proceed as follows:

1- Close the valve (installed by the customer) upstream and downstream the compressor.



2- Push the emergency push-button (installed by the customer) on the control board of the system.

3- Check that all working operations are executed without problems.

WARNING!
After using the compressor, open the by-pass valve and let the compressor idle for some minutes in order to cool it down.
The non-observance of this rule may put the rod stuffing box out of commission.

4

Chapter 5

Maintenance

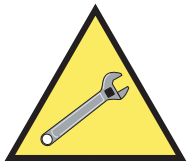
General maintenance rules
Routine maintenance
Extraordinary maintenance

5

Maintenance

General maintenance rules

All maintenance operations shall be executed by qualified personnel “1” or “2”, depending on whether the maintenance is mechanic or electric.



WARNING!
It is strictly prohibited to allow unqualified personnel to carry out any type of maintenance.

Every maintenance person shall comply with the accident-prevention rules, wearing protection devices according to the regulation in force and included in the section “Safety devices” in this manual.

WARNING!
The maintenance and lubrication operations shall be carried out while the system is not working and, if possible, far from the explosion-proof area.

When the machine is not working due to maintenance operations, it is necessary to hang on the emergency push-button a sign near every access: “CAUTION! MACHIINE UNDER MAINTENANCE”

During maintenance and repairing, all unauthorized people shall keep away from the system.

During maintenance, it is necessary to put the machine in the emergency mode by pressing one of the emergency push-buttons placed on the panels.
Close the on-off valves as well, placed both upstream and downstream the compressor.

Lack of inspection, maintenance and lubrication may cause serious damages to people and/or property.

The disposal of replaced components and of waste shall be executed in compliance with the specific provisions and local regulations.

For any overhauling, TIGHT suggests sending the compressors to Tecnogas or to authorized workshops. The installation tolerances, material controls and tests can be carried out by authorized technicians only.

To receive the list of authorized workshops, please call 0039-0524-532131

Tight declines any responsibility for any damage in case TIGHT compressors are not duly overhauled by authorized workshops.

TIGHT compressor overhauling shall be planned every 150 working hours of the machine .

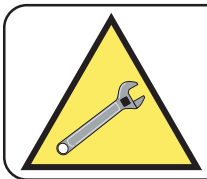
The average life of the compressor is around 10 years.
Conditions that may remarkably decrease the average life of the compressor are:
- extreme temperatures
- pressures and/or pressure ratios higher than the suggested values
- non stop operation
- decrease in piping sizing

Please remind that after 10 years the manufacturer cannot be held responsible anymore for damages arising from defective products (Directive 85/374/CEE) .

Routine maintenance

The system members need maintenance and/or periodical inspections. Considering that correct and safe operation largely depends on this, we have developed the following table to keep the machine always in perfect working conditions.

The table below shall be copied by the maintenance person who has to write down the date and the type of maintenance carried out on a certain component.



All notes shall be signed by the person in charge of the operation

Mechanic maintenance program

Member	Operation	Frequency	Inspection date	Signature
Liquid lock valve	Check that no liquid is inside the barrel	once a day		
Manometer	Check the oil pressure	once a day		
Belts	Check the belt tension. Check the bearings of return pulleys.	once a month		
Pulleys	Check the correct alignment of pulleys. Check wear of belts and pulleys.	once a month		
Oil	Check and, if necessary, replace the oil inside the tank	once a month		
Seals	Check their wear.	Once every 6 months		

Lubrication

Lubrication is also included in the “routine maintenance” operations, since it implies periodical interventions.

To preserve the system from wear, seizure and other damages to the different mechanisms, you need to periodically lubricate and grease all the points indicated in this section, carefully observing the specified timing and quantity.

A particularly humid place, subject to extreme changes in temperature, may damage the sealing (oil seals, collars, etc) of reducers; therefore we suggest checking their efficiency periodically. Moreover, make sure that there are no water infiltrations inside the motor.
For any further information refer to the manuals provided by the sub-suppliers.

This section includes a specific paragraph showing a general lubrication table, which can be used to establish the types of oil or grease to use for the different system parts.

WARNING!!
Proceed as follows for a correct lubrication, which will prevent you from spending time and money in repairing due to serious damages to the machine.

WARNING!!
It is important to remember that all maintenance operations, including lubrication, shall be executed after turning the power off. After switching OFF the main switch, padlock it.

5 General warning

- Line state:
plugged to power sources

- Main switch:
disconnected

- Emergency stop:
pushed and held

- Operator n.: 1

- Qualification:
Mechanic maintenance person (qual. 1)

Fill and lubricate the indicated parts before starting the line.

Use lubricants similar to those indicated in this manual. The elimination of drain oil shall be executed in compliance with the specific provisions and local regulations.

All lubrication operations shall be executed when the line is stopped, with power off and emergency push-button pressed.

Table of suggested lubricants

The lubrication oil can be both pure mineral and synthetic.
Oil shall NOT be of the detergent or “Heavy Duty” type.

DESCRIPTION	AGIP	CASTROL	CASTROL(2)	IP	TOTAL
Viscosity SAE 5W+SAE 15W - 10°C < temperatures < 0°C		MAGNA 32	Icematic SW -32 (2)	VERETUM -32	CORTIS-32
Viscosity SAE 20 5°C < temperatures < 30°C	DICREA -68	MAGNA 68	SW -68 (2)	VERETUM -68	CORTIS-68
Viscosity SAE 40 30°C < temperatures < 50°C	DICREA -150	MAGNA 150	SW -150 (2)	VERETUM -150	CORTIS -150
Comp. with 500RPM Max.	DICREA -150	MAGNA 150	SW -150 (2)	VERETUM -150	CORTIS -150

It is unadvisable to use the compressor at a room temperature lower than -10.

For “R134A” coolant, use ONLY “CASTROL ICEMATIC SW” oil.

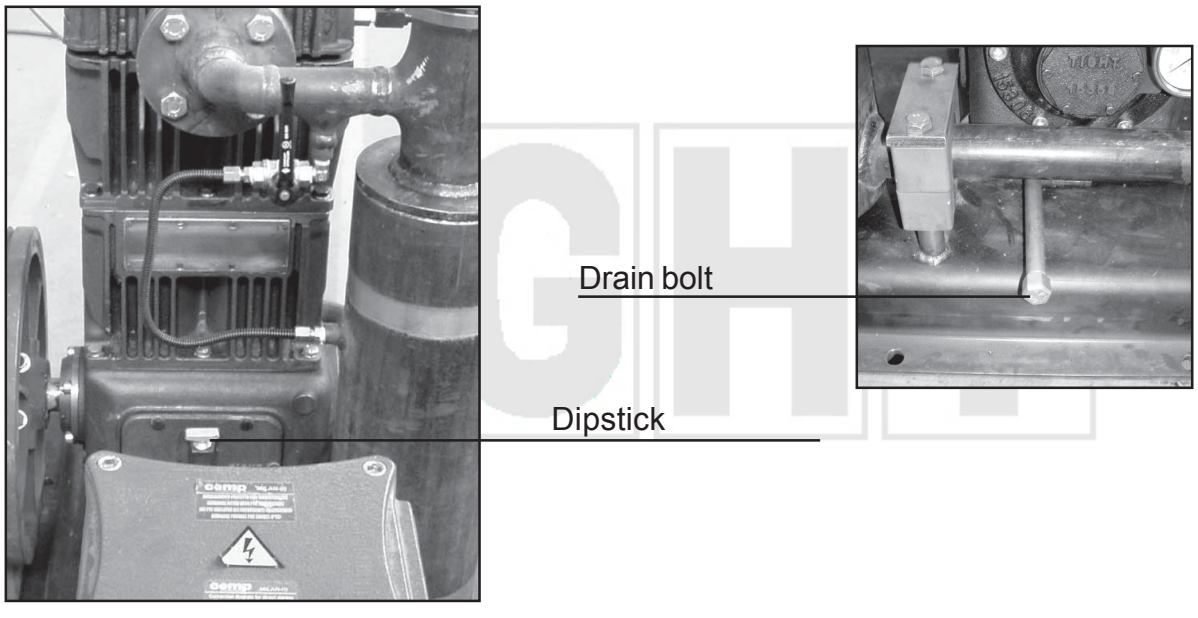
5

Oil change

The oil in the circuit shall be replaced at least 3-4 times per year.

WARNING:
Regardless its depletion, oil shall be replaced at every season change (before the winter cold and the summer heat). The oil that is not suitable to current temperatures may create lubrication problems resulting in damages to the machine.

To replace the oil, proceed as follows:
1 – Bring the machine to the right temperature.
2 – Unscrew the drain bolt allowing the depleted oil to come out.
3 – Clean the oil filter on the side.
4 – Reassemble all the disassembled parts.
5 – Take the dipstick out in order to refill the tank from that port.
6 – Start the machine and refill oil to the maximum level.
7- Check the oil pressure with the specific manometer.

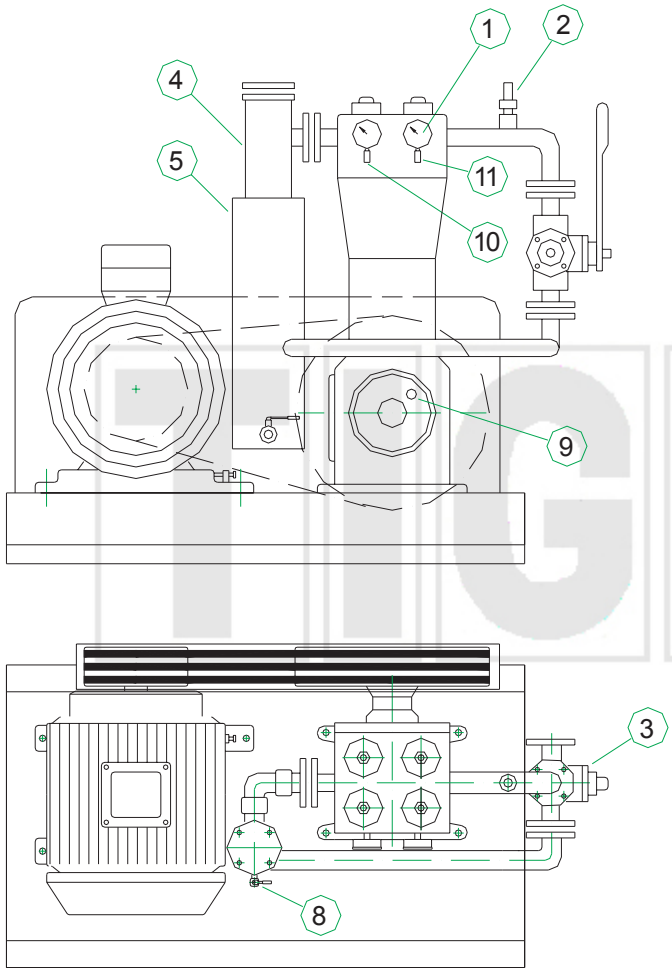


WARNING!
All lubrication operations shall be executed by a specialized technician. The manufacturer declines any responsibility for damages to people or property arising from the non-compliance with the indications of this manual

Drainage of the liquid phase

Before starting working, it is necessary to carry out a preventive drainage:

1 - Close the on-off valves both upstream and downstream the compressor.
2 – Drain the liquid through the barrel (8) of the lock valve (5). Execute this operation with the greatest care avoiding formation of sparks.
3 – Open the valve (7) for pressure compensation.
4 – Close the valve (7) for some seconds.
5- Close the drainage port(8).
6 – Reopen the on-off valves.



1. Vacuum gauge - manometer
2. Safety valve
3. 4-way valve DN32 PN40
4. Suction filter
5. Liquid lock valve
6. TIGHT compressor
7. By-pass valve
8. Drain valve
9. Oil pressure switch connection
10. Suction pressure switch connection
11. Delivery pressure switch connection

If some liquid is found inside the barrel, this may be due to:
- Liquid condensate inside the transfer piping
- Suction tanks too full
- Low temperature and lines not thermally isolated

WARNING!
All drainage shall be conveyed outside the dangerous area. **Keep away your hands or face from the drainage valve when it is working!** The gas coming out could cause serious injuries to the operator.

Cleaning

General safety warning

- Cleaning must be carried out almost exclusively with compressed air.
- in case disinfectant solutions are used to clean some parts of the system, at the end of the cleaning cycle, rinse the machines and the conveyors abundantly in order to remove any trace of disinfectant (whose use is in any case unadvisable.
- In case of disinfectant solutions obtained by concentrated or powdered products, prepare the solution separately paying attention when mixing to avoid clots or undissolved particles.
- Do not carry out cleaning while the system is working.
- Before cleaning and washing make sure that the system main switch on the electric panel and the electric power plug are disconnected.
- if compressed air is used to clean some parts (e.g.: mesh filter), the operator shall wear goggles and limit the pressure of the compressed air device to maximum 8 bars.
- Comply with the regulations in force within your country as for the treatment of wastewater.
- The cleaning of installation shall be carried out by duly trained authorized operators only.
- Do not wet electric motors, belts, control tools, chains or lubricated parts.

WARNING!
Never use solutions containing aggressive chemical products to avoid damages to the system construction; indeed these types of product could cause“stress corrosion” resulting inevitably in a short term structure damage.

TIGHT will not apply any warranty if this condition is not observed.

It is of paramount importance to keep the machine cleaned from grease and dirt because they can cause:

- Pollution of the transported product.
- Greatest effort for belts and motor.
- Quicker wear of machine components.
- Need for lubrication.

We recommend cleaning the oil filter and the suction filter frequently.

Cleaning procedure: frequency and type

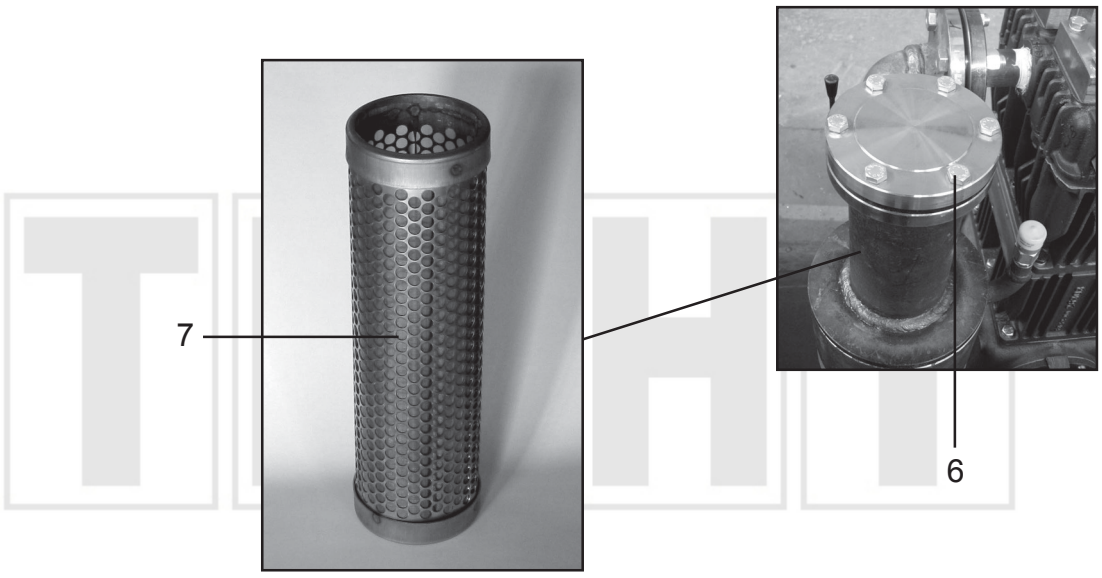
WARNING!
Before cleaning and washing rotate the main switch to “0” and unplug power supply.

5

Carry out the cleaning procedure according to the following intervals:

A) MONTHLY
Once (or twice) a month, cleaning shall be made with compressed air and, only if necessary, with a disinfectant solution, paying attention to carefully rinse it with clean water in order to remove any residue of washing solution.

Cleaning cycle:
1- Rotate the system main switch to “0” and padlock it to avoid any untimely starting.
2 – Disassemble the machine protection casing by unscrewing the relevant fixing bolts.
3 – Remove the deposits of dust from the cooling surface of motors (only with compressed air).
4 – Reassemble the machine protection casing and unscrew the relevant fixing bolts.
5 – Act on the fixing bolts to access the suction filters.
6 – Remove the filter and carry out the washing cycle described in items 1, 2, 3, 4, 5.
7 – Reinstall the filter and fix the cover with the bolts previously unscrewed.



WARNING!
Comply with the regulations in force within your country as for the treatment of washing liquids since no product nor washing liquid residue is acceptable in the waste water.

NOTE
Never wash the electric cabinet , the control panels and the electric motors with jet of water.

Extraordinary maintenance

Extraordinary maintenance concerns the stress parts of the machine. These elements need periodical controls so as to carry out maintenance before their wear results in malfunctions or damages to the machine.

Every single element will be analyzed separately, as well as the information for repairing or replacement.

WARNING!!
• The replacement of electric and electronic parts (if existing) shall be executed by specialized personnel only.

General warning

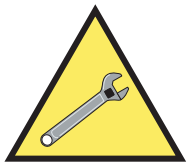
- Line state:
connected to power sources

- Main switch:
disconnected

- Emergency stop:
pushed and held

- Operator n.:
1

- Qualification:
Mechanic maintenance person
(qualifica1)
Manufacturer's technician
(qualification 3)



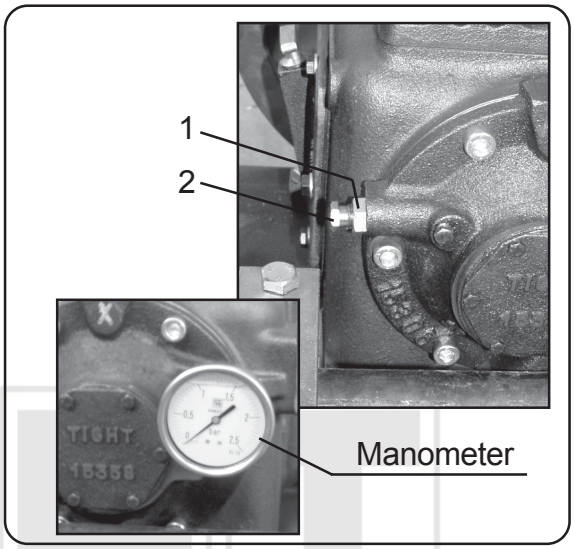
Wear personal protection equipment !

Mechanic maintenance

Oil pressure adjustment

The compressor is provided with an adjusting screw for oil pressure inside the circuit. If the manometer installed shows a pressure variation (usually it has to be included between 0.6 and 1 bar) follow this procedure to reset the normal working conditions.

1- Loosen the lock nut.
2- Screw the nut to increase the pressure and unscrew it to decrease the pressure.
3- Fix the lock nut after finding the ideal adjustment.



Pulley alignment

To align the pulleys properly, proceed as follows:

1 – Make sure that the electric power is disconnected.
2 – Install the belts on two pulleys.
3 – Move away the electric motor manually until the belt is partially tensioned.
4 – With a ruler and a gauge align the two pulleys so that:

L1=L2=L3

5 – Put the motor slightly bent and lock the nut (1) (fig. 2).
6 – Act on the adjusting screw (5) until you reach the right belt tensions.
7 – Check the pulley alignment again (fig. 1)

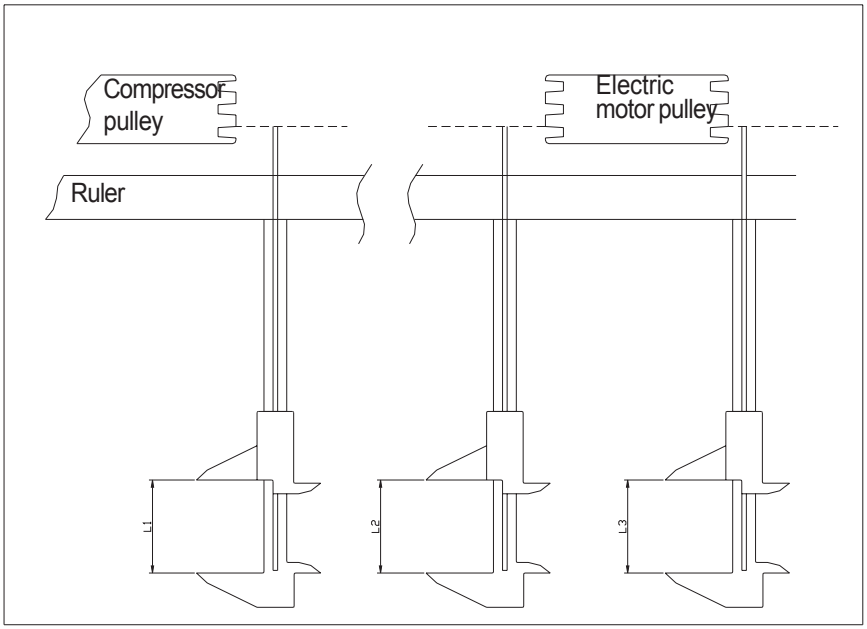


Fig. 1

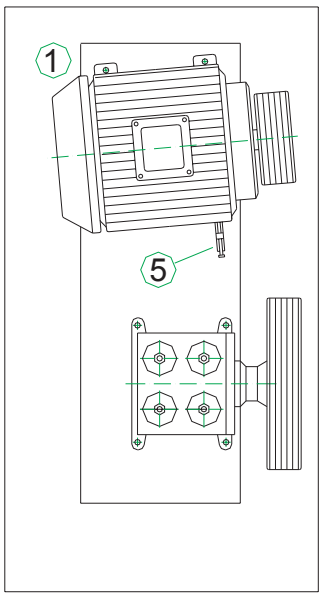


Fig. 2

8 – When the two pulleys are carefully aligned, tighten nut (2), nut (3) and nut (4) (fig.3).
9 – Bring the adjusting screw (6) to end of stroke (fig.3)

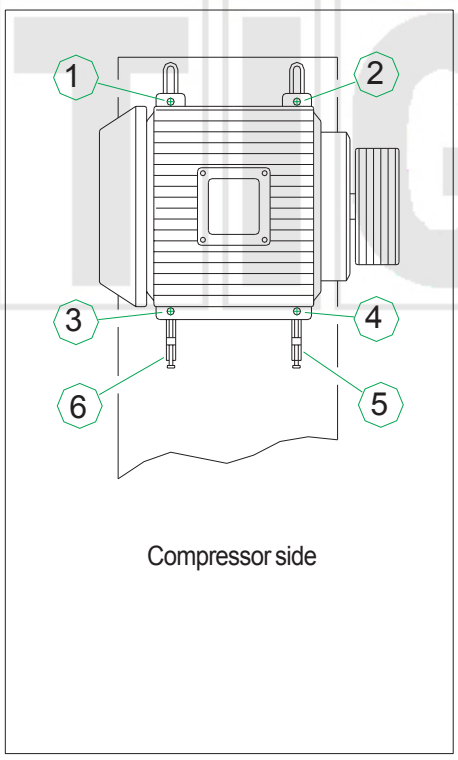


Fig. 3

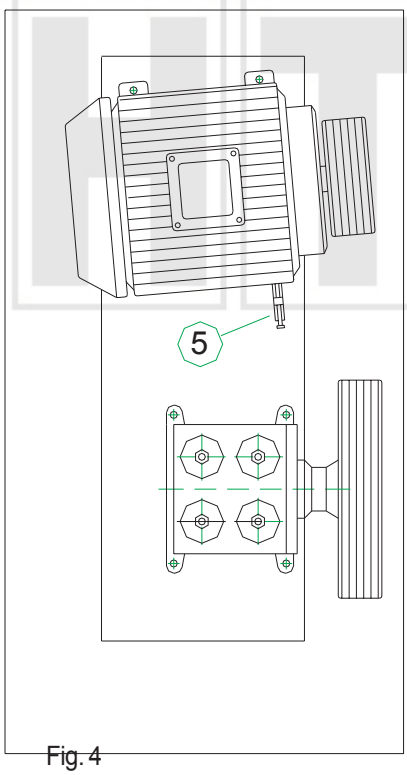


Fig. 4

5

WARNING!
If the alignment is NOT correct (for example due to an excessive tightening of the adjusting screw (5) (fig. 4), you have to:

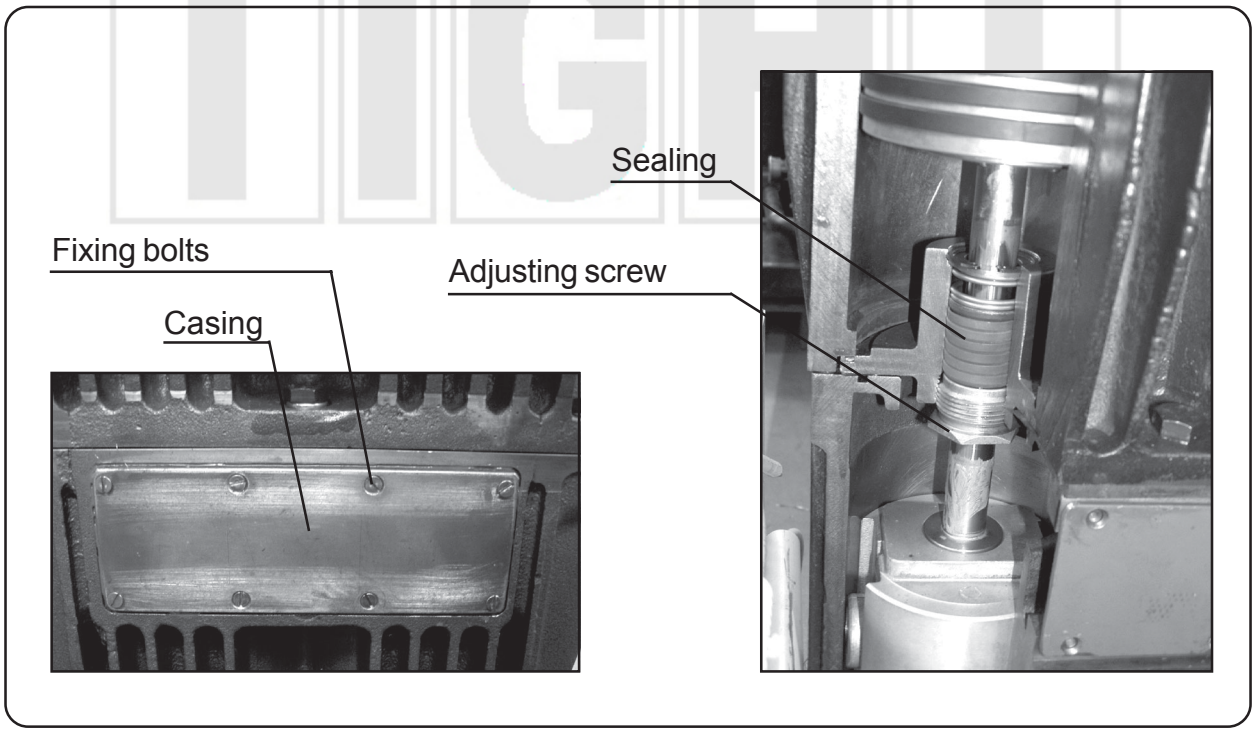
1 – Loosen the adjusting screw (5) and the nut (1).
2 – Slightly move forward point (1)
3 – Tighten the nut.
4 – Continue as in items (4) and (5).

Sealing adjustment

If seals are worn or loosened, the product may be contaminated. The oil in the tank could mix with the product and vice versa.
This adjustment allows to compress the seals to prevent product outflow to the oil tank and vice versa.

To adjust:

1- Make sure that power supply is unplugged.
2 - Close the on-off valves both upstream and downstream the compressor.
3- Unscrew the fixing bolts of the casing for the adjustment.
4- Act on the specific screw for compression.
5- After finding the right adjustment, reassemble the casing with the appropriate bolts (in the DS version open the upper housing).

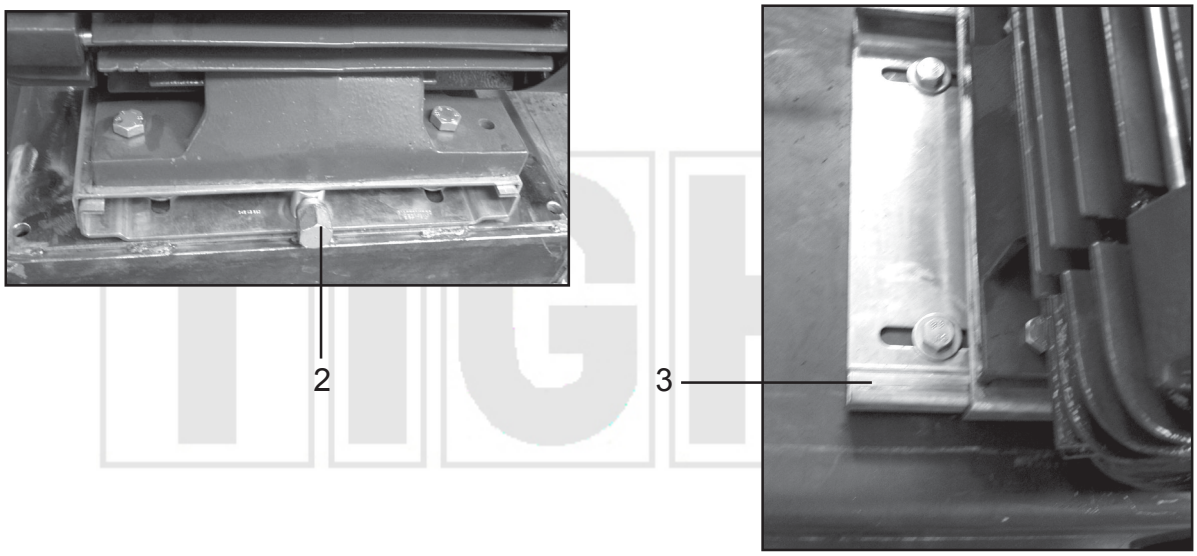


WARNING!!
This adjustment allows to work in safety conditions for a short time! Therefore, we recommend replacing the seals within a short time interval!

Belt tensioning

For belt tensioning proceed as follows:

1 – Make sure that the power supply is unplugged (main switch on “0”).
2 – Act on the adjusting bolt of the sliding system.
3 – After finding the right tensioning, act on the bolt again to fix the new position.



5

Chapter 6

Trouble - Shooting

6

Trouble - Shooting

Warning

This chapter includes the most common defects, the potential causes and the solutions to restore the normal working conditions.
If the failure persists or is not included in the following cases, the Technical Service of the Manufacturer will be available for any instruction on how to obtain the best performances.

In any case, before intervening remember that:

1 – it is possible to operate on the machine only after stopping the system, as indicated in this section.

The system main switch is provided with a safety device so that nobody can start unintentionally the line during the reset operations thus causing serious damages to the operator and/or to the system !!

2 – always work with maximum care, using appropriate protections depending on the kind of trouble.

The manufacturer declines any responsibility for damages to persons or property arising from the operator's lack of attention or carelessness.

6

Failure cases

Tables including failures description , possible causes, effect, possible solutions, residual risks.
Please find below the causes of failure requiring specific operation modes.
All the failure causes are indicated on the screen in the SELF-DIAGNOSIS section.

Alarm	Cause	Solution
Poor performance of the machine	1 – The 4-way valve is leaking 2 – Broken valves, locked or leaking. 3 – Worn piston rings. 4 – Clogged suction filter. 5 – Piping leakage.	1 – Check if the ball is scored. 2 – Check by Tecnogas S.r.l. 3 – Check by Tecnogas S.r.l. 4 – Clean or replace the filter. 5 – Inspection and repairing.
Abnormal wear-and-tear of the piston rings	1 – Broken valves, jammed or leaking. 2 – Clogged suction filter. 3 – Suction gas temperatures or room temperature too high. 4 – Compression ratio too high. 5 – Unbalanced load. 6 – Loose valves, pistons or gaskets	1 – Check by Tecnogas S.r.l 2 – Clean or replace the filter. 3 – Check by Tecnogas S.r.l. 4 – Check the application and refer to Tecnogas S.r.l.. 5 – Check by Tecnogas S.r.l. 6 – Tighten
Subsequent vibration	1 – Broken valves, jammed or leaking. 2 – Loose flywheel pulley and belts. 3 – Worn connecting rod bearing. 4 – Worn pin or pin bushing. 5 – Unbalanced load. 6 – Inappropriate foundation or mount.	1 – Check by Tecnogas S.r.l. 2 – Tighten the bolts and adjust the belt tension. 3 – Check by Tecnogas S.r.l. 4 – Check by Tecnogas S.r.l. 5 – Check by Tecnogas S.r.l. 6 – Strengthen or tighten the bolts.

The compressor is noisy	1 – Broken valves, jammed or leaking. 2 – Loose flywheel pulley and belts. 3 – Worn connecting rod bearing. 4 – Worn pin or pin bushing. 5 – Loose valves, pistons or gaskets	1 – Check by Tecnogas S.r.l. 2 – Tighten the bolts and adjust the belt tension. 3 – Check by Tecnogas S.r.l. 4 – Check by Tecnogas S.r.l. 5 – Tighten.
High temperature	1 – Broken valves, jammed or leaking. 2 – Worn piston rings. 3 – Clogged suction filter. 4 – Suction gas temperatures or room temperature too high. 5 – Compression ratio too high.	1 – Check by Tecnogas S.r.l. 2 – Check by Tecnogas S.r.l. 3 – Clean or replace the filter. 4 – Refer to Tecnogas S.r.l. 5 – Check the application and refer to Tecnogas S.r.l.
Oil in the cylinder	1 – Worn out or not adjusted rod gasket. (see chap. Maintenance). 2 – Oil inside piping.	1 – Check by Tecnogas S.r.l. 2 – Drain the oil weekly from the storage tank
The electromagnetic switch trips	1 – Insufficient power of the motor or wrong calibration of the electromagnetic switch	1 – Control by Tecnogas S.r.l. 2 – Check the application and refer to Tecnogas S.r.l.

6

Chapter 7

Spare parts

General provisions
How to order spare parts
How to ask for technical support
How to read the spare part tables
Spare part tables

Spare parts

General provisions

ORIGINAL SPARE PARTS only can be used for replacements.
Do not wait until parts are worn out by use. Replacing a part at the right time means improving machine operation and simultaneously saving money and avoiding higher damages.
TIGHT technicians are at customers' disposal at our factory in order to solve any problem concerning the machine use and maintenance.
Please contact directly our technical office to arrange maintenance operations, repairing or technical training outside **TIGHT** offices.

Always refer to the tables in the following pages to order spare parts.

Visit our website www.tightcompressor.it to order spare parts on-line

How to order spare parts

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To order spare parts :
1) Make a photocopy of the form on the following page.
2) Fill out the required fields according to the indications below:

TIGHT	SPARE PARTS AND SERVICE DEPT. FAX:	A
B	FORM FOR SPARE PART REQUEST OF OFFER	
C	D	
E	F G	H I

Unit code	Part code	Description	Measurement unit	Quantity
L	M	N	O	P

A - Number of pages of the request of offer (example: if you need 2 forms for the spare part list, write “1/2” in the first one and “2/2” in the second one).
B - Machine model and serial number to avoid mistakes.

WARNING: Use different forms for each machine type.
C - Data of the company where the goods are to be shipped.
D - Data of the company where the invoice is to be sent (if different from C).
E - Name and surname of the person to whom the offer is to be addressed (write in block letters)
F - Phone number of the person requiring the offer.
G - Fax number to which the offer is to be sent.
H - Writer’s favourite shipment type.
I - Date of the request of offer.
L - TIGHT code of the assembly from which the required code was taken *.
M - TIGHT part code *.
N - Part description *.
O - Unit measurement of the part *.
P - Required quantity of the single spare part.

* Copy these data from the spare part table
3) Send a copy of the form, thouroughly filled in, to the given fax number. In the shortest time possible we will reply with an offer including price, delivery and sales conditions.

Warning: if the request is submitted in another way or on an uncompleted form, TIGHT will refuse all responsibility for any possible misunderstanding.

TIGHT	SPARE PARTS AND SERVICE DEPT FAX:	

Machine model - serial number	FORM FOR SPARE PART REQUEST OF OFFER

Address where to send the goods	Address where to send the invoice

Name of the person requiring the offer	Phone number	Shipment through
	Fax number	Date

Unit code	Part code	Description	Measurement unit	Quantity

How to ask for technical support

7

In case of problem and chapter 6 “Troubleshooting” instructions suggest to apply to one of our technicians, or should you have identified an inconsistency in machine operation, proceed as follows:

1) Make a photocopy of the form on the following page.
2) Fill in the required fields according to the indications below:

TIGHT	SPARE PARTS AND SERVICE DEPT. FAX:	A
B	FORM FOR TECHNICAL SUPPORT REQUEST	
C		D
E	F	H
	G	I
L		

A - Number of pages of the request of technical support (example: if you need 2 forms for the description of pos. “L”, write “1/2” in the first one and “2/2” in the second one).
B - Machine serial number to avoid mistakes.
WARNING: Use different forms for each machine type.
C - Data of the company where to send the technician.
D - Data of the company where the invoice is to be sent (if different from C).
E - Name and surname of the person in charge of maintenance (write in block letters)
F - Phone number of the person requiring the intervention.
G - Fax number to which the offer of intervention is to be sent.
H - Date of the request of offer.
I - Date of the request of intervention.
L - Description of the wrong operation or failure. Describe here during which cycle phase the trouble occurred and in which position the machine stopped as well as the message on the display, if any.

3) Send a copy of the form, thoroughly filled in, to the given fax number. In the shortest time possible we will reply with a complete offer.

Warning: if the request is submitted in another way or on an uncompleted form, TIGHT will refuse all responsibility for any possible misunderstanding.

TIGHT	SPARE PARTS AND SERVICE DEPT. FAX:	

Machine model - serial number	FORM FOR TECHNICAL SUPPORT REQUEST

Company address	Address where to send the invoice

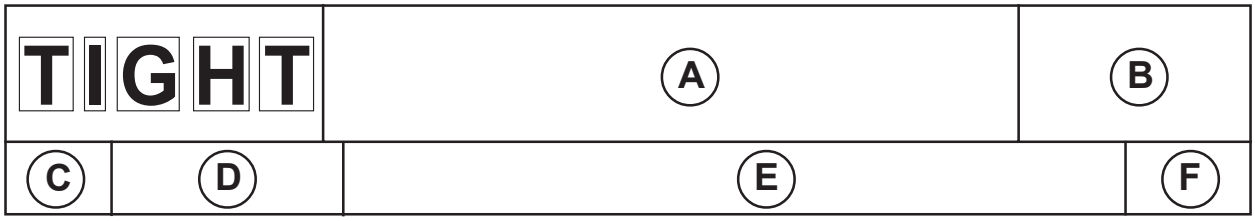
Name of the person in charge of maintenance	Phone number	Request date
	Fax number	Date of request of intervention

Description of wrong operation or failure

7

How to read the spare part table

In case you need to order spare parts through the form described in the specific paragraph of this chapter, please refer to the following tables. They provide a complete overview of the possible machine spare parts, divided into the various operation assemblies. The text tables contain all the information needed to accurately identify the reference numbers in the drawing tables.

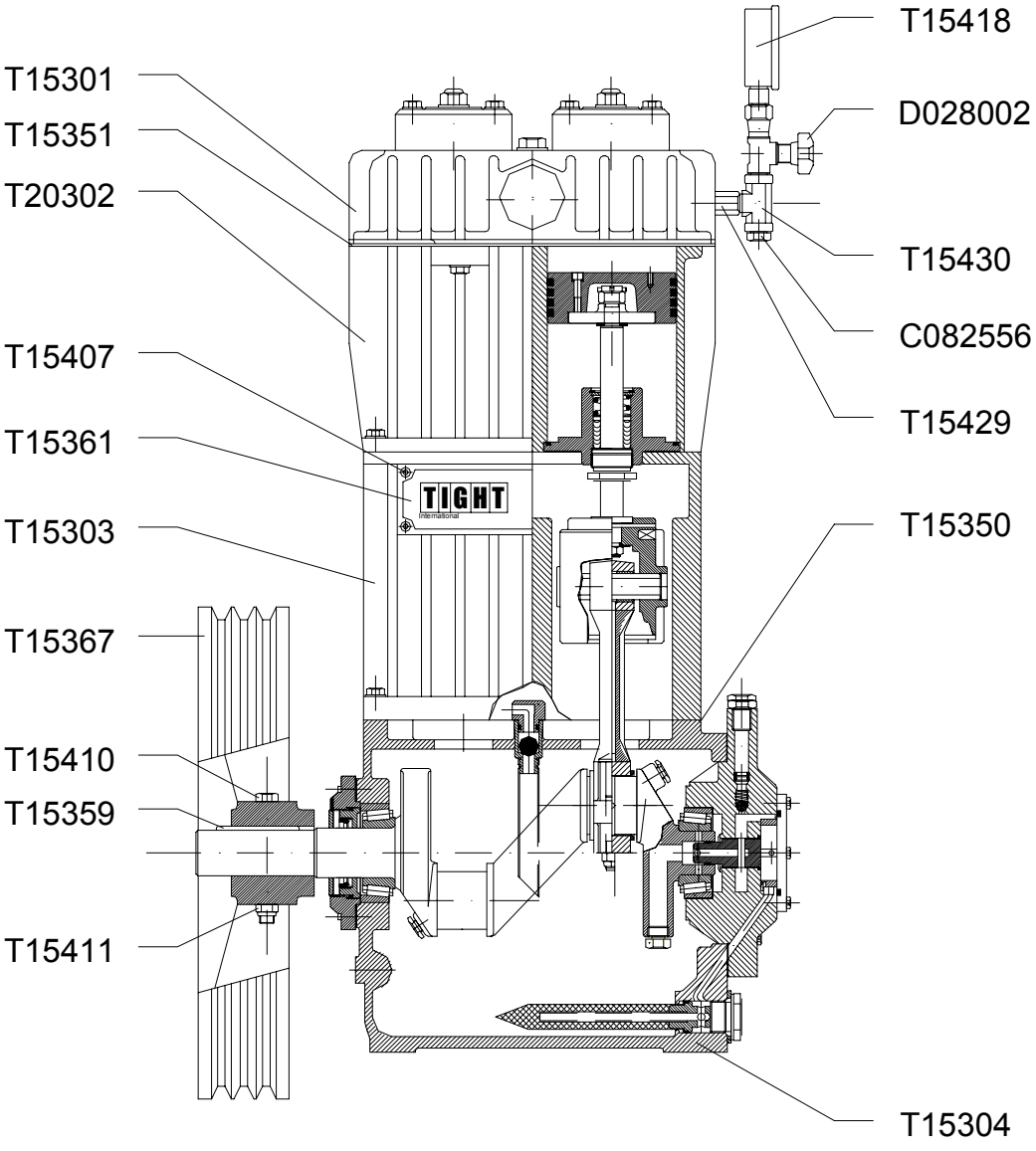


In order to be able to read the content of the text tables, pay attention to the following
A - Assembly name
B - Assembly reference code
C - reference number of the part in the drawing table.
D - TIGHT order code for the part.
E - Part description
F - Total quantity of the part in the assembly.

7

Spare part tables A668

TIGHT	CUTWAY VIEW OF THE WHOLE COMPRESSOR	000.000.000

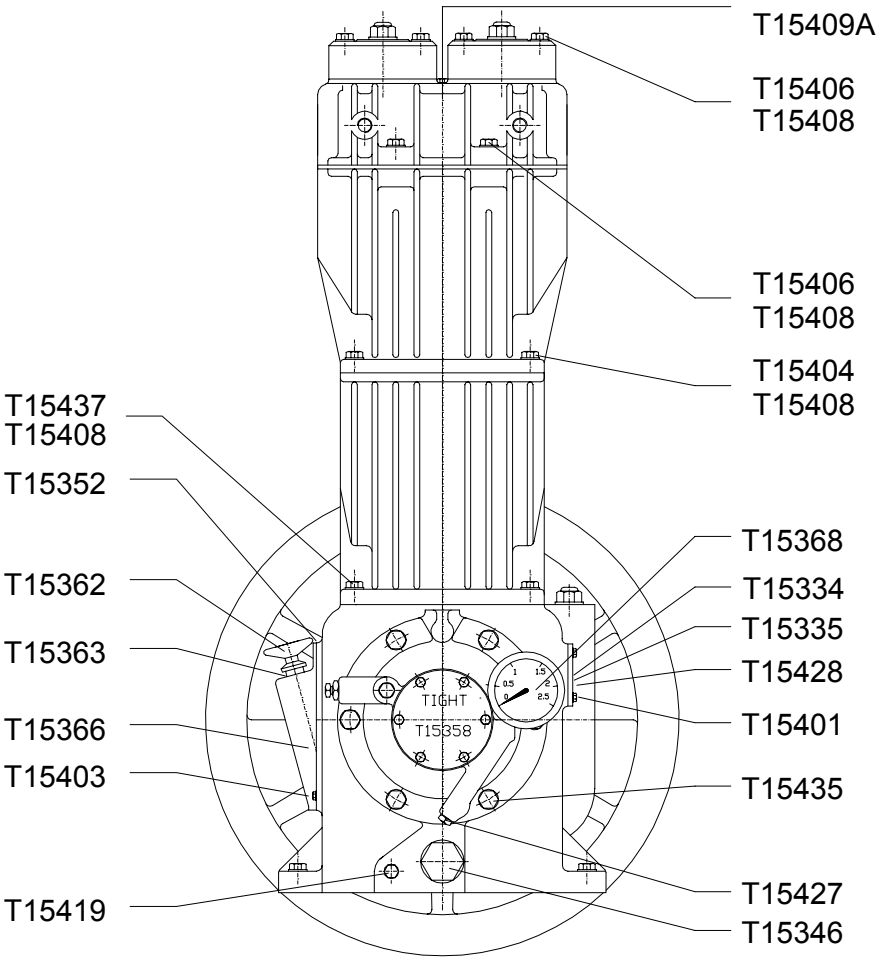


TIGHT	CUTWAY VIEW OF THE WHOLE COMPRESSOR	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15301	CYLINDER HEAD	1
2	T15303	INTERMEDIATE CASING	1
3	T15304	MAIN CASING	1
4	T15350	OIL PAN GASKET	1
5	T15351	HEAD GASKET	1
6	T15359	PULLEY KEY	1
7	T15361	PLATE	1
8	T15367	SELF-VENTILATED PULLEY	1
9	T15407	COUTERSUNK SCREW M4x10	8
10	T15410	PULLEY NUT	2
11	T15411	PULLEY SELF-LOCKING NUT	2
12	T15418	VACUUM PRESSURE GAUGE	1
13	T15429	DAMPER	2
14	T15430	TEE COCK-HOLDER	2
15	T20302	CYLINDER BLOCK	1
16	D028002	NEEDLE COCK ¼"	2
17	C082556	¼"MALE CUP	2

7

TIGHT	SIDE VIEW OF THE WHOLE COMPRESSOR	000.000.000

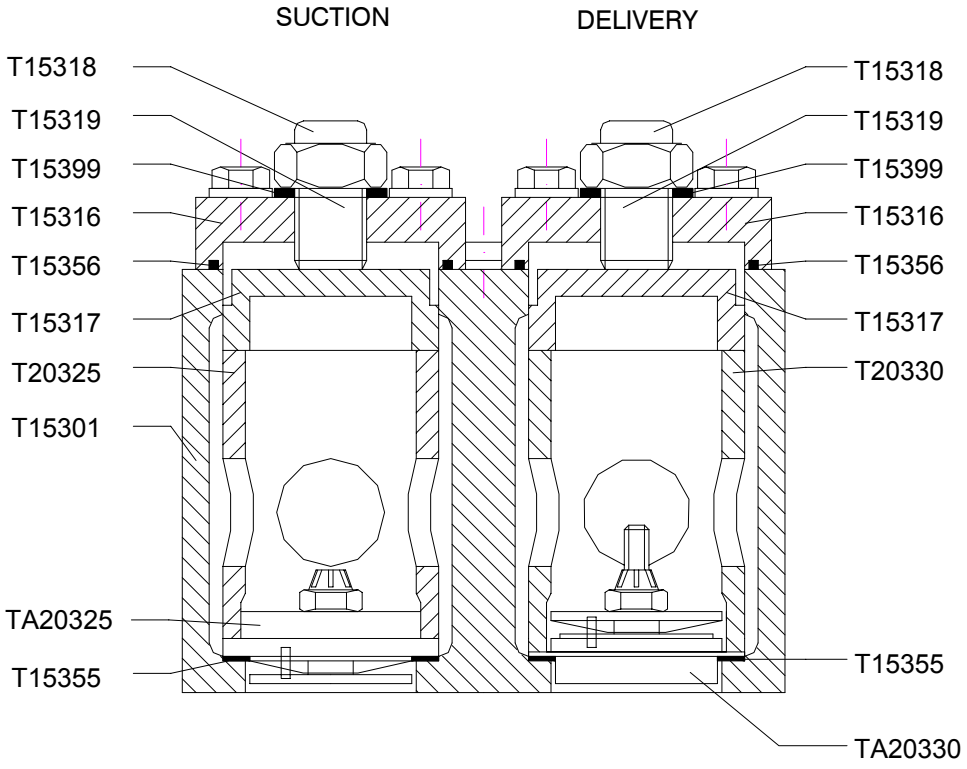


TIGHT	SIDE VIEW OF THE WHOLE COMPRESSOR	000.000.000

POS	P-N	DESCRIZIONE	Q.TY
1	T15334	OIL CIRCUIT LABYRINTH CAP	1
2	T15335	OIL CIRCUIT LABYRINTH	1
3	T15346	OIL PUMP FILTER	1
4	T15352	PAN PLATE GASKET	1
5	T15362	OIL LEVEL ROD	1
6	T15363	O-RING FOR OIL LEVEL ROD	1
7	T15366	INSPECTION PLATE	1
8	T15368	OIL PRESSURE GAUGE	1
9	T15401	HEXAGONAL HAED NUT M6 x 10 mm	5
10	T15403	HEXAGONAL HEAD NUT M8 x 20 mm	6
11	T15404	HEXAGONAL HEAD NUT M10 x 30 CL.10.9	6
12	T15406	HEXAGONAL HEAD NUT M 10 X 90 CL. 10.9	24
13	T15408	ELASTIC WASHER Ø 10 mm	36
14	T15409	HEXAGONAL HEAD NUT	2
15	T15409A	NUT WASHER	2
16	T15419	OIL DELIVERY CAP	1
17	T15427	OIL PUMP CAP	1
18	T15428	RUBBER RING FOR OIL LABYRINTH	2
19	T15435	EMBEDDED HEXAGONAL BOLT M 10 x 25 CL. 8.8	6
18	T15437	EMBEDDED HEXAGONAL BOLT M 10 x 25 CL. 8.8	6

7

TIGHT	SUCTION AND DELIVERY VALVE	000.000.000

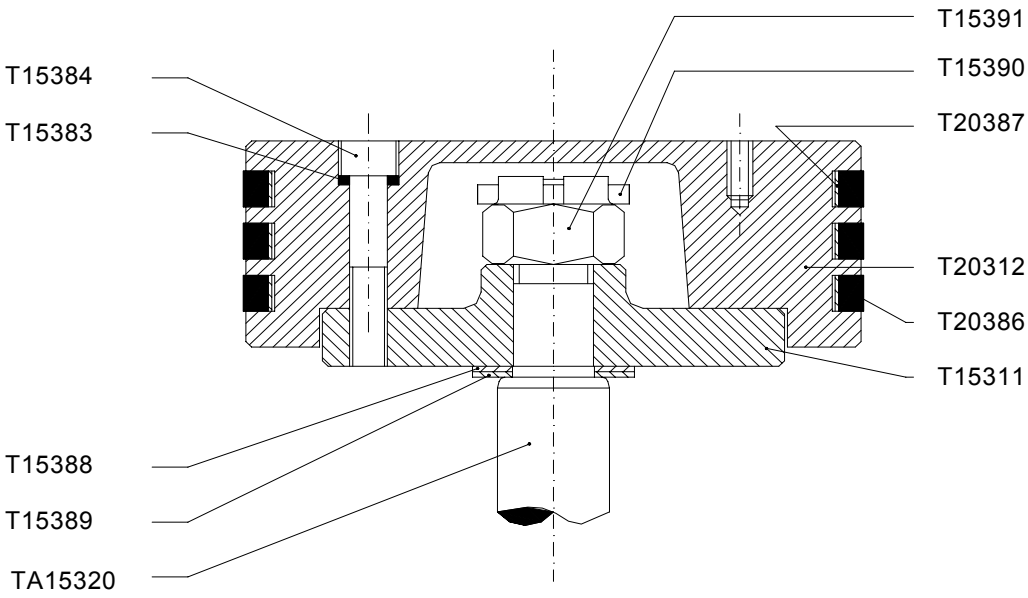


TIGHT	SUCTION AND DELIVERY VALVE	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15301	CYLINDER HEAD	1
2	T15316	VALVE CAP	4
3	T15317	SUCTION / DISCHARGE VALVE SPACER CAP	4
4	T15318	VALVE SPACER CLAMPING NUT	4
5	T15319	VALVE SPACER CLAMPING SCREW	4
6	T15355	SUCTION / DISCHARGE VALVE GASKET	4
7	T15356	O-RING FOR VALVE CAP	4
8	T15399	VALVE NUT WASHER	4
9	T20325	SUCTION VALVE UPPER BODY	2
10	TA20325	SUCTION VALVE	2
11	T20330	DISCHARGE VALVE UPPER BODY	2
12	TA20330	DISCHARGE VALVE	2

7

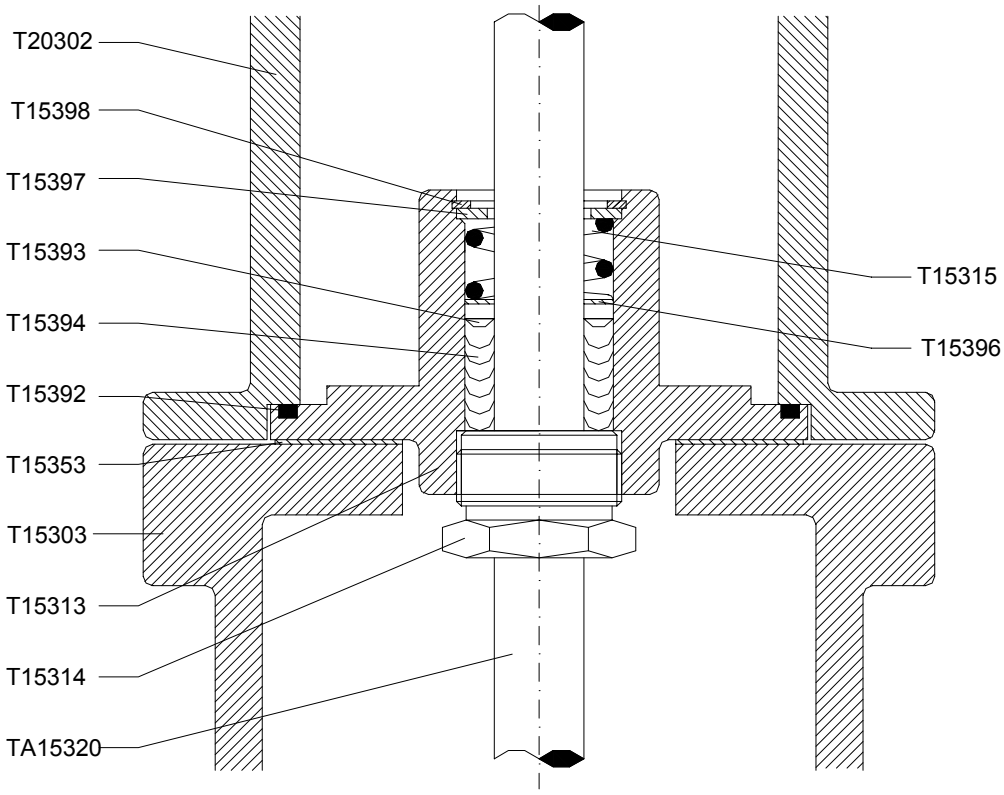
TIGHT	PISTON ASSEMBLY	000.000.000



TIGHT	PISTON ASSEMBLY	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15311	PISTON CONNECTING FLANGE	2
2	TA15320	PISTON ROD + CROSSHEAD	2
3	T15383	ELASTIC WASHER FOR PISTON SCREW	16
4	T15384	PISTON HEAD SCREW 6x35 mm	16
5	T15388	WASHER 1mm	2
6	T15389	PISTON FLANGE SUPPORT WASHER 1.5mm	2
7	T15390	PISTON ROD FIXING PIN	2
8	T15391	PISTON ROD CARVED NUT	2
9	T20312	PISTON BODYØ108mm	2
10	T20386	ELASTIC BANDØ108mm	6
11	T20387	ESPANSION RING Ø108mm	6

TIGHT	MECHANICAL SEAL UNIT	000.000.000

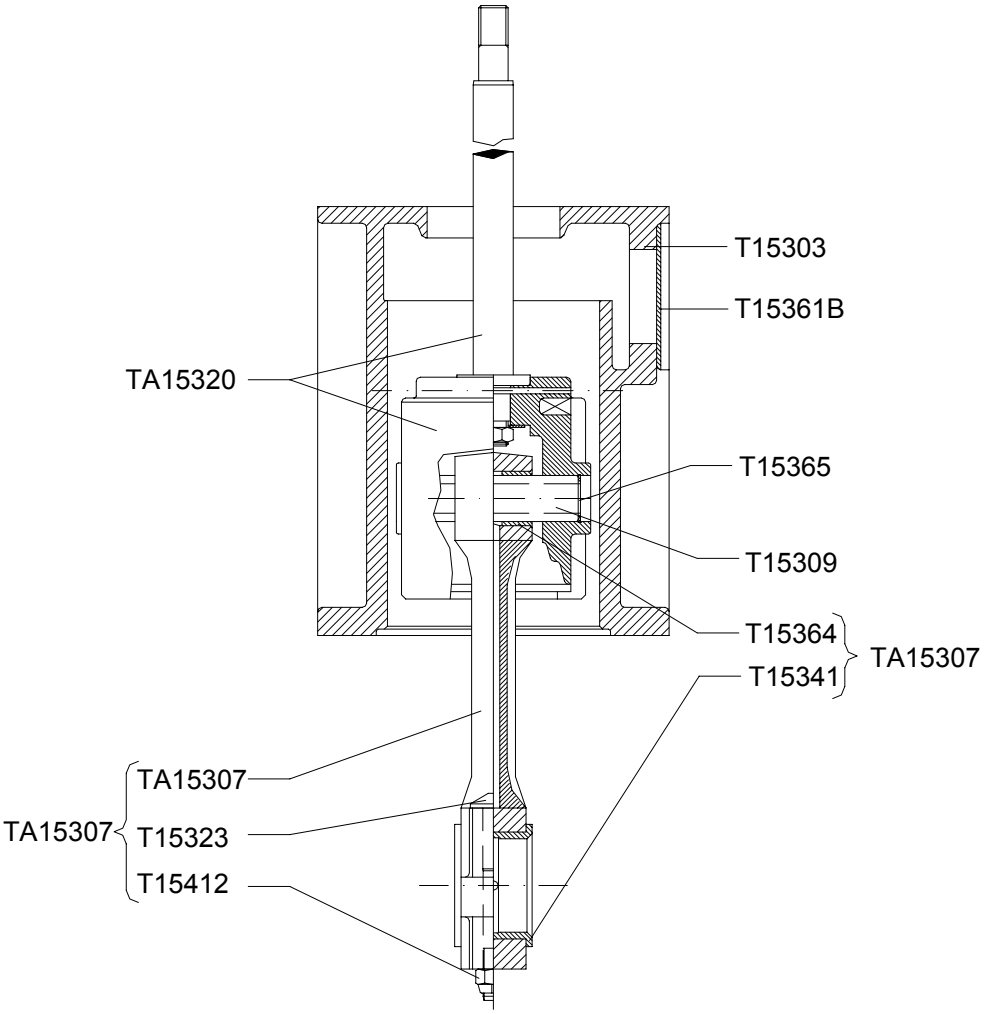


TIGHT	MECHANICAL SEAL UNIT	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15303	INTERMEDIATE CASING	1
2	T15313	SEAL COVERING SUPPORT	2
3	T15314	SEAL WASHER ADJUSTING CAP	2
4	T15315	SEAL WASHER SUPPORT SPRING	2
5	TA15320	PISTON ROD + CROSSHEAD	2
6	T15353	GLAND GASKET SUPPORT	2
7	T15392	O-RING FOR SEAL COVERING	2
8	T15393	TERMINAL GLAND COVERING	2
9	T15394	SELF- LUBRICANT SEAL TILE	12
10	T15396	COVERING SUPPORT SPRING WASHER	2
11	T15397	SPRING LOCK WASHER	2
12	T15398	SEGER ELASTIC RING	2
13	T20302	CYLINDER BLOCK	1

7

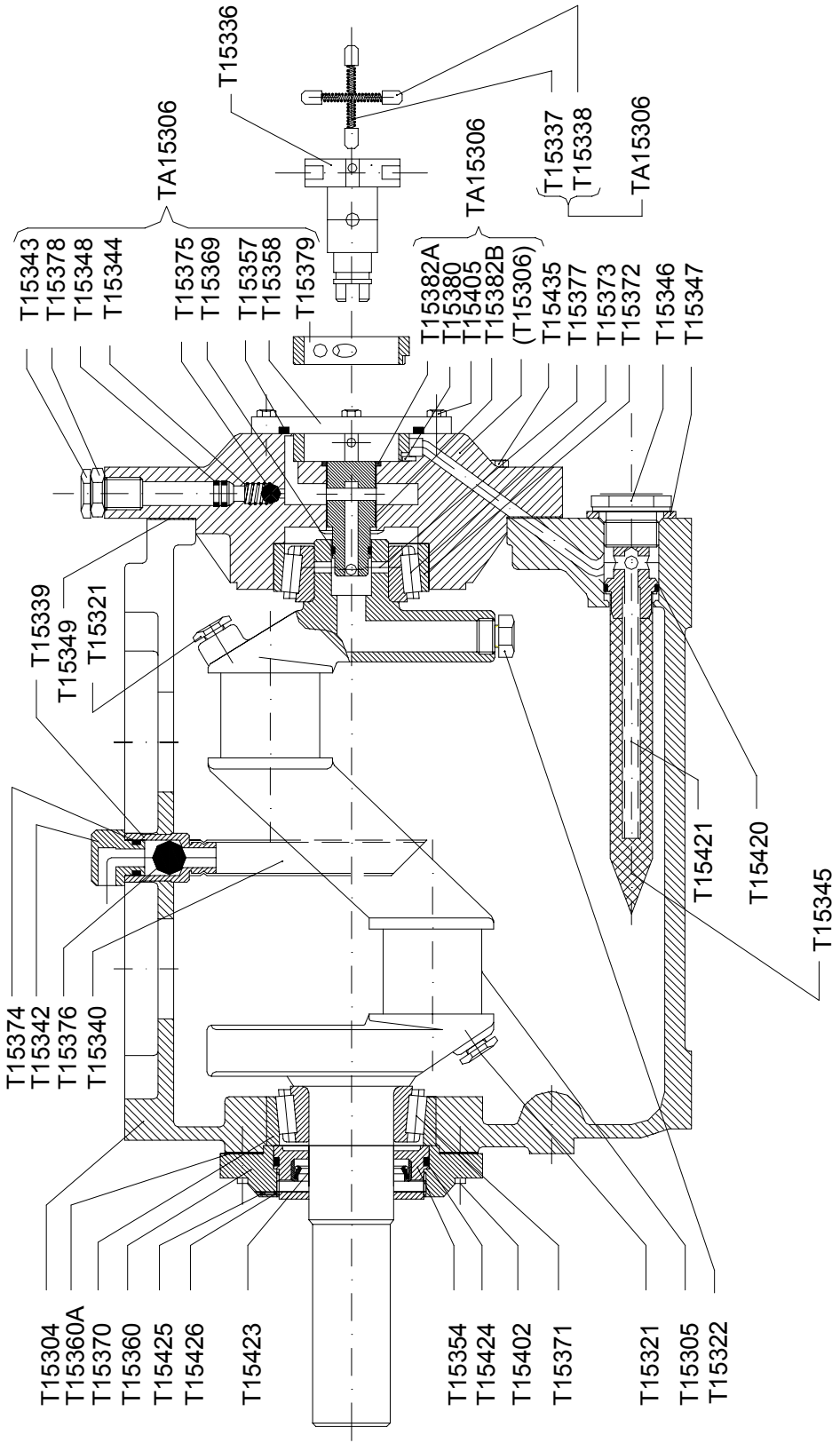
TIGHT	PISTON / CONNECTING ROD DRIVE UNIT	000.000.000



TIGHT	PISTON / CONNECTING ROD DRIVE UNIT	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15303	INTERMEDIATE CASING	2
2	TA15307	COMPLETE CONNECTING ROD	1
3	T15309	JOINT PIN	2
4	TA15320	PISTON ROD + CROSSHEAD	2
5	T15323	CONNECTING ROD SCREW	4
6	T15341	BEARING FOR OVERSIZE CONNECTING ROD	2
7	T15361B	PLATE GASKET	1
8	T15364	CONNECTING ROD BEARING	2
9	T15365	SEGER PIN RINGS	4
10	T15412	CONNECTING ROD SELF-LOCKING NUT	4

TIGHT	COMPRESSOR BASEMENT/1	000.000.000



TIGHT	COMPRESSOR BASEMENT/1	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15304	MAIN CASING	1
2	T15305	CRANK SHAFT	1
3	TA15306	COMPLETE OIL PUMP	1
4	T15321	CRANK SHAFT ORIFICE CAP	2
5	T15322	CRANK SHAFT CAP	1
6	T15336	OIL PUMP ROTOR	1
7	T15337	OIL PUMP SECTORS	4
8	T15338	OIL PUMP SECTOR SPRINGS	4
9	T15339	OIL VAPOUR DISCHARGE VALVE	1
10	T15340	OIL VAPOUR DRAIN	1
11	T15342	DISCHARGE VALVE HEAD FOR OIL VAPOURS	1
12	T15343	CALIBRATION SCREW FOR OIL PUMP VALVE	1
13	T15344	CALIBRATION SPRING FOR OIL PUMP VALVE	1
14	T15345	OIL FILTER NET	1
15	T15346	OIL PUMP FILTER	1
16	T15347	WASHER FOR OIL PUMP FILTER	1
17	T15348	O-RING FOR OIL PUMP CALIBRATION VALVE	2
18	T15349	OIL PUMP GASKET	1
19	T15354	CALIBRATION BEARING RING NUT	1
20	T15357	O-RING FOR OIL PUMP CAP	1
21	T15358	OIL PUMP CAP	1
22	T15360	RING NUT SUPPORT FOR BEARING CALIBRATION	1
23	T15360A	GASKET	1
24	T15369	O-RING FOR OIL PUMP PULLEY	1
25	T15370	PULLEY SIDE OUTER BEARING	1
26	T15371	PULLEY SIDE INNER BEARING	1
27	T15372	PULLEY SIDE OUTER BEARING	1
28	T15373	PULLEY SIDE INNER BEARING	1
29	T15374	O-RING FOR OIL VAPOUR DRAIN CAP	1
30	T15375	OIL PUMP CALIBRATION BALL	1
31	T15376	NYLON BALL FOR OIL BREATHING	1
32	T15377	OIL PUMP ROTOR SHAFT ELASTIC PIN	1
33	T15378	OIL PUMP CALIBRATION LOCK NUT	1
34	T15379	OIL PUMP CAM	1

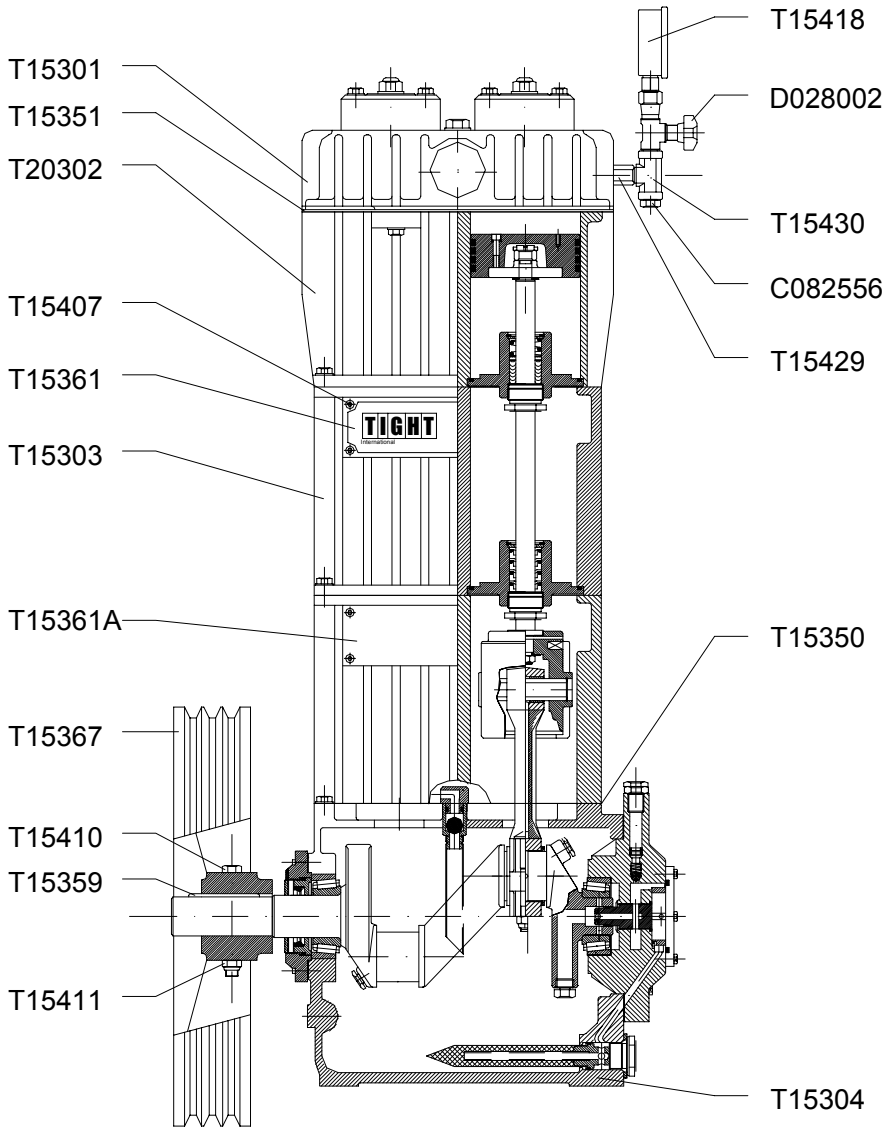
TIGHT	COMPRESSOR BASEMENT/2	000.000.000

POS	P-N	DESCRIPTION	Q.TY'
35	T15380	OIL PUMP CAM FIXING PIN	1
36	T15382A	OIL PUMP SHAFT BUSHING	1
37	T15382B	OIL PUMP SHAFT BUSHING	1
38	T15402	SOCKET HEAD SCREW M8x20	4
39	T15435	HEXAGONAL HEAD NUT 10 x 25mm CL.8.8	6
40	T15405	HEXAGONAL HEAD NUT M5x15mm	6
41	T15420	O-RING FOR OIL SUCTION FILTER	1
42	T15421	OIL SUCTION HOSE	1
43	T15423	CRANK SHAFT OIL SEAL	1
44	T15424	O-RING FOR CALIBRATION BEARING RING NUT	1
45	T15425	SECURITY DOWEL FOR CALIBRATION RING NUT	2
46	T15426	SECURITY DOWEL FOR CALIBRATION RING NUT	2

7

Spare part tables A668 DT

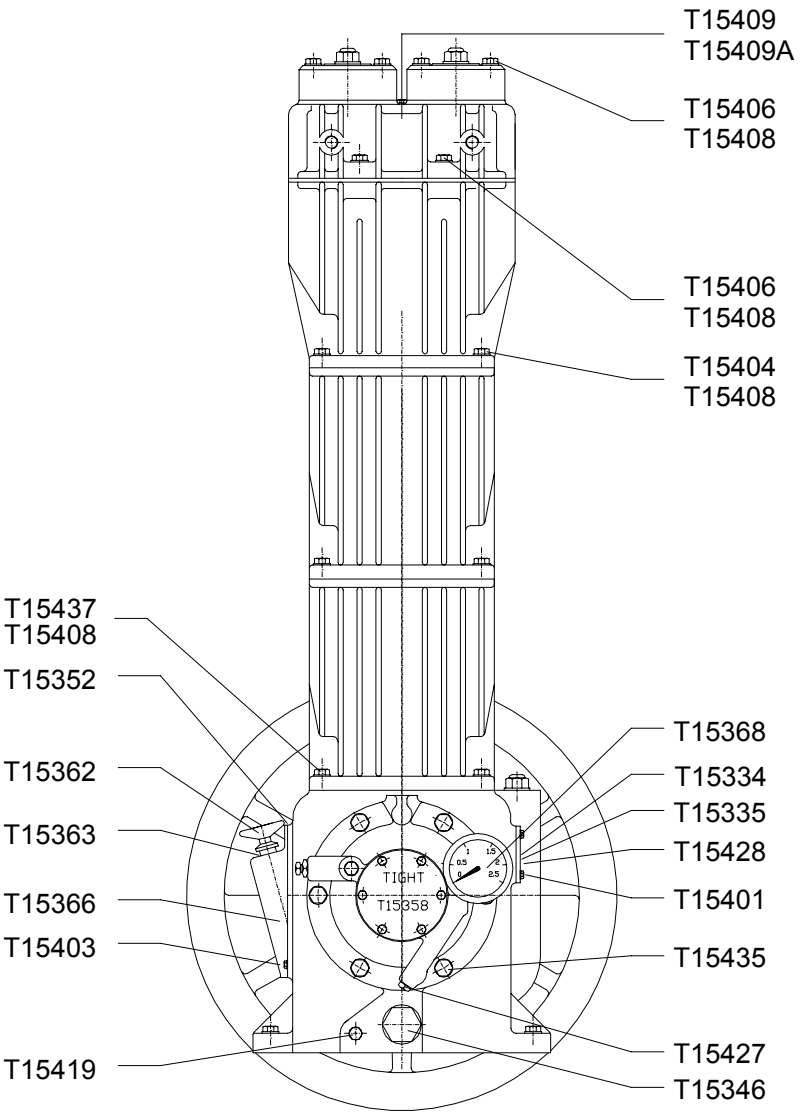
TIGHT	CUTWAY VIEW OF THE WHOLE COMPRESSOR	000.000.000



TIGHT	CUTWAY VIEW OF THE WHOLE COMPRESSOR	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15301	CYLINDER HEAD	1
2	T15303	INTERMEDIATE CASING	2
3	T15304	MAIN CASING	1
4	T15350	OIL PAN GASKET	1
5	T15351	HEAD GASKET	1
6	T15359	PULLEY KEY	1
7	T15361	PLATE	1
8	T15361A	SUPPORT PLATE	2
9	T15367	SELF-VENTILATED PULLEY	1
10	T15407	COUTERSUNK SCREW	8
11	T15410	PULLEY BOLT	2
12	T15411	PULLEY SELF-LOCKING NUT	2
13	T15418	VACUUM PRESSURE GAUGE	1
14	T15429	DAMPER	2
15	T15430	TEE COCK-HOLDER	2
16	T20302	CYLINDER BLOCK	1
17	D028002	NEEDLE COCK ¼"	2
18	C082556	¼"MALE CUP	2

TIGHT	SIDE VIEW OF THE WHOLE COMPRESSOR	000.000.000

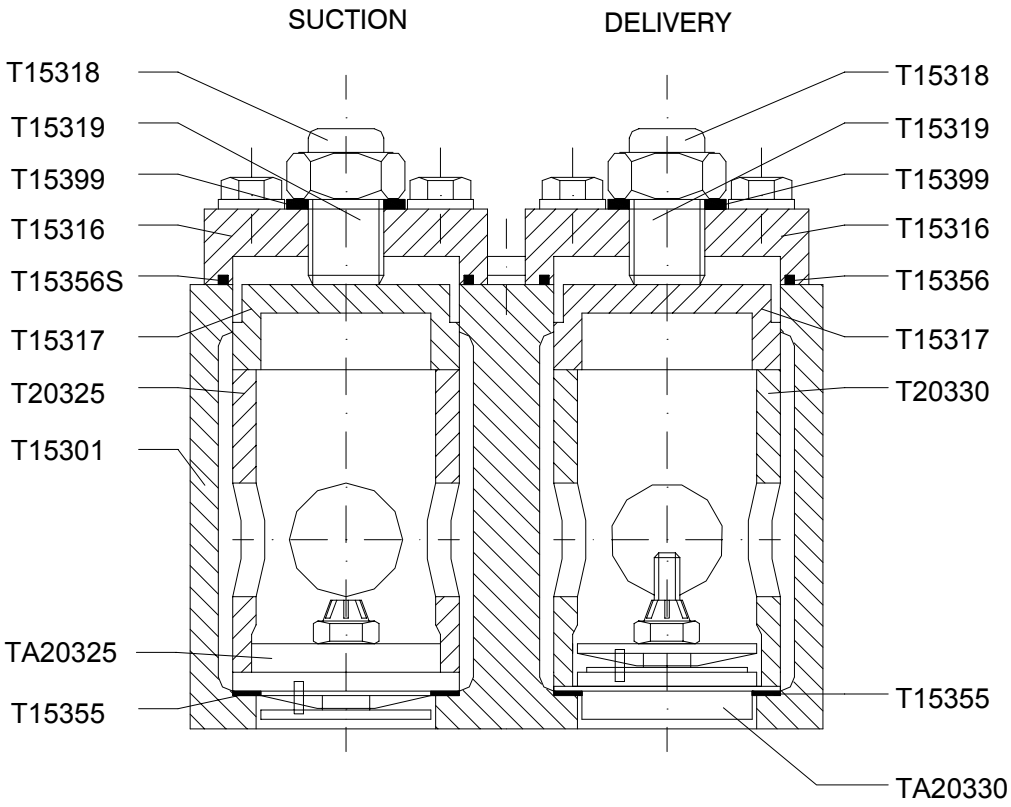


TIGHT	SIDE VIEW OF THE WHOLE COMPRESSOR	000.000.000

POS	P-N	DESCRIZIONE	Q.TA'
1	T15334	COPERCHIO LABIRINTO CIRCUITO OLIO	1
2	T15335	LABIRINTO CIRCUITO OLIO	1
3	T15346	FILTRO POMPA OLIO	1
4	T15352	GUARNIZIONE PLACCA D'ISPEZIONE COPPA	1
5	T15362	ASTINA LIVELLO OLIO	1
6	T15363	O-R DI TENUTA PER ASTINA LIVELLO OLIO	1
7	T15366	PIASTRA D'ISPEZIONE	1
8	T15368	MANOMETRO PRESSIONE OLIO	1
9	T15401	BULLONE TESTA ESAGONALE M6 x10mm	5
10	T15403	BULLONE TESTA ESAGONALE M8 x 20mm	6
11	T15404	BULLONE TESTA ESAGONALE M10 x 30 CL. 10.9	12
12	T15406	BULLONE TESTA ESAGONALE M10 X 35 CL.10.9	24
13	T15408	RONDELLA ELASTICA Ø10	42
14	T15409	BULLONE TESTA ESAGONALE M10 X 90 CL.10.9	2
15	T15409A	RONDELLA (BULLONE T15409)	2
16	T15419	TAPPO SCARICO OLIO	1
17	T15427	TAPPO POMPA OLIO	1
18	T15428	ANELLO DI GOMMA PER LABIRINTO OLIO	2
19	T15435	BULLONE ESAGONO INCASSATO M10 x 25 CL. 8.8	6
20	T15437	BULLONE ESAGONALE M10 x 25 CL. 8.8	6

7

TIGHT	SUCTION AND DELIVERY VALVE	000.000.000

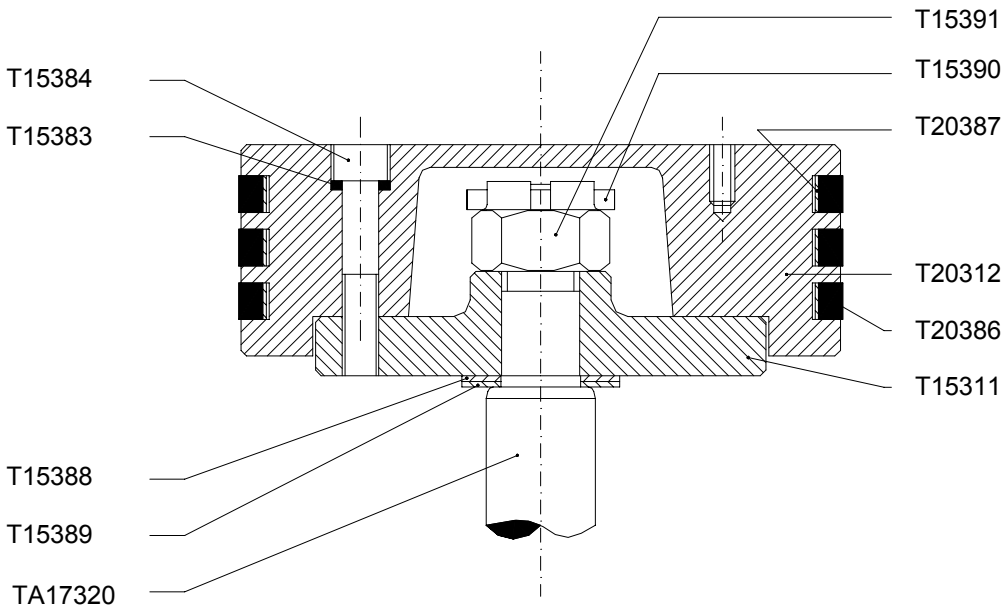


TIGHT	SUCTION AND DELIVERY VALVE	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15301	CYLINDER HEAD	1
2	T15316	VALVE CAP	4
3	T15317	SUCTION / DISCHARGE VALVE SPACER CAP	4
4	T15318	VALVE SPACER CLAMPING NUT	4
5	T15319	VALVE SPACER CLAMPING SCREW	4
6	T15355	SUCTION / DISCHARGE VALVE GASKET	4
7	T15356S	O-RING FOR VALVE CAP TFM	4
8	T15399	VALVE NUT WASHER	4
9	T20325	SUCTION VALVE UPPER BODY	2
10	TA20325	SUCTION VALVE	2
11	T20330	DISCHARGE VALVE UPPER BODY	2
12	TA20330	DISCHARGE VALVE	2

7

TIGHT	PISTON ASSEMBLY	000.000.000

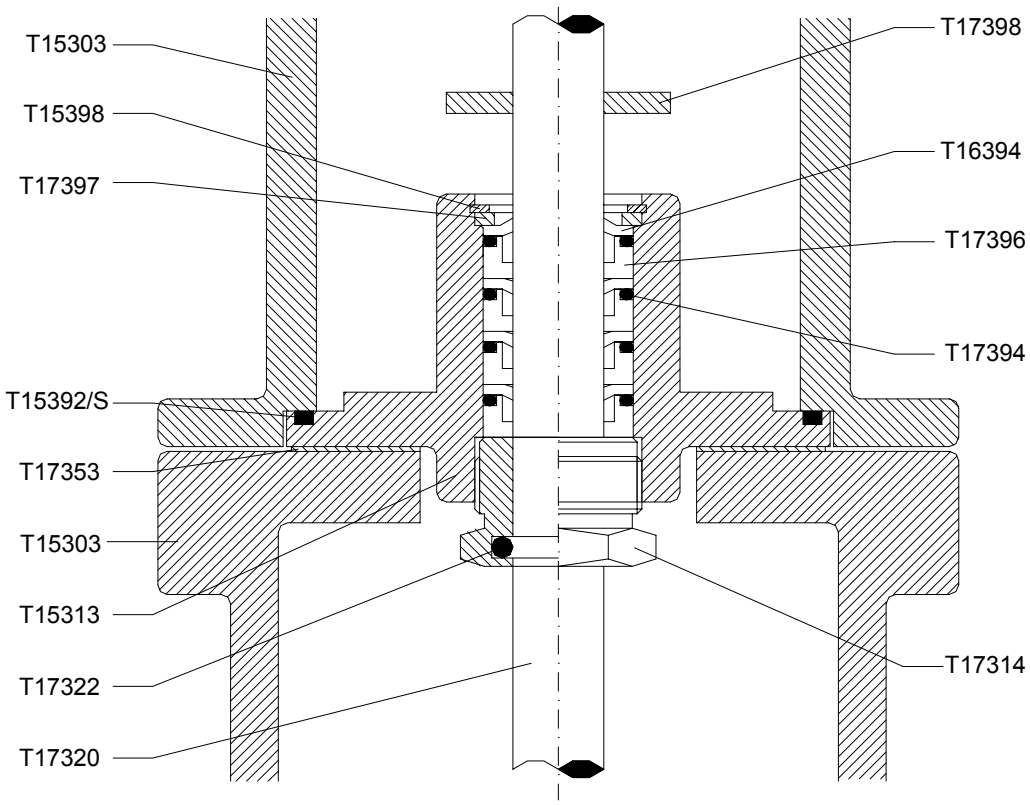


TIGHT	PISTON ASSEMBLY	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15311	PISTON CONNECTING FLANGE	2
2	TA17320	PISTON ROD DT + CROSSHEAD (T15324)	2
3	T15383	ELASTIC WASHER FOR PISTON SCREW	16
4	T15384	PISTON HEAD SCREW 6x35 mm	16
5	T15388	WASHER 1mm THICK	2
6	T15389	WASHER 1.5 mm THICK	2
7	T15390	PISTON ROD FIXING PIN	2
8	T15391	PISTON ROD CARVED NUT	2
9	T20312	PISTON BODY Ø108mm	2
10	T20386	ELASTIC BAND Ø108mm	6
11	T20387	ESPANSION RING Ø108mm	6

7

TIGHT	MECHANICAL SEAL UNIT	000.000.000

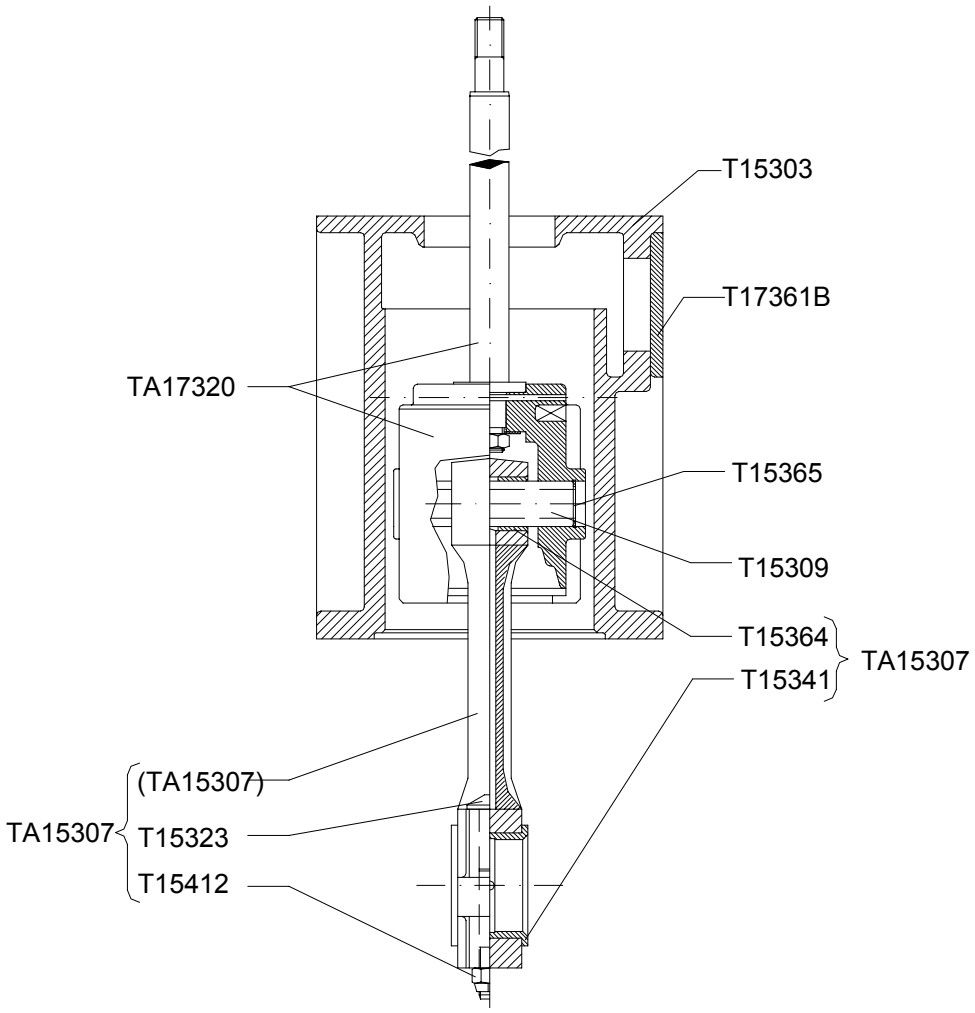


TIGHT	MECHANICAL SEAL UNIT	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15303	INTERMEDIATE CASING	2
2	T15313	SEAL COVERING SUPPORT	4
3	T17353	GLAND GASKET	4
4	T15392/S	O-RING FOR SEAL COVERING	4
5	T15398	SEGER ELASTIC RING	4
6	T16394	GYLON SELF- LUBRICANT SEAL TILE	8
7	T17314	SEAL WASHER ADJUSTING CAP	2
8	TA17320	PISTON ROD	2
9	T17322	O-RING FOR SEAL WASHER ADJUSTING CAP	2
10	T17394	PTFE O-RING FOR GYLON TILES	8
11	T17396	COVERING SUPPORT SPRING WASHER	8
12	T17397	WASHER	2
13	T17398	DUST COVER FOR GYLON TILE	2

7

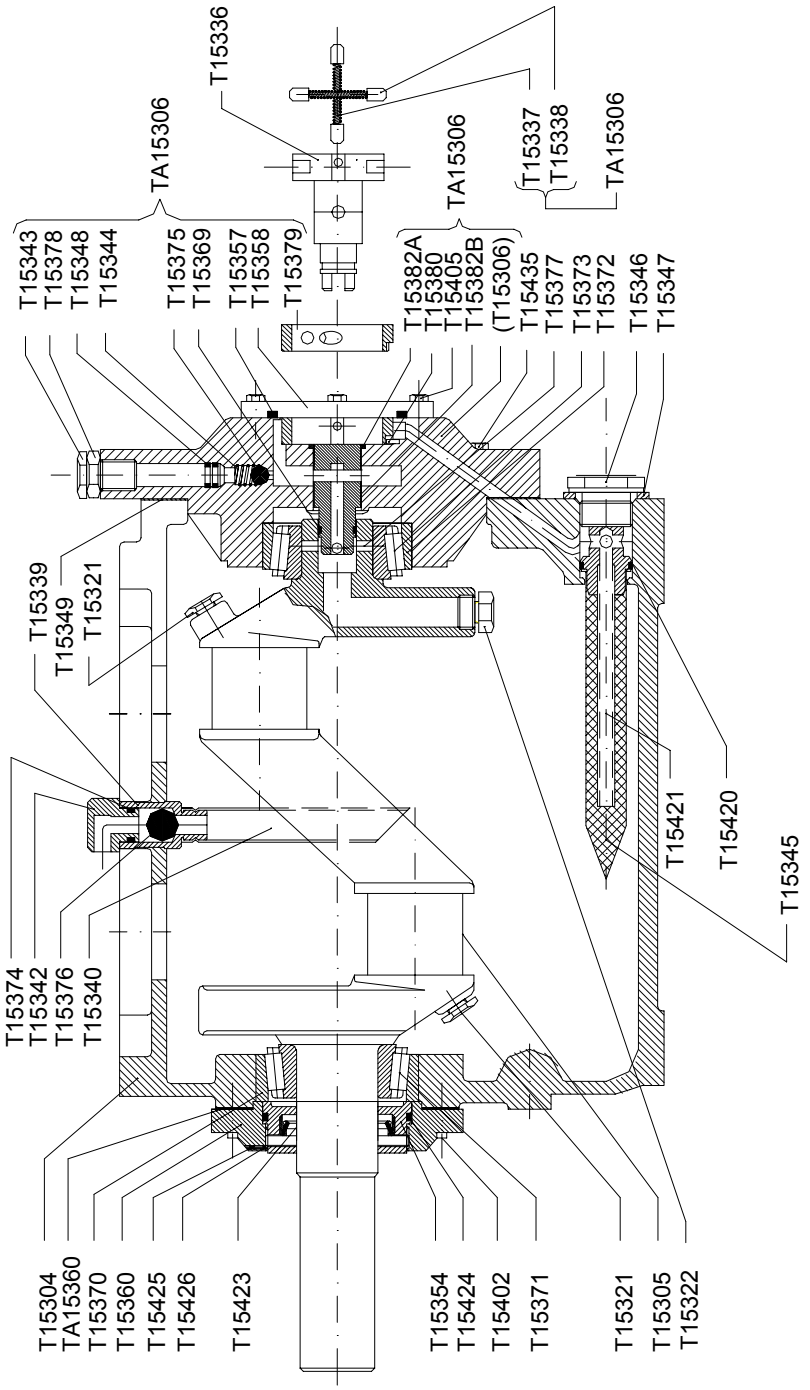
TIGHT	PISTON / CONNECTING ROD DRIVE UNIT	000.000.000



TIGHT	PISTON / CONNECTING ROD DRIVE UNIT	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15303	INTERMEDIATE CASING	2
2	TA15307	COMPLETE CONNECTING ROD	2
3	T15309	JOINT PIN	2
4	TA17320	PISTON ROD + CROSSHEAD	2
5	T15323	CONNECTING ROD SCREW	4
6	T15341	BEARING FOR OVERSIZED CONNECTING ROD	2
7	T17361B	PLATE GASKET	2
8	T15364	CONNECTING ROD BEARING	2
9	T15365	SEGER PIN RINGS	4
10	T15412	CONNECTING ROD SELF-LOCKING NUT	4

TIGHT	COMPRESSOR BASEMENT/1	000.000.000



TIGHT	COMPRESSOR BASEMENT/1	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15304	MAIN CASING	1
2	T15305	CRANK SHAFT	1
3	TA15306	COMPLETE OIL PUMP	1
4	T15321	CRANK SHAFT ORIFICE CAP	2
5	T15322	CRANK SHAFT CAP	1
6	T15336	OIL PUMP ROTOR	1
7	T15337	OIL PUMP SECTORS	4
8	T15338	OIL PUMP SECTOR SPRINGS	4
9	T15339	OIL VAPOUR DISCHARGE VALVE	1
10	T15340	OIL VAPOUR DRAIN	1
11	T15342	DISCHARGE VALVE HEAD FOR OIL VAPOURS	1
12	T15343	CALIBRATION SCREW FOR OIL PUMP VALVE	1
13	T15344	CALIBRATION SPRING FOR OIL PUMP VALVE	1
14	T15345	OIL FILTER NET	1
15	T15346	OIL PUMP FILTER	1
16	T15347	WASHER FOR OIL PUMP FILTER	1
17	T15348	O-RING FOR OIL PUMP CALIBRATION VALVE	2
18	T15349	OIL PUMP GASKET	1
19	T15354	CALIBRATION BEARING RING NUT	1
20	T15357	O-RING FOR OIL PUMP CAP	1
21	T15358	OIL PUMP CAP	1
22	T15360	RING NUT SUPPORT FOR BEARING CALIBRATION	1
23	T15360A	GASKET	1
24	T15369	O-RING FOR OIL PUMP PULLEY	1
25	T15370	PULLEY SIDE OUTER BEARING	1
26	T15371	PULLEY SIDE INNER BEARING	1
27	T15372	PULLEY SIDE OUTER BEARING	1
28	T15373	PULLEY SIDE INNER BEARING	1
29	T15374	O-RING FOR OIL VAPOUR DRAIN CAP	1
30	T15375	OIL PUMP CALIBRATION BALL	1
31	T15376	NYLON BALL FOR OIL BREATHING	1
32	T15377	OIL PUMP ROTOR SHAFT ELASTIC PIN	1
33	T15378	OIL PUMP CALIBRATION LOCK NUT	1
34	T15379	OIL PUMP CAM	1

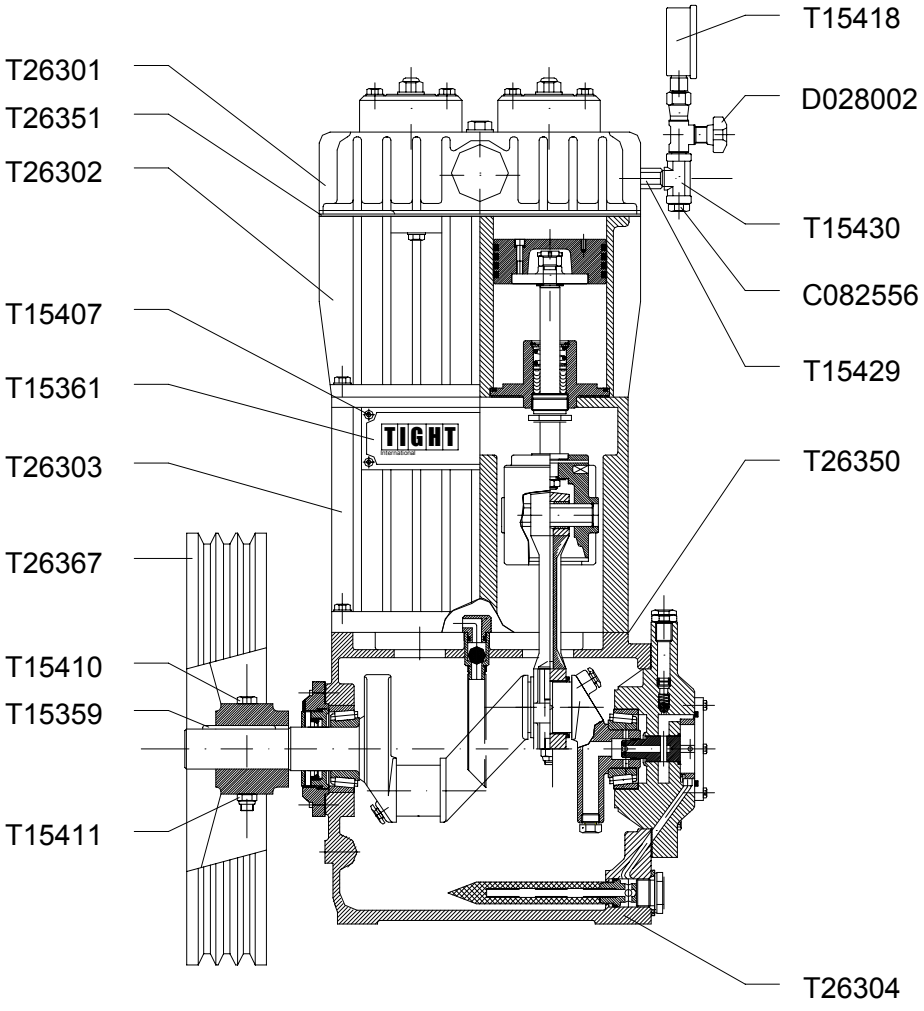
TIGHT	COMPRESSOR BASEMENT/2	000.000.000

POS	P-N	DESCRIPTION	Q.TY'
35	T15380	OIL PUMP CAM FIXING PIN	1
36	T15382A	OIL PUMP SHAFT BUSHING	1
37	T15382B	OIL PUMP SHAFT BUSHING	1
38	T15402	SOCKET HEAD SCREW M8x20	4
39	T15435	HEXAGONAL HEAD NUT 10 x 25mm CL.8.8	6
40	T15405	HEXAGONAL HEAD NUT M5x15	6
41	T15420	O-RING FOR OIL SUCTION FILTER	1
42	T15421	OIL SUCTION HOSE	1
43	T15423	CRANK SHAFT OIL SEAL	1
44	T15424	O-RING FOR CALIBRATION BEARING RING NUT	1
45	T15425	SECURITY DOWEL FOR CALIBRATION RING NUT	2
46	T15426	SECURITY DOWEL FOR CALIBRATION RING NUT	2

7

Spare part tables A938

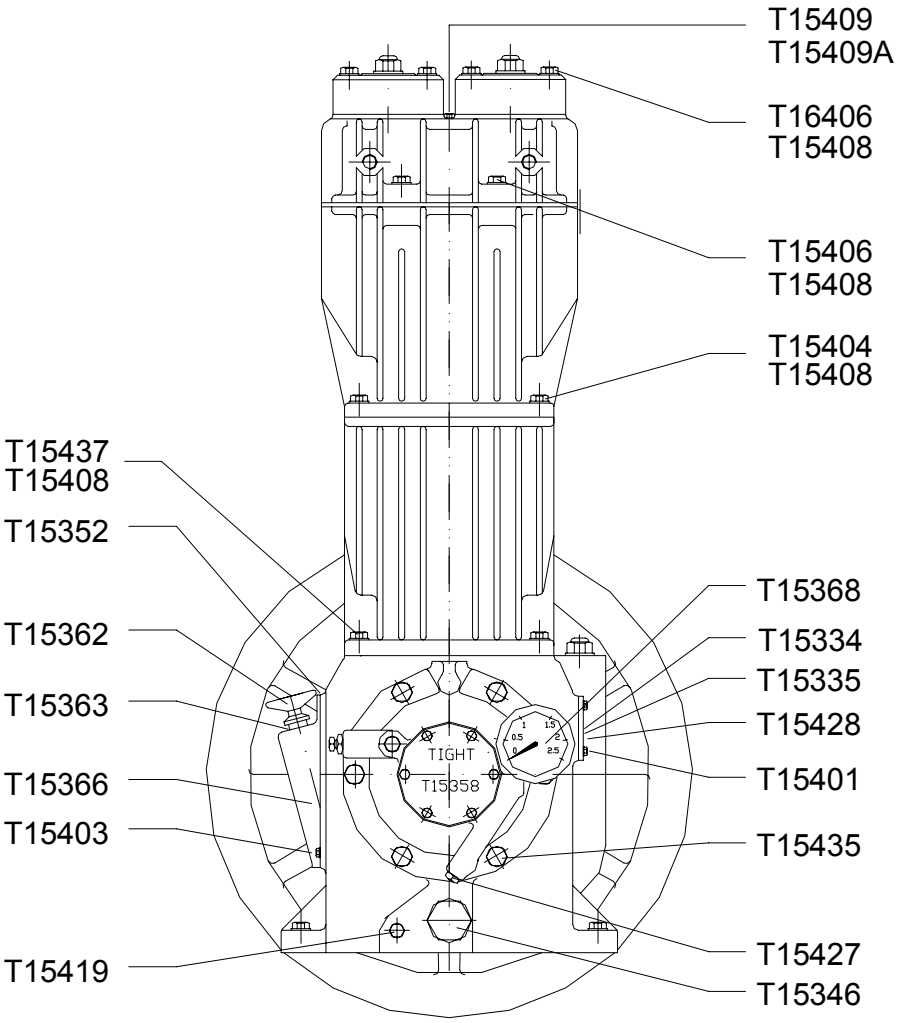
TIGHT	CUTWAY VIEW OF THE WHOLE COMPRESSOR	000.000.000



TIGHT	CUTWAY VIEW OF THE WHOLE COMPRESSOR	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15359	PULLEY KEY	1
2	T15361	PLATE	1
3	T15407	COUTERSUNK SCREW	8
4	T15410	PULLEY BOLT	2
5	T15411	SELF-LOCKING PULLEY NUT	2
6	T15418	VACUUM PRESSURE GAUGE	1
7	T15429	DAMPER	2
8	T15430	TEE COCK-HOLDER	2
9	T26301	CYLINDER HEAD	1
10	T26302	CYLINDER BLOCK	1
11	T26303	INTERMEDIATE CASING	1
12	T26304	MAIN CASING	1
13	T26350	OIL PAN GASKET	1
14	T26351	HEAD GASKET	1
15	T26367	SELF-VENTILATED PULLEY	1
16	D028002	¼" NIDLE COCK	2
17	C082556	¼" MALE CAP	2

TIGHT	SIDE VIEW OF THE WHOLE COMPRESSOR	000.000.000

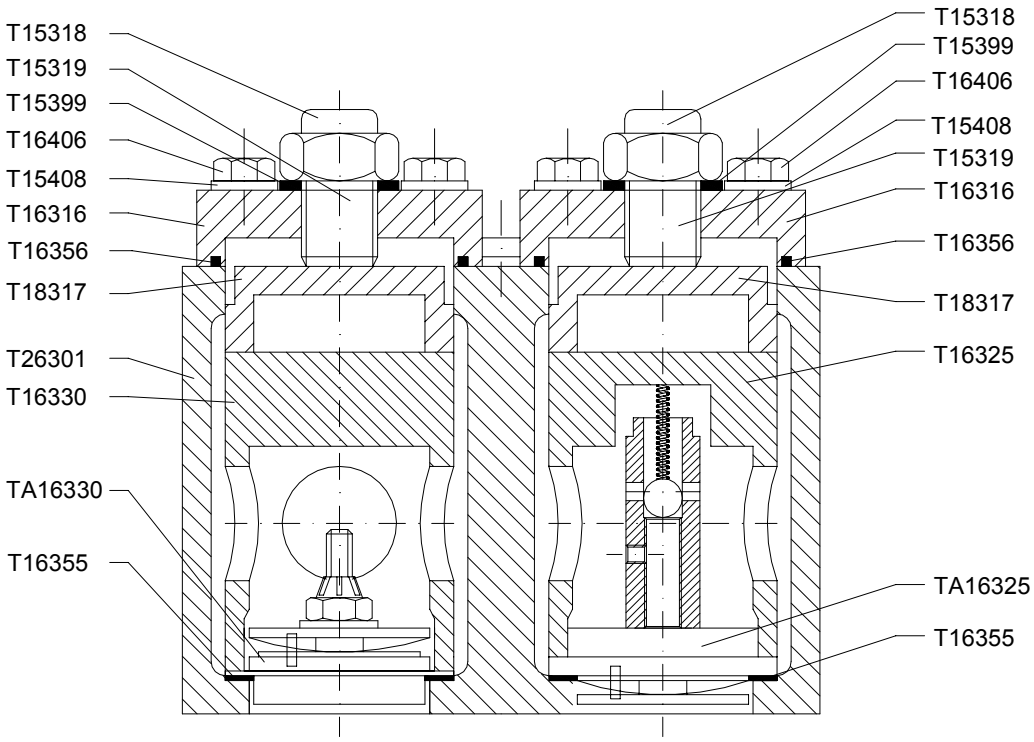


TIGHT	SIDE VIEW OF THE WHOLE COMPRESSOR	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15334	OIL CIRCUIT LABYRINTH CAP	1
2	T15335	OIL CIRCUIT LABYRINTH	1
3	T15346	OIL PUMP FILTER	1
4	T15352	PAN PLATE GASKET	1
5	T15362	OIL LEVEL ROD	1
6	T15363	O-RING FOR OIL LEVEL ROD	1
7	T15366	INSPECTION PLATE	1
8	T15368	OIL PRESSURE GAUGE	1
9	T15401	HEXAGONAL HEAD NUT M6 x10mm	5
10	T15403	HEXAGONAL HEAD NUT	6
11	T15404	NUT 10x30 CL.10.9	6
12	T15406	NUT 10x35 CL.10.9	8
13	T15408	ELASTIC WASHER Ø 10.5 mm	36
14	T15409	HEXAGONAL HEAD NUT	2
15	T15409A	WASHER (NUT T15409)	2
16	T15419	OIL DELIVERY CAP	1
17	T15427	OIL PUMP CAP	1
18	T15428	RUBBER RING FOR OIL LABYRINTH	2
19	T15435	EMBEDDED HEXAGONAL BOLT	6
20	T15437	HEXAGONAL HEAD NUT M10x25 mm	6
21	T16406	HEXAGONAL HEAD NUT	16

7

TIGHT	SUCTION AND DELIVERY VALVE	000.000.000

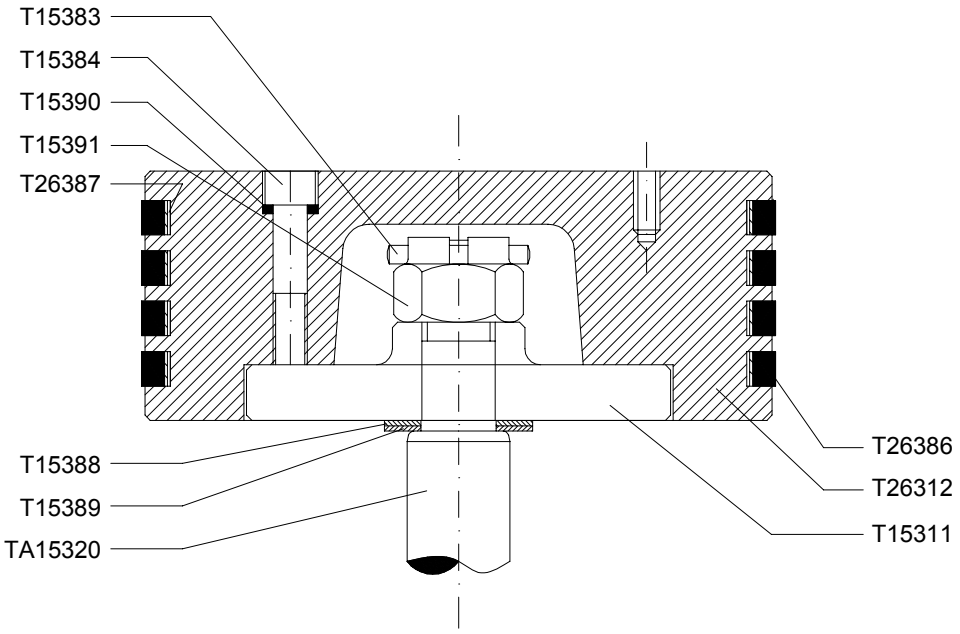


TIGHT	SUCTION AND DELIVERY VALVE	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15318	VALVE SPACER CLAMPING NUT	4
2	T15319	VALVE SPACER CLAMPING SCREW	4
3	T15399	VALVE NUT WASHER	4
4	T15408	ELASTIC WASHER	36
5	T16316	VALVE CAP	4
6	T16325	SUCTION VALVE UPPER BODY	2
7	TA16325	SUCTION VALVE	2
8	T16330	DISCHARGE VALVE UPPER BODY	2
9	TA16330	DISCHARGE VALVE	2
10	T16355	SUCTION / DISCHARGE VALVE GASKET	4
11	T16356	VALVE CAP GASKET	4
12	T16406	HEXAGONAL HEAD NUT VALVE CAP NUT M10 x 50 cl.10.9	16
13	T18317	SUCTION / DISCHARGE VALVE SPACER CAP	4
14	T26301	CYLINDER HEAD	1

7

TIGHT	PISTON ASSEMBLY	000.000.000

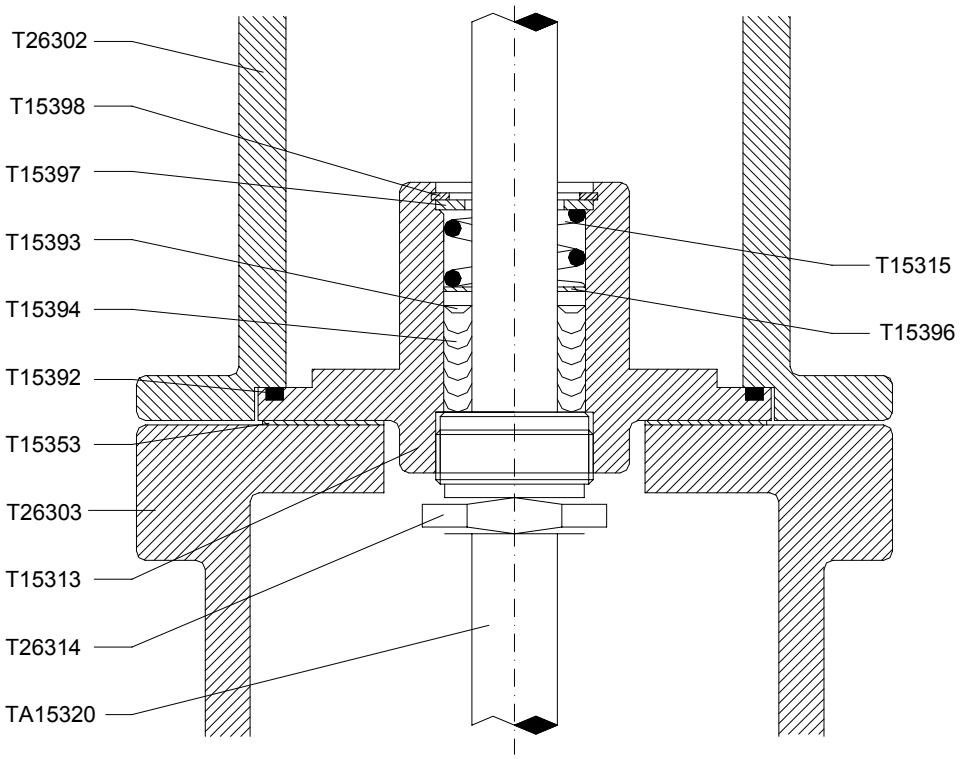


TIGHT	PISTON ASSEMBLY	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15311	PISTON CONNECTING FLANGE	2
2	TA15320	PISTON ROD + CROSSHEAD	2
3	T15383	ELASTIC WASHER FOR PISTON SCREW	16
4	T15384	PISTON HEAD SCREW 6x35 mm	16
5	T15388	WASHER 1mm THICK	2
6	T15389	WASHER 1.5mm THICK	2
7	T15390	PISTON ROD FIXING PIN	2
8	T15391	PISTON ROD CARVED NUT	2
9	T26312	PISTON BODY Ø120 mm	2
10	T26386	ELASTIC BAND Ø120 mm	8
11	T26387	ESPANSION RING Ø120 mm	8

7

TIGHT	MECHANICAL SEAL UNIT	000.000.000

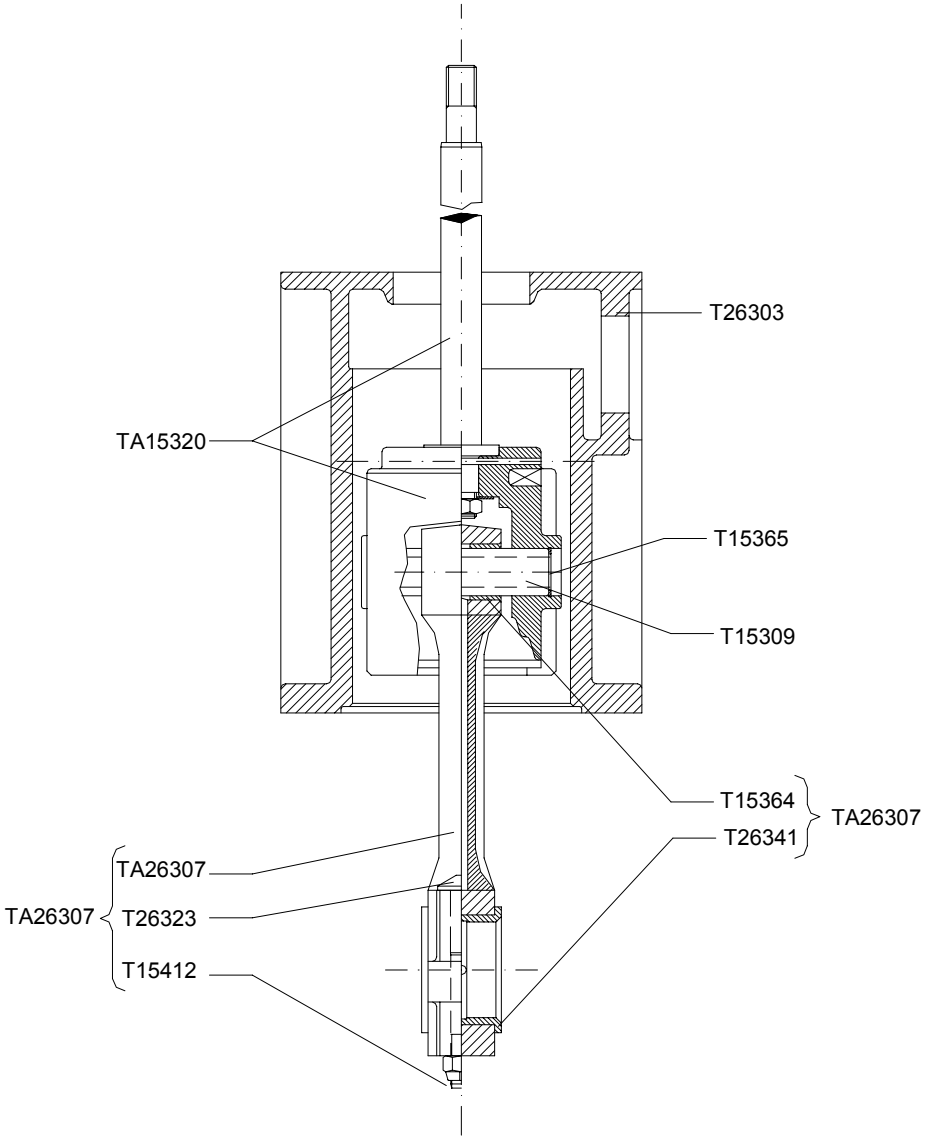


TIGHT	MECHANICAL SEAL UNIT	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15313	SEAL COVERING SUPPORT	2
2	T15315	SEAL WASHER SUPPORT SPRING	2
3	TA15320	PISTON ROD+CONNECTING ROD	2
4	T15353	GLAND GASKET	2
5	T15392	O-RING FOR SEAL COVERING	2
6	T15393	TERMINAL GLAND COVERING	2
7	T15394	SELF- LUBRICANT SEAL TILE	12
8	T15396	COVERING SUPPORT SPRING WASHER	2
9	T15397	SPRING LOCK WASHER	2
10	T15398	SEGER ELASTIC RING	2
11	T26302	CYLINDER BLOCK	1
12	T26303	INTERMEDIATE CASING	1
13	T26314	SEAL WASHER ADJUSTING CAP	2

7

TIGHT	PISTON / CONNECTING ROD DRIVE UNIT	000.000.000

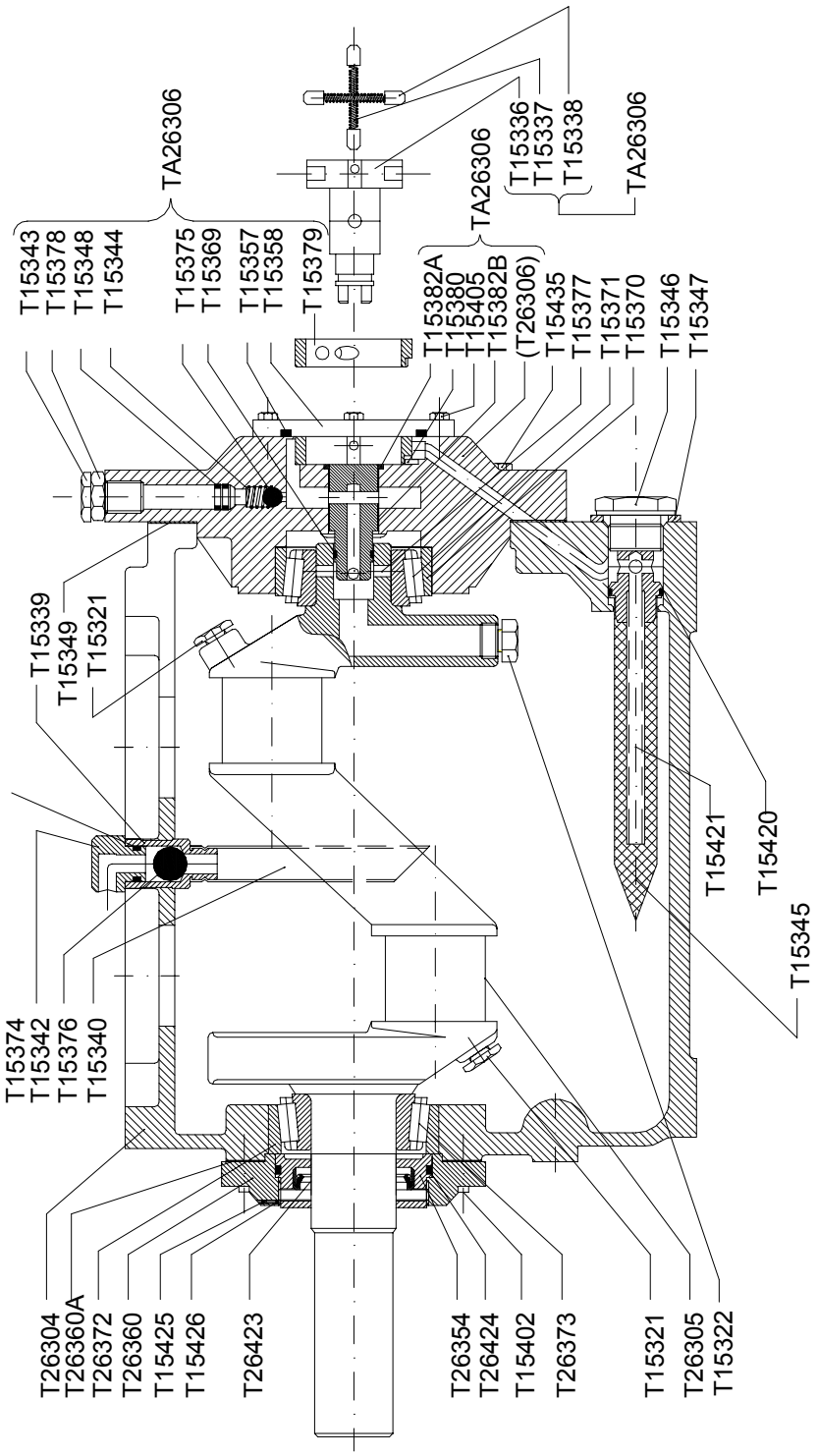


TIGHT	PISTON / CONNECTING ROD DRIVE UNIT	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15309	JOINT PIN	2
2	TA15320	PISTON ROD + CONNECTING ROD	2
3	T15364	CONNECTING ROD BEARING	2
4	T15365	SEGER PIN RINGS	4
5	T15412	CONNECTING ROD SELF-LOCKING NUT	4
6	T26303	INTERMEDIATE CASING	1
7	T26307	COMPLETE CONNECTING ROD	2
8	T26323	CONNECTING ROD SCREW	4
9	T26341	BEARING FOR OVERSIZE CONNECTING ROD	2

7

TIGHT	COMPRESSOR BASEMENT/1	000.000.000



TIGHT	COMPRESSOR BASEMENT/1	000.000.000

POS	P-N	DESCRIPTION	Q.TY
1	T15321	CRANK SHAFT ORIFICE CAP	2
2	T15322	CRANK SHAFT CAP	1
3	T15336	OIL PUMP ROTOR	1
4	T15337	OIL PUMP SECTORS	4
5	T15338	OIL PUMP SECTOR SPRINGS	4
6	T15339	OIL VAPOUR DISCHARGE VALVE	1
7	T15340	OIL VAPOUR DRAIN	1
8	T15342	DISCHARGE VALVE HEAD FOR OIL VAPOURS	1
9	T15343	CALIBRATION SCREW FOR OIL PUMP VALVE	1
10	T15344	CALIBRATION SPRING FOR OIL PUMP VALVE	1
11	T15345	OIL FILTER NET	1
12	T15346	OIL PUMP FILTER	1
13	T15347	WASCER FOR OIL PUMP FILTER	1
14	T15348	O-RING FOR OIL PUMP CALIBRATION VALVE	2
15	T15349	OIL PUMP GASKET	1
16	T15357	O-RING FOR OIL PUMP CAP	1
17	T15358	OIL PUMP CAP	1
18	T15369	O-RING FOR OIL PUMP PULLEY	1
19	T15370	PULLEY SIDE OUTER BEARING	1
20	T15371	PULLEY SIDE INNER BEARING	1
21	T15374	O-RING FOR OIL VAPOUR DRAIN CAP	1
22	T15375	OIL PUMP CALIBRATION BALL	1
23	T15376	NYLON BALL FOR OIL BREATHING	1
24	T15377	OIL PUMP ROTOR SHAFT ELASTIC PIN	1
25	T15378	OIL PUMP CALIBRATION LOCK NUT	1
26	T15379	OIL PUMP CAM	1
27	T15380	OIL PUMP CAM FIXING PIN	1
28	T15382A	OIL PUMP SHAFT BUSHING	1
29	T15382B	OIL PUMP SHAFT BUSHING	1
30	T15402	SOCKET HEAD SCREW M8x20mm	4
31	T15405	HEXAGONAL HEAD NUT M5x15mm	6
32	T15420	O-RING FOR OIL SUCTION FILTER	1
33	T15421	OIL SUCTION HOSE	1
34	T15425	SECURITY DOWEL FOR CALIBRATION RING NUT	2

TIGHT	COMPRESSOR BASEMENT/2	000.000.000

POS	P-N	DESCRIZIONE	Q.TY
35	T15426	SECURITY DOWEL FOR CALIBRATION RING NUT	2
36	T15435	NUT 10 x 25mm CL.8.8	6
37	T26304	MAIN CASING	1
38	T26305	CRANK SHAFT	1
39	TA26306	COMPLETE OIL PUMP	1
40	T26354	CALIBRATION BEARING RING NUT	1
41	T26360	RING NUT SUPPORT FOR BEARING CALIBRATION	1
42	T26360A	GASKET	1
43	T26372	PULLEY SIDE OUTER BEARING	1
44	T26373	PULLEY SIDE INNER BEARING	1
45	T26423	CRANK SHAFT OIL SEAL	1
46	T26424	O-RING FOR CALIBRATION BEARING RING NUT	1

Chapter 8

Technical documentation

Manuals of sub-supplied parts

Electric diagrams

8

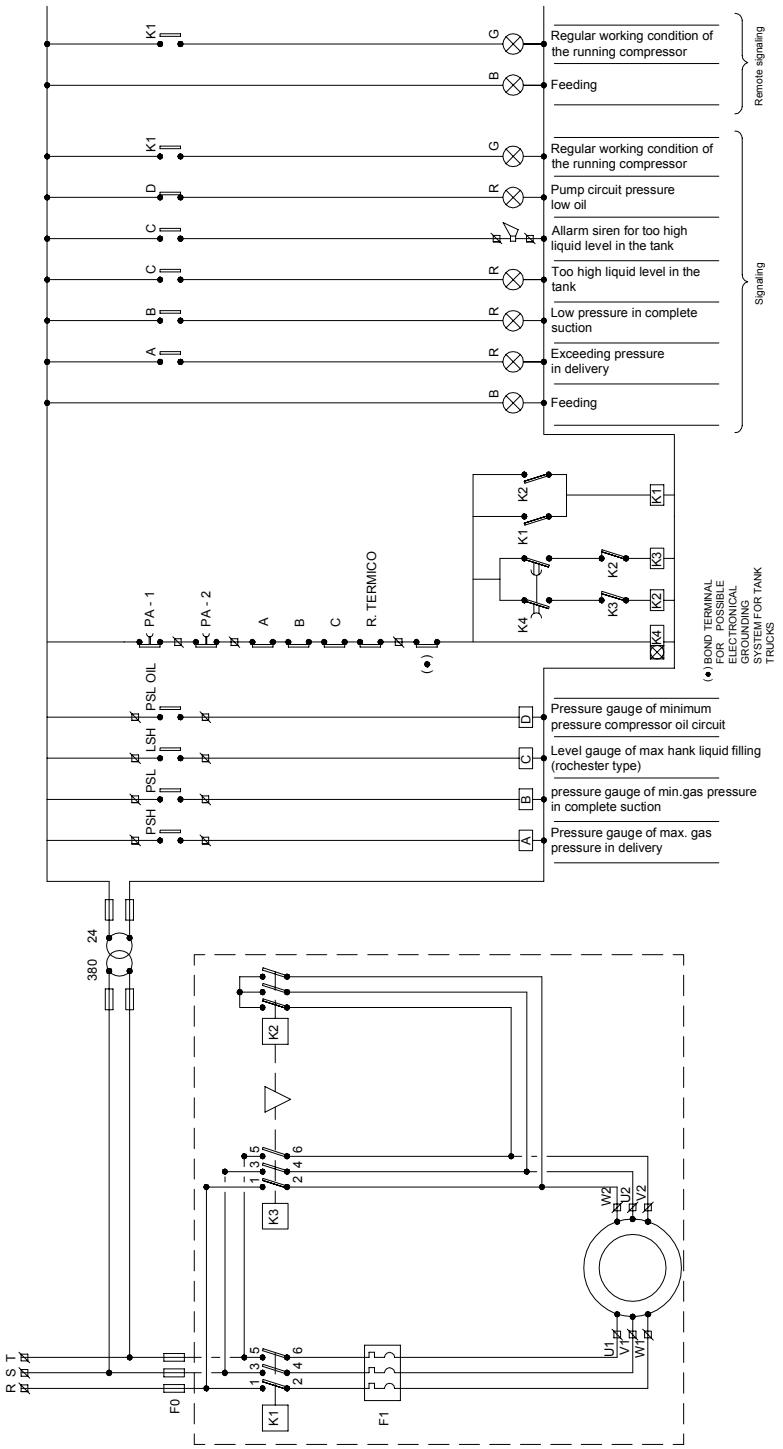
Manuals of sub-supplied parts

8

Electric diagrams

PROVIDE FOR A DIFFERENTIAL PROTECTION RELAY TO BE COORDINATED WITH THE EXISTING GROUNDING PLANT

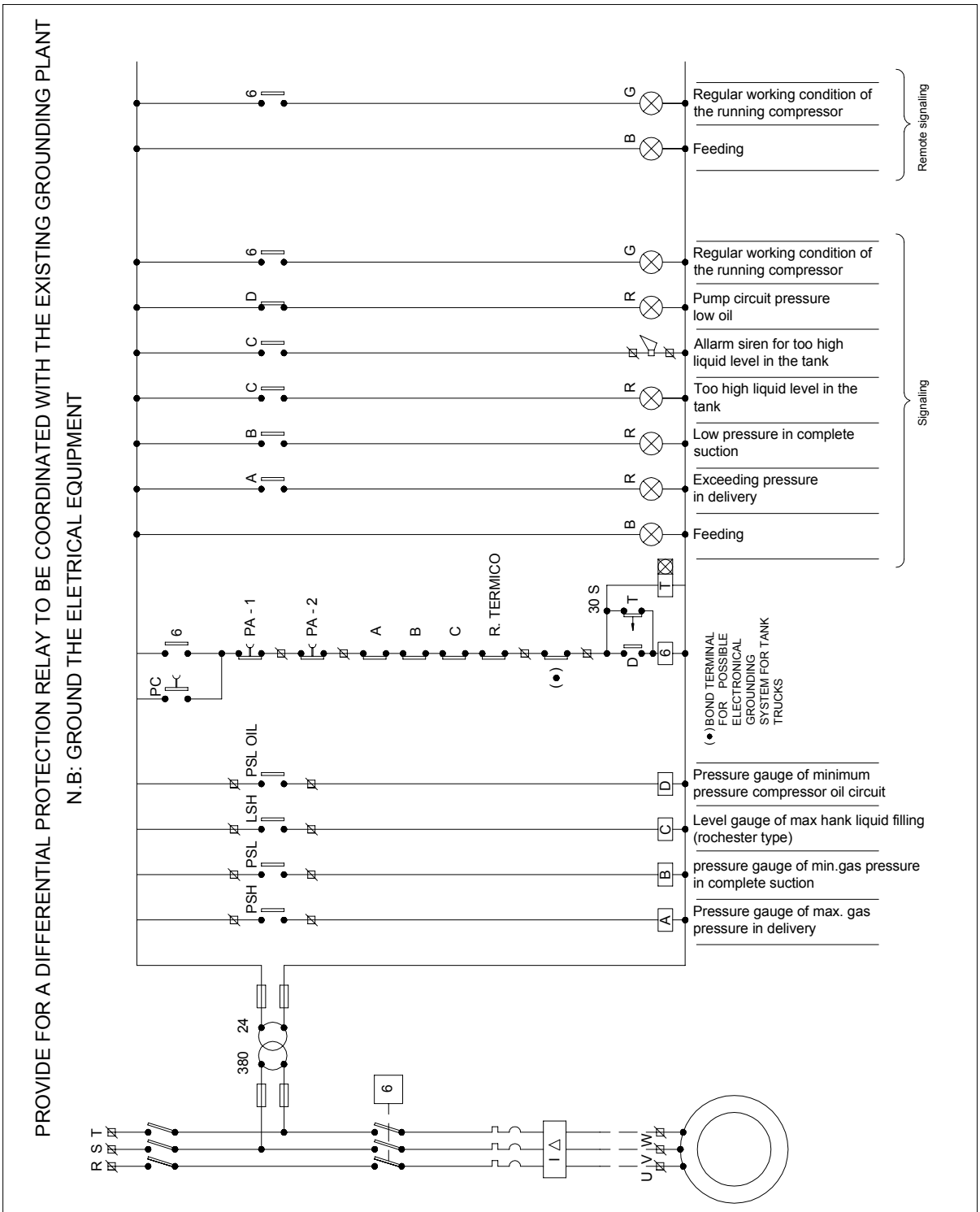
N.B: GROUND THE ELETRICAL EQUIPMENT



	43036 Fidenza (PARMA) Italy, Via Chiusa Ferranda 15/A Tel.:0039-0524-532111 Fax.: 0039-0524-81952 tight@polaris.it	Disegno: N° MAN-668-5.5-IT-004

TIHGT COMPRESSOR ELECTRICAL SCEME - DIRECT STARTING

	Data	Firme
Controllo:		
Visto:		



	43036 Fidenza (PARMA) Italy, Via Chiusa Ferranda 15/A Tel.:0039-0524-532111 Fax.: 0039-0524-81952 tight@polaris.it	Disegno: N° MAN-668-5.5-IT-004

TIHGT COMPRESSOR ELECTRICAL SCEME - DIRECT STARTING

N.B.- A termine di legge ci riserviamo la proprietà di questo disegno con divieto di riprodurlo o di renderlo comunque noto a terzi o a ditte concorrenti senza nostra autorizzazione.		Data	Firme
	Controllo:		
	Visto:		


TIGHT