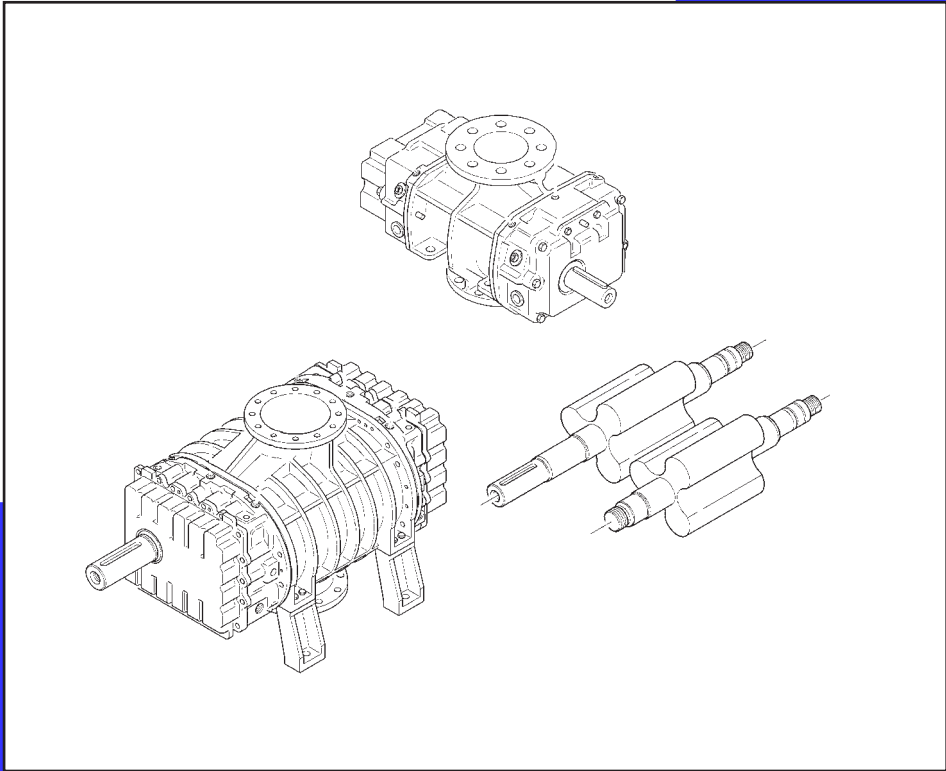


Rotary piston blower stage

Installation, assembly and operating instructions
for rotary piston blower stage

ENGLISH



**AERZENER MASCHINENFABRIK
GMBH**

G4-001 N EN	
168 397 000	01-2012



Die INFO-Seite ist vor der Inbetriebnahme durchzulesen.
Dort evtl. vermerkte Hinweise und Änderungen sind durchzuführen.

Read the INFORMATION sheet prior to commissioning.
Possible notes and changes indicated herein are to be effected.

La page INFO est à lire avant la mise en route.
Y apporter éventuellement des annotations et modifications.

De INFO-Bladzijde moet voor de inbedrijfname worden doorgelezen.
Daar eventueel opgeschreven aanwijzingen en modificaties moeten worden uitgevoerd.

Prima della messa in esercizio leggere la pagina INFO, ed eseguire eventuali
istruzioni o modifiche indicate.

Antes de proceder a la puesta en marcha, leer detenidamente la página informativa y
cumplir eventuales indicaciones y modificaciones indicadas en la misma.

A página de informações deve ser lida antes da colocação em funcionamento. As eventuais indicações e alterações
aí mencionadas devem ser respeitadas.

INFO-siden skal læses igennem inden idriftsættelsen. Evt. anvisninger og ændringer der står dér skal gennemføres.

Les INFO-siden før igangsetting. Anvisninger og endringer som står oppført der, skal utføres.

Läs igenom INFO-sidan före idrifttagning. Eventuellt angivna anvisningar eller förändringar skall genomföras.

Pidätämme oikeuden painovirheisiin, erehdyksiin sekä teknisiin muutoksiin..

Druckfehler, Irrtümer sowie technische Änderungen sind vorbehalten.

We are not liable for misprints, errors, and we reserve the right to make technical changes.

Sous réserve de fautes d'impression, d'erreurs et de modifications techniques.

Drukfouten, vergissingen en technische wijzigingen voorbehouden.

Salvo error u omisión. Reservado el derecho a realizar modificaciones técnicas.

Salvo errori di stampa, incorrettezze e modifiche tecniche.

Reservamo-nos o direito a erros de impressão, enganos e alterações técnicas.

Der tages forbehold for trykfejl, fejl og tekniske ændringer.

Med forbehold om trykfeil, feiltagelser og tekniske endringer.

Tryckfel, övriga fel samt tekniska förändringar förbehålles.

INFO-sivu on luettava ennen käyttöönottoa. Siellä ilmoitetut mahdolliset muutokset tai lisäykset on otettava huomioon

Einbauerklärung

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 Déclaration d'incorporation
 Inbouwverklaring
 Declaración de incorporación
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ENGLISH

Translation of the original instructions

1 - 44



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Einbauerklärung für unvollständige Maschinen gemäß Maschinenrichtlinie 2006/42/EG

Declaration of incorporation for partly completed machineries in accordance with Machine Directive 2006/42/EC

Déclaration d'incorporation de quasi-machines selon la directive Machines 2006/42/CE

Die Einbauerklärung für diese Drehkolbenmaschine wird von den technischen Angaben im Kapitel „Leistungsdaten“ ergänzt. Die dort erwähnten Angaben identifizieren das Produkt und sind in Verbindung mit dieser Einbauerklärung zu verwenden.

The declaration of incorporation for the rotary piston machine is supplemented by the technical specification in the chapter „Performance data“.

The data mentioned there identify the product and must be used in association with this declaration of incorporation.

La déclaration d'incorporation de cette machine à pistons rotatifs est complétée par les indications techniques du chapitre « Caractéristiques de puissance ».

Les indications qui y sont données identifient le produit et sont à mettre en relation avec la présente déclaration d'incorporation.

DEUTSCH Originaleinbauerklärung

Hiermit erklärt der Hersteller: **Aerzener Maschinenfabrik GmbH, Reherweg 28, D-31855 Aerzen**

dass folgende grundlegende Sicherheits- und Gesundheitsschutzanforderungen nach Anhang I der oben genannten Richtlinie angewandt und eingehalten sind: Artikel 1.1.2 Grundsätze für die Integration der Sicherheit, 1.1.3 Materialien und Produkte, 1.1.5 Konstruktion der Maschine im Hinblick auf die Handhabung, 1.2.1 Sicherheit und Zuverlässigkeit von Steuerungen, 1.3.1 Risiko des Verlustes der Standsicherheit, 1.3.2 Bruchrisiko beim Betrieb, 1.3.4 Risiken durch Oberflächen, Kanten und Ecken, 1.5.6 Brand, 1.5.8 Lärm, 1.5.9 Vibrationen, 1.6.4 Eingriffe des Bedienpersonals, 1.7.1 Informationen und Warnhinweise an der Maschine, 1.7.2. Warnung vor Restrisiken.

Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn festgestellt wurde, ob das endgültige Aggregat, in das die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht.

Bei Einbau einer unvollständigen Maschine in eine Gebrauchsmaschine ist zu prüfen, ob dieser Einbau zu einer wesentlichen Veränderung der Gebrauchsmaschine führt und somit die Maschinenrichtlinie anzuwenden wäre.

Der Einbau unvollständiger Maschinen in Gebrauchsmaschinen fällt ansonsten nicht unter den Anwendungsbereich der Maschinenrichtlinie.

Diese Einbauerklärung bezieht sich auf den vom Hersteller in Verkehr gebrachten originalen Maschinenzustand. Bei nachträglich durchgeführten Veränderungen und/oder nachträglich vorgenommenen Eingriffen erlischt diese Einbauerklärung.

Der Hersteller verpflichtet sich, die speziellen Unterlagen dieser unvollständigen Maschine, einzelstaatlichen Stellen auf begründetes Verlangen, in elektronischer Form, zu übermitteln.

Die zur Maschine gehörenden speziellen technischen Unterlagen nach Anhang VII Teil B wurden erstellt.

Dokumentationsverantwortlicher: Herr Irtel Aerzen, 18-08-2009

ENGLISH Translation of original declaration of incorporation

The manufacturer: **Aerzener Maschinenfabrik GmbH, Reherweg 28, D-31855 Aerzen**

hereby declares that the following safety and health protection requirements according to Appendix I of the above-mentioned directive have been applied and complied with: Article 1.1.2 Fundamental Principles for Integrating Safety, 1.1.3 Materials and Products, 1.1.5 Machine Design with Regard to Handling, 1.2.1 Safety and Reliability of Controllers, 1.3.1 Risk of Loss of Stability, 1.3.2 Risk of Fracture During Operation, 1.3.4 Risks due to Surfaces, Edges and Corners, 1.5.6 Fire, 1.5.8 Noise, 1.5.9 Vibrations, 1.6.4 Intervention by Operating Personnel, 1.7.1 Information and Warnings on the Machine, 1.7.2. Warning of Residual Risks.

The partly completed machinery must only be put into operation once it has been established whether the final assembly in which the partly completed machinery is to be installed complies with the Machine Directive 2006/42/EC.

When installing a partly completed machinery in a used machine, it is essential to check whether the installation significantly alters the used machine and whether the machine directive must be applied.

Otherwise, installing partly completed machineries in used machines is not covered by the area of application of the machine directive.

This declaration of incorporation refers to the machine in its original state as marketed by the manufacturer. Any changes introduced subsequently and/or interventions carried out subsequently will void this declaration of incorporation.

The manufacturer is obliged to transmit the special documents for the partly completed machinery to the national authorities in response to a request with reasons.

The special technical documents for the machine in accordance with Appendix VII Part B have been created.

Responsible for documentation: Herr Irtel Aerzen, 18-08-2009

FRANÇAIS Traduction de la déclaration d'incorporation d'origine

Le fabricant : **Aerzener Maschinenfabrik GmbH, Reherweg 28, D-31855 Aerzen**

déclare par la présente que les exigences fondamentales relatives à la santé et à la sécurité suivantes, définies dans l'annexe I de la directive mentionnée ci-dessus, sont appliquées et satisfaites : Article 1.1.2 Principes d'intégration de la sécurité, 1.1.3 Matériaux et produits, 1.1.5 Conception de la machine en vue de sa manutention, 1.2.1 Sécurité et fiabilité des systèmes de commande, 1.3.1 Risque de perte de stabilité, 1.3.2 Risque de rupture en service, 1.3.4 Risques dus aux surfaces, aux arêtes ou aux angles, 1.5.6 Incendie, 1.5.8 Bruit, 1.5.9 Vibrations, 1.6.4 Intervention de l'opérateur, 1.7.1 Informations et avertissements sur la machine, 1.7.2. Avertissement sur les risques résiduels.

La quasi-machine ne doit pas être mise en service avant que la machine finale dans laquelle elle doit être incorporée ait été déclarée conforme aux dispositions pertinentes de la directive Machines 2006/42/CE.

En cas d'incorporation d'une quasi-machine dans une machine d'occasion, il convient de vérifier si cette incorporation entraîne une modification significative de la machine d'occasion et si la directive Machines est applicable.

Sinon, l'incorporation de quasi-machines dans des machines d'occasion ne tombe pas dans le domaine d'application de la directive Machines.

La présente déclaration d'incorporation se rapporte à l'état d'origine de la machine tel que mis en circulation par le fabricant. Cette déclaration d'incorporation est rendue caduque par toute modification et/ou intervention ultérieure.

Le fabricant s'engage à transmettre sous forme électronique les informations pertinentes concernant la quasi-machine à la suite d'une demande dûment motivée des autorités nationales.

La documentation technique pertinente pour la quasi-machine a été constituée conformément à l'annexe VII partie B.

Responsable de la documentation : Monsieur Irtel Aerzen, 18-08-2009

Herr Irtel

Leiter Techn. Abteilung
Head of the dept.
Directeur technique

Unterschrift des Herstellers
Signature of the manufacturer
Signature du constructeur

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Diese Einbauerklärung ist mit dem Inkrafttreten der Maschinenrichtlinie 2006/42/EG ab dem 29-12-2009 gültig.

This declaration of incorporation applies when the Machine Directive 2006/42/EC comes into force on 29-12-2009.
Cette déclaration d'incorporation est valable à partir du 29/12/2009 avec l'entrée en vigueur de la directive Machines 2006/42/CE.



Inbouwverklaring voor incomplete machines conform machinerichtlijn 2006/42/EG
Declaración de incorporación para cuasi máquinas, de conformidad con la Directiva de Máquinas 2006/42/CE
Dichiarazione di incorporazione per macchine incomplete secondo la Direttiva macchine 2006/42/CE

De inbouwverklaring voor deze roterende zuigercompressor wordt aangevuld door de technische informatie in het hoofdstuk „Specificaties“.
Aan de hand van de daar vermelde informatie wordt het product geïdentificeerd en de informatie moet in combinatie met deze inbouwverklaring toegepast worden.
La declaración de incorporación para esta máquina de émbolos giratorios es complementada por los datos técnicos que se encuentran en el capítulo "Datos de potencia".
Los datos ahí indicados identifican al producto y se deberán utilizar conjuntamente con esta declaración de incorporación.
La Dichiarazione di incorporazione per la presente macchina a pistoni rotanti è integrata dai dati tecnici riportati nel capitolo „Dati di prestazione“.
Le informazioni incluse in quel capitolo identificano il prodotto e devono essere utilizzate insieme alla presente Dichiarazione di incorporazione.

NEDERLANDS

Vertaling van de originele inbouwverklaring

Hiermee verklaart de fabrikant: **Aerzener Maschinenfabrik GmbH, Reherweg 28, D-31855 Aerzen** dat de volgende fundamentele veiligheids- en gezondheidseisen conform bijlage I van de hiervoor genoemde richtlijn toegepast en nageleefd zijn: Artikel 1.1.2 Beginselen van geïntegreerde veiligheid, 1.1.3 Materiaal en producten, 1.1.5 Ontwerp van de machine met het oog op het hanteren ervan, 1.2.1 Veiligheid en betrouwbaarheid van de bedieningssystemen, 1.3.1 Risico van verlies van stabiliteit, 1.3.2 Risico van breuken tijdens het gebruik, 1.3.4 Risico's in verband met oppervlakken, scherpe kanten, hoeken, 1.5.6 Risico's door brand, 1.5.8 Risico's door geluid, 1.5.9 Risico's door trillingen, 1.6.4 Ingrepen door het bedieningspersoneel, 1.7.1 Informatie en waarschuwingen op de machine, 1.7.2. Waarschuwing voor restrisico's.
De incomplete machine mag pas in gebruik genomen worden nadat vastgesteld is of het definitieve aggregaat waarin de incomplete machine ingebouwd wordt, aan de bepalingen van machinerichtlijn 2006/42/EG voldoet.
Bij inbouw van een incomplete machine in een gebruikte machine moet gecontroleerd worden of deze inbouw tot een wezenlijke verandering van de gebruiksmachine leidt en of zodoende de machinerichtlijn toegepast moet worden.
De inbouw van incomplete machines in gebruikte machines valt anders niet onder de werkingssfeer van de machinerichtlijn.
Deze inbouwverklaring heeft betrekking op de originele machinetoestand die door de fabrikant in omloop is gebracht. Bij veranderingen en/of ingrepen die naderhand uitgevoerd zijn, komt deze inbouwverklaring te vervallen.
De fabrikant is verplicht de speciale documentatie van deze incomplete machine, op gegronde wens in elektronische vorm aan nationale instanties door te geven.
De speciaal bij de machine horende technische documentatie conform bijlage VII deel B is opgesteld.
Verantwoordelijk voor de documentatie: de heer Irtel Aerzen, 18-08-2009

ESPAÑOL


Traducción de la declaración de incorporación original

Por la presente, el fabricante: **Aerzener Maschinenfabrik GmbH, Reherweg 28, D-31855 Aerzen** declara que se han aplicado y se cumplen los siguientes requisitos esenciales de seguridad y salud según el anexo I de la directiva mencionada: Artículo 1.1.2 Principios de integración de la seguridad, 1.1.3 Materiales y productos, 1.1.5 Diseño de la máquina con vistas a su mantenimiento, 1.2.1 Seguridad y fiabilidad de los sistemas de mando, 1.3.1 Riesgo de pérdida de estabilidad, 1.3.2 Riesgo de rotura en servicio, 1.3.4 Riesgos debidos a superficies, aristas o ángulos, 1.5.6 Incendio, 1.5.8 Ruido, 1.5.9 Vibraciones, 1.6.4 Intervención del operador, 1.7.1 Información y señales de advertencia sobre la máquina, 1.7.2 Advertencia de los riesgos residuales.
No está permitido poner en marcha la cuasi máquina hasta que no se haya comprobado, que el equipo final, en el que se incorporará la cuasi máquina, cumple con las disposiciones de la Directiva de Máquinas 2006/42/CE.
Al incorporar una cuasi máquina en una máquina usada, deberá comprobarse si esta incorporación supone una modificación importante que implique la aplicación de la Directiva de Máquinas.
En caso contrario, la incorporación de cuasi máquinas en máquinas usadas no recae dentro del ámbito de aplicación de la Directiva de Máquinas.
Esta declaración de incorporación se refiere al estado original de la máquina que el fabricante comercializa. En el caso de realizar modificaciones y/u operaciones posteriores, la declaración perderá toda validez.
El fabricante se compromete a transmitir, en respuesta a un requerimiento debidamente motivado de las autoridades nacionales, la información pertinente relativa a esta cuasi máquina, en formato electrónico.
La documentación técnica correspondiente a la máquina, de conformidad con el anexo VII, parte B ha sido elaborada.
Responsable de la documentación: Sr. Irtel Aerzen, 18.08.2009

ITALIANO

Traduzione della dichiarazione originale di incorporazione

Con la presente dichiarazione il produttore: **Aerzener Maschinenfabrik GmbH, Reherweg 28, D-31855 Aerzen** dichiara di avere applicato e rispettato i seguenti requisiti essenziali di sicurezza e di tutela della salute in base all'Allegato I della suddetta direttiva: art. 1.1.2 Principi d'integrazione della sicurezza, 1.1.3 Materiali e prodotti, 1.1.5 Progettazione della macchina ai fini della movimentazione, 1.2.1 Sicurezza ed affidabilità dei sistemi di comando, 1.3.1 Rischio di perdita di stabilità, 1.3.2 Rischio di rottura durante il funzionamento, 1.3.4 Rischi dovuti a superfici, spigoli od angoli, 1.5.6 Incendio, 1.5.8 Rumore, 1.5.9 Vibrazioni, 1.6.4 Intervento dell'operatore, 1.7.1 Informazioni e avvertenze sulla macchina, 1.7.2. Avvertenze in merito ai rischi residui.
La quasi-macchina può essere messa in funzione soltanto una volta appurato che il gruppo finale in cui deve essere incorporata soddisfa le disposizioni della Direttiva macchine 2006/42/CE.
In caso di installazione di una quasi-macchina in una macchina usata, è necessario verificare se tale installazione comporta una modifica essenziale della macchina usata e, quindi, se deve essere applicata la Direttiva macchine.
In caso contrario l'installazione di una macchina incompleta in una macchina usata non rientra nel campo applicativo della Direttiva macchine.
Questa dichiarazione di incorporazione si riferisce allo stato della macchina originale messa in circolazione dal produttore.
In caso di modifiche eseguite successivamente e/o di interventi eseguiti in un secondo momento, decade l'obbligo della dichiarazione.
Il produttore si impegna a trasmettere la documentazione speciale in formato elettronico relativa alla quasi-macchina ad uffici a livello nazionale dietro richiesta fondata.
È stata predisposta la documentazione tecnica speciale relativa alla macchina secondo l'Allegato VII Parte B.
Responsabile della documentazione: Sig. Irtel Aerzen, 18-08-2009



(Herr Irtel)

Hoofd technische afdeling
Director Dept. Técnico
Responsabile reparto tecnico

Handtekening van de fabrikant
Firma del fabricante
Firma del fornitore

A3-045 A XT

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Ersatzteile, spare parts, pièces dé tachée, onderdelen, repuestos, pezzi di ricambio

- AERZENER MASCHINENFABRIK -

Ersatz- und Zubehörteile

Es wird darauf hingewiesen, dass nicht von uns gelieferte Originalteile und Zubehör auch nicht von uns geprüft und freigegeben sind. Der Einbau oder Anbau sowie die Verwendung solcher Produkte kann daher unter Umständen konstruktive vorgegebene Eigenschaften der Anlagen beeinflussen. Für Schäden, die durch Verwendung von nicht Originalteilen und Zubehör entstehen, ist jede Haftung des Herstellers ausgeschlossen.

Spare parts and accessories

We draw your attention to the fact that original parts and accessories not supplied by us are also not inspected and released by us. Therefore, the installation and application of such products might influence under certain circumstances constructively stipulated properties of the plants. Consequential damages due to application of non-original parts and accessories release the manufacturer from any warranty and liability.

Accessoires et pièces de rechange

Nous attirons votre attention sur le fait que les accessoires et pièces d'origine n'étant pas de notre fourniture ne peuvent être contrôlés et pris en considération lors d'une réclamation. L'intégration ou le montage ainsi que l'utilisation de telles pièces peut influencer sous certaines conditions les caractéristiques et performances de la machine. Pour tout dommage causé du fait de pièces n'étant pas d'origine ou de montage erroné, nous déclinons toute responsabilité.

Reservedelen en toebehoren

Er wordt uitdrukkelijk op gewezen dat niet door ons geleverde originele delen en toebehoren ook niet door ons getest en vrijgegeven zijn. De in- of aanbouw alsmede de toepassing van zulke producten kan derhalve onder zekere omstandigheden constructief gegeven eigenschappen van de installatie beïnvloeden. Voor schade, die door gebruik van niet originele delen en accessoires ontstaan, is iedere aansprakelijkheid jegens de fabrikant uitgesloten.

Ricambi ed accessori

Devono essere utilizzati solo parti e ricambi originali in quanto verificati dal costruttore della macchina. Il montaggio o l'impiego di prodotti non originali può, in certe circostanze, provocare un cattivo funzionamento dell'impianto. Danni causati dall'impiego di parti e/o ricambi non originali esonerano il produttore da ogni responsabilità e garanzia.

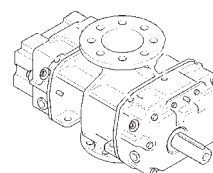
Piezas de repuesto y accesorios

Indicamos expresamente, que aquellos repuestos y/o accesorios no suministrados por nosotros no están comprobados ni homologados por Aerzen. Su montaje, así como su utilización pueden tener incidencia en las características prefijadas de la instalación. Por lo tanto no asumimos garantía ni responsabilidad alguna sobre éstas piezas y de los eventuales daños posteriores y/o alteraciones de las calidades y prestaciones de origen. Para daños originados por la utilización de piezas y accesorios no originales, se excluye cualquier responsabilidad por parte del fabricante.



Leistungsdaten

Performance data



Aerzener Maschinenfabrik

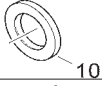


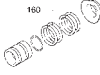

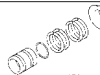





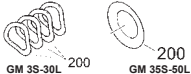







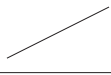

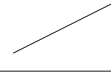

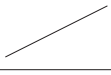

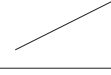

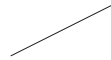


Ersatzteilliste / spare parts list

3SG-4648
3SG-4647



Auftrags-Nr. <i>order no.</i>		Typ <i>type</i>	
Fabrik-Nr. <i>serial no.</i>		Kundenbestell-Nr. <i>Customer's order no.</i>	
Lieferanschrift <i>Dispatch address</i>			
Rechnungsanschrift <i>Invoice address</i>			

Pos.		Stückzahl / quantity	Pos.		Stückzahl / quantity
10			150		
20			160		
30			170		
40			180		
50			190		
60			200		
70			210		
80			220		
90			230		
100			240		
110			250		
120			260		
130			270		
140			280		

Bitte richten Sie Ihre Bestellung, an die für Sie zuständige Aerzener Vertretung / -Gesellschaft.
 Abruf unter (++49) 0 51 54 81 192
 Please send your ordering to the Aerzen representation / -company responsible for your country.
 Fax polling ++49 (0) 515481192

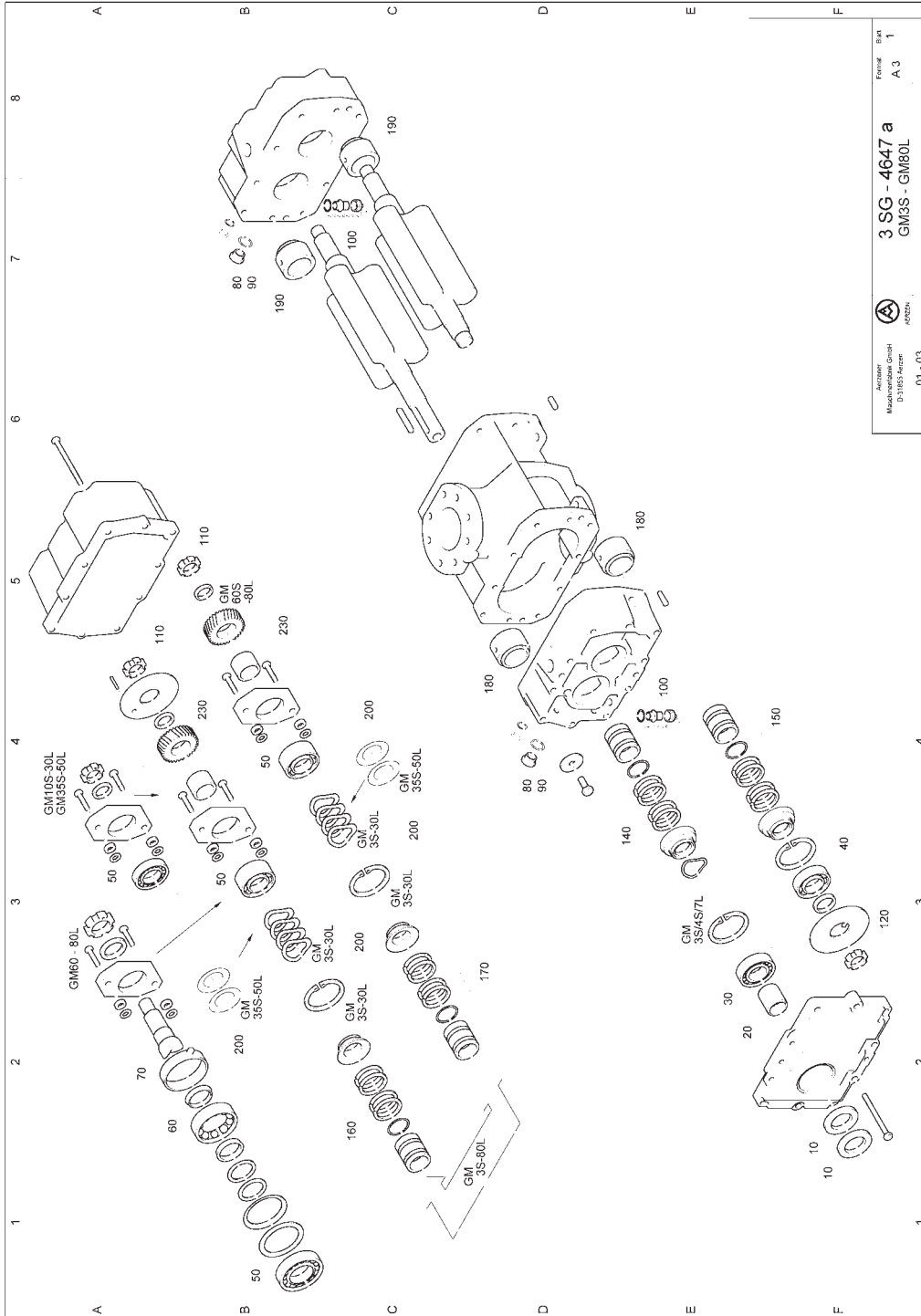
ENGLISH

Notizen

note

Gebälsestufe / Rotary piston - blower stage

Verschleißteilzeichnung / Wearing parts drawing



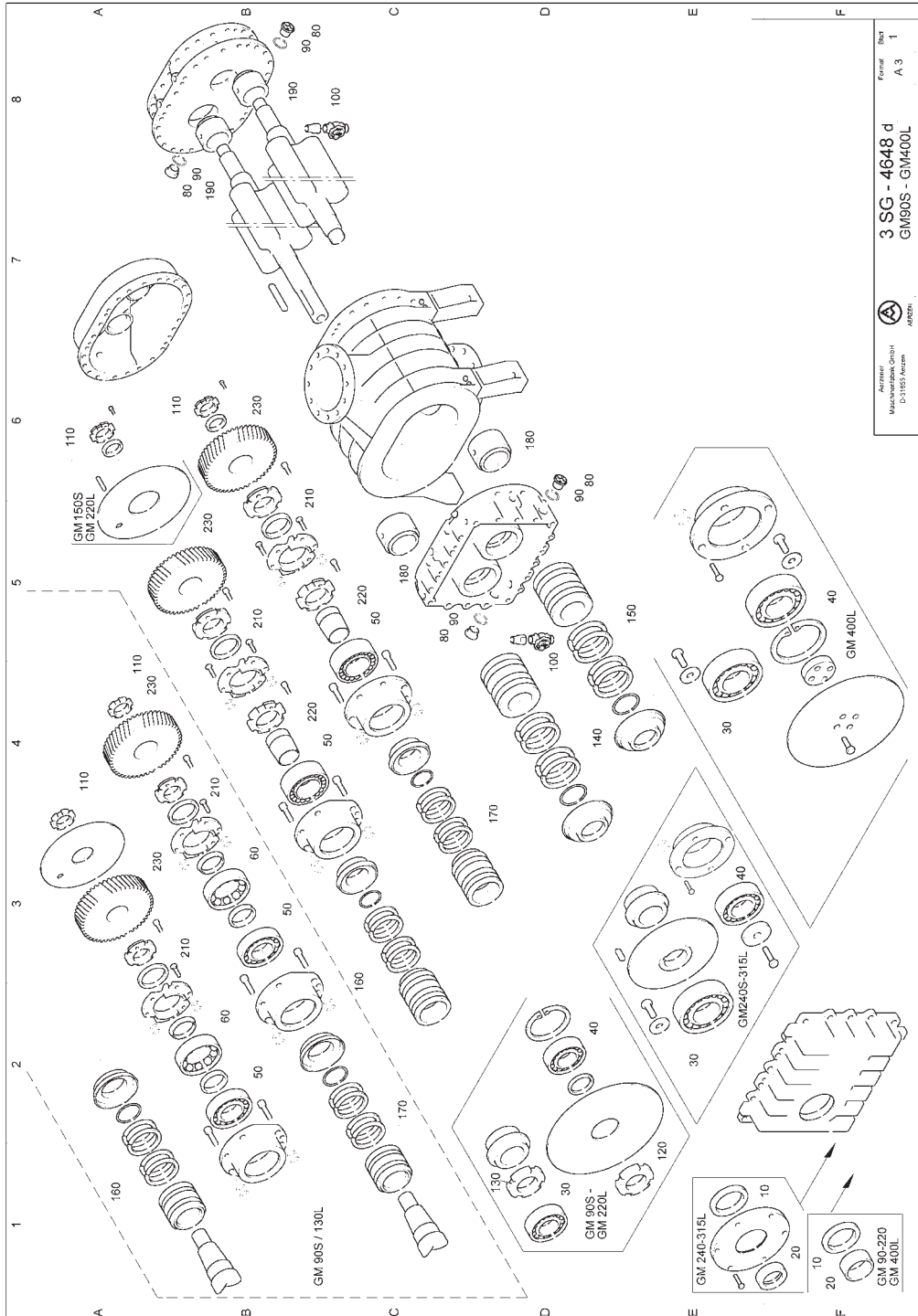
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 GM3S - GM80L
 01 - 03
 D-31853-Auzen
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**Diese Abbildung ist eine Beispiel-Darstellung und dient der Ersatzteilbestellung.
 Abweichungen zu der ausgelieferten Maschine sind möglich.
 Detaillierte Informationen enthält die auftragsbezogene Zeichnung.**

***This figure is an example-presentation and serves for spare part order.
 Deviations to the machine supplied are possible.
 The drawing gives detail information according to the order number.***

Gebläsestufe / Rotary piston - blower stage

Verschleißteilzeichnung / Wearing parts drawing



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Suitability/General information

The German version of these instructions is the "Original instructions". Any version in a language other than German is a "Translation of the original instructions".

Aerzener rotary piston machines are suitable for the oil-free conveying and compression of air and, if specially modified versions are used, various other types of gas.

The technical performance limits must be observed if perfect operation of the equipment is to be ensured in the long term.

The performance limits specified in the order confirmation apply.

The intake temperature t_1 specified on the order confirmation serves as the installation site ambient temperature.

Non-observance of the technical performance limits or the safety information shall absolve Aerzener Maschinenfabrik of its warranty obligations and its liability to pay damages or compensation as a result of any consequential damage. The same shall apply to defects that can be traced back to recommended inspections not being performed correctly or on time.

The vibration behaviour of blowers and compressors with mounted belt pulleys or couplings is largely determined by the balance quality of the pistons/rotors as well as the balance of the driving elements.

At Aerzener Maschinenfabrik, the piston/rotor driving shafts are balanced using the „half-key balancing“ technique.

The belt pulleys/couplings must be used in accordance with the requirements of balancing type „H“.

The maintenance intervals according to these operating instructions must be followed and carried out properly. Complying with the maintenance specifications will ensure that the machine retains its value and will also promote operational reliability.



Construction, function

Blower stage:

The blower stage is supplied as a fully assembled unit.

The following additional work must be carried out:

- Correct installation/assembly in the relevant unit/system
- Connect the conveying piping.
- Check lubricating oil level.
- Adjust level, if necessary.
- Install driving elements, ensuring that safety devices are in place!
- Install special accessories which are supplied separately, if necessary.

Service package:

An Aerzener service package is available for the blower stage. Depending on the option selected, this includes auxiliary equipment and material, e.g. for filling with oil, draining oil, etc.

Motor connection:

Electrical installation of the driving motor must only be carried out by an authorised electrical fitter.

The motor and control voltage must be connected to a stable common network and the power contactor unlocked in the event of an interruption of circuit. Voltage fluctuations and dips must be avoided.

Alternative: An electronic monitoring relay must be installed parallel to the driving motor so that the power contactor can be unlocked in the event of an interruption of circuit.

A restart should only be possible once the machine has come to a complete halt.

Requirements for operating rotary piston machines with asynchronous electric motors on a 3-phase AC system:

The machine should only be used on stable three-phase systems.

The voltage and frequency limits must be observed. These are specified in EN 60034-1.

Voltage fluctuations/dips beyond the tolerance zone can seriously damage all the elements that make up the drive system, e.g. couplings, V-belts, V-belt pulleys, shafts, gear wheels, etc. .

If the supply system is subject to significant voltage fluctuations.

Aerzener Maschinenfabrik recommends the following measures to avoid damaging the blower, compressor or motor:

- Use a suitable protective device that will shut down the motor and definitely prevent an automatic restart when impermissible operating data is detected. Please also observe EN 60034-1 and EN 60 204-1 in this respect.

Unit/System:

The blower stage must be installed/assembled in a unit/system in the correct way so that it is safe to operate.

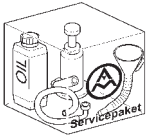
No forces or moments that could distort the blower housing are permitted to act on the flange.

A distortion-resistant form of assembly/installation must be ensured.

The blower stage must be installed flat (without any slopes).

Operational safety/reliability will be affected in accordance with the extent of any misalignment.

We recommend that you install a pressure valve in the piping on the discharge side to protect the blower against overload. No shut-off valves must be installed between the pressure valve and blower stage.



With a suction pressure version, we recommend that you install a suction valve in the piping on the intake side. No shut-off valves must be installed between the suction valve and blower stage.

Suitable valves are available from Aerzener Maschinenfabrik.

The valves are not intended to control the operating data!

Filter silencer/Starting strainer

A filter (or in the case of intake from a pipeline, a starting strainer) should be used to ensure the blower stage's operational reliability.

We recommend that you use an Aerzener intake silencer. This silencer is a combination of intake-side silencer and intake filter. The filter element is easily exchanged due to its easy access.

The degree of contamination or the specifications in the maintenance schedule determine when the filter element is to be replaced.

Accessories:

A non-return valve is required on the discharge side to prevent the blower from running in reverse after shutdown.

Additionally, a start-up relief can be installed on the discharge side.

This provides relief from any existing discharge pressure during start-up.

With a suction pressure version, various components must be used accordingly.

All accessory components are available from Aerzener Maschinenfabrik.

Function:

Aerzener rotary piston blowers are dual-shaft rotary piston machines whose pistons turn uniformly against each other. Timing gear wheels guarantee contact-free running of the rotary pistons. The rotational direction determines the conveying direction of the blower, which means there is a discharge-side and intake-side flange. During operation, the medium to be conveyed flows through the intake flange into the housing.

From there, it is forced through the conveying chambers (consisting of the pistons and the blower cylinder) to the discharge side.

Pulsation decrease on the basis of interference (patented).

The conveying chamber (cylinder) is sealed against the oil chambers (casing cover and gear case) by square piston ring labyrinth seals and the driving shaft is sealed by means of one or two radial seal rings.

If the oil level is too high, oil can penetrate into the conveying chamber in an uncontrolled manner.

Compression heat arises during the compression process. Some of the heat is dissipated via the outer surfaces of the blower and conveying piping into the ambient air.

Outer surfaces and conveying piping reach temperatures that can result in burns to exposed skin.



**Erst lesen -
dann bedienen!**

*Read first,
then operate !*



Hinweis:

Angaben zur Schallhaube können je nach Aggregat- / Anlagenausführung variieren. Instruktionen des Anlagenbauers beachten !

Note:

Details concerning acoustic hood can vary depending on unit-/plant design. Pay attention to instructions of plant manufacturer!

Remarque:

Les indications concernant capot d'insonorisation peuvent varier selon exécution du groupe / de l'usine. Les instructions du constructeur de l'usine sont à observer.



Due Care to Be Taken Before and During Operation

CAUTION !  Identifies all hazardous situations

WARNING !  Indicates direct risk to personnel

Upon arrival/receipt, the rotary piston machine must be checked against the delivery and order documentation to make sure it has not been damaged during transit and is complete.

Work safety regulations, safety information and operating instructions must all be complied with.

Read the **INFORMATION SHEET** prior to commissioning. Any notes or changes stated on it must be observed.

The tasks described below must only be carried out by qualified personnel who are familiar with the operation of the machine and its components, and have been instructed in the relevant safety information.

This rotary piston machine conforms to European safety regulations. Nevertheless, residual technical risks, which could endanger persons and property, may remain. To prevent this, operators must take note of the following safety information:

Assembly of the unit

- Keep the flange connections sealed during installation.
- The ingress of dirt, burring, sputtering, liquids or similar must be avoided.
- Remove the seals and covers on the flanges just before the ducting connection.
- The rotary piston machine can otherwise be blocked or sustain serious damage.

Information about operating data

- The machine must be used appropriately and in compliance with the regulations, and within its performance limits.
- The sound pressure level may deviate from that stated in the operating data, depending on the operating state. A sound pressure level in excess of 85 dB(A) may therefore occur for a short period of time.

Information about general operation

- The general safety and industrial accident prevention regulations set down by law must be taken into account in addition to the information in the operating instructions.
- The user has an obligation to only operate the machine in perfect, original condition and when it is safe to operate.
- The rotary piston machine is equipped with electrical energy in order to avoid any hazards that may be caused by electricity.
- Only trained electrical technicians may work on current-carrying components.
- Any possibly dangerous electrostatic charging must be avoided and/or enable the discharge of electrical charges with the support of devices.
- A suitable earthing system must be equipped to protect against possible damage caused by lightning strikes.
- For operation, the unit must be equipped with one or more **EMERGENCY BREAK** control units. The **EMERGENCY BREAK** function must be available and ready for operation at all times, independent of the type of operation.

- It must be ensured that a stopped positive displacement machine cannot be moved from the rest position without operating the start function, no matter what the cause!
- Damaged rotary piston machines or machines that are not in perfect working order must be replaced immediately.
- Any operation that impairs machine safety is prohibited.
- The supplier documentation provided with the accessories and the general safety regulations must also be observed.
- The unit contains rotating components. If their protective equipment, according to the version of the unit, e.g. the acoustic hood, belt guard, coupling guard etc., are not observed or are not used appropriately, there is a **risk of injury !**
- Protective equipment such as the belt guard/coupling guard, blower guard, hood elements, electrical safety elements, pressure valves, motor protection/EMERGENCY OFF etc., must not be removed or its operational safety restricted whilst the machine is in operation. **Risk of injury !**
- Do not operate when electrical, mechanical or hydraulic connections are defective missing or are not correctly connected.
- It is expressly prohibited to operate the rotary piston machine without the appropriate protective equipment or safety devices.
- It is expressly prohibited to remove or modify any protective equipment located on the rotary piston machine, divert it from its intended use, or attach third-party protective equipment.
- Do not operate the unit if protective equipment such as the belt or coupling guard, acoustic hood elements, pressure valve, etc., is defective or missing.
- When carrying out work on the unit, the drive motor must be securely disconnected from its power supply.
- Never look into or touch the discharge opening/side of the pressure valve!
- There is a **risk of injury** from decompressing gas escaping at a high speed when the pressure valve is drained. Residual pieces of contaminants, dust particles etc. may escape along with this.
- Screwed connections should only be retightened while the machine is in a depressurised state or is shut down.
- The machine must only be used in stable three-phase supply networks. Voltage fluctuations/dips beyond the tolerance zone can seriously damage all elements that make up the drive system, e.g. couplings, V-belts, V-belt pulleys, shafts, etc. The operator must use oil of a suitable quality, conforming to the Aerzener lubricating oil specifications.
- Observe the safety, operating and maintenance information of the drive motor manufacturer!

Safety instructions for commissioning

- These operating instructions must be read and understood before commissioning the machine.
- Commissioning must only be carried out by persons with the relevant knowledge and skills.
- Before switching on the machine, ensure you are familiar with all protection, operation and monitoring elements by referring to these instructions.
- Before commissioning, the unit must be equipped with a command system with which the machine can be shut down according to the hazard potential in order to return the machine to a safe state.
- The energy supply to the drive motor must be disconnected as soon as the machine is shut down. If this is not possible, the operating state "Shut down" must be monitored and maintained.
- Check that the intake side is clean before commissioning.





- Any evidence of dirt, dust or foreign matter must be removed from the intake area.
- Compliance with the maintenance schedule is absolutely mandatory.

Qualification of operators

- Each person dealing with the installation, operation, maintenance and repair of this unit must have read and understood the operating instructions.
- The unit must only be operated by trained and authorised personnel.
- Personnel must be trained according to the operating instructions.
- Responsibility for operation must be precisely defined in order to prevent any unclear designation of responsibilities.
- Operators must be proficient, instructed and appointed to the work.
- Only trained and authorised electrical technicians may work on current-carrying components. The unit must be disconnected from the power supply. Fuses must be disconnected.

Safety instructions in relation to prevailing residual risks

- The warning and information signs on the machine must be observed.
- They provide important information about potential sources of danger.
- Check that the machine is not damaged in any way before commissioning.
- Do not operate the unit if electrical connections are damaged, defective or not properly connected.
- Do not operate the machine with exposed and accessible inlet or discharge sockets, for the following reasons: Rotary piston machines are positive displacement machines which present a risk of injury in the area around the conveying chamber.
- Only suitable tools that correspond to the respective standards and design of the bolts, nuts and screwed connections must be used.
- When using cleaning agents and sprays, there is a risk of poisoning from inhalation, and a risk of burning from coming into contact with them.
- Please refer to the material safety data sheets for the operating materials used.
- Avoid skin contact with or the swallowing of the lubricant. **Risk of poisoning !** Wear protective gloves.
- Used lubricants are extremely harmful to the environment and can contain noxious materials.
- Lubricants must be stored and disposed of properly and in an environmentally-friendly manner.
- The appropriately fitted rotary piston machines must be used for conveying oxygen. A lubricant especially suited for operating with oxygen must be used.
- Disregarding these warnings is a **risk of fire and explosion !**
- Rotary piston machines with separate speed monitoring are equipped with a contact plate on the drive shaft.
- This contact plate rises above the diameter of the belt pulley and reaches operating speed.
- Disregarding the separating protective equipment is a **risk of shearing !**

Warning signs for hazardous operations

- Repairs and modifications to the unit must only be carried out in a professional manner. If you have any problems, please contact Aerzener After-Sales Service for assistance.
- Before carrying out any retrofitting, servicing or maintenance work that requires the removal of protective equipment, the power supply must be disconnected and the machine secured to prevent it starting up.
- When replacing and cleaning the filter material (if present) dust particles and fibres may be released into the ambient air. Do not breathe in these materials. These materials must not reach the unprotected intake area of

the rotary piston machine.

- Lubricating and control oil pipes should only be retightened or opened while the machine is in a depressurised state.
- Depressurise conveying ducts before attempting to remove them.
- When conveying technical gases, conveying ducts must be rinsed with a neutral gas before disassembly.
- Note the oil temperature when changing the oil. The oil temperature must not rise above 60°C. If it is above 60°C, there is a **risk of burns !**

Personal protective measures

- Conveying ducts or components on the discharge side must not be touched without adequate protection. The ducts and components can reach temperatures in excess of 70°C.
- **Risk of burns !**
- If the acoustic hood is open or missing, there is **risk of burns** when the housing surface becomes hot as a result of operation.
- Protective gloves and clothing must be worn.
- Close-fitting clothing is required due to the presence of rotating components.
- **Risk of injury !**
- Ear protection must be worn during machine operation.

Information about the installation site

- It is the operator's responsibility to use and operate the machine in accordance with its intended use taking into account the local conditions.
- The machine must only be operated in a suitable, well-ventilated installation site. The installation site must be free from excessive dust, acids, steam and explosive or flammable gases.
- The installation site must be arranged to avoid risks as a result of the ambient air, the medium to be conveyed or oxygen deficiency.
- The installation site must be arranged so that the commissioning of the rotary piston machine does not impose a risk of overheating, fire and/or explosion.
- The protective equipment provides protection against injury and must not be modified or bypassed.
- When using diesel or petrol drive motors, there is a **risk of poisoning** if there is insufficient room ventilation. The installation site must be sufficiently ventilated. The motor manufacturer's operating instructions must also be observed

Information on operation with an acoustic hood

- The acoustic hood is a structural safety component.
- During operation with an acoustic hood, all hood elements are to be closed before starting operation and are only to be opened after the motor has been shut down and the fuses removed or switched off.
- The acoustic hood prevents the risk of injury from rotating and hot components.
- If the acoustic hood is opened while the machine is operating,
- there is a **risk of injury**.
- When installing and assembling the unit, no sparks or glowing objects caused by, e.g. welding or separating, are allowed to enter the foam in the acoustic hood.
Risk of fire ! Risk of glowing embers !
- Fire regulations must be adhered to for all "hot work operations" close to the unit.
- **CAUTION !**
- When commissioning, sparks, glowing or other fire-causing objects could be taken in from the intake airflow and, fanned by the acoustic hood ventilator, set the foam alight.
- **Risk of fire !**
- No welding or separating is to be done on the acoustic hood as sparks or sputtering caused by the applied thermal energy could set the foam alight.





- **Risk of fire ! Risk of glowing embers !**
- Depending on the size and increased fire protection regulations, a flame retardant foam would be applied according to the order.

Information about the event of damage

- If the unit produces an abnormal and/or unusual sound, the machine must be shut down immediately using the **EMERGENCY BREAK** function.
- The energy supply to the drive motor must be disconnected.
- If the unit is blocked, the energy supply to the drive motor must be immediately disconnected.
- The cause of malfunction must be determined.
- Aerzener Service can be quickly at hand and provide expert troubleshooting for you.
- The unit must not be taken into operation until it is properly functioning.

Information about operating the pneumatic conveyor/air-separation systems

- When using the positive displacement machine for pneumatic conveying or in air-separation systems with alternating air-separation columns, pressure surges must not occur when switching between different delivery lines. Pressure surges can be prevented by making the switching process for the intake-side and discharge-side valves take at least five seconds. This pre-accelerates the gas column in the pipework and prevents damage to the positive displacement machine caused by sudden acceleration of the gas. The distance between the switchover valve and the intake-side flange must be at least $\geq 10 \times DN$, where DN = nominal diameter of the pipework. This safety note applies to both pressure and vacuum mode.

Inadmissible operating methods

- Installation on uneven and / slanting foundations.
- Securing transport devices to the acoustic hood, e.g. using eye bolts in the acoustic hood element, winding ropes without expansion braces etc.
- Non-observance of operating data.
- Non-observance of maintenance intervals.
- Incorrect direction of rotation.
- Switching on
 - during run-down.
 - during reverse rotation.
- Inadmissible increase in pressure.
- Remaining under or exceeding maximum rotational speed.
- Exceeding the maximum temperature.
- Pole change to lower rotational speed before motor has come to a standstill.
- Operating without a properly connected fault indicator / control is not permitted. Risk of total machine damage!
- Operation without assemblies or with damaged assemblies which serve for the protection of persons and machine.
- Overfilling the maximum oil level.
- Operation without oil.

“Reasonably foreseeable misuse” that can result from easily foreseeable human behaviour:

- Operating the machine without having filled the lubricant.
- Operating the machine with too much lubricant.
- Operating the machine with reduced intake performance, e.g. due to a soiled intake filter, starting strainer etc.
- Assembly and commissioning of the rotary piston machine with intake-side and/or discharge-side flange sealers, protection covers or similar.
- Insufficient ventilation at the installation site, no insulated lines.
- Open fire or sparks created by welding, separating or similar in direct proximity to the unit. Risk of fire!
- Operating the machine without an isolated protective device, open belt or coupling drive.
- Risk of injury from rotating components!
- Taking out the transport securing pin under the hinged motor support during operation.
- Only applicable for belt drive machines.

Foreseeable incorrect operation or use

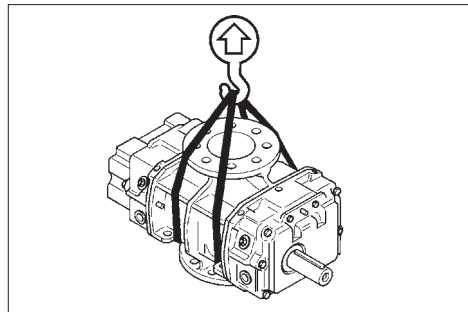
- Dust contaminants should be removed before entry into the blower. In particular, substances which can settle in the conveying chamber or the rotors can jeopardise the operational reliability of the machine.
- The same applies to the compression of resublimating gases containing solid particles, which can separate from the gas phase and deposit in the machine. Resublimation in the blower must be prevented via suitable process control (pressure, partial pressure, temperature and speed etc.).



Transport / Installation / Assembly

When transporting the machine, the following key points must be observed:

- Do not expose the blower to impact loads.
- Transport the blower using a crane, fork-lift truck, lift trolley or similar.
- Only suspend the blower as shown in the sketch.
- Use suitable hoisting gear that is appropriate for the load concerned. Failure to observe this point could result in damage or injury!
- The hoist, cable, chains, etc. must be designed for the load concerned.
- The hoist must be arranged in accordance with the machine's centre of gravity.
- The hoist must not be able to exert any forces on the machine that could result in damage.
- It must be ensured that inadvertent dislocations and hazards due to insufficient stability do not occur during transport and installation of the rotary piston machine.



Storage

- Prior to delivery, rotary piston machines are treated and packaged to allow for a 12-month storage period. If they are to remain in storage following this 12-month period, they will need to be retreated and the machine will need to be repacked appropriately.
- See storage and mothballing guidelines TN0 1175... .
- Whilst the units are in storage, please ensure that they are correctly preserved, packaged and if necessary that they undergo nitrogen replenishment in accordance with TN0 1175. They must be checked every six weeks.
- You must eliminate any adverse influences immediately to ensure ongoing preservation of the units.
- During storage, no sealing plugs or plastic caps should be removed from bore holes, flanges, etc. The purpose of these is to prevent any foreign bodies from entering the machine.
- The oil chambers have been sufficiently preserved for one year.
- If the machine needs to be stored for longer than 24 months, the entire scope of supply must undergo a general inspection by Aerzener trained personnel.
- If special packaging is to be used, e.g. for transportation by sea, etc., specific storage and mothballing guidelines laid down by Aerzener Maschinenfabrik must be observed.
- If the machine is to be stored or if the unit is intended to be taken out of operation for longer than six weeks, the conveying chamber, piston/rotor and bare parts must be preserved.

Installation/Assembly

During installation the following points must be observed:

- The blower must be installed on an a foundation, base and connections that are even, non-vibrating and slope-free.
- CAUTION! If the blower is installed with a tilt, this will result in irreparable damage to the machine due to the uneven oil level.

The machine's operational safety/reliability and service life will be affected in accordance with the extent of any misalignment.

- Remove all packaging material. If your machine features an acoustic hood, ensure that the inlet and exhaust air louver profiles can be accessed.
- Ensure that the installation site is adequately ventilated.
- The following standard installation conditions must be observed:

Ambient temperature : -10°C to 40°C

Rel. air humidity : 0% to 80%

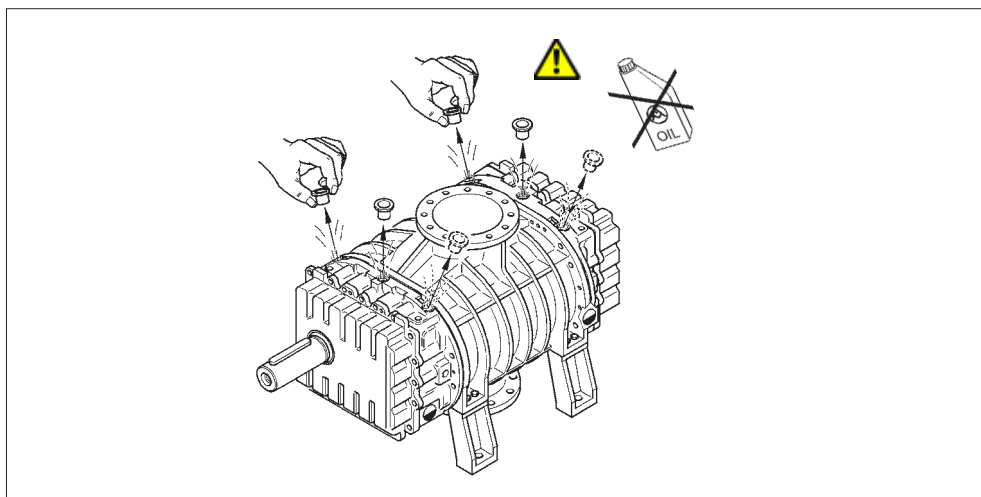
Atmosphere free of chemicals

- Check that the rotary piston machine can run easily. Sluggishness indicates the presence of distortion or foreign bodies.
- For the purpose of conveying air, the plastic plugs must be removed from the condensation holes on the blower. This enables a small amount of warm air to escape in order to clear the condensation holes.

For the purpose of conveying „industrial gases“, the condensation holes must remain sealed.

If the medium to be conveyed has a tendency to produce condensation, then the condensate should be discharged by means of collecting basins or residual gas pipelines or by temporarily opening the lower holes (depending on the application).

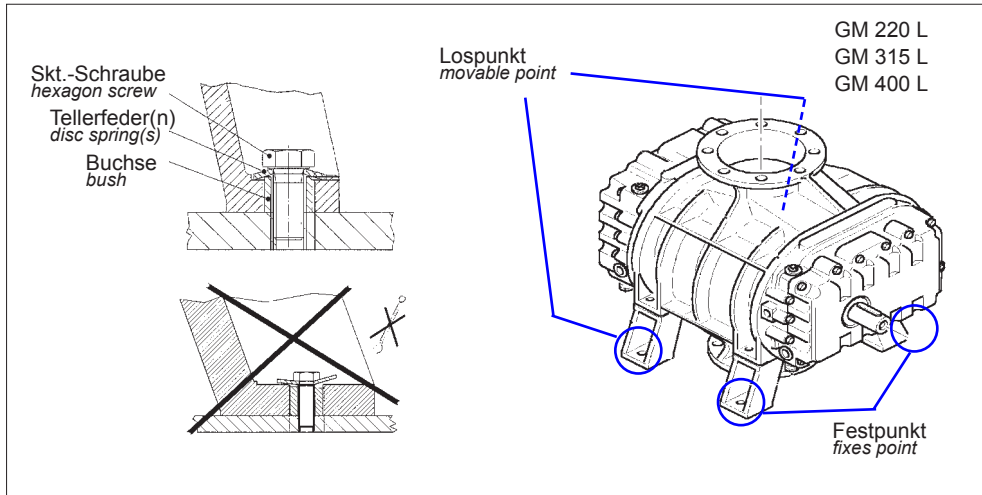
CAUTION! Hot gas or condensate can escape through the holes!



- To avoid electrostatic charging of the units, the motor, acoustic hood and base frame must be earthed via the relevant connections.
- Fasten the piping on the discharge side and the piping on the intake side separately to ensure a stable connection.
- No forces and/or moments are permitted to act on the flange and connections.
- Check that the blower can run easily prior to installation. Sluggishness indicates the presence of foreign bodies inside the conveying chamber.
- Remember to remove the sealing covers from the intake-side and discharge-side flanges prior to installation!



- There must be no distortion of the blower as a result of alignment or tightening operations.
- Assemble the blower fixing screws in the correct manner.
 - Please observe the foot assembly drawing 139 006.
 - According to drawing 139 006, the length of the bush should be determined within the context of assembly.
 - The screw, disc spring and bush must be tightened as far as the stop.



Height equalisation when installing GM blower with fitted machine feet

- When installing a GM blower stage with fitted machine feet there is a difference in height between the lower blower flange surface and the machine foot surface.
- This height difference must be determined during installation and equalised by means of suitable shims.
- Determine the equalisation dimension as follows:
- Locate the blower on the flange with a new flange seal and tighten all the flange bolts.
- Measure and record the gap between all four blower feet and the base surfaces. Then loosen the flange bolts again.
- Insert shims in the appropriate thickness between the blower feet and the base surfaces.
- Required shim thickness = existing gap + 0.1 mm.
- The blower feet should stand almost entirely flush on the shims.
- Tighten the flange and foot bolts. Check after approx. 50 hours' operation and retighten if necessary.
- Check that the blower can run easily following installation. Sluggishness indicates the presence of foreign bodies inside the conveying chamber or distortion.
- Take noise protection into consideration. Piping and foundations may be stimulated into producing natural vibrations along with the inevitable sound emissions.
- If you are planning the system in-house, the safety information, maintenance information and technical documentation provided by your component suppliers must also be observed.

Check oil level prior to commissioning and correct if necessary.

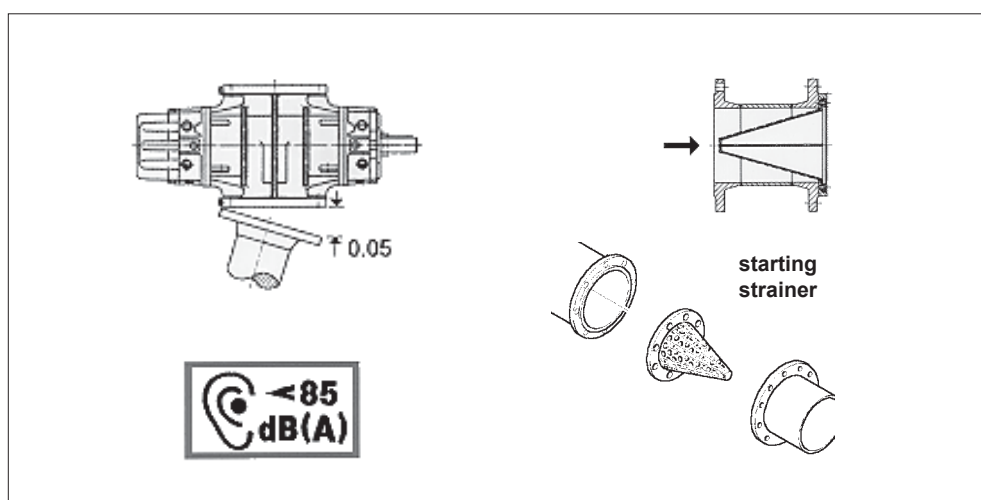


Piping

- When installing the piping on the intake side, ensure that it is clean. Foreign bodies and dirt will damage the blower.
- Any piping that is to be connected must be carefully cleaned and must be free from foreign bodies.
- Piping on the intake side must be supported/propped up. No forces and/or moments are permitted to act on the blower housing.
- A starting strainer should be installed for the first 500 operating hours to prevent damage as a result of impurities. Install the starting strainer together with a seal on the intake side.
- Prior to tightening, the piping and seals must sit on the blower housing flange without any stresses.
- The maximum distance in the sealing surface area is 0.05 mm on one side.
- Once it has been tightened, the blower stage should be able to rotate easily without any resistance.
- Please note that piping and foundations may be stimulated into producing vibrations and sound emissions when the blower is in operation.
- Therefore, insulation and soundproofing measures should be taken into account right from the planning stage.
- If you are planning a system in-house and/or plan to install the blower stage yourself, the safety information and technical documentation provided by your component suppliers should also be observed.

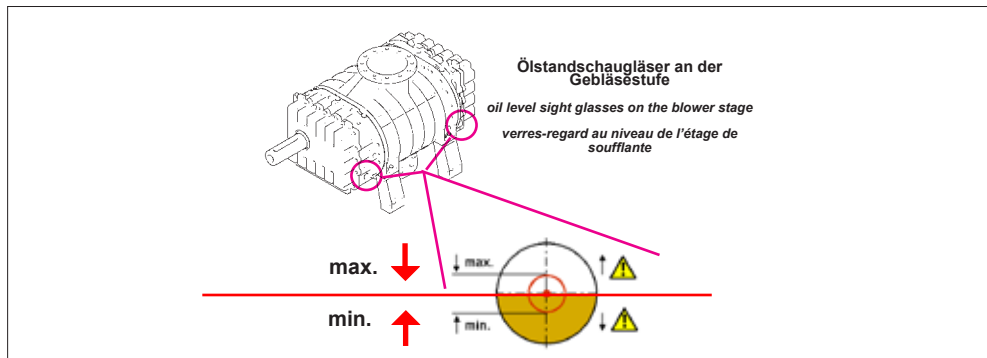
Coolant connections for oil cooling (special accessories)

- Install shut-off valves in the feed piping.
- The coolant must flow through the refrigerating chambers from bottom to top.
- A flow indicator should be installed in order to monitor water throughput.
- A drain valve must be provided for the purpose of emptying the cooling system completely.
- Caution! Risk of frost in the case of winter operation.

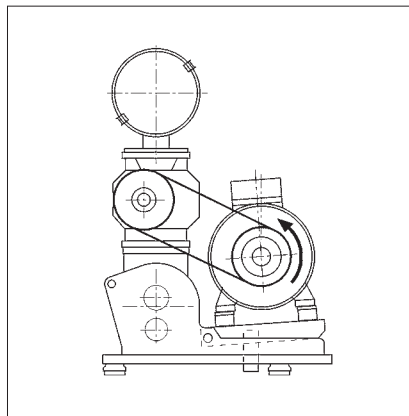


Commissioning

1. Install and assemble the blower stage in accordance with these instructions. Assemble the driving elements correctly.
CAUTION! Do not establish *any* connection with the driving motor yet.
2. **On first commissioning**
top up lubricating oil on empty machines.
Check lubricating oil level and correct if necessary.
Check that the oil filling plug and the drain valve are seated securely and do not leak.



3. Observe the commissioning instructions and lubrication intervals provided by the driving motor manufacturer.
Observe the requirements for operating rotary piston machines with asynchronous electric motors on a 3-phase AC system. See under Construction and function.
4. Check the direction of rotation.
See also the red direction plate on the blower.
There must not be any V-belts on the motor pulley/the drive coupling between the blower and motor must not be connected.
Briefly start the driving motor (approx. 1 - 2 seconds).
See also the instructions provided by the electronics supplier/system manufacturer.
CAUTION! The blower will be destroyed if it is operated in the wrong direction.
The blower's direction of rotation must match that of the driving motor.



5. With the correct direction of rotation:
The alignment of the belt pulleys/drive coupling should be checked.
The V-belts should be attached/the drive coupling should be connected using connecting elements.
Tension the V-belts. Observe the specifications regarding the belt tensioning force.
6. Ensure that protective equipment is in place for the belt drive/drive coupling.
7. Safety information stickers must be legible and protective equipment must have been checked.
8. Open the slide on the system side. Operation can now start.
9. Switch the driving motor on.
Switch it off after approx. 20 seconds and monitor the blower to ensure it coasts down smoothly.
If the pressure valve blows off, switch the blower off immediately and remove the cause.
10. Switch on again.
Check the EMERGENCY STOP switch.
11. The unit is now ready for operation.

Switch off / shutdown

- Switch off is effected via the power switch on the motor.
- To shut the unit down completely the fuses must be removed after the blower has come to a standstill. The valves on the conveying pipes must be closed. Avoid possible entry of condensate into the blower stage.
- In case of a shutdown for more than six weeks the conveying chamber is to be preserved and the blower turned regularly by hand to avoid damage due to standstill. Observe also the TN01175 regulations governing storage and preservation.

In case of danger:

Press EMERGENCY - OFF button. For details refer to the instructions of the supplier of electrical components or the plant manufacturer.



Frequency converter operation

- If the electric motor is driven by frequency converters, we strongly recommend using an engine throttle and power choke. These are specifically designed for the frequency converter and filter dangerous harmonics from the drive current. Damage to the motor winding can be prevented by improving the electromagnetic compatibility of the system and reducing reactions of the frequency converter in the current.
- The electrical and mechanical characteristics of the drive motor are to be taken into account.
- The minimum frequency must always be fixed. This frequency must never fall below the fixed minimum during operation.
- The maximum frequency is to be set by taking into account the maximum rotational speed of the motor and the maximum speed of the blower / compressor.
- The run-up time of the drive motor from standstill up to minimum speed may be 3 to 6 seconds.
- The frequency converter must be designed with a constant load moment for operation with a working machine.
- Rotational speeds must not fall below minimum nor exceed maximum.
- The highest admissible voltage increase speed of the motor converter is 1200 V/ μ s.
- When exceeding the value, e.g. due to excessively long cables, frequency converter type... etc. a motor throttle / motor filter coil to match the frequency converter is to be used.
- If these components are not used, this can lead to damage of the motor isolation and to a motor breakdown.
- The maximum rotational changeover speed on positive displacement blowers / screw compressors, after run-up to minimum speed, amounts to 1 Hz per second for upward and downward control time.
- Minimum frequency = 20 Hz // maximum frequency = 50 Hz results in a control time of 30 seconds from minimum to maximum.
- The maximum current limit of the motor must not be exceeded. Observe the specifications on the motor name plate.
- To prevent operational faults the function "Interception circuit" must not be parameterised in the control of the frequency converter. When the frequency converter is switched off, a restart should only be possible after a complete standstill of the blower or compressor.

Only applies to screw compressors

- At a speeds below 50% the oil pressure sinks to approximately 0.6 bar (\ddot{u}). To enable the machine to run at speeds up to 25% the air oil pressure switch, setting value of 1.8 bar (\ddot{u}), is bridged with a threshold switch. A further switch, setting value of 0.5 bar (\ddot{u}), is installed for oil pressure safety.

Operation with pole-changing motor

Between a changeover of motor speed

- from a high to a low speed, the motor must have reached zero rotational speed each time.
- from a low to a high speed, changeover can take place instantaneously.

Maintenance

Maintenance is to ensure that all functions are maintained or that they can be restored after a breakdown.

Maintenance includes specifications about inspection, service and repairs.

Maintenance includes instructions for trained and qualified personnel.

If anything is unclear consult Aerzener customer service.

During inquiries please state:

- order and serial number
- prevailing faults / malfunctions as accurately as possible
- steps taken to rectify faults.

If the machine is sent back to the supplier, the following measures are to be carried out:

- Completely drain oil, otherwise it is transport of hazardous goods.
- Treat bare components with preservative.
- Seal flange with blind cover.
- Seal open connections.
- Also observe instructions in chapter "Transport".

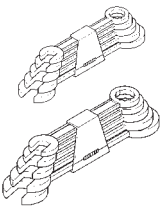
Inspections / inspection schedule

A general inspection should be carried out by a service technician from Aerzener after 3 years or 20,000 operating hours.

This includes the preventive maintenance of wearing and replacement parts such as bearings, seal, etc.

We recommend maintaining a stock of replacement and wearing parts to avoid or reduce waiting times and downtimes.

9.1



Whenever work is carried out on the positive displacement machine, it must be switched off and isolated from the mains electricity supply.
 Failure to follow this instruction could result in injury or damage!
 Various steps should be taken to achieve a long service life and provide the optimum operating conditions. These include carrying out the maintenance work specified in this table at the intervals specified here.

3 flg. Stufe / blower stage	Maintenance intervals								
We recommend carrying out the maintenance work on the positive displacement machine at the specified intervals. The operating hours represent average operating conditions. The actual service life of the equipment may vary depending on environmental conditions and operating data. If you think this situation applies to you, please contact Aerzener Maschinenfabrik.	After the first 3 op. hrs	After the first 25 op. hrs	After the first 500 op. hrs	Weekly	After every subsequent 2000 op. hours or every 3 months	After every subsequent 4000 op. hours or every 6 months	After every subsequent 8000 op. hours or every year	After every subsequent 16,000 op. hours or after every subsequent 2 years	After every subsequent 20,000 op. hours or after every subsequent 3 years
	Check fixing screws and screwed connections <ul style="list-style-type: none"> Re-tighten once the machine has cooled down, if possible 	•							
Starting strainer, if fitted <ul style="list-style-type: none"> Check; can be removed if dirt is no longer being accumulated 			•						
Intake filter (part of the unit) <ul style="list-style-type: none"> Check level of filter contamination and, if necessary, replace filter cartridge, max. -45 mbar Replace filter cartridge 				•	○		•		
Check and clean inlet/exhaust openings (part of the unit) <ul style="list-style-type: none"> of acoustic hood 						•			
V-belts (part of the unit) <ul style="list-style-type: none"> Check condition; replace if necessary Replace 		•						•	
Belt pulley alignment (part of the unit) <ul style="list-style-type: none"> Check; correct if necessary 		•						•	
Pressure valve (part of the unit) <ul style="list-style-type: none"> Check function 	•				○	•			
Oil level <ul style="list-style-type: none"> Check; correct if necessary 	•	•		•					
Lubricating oil <ul style="list-style-type: none"> Replace Replace, with final compression temperatures above 140°C 			•			•	•		
Lubricating grease, only with gas-tight shaft seal <ul style="list-style-type: none"> Replace Replace if Aerzener special rotary piston oil is used and with a final compression temperature above 140°C Replace if ISO VG 220 is used and the oil has a pronounced dark discolouration 			•			•	•		
Drive shaft seal (when conveying toxic / inflammable gases) <ul style="list-style-type: none"> Replace 							•		
Non-return valve (part of the unit) <ul style="list-style-type: none"> Check for wear and leaks, replace if necessary 							○	•	
Flexible pipe connection, (part of the unit) , if fitted pressure side/suction <ul style="list-style-type: none"> Check for leaks, replace if necessary 								•	
Hydraulic, pneumatic and measurement lines, (part of the unit) , if fitted <ul style="list-style-type: none"> Check for leaks, replace if necessary Recommendation: Replace every 6 years 									• •
<input type="radio"/> Halving of or reduction in maintenance intervals (recommendation)	Under difficult operating conditions such as: - ambient temperatures in excess of 30°C throughout the year - high level of dust etc.								
Main inspection / maintenance (recommendation) <ul style="list-style-type: none"> Check/replace spare and wearing parts Check entire machine 									• •
Drive motor <ul style="list-style-type: none"> Perform maintenance Observe deadlines for re-lubrication 	Please observe the maintenance intervals and maintenance specifications of the motor manufacturer! With Aerzener motors, the Aerzener operating and maintenance instructions must be followed.								

Arrange for the positive displacement machine to undergo a complete check by the Aerzener Service department at the specified intervals
 Or: Take out a maintenance contract with Aerzener Maschinenfabrik.
 If you maintain your machine regularly and properly, Aerzener Maschinenfabrik will guarantee maximum reliability for your application.

Lubricating oil specification for rotary piston blowers

Additives and viscosity class are the defining factors in selecting types of lubricating oil.

The following oils, which are of the correct viscosity and contain appropriate additives, are to be used in accordance with the relevant operating conditions.

1. General requirements for lubricating oil properties

Kinematic viscosity at operating oil temperature	:	10 - 13 cSt (mm ² /s)
Kinematic viscosity at -10°C	:	≤ 3500 cSt (mm ² /s)

Minimum oil additive properties

- EP wearing protection additives for use in roller bearing gearboxes
- Oxidation stability up to 110°C oil sump temperature, at continuous oil temperatures above 120°C = oxidation stability up to 220°C oil sump temperature
- Foam suppressor
- Detergents for solution of deposits
- Neutrality compared with sealing materials made of fluoro-propylene-methyl (Viton).
- Neutrality compared with single-component resin primers
- Adequate shear stability

* Ambient temperature = Temperature in the immediate environment of the machine all year round.

2. Single or double-shift operation / intermittent operation

Intake temperature stage	:	Up to 50°C
Final compression temperature	:	Up to 140°C
Ambient temperature*	:	No restriction
Lubricant to be used	:	Aerzener special rotary piston oil, Order no.: 160 754 or 160 755

This lubricating oil is used for the initial filling for standard application conditions.

3. Continuous operation / 24 hours per day

Intake temperature stage	:	Up to 50°C
Final compression temperature	:	Up to 140°C
Ambient temperature*	:	No restriction
Lubricant to be used	:	Aerzener special rotary piston oil, Order no.: 160 754 or 160 755

or

ISO VG 150

Fully synthetic (PAO) poly-alpha-olefin, gearbox or compressor oil

Example : MOBIL SHC 629



4. Operation at final compression temperatures above 140°C

Continuous oil temperature	:	120°C to 140°C or
Final compression temperature	:	Above 140°C
Lubricant to be used	:	ISO VG 220 Synthetic lubricating oil with a polyglycol base oil. Example: ESSO Glycolube 220 ARAL Degol GS 220
Note	:	Oil change intervals are to be halved in case of significant, dark oil discolouration.

5. Lubricating oils in the foodstuffs and pharmaceutical industry

For rotary piston blowers it is possible to use lubricating oils that have approval as per the specification USDA H1.

Experience in operation is only available with the following lubricating oil. Aerzener Maschinenfabrik cannot approve any other oils.

It is recommended to perform an oil analysis in agreement with the oil manufacturer after 1000 operating hours.

Final compression temperature	:	Up to 120°C
Continuous oil temperature	:	Up to 100°C
Lubricant to be used	:	ISO VG 100 Klüber oil 4UH1-100 N
Final compression temperature	:	Above 120°C
Continuous oil temperature	:	Above 100°C
Lubricant to be used	:	ISO VG 220 Klüber oil 4UH1-220 N

Changing to other oil types

- The Aerzener special rotary piston oil and PAO oils are completely consolute. When switching from one type of oil to another, there are no special measures to be taken into account. However, in order to maintain the useful properties of the new oil type, the oil to be changed should be completely drained and a single intermediate oil change undertaken after an operating period of 100 hours. Only the same oil should be used for refilling.
- Polyglycol-based oils cannot be mixed with Aerzener special rotary piston oil or PAO oils. In case of doubt, the oil chambers are to be opened and flushed.
- Oils based on perfluorinated polyethers, e.g. Fomblin, cannot be mixed with either Aerzener special rotary piston oil or with PAO, or with polyglycol oils. To change the oil the machine must be completely dismantled and the entire oil system through cleaned of all residue. A flushing run prior to commissioning is recommended.



9.4

Lube oil quantities

Total oil quantity, in approximate litres / oil level up to middle of gauge glass on the blower stage							
GM 3S	0.55 l		GM 4S	0.55 l		GM 7L	0.55 l
GM 10S	0.86 l		GM 15L	0.86 l		GM 25S	1.2 l
GM 30L	1.20 l		GM 35S	3.00 l		GM 50L	3.50 l
GM 60S	6.50 l		GM 80L	6.50 l		GM 90S	11.50 l
GM 130L	11.50 l		GM 150S	11.00 l		GM 220L	11.00 l
GM 240S	17.50 l		GM 315L	17.50 l		GM 400L	22.00 l

Total oil quantity / only applies to generation 5 units with acoustic hood in approximate litres / oil level up to mark on the gauge glass of the acoustic hood							
GM 3S	0.55 l		GM 4S	1.00 l		GM 7L	1.00 l
GM 10S	1.40 l		GM 15L	1.40 l		GM 25S	1.75 l
GM 30L	1.75 l		GM 35S	3.75 l		GM 50L	4.50 l
GM 60S	7.50 l		GM 80L	7.50 l		GM 90S	12.50 l

Generation 5 units with acoustic hood

NOTE: The lubricating oil volume specification is a guide value. The display in the oil sight glasses of the blower or the display in the oil sight glass of the acoustic hood are crucial for determining the oil fill volume.



Change of lubricant on the drive shaft

> Only on drive shaft of gas-tight design <

Changing lubrication on a gas-tight drive shaft is carried out by means of re-lubrication on the drive shaft.

- Depending on the sealing method, a lube oil or grease block is used.
- If an oiler is used the oil level is to be checked weekly and topped up if necessary. The maximum oil level should be in the middle of the oiler.
- If a grease bush or grease nipple is used, the grease quantities listed below, according to the intervals listed in the maintenance schedule, are to be used for re-greasing.
- Please note!
The grease is to be pressed in / changed several operating hours before the lube oil change. In this way the used, excess grease reaches the oil chamber of the blower and can then be drained together with the lube oil.
- Once the grease has been pressed in, the cover for the compression lubricator must be turned back into place by one rotation. The volume of grease pressed in may therefore expand if heated. Please ensure that this rotation is observed once the grease has been pressed in and add it to the necessary number of rotations.

Grease specifications

- When using lube oils according to Aerzener lube oil specifications, *except polyglycol oils*, grease type KHC-2P-30 is used.
- Filled at factory: **KLÜBER PETAMO GHY 133 N**
- When using polyglycol oil according to Aerzener lube oil specification, grease type **MPG2K-40** is used

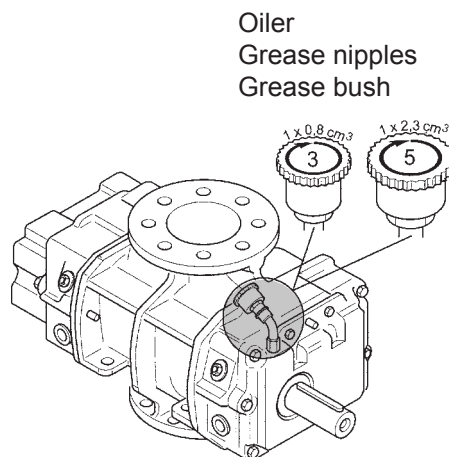
KLÜBER SYNTHESO PROBA 270

- Mixing of different greases is to be avoided.
- Re-lubrication is admissible only with the same grease.
- If these greases are not available, they are to be removed completely and replaced with other greases according to KHC-2P-30 or MPG2K-40.
- Observe sealing consistency with Viton.

Re-lubrication quantities

Type	GM 3S - GM 30L	≈ 5 cm ³
	GM 35S - GM 130L	≈ 10 cm ³
	GM 150S - GM 400L	≈ 20 cm ³

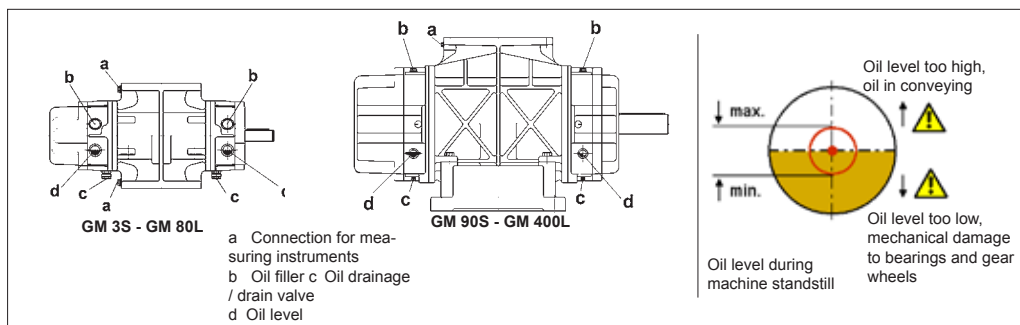
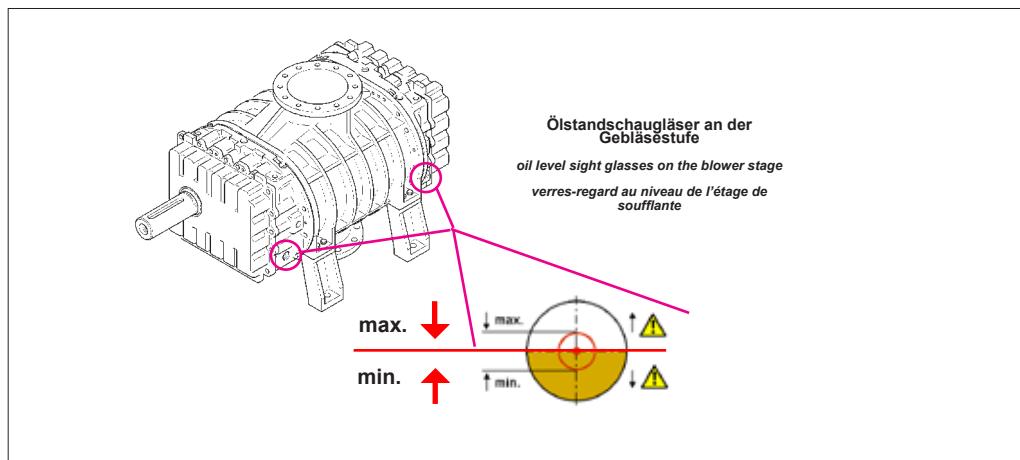
Profile	10 - 12	≈ 5 cm ³
	13 - 15	≈ 10 cm ³
	16 - 18	≈ 20 cm ³
	19 - 21	≈ 40 cm ³



Lubricant change

• Filling up oil

- Drainage valves must be closed/check for proper seating.
- Open oil reservoir.
- The specified oil quantity must be divided proportionately between both oil chambers according to the oil level indicator. Correct oil level = middle of sight glass, observe maximum and minimum markings.
- It is very important that each of the oil chambers is filled and drained separately and that they are checked using the relevant sight glasses.
- Fill oil with a suitable funnel. Please ensure that the oil temperature is at least 20°C.
- The filling process should be carried out in stages.
- First fill with approximately $\frac{3}{4}$ of the specified oil quantity.
- After a brief interval, the oil level adjusts itself in the oil chambers.
- The oil level should now be checked and adjusted in line with the markings on the sight glass. Oil level can move between the minimum and maximum marks. The oil level should be checked after the first 3 and 25 operating hours and then at weekly intervals, and adjusted if necessary.



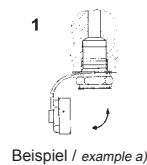
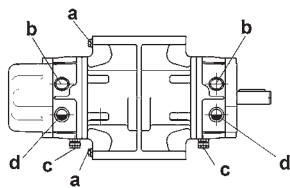
• Draining oil

The initial operating oil container can be used as a collecting container.
The waste oil can be collected in this container in the proper manner and disposed of in an environmentally-friendly way at an appropriate collecting station.
Please observe capacity.

- a) b) Unscrew cap (1), threaded plug (1) from the drain valve.
If the cap (1) and threaded plug (1) have been screwed in too tight, hold the valve firmly with an open-jaw wrench and loosen position (1) with a second wrench.
- a) Screw on the hose, which is supplied.
- a) The drain valve opens automatically.
- a) Position the end of the hose in a collecting container.
 - b) Open manual valve, drain the waste oil into a container.
- a) b) The waste oil must be disposed of in the proper manner.
- a) Remove the hose from the drain valve
 - b) Close manual valve, screw in threaded plug (1) while gripping the valve firmly.
- a) Screw cap (1) hand-tight onto drain valve.
- a) b) If the drain valve becomes loose or completely detached in the thread, it must be replaced together with a new seal.

Observe oil temperature when changing the oil. The oil temperature must not exceed 60°C, due to the thermal load capacity of the “drain hose”.

If the oil temperature exceeds 60°C there is a risk of burns.



Design without acoustic hood
c - Oil drainage / drain valve

Drive, belt drives, couplings

- Before installing the driving elements, clean the shaft journals to remove the preserving oil.
- Gently break off (debur) any sharp edges on the drive shaft, coupling or belt pulley.
- Push the coupling/belt pulley onto the shaft journal using a fixture, threaded rod...
- In the case of belt pulleys with Taper Lock bushes, refer to the manufacturer's assembly instructions.
- The fixture, threaded rod ... must be screwed into the metric tapped centre hole on the driving shaft.
- The driving elements must **NOT** be driven onto the shaft journal with a hammer. This would risk damaging the blower bearings.
- Following assembly and alignment, the belt pulley/coupling half must be secured to prevent axial displacement.
- At Aerzener Maschinenfabrik, the piston/rotor driving shafts are balanced using the „half-key balancing“ technique. The belt pulleys/couplings must be used in accordance with the requirements of balancing type „H“.

Notes on V-belts, V-belt pulleys, V-belt tensioning

Whenever work is carried out on the belt drive, the machine must be taken out of operation and correctly isolated from the mains supply.

Measures must be implemented to prevent the machine from starting up/being operated.

Caution: The belt drive is potentially dangerous and can sever and/or crush body parts.

Changing V-belts

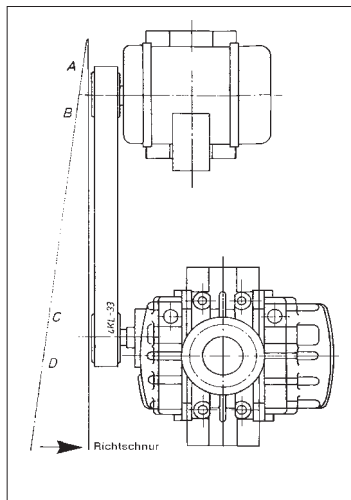
V-belt replacement/life depends on the unit version and on the operating conditions. Please refer to the information provided by the unit manufacturer.

V-belt pulley alignment

The belt pulleys should be aligned as precisely as possible with the aid of a standard or gauge.

The life of the driving elements will be affected in accordance with the extent of any misalignment.

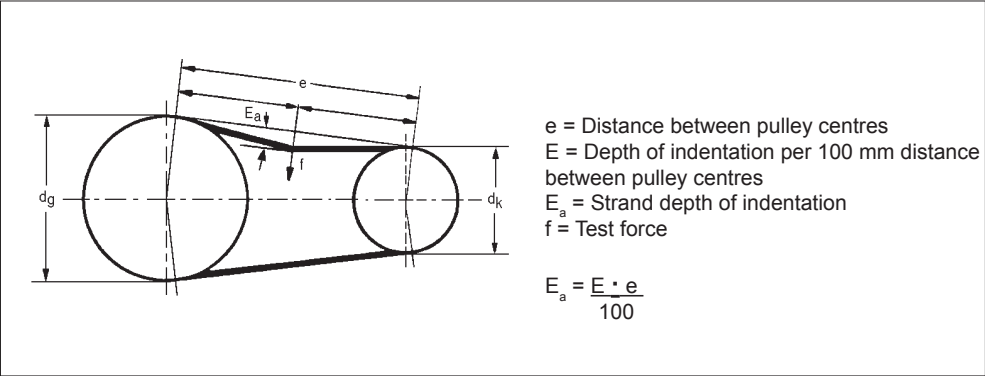
The standard/gauge must make contact with the belt pulleys at points A, B, C and D.



Machine type	Min. belt pulley Ø (mm)	Max. belt pulley width (mm)
GM 3S/4S/7L	160	70
GM 10S/15L	165	85
GM 25S/30L	140	115
GM 35S/50L	170	115
GM 60S/80L	230	150
GM 90S/130L	360	180
GM 150S/220L	425	225
GM 240S/315L	/	/
GM 400L	/	/

Minimum perm. belt pulley diameter and maximum perm. belt pulley width for the relevant frame size





Profile	Test force f per V-belt (daN)	Diameter d_k (mm)	Depth of indentation E (mm) per 100 mm Strand length on initial assembly	Depth of indentation E (mm) per 100 mm Strand length during operation after run-in
SPZ/3V XPZ/3VX	2.5	$\geq 56 - 71$	2.20	2.45
		$> 71 - 90$	1.95	2.20
		$> 90 - 125$	1.50	2.00
		> 125	1.20	1.70
SPA XPA	5.0	$\geq 71 - 100$	2.80	3.20
		$> 100 - 140$	2.50	2.85
		$> 140 - 200$	2.20	2.55
		> 200	2.15	2.40
SPB/5V XPB/5VX	7.5	$\geq 112 - 160$	2.40	3.00
		$> 160 - 224$	2.10	2.65
		$> 224 - 355$	1.70	2.22
		> 355	1.40	1.90
SPC XPC	12.5	$\geq 180 - 250$	2.30	2.65
		$> 250 - 355$	1.90	2.30
		$> 355 - 560$	1.65	1.90
		> 560	1.60	1.70

1. Specifying the test force f from the table on the basis of the V-belt profile used.
2. Determine the smallest pulley diameter d_k on the drive and take the corresponding depth of indentation E from the table.
3. Using the formula, the depth of indentation E_a should be calculated with the available distance between pulley centres e
4. The test force f must be applied to the V-belts in the middle of the distance between pulley centres e and must act vertically in relation to the strand. Pretension the drive until the calculated depth of indentation E_a is achieved.

Pretensioning calculation

Example: Profile = SPZ; $d_k = 100$ mm; $e = 380$ mm; $f = 2.5$ daN;
 $E = 2.00$ mm; $E_a = 7.6$ mm

Check the tension of the V-belt after an operating time of approx. 30 minutes. The belts may need to be retightened depending on the tensioning unit. Subsequent checks are to be made in accordance with the maintenance schedule.

Drive coupling/alignment notes

Whenever work is carried out on the drive coupling, the machine must be taken out of operation and correctly isolated from the mains supply. Measures must be implemented to prevent the machine from starting up/being operated.

Caution: The coupling is potentially dangerous and can sever and/or crush body parts.

Changing the coupling elements

Driving element replacement/life depends on the unit version and on the operating conditions. Please refer to the information provided by the unit manufacturer.

Coupling alignment

Use dial gauges/hairline squares for alignment purposes.

The life of the driving elements will be affected in accordance with the extent of any misalignment.

Use dial gauges/hairline squares to check the axial and radial run-out.

The coupling must be pushed onto the driving shaft in the correct way so that it provides full bearing support.

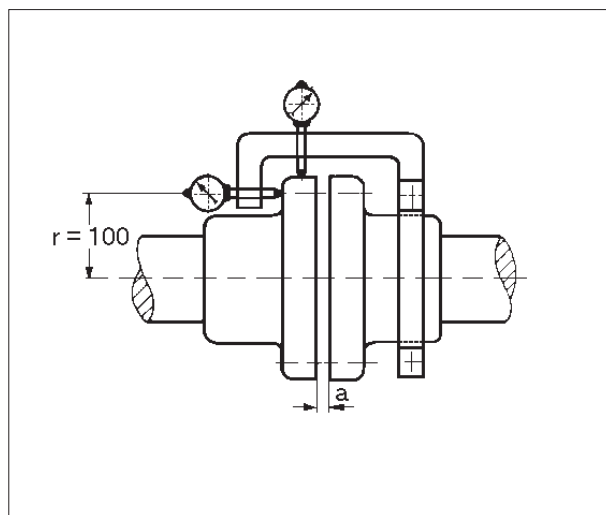
Coupling running tolerances:

Radial : max. 0.05 mm parallel shaft misalignment/0.1 mm on turnover

Axial : max. 0.05 mm on turnover

- Dimensions apply to a distance $r = 100$ mm from the centre of the shaft.

- In the case of other distances, the tolerances will need to be adapted accordingly.



Accessories

1. Filter silencer
2. Service indicator for monitoring filter soiling
3. Starting strainer
4. Pressure gauge for monitoring the intake and discharge pressure
5. Pressure valve
6. Discharge silencer
7. Pressure switch
8. Non-return valve
9. Start-up relief
10. Acoustic hood
11. Thermometer for indicating the discharge temperature
12. Compensators
13. Driving motor
14. Maintenance accessories (V-belts, intake filter, oil, etc.)

The scope of supply can be expanded to include the accessories listed above. For enquiries and orders, simply contact the Aerzener After-Sales Service department (also responsible for spare parts).



Malfunction / Possible cause / Remedy

Repairs on positive displacement blowers must be carried out only by authorized and qualified personnel. Improper repairs can lead to considerable damage for the user / persons.

Malfunction Faults What to do, when . . ?	Possible Causes . . .	Remedy . . .
... abnormal running noises occur?	<ul style="list-style-type: none"> • Belt not properly aligned • Bearing damage • Rotary pistons contact each other or in the conveying chamber • Pistons contact due to contamination • Foreign particles in gear wheels • Shaft deflection 	<ul style="list-style-type: none"> • Check and adjust if necessary • Exchange bearings • Check clearance adjustment/check for cracks • Clean conveying chamber • Check wheels, clean, exchange if necessary • Measure deflection, change rotary piston if necessary
... the blower gets too hot?	<ul style="list-style-type: none"> • Intake filter contaminated • Ambient temperature too high • Hood slots clogged • Ventilator defective • Oil level or viscosity too high • Rotary piston clearances too large • Overloaded 	<ul style="list-style-type: none"> • Replace filter • Ensure sufficient room ventilation inlet-/exhaust air • Clean ventilation slots • Replace ventilator • Correct oil level, observe viscosity • Replace damaged components • Check and observe operating data
... oil appears in conveying medium?	<ul style="list-style-type: none"> • Oil level too high • Worn seals 	<ul style="list-style-type: none"> • Adjust oil level • Replace seals
... the intake volume is too low?	<ul style="list-style-type: none"> • Anfahrtsieb bzw. Ansaugfilter verschmutzt • undichte Leitungen • Gebläse falsch dimensioniert • beschädigte(r) Drehkolben / Zylinder 	<ul style="list-style-type: none"> • reinigen ggf. ersetzen • Leitungen abdichten • Auslegung prüfen • beschädigte Bauteile austauschen
... motor requires too much power?	<ul style="list-style-type: none"> • Operating data differ from order data • Mechanical blower or motor damage • Motor voltage drop 	<ul style="list-style-type: none"> • Check and observe operating data • Replace damaged components • Adjust power, refer to motor instructions

Malfunction Faults What to do, when . . ?	Possible Causes . . .	Remedy . . .
... the side of belt vibrates?	<ul style="list-style-type: none"> • V-belt is worn • Belt not properly aligned 	<ul style="list-style-type: none"> • Replace belt • Check and correct if necessary
... the blower runs in reverse direction after shutdown?	<ul style="list-style-type: none"> • Non-return valve defective or leaky 	<ul style="list-style-type: none"> • Replace valve
... machine damage occurs due to faulty electrical connection?	<ul style="list-style-type: none"> • Motor and control system are connected to two different networks 	<ul style="list-style-type: none"> • Connect motor and control voltage to one supply network • Alternative: Installation of a power monitoring relay
<p>After the correction of each malfunction, the following is to be checked:</p> <ul style="list-style-type: none"> • Freedom of movement of the machine • Non-contact turning • Lube oil level • Proper function and connection • Adherence to safety and warning instructions 		

Spare parts - overview

For effective and durable use of the rotary piston machine, there follows a list of components necessary for maintenance, an inspection or a repair.

The components are grouped by expected life into three spare part versions.

1.) Maintenance

- Shaft sealing ring(s)
- Inner ring, shaft sleeve, bush
- Sealing rings and screw plugs, drain valves for oil drain
- V-belt / wearing parts on coupling
- Air filter element
- Lubricating oil, oil filter element

2.) Inspection

- Components from point 1.)
- Bearing and sealing components
- for compressor plus the adjustable bearing cover including the related minor items

3.) Repair

- Components from point 1.) and 2.)
- Rotor pair / rotary piston pair
- Timing gear wheels
- for compressor plus the torsion shaft and the oil pump

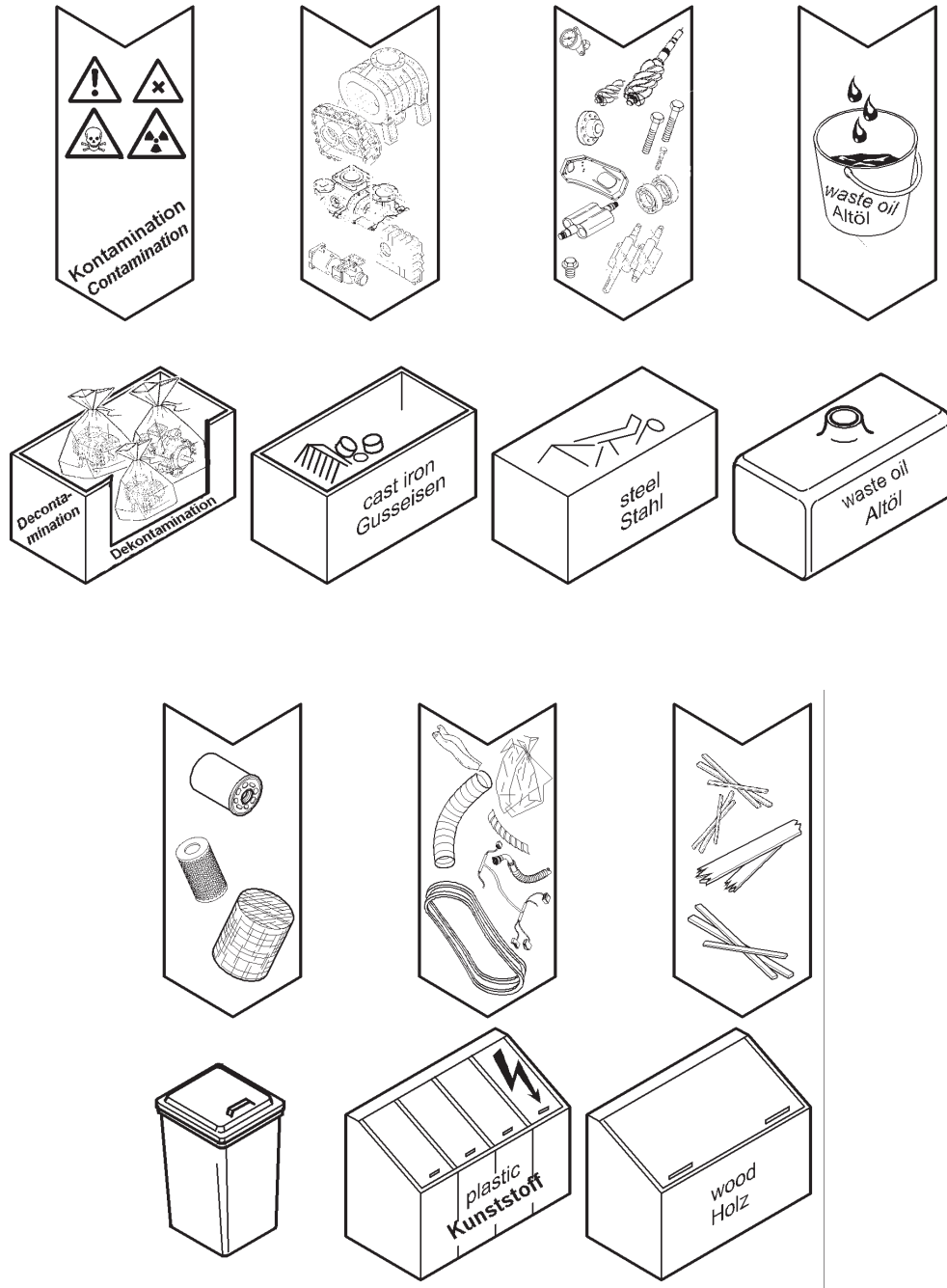
Spare parts and accessories

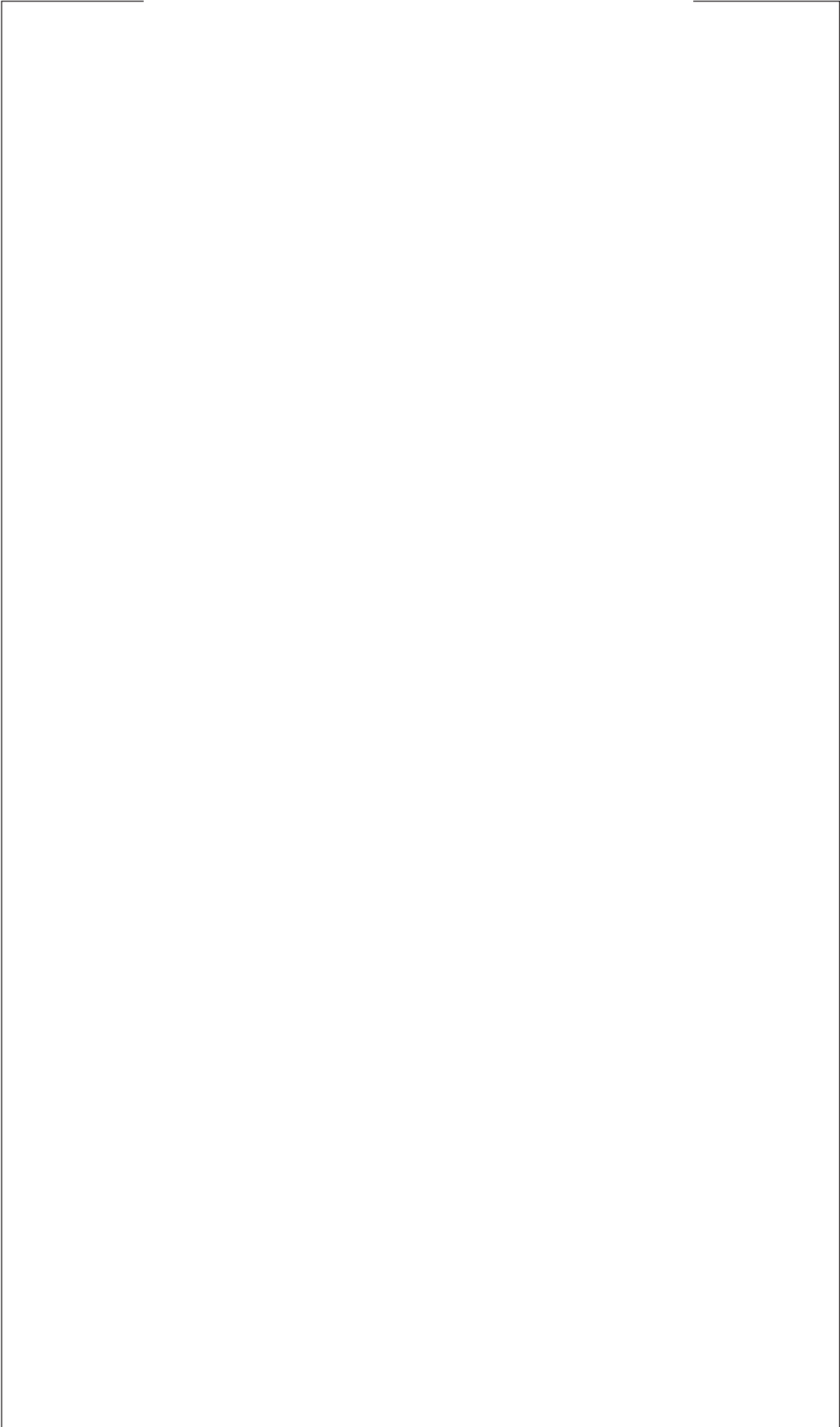
It is specifically highlighted that original parts and accessories not supplied by us have also not been tested or approved by us.

Therefore, installing or mounting and using any such products could, under certain circumstances, degrade the stipulated system characteristics. The manufacturer shall assume no liability whatsoever for damage caused by the use of non-genuine parts or accessories.

Recycling / Disposal

- All waste products are to be disposed of or treated not harmful to the environment.
- Used lubricants are to be disposed of properly.
- Contaminated components and auxiliary material are to be packed and decontaminated.





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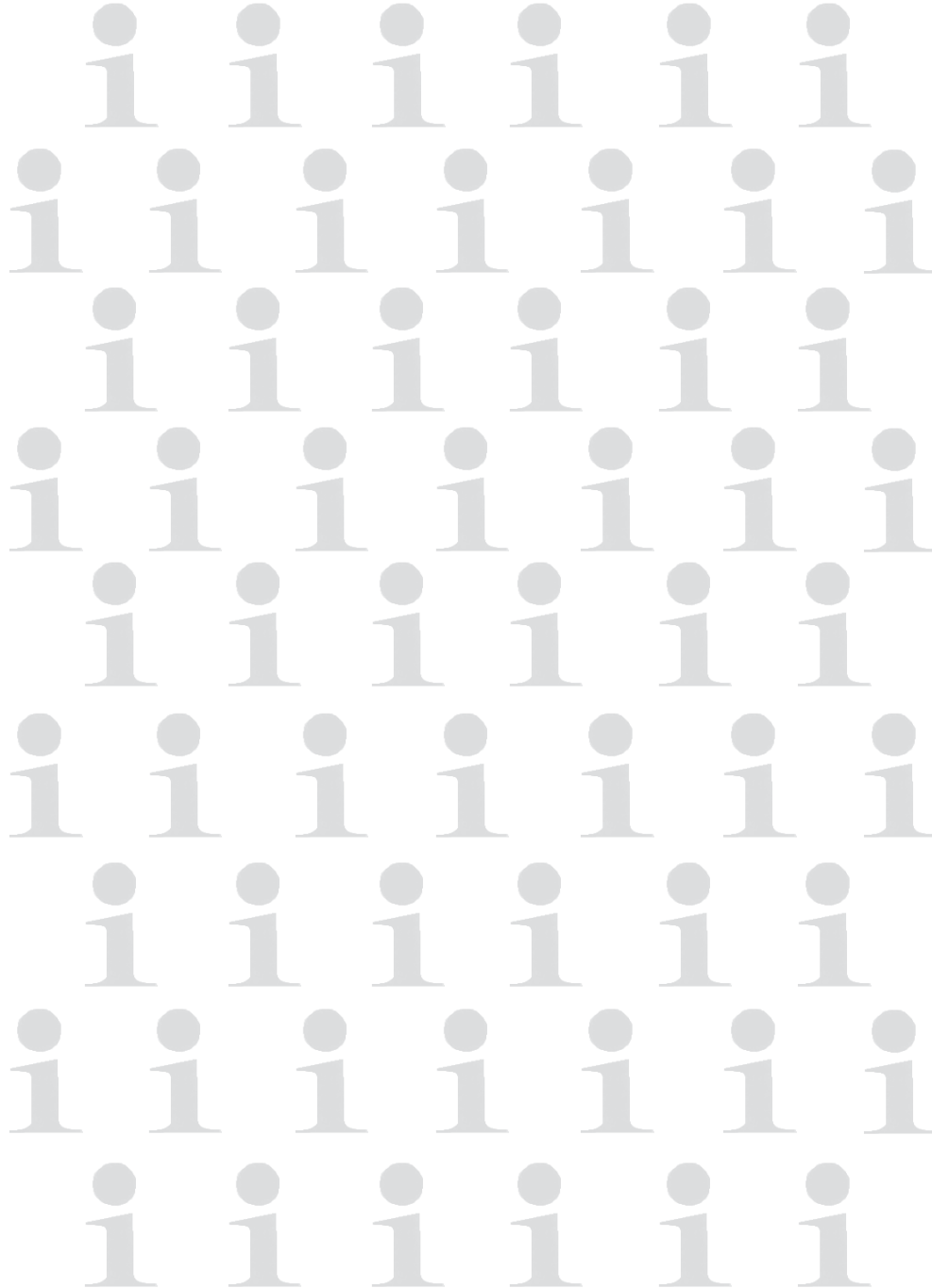
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Gegenüber Darstellungen und Angaben dieser Betriebsanleitung sind technische Änderungen,
die zur Verbesserung der Drehkolbenmaschinen notwendig werden, vorbehalten.

This operating- and installation manual is subject to engineering changes necessary for the compressor advancement.

Nous nous réservons le droit dans les instructions de service procéder à toutes modifications techniques utiles visant à améliorer la qualité des compresseurs.
Wat de betreft de tekeningen en gegevens in deze bedienings- en opstellings-handleiding verbetering van de schroefcompressor noodzakelijk worden, voorbehouden.


Nos reservamos el derecho de efectuar, frente a las representaciones e indicaciones de esta
instrucciones de montaje servicio modificaciones técnicas necesarias para perfeccionar.

Rispetto all'illustrazione ed alle indicazioni di questa Istruzioni di Esercizio ci si riserva quelle modifiche tecniche che sono necessarie per migliorare i compressori.



ENGLISH



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