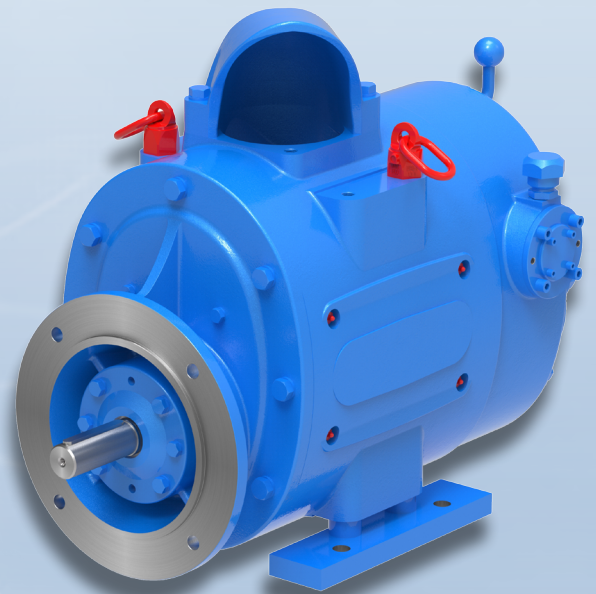


DÜSTERLOH **Fluidtechnik**

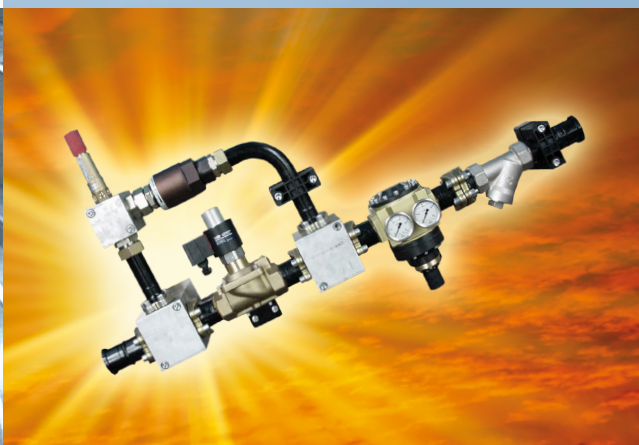
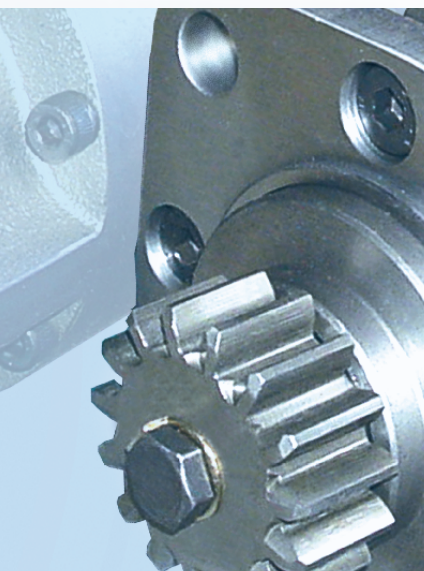
Pneumatic motors

Pneumatic motors

DMO 8 - DMO 56G

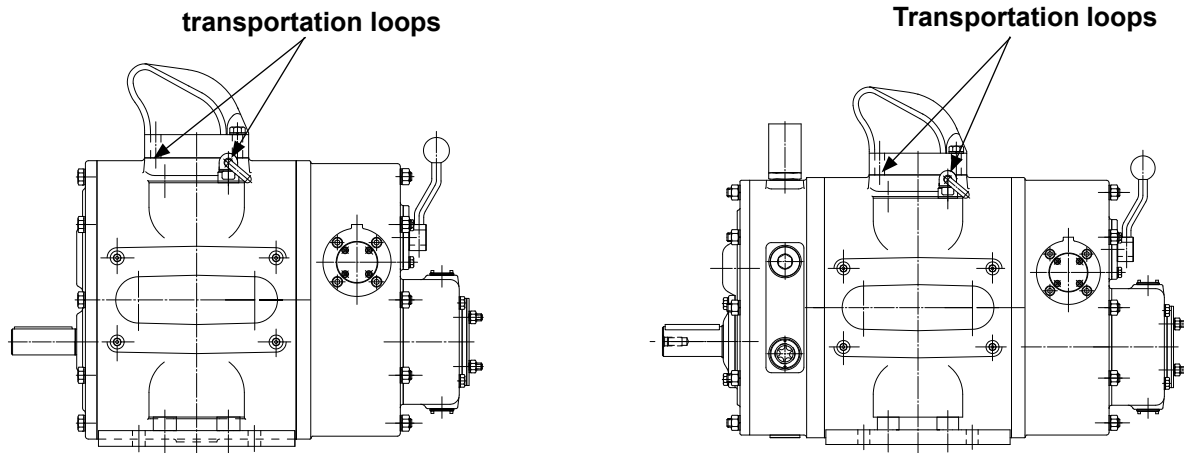


Assembly and operating instructions



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**Transportation:**

The pneumatic motor is standard-wise equipped with special loops at the motor housing, for transportation.

After opening and removing the package, please use all loops at once for moving and lifting the motor. This procedure guarantees a well balanced moving of the motor.

Also in the process of mounting the motor, please use the loops, till the motor is securely mounted at the feet or the flange.

Please follow the general transportation- and security instructions to avoid accidents.

Storing:

The delivered motor is tested in our factory and equipped with protection caps to protect the motor from dirty, climatical and mechanical influences.

For short storage, the motor should be kept in dry rooms.

For long time storage, the motor must be run one time with oiled compressed air and then be put in dry rooms.

Caution:

Should the motor be drawn through from the output shaft side due to operating conditions (e.g. using an E-motor or unbraked load) contrary to the normal operation, it is important to ensure that the max. admissible motor speed of $n=3000 \text{ min}^{-1}$ is not exceeded under any circumstances.

The centrifugal speed control can be destroyed if the max. admissible speed is exceeded.

The control housing can even be destroyed in extreme cases.



1. Installation of the motor

The motor must be assembled precisely on its base frame, having the drive shaft carefully aligned. If you have the drive shaft carefully aligned, the down bolts should be tightened. These bolts should be checked daily during operation and tightened, if necessary. Operating with slack or missing bolts will cause unnecessary wear. It is of paramount importance that the driven piece of machinery coupling onto the drive shaft fits perfectly.

2. Air supply

From the table below, you can select the hose or pipe size to suit the type of air motor being used. In order to achieve the rated performance, an air pressure, when the air is following, of 6 bar is essential. It is important to ensure that the compressed air supply is dry and clean. For using wet compressed air, it is important to install a fitted water separator, to avoid possible icing. Wet air is mostly detrimental to the life and performance of the air motor. Before coupling the air hose or pipe, see that it is blown through very thoroughly. The sieve behind the air tap should be cleaned weekly under normal conditions and more frequently if the conditions are dusty.

The air motor is reversible and the motor is protected by the built in centrifugal governor which is designed to allow the motor to operate for example at 1500 rpm by type 15.

3. Lubrication of the air motor

There are two areas where one must provide lubrication, the two rotors and the four bearings which carry the rotors. Motors with bevel gears are fitted with an redundant lubrication. The execution of lubrication is shown in this operation manual 02.0000.50 on page 6.

Clean oil must be filled into the differential pressure lubricator resp. into the gearbox. When you refill the differential pressure lubricator with oil, take care that no dirty particles enter into the reservoir. Ensure that the rotor lubrication and the nozzle hole of the differential pressure lubricator is clean. For cleaning, the upper counter nut has to be solved and the nozzle of the differential pressure lubricator must be removed. It is also important, that the filler caps are kept tight in order that the pressure inside does not fall below designed limits thus preventing the venturi from operating fully.

4. Care of Motor

Should the air motor performance drop, normally diagnosed by the drop in number of revolutions of the motor, then the dirt-trap should be examined and if found blocked or partly blocked, cleaned. Also check air pressure of the incoming air. If the motor does not run possible, control the rotors and the motor bearings. Every repair work to be done in our factory. Only on that based, a guarantee for the proper function of the motor can be given.

Internal diameter of air connecting					
Motortype	DMO 8	DMO 15	DMO 20	DMO 35G	DMO 56G
Power (KW)	9	16,5	26	45	66
Internal diameter (mm)	40	50	50	65	80



Connection

The working fluid (air, nitrogen or similar fluid) is fed to the air motor by means of either a hose or pipe.

Attention: When the motor is working as an emergency drive, the working fluid will be fed from tank!

A two way valve or screw down valve is normally mounted on the air line directly before the air motor. This shut off valve prevents the escape of air at the directional control valve when the air motor is in neutral position and not running. Before air entry, the working fluid should be cleaned with a filter (filter mesh about 0,5 to 1 mm).

Before the motor with spur gear box is started, fill in oil up to half of oil level gauge. Suitable gear oil types are shown on page 8 in this operation manual.

Differential pressure lubricator

After the shut off valve, the working fluid passes through the differential pressure lubricator which is normally designed for horizontally mounted motors. Vertical or incline applications require a special lubricator.

The differential pressure lubricator operates using the venturi jet principle producing a pressure difference before and behind the jet causing the oil in the reservoir to rise in the small bore pipe and be carried in the air stream in "atomised" form producing a fine mist.

The oil mist in the air provides the lubrication of the rotor faces and the motor housing. Thus preventing rusting and eventual loss in tolerance between rotor faces and casing, which results in a performance loss.

The level of the lubricator must be checked every eight hours of operation and the reservoir replenished to the required level. The oil used in the lubricator should have anti corrosive properties and also have a viscosity of 36 cst/ 50°C (4,5 °E / 50°C). Examples of this type are shown on page 7 in this operation manual.

Centrifugal speed – governor

The differential pressure lubricator is also connected to the centrifugal speed - governor, which is installed so that a rotor speed is maintained under the supply air conditions.

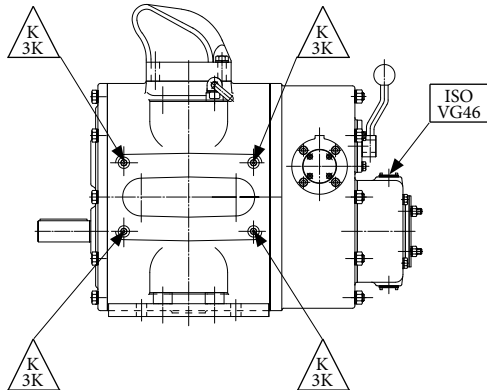
In the governing device is incorporated a precision casing containing two radially placed pistons left and right, retained by spring. By means of increased or decreased revolutions, the pistons are moved by centrifugal force to counter the spring tension, thereby opening or closing the air outlets of the casing which are connected to the directional control valve of the motor. From the directional control valve the compressed air is fed to the air motor in such a manner as to produce the desired direction of rotation. After that, the exhaust air flows through the exhaust paths of the motor case into the atmosphere.

Technical data and dimensions for the pneumatic motors type DMO on catalogue-Nr.: LM1-008 EN



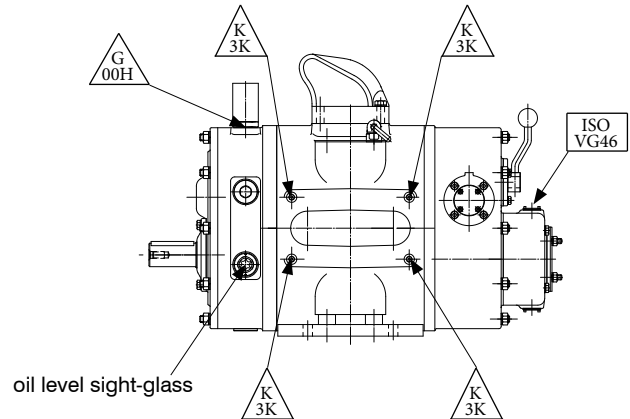
Pneumatic gearwheel motor
DMO 08 - DMO 56G

Delivered **without oil!**



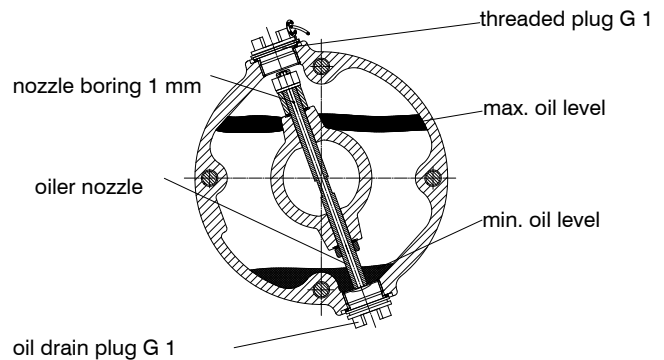
Pneumatic gearwheel motor with gear box
DMO 08 - DMO 35G

Delivered **without oil!**



Differential pressure lubricator for rotor lubrication

For gears (coaxial, bevel or bevel helical) connected to the pneumatic gear motor, please follow the instructions on pages 8 and 9 of this manual and the separate installation and operating instructions of our planetary or bevel helical gears supplied with the drive unit.



Motortype	Oil volume VG46 Differential pressure lubricator [l]	Oil volume G00H Gearwheel motor [l]	Oil volume G00H Bevel gear box [l]
DMO 8	0,90	2,00	according to type
DMO 15	1,40	3,50	according to type
DMO 20	1,40	4,00	according to type
DMO 35G	5,00	1,50	according to type
DMO 56G	5,00	----	----

ISO VG46 Corrosion resistant oil, having a viscosity of 46 mm²/s at 40°C
Solidifying below -30°C

Check and fill all 50 h

K3K Litium based grease - NLGI - Class 3
for operating temperature up to +120°C

Grease every 50 h

G 00H Semiliquid grease
der NLGI Class 00

Fill every 500 h
at least every 12 Monate

(Lubricant types to DIN 51502)



The following mineral oils have proved to be satisfactory:

Producer	Mineral oil type HLP 22, ISO VG 22 Ambient temperature under 0°C	Mineral oil type HLP 46, ISO VG 46 normal working temperature about 50°C	Mineral oil type HLP 100, ISO VG 100 high working temperature over 70°C
ARAL AG	Aral Vitam GF 22 Aral Vitam DE 22	Aral Vitam GF 46 Aral Vitam DE 46	Aral Vitam GF 100
AVIA Mineralöl AG	AVILUB Hydr. Öl RSL 22 AVILUB Hydr. Öl H-LPD 22	AVILUB Hydr. Öl RSL 46 AVILUB Hydr. Öl H-LPD 46	AVILUB Hydr. Öl RSL 100 AVILUB Hydr. Öl H-LPD 100
BP Oil Deutschland GmbH	BP Energol HLP 22 BP Energol HLP-D 22	BP Energol HLP 46 BP Energol HLP-D 46	BP Energol HLP 100
Calypsol	Hydrauliköl HLP 22 Hydrauliköl HLPD 22	Hydrauliköl HLP 46 Hydrauliköl HLPD 46	Hydrauliköl HLP 100 Hydrauliköl HLPD 100
Castrol Ltd. England	Castrol Hyspin AWS 22 Castrol Hyspin AWH 22	Castrol Hyspin AWS 46 Castrol Hyspin AWH 46	Castrol Hyspin AWS 100 Castrol Hyspin AWH 100
Ecubsol	UK Ecubsol Oel HYC UK Ecubsol Oel HH 22	UK Ecubsol Oel HYD UK Ecubsol Oel HH 46	UK Ecubsol Oel HYS UK Ecubsol Oel HH 100
Esso Deutschland GmbH	NUTO H 22 HLPD-Öl 22	NUTO H 46 HLPD-Öl 46	NUTO H 100
Fuchs Mineralölwerke GmbH	Renolin MR 5 VG 22 Renolin B 5 VG 22	Renolin MR 15 VG 46 Renolin B 5 VG 46	Renolin MR 30 VG 100 Renolin B 30 VG 100
Houghton	Hydrolubric VG 22	Hydrolubric VG 46	Hydrolubric VG 100
Mobil Oil AG	Mobil DTE 11 Mobil DTE 22 Hydrauliköl HLPD 22	Mobil DTE 15 Mobil DTE 25 Hydrauliköl HLPD 46 Hydraulic Oil Medium	Mobil DTE 18 Mobil DTE 27 Hydraulic Oil Heavy
SHELL	Shell Tellus Öl 22 Shell Hydrol DO 22	Shell Tellus Öl 46 Shell Hydrol DO 46	Shell Tellus Öl 100 Shell Hydrol DO 100
TEXACO	Rando Oil HD A-22 Alcor Oil DD 22	Rando Oil HD B-46 Alcor Oil DD 46	Rando Oil HD E-100 Alcor Oil DD 100
TOTAL	Azolla ZS 22 Azolla AF 22 Azolla DZF 22	Azolla ZS 46 Azolla AF 46 Azolla DZF 46	Azolla ZS 100 Azolla AF 100 Azolla DZF 100



Our gearbox units are shipped without lubrication oil ; remember to fill them to the correct level before they are put into service. When the units must be stored for a long period of time, particularly in humid conditions, fill them completely with oil and protect the machined parts with rust inhibitors.

Lubrication

For gearbox units we recommend the use of gear oils with EP additive and minimum viscosity index of 95 and viscosity chosen on order that, when the normal working temperature is reached, it has a 40 - 60 cst minimum value, in relation to the speed and transmitted torque conditions. Considering normal temperature increases of 40°C - 50°C, the choice is often made considering ambient temperature, as per table of the following page.

In case of wide temperature changes, we recommend the use of synthetic lubricants, with EP additives, minimum viscosity index 165 and viscosity VG 150 or VG 220 (ISO 3448). For special applications where high powers and speeds are involved, we suggest to contact technical office. However, it is always recommendable to use age-resistant oils, relative to their operational temperature. The period between oil changes depends on the type of application and duties performed. Generally the following rules apply for oil quantity :

in-line units mounted horizontally and right-angled units mounted in the B3A, B3B and B3C position, fill to centre line.

right-angled units in position B3D: fill them completely in case of intermittent duty, otherwise please apply to technical office staff.

any unit mounted in positions not covered by the above: completely fill with oil.

Check the correct plug positions. Check oil filling carefully in all cases. Extension pipes may be installed for facilitate checking of oil level, depending on type of mounting. For vertical mounting an special tank can be supplied. Continuous working temperature must not exceed 90°C.

Oil changes

Oil changes must be carried out after first 50/100 hours operation, and subsequently after every 2500 hours or at least every 12 months. These intervals may be modified, depending on actual operating conditions. During oil change, we recommend that the inside of the gearcase is flushed out with flushing fluid recommended by lubricant manufacturer.

Oil should be changed when hot to prevent build up of sludge deposit. It is recommendable to check oil level at least once per month. If more than 10% of total oil capacity has to be added, check for oil leaks. Do not mix oils of different types even of the same make. Never mix mineral and synthetic oils. Pay attention to oil and gearbox temperature during oil change, to avoid the risks of scalding. Be aware of the pollution hazard due to the oil.

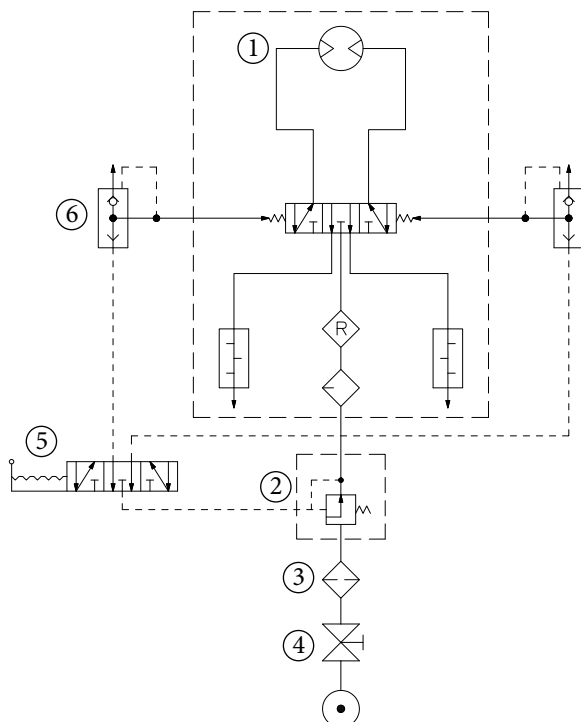
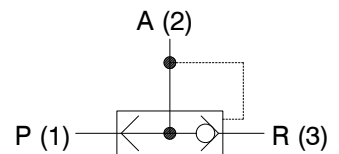


Lubricant	- 20° C / + 5° C min. VI = 95	+ 5° C / + 30° C min. VI = 95	+ 30° C / + 50° C min. VI = 95	- 30° C / + 65° C min. VI = 95
ISO 3448	VG 100	VG 150	VG 320	VG 150 - 220
AGIP	Blasia 100	Blasia 150	Blasia 320	Blasia S 220
ARAL	Degol BG 100	Degol BG 150	Degol BG 320	Degol GS 220
BP Mach	GR XP 100	GR XP 150	GR XP 320	Energol HTX 220
CASTROLI	Alpha SP 100	Alpha SP 160	Alpha 320	Alpha SN 150
CHEVRON	non leaded gear Compound 100	non leaded gear Compound 150	non leaded gear Compound 320	
ESSO	Spartan EP 100	Spartan Ep 150	Spartan EP 320	Excolub SLG
KLUEBER	Lamora 100	Lamora 150	Lamora 320	Synteso D220 EP
MOBIL	Mobilgear 627	Mobilgear 629	Mobilgear 632	Glygoyle 22 Glygoyle 30 SHC 630
Q8	Goya 100	Goya 150	Goya 320	El Greco 220
SHELL	Omala oil 100	Omala oil 150	Omala oil 320	Tivela Oil SA
TOTAL	Carter EP 100	Carter EP 150	Carter EP 320	Carter SH 220 Carter SY 220

1. To change the sense of rotation of the air motors with the integrated change over valve "MP", please take care, that only cleaned working fluid is used. It is therefore recommendable to install a filter before the motor. Also take care, that the filter quality is the same filter quality as the external valves in the circuit.

2. If the change of sense of rotation "left/right" is too slow, the reason is as follows: The pipes between the integrated change over valve of the motor and the external way valve are too long. If they are longer than 5 - 6 m, we recommend a quick release valve. Installation position see in the circuit layout below. These valves have to be installed at each side of the motor housing. Thus the compressed air for change of sense of rotation can be easily discharged at one side and the pressure at the other side can increase fastly.

Quick release valve



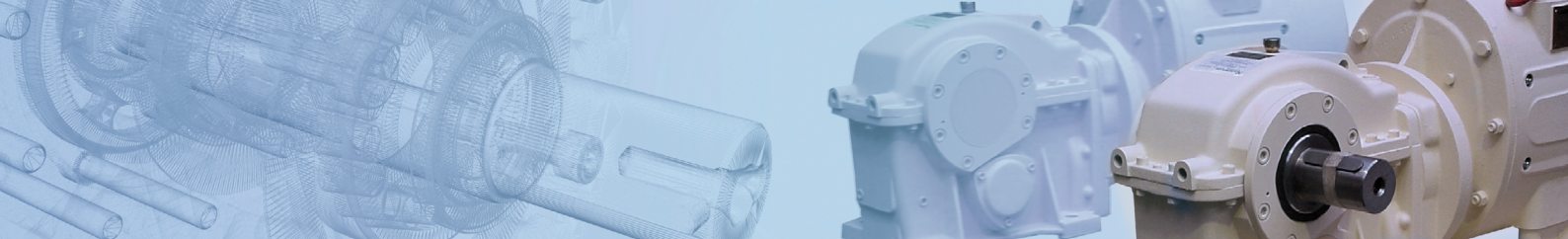
3. **Attention:**

If you use a pneumatic brake, the circuit, motor charge load and brake function have to be checked, so that no malfunctions occur by the quick release valve in case of emergency stop.

- ① Pneumatic motor
- ② Pressure reducing valve
- ③ Dirt trap
- ④ Shut - of valve
- ⑤ * Way valve for change of sense of rotation direction G 3/8
- ⑥ * Quick air - release valve G 3/8

* only control conduit size G 3/8





DÜSTERLOH has been developing fluid technology products for more than 100 years.

The drives, controls and hydraulic power units from Hattingen are appreciated throughout the world for their complete reliability; including under extreme conditions. The owner-managed company's own development and construction department and the wide range of products cater for distinctive flexibility and customer-orientation.

Products

- Hydraulic radial piston motors
- Hydraulic axial piston motors
- Hydraulic high precision motors
- Pneumatic motors
- Pneumatic starters
- Hydraulic and pneumatic controls
- Hydraulic power units

Designing controls and hydraulic power units specific to the customer is our company's major strength. Vast product diversity is also available for standardized products.

Industrial areas of application

- Machine tools
- Smelting and rolling mill equipment
- Foundry machines
- Testing machines
- Shipbuilding (diesel engines)
- Offshore technology
- Printing and paper technology
- Vehicle construction
- Manipulators
- Environmental technology
- Mining equipment
- Materials handling equipment



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