



OPERATING INSTRUCTIONS

Variable speed gearboxes

plaromaster[®]

Directive 94/9/EC (ATEX 95)

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MANUAL **plaromaster**[®]

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1 General references

The available manual is a component of the variable speed gearboxes „plaromaster®“, mentioned „gearboxes“ in the following.

Always keep the manual close to the gear.

The exact knowledge of the manual ensures a safe and troublefree operating of the gear by avoidance of operating errors and inappropriate use.

Therefore, it is in the interest of the operator that the manual is read, understood and observed in all points by the persons responsible for transport, assembly and operation and/or application. For motors, clutches, brake motors, reduction or transmission gears as well as other additional equipments, which are mounted on the gearbox, the further provided manuals must be observed.

There is no separate manual for the planetroll planetary gearboxes „planetdrive®“ mounted to the variable speed gearboxes ex work, as these planetary gearboxes are tuned power related to the variable speed gearbox and maintenance-free.

In connection with the variable speed gearbox „plaromaster®“, these planetary gearboxes fulfill all ATEX requirements. In this respect, the references of this manual are to be applied by analogy to the planetary gearbox.

The transmissions and/or drives described here correspond to the technical conditions at that time of printing this manual.

In the interest of advancing we reserve ourselves the right for carrying out changes in this manual, which are considered as useful, while keeping the substantial characteristics for efficiency and safety of the gearboxes and/or drives described here.

The copyright of this manual remains with planetroll GmbH & Co. KG, Munderkingen. Also, the manual may not be multiplied without our agreement – neither completely nor partly. It may also not be used unauthorized for purposes of competition and it may not be made available against third persons.

Only planetroll has the sole right to change this manual or to add specifications in it, otherwise any warranty claim will expire.

Attention! We accept no responsibility for damages and operational disturbances caused by non-observance of the manual.

1.1 Safety references

Please take special care of the following safety and reference signs!



danger!
danger to life and danger of injury for humans



danger!
important references for protection against explosion



danger!
threatening danger by current



attention!
possible damages on the plant /
special caution is required



reference!
useful information

1.2 Intended use



The variable speed gearboxes „plaromaster®“ are intended for the employment in commercial plants. They fulfill the explosion-proof requirements according to Directive 94/9/EG (ATEX 95) for the category indicated on the identification plate. The technical data indicated on identification plate must be observed strictly.

Outside the power limits specified there, the gears and/or drives may not be operated. Deviating operating conditions require new contractual agreements.

2 Safety references



With all work such as installation, assembly, electrical connection, starting-up, maintenance, servicing and repair no explosive atmosphere may be present. Explosive gas mixtures or dust concentration in connection with hot, live and moved parts of electrical machines can cause serious or fatal injuries.



Working on the gearbox may be accomplished only by qualified personnel.

The operator has to ensure that the persons engaged with assembly, operating, care and maintenance as well as servicing have read the manual, understood it and that they observe it in all points, in order to

- avert danger for life and health of the user and of third persons.
- guarantee the safety reliability of operation of the gear as well as of the necessary components.
- exclude loss of use and environmental pollutions by wrong handling.



- All work on the gear may be implemented only at rest. The drive must be switched free from voltage and secured against unintentional switching on. A sign is to be attached at the switching on place showing that somebody is working on the drive.



- The references on the drive, e.g. identification plates must be observed. Keep them free from dirt and color. Missing plates must be replaced.



- Possibly the transmission housing heats up. Accidental contact with bare hand can lead to uncontrolled, frightfull reaction or to a burn.



- Attention: no lifting operations!
The gear is not self-locking.
Not suitable for lifting operations.



- All work is to accomplish carefully, conscientiously and under the criterion of "security".



- During transportation, assembly and dismantling, operation as well as attendance and maintenance the relevant regulations of industrial safety and environmental protection must be followed.



- The driving motor is to be set out of operation immediately, if during the operation changes on gear are determined, e.g. an increased operating temperature, unusual gearbox noises.



- With installing the drive in devices or plants the manufacturer of the devices or plants is obligated to consider in his own manual the regulations, references and descriptions of this manual.



- With the change of traction fluid the used up traction fluid is to be collected in a suitable tank. Run out traction fluid is to be eliminated immediately by means of an oil binding agent. The used up traction fluid is to be disposed according to the relevant environmental regulations, just like oil binding agents and the cleaning cloths.

3 Description of gearboxes





The variable speed gearbox „plaromaster®“ is an infinitely variable-speed ball gearbox. Life span of in and output shaft bearings amounts to at least 20,000 operating hours. Output speed can be adjusted to speed zero.

4 Technical data

4.1 Output data of identification plate



The identification plate of the gearbox contains the most important technical data. These data and the contractual agreements for the drives specify the borders of the intended use.

1.		 Planetroll <small>the driving power</small> 89597 Munderkingen
2.		
3.	4.	5.
6.	7.	
8.	9.	
Achtung: Betriebsanleitung unbedingt beachten. Attention: Manual must be strictly observed.		
		

1. ATEX execution of variable-speed gear
2. type description planetroll
3. fabrication no.
4. mounting position (see also quantity plan for traction fluid)
5. input speed [rpm]
6. speed range [rpm]
7. maximum torque in speed range, torque at maximum output speed
8. specification of traction fluid
9. filling quantity

4.2 Housing



Gearbox housing consists of aluminium-sand casting.
Housing covers consist of aluminium-continuous casting.

4.3 Traction fluid

Attention: Traction fluid is not a standard gear lubricating oil!



With horizontal mounting position the gearbox transmission parts are moistened with traction fluid by immersing. With vertical mounting position the parts are moistened with traction fluid by immersing and fine dispersion.

The external shaft bearings are grease lubricated for life.

4.4 Rotary shaft seals



Radial rotary shaft seals on shaft entrance and shaft outlet prevent from traction fluid leakage of the gear and from penetration of impurities.

Dependent on the temperature, rings with a material having the ability to resist high temperatures are used with a thermal range of application from -20°C up to $+200^{\circ}\text{C}$.

4.5 O – rings



Flanged on transmission covers are sealed with o-rings with a material having the ability to resist high temperatures with a thermal range of application from -20°C up to $+200^{\circ}\text{C}$.

4.6 Bearing



All shafts are executed with an anti-friction bearing. They are continuously lubricated for life.

4.7 Cooling



The gearbox surface is designed for the dissipation of the convection and radiation heat (infrared heat).

It is important that the gearbox surface remains clean.

4.8 Varnishing



The gearbox housing is made up of aluminium sand casting alloy and in standard execution it is unvarnished. The drive units can be varnished in different RAL colors according to customer's request.

In case of a subsequent lacquer finish of the gearbox, rotary shaft seals, in and output shaft may not get in contact with colors, lacquers and solvents.

Operationally rubbed plastic surfaces can load themselves electrostatically.

With application in zone 21 and 22 (types of dust) the layer thickness may not be thicker than $200\ \mu\text{m}$.

5 Storage of the gearboxes

During storage following points are to be considered:

- The gearboxes are to be secured against falling down.
- Bright connecting surfaces and shafts are to be oiled lightly.
- Storage in dry rooms.

- Temperature without large fluctuations in the range of -5°C up to $+50^{\circ}\text{C}$.
- Relative humidity smaller than 60 %.
- No direct sun exposure or ultraviolet light.
- No aggressive, corrosive materials in the environment.
- No vibrations and oscillations.

6 Setting-up of the gearboxes

6.1 Examination of the gearboxes

The gearbox is to be examined and only is to be installed, if no damages by storage or transport are visible. Special attention applies for the rotary shaft seals.

6.2 Preparation for setting-up



It is to be considered that the components and driving motors mounted on the gearbox are designed according to ATEX conformity, provided that the gearboxes and/or drives are operated in an explosion-proof area.

If a wrong direction of rotation can lead to a damage or to a risk, then the correct direction of output shaft ist to be determined by a test run of the drive in non-coupling condition and it is to be guaranteed for later operation.

No aggressive, corrosive materials may be present in the environment of the gearbox, which would cause an attack to the material, traction fluid, lubricant or elastomers.

This applies also to later operation.

6.3 Setting-up of the gearboxes



When setting-up the gearbox no explosive atmosphere may be present.

The foundation and/or construction unit to which the gearbox is fastened, should be oscillation-poor, torsionally rigid and even.



The driven end is to be aligned carefully. Contamination on the fixing surfaces is to be cleaned.

Accessible rotary parts are to be covered.

In order to avoid overheating of drive, following points are to be considered during setting-up:

1. An unrestricted air draught at all sides of gearbox is to be realized.
2. A sufficient free space is to be planned around the gearbox.
3. Cooling air of the motor fan of gear motor must flow against the gearbox unrestrictedly.
4. No capsulating or lining of the gearbox.
5. Do not expose drive to heating up by direct sun exposure.
6. Do not lead warm exhaust air of other aggregates to the gearbox.
7. The foundation and/or construction to which the gearbox is fastened must not lead any heat inside the gearbox.
8. No dust pouring in the area of the gearbox.

6.4 Assembly



The installing of in and output elements, e.g. clutch hubs onto the output shaft of gearbox has to be realized by means of a suitable winding-up mechanism, in order to avoid an attack of harmful forces to the gearbox. Hubs never must be impacted with the hammer. There is a thread centering bore hole at the in and output shaft, which is suitable for winding-up the hubs. The assembly of the hube is facilitated, if it is coated before with lubricant or if the hube is warmed up to 100° C.
In and output elements, e.g. belt drives must be provided with a contact protection. The lateral force insertion should be as close as possible to the gearbox.

6.5 Mounting of driving motor



Only IEC standard motors may be used for the drive of gearbox, which prove a category sufficient for ATEX zone in accordance with the motor shield.



With gears of ATEX category 2D, at least the motor must show the protective system IP6X.

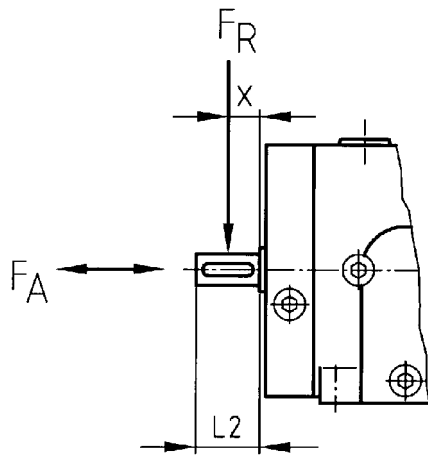
Electrical connections must correspond to technical standards and must be implemented by qualified persons (regulation for specialists, see DIN VDE 0105 or IEC 364).

Motor connection: if motor is factory-mounted, then you will find electrical connection diagram together with safety regulations inside the terminal box. The references and safety regulations indicated there must be obeyed strictly. Further data are indicated on identification plates of motor and possibly other components.

Attention! Before starting-up of drive it is to be guaranteed that

1. the drive does not drive on block.
2. brakes are possibly ventilated.
3. all protection and safety devices are duly installed, also during trial operation.
4. the direction of rotation of the drive is correct.

6.6 Permissible output shaft loading



The point of load attack corresponds to the center of the output shaft.

The values for F_R consider 30 % of axial force.

If the force insertion of radial force F_R lies outside the center of output shaft, then the permissible force values reduce ($x > L_2/2$) and/or the permissible force values increase ($x < L_2/2$).

Points of load attack on the gearbox output shaft:

F_A = permissible axial force

F_R = permissible radial force

L_2 = shaft length

x = space

Type	Permissible output shaft loading F_R	
	standard	reinforced
	N	
MR 1	250	300
MR 3	370	500
MR 5	600	800
MR 7	700	1000
MR 9	900	1300
MR11	2100	3700

7 Starting-up

7.1 Control of traction fluid before starting-up



Before starting-up the level of traction fluid must be checked. For this, the gearbox motor is to be switched free from voltage, secured against unintentional switching on.



Mounting position has to be considered (see quantity plan for traction fluid).

The maximum conditions are the bottom edge of the tapped hole for the control screw of traction fluid.

If no traction fluid is flowing out from the opened tapped hole, then traction fluid must be refilled until level of traction fluid reaches the bottom edge of tapped hole of the control screw of traction fluid.

The conditions for traction fluid are to be controlled quarterly (every third month). Basis for this is the quantity plan for traction fluid.

7.2 Control of traction fluid after starting-up



On the first day after starting-up, thereafter once a week, it must be accomplished a visual inspection for possible leakage places.



If leakage places are found, then the drive is to be put out of service and planetroll® has to be contacted immediately.

for control:



1. The gearbox motor is to be switched free from voltage and secured against unintentional switching on.
2. Check of oil level is to be accomplished only at standstill and cooled gearbox.
3. The control screw for traction fluid, appropriate to the design, is to be unscrewed.
4. In case of damages of this screw or seal these parts have to be exchanged.

7.3 Surface temperature of gearboxes



In continuous operation the gearbox is appropriate for surface temperature of 95° C.

For short time planetroll® gearboxes can be loaded beyond a multiple of rated torque.

In dependence on the taken power, on speed and on mounting position,



short-term surface temperatures of 115° C are permissible.

The permissible ambient temperature for the gears amount to:

-10°C up to +40°C.

The gearbox may be installed only in the ordered mounting position.

In case of change in mounting position the quantity of traction fluid will change.

A change of mounting position may take place only after consultation with planetroll®.

Changing the mounting position without any previous consultation with planetroll® will lead to an expiring of the ATEX permission as well as to an expiring of any warranty claims.

During operation the gearbox is to be checked on superheated surface temperatures and for changed noises.

If irregularities are found, then the gearbox and/or drive is to be put out of service and planetroll® has to be contacted immediately.

The surface temperature of gearbox has to be checked from time to time.

Please note that slightly changed ambient and setting-up conditions, e.g. restricted mounting conditions contrary to the instructions given by you (planetroll® ATEX check list) can affect temperature conditions substantially.

7.4 Control of the gearboxes



During test run the gearbox is to be examined under maximum load for the following:

- unusual noises, e.g. milled, knocked or grinded noises.
- unusual vibrations, oscillations and movements.
- formation of fog and/or smoke.

After its test run the gearbox is to be examined for leakage places.

If any conspicuousness during the described check tests is determined, then the gearbox is to be put out of service and planetroll® has to be informed

7.5 Check list for setting-up



Before setting-up within the ex area it is to be checked the following:

1. The examination of the delivered goods immediately on their receipt on possible transportation damages. The haulage firm has to be informed immediately of such damages.
2. The correctness of the following maximum permissible data indicated on identification plate of gearbox compared with the actual ex area conditions of local application:
 - group of equipment
 - ex category
 - ex zone
 - temperature class
 - maximum surface temperature
3. The guarantee that there are no explosive atmospheres present during installation.
4. The free accessibility of all control screws for traction fluid and drain plugs.
5. The correctness of the motor data indicated on identification plate regarding the actual ambient conditions at place of work.

8 Maintenance and servicing

8.1 Maintenance details

8.2 Intervals for inspection and maintenance



From the date of setting-up the variable speed gearbox, it must be accomplished a change of traction fluid after every 5000 hours of operation.

planetroll® variable speed gearboxes must be filled exclusively with synthetic traction fluids indicated on identification plate of variable-speed gearbox.

Attention! The traction fluids specified above must not be mixed with mineral oil, lubricating oil or other synthetic oils. Even the mixture of smallest quantities of lubricating oil with traction fluid causes a loss in power, irreversible damages on the gearbox transmission parts and thus the failure of the gearbox.

8.3 Inspection and maintenance work



Dust pollution on gearbox housing is to be removed regularly.

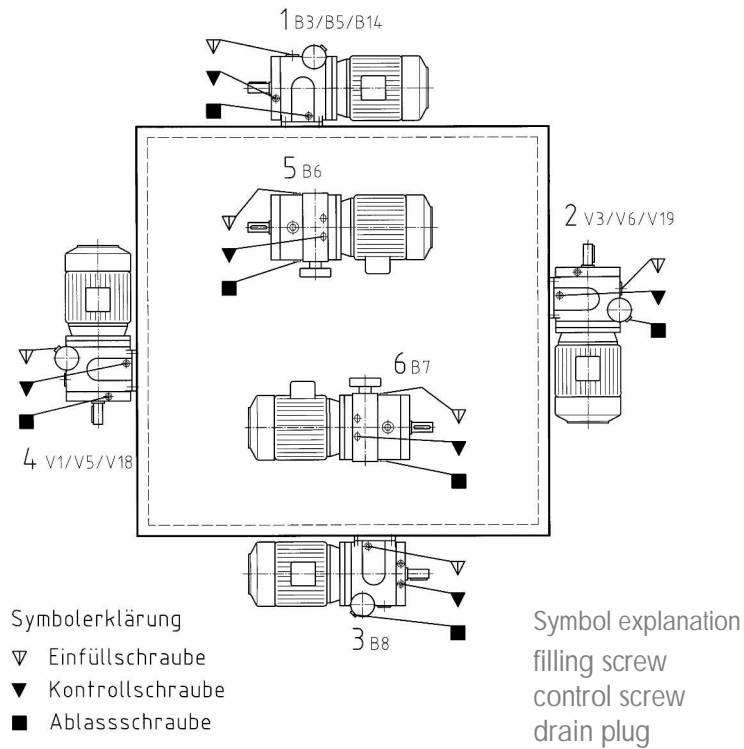
The dust pollution may not amount to any more than 5 mm.



Never blow off dust (danger by dust air atmosphere), but wipe it off by means of a wet cloth. The cleaning should be accomplished in the cold gearbox condition.

9 Quantity plan for traction fluid

The filling quantity of traction fluid depends on mounting position and is marked with the figures 1, 2, 3, 4, 5 and 6.



Traction fluid capacity plaromaster®			
size	mounting pos.	capacity [ml]	traction fluid
MRV	1, 2, 3, 4, 5, 6	traction fluid filling for life (15 ml)	
MR1	1, 2, 3, 4, 5, 6	70	sort of traction fluid according to identification plate of each variable speed gearbox
MR3	1, 3, 5, 6	160	
	2	180	
	4	230	
MR5	1, 3	300	
	2	370	
	4	500	
MR7	5, 6	320	
	1, 3, 5, 6	500	
	2	750	
MR9	4	820	
	1, 5, 6	850	
	2	1130	
MR11	3	800	
	4	1300	
	1, 2	3200	
	3	1700	
MR11	4	4400	
	5, 6	2500	