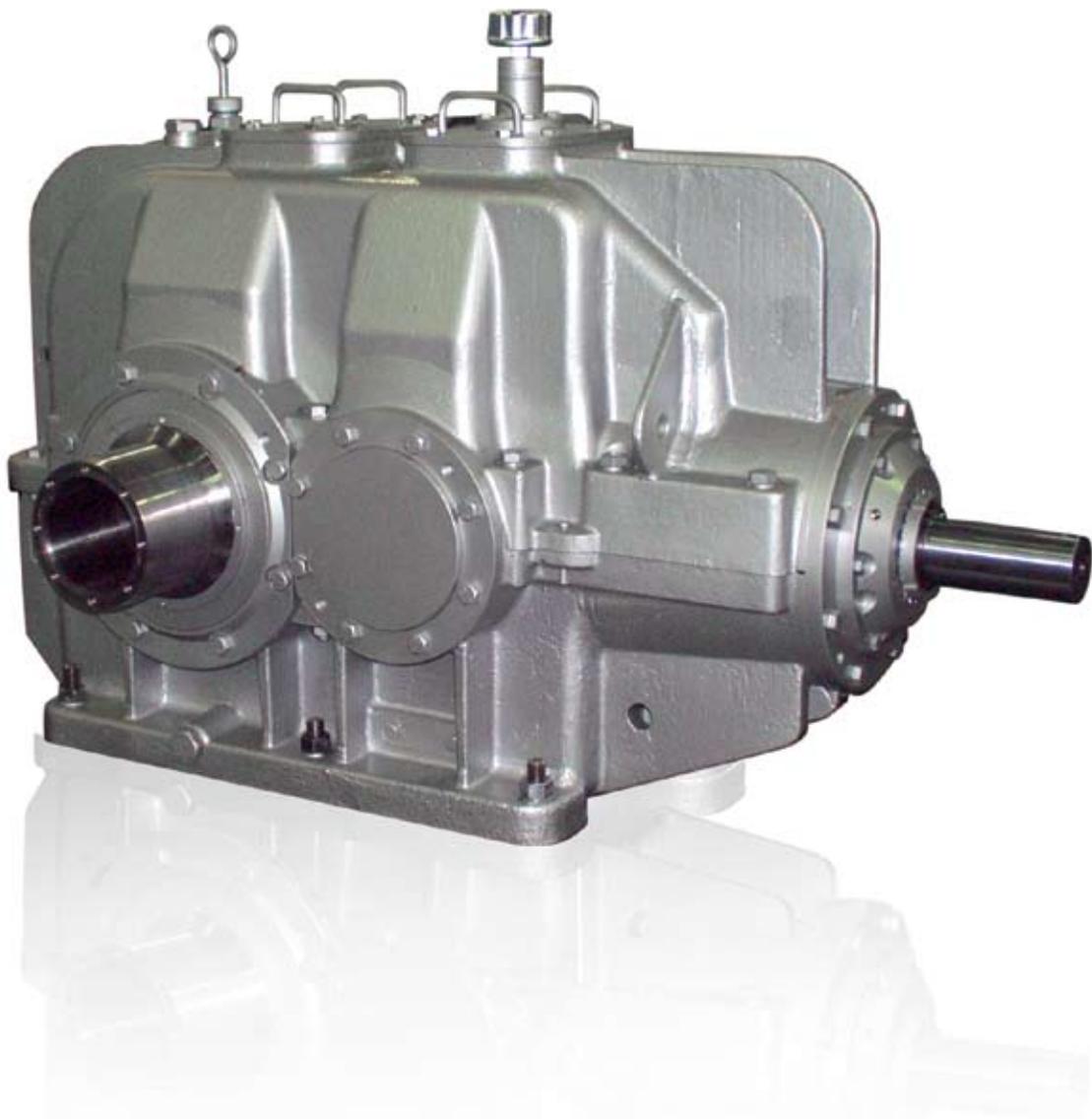


One Source

KA and KB Transmission Gears

Gear units for the Mining Industry



FLSMIDTH
MAAG GEAR

Our Quality Policy



FLSmidth MAAG Gear's Quality Policy is that we at all times strive to meet the requirements of our customers and stakeholders as regards our products, projects and services in the industry we serve.

With our process management (certified QM System) we endeavour to increase and improve customer's trust and satisfaction. Our goals are achieved by commitment, competence and personal responsibility of our employees.

Management is committed and dedicated to ensure continuous implementation and evaluation of the principles of our quality policy. Each employee is aware of the mission, vision and strategy of FLSmidth MAAG Gear, and through the implemented guidelines fulfils the required quality and legal regulations in his own field of activity. All employees are individually responsible for their own tasks.

Continuous improvement in organisational, operational, technical and personal affairs will increase the quality of our products, projects and services. At the same time this enables us to lower our costs but also ensures and improves our market position. Our process management monitors all our processes, and supports economic behaviour at all levels.

We work in partnership with our suppliers and external partners on a basis of open communication and performance-oriented results.

A pioneer of modern gear technology

FLSmidth MAAG Gear has almost 100 years of experience in manufacturing gear units. The company was founded in 1913 and quickly expanded into an international group. FLSmidth MAAG Gear introduced the technology of mill gear boxes for the cement industry with great success in 1965. Since then over 650 MAAG Gear units were sold.

The company

At the FLSmidth MAAG Gear headquarters in Winterthur, Switzerland, more than 100 employees work in development, design, finance, project management, sales, customer service and marketing. Production and purchasing take place in a modern plant equipped with new high-performance machines in Elblag, Poland. More than 160 employees manufacture there gear units which satisfy the most demanding quality standards. The company belongs to the successful FLSmidth Group, a listed Danish firm.

Our strength

The combination of unique precision, accuracy and modularized solutions with compact design are leading to high efficiency products and therefore low maintenance cost for the customer. Experience, new technical solutions and the latest manufacturing techniques are regularly incorporated into the production process.

Intensive development and training of our engineers assure best understanding of how to operation and lengthen the lifecycle of a gear.

A constant willingness to innovate, and close collaboration with our customers, have helped to ensure that MAAG Gear units continue to operate reliably throughout the world under the toughest conditions.

Product range

Today, the product range includes various gear units for mills, gear solutions for bucket wheel excavators and belt conveyors, as well as maintenance systems for all types of plant.

FLSmidth MAAG Gear offers the following units and more for the mineral industry:

For belt conveyors:

- KA/KB gear units

For bucket wheel excavators:

- KPB gear units

For horizontal mills:

- LGD: lateral gear drive

MAAG Gear units for the cement industry include:

For vertical mills:

- WPU two-stage gear units
- WPV three-stage gear units
- Atox gear units

For horizontal mills:

- CPU two-stage planetary gear units
- LGD lateral gear drive
- Symetro gear units

For roller presses:

- PPU gear units

Replacements: replacement gear units for all types of installation

All MAAG Gear units are available as standard solutions or are customized to the required needs.



KA & KB Transmission Gears



Introduction

Bevel-cylindrical reduction gear units type KA or KB are designed for torque transmission from electric drive motor to conveyor shaft (usually of belt type). They found their application in brown and hard coal mines, copper and sulphur mines, and in other general purposes. Design and manufacturing of these gear units have been based on our long experience in developing industrial gears. Design process is supported by the newest calculation methods with usage of computer techniques (engineering programs, CAD, CAE etc.)

Advanced manufacturing process uses the latest achievements in heat-treatment and teeth machining. Precise machines in connection with control process ensure that rotors and casings are always on the highest level of quality. This is our guarantee that technical assumptions are met every time, providing optimal quality, silent running and efficiency of our gearboxes.

Technical description

Gear wheels

All gear wheels are made of an alloy, casehardened steel, which ensures high strength and wear resistance of the teeth and provides light and compact construction of the gearbox. Tothing of the bevel stage is of the Cyclo-Paloid type. Tothing of helical stages is with all necessary modifications. Heat treatment and precise teeth machining result in optimal tooth contact under load conditions.

Bearings

KA and KB gear units are working on roller bearings. The type of bearings depends on load type transmitted. Standard bearing durability calculation assumes 30 000 working hours.

Gear casing

Sturdy, ribbed casings are made of ductile cast iron in standard version. To simplify the maintenance, their role is to be also an oil tank. Solutions applied in their construction ensure high quality of the acoustic and the dynamic state. Sealing of the shafts prevent internal parts from any contamination present in usual operation environment of the gearbox.

Lubrication system

Gearboxes work with a splash-gravity lubrication system. To ensure the best quality of gears and bearings lubrication, gearboxes are equipped with oil heaters. For special purposes or requirements of the customer a pressure lubrication system is also available.

Monitoring system

Standard version of the gearboxes is equipped with resistance thermometers. They monitor and signalize too high oil temperature, switching off the main motor drive in case of reaching critical conditions. For a pressure lubrication system, the monitoring system is more complex. It contains pressure transmitters, resistance temperature transmitters, thermometers and pressure gauges.

Maintenance

Each gearbox, before it will be released, is submitted to a trial run on the factory test station. Standard version of the gearbox can work within range of environment temperatures from -30oC to +40oC.

Cooling and thermal power of the gearbox

In a certain range of power, heat generated by the gearbox is naturally radiated through the casing surface. This power range is called the thermal power of the gearbox. It is limited by maximum allowed temperature of the casing surface equal to 85°C and environment temperature which shall not be higher than 40°C. For power levels higher than the thermal power of the gearbox, it is necessary to apply additional cooling (e.g. by means of a fan installed on the input shaft) or by a special-designed gear casing with surface adapted to increased heat radiation.

Technical Terms of Delivery

The Quality

The Quality of the gear unit is guaranteed by the Company Quality Assurance System complying with ISO 9001 (certificate SGS).

Painting and Preservation

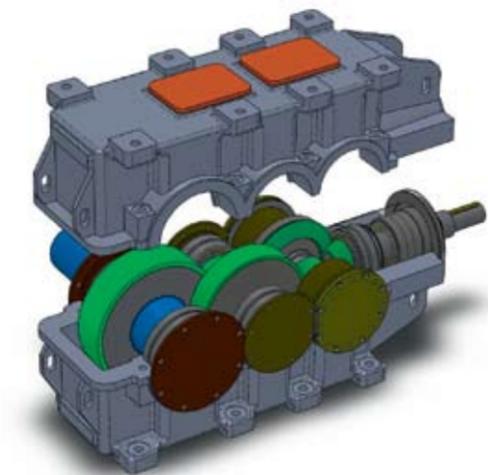
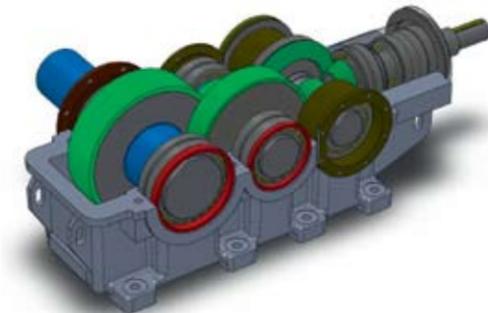
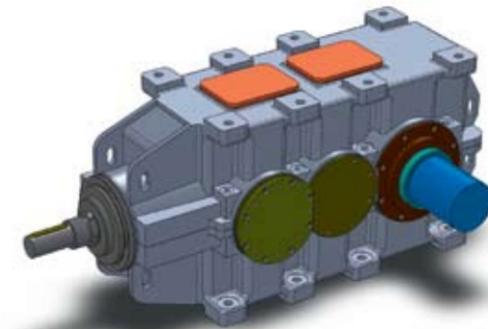
All internal surfaces are covered with preservative medium, which doesn't require to be removed before the start up of the gear unit. All external parts are painted with appropriate paint without lute fillings. Preservation of the gearbox is normally foreseen for 6 months of storage in a closed room. Painting and preservation can be easily adjusted every time to requirements of the customer.

Warranties

Standard warranty period is 12 months from commissioning, however not longer than 18 months from the delivery. Warranty conditions can be negotiated if required by the customer - warranty period may increase if installation and commissioning will be inspected by the Service of the gear unit manufacturer.

Reference

Design and manufacturing process of the bevel-cylindrical gear units is based on the over 40 years of MAAG Gear Zamech experience (formerly ABB Gear Zamech Ltd and ZAMECH - Elblag).



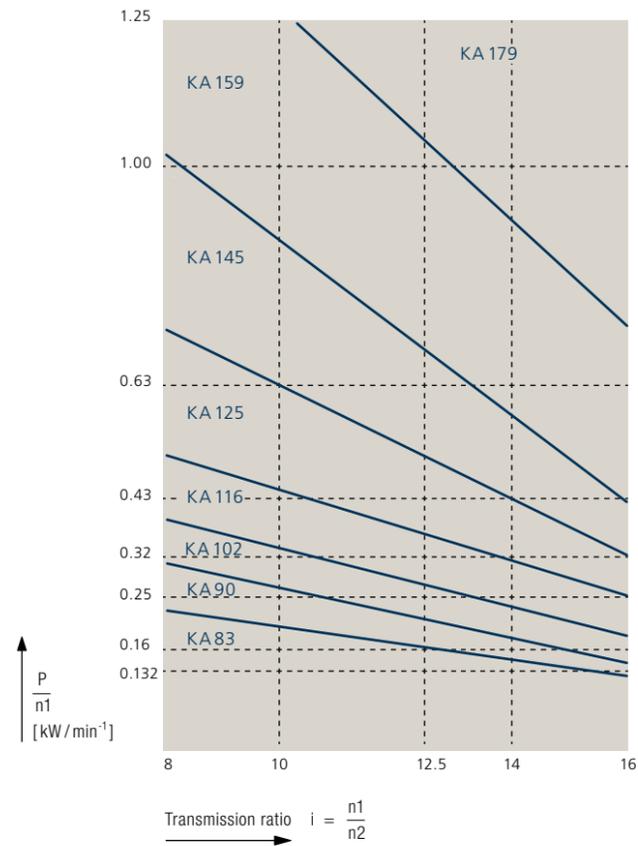
KA

Diagram No. 1

	Nominal Power P [kW] at $n_1 = 1000$ rpm
KA 179	1150
KA 159	570
KA 145	470
KA 125	380
KA 116	290
KA 102	225
KA 90	170
KA 83	140

rpm of the input shaft (n1)	
1	1000
2	1500
3	750
4	1800
5	1200
6	900

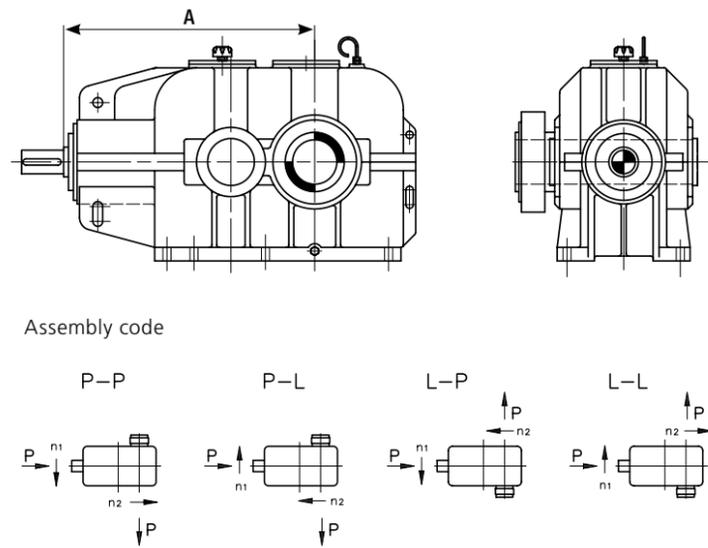
rpm of the output shaft (n2)



K	bevel stage
A	one helical stage

Gear Unit Size (distance A in cm)

INPUT SHAFT
Input with keyway
OUTPUT SHAFT
with hollow shaft, aligned on the foundation
with full shaft
with flange shaft
with hollow shaft, lift on the conveyor shaft



Other designs would be available on request.

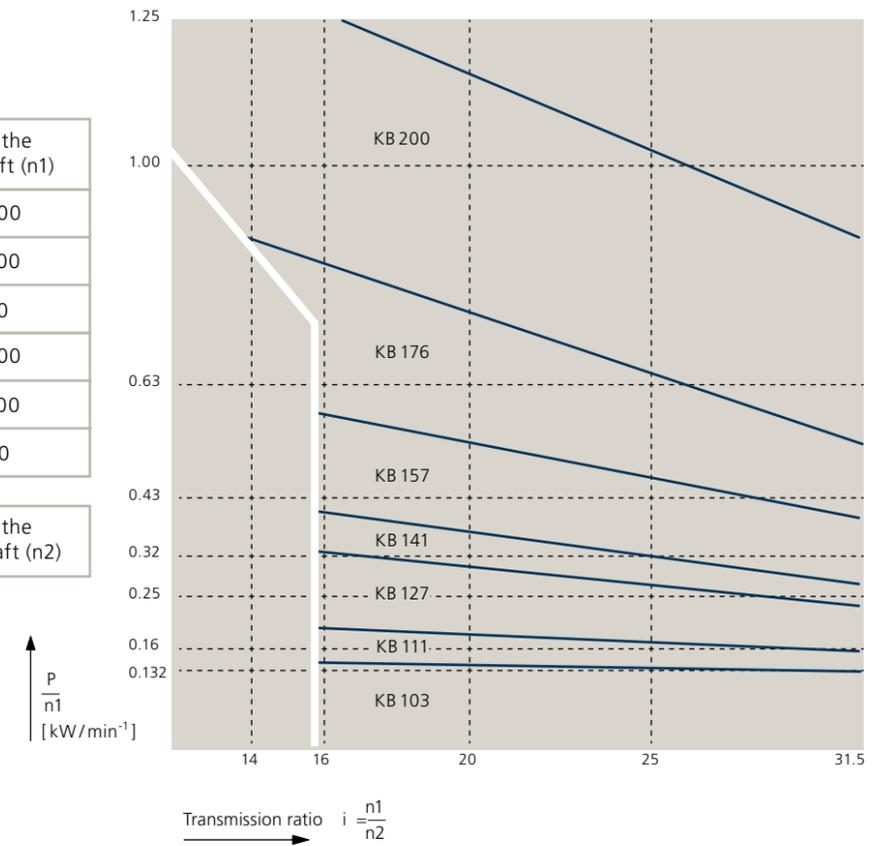
KB

Diagram No. 2

	Nominal Power P [kW] at $n_1 = 1000$ rpm
KB 200	590
KB 176	465
KB 157	370
KB 141	295
KB 127	235
KB 111	185
KB 103	148

rpm of the Input Shaft (n1)	
1	1000
2	1500
3	750
4	1800
5	1200
6	900

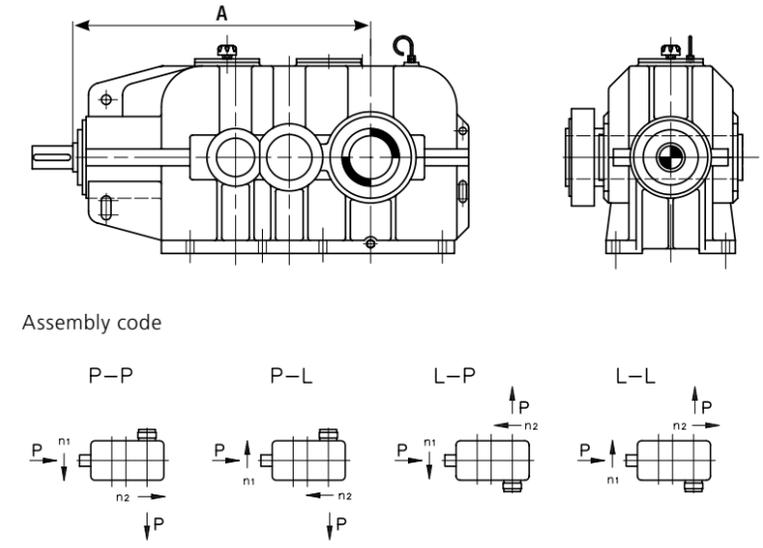
rpm of the output shaft (n2)



K	bevel stage
B	two helical stages

Gear Unit Size (distance A in cm)

INPUT SHAFT
Input with keyway
OUTPUT SHAFT
with hollow shaft, aligned on the foundation
with full shaft
with flange shaft
with hollow shaft, lift on the conveyor shaft



Other designs would be available on request.

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