Elevator Components

Best Quality - Made in Germany










Onlineshop

EN 81-20/-50 -conform

LE-Centre

LEKALK 3.0 LiftEquip ELEVATOR COMPONENTS

More than you expect ...

LiftEquip®
ELEVATOR COMPONENTS

Table of Contents

More information to our systems: www.liftequip.com

Preface

Dear Sir/Madam,

As usual, we will be presenting our comprehensive product portfolio in our component catalogue. Our LEA family lift systems are laid out clearly in another catalogues, so that the right information is available to you, depending on your needs.
All catalogues can be downloaded from our homepage **www.liftequip.com.** Contact data can be found on the last page.

We greatly appreciate your interest and now wish you every success in looking for the solution that fits you best.

LiftEquip's team would be pleased to advise you. You can find our contact data on the cover page at the end of the catalogue.

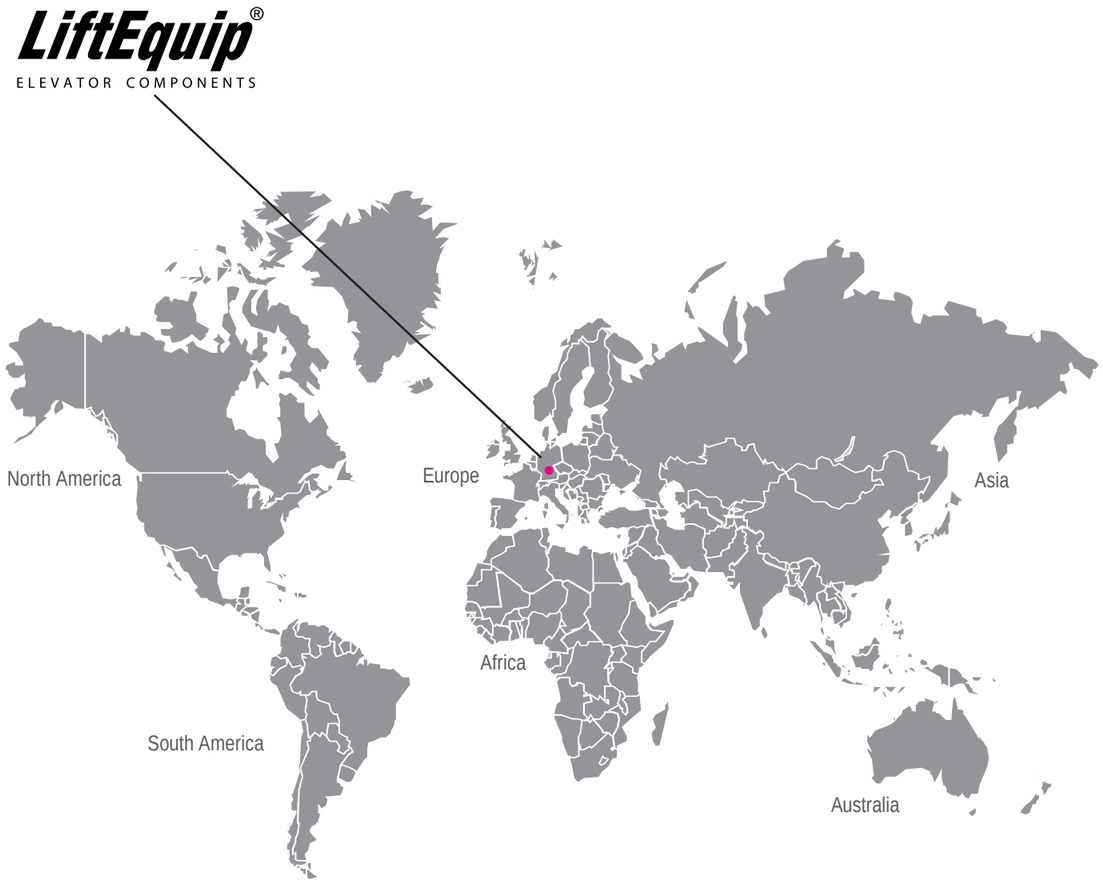
We look forward to working with you.

Best regards

Your LiftEquip team

Location and International Alignment

Always where you need us



What occurs to you when you think of elevators? What do you consider particularly important when you are choosing a provider of elevators? No doubt you expect safety and reliability, and want products you can trust. After all, you are deciding on an investment that you do not want to regret in future.
As LiftEquip, the renowned provider of components for elevators, we know your requirements and expectations very precisely. Our products and services, in the same way as our company and actions, have been aligned to these requirements and expectations. You receive full support where you need it. Our international alignment means that we know the national legal and technical requirements in your country.
Thousands of highly satisfied customers have been placing their trust in us for many decades. Alongside the „big players" in the industry, many small and medium-sized elevator companies and service operations are among our customers. What they appreciate is that we know more about elevators than almost anyone else!

Range of Products

High-Quality Components for your Elevator

From the Component to the Complete Assemblies

Whether you are planning a low-cost standard elevator or a premium installation that will be subjected to high loads, and whether your elevator is to run in a closed shaft or as a representative panorama system: we cover the entire range of applications from passenger to freight elevators, and deliver all the important components for your elevator.

Drives

With our elevator drives, you can choose between the energy-efficient, gearless drives or the legendary gear drives for virtually any range of speed and rated load. A balanced system with matching frequency control ensures outstanding running performance on every drive.

Solutions for modernisation

We have developed very special solutions for the modernisation of existing elevator systems. Variable in dimensions, our compact and highly modern drives can be easily adapted to almost any circumstances. With a modification, you reliably bring your installation up to date with regard to safety, comfort and energy consumption.

Gears

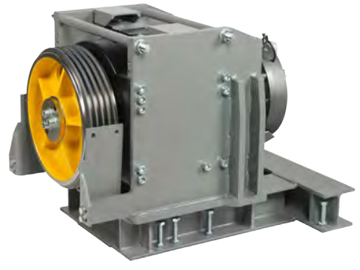
Gearless

Control system

Modernisation

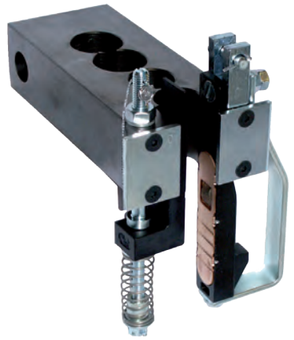
ModKit MO61 D4

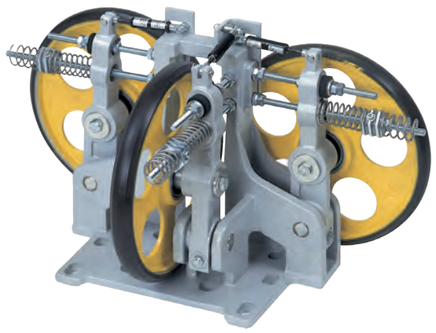
LEMoS®



Range of Products

Safety





Safety Technology

Our safety technology components are reliable and space-saving.

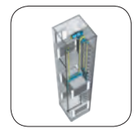
It goes without saying that the comprehensive range of products also includes all other safety devices.

High-Quality Components for your Elevator

From the Component to the Complete Assemblies

Kits - The LEA® Familie

LEA® - Family

Standard 100	**Pure and efficient** The ideal solution for low-traffic functional residential buildings. Type: MRL Rated Load: 450 – 1.000 kg Travel height: 45 m Speed: 1.0 m/s	
Standard 200	**Stylish and flexible** Ideal elevator for low-to mid-traffic residential buildings with demanding design and flexibility requirements. Also perfect for modernizing existing buildings. Type: MRL Rated Load: 320 – 1.000 kg Travel height: 60 m Speed: up to 1.75 m/s	
Comfort 300	**Versatile and smart** Designed for busy commercial and office buildings. Type: MRL Rated Load: 450 – 4.000 kg Travel height: 100 m Speed: up to 2.5 m/s	
Comfort **Plus**	**A classic** Tried-and-tested elevator system with machine room and with geared or gearless drive. Type: MR Rated Load: 450 – 2.500 kg Travel height: 135 m Speed: up to 2.5 m/s	
Cargo	**Robust and reliable** Sturdy freight elevator with machine room and with geared or gearless drive. Type: MR Rated Load: from 1.800 kg Speed: up to 1.0 m/s	

More information to our systems: www.liftequip.com

Overall system in focus

All of our products meet the applicable requirements of European regulations and are certified for many countries. They are designed and built according to the state of the art, have long service lives and are very reliable.

We pay particular attention to the function, co-ordination and availability of the entire elevator on designing our components. This is why you also get components in finely graded construction sizes, each of which has the optimal performance and price for your elevator.

Whether for a new installation or for a modernisation: with our components, you establish the basis for an outstanding elevator and always make a good decision in favour of an economical investment!

You can download the complete brochure on our homepage.

Consulting for our Customers

Every elevator is individual and must be adapted to the type of use in the building and the requirements of the operator. The elevator should fit into the building harmoniously and ensure smooth transport of passengers and freight. This is why the choice of the appropriate components is of particular significance. Here, too, we support you as a partner.

Personal consulting

In a personal discussion, we are glad to advise you on the telephone or on site, naturally also in your national language. Together we find the optimal solution for your use case. Our aim at all times is to work with you to create an elevator system with optimised technology and economy.

Configuration program LEKalk 3.0

Our configuration program LEKalk 3.0 contains all of our experience from theory and practice. The relevant criteria are queried to ensure a reliable selection of products and construction sizes. Alongside the performance data such as rated load and speed, the so-called handling capacity has a decisive influence. The programs deliver you planning data and also the complete documentation that you require for registration and approval of the elevator system. All requirements of the new Lift Directive 2014/33/EU and the EN 81-20/-50 considered.

The Human Factor for Success

Expertise in Elevators Guarantees you have made the right decision

What makes a company good and how does a good company differ from others? We are convinced that the major factor is the workforce! Their qualifications and ideas have made us one of the best providers on the market. This is to remain so in future.

Elevator expertise

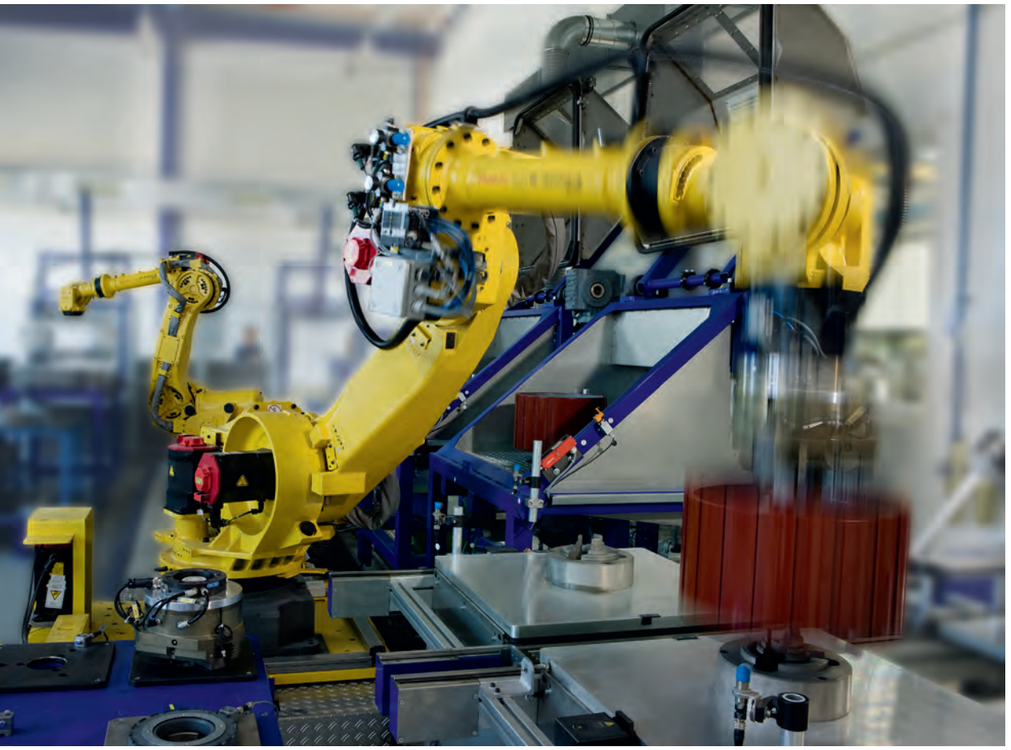
Our specialists have the elevator expertise that enables them to adapt to your individual ideas and wishes. This is the basis for being able to provide you as a customer with skilled and superior support, above all when older elevator systems or delivery capabilities with respect to spare parts are involved. In the case of an elevator that is to continue running safely after ten, twenty or more years, our expertise is a great advantage.

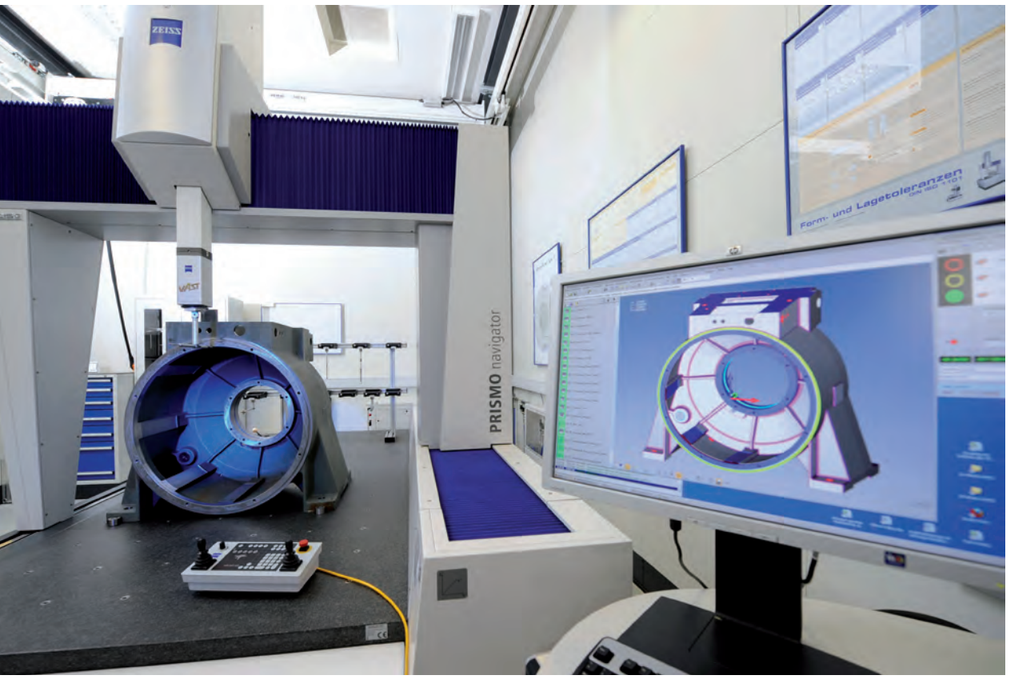
Continuous re-qualification

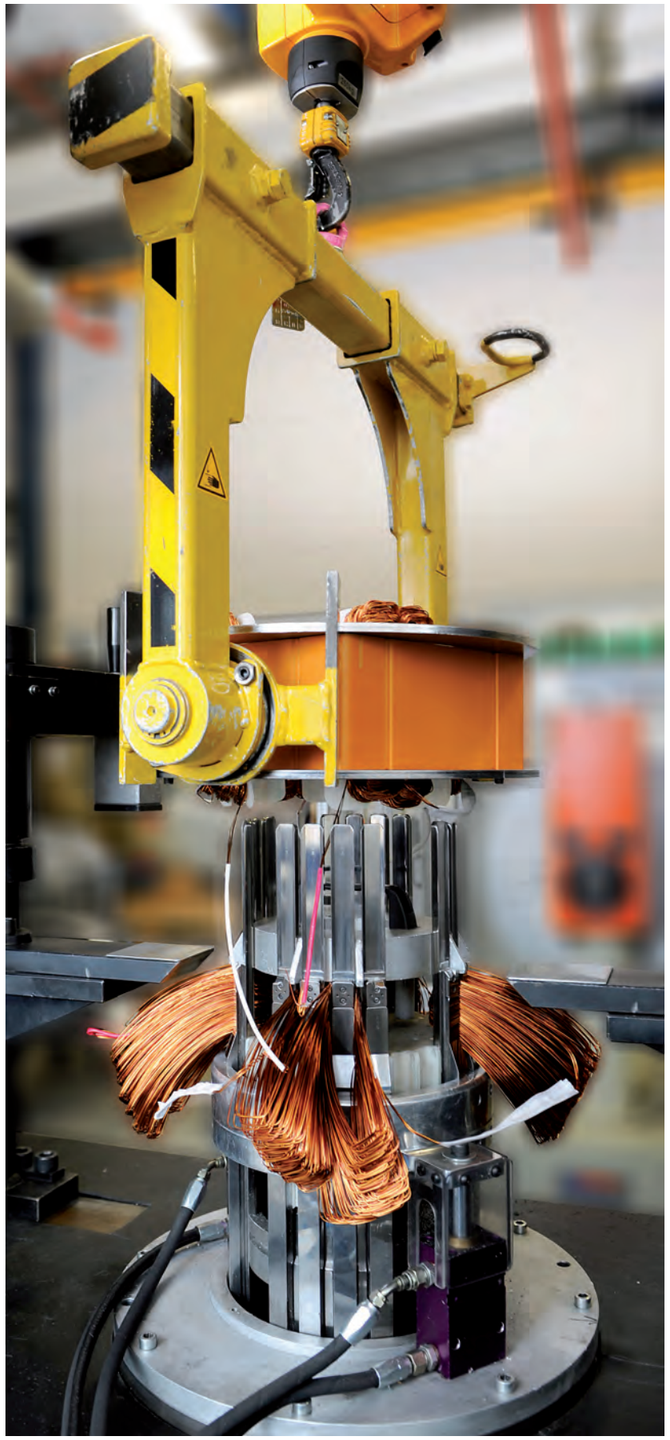
This is why outstanding in-house training and continuous re-qualification are particularly important to us. We want our employees to know our customers and understand their needs and expectations. Our customers place high demands on us with respect to safe and reliable elevators. And they are right to do so – after all, a long-term investment decision is involved!

High-End Technology

Production with top technology - at an attractive price for you







High-Quality Components for your Elevator

Alongside the people and their know-how, the technology in production has a decisive influence on the quality of our products. This is why we invest in the latest processes, machines and systems.

Certified quality

We guarantee the high quality level with certified processes. Quality assurance checks are performed at each work step.. In our own test laboratory, we use a highly precise 3-D measuring unit. Nothing is left to chance.
Our certifications document this impressively:
- Quality management ISO 9001
- Environmental management ISO 14001
- Energy Management ISO 50001
- Occupational health and safety management OHSAS 18001.

Production at the elevator specialist

One important aspect of an elevator is good preparation of the components for installation in the shaft. The metal plate parts must not be sharp-edged. This is why we use a laser to cut them without burrs. The exact fitting accuracy of the parts is achieved with a modern bending centre. Excessive tolerances can only be balanced out on the construction site very laboriously.
The drive is the component in the elevator that is subjected to the highest stress. A long service life and reliability for gears are only achieved with precise production of the gear teeth. We do this with special machines and by exploiting our extensive experience. The same applies to the motors of the gearless drives. The electrical and thermal configuration and the insulation of the windings are the decisive quality characteristics here.
If only metal had no „natural enemies“ such as corrosion ... To counteract this, we use sheets made of stainless steel or with galvanised surfaces. Other surfaces are covered with a high-quality powder coating.

Attractive price-performance ratio

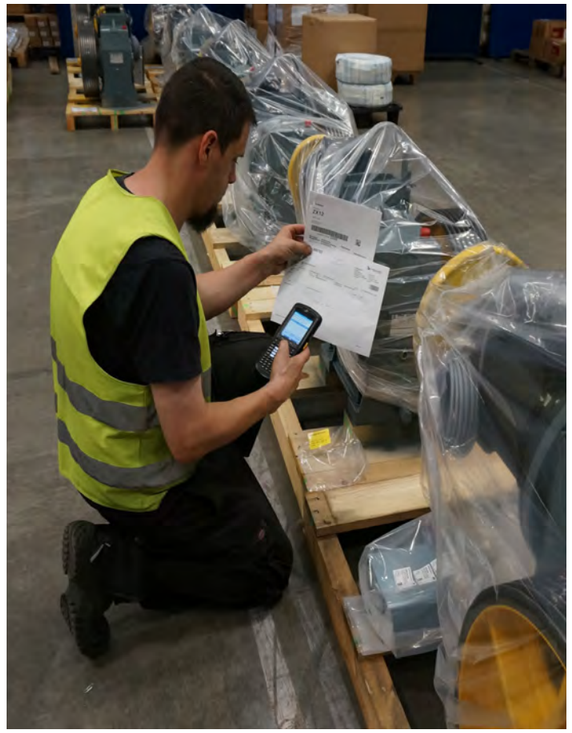
Alongside quality, you naturally also expect an affordable product. The deployment of technologically and economically optimised processes means that our products are very attractive as regards the price-performance ratio. Our production can react flexibly when individual wishes or very short delivery times have to be complied with.

Perfection all the way to delivery

Before our components leave our plant, we test the function of all products and the completeness of every delivery. Our customers on the construction site receive correctly adjusted and tested products at all times. This is what we demand of ourselves!

Reliable Delivery

Tested products punctually at your elevator system



You order from us and want the products „immediately“?
We can‘t quite manage „immediately“, but we deliver the components to your construction site within a few days!

How do we manage that?
The common products such as drives, frequency controls and components for modernisation are in stock in our warehouse. Our production plant is also very well situated for road, rail and air transport. We maintain other warehouses at central locations within Europe. This is an unbeatable advantage when a matter becomes urgent!

What awaits you at the construction site?
We deliver the products safely and suitably packaged for transport to the construction site and prepared for installation in line with the needs of the site. Our own installation specialists check and improve this continuously.

We offer solutions
The short-term availability of major components rounds off our service and together we find the right solution for your project. Safely – quickly – reliably.

We make every effort to manufacture the best products for you – so they should also arrive at your site in faultless condition and punctually!

Service and Customer Proximity

Full support until you are fully satisfied

For such a sophisticated and long-term investment as an elevator, we offer not only the product itself but also a comprehensive range of services. We assure you: you always get our full support!

Consulting and telephone hotline
On our telephone hotline, we advise you with regard to our products and the best way to deploy them. You talk to specialists with practical experience who do their best to answer your questions at all times. We clear up most of these questions quickly and reliably by telephone, e-mail or fax. You can also talk to our employees in many languages.

Proximity to our customers
Close contact to our customers and the practitioners on the construction site provide us with valuable feedback. We use this acquired knowledge to continuously adapt the products and their documentation to the requirements of our customers to an even greater degree. Profit from this wealth of experience from elevator construction and from our close relationship to our customers.

On-site support
For each product, you receive detailed documentation with all technical details, connection values, installation instructions and many valuable tips. The safe and error-free installation of the products is our number one priority. Should you ever need on-site support, we will send one of our specialists directly to you and your elevator as quickly as possible.

Trade fairs and visiting you
Allow us to convince you of our services: we are represented at many trade fairs within Europe. There, you can inspect our products and have them explained in detail. We will also be glad to visit you to present our components directly on site.
Place your trust in the attitude of our employees: „We are only satisfied when your elevator runs perfectly and reliably and your wishes have been fulfilled!“

Inquiry Sheet

For components

LEKalk 3.0

The tool for drive design and component selection

LiftEquip®
ELEVATOR COMPONENTS

2.1 Drive Units

Inquiry/Order

Customer ❑ **Inquiry** ❑ **Order** _____ **To**

Company	LiftEquip GmbH Elevator Components
Contact person	
Phone	+49 (7158) 12-2929
Fax	+49 (7158) 12-2971
E-Mail	Kontakt@liftequip.de
Date	

Machine type	❑ Gear		❑ Gearless	
Controller type	❑ Frequency regulated		❑ 2-speed	
VVVF inverter	❑ MFC 20/21 ❑ E300		❑ MFC 30/31 ❑ Others	
Suspension r	❑ 1:1	❑ 2:1	❑ 3:1	❑ 4:1
Rated load Q [kg]	_____			
Rated speed v_N [m/s]	_____			
Car weight F [kg] incl. Car sling	_____			
Counterweight GG [kg]	_____			
Travel height [m]	_____			
Compensation rope / chain	❑ Yes	❑ No		
Machine located	❑ Above (MR) ❑ Below (MR)	❑ Above beside ❑ Below beside	❑ Above (HR) ❑ Below (SP)	
Depth of machine [m] (if machine not above)	_____			
Machine type Gear	❑ TW 45 C ❑ TW 160	❑ TW 63 B ❑ W 332 C	❑ TW 130	
Gearless	❑ PMC 125 ❑ PMC 145 ☐ PMC 170	❑ DAF 210 ❑ DAF 270	❑ SC 300 ❑ SC 400 ☐ SC 500	
Documentation	❑ German	❑ English		

Notes:

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Systems have interfaces to the building and components have interfaces to the neighbouring assemblies.

Since only you know your project, we need your input in order to be able to submit a tailor-made offer to you, which takes all your requirements into account.

We have produced enquiry forms for all of our products, covering the parameters we need for a qualified offer.

You can find the enquiry forms for downloading on our home page or contact our sales.

You will not only assist us in designing your components, but also benefit from our serving you as quickly as possible.

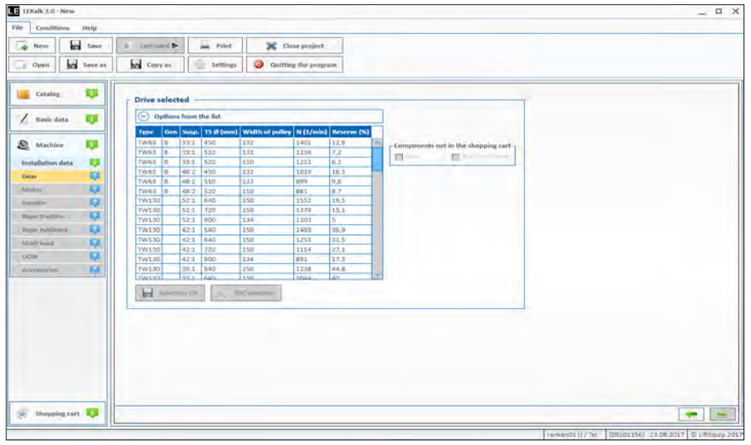
If it is very urgent, use LEKalk and assemble the components needed.

When you place the order, we will once again check the technology with you so that you can be sure of having selected the best product for your needs.

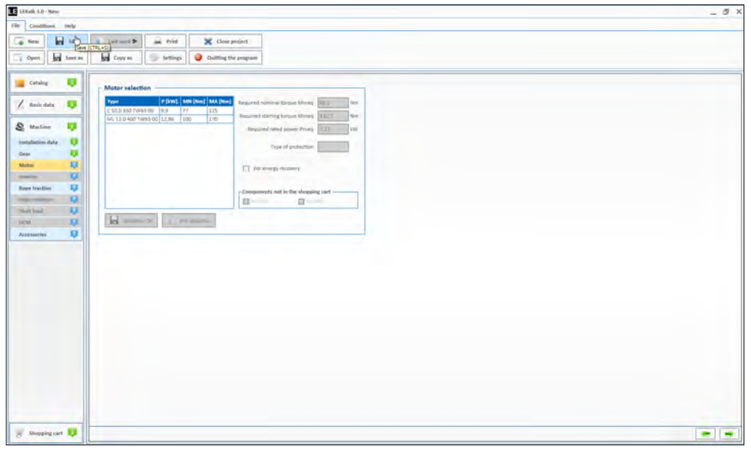
The LEkalk 3.0 tool is a design and planning instrument for customers and planners with which a gearless or gear drive can be quickly and efficiently calculated with the matching inverter, with or without energy feedback.

As a result, it is also very easy to calculate different lift configurations – comparing gearless or gear drive or designs with or without energy feedback for lift planning and evaluation and in this way work out the best solution for each application.
The drive design, traction capacity and rope detection can be used as calculation, incl. UCM proof, for your registration documents at the body mentioned.
The programme is a local application, which you can download from our homepage www.liftequip.de after the corresponding registration. Please contact us in this regard.

Below there is a short overview of the LEKalk 3.0 tool options:



LEKalk 3.0 suggests possible motors on the basis of the lift data and selection of the gear drive. Here you can for example also indicate whether energy feedback is desired.



After selecting the motor and type of frequency control (here with feedback), a selection of possible inverters is suggested. Power consumption and power reserves are likewise stated.

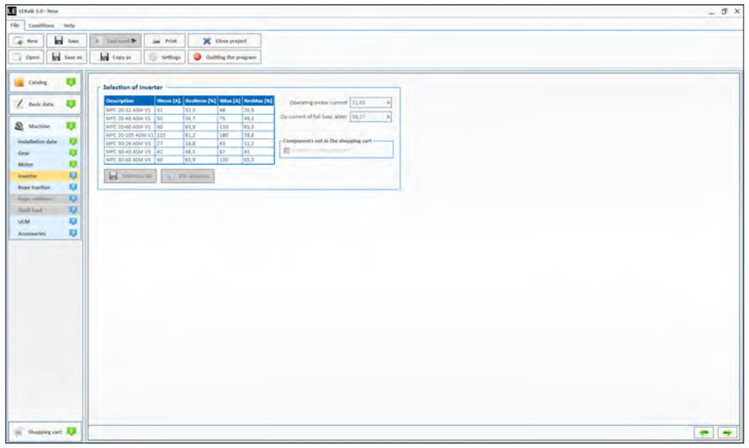
LEKalk 3.0

LEKalk 3.0

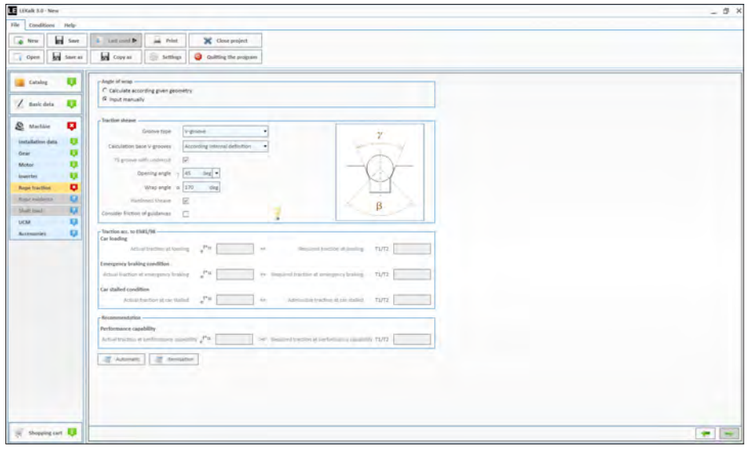
The tool for drive design and component selection

LEKalk 3.0

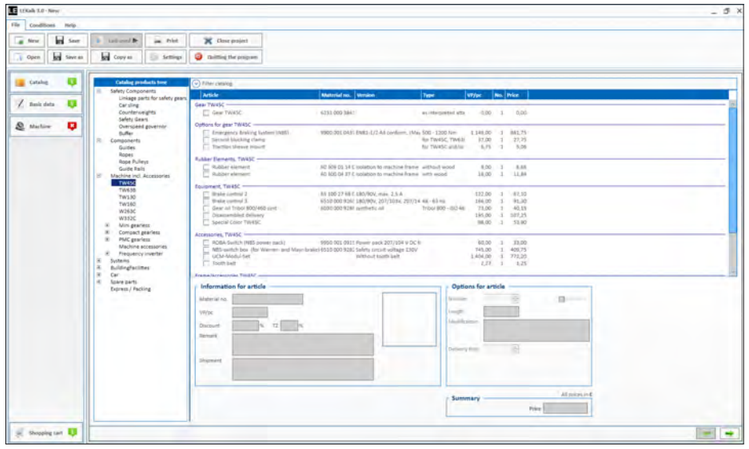
The tool for drive design and component selection



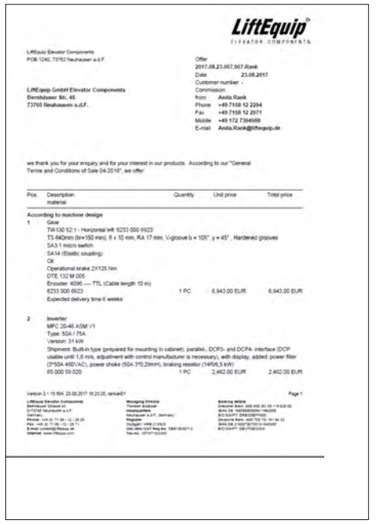
LEKalk 3.0 shows possible suitable inverters. Power reserves are stated.



LEKalk 3.0 calculates the traction capacity on the basis of the relevant parameters.



You can add even more components via the catalogue function, such as the base frame, ropes, car frame and the entire spectrum of safety technology.



In this way you can create your own offer independently with price and delivery information at any time.

The design is for submission to the responsible monitoring bodies.

An employee of LiftEquip would be pleased to assist you with queries and training courses regarding LEkalk 3.0 and with technical advice.

www.liftequip.com

Your information platform for components and systems

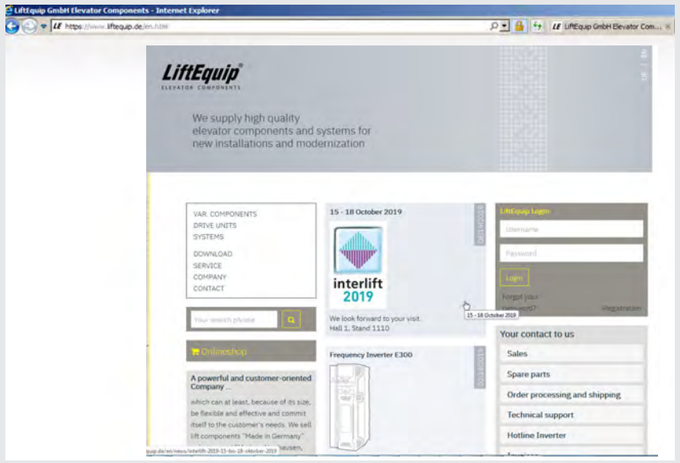
LiftEquip Homepage

Always online, always up-to-date

Here you can find all the information on LiftEquip's products.

Register as a customer and the following additional documents and tools will be available to you:

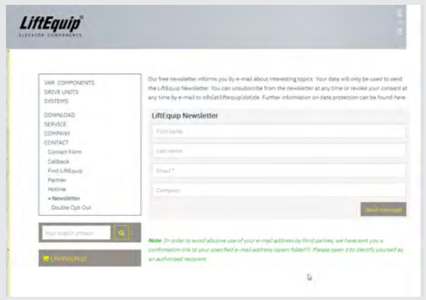
- LEKalk 3.0
- product catalogues
- operating manuals
- type approval certificates
- CAD data
- 3D models
- ….



LiftEquip newsletter

To ensure you are always up-to-date, please register via the home page for our newsletter.

https://www.liftequip.com/newsletter.html



Modernisation lift car LEMoS®

LiftEquip has provided a modular solution for lift modernisations for rated loads up to 1050 kg at speeds of 1 m/s in the form of **LEMoS®**.

Flexible means you can keep the parts of your lift whose replacement is not technically necessary and would make little economic sense. This flexibility with the flexible **LEMoS®** lift car, which can be combined with the doors of different manufacturers, is this solution's USP. Customised modernisation solutions, which make allowance for technical as well as economic considerations, can be put together here irrespective of the old lift's manufacturer.

You can find more advantages of the **LEMoS®** system below or on our homepage:

www.liftequip.com/products/systems/lemos.html

LEMoS® - in a nutshell:

- The lift car width and depth can be configured in millimetre steps – hence optimal use of the existing shaft.
- Very compact. Micrometer: car width + 40 mm.
- Short standstill times thanks to short installation and delivery times.
- Prepared for doors of many different well-known markt manufacturers. As a result, it is possible to react with the flexibility required to all kinds of demands.
- Modern lift car design and high quality appearance.

LEMoS® arose out of modernisation for modernisation! Modernisation can be this easy! Find out from us today with the question sheet.

Machine base frame ModKit MO61 S

Extremely flexible and economic!

We would like to present another ***LiftEquip*** modernisation solution – our new **ModKit MO61S** machine base frame. It is a pre-installed machine base frame, specially developed for our gearless PMC145-2 M/XL and L/XL for 1:1 suspension, rated load up to 675 kg and 1.0 m/s.

The ASL dimension (distance of lift car suspension to the counterweight suspension) can be set flexibly from 555 to 765 mm and is delivered with rope guard. A hand release and hand wheel are optionally available. The frame is pre-installed and can be supplied from stock with the drive.

www.liftequip.com/products/systems/modkit-mo61s.html

LE-Centre

Customer and Training Centre

In the new LE-centre, we offer the following training courses for you:

- **LEKalk 3.0 course:** Here you learn how to handle LEKalk 3.0 like a professional. The goal of this course is to learn the finer points of the programme and then use it in everyday work.

- **Maintenance and service on LiftEquip motors:** You learn the basics of gear drive and gearless drive technology as well as everything needed to maintain and correctly set the drives of LiftEquip and replacing the rotary encoder and traction sheave. You must bring your work clothing and safety shoes.
  Course duration: one day

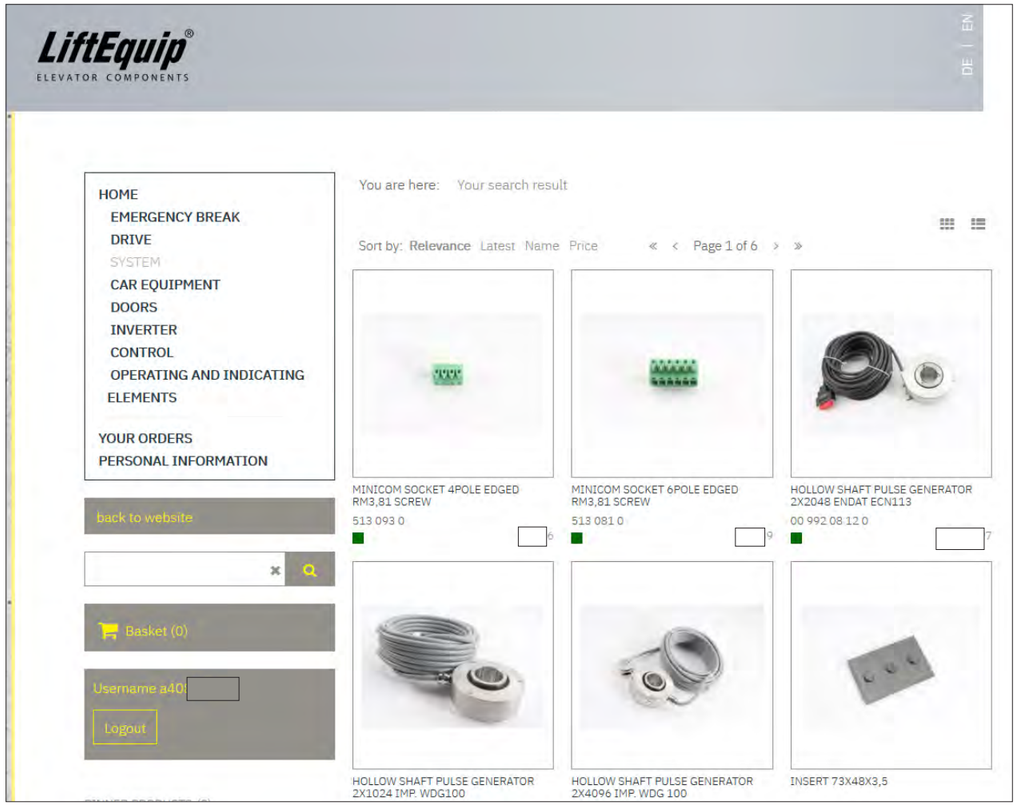
- **LEA assembly course:** You learn how to assemble the LiftEquip LEA MRL building kit in real lift shafts. We show you the version of frameless assembly. The focus here in particular is on the installation of the machine base frame. You must bring your own work clothing and personal protective equipment.
  Course duration: one-and-a-half days

Please contact us if you are interested in one of the courses.

Onlineshop

Digitization and new media are also the current topic in the elevator industry against the background of globalization. LiftEquip would like to support this through an onlineshop and give you the opportunity to select and order the products quickly and independently of office hours.
In the online shop you will find many of our components and spare parts.

Let us register on our homepage **www.liftequp.de**, we will set up the access so that also the agreed conditions are considered.



TW- and W-Series

TW- and W-Series
Product Description

TW- and W-Series
Product Description

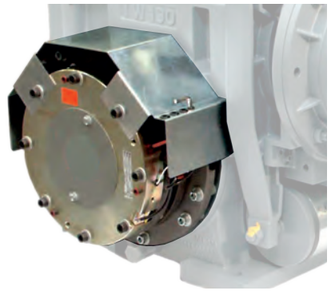
All gear drives are designed with VVVF motors in B5 configuration with flexible coupling and as result provide maximum travel comfort. Depending on your space requirements, these gear drives are available with a vertically or horizontally installed motor (TW160, W263C und W332C only horizontal).
Pole-changing (AC2) motors are also optionally available for the geared machine TW63B.
One- to three-stage worm gears ensure continuous smooth running. Tight production tolerances and the use of high quality materials preserve smooth running. Synthetic transmission oil ensures optimal lubrication and high efficiency.
The hardened, low-wear traction sheave has a long service life.

The service brake keeps the lift safe as dual-circuit disc brake in the TW45C and from the TW63B as dual-circuit external contracting shoe brake, even if a pitch circle fails.

Machine base frame
A series of base frames are available in connection with the gear drives, e.g. with and without diverting pulleys, for 2:1 or 1:1 rope suspensions, in left or right designs and in general for downward traction sheaves. The rope distance dimension can be chosen flexibly according to the circumstances on the spot as a result of suitable perforation patterns for the attachment of the drive and diverting pulley. The base frame design left / right can be chosen irrespective of the left / right traction sheave.
The machines base frames are mounted on anti-vibration elements.

Optimal adjustment to your lift
Traction sheaves in all directions are possible, but must be ordered as custom-build.

Also optionally as Ex part
An extended traction sheave shaft with wall bearing, vapour-proof shaft duct and the optional accompanying base frame permit the use of standard machines for Ex areas.



Emergency brake system NBS optional
TW45C to TW160:
The certified brake fulfills the requirement as braking device against overspeed according to EN 81-20 /5.6.6 and against unintentional movement of the car according EN 81-20 /5.6.7.

EN81 20/-50
Our drives meet all requirements with regard to the above standards, in particular the approval of safety brakes and the rope guard.

TW45C up to 1000 kg*

- Horizontal/vertical version
- Right or left hand
- Emergency braking system optional

TW63B up to 2000 kg*

- Horizontal/vertical version
- Right or left hand
- Emergency braking system optional
- pole changing

TW130 up to 3500 kg*

- Horizontal/vertical version
- Right or left hand
- Emergency braking system optional
- pole changing

TW160 up to 4000 kg*

- Horizontal version
- Right or left hand
- Emergency braking system optional

W263C up to 5000 kg*

- Horizontal version
- Right or left hand
- Worm gear with combined plained bearings

W332C up to 6000 kg*

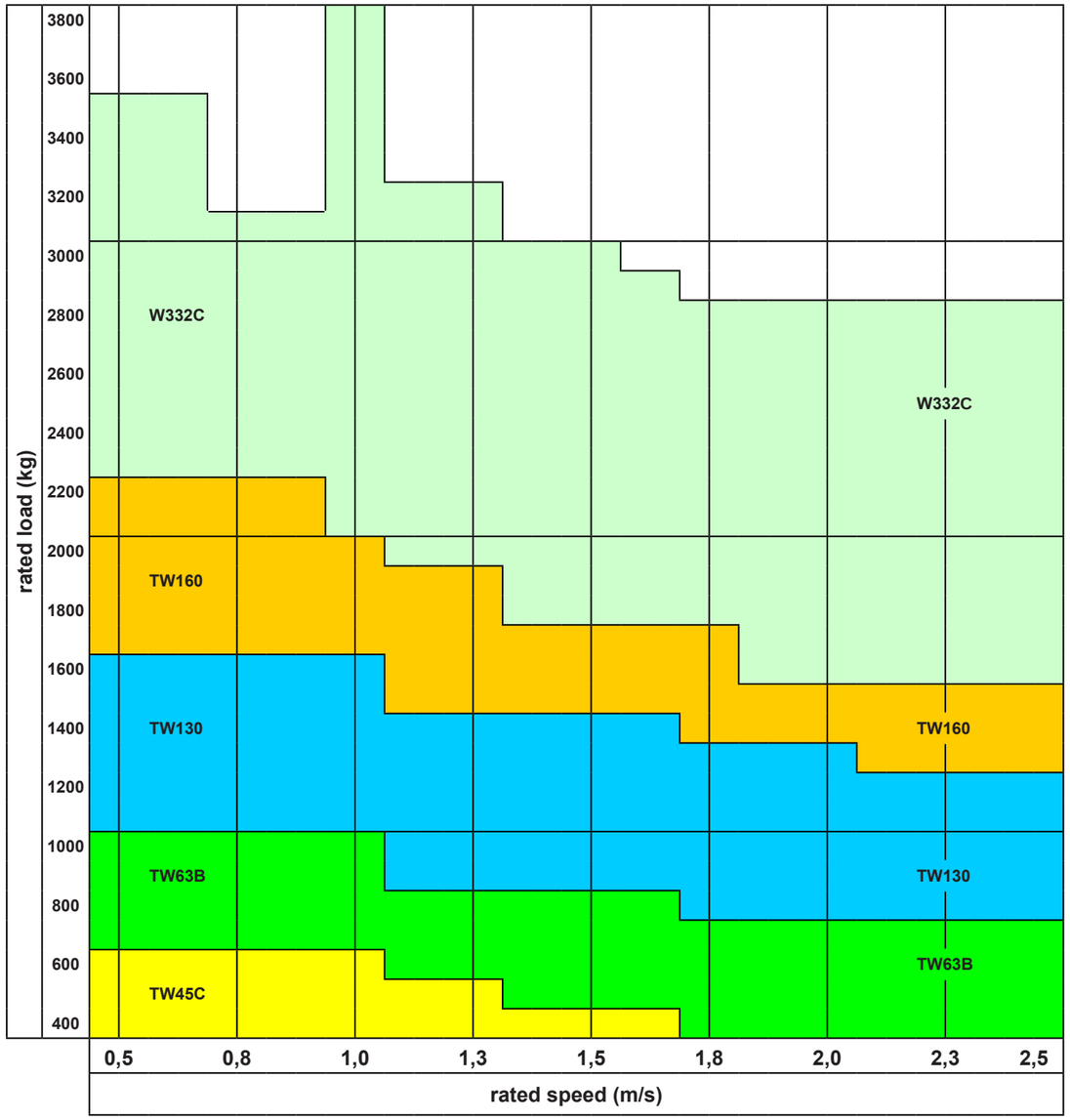
- Horizontal version
- Right or left hand
- Worm gear with combined plained bearings

*Representation of the drives: horizontal right, 2:1 suspension

Gears

TW- and W-Series

Duty range for rope suspension 1:1

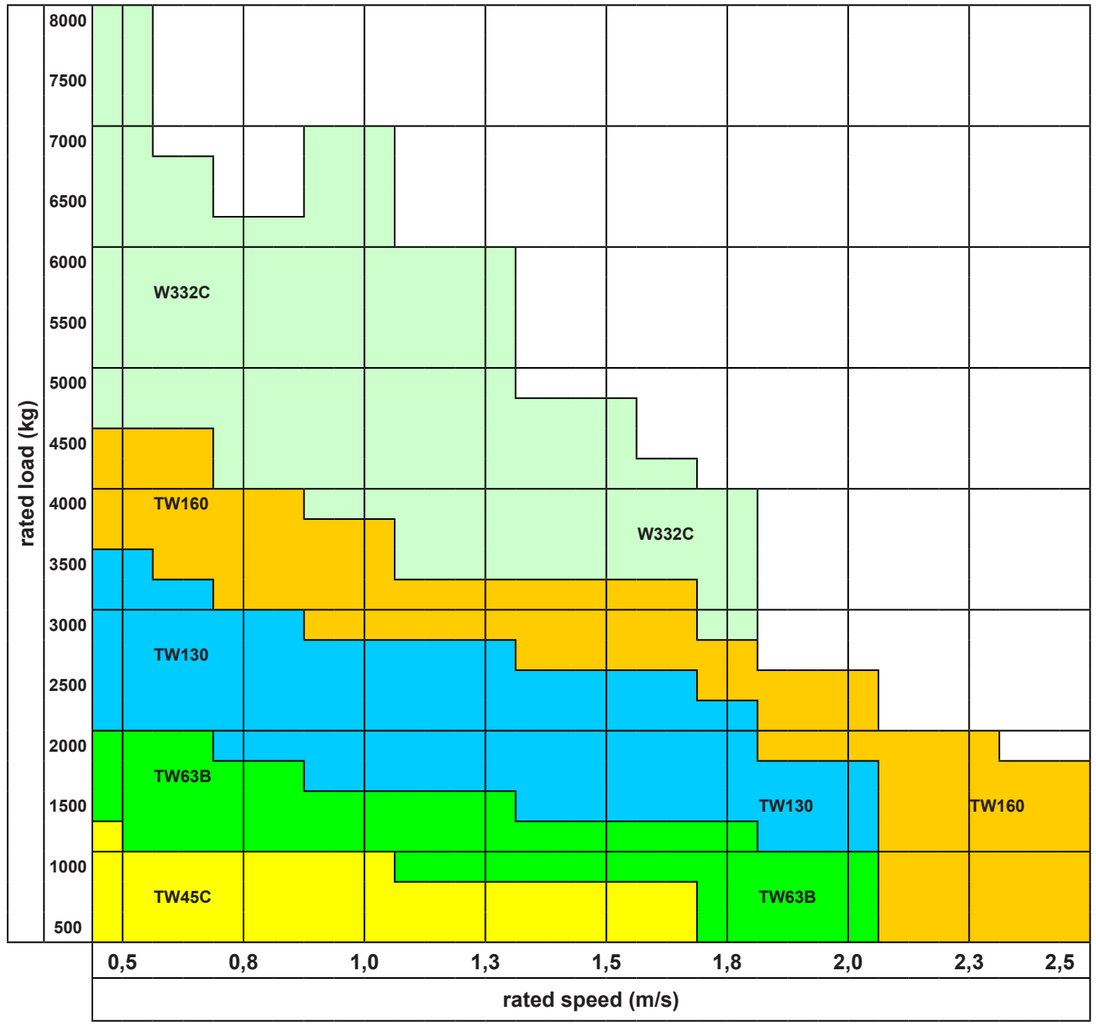


Data can vary depending on car weight and travel height

TW- and W-Series

Duty range for rope suspension 2:1

Gears



Data can vary depending on car weight and travel height

TW- and W-Series

Performance Matrix Gears 1:1

Travel height	25 m				40 m	
Operating speed	0.63 m/s	0.8 m/s	1 m/s	1.2 m/s	1.6 m/s	2 m/s
Q= 450kg F= 950kg	TW45C, 46:1, TS 440, 5.2 kW 8.32 A / 11.9 A 1258 1/min, (NBS) E300 100	TW45C,46:1, TS 520, 5.2 kW 10.02 A / 14.14 A 1352 1/min, (NBS) E300 150	TW45C,32:1, TS 440, 5.2 kW 11.28 A / 16.29 A 1389 1/min, (NBS) E300 150	TW45C,32:1, TS 520, 5.2 kW 12.66 A / 19.1 A 1410 1/min, (NBS) E300 150	TW45C, 41:2, TS 440, 7 kW 15.59A / 23.47A 1424 1/min, (NBS) E300 172	TW63B, 48:2, TS 675, 10 kW 22.33 A / 40.21 A 1358 1/min, (NBS) E300 300
Q= 630kg F= 950kg	TW45C, 32:1, TS 360, 4.45 kW 10.88 A / 15.2 A 1070 1/min, (NBS) E300 150	TW45C, 32:1, TS 440, 4.6 kW 12.4 A / 18.38 A 1111 1/min, (NBS) E300 150	TW45C, 32:1, TS 440, 7.0 kW 14.18 A / 19.46 A 1389 1/min, (NBS) E300 172	TW45C, 41:2, TS 360, 7.0 kW 14.98 A / 22.42 A 1305 1/min, (NBS) E300 172	TW63B, 48:2, TS 590, 9.95 kW 26.37 A / 44 A 1243 1/min, (NBS) E300 300	TW63B, 48:2, TS 675, 10 kW 29.61 A / 44 A 1358 1/min, (NBS) E300 350
Q= 800kg F=1050kg	TW63B,54:1, TS 510, 5.2 kW 11.38 A / 17.02 A 1274 1/min, (NBS) E300 150	TW63B,48:1, TS 590, 6.97 kW 14.48 A / 21.57 A 1243 1/min, (NBS) E300 172	TW63B, 33:1, TS 510, 6.93 kW 16.51 A / 25 A 1236 1/min, (NBS) E300 220	TW63B, 33:1, TS 510, 10 kW 23.57 A / 34.76 A 1483 1/min, (NBS) E300 300	TW63B, 48:2, TS 510, 10 kW 30.12 A / 44 A 1438 1/min, (NBS) E300 350	TW130, 45:2, TS 640, 16 kW 32.12 A / 51.63 A 1343 1/min, (NBS) E300 470
Q= 1000kg F= 1200kg	TW63B, 48:1, TS 450, 7 kW 13.78 A / 19.61 A 1283 1/min, (NBS) E300 150	TW63B, 33:1, TS 450, 8.97 kW 22.2 A / 34.44 A 1120 1/min, (NBS) E300 300	TW63B, 33:1, TS 450, 10 kW 23.93 A / 35.33 A 1401 1/min, (NBS) E300 300	TW63B, 48:2, TS 450, 9.78 kW 28 A /44 A 1222 1/min, (NBS) E300 350	TW130, 45:2, TS 540, 20.5 kW 41.17 A / 52.37 A 1273 1/min, (NBS) E300 470	TW130, 45:2, TS 640, 20.5 kW 39.34 A / 60.29 A 1343 1/min, (NBS) E300 470
Q= 1200kg F= 1400kg	TW130, 52:1, TS 540, 9.67 kW 21.04 A / 30.94 A 1159 1/min, (NBS) E300 220	TW130, 52:1, TS 640, 11.09 kW 24.08 A / 36.18 A 1241 1/min, (NBS) E300 300	TW130, 42:1, TS 640, 11.25 kW 26.14 A / 40.69 A 1253 1/min, (NBS) E300 300	TW130, 35:1, TS 640, 16.0 kW 30.79 A / 49.4 A 1253 1/min, (NBS) E300 350	TW130, 45:2, TS 540, 16 kW 36.2 A / 58.79 A 1273 1/min, (NBS) E300 470	TW130, 45:2, TS 640, 20.5 kW 45.04 A / 68.78 A 1343 1/min, (NBS) E300 660
Q= 1600kg F= 1800kg	TW130, 52:1, TS 540, 9.67 kW 24.75 A / 37.43 A 1159 1/min, (NBS) E300 300	TW130, 42:1, TS 540, 14.45 kW 29.59 A / 45.62 A 1188 1/min, (NBS) E300 350	TW130, 35:1, TS 540, 15.69 kW 33.52 A / 52.8 A 1238 1/min, (NBS) E300 470	TW130, 35:1, TS 540, 16 kW 37.18 A / 60.78 A 1485 1/min, (NBS) E300 470	TW130, 45:2, TS 540, 20.5 kW 46.35 A / 72.09 A 1273 1/min, (NBS) E300 660	TW160, 45:2, TS 640, 27.5 kW 59.2 A / 86.97 A 1343 1/min, (NBS) E300 660
Q= 1800kg F= 2000kg	TW130, 42:1, TS 540, 11.49 kW 31.14 A / 45.16 A 936 1/min, (NBS) E300 350	TW130, 35:1, TS 540, 12.86 kW 35.87 A / 52.98 A 990 1/min, (NBS) E300 470	TW130, 35:1, TS 540, 15.69 kW 36.2 A / 57.37 A 1238 1/min, (NBS) E300 470	TW130, 45:2, TS 540, 19.55 kW 50.89 A / 75.41 A 955 1/min, (NBS) E300 660	TW160, 51:2, TS 640, 26.11 kW 58.66 A / 88.56 A 1218 1/min, (NBS) E300 660	TW160, 45:2, TS 640, 27.5 kW 64.47 A / 94.87 A 1343 1/min, (NBS) E300 770
Q= 2000kg F= 2200kg	TW160, 50:1, TS 640, 11.59 kW 35.55 A / 51.12 A 940 1/min, (NBS) E300 470	TW160, 50:1, TS 640, 14.6 kW 35.58 A / 55.43 A 1194 1/min, (NBS) E300 470	TW160, 41:1, TS 640, 19.66 kW 42.5 A / 64.29 A 1224 1/min, (NBS) E300 470	TW160, 35:1, TS 640, 20.5 kW 46.27 A / 71.36 A 1253 1/min, (NBS) E300 660	TW160, 51:2, TS640, 26.11 kW 63.41 A / 95.83 A 1218 1/min, (NBS) E300 770	W332, 46:2, TS 640, 37 kW 81.92 A / 144.13 A 1373 1/min E300 1570
Q= 2200kg F= 2400kg	TW160, 50:1, TS 640, 18.5 kW 29.88 A / 41.72 A 940 1/min, (NBS) E300 470	TW160, 50:1, TS 640, 18.7 kW 39.37 A / 58.61 A 1194 1/min, (NBS) E300 470	TW160, 41:1, TS 640, 19.66 kW 45.82 A / 69.01 A 1224 1/min, (NBS) E300 660	TW160, 35:1, TS 640, 20.5 kW 49.82 A / 76.65 A 1253 1/min, (NBS) E300 660	W332C, 59:2, TS 640, 33.5 kW 76.8 A / 128.5 A 1409 1/min E300 1000	W332C, 46:2, TS 640, 37.0 kW 87.46 A / 152.95 A 1373 1/min E300 1570
Q= 2400kg F= 2600kg	TW160, 50:1, TS 640, 18.5 kW 32.47 A / 44.77 A 940 1/min, (NBS) E300 470	TW160, 41:1, TS 640, 18.5 kW 39.27 A / 52.81 A 979 1/min, (NBS) E300 470	TW160, 35:1, TS 640, 19.18 kW 53.86 A / 79.01 A 1044 1/min, (NBS) E300 660	W332C, 47:1, TS 800, 27.5 kW 62.56 A / 100 A 1346 1/min E300 770	W332C,59:2, TS 640, 37 kW 83.05 A / 157 A 1409 1/min E300 1570	W332C, 46:2, TS 640, 36.75 kW 92.43 A / 180 A 1373 1/min E300 1570
Q= 2600kg F= 2800kg	W332C, 63:1, TS 640, 18.39 kW 42.38 A / 76.7 A 1184 1/min E300 470	W332C, 47:1, TS 640, 22.16 kW 52.15 A / 89.8 A 1122 1/min E300 660	W332C, 47:1, TS 640, 33.5 kW 59.79 A / 128.5 A 1403 1/min E300 1000	W332C, 47:1, TS 800, 33.5 kW 68.95 A / 128.5 A 1346 1/min E300 1570	W332C, 59:2, TS 640, 42 kW 87.11 A / 174.03 A 1409 1/min E300 1570	W332C, 46:2, TS 640, 42 kW 98.05 A / 180 A 1373 1/min E300 1570
Q= 2800kg F= 3000kg	W332C, 63:1, TS 640, 18,39 kW 44.93 A / 76.7 A 1184 1/min E300 1000	W332C, 63:1, TS 700, 27.5 kW 50.93 A / 100 A 1375 1/min E300 1000	W332C, 47:1, TS 640, 33.5 kW 63.13 A / 128.5 A 1403 1/min E300 1000	W332C, 47:1, TS 800, 33.5 kW 72.57 A / 128.5 A 1346 1/min E300 1570	W332C, 59:2, TS 640, 42 kW 92.14 A / 180 A 1409 1/min E300 1570	W332C, 46:2, TS 640, 46.5 kW 112.49 A / 209.74 A 1373 1/min E300 1570

The calculations are examples, alterations are possible

Machine type, Ratio,
TS-Ø [mm], Motor perf. [kW] at RPM
Req. motor current [A] / Req. start up current [A]
Motor RPM [1/min], (NBS possible)
Inverter type.

Q = Rated load,
F = Maximum mass of car,
TS = Traction sheave diameter, (NBS) = Compatible with emergency brake system.

TW- and W-Series

Performance Matrix Gears 2:1

Travel height	25 m				40 m
Operating speed	0.63 m/s	0.8 m/s	1 m/s	1.2 m/s	1.6 m/s
Q= 630kg F= 1000kg	TW45C, 32:1, TS 520, 5.2 kW 10.22 A / 12.65 A 1481 1/min, (NBS) E300 150	TW45C, 41:2, TS 440, 5.2 kW 11.26 A / 14.92 A 1424 1/min, (NBS) E300 150	TW45C, 41:2, TS 590, 5.2 kW 12.94 A / 19.06 A 1327 1/min, (NBS) E300 150	TW45C, 40:3, TS 440, 7 kW 15.23 A / 21.64 A 1389 1/min, (NBS) E300 172	TW63B, 43:3, TS 675, 10 kW 26.2 A / 43.12 A 1298 1/min, (NBS) E300 300
Q= 1000kg F= 1200kg	TW45C, 32:1, TS 520, 7 kW 14.43 A / 17.12 A 1481 1/min, (NBS) E300 172	TW45C, 41:2, TS 440, 7 kW 15.81 A / 20.2 A 1424 1/min, (NBS) E300 172	TW45C, 40:3, TS 360, 7 kW 17.31 A / 23.57 A 1415 1/min, (NBS) E300 220	TW63B, 43:3, TS 510, 10 kW 26.75 A / 42.43 A 1288 1/min, (NBS) E300 300	TW63B, 43:3, TS 590, 13 kW 32.38 A / 45.96 A 1485 1/min, (NBS) E300 470
Q= 1600kg F= 1800kg	TW63B, 33:1, TS 590, 10 kW 24.85 A / 35.58 A 1346 1/min, (NBS) E300 300	TW63B, 48:2, TS 590, 9.95 kW 29.94 A / 44 A 1243 1/min, (NBS) E300 350	TW63B, 43:3, TS 450, 12.67 kW 30.65 A / 46.77 A 1217 1/min, (NBS) E300 470	TW130, 43:3, TS 540, 15.17 kW 37.07 A / 60.49 A 1217 1/min, (NBS) E300 470	TW130, 43:3, TS 640, 20.5 kW 49.53 A / 71.96 A 1369 1/min, (NBS) E300 660
Q= 2000kg F= 2200kg	TW63B, 48:2, TS 450, 10 kW 28.42 A / 41.36 A 1283 1/min, (NBS) E300 350	TW130, 45:2, TS 540, 16 kW 31.83 A / 48.49 A 1273 1/min, (NBS) E300 350	TW130, 45:2, TS 640, 16 kW 37.28 A / 56.46 A 1343 1/min, (NBS) E300 470	TW130, 43:3, TS 540, 19.43 kW 45.74 A / 70.78 A 1217 1/min, (NBS) E300 660	TW 130, 43:3, TS 640, 27.5 kW 57.97 A / 82.73 A 1369 1/min, (NBS) E300 660
Q= 2500kg F= 2500kg	TW130, 35:1, TS 640, 16 kW 32.5 A / 47.28 A 1316 1/min, (NBS) E300 350	TW130, 45:2, TS 540, 16 kW 36.77 A / 55.89 A 1273 1/min, (NBS) E300 470	TW130, 45:2, TS 640, 20.5 kW 45.66 A / 64.77 A 1343 1/min, (NBS) E300 660	TW130, 43:3, TS 540, 26.07 kW 53.89 A / 81.17 A 1217 1/min, (NBS) E300 660	TW 130, 43:3, TS 540, 33.5 kW 68.78 A / 96.05 A 1622 1/min, (NBS) E300 770
Q= 3000kg F= 2800kg	TW130, 35:1, TS 640, 16 kW 37.17 A / 55.3 A 1560 1/min, (NBS) E300 470	TW130, 45:2, TS 540, 20.5kW 44.4 A / 63.5 A 1273 1/min, (NBS) E300 470	TW130, 43:3, TS 540, 22.04 kW 59.48 A / 86.72 A 1014 1/min, (NBS) E300 770	TW160, 45:2, TS 720, 27.5 kW 62.45 A / 95.76 A 1432 1/min, (NBS) E300 770	W332C, 57:3, TS 800, 42 kW 84.64 A / 170.16 A 1451 1/min, (NBS) E300 1570
Q= 3500kg F= 3200kg	TW130, 45:2, TS 540, 17.71 kW 48.54 A / 67.17 A 1003 1/min, (NBS) E300 660	TW160, 57:2, TS 640, 27.5 kW 50.61 A / 69.43 A 1361 1/min, (NBS) E300 660	TW160, 45:2, TS 640, 27.5 kW 60.34 A / 83.33 A 1343 1/min, (NBS) E300 660	TW160, 45:2, TS 640, 33.5 kW 72.52 A / 101.08 A 1611 1/min, (NBS) E300 1000	W332C, 57:3, TS 800, 46.5 kW 114.77 A / 209.45 A 1451 1/min E300 1570
Q= 4000kg F= 3500kg	TW160, 35:1, TS 640, 20.5 kW 46.98 A / 64.39 A 1316 1/min, (NBS) E300 660	TW160, 51:2, TS 640, 26.11 kW 58.95 A / 83.46 A 1218 1/min, (NBS) E300 660	TW160, 45:2, TS 640, 33.5 kW 69.42 A / 93.5 A 1343 1/min, (NBS) E300 770	W332C, 57:3, TS 640, 42 kW 85.43 A / 177.21 A 1361 1/min E300 1570	
Q= 4500kg F= 4000kg	TW160, 35:1, TS 640, 27.5 kW 51.05 A / 70.19 A 1316 1/min, (NBS) E300 660	W332C, 59:2, TS 640, 33.5 kW 72.82 A / 128.5 A 1409 1/min E300 1000	W332C, 46:2, TS 640, 42 kW 84.29 A / 170.96 A 1373 1/min E300 1570	W332C,57:3, TS 640, 42 W 6.3 A / 172.4 A 1361 1/min MFC 20-105 V1	
Q= 5000kg F= 4500kg	W332C, 59:2, TS 640, 32.83 kW 74.09 A / 137.39 A 1109 1/min E300 1000	W332C 59:2, TS 640, 32.29 kW 79.87 A / 157 A 1409 1/min E300 1570	W332C, 46:2, TS 640, 42 kW 91.98 A / 180 A 1373 1/min E300 1570		
Q= 5500kg F= 5000kg	W332C, 59:2, TS 640, 32.83 kW 79.98 A / 145.34 A 1109 1/min E300 1000	W332C, 59:2, TS 640, 42 kW 85.21 A / 176.96 A 1409 1/min E300 1570	W332C, 46:2, TS 640, 46,5 kW 107.92 A / 206.92 A 1373 1/min E300 1570		
Q= 6000kg F= 5500kg	W332C, 59:2, TS 640, 37.26 kW 84.77 A / 175.7 A 1109 1/min E300 1570	W332C, 59:2, TS 640, 46.5 kW 101.19 A / 201.36 A 1409 1/min E300 1570	W332C, 46:2, TS 640, 59 kW 119.15 A / 223.42 A 1373 1/min E300 1570		

The calculations are examples, alterations are possible

Machine type, Ratio,
TS-Ø [mm], Motor perf. [kW] at RPM
Req. motor current [A] / Req. start up current [A]
Motor RPM [1/min], (NBS possible)
Inverter type.

Q = Rated load,
F = Maximum mass of car,
TS = Traction sheave diameter,
(NBS) = Compatible with emergency brake system.

TW-Drives

TW45C

EN 81-
20/-50
-conform

TW45C

TW45C
horizontal right

The ideal solution for light loads

- VVVF-motor (5,2 and 7 kW) controlled accurately
- Emergency braking system NBS, optional
- Brake monitoring switch, manual brake release
- Low-wear traction sheave, available in Ø 320, 360, 440, 520 or 590 mm
- Gear, motor, traction sheave: approx. 250 kg

Special designs are possible

Technical Data						
Gear type		TW45C				
Axle distance	mm	120				
Load on shaft (Ft)	kN	≤ 30				
Ratios		46:1 / 32:1 / 41:2 / 40:3				
Oil filling	L	5,5				
Type of oil		synthetic gear oil				
Backlash	°	0,03 - 0,07				
Weight	kg	ca. 105				
Type of protection - Motor		IP54				
Hand wheel	mm	D270 (plastic)				
Actual Value Sensor (standard)		WDG100-38-1024/4096 TTL				
Actual Value Sensor (special)		WDG100-38-1024 HTL WDG100-38-1024 Sinus/Cosinus				
Operational Brake						
Type		Robastop RSZ 60				
Braking Torque	Nm	2 x 50				
Operational Voltage	VDC	180 - overexitation // 90 - retentive voltage				
Traction Sheave						
Diameter Traction Sheave	mm	320	360	440	520	590
Rim width	mm	102	77	115		
max. Numerbrs of grooves (z x d)		7 x 8	5 x 8	7 x 8 / 6 x 10 6 x 11	7 x 8 / 6 x 10 6 x 11 / 5 x 12	
Weight	kg	30	25	45	55	60

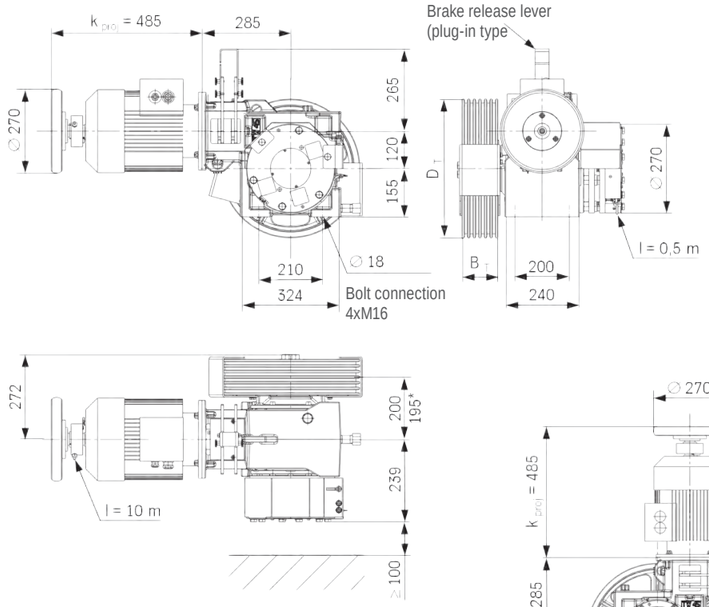
Subject to modifications

PERFORMANCE DATA

Rated Load Q [kg]	Operational Speed v [m/s]	Suspension r
320	0,63 - 1,20	1:1
450	0,5 - 1,25	1:1
630	0,5 - 1,0	1:1
900	0,4 - 0,63	2:1
1000	0,4 - 1,0	2:1
1300	0,4	2:1

TW45C
on machine base frame

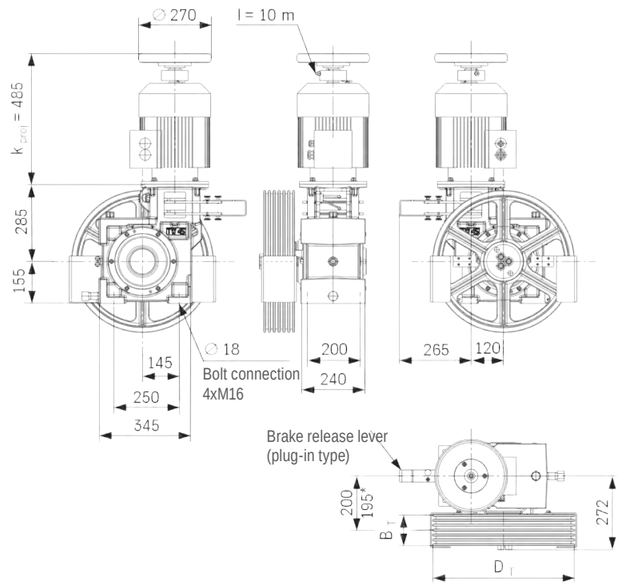
Motor position horizontal
(pictured with traction sheave on left and with emergency brake system NBS, optional)



D_T =	320	360	440	520	590
W_T =	102	77	115	115	115

* Dimensions applicable to D T = 360 mm

Motor position vertical
(pictured with traction sheave on left)



TW-Drives

TW63B

EN 81-
20/-50
-conform

TW63B

TW63B
horizontal right

The machine for middle loads

- VVVF-motor (5,2 up to 13 kW) controlled accurately
- Emergency braking system NBS, optional
- Brake monitoring switch, manual brake release
- Traction sheave in shaft with extended traction sheave shaft and pedestal bearing (SA 9)
- Gear according to ATEX
- Brake magnets, Ex-proof (SA 15)
- Low-wear traction sheave, available in Ø 450, 510, 520, 590 or 675 mm
- Gear, motor, traction sheave: approx. 350 kg

Special designs are possible

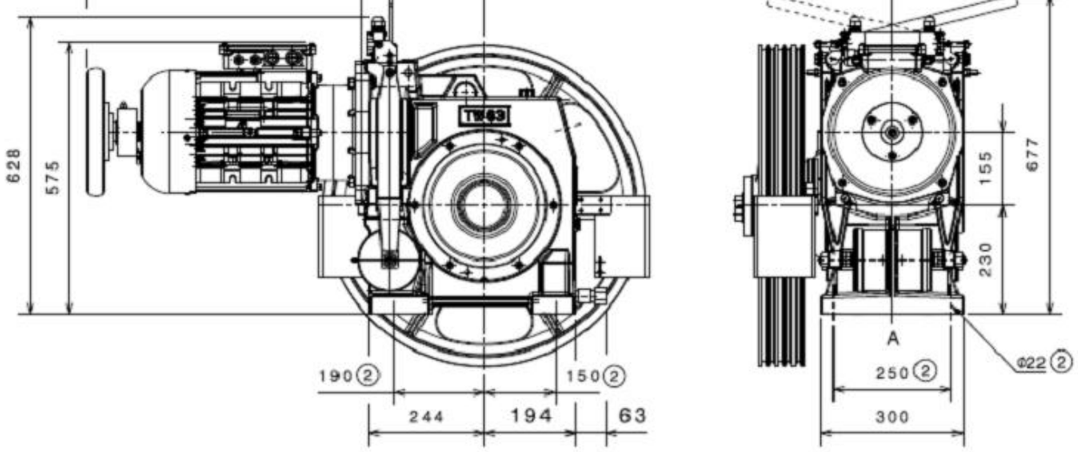
PERFORMANCE DATA

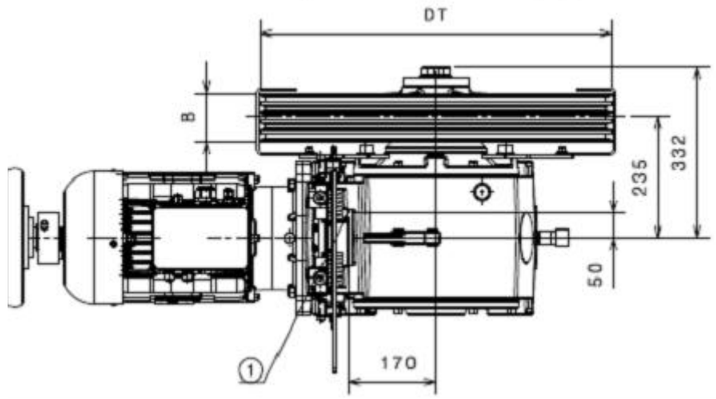
Rated Load Q [kg]	Operational Speed v [m/s]	Suspension r
800	0,63 - 2,0	1:1
1000	0,63 - 1,2	1:1
1000	0,4 - 1,6	2:1
1600	0,4 - 1,2	2:1
2000	0,4 - 0,63	2:1

TW63B, vertical left hand
on machine base frame
down beside

Technical Data						
Gear type		TW63B				
Axle distance	mm	155				
Load on shaft (Ft)	kN	≤ 43 (rope departure direction downwards)				
Ratios		54:1 / 48:1 / 33:1 / 48:2 / 43:3				
Oil filling	L	vertical: ca.11 / horizontal: ca. 9				
Type of oil		synthetic gear oil				
Backlash	°	0,025 - 0,07				
Weight	kg	ca. 190				
Motor		pole changing	frequency-controlled			
Type of protection - Motor		IP54				
Hand wheel		flywheel rim	D270 (plastic)			
Actual Value Sensor (standard)		without	WDG100-38-1024/4096 TTL			
Actual Value Sensor (special)		without	WDG100-38-1024 HTL WDG100-38-1024 Sin/Cos			
Operational Brake						
Type		TW63B				
Braking Torque	Nm	max. 2 x 90				
Operational Voltage	VDC	180 - overexitation // 90 - retentive voltage				
Traction Sheave						
Diameter Traction Sheave	mm	450	510	520	590	675
Rim width	mm	132	132	110	132	96
max. Numerbrs of grooves (z x d)		8 x 8 7 x 10/11	8 x 8 7 x 10/11 6 x 12	5 x 13	8 x 8 7 x 10/11 6 x 12	6 x 8 5 x 10/11 4 x 12
Weight	kg	50	60	50	70	

Subject to modifications





① Machine centre of gravity
② Mount of machine on machine base frame
③ Operation lever for manual brake release (plug-in)
kproj. = see product catalog

TW-Drives

TW130

EN 81-
20/-50
-conform

TW130

TW130
horizontal right

The ideal solution for higher loads

- VVVF-motor (11 up to 42 kW) controlled accurately
- Emergency braking system NBS, optional
- Brake monitoring switch, manual brake release
- Traction sheave in shaft with extended traction sheave shaft and pedestal bearing (SA 9)
- Part-Ex proof: wall bearing with vapour-proof shaft duct, extended drive shaft and suitable machine base frame (SA4)
- Reinforced machine mounting for rope pull resultant - horizontal or vertical pointing upwards (SA1)
- Additional terminal block for intermediate terminal connection (SA12)
- Gear according to ATEX
- Brake magnets, Ex-proof (SA 15)
- Low-wear traction sheave, available in Ø 540, 640, 720 or 900 mm
- Gear, motor, traction sheave: approx. 560 kg

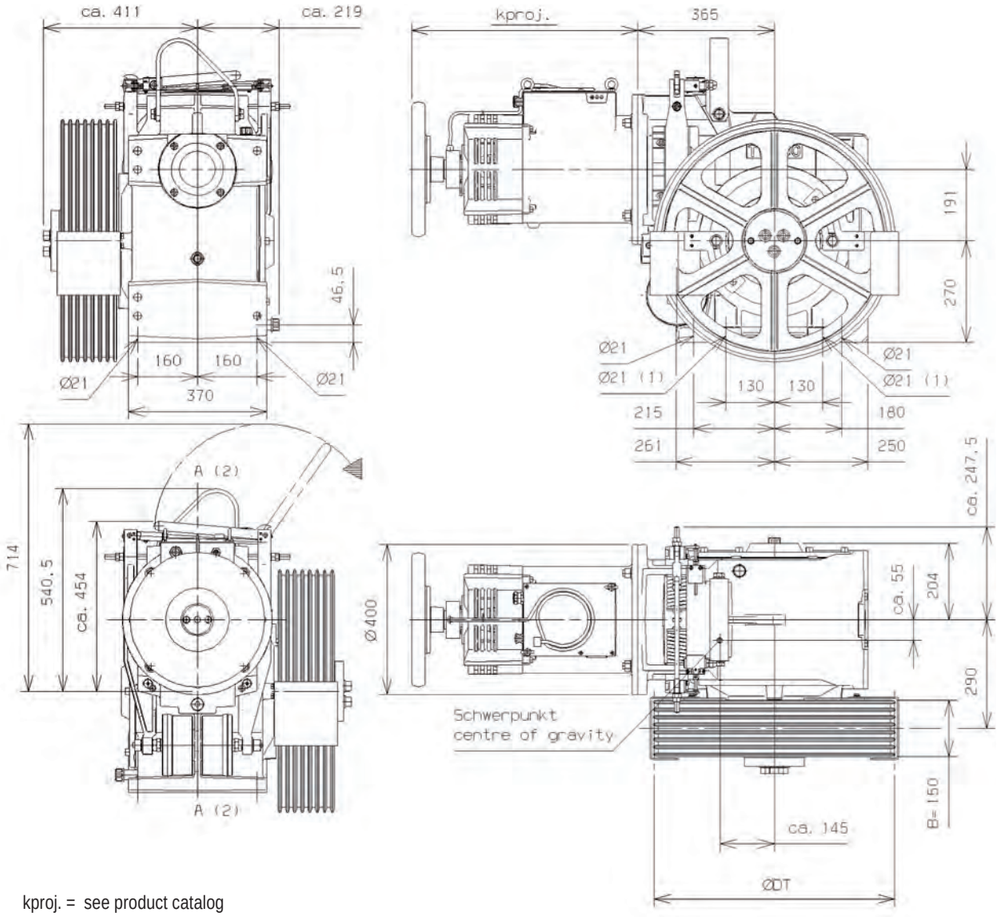
Special designs are possible

PERFORMANCE DATA		
Rated Load Q [kg]	Operational Speed v [m/s]	Suspension r
1000	0,63 - 2,5	1:1
1300	0,63 - 2,5	1:1
1600	0,63 - 1,0	1:1
1300	0,5 - 2,0	2:1
2200	0,5 - 1,75	2:1
3000	0,5 - 0,8	2:1

TW130
on machine base frame

Technical Data					
Gear type		TW130			
Axle distance	mm	191			
Load on shaft (Ft)	kN	≤ 77 (rope departure direction downwards)			
Ratios		52:1 / 42:1 / 35:1 / 45:2 / 43:3			
Oil filling	L	vertical: ca. 25 / horizontal: ca. 20			
Type of oil		synthetic gear oil			
Backlash	°	0,02 - 0,06			
Weight	kg	430			
Motor					
Motor		frequency-controlled			
Type of protection - Motor		IP 21	IP 55		
Hand wheel		D270 / 360 (plastic)	D270 / 360 (plastic)		
Actual Value Sensor (standard)		WDG100-38-1024/4096 TTL			
Actual Value Sensor (special)		WDG100-38-1024 HTL WDG100-38-1024 Sin/Cos			
Operational brake					
Type		TW130			
Braking Torque	Nm	max. 2 x 125 / max. 2 x 200			max. 2 x 125
Operational Voltage	VDC	180 - overexitation // 90 - retentive voltage			
Traction Sheave					
Diameter Traction Sheave	mm	540	640	720	900
Rim width	mm	150			
max. Numerbrs of grooves (z x d)		7 x 12/13, 8 x 10/11, 10 x 8, 9 x 9		5 x 16	6 x 12/13, 7 x 10/11
Weight	kg	75	90	140	150

Subject to modifications



kproj. = see product catalog

TW-Drives

TW160

EN 81-
20/-50
-conform

TW160

TW160
horizontal right

The cart horse for higher loads

- VVF-motor (11 up to 42 kW) controlled accurately
- Emergency braking system NBS, optional
- Brake monitoring switch, manual brake release
- Traction sheave in shaft with extended traction sheave shaft and pedestal bearing (SA 9)
- Part-Ex proof: wall bearing with vapour-proof shaft duct, extended drive shaft and suitable machine base frame (SA4)
- Gear according to ATEX
- Brake magnets, Ex-proof (SA 15)
- Low-wear traction sheave, available in Ø 640, 720 or 800 mm
- Gear, motor, traction sheave: approx. 925 kg

Special designs are possible

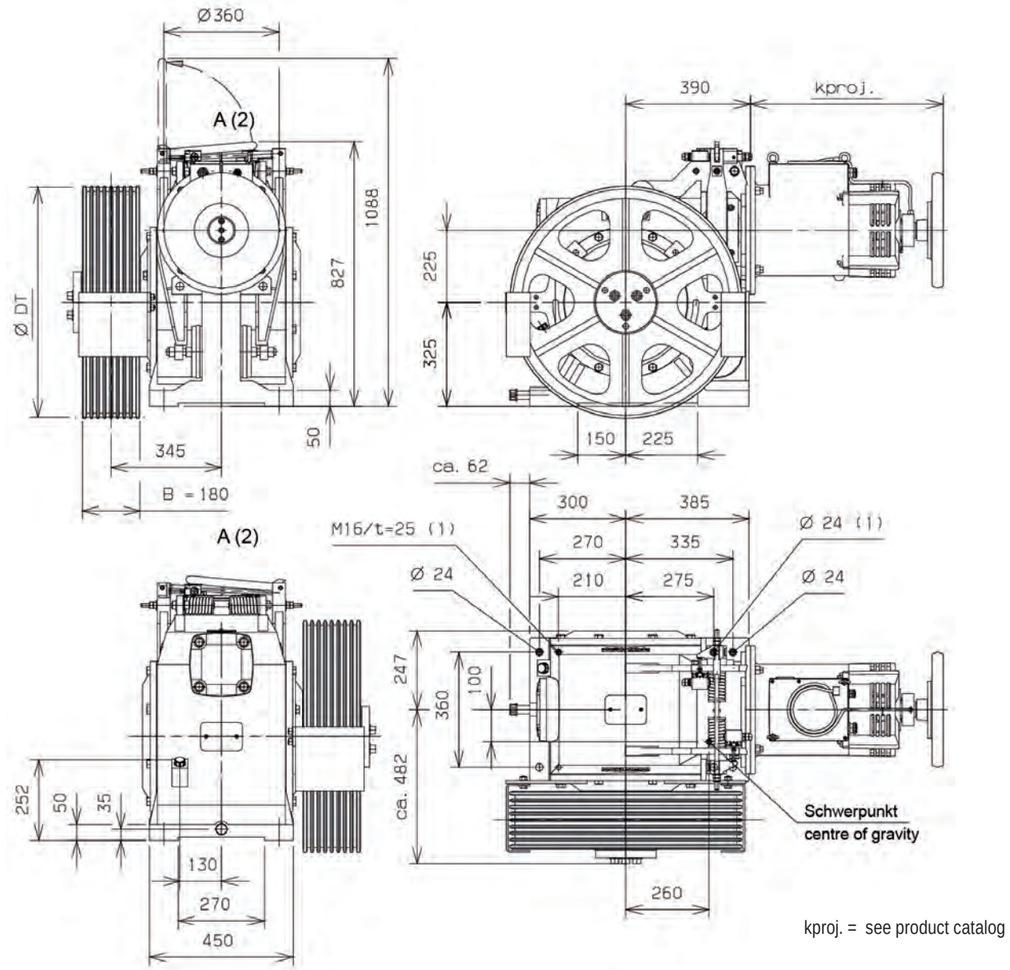
PERFORMANCE DATA

Rated Load Q [kg]	Operational Speed v [m/s]	Suspension r
1800	0,8 - 2,0	1:1
2000	0,8 - 1,2	1:1
2500	0,63 - 1,6	2:1
3000	0,63 - 1,2	2:1
3500	0,63 - 1,0	2:1

TW160
on machine base frame

Technical Data							
Gear type		TW160					
Axle distance	mm	225					
Load on shaft (Ft)	kN	≤ 97 (rope departure direction downwards)					
Ratios		50:1 / 42:1 / 35:1 / 57:2 / 51:2 / 41:3					
Oil filling	L	ca. 16,5					
Type of oil		synthetic gear oil					
Backlash	°	0,015 - 0,06					
Weight	kg	ca. 540					
Motor		frequency-controlled					
Type of protection - Motor		IP21			IP55		
Hand wheel		D360 (plastic)					
Actual Value Sensor (standard)		WDG100-38-1024/4096 TTL					
Actual Value Sensor (special)		WDG100-38-1024 HTL WDG100-38-1024 Sin/Cos					
Operational Brake							
Type		TW160					
Braking Torque	Nm	max. 2 x 245					
Operational Voltage	VDC	180 - overexitation // 90 - retentive voltage					
Trachtion Sheave							
Type		Standard			SA 4/9		
Diameter Traction Sheave	mm	640	720	800	640	720	800
Rim width	mm	180			160		
max. Numerbrs of grooves (z x d)		8 x 13, 7 x 16			7 x 13, 6 x 16		
Weight	kg	140	160	190	130	150	180

Subject to modifications



kproj. = see product catalog

W-Drives

W263C

W263C

W263C
horizontal right

For big travel heights & high loads

- VVVF-motor (16 up tp 75 kW) controlled accurately
- Horizontal rope departure (SA1)
- Brake monitoring switch, manual brake release
- Traction sheave in shaft with extended traction sheave shaft and pedestal bearing (SA 9)
- Part-Ex proof: wall bearing with vapour-proof shaft duct, extended drive shaft and suitable machine base frame (SA4)
- Reinforced traction sheave shaft (SA13)
- Gear according to ATEX
- Brake magnets, Ex-proof (SA 15)
- Double safety by dual-circuit shoe brake
- Low-wear traction sheave, available in Ø 540, 640, 700, 740 or 800 mm
- Gear, motor, traction sheave: approx. 1250 kg

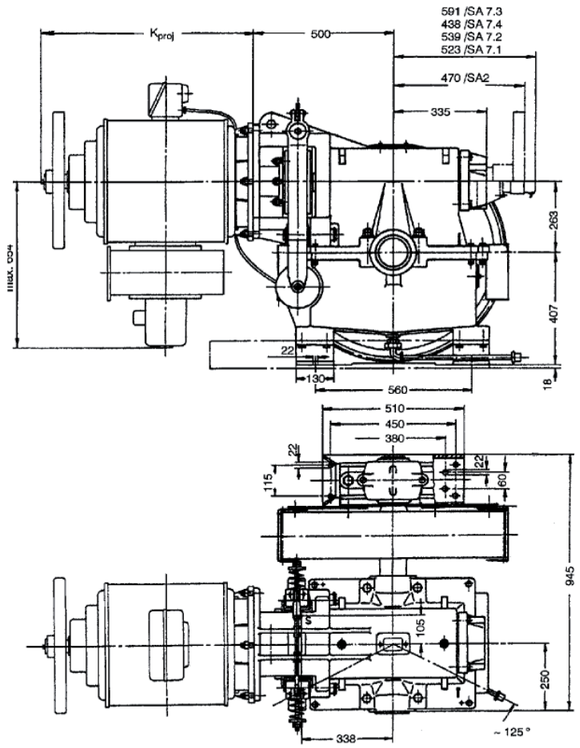
Special designs are possible

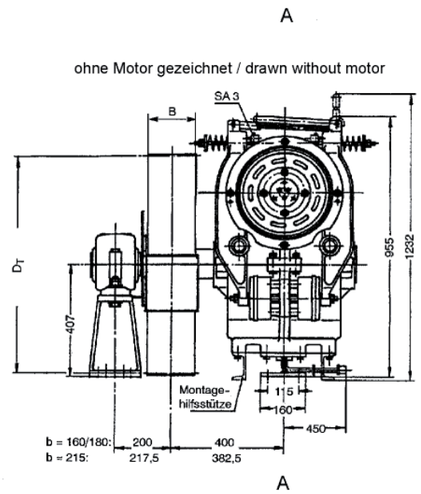
PERFORMANCE DATA		
Rated Load Q [kg]	Operational Speed v [m/s]	Suspension r
2000	0,8 - 2,0	1:1
2200	0,8 - 1,2	1:1
3500	0,63 - 1,2	2:1
4000	0,63 - 1,0	2:1
4500	0,63 - 1,0	2:1

W263C
horizontal left hand

Gears

Technical Data											
Gear type		W263C									
Axle distance	mm	263									
Load on shaft (Ft)	kN	≤ 84 (rope departure direction downwards)									
Ratios		49:1 / 40:1 / 60:2 / 50:2 / 41:2									
Oil filling	L	ca. 20									
Type of oil		synthetic gear oil									
Backlash	°	0,021 - 0,05									
Weight	kg	1250									
Motor		frequency-controlled									
Type		DTE / DTL / 1LA6									
Type of protection - Motor		IP23						IP55			
handwheel		D360 (plastic)									
Actual Value Sensor (standard)		WDG100-38-1024/4096 TTL									
Actual Value Sensor (special)		WDG100-38-1024 HTL / WDG100-38-1024 Sin/Cos									
Operational Brake											
Type		W263C									
Braking Torque	Nm	max. 2 x 320									
Operational Voltage	VDC	1180 - overexitation // 90 - retentive voltage									
Traction Sheave											
Type		Standard / SA 9 / SA 4									
Diameter Traction Sheave	mm	540	640			700		740		800	
Rim width	mm	160	160	180	215	180	215	160	215	160	215
max. Numerbrs of grooves (z x d)		8 x 10/11									
		7x13		8x13		8x13		7x13	8x13	7x13	8x13
			6x16	7x16	8x16	7x16	8x16	6x16	8x16	6x16	8x16
								5x18	7x18	5x18	7x18
Weight (incl. hub)	kg	125	150	160	180	185	210	195	230	225	265





S = Schwerpunkt / centre of gravity

kproj. = see product catalog

Technische Änderungen vorbehalten

W-Drives

W332C

W332C

W332C
horizontal right

The well proven for big loads

- VVVF-motor (16 up to 75 kW) controlled accurately
- Horizontal rope departure (SA1)
- Brake monitoring switch, manual brake release
- Traction sheave in shaft with extended traction sheave shaft and pedestal bearing (SA 9)
- Part-Ex proof: wall bearing with vapour-proof shaft duct, extended drive shaft and suitable machine base frame (SA4)
- Gear according to ATEX
- Brake magnets, Ex-proof (SA 15)
- Double safety by dual-circuit shoe brake
- Low-wear traction sheave, available in Ø 640, 700, 740 or 800 mm
- Gear, motor, traction sheave: approx. 1700 kg

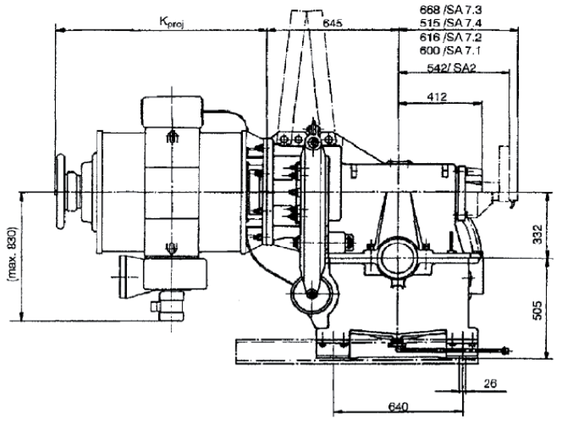
Special designs are possible

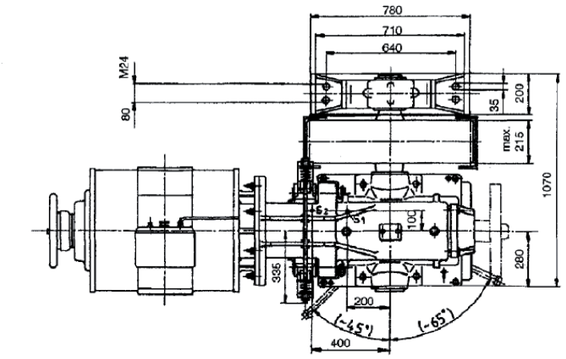
PERFORMANCE DATA		
Rated Load Q [kg]	Operational Speed v [m/s]	Suspension r
2800	0,63 - 1,6	1:1
3200	0,63 - 1,2	1:1
4500	0,4 - 1,2	2:1
5500	0,4 - 1,0	2:1
6000	0,4 - 0,6	2:1

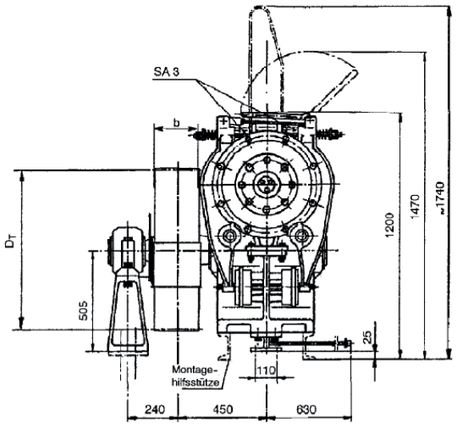
W332C
horizontal left hand

Gears

Technical Data										
Gear type		W332C								
Axle distance	mm	332								
Load on shaft (Ft)	kN	≤ 155 (rope departure direction downwards)								
Ratios		63:1 / 47:1 / 59:2 / 46:2 / 57:3								
Oil filling	L	ca. 33								
Type of oil		synthetic gear oil								
Backlash	°	0,022 - 0,04								
Weight	kg	1700								
Motor		frequency controlled								
Type		DTE / DTL / 1LA6								
Type of protection - Motor		IP23						IP55		
handwheel		D360 (plastic)								
Actual Value Sensor (standard)		WDG100-38-1024/4096 TTL								
Actual Value Sensor (special)		WDG100-38-1024 HTL / WDG100-38-1024 Sin/Cos								
Operational Brake										
Type		W332C								
Braking Torque	Nm	max. 2 x 625								
Operational Voltage	VDC	180 - overexitation // 90 - retentive voltage								
Traction Sheave										
Type		Standard / SA 9 / SA 4								
Diameter Traction Sheave	mm	640			700		740		800	
Rim width	mm	160	180	215	180	215	160	215	160	215
max. Numerbrs of grooves (z x d)		8 x 10/11								
		7x13	8x13		8x13		7x13	8x13	7x13	8x13
		6x16	7x16	8x16	7x16	8x16	6x16	8x16	6x16	8x16
							5x18	7x18	5x18	7x18
Weight (incl. hub)	kg	150	160	180	185	210	195	230	225	265







kproj. = see product catalog

Subject to modifications

Gearmotors

Elevator motors
General description

Elevator motor for TW45C

Gears

Description of the motors

All motors are constructed as three-phase current squirrel-cage motors and have either an internal ventilator on the motor shaft or forced ventilation. The motors with type of protection IP 21 are internally cooled, whereas the motors with the increase type of protection IP 55 are externally cooled.

The frequency-controlled types (V3F) are designed as 4-pole motors. 4/16-pole versions of the motors are used for pole-changing operation (AC2). For the voltage-controlled version (ACVV), which are also 4/16-pole, the 16-pole winding by means of direct current braking is used for the speed controller.

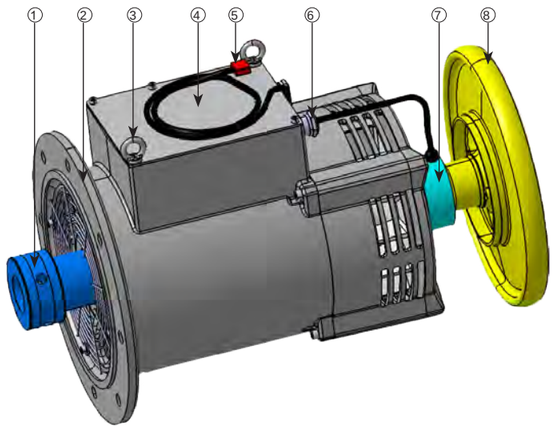
The motors are configured for thermal class F, but are only used up to thermal class B.

Inspection of the motor temperature takes place via two and/or three flush mounted PTC thermistors in the motor winding.

The mechanical power transmission of the motor to the gear takes place by means of a flexible coupling (the coupling is a constituent part of the gear).

In emergency situations, the handwinding wheel on the motor can be used to turn the drive by hand after manual release of the operational and emergency brake. This enables the elevator car to be move to a landing to rescue trapped persons in the event of failure of the power supply.

All motors are equipped with roller bearings.



Item	Designation	Item	Designation
1	Coupling hub	2	Motor flange
3	Load securing device	4	Terminal box
5	Connection for encoder	6	Cable gland for terminal box
7	Encoder	8	Handwinding wheel

Components of the elevator motors (DTE140 as an example)

Site conditions

The following application conditions apply to all motors:

- Maximum altitude: 1000 m amsl
- Max. 40° C ambient temperature at max. 50% air humidity. The minimum ambient temperature should not fall below +5° C. Cf. also EN 81.
- Max. rel. air humidity 90% at 20° C (without dewfall)

If the site altitude of the motor is exceeded, the power outputs of the motors are to be reduced.

If the maximum temperature is exceeded, the power outputs of the motors are to be reduced (cf. derating according to VDE 0530).

An increase in power output even with reduced requirements is not possible!

Motor CEG MT132S for Machine TW45C

Standard motors

Name	Unit	Technical data			
Manufacturer		EME (CEG)			
Type		MT132STD 20197S		MT132STD 20193S	
Motor type designation TKAW		C 5.2 400		C 7.0 400	
Voltage/frequency	[V/Hz]	340/42			
S5-operation data		180 c/h / 50% ED			
Speed range	[1/min]	1000 - 1249	1250 - 1800	1000 - 1249	1250 - 1800
Performance	[kW]	4.2 - 5.2	5.2	5.6 - 7.0	7.0
Torque	[Nm]	40	40 - 28	54	54 - 37
Rated current	[A]	12.5		16.5	
Allowed starting torque	[Nm]	70	63	88	79
Allowed starting current	[A]	20		25	
Effective power	[V]	340		340	
Cos Ø		0.87		0.88	
Efficiency		0.82		0.82	
Structural shape		IMB5/V1			
Type of protection		IP54			
Ventilation		internal ventilator			
Handwinding wheel[1)]	[mm]	D270 (plastic)			
Kproj.	[mm]	483			
Weight	[kg]	50		60	
Real value generator (standard)		WDG100-38-1024/4096 TTL			
Real value generator (special)		WDG100-38-1024 HTL / WDG100-38-1024 Sinus/Cosinus			

1) optional without handwinding wheel for location of machine in headroom/pit

Elevator motor for TW63B

Motor CEG MT132S für Maschine TW63B

Standardised motors for V3F (frequency-controlled)

Name	Technical data							
Version	frequency-controlled (VVVF)							
Manufacturer	EME (CEG)						Motorlift	
Type	MT132STD 20705S		MT132STD 22557S		MT132STD 22164S		CMRF160L1	
Motor version name TKAW	C 5.2 400 TW63 00		C 7.0 400 TW63 00		C 10.0 330 TW63 00		ML 13.0 400 TW63 00	
S5-operation data	180 c/h / 50% ED							
Speed range [1/min]	1000 - 1249	1250 - 1800	1000 - 1249	1250 - 1800	1000 - 1249	1250 - 1650	1000 - 1249	1250 - 1650
Performance range [kW]	4.2 - 5.2	5.2	5.6 - 7.0	7.0	8.0 - 10.0	10.0	10.5 - 13.0	13.0
Torque range [Nm]	40	40 - 28	54	54 - 37	77	77 - 58	100	100 - 75
Rated current [A]	12.5		16.5		28		32	
Allowed starting torque [Nm]	70	63	88	79	125		170	
Allowed starting current [A]	20		25		44		48	
Effectiv power [V]	340		340		290		340	
Cos Ø	0.87		0.88		0.84		0.82	
Efficiency	0.82		0.82		0.85		0.85	
Structural shape	BV6530-06/Bl.1[2)]							
Type of protection	IP55						IP54	
Ventilation	Internal ventilator							
handwinding wheel [1)] [mm]	D270 (plastic)							
Kproj. [mm]	539 [2)]				577 [2)]		639 [2)]	
Weight [kg]	56		62		70		TBD	
Real value generator (standard)	WDG100-38-1024/4096 TTL							
Real value generator (special)	WDG100-38-1024 HTL / WDG100-38-1024 Sinus/Cosinus							

1) optional without handwinding wheel for location of machine in headroom / pit

2) motor with integrated special flange and enhanced motor terminal box for intermediate clamping of the brake magnets

On inquiry also pole changing motors are possible.

Elevator motor for TW130

Motor EMOD for TW130

Standard motors

Name	Unit	Technical data		
Solution		frequency-controlled (VVVF)		
Manufacturer		ThyssenKrupp Aufzugswerke	Motorlift	EMOD
Type		DTE132 - DTL180	CMRF160	BG180L/4 BG180L/4a BG225SM/4
Voltage / frequency	V / Hz	see Product catalogue „Elevator motors“		
S5 - operation data		240 c/h / 50% ED		
Speed range	rpm	1250 - 1650	1000 - 1650	1250 - 1650
Nominal power	kW	11 - 42	11 - 42	18.5 - 31.5
Structural shape		IMB5/V1		
System of protection		IP21	IP54	IP55
Ventilation		Internal ventilator[1)]		
Handwinding	mm	D270[2)] / 360 (plastic)	D270 (plastic)	D360 (plastic)
Kproj.	mm	see Product catalogue „Elevator motors“		
Real value generator (standard)		WDG100-38-1024/4096 TTL		
Real value generator (special)		WDG100-38-1024 HTL WDG100-38-1024 Sin/Cos		

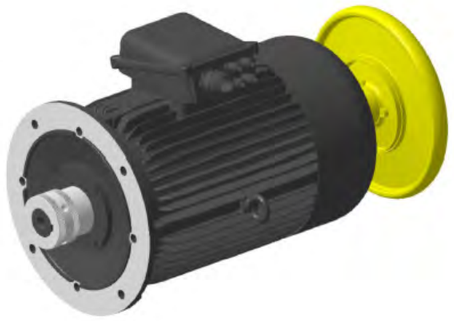
1) type DTL180 with forced ventilation

2) only for type DTE132

Special motors

For areas of application in which a standard version motor cannot be used, a custom-order type IMB5/V1 motor is used.

Elevator motor for TW160



Motor EMOD für TW160

Standard motors

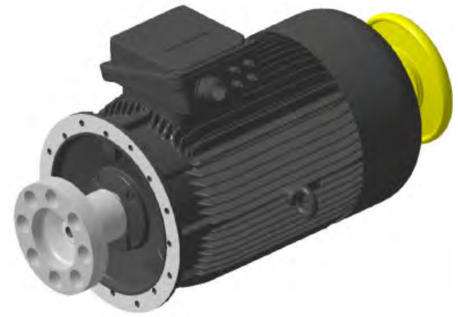
Name	Unit	Technical data	
Solution		Frequency-controlled (VVVF)	
Manufacturer		ThyssenKrupp Aufzugswerke	EMOD
Type		DTE132 - DTL180	BG180L/4 BG180L/4a BG225SM/4
Voltage / frequency	V/Hz	4)	
S5 - operation data		240 c/h / 50% ED	
Speed range	rpm	1250 - 1650	1250 - 1650
Rated output	kW	11 - 42	18.5 - 31.5
Structural shape		IMB5	
System of protection		IP21	IP55
Ventilation		Internal ventilator[2)]	
Handwinding wheel	mm	D270[3)] / 360 (plastic)	D360 (plastic)
Kproj.	mm	4)	
Real value generator (standard)		WDG100-38-1024/4096 TTL	
Real value generator (special)		WDG100-38-1024 HTL WDG100-38-1024 Sin/Cos	

1) version depends on project specs.
2) type DTL180 with forced ventilation
3) only for type DTE132
4) see product catalogue elevator motors

Special motors

For ranges of application in which a standard version motor cannot be used, a custom-order type B9 or IMB5 motor is used.

Elevator motor for W-Drives



Motor EMOD for W263C and W332C

Standard motors

Name	Unit	Technical data				
Solution		frequency-controlled (V3F)				
Manufacturer		ThyssenKrupp Elevator				EMOD
		DTE		DTL	DTE	BG ...
Type		140 S/L	180 S/M	180 M	180S	225 - 280
Voltage / frequency	V / Hz	1)				
S5 - operation data		240 c/h / 50% ED				
Speed range	rpm	1250 - 1650			800 - 1050	1250 - 1650
Rated output	kW	16 - 20	27 / 33	37 / 42	185	31.5 / 65
Structural shape		IMB5				
System of protection		IP23				IP55
Ventilation		Internal ventilator		Forced ventilation	Internal ventilator	
Handwinding wheel	mm	D360 (plastic)				
Kproj.	mm	See factory standard				
Real value generator (standard)		WDG100-38-1024/4096 TTL				
Real value generator (special)		WDG100-38-1024 HTL / WDG100-38-1024 Sin/Cos				

1) see product catalogue elevator motors

Special motors

For ranges of application in which a standard version motor cannot be used, a custom-order B9 or IMB5 type motor is used.

Drum Drives

Drum Drives

Drum Drives

Gears

In shafts with cramped space a drum drive is an alternative to a traction sheave lift with counterweight or hydraulic lift. In this case the lift is suspended on two ropes, coiled on a drum. Depending on the length of drum required, the installation can be carried out in an overhanging arrangement, comparable to traction sheave installation. In designs with outer bearing, the drive must be attached to two double T-profiles according to the SA9 design to bring the statically indeterminate three-point bearing back to a two-point bearing.

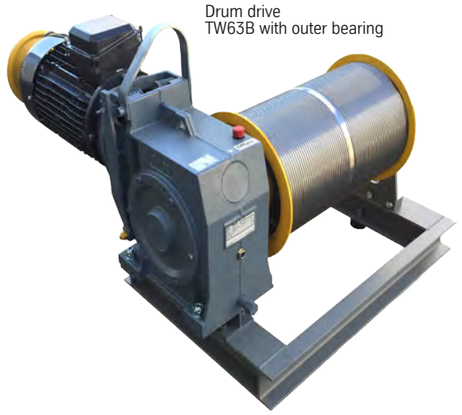
Drum drives can be used for the modernisation of existing drum drives and new lifts, where, due to the space available (shaft floor space), no lift with counterweight or hydraulic jack can be employed. The installation is frequently planned in existing stairwells that are to be used as part of a building renovation to enable the comfort requirements of the customer regarding the building to be realised.

The rope breaking force with only two cables limits the possible load of cage mass and load capacity, and define the required rope diameter. The defined in EN81-20 requirements for drum drives are defined as follows:

<u>Requirements of the standard EN81-20:</u>

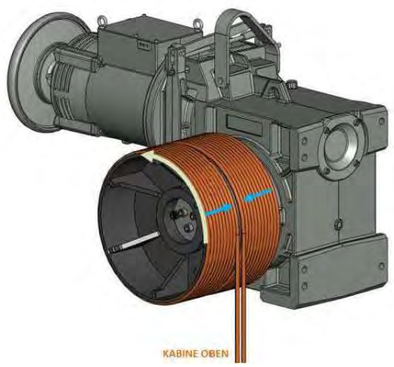
- Minimum 2 cables, which are wound one layer
- D/d (Drum/Rope): ≥ 40
- Rope diameter: ≥ 8 mm
- Rope safety: ≥ 12
- Speed max. 0,63 m/s

Drum drive TW130 without outer bearing

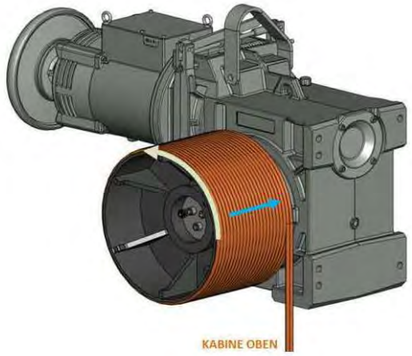


Drum drive TW63B with outer bearing

The UCM requirement can either be realised with an NBS system or a safety catch.
Coiling of both ropes can be achieved either in parallel or from the outside to the centre. Given the axis load, coiling from the outside to the centre is preferable.



Rope coiling centrally coiled



Rope coiling coiled in parallel

The illustration shows the design for a drum with 2:1 suspension.

LiftEquip® ELEVATOR COMPONENTS				
Travel height	13,47		[m]	
Ø-drum	400		[mm]	
Ø-rope	10		[mm]	
Suspension	2	: 1		
outer pillow block	n		[y/n]	
Length (parallel)	☐ 551		[mm]	
Length (centered)	X 581		[mm]	

Calculation tool rope drum				
Car weight	1450	[Kg]		
Rated load	1000	[Kg]		
Rope strength	72,7	[kN]		
Rope safety	12,1			
Drako H250 Rope strength	8	[mm]	46,7	[kN]
	9	[mm]	58,9	[kN]
	10	[mm]	72,7	[kN]
	11	[mm]	86,0	[kN]
	12	[mm]	104,8	[kN]
	13	[mm]	126,0	[kN]

The table shows model designs with reference to 12 m conveyance height. In the event of queries the design must be realised on the basis of customer data.

Technical Data							
Rated load max. Q [kg]	450	525	800	800	1000	1000	1200
Car weight max. F [kg]	300	400	550	550	700	700	800
Total load F+Q [kg]	750	925	1350	1350	1700	1700	2000
Rated speed v [m/s]	0,5	0,63	0,5	0,63	0,5	0,63	0,63
Suspension	1:1						
Travel height max. [m]	12						
Machine type	TW63B		TW130		TW160		
Ratio	48:1	33:1	42:1	35:1	50:1	41:1	35:1
Drum -Ø [mm]	360	360	450	450	520	520	520
Drum length [mm]	240	265	300	300	300	300	300
Number of ropes	2						
Rope -Ø [mm] (Drako 250 H)	8	9	10	11	11	12	13
Dissipated heat [kJ/h]	1850	2615	3185	4183	4232	5483	6623
Motor output [kW]	6,5	9,3	11,8	14,5	14,7	18,1	22,2
Motor current [A]	14,4	25,5	26,8	44,5	46,0	41,2	52,4

For higher loads the W-series is available on request.

Our whole range of options, for example emergency brake system (NBS), Ex-protection or vertical motors is available for you. If you cannot find the suitable machine in the matrix above, please contact us, together we will find a solution for higher loads or special applications.

Drum drives – Possible uses and solution versions

Volker Lenzner[1)], Frank Eßer[2)]

Apart from the standard lift drive concepts with traction sheave drives with counterweight balance or hydraulics, there is another drive concept with geared unit and rope drum.

In the case of the drum drive, the lift car is suspended on the rope and the drive machine coils up the rope attached to the drum, in a manner similar to a crane, on the drum (Figures 4 to 6). Due to the torque needed, worm gear is preferred as drives with corresponding adjustment for attachment of the drum. This lift system dispenses with a counterweight to enable the entire shaft cross-section to be used for the car. This lift concept is also suitable for replacing existing hydraulic lifts.

These systems are used as replacement drives for pre-existing lifts or in modernisation, when the car floor area is reduced by retrofitting of car separation doors and automatic landing doors.

Against the background of demographic change, growing requirements for handicapped friendly accessibility of buildings and comfort requirements, it may be technically necessary to realise a lift solution in an existing stairwell with cramped space. In this case a lift with drum drive makes sense.

In terms of regulatory standards, both EN 81-1 (see 9.2.2., 9.2.3.2, 9.4 and 10.3.2) as well as EN 81-20 (see 5.5.2.2, 5.5.4) make the following demands on the use of drum drives:

- Minimum number of two ropes, coiled in a single layer

LiftEquip® ELEVATOR COMPONENTS				calculation tool rope drum			
Travel height	13,47		[m]	Car weight	1450		[Kg]
Ø-drum	400		[mm]	Rated load	1000		[Kg]
Ø-rope	10		[mm]	Rope strength	72,7		[kN]
Suspension	2	: 1		Rope safety	12,1		
outer pillow block	n		[y/n]	Drako H250 Rope strength	8 [mm]	46,7	[kN]
Length (parallel)	☐	551	[mm]		9 [mm]	58,9	[kN]
Length (centered)	☑	581	[mm]		10 [mm]	72,7	[kN]
					11 [mm]	86,0	[kN]
					12 [mm]	104,8	[kN]
					13 [mm]	126,0	[kN]

Figure 1: Example for a rope test and determination of drum length.

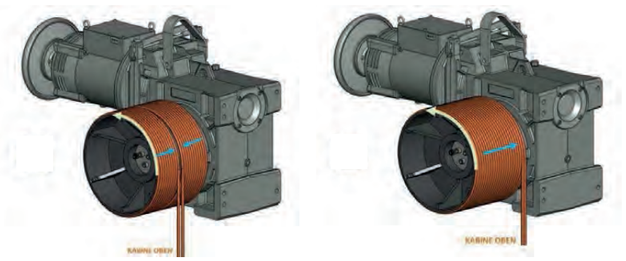


Figure 2: Rope coiling (centrally coiled or coiled in parallel)

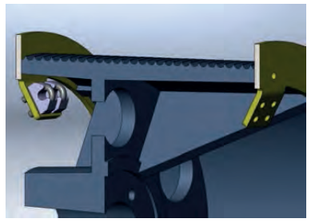


Figure 3: Rope end attachment

- D/d (drum diameter to rope diameter) greater than 40
- Minimum rope diameter 8 mm
- Rope safety greater than 12
- max. speed of lift 0.63 m/s
- No restriction regarding the type of suspension (1:1 or 2:1)

Since the mass of the car and the load-bearing capacity are suspended without balancing mass on both ropes, the rope-breaking force must be considered in reference to the total mass. Through the use of ropes with high breaking force (e.g. Drako 250h or equivalent) and a low lift car mass, a good economic solution can be found here too.

Drive design

The rope diameter required and the resulting minimum drum diameter are derived from the information of load-bearing capacity (Q) and lift car mass (F). The rope safety also has to be checked (Figure 1).

The length of the rope drum required depends on the conveyance height, the type of suspension and coiling direction of both ropes (Figure 2). Coiling from the outside inwards (groove in the middle) is preferable due to the axis load, since the load centre is always the same.

1) LiftEquip GmbH Elevator Components
2) Rudolf Fuka GmbH

Based on the shaft loading, it is possible to define whether a drum with overhanging arrangement (Figure 4) is viable or whether the drum has to be designed with outer bearings (Figures 6 and 7).

In the case of a layout with outer bearings, the statically indeterminate triple bearing must be led back via the hinged column below the drive to a double bearing.

Since with increasing gross weight and greater traction sheave diameter, the drive power required of the geared drive increases as does the size of the geared drive, the potential installation situation must be examined to determine whether the often cramped space is sufficient.

Figure 4: Geared drive TW130 horizontal with drum and overhanging traction sheave

Figure 5: MFR frequency inverter with integrated regenerative braking

Figure 6: Geared unit TW130 with drum and traction sheave with outer bearing on frame

Figure 7: Geared unit TW63horizontal with drum and traction sheave with outer bearing on frame

If necessary, guidance of the rope can be realised via a guided diverted pulley, depending on the site circumstances. Compensation of the different rope extension of both ropes must be achieved via attachment to a “rocker.”

To operate lifts with drum drives especially economically, use of a frequency inverter with regenerative braking is advisable. Measurements on lifts have shown that the share of regenerative braking can amount to 60 to 70%. This means that as a result of regenerative braking, a lift system of comparable effectiveness with a traction sheave lift with 50% counterweight compensation can be achieved in terms of energy efficiency.

The MFR inverter (Figure 5) with integrated regenerative braking of LiftEquip is a very economical solution here, since the regenerative braking unit is integrated in the inverter without additional hardware costs. All regulatory standard requirements for regenerative braking have been met.

Since drum lifts have to meet the requirements based on EN81-1 (see 9.11) or of EN81-20 (5.6.7), the subject of UCM (A3) also has to be considered. There are two possible solutions for this: the first is a design with an emergency braking system (NBS) on the geared drive if the space available in the geared drive layout permits this. The other solution is to realise the UCM case via a safety catch acting on both sides.

Since the lift can only leave the stop downwards due to load conditions, only a potential electrical fault needs to be considered for the upwards direction when leaving the stop. The electrical power must undergo a three-phase shutdown when passing the final stops to ensure safe stopping of the lift car via limit switches according to EN81-1 (see 10.5.2.2. and 10.5.3.1) and EN 81-20 (5. 8. 1. 2 and 5. 12. 2).

Market situation

While the drum drive used to be very much a niche product, the demand and project situation has altered greatly in recent years. To cope with this situation the two

Figure 8: Geared unit TW130 V with drum below with outer bearing and diverter pulley on frame

Technical Report

Possible uses and solution version

companies FUKA and LiftEquip have developed a joint concept. An altered load population was considered in this regard for the calculation of the worm drive and defined as an overall concept by a standardisation of the drums (diameter and length of the blanks). Together with the production facilities for corresponding machine frames, in particular for designs with outer bearings from Fuka, a wide range of solutions can now also be offered here economically (Figure 8).

Summary

Lifts with a drum drive are a special solution that not only represent a good technical solution, especially for installations in cramped spaces, but are also economical. The regulatory standard requirements from EN81-1 have not been changed in EN81-20; allowance must be made for the UCM aspect.

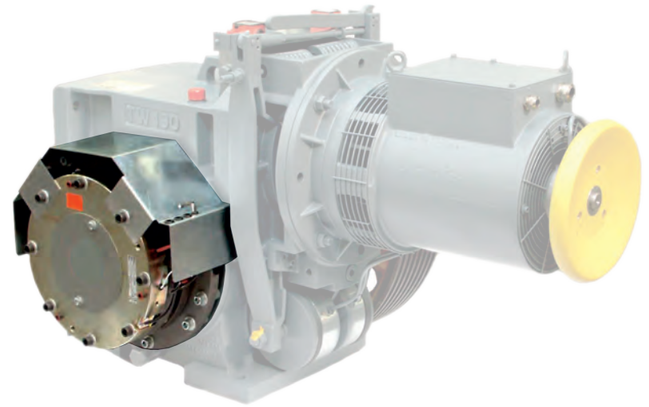
Different arrangements of the drive and requirements for the rope coiling can be realised on a project-related basis.

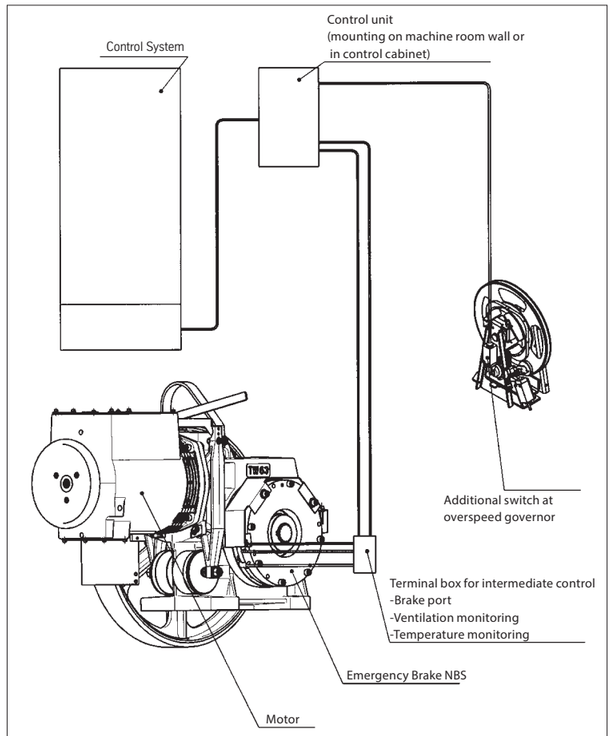
Consequently this drive concept is not only an option as a replacement solution for existing drum drives, it can also be used in retrofitting of a new lift or as replacement for a hydraulic lift. The use of regenerative frequency inverters – MFR with integrated regeneration – is advisable in combination with a drum drive, since up to 50% of the energy can be saved through regenerative braking, depending on the lift constellation.

Emergency Brake System NBS

EN 81-
20/-50
-conform

Space saving, simple, cost-effective
Certified and type approved according to EN 81-20/-50





We provide you with a well thought out and calculated package of solutions: Machine with emergency brake, overspeed governor including a switch for overspeed and a separate control-unit. Together, those components form a closed and operable system. This systemic solution spares you time consuming self-made constructions bearing unforeseeable costs.

Compact Design

Our emergency brake is mounted on the drive shaft vis-à-vis the traction sheave: A configuration, which offers you a space saving solution.

Easy Conversion

To modernize your lift installation the addition of the following components to the drive suffices: an additional safety switch at the overspeed governor and a separate control unit with a voltage supply for wall-mounted installation in the machine room.

Continuous Availability

The emergency brake system is optionally available for the following geared drives:
TW 45C, TW63B, TW130, TW160.
Braking device against overspeed according to EN 81-20 /5.6.6 and against unintentional movement of the car according EN 81-20 /5.6.7.

Technical Data

Machine	Rated Load Q [kg]*	Suspension r	Brake Torque [Nm]
TW 45C	500/1000	1:1/2:1	1200
TW 63B	1125/2100	1:1/2:1	2200
TW 130	1800/3500	1:1/2:1	4000
TW 160	2200/4750	1:1/2:1	5500

* maximum values depending on speed v

Own Notes

PMC- / DAF-Series

Mini-Gearless

PMC - DAF

Product Description

regeneration

EN 81-20/-50 -conform

Performance Matrix

Efficient

With our synchronous gearless series (PMC and DAF) one of the most compact drives is available for deployment in energy efficient modernisation / or system solutions, ideally suited for energy recovery. These series stand out as excellent value for money. Excellent efficiencies with low energy consumption.

Safe

A safety brake is used in all gearless drives available from LiftEquip, which is licensed as type-tested safety brake against excessive speed upwards in accordance with EN81-1/9.10. EN 81-A3 compliant. Rope guard acc. to EN 81-77 up to earthquake category 3.

Flexible

The drives can be used both in the shaft (MRL) as well as in the machine room. The arrangement can be configured in 1:1 and 2:1 suspension.

A design version of the brake with a manual venting lever is possible. Another option of the PMC series is a handwheel extension.

Complete

We can provide you with the matching frequency inverter (E300, in connection with M600 regenerative; MFC: with braking resistor) in each case for our gearless drives, which feature all of the drive parameters required. In this way we guarantee fast, safe start-up. Optionally in plug&play version with integrated brake control, line filter, line inductor and contactors.
In addition, we provide various machine frames, perfectly adapted to these drives. Special designs are available on request.

Smooth running

The traction sheaves we use are precisely manufactured and supplied with hardened grooves. As a result we guarantee you a long service life, low vibrations and an extremely smooth running drive for your lift.

Compact

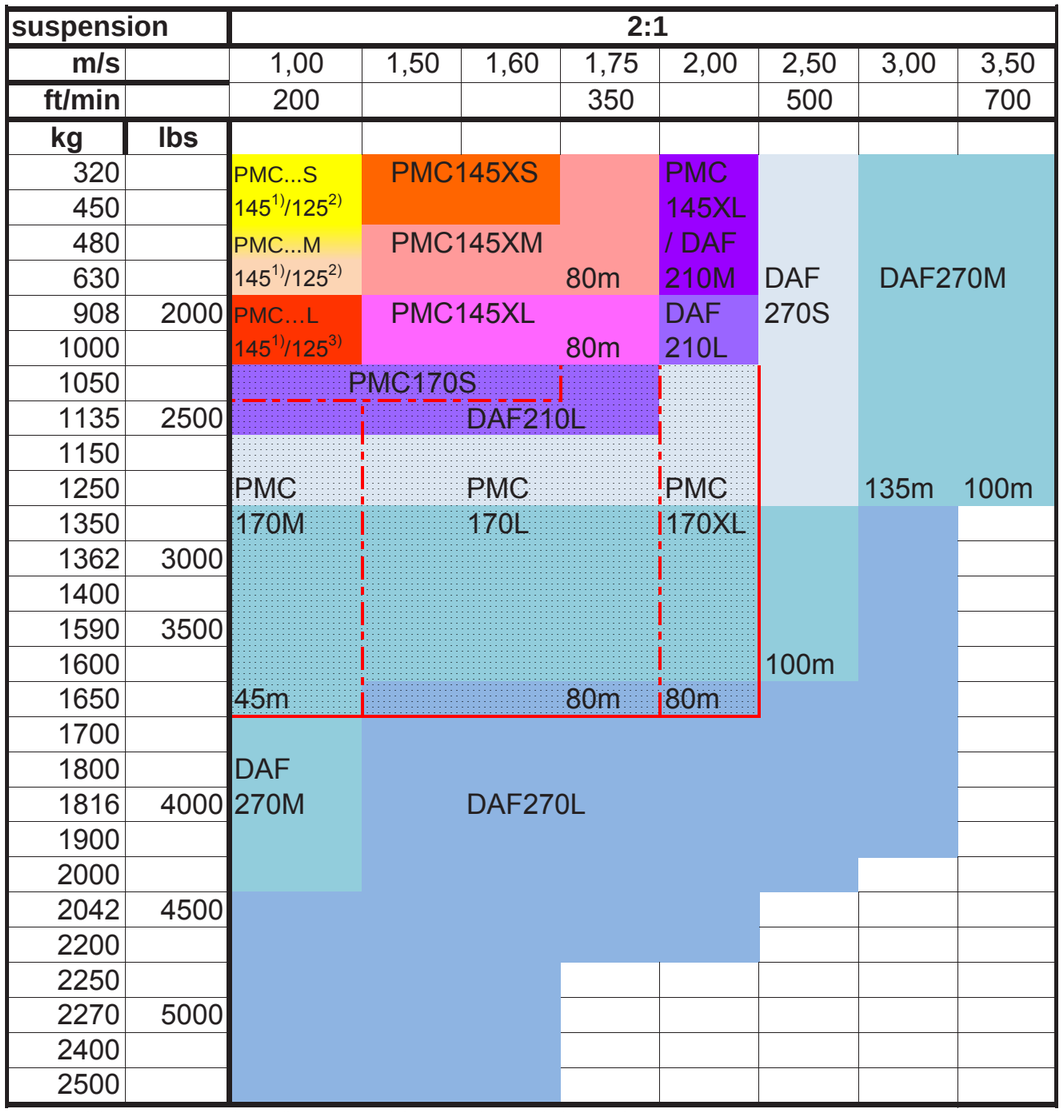
The compact design is a significant advantage for using the drives in your systems.

Reliable

Durable, sturdy construction, promising exceptionally long service life and availability and sustainable economic efficiency.

EN81 20/-50

Our drives meet all requirements with regard to the above standards, in particular the approval of safety brakes and the rope guard.



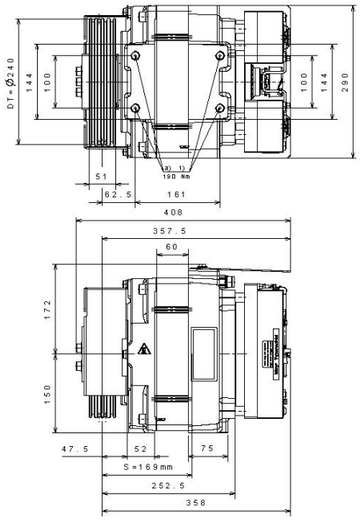
Travel height data can vary depending on car weight etc. A check with the TLD is necessary.
1) PMC145 is designed for 240 Starts/h
2) PMC125S/M are designed for 120 Starts/h
3) PMC125L is designed for 180 Starts/h

Gearless

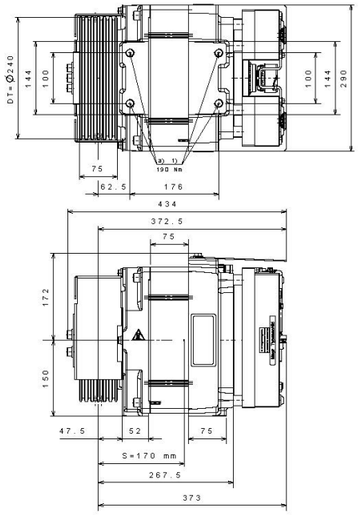
PMC125 S / M / L

EN 81-
20/-50
-conform

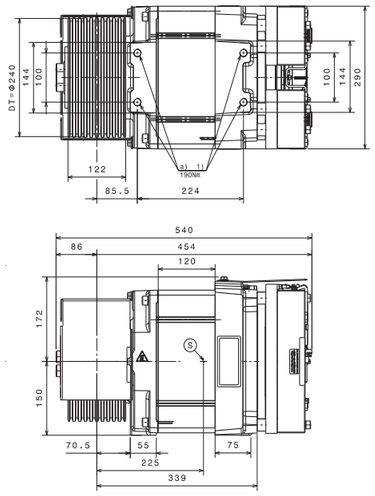
PMC125S



PMC125M



PMC125L*



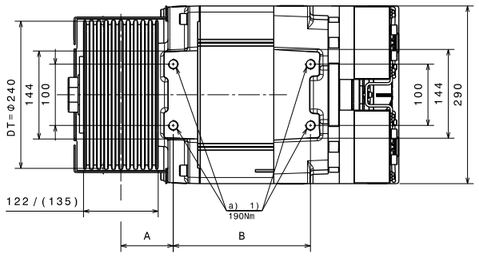
Technical Data									
Type of machine		PMC125S001	PMC125M002		PMC125L003				
Suspension	r	2:1			1:1	2:1			
Rated Load	Q [kg]	450 / 480	480	630	500	750		800	1000
Rated Speed max.	v [m/s]	1,0							
Diameter of Traction Sheave	DT [mm]	240	320	240	240	320		240	
Diameter of Ropes	d [mm]	6 / 6,5	6 / 6,5	8	6 / 6,5	6 / 6,5	6 / 6,5	8	6 / 6,5
Number of Grooves max. [1]	z	4	5	4	6	10	7	6	10
Groove type		seat / vee groove, hardened							
Rated Power	PN [kW]	2,8	2,9		3,8	2,9	4,4		4,7	5,9
Rated Torque	MN [Nm]	170	230			350	350		280	350
Permitted radial Shaft Load	[kN]	13	14			25				
Weight	[kg]	127	150		137	204			193	
Number of Switching Operations		120				180				
Duty Cycle	%	40				50				
Rated Current	IN [A]	7,9	10,2			14,6	14,9		11,9	14,9
Output Factor	cos φ	0,89				0,91	0,91		0,93	0,91
Braking Torque	[Nm]	2 x 210	2 x 300			2 x 500				
Designation		2-surface disc brake in double configuration (2 brake circuits)								
Brake Monitoring		1 microswitch per brake circuit								
Protection Class		IP 21								
Noise level	[dB(A)]	< 60								
Frequency inverter type	E300	150				220				
	MFC	21-15, 31-10				21-15, 31-15				

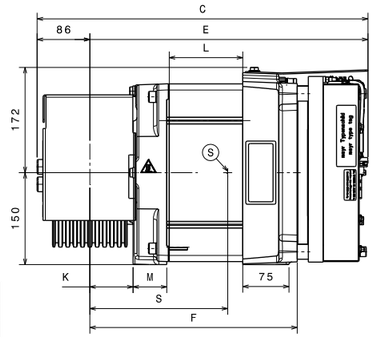
[1] with standardised groove clearance RA 12 mm for d=6/6,5 and 14 mm for d=8 mm

Subject to techn. modifications. For further information please refer to the current product catalog PMC125 drive

PMC125 XL

EN 81-
20/-50
-conform





	A	B	C	E	F	K	L	M	S	G
PMC125L0	85.5	224	540	454	339	70.5	120	55	225	193 kg
PMC125XL0	85.5	254	570	484	369	70.5	150	55	240	205 kg

Technical Data			
Type of machine		PMC125XL004	
Suspension	r	2:1	
Rated Load	Q [kg]	1000	
Rated Speed max.	v [m/s]	1,6	1,75
Diameter of Traction Sheave	DT [mm]	240	320
Diameter of Ropes	d [mm]	6 / 6,5	6 / 6,5 / 8
Number of Grooves max. [1]	z	10	6 / 7
Groove type		Sitz-/Keilrille, gehärtet	
Rated Power	PN [kW]	9,3	10,2
Rated Torque	MN [Nm]	350	
Permitted radial Shaft Load	[kN]	28	
Weight	[kg]	205	216
Number of Switching Operations		180	
Duty Cycle	%	50	
Rated Current	IN [A]	10,2	
Output Factor	cos φ	0,93	
Braking Torque	[Nm]	2 x 550	
Designation		2-surface disc brake in double configuration (2 brake circuits)	
Brake Monitoring		1 microswitch per brake circuit	
Protection Class		IP21	
Noise level	[dB(A)]	< 60	
Frequency inverter type	E300	350	
	MFC	21-32	

[1] with standardised groove clearance RA 12 mm for d=6/6,5 and 14 mm for d=8 mm

Subject to techn. modifications. For further information please refer to the current product catalog PMC125 drive

PMC145-3 S/XS

EN 81-
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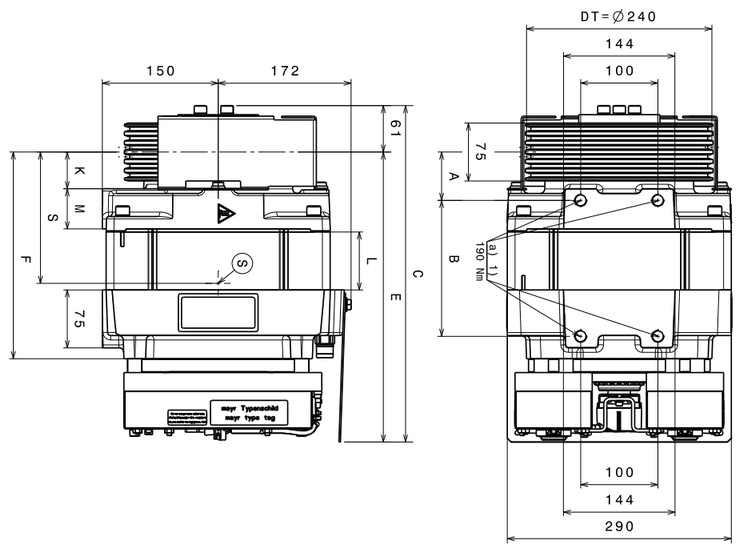
-conform



	A	B	C	E	F	K	L	M	S	G
PMC145S3	62.5	176	436	375	267.5	47.5	75	52	170	135 kg
PMC145XS3	57.5	239	494	433	325.5	42.5	120	70	215	160 kg

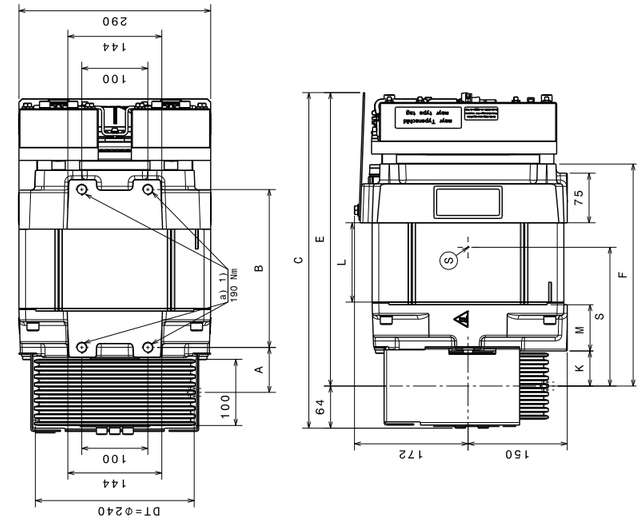
Technical Data

Type of machine		PMC145-3**S**		PMC145-3**XS**
Suspension	r	1:1	2:1	
Rated Load	Q [kg]	275	450	
Rated Speed max.	v [m/s]	1,0		1,6
Diameter of Traction Sheave	DT [mm]	240		
Diameter of Ropes	d [mm]	6		
Number of Grooves max.	z	6 at groove clearance 12 mm / 7 at groove clearance 10 mm		
Groove type		seat / vee groove, hardened		
Rated Power	PN [kW]	1,59	2,8	4,4
Rated Torque	MN [Nm]	190	170	165
Permitted radial Shaft Load	[kN]	14		15
Weight	[kg]	132		158
Number of Switching Operations		180		
Duty Cycle	%	50		
Rated Current	IN [A]	8,4	7,5	9,9
Output Factor	cos φ	0,92	0,91	0,96
Designation		2 x 250 Nm, 2-surface disc brake in double configuration (2 brake circuits)		
Brake Monitoring		1 microswitch per brake circuit		
Protection Class		IP 21		
Frequency inverter type	E300	150		
	MFC	31-10		31-15

Subject to techn. modifications. For further information please refer to the current product catalog PMC145-3 drive

PMC145-2 M/XM

EN 81-
20/-50
-conform



	A	B	C	E	F	K	L	M	S	G
PMC145M3	68	239	508	444	336	53	120	70	210	175 kg
PMC145XM3	68	273	494	542	370	53	150	74	230	190 kg

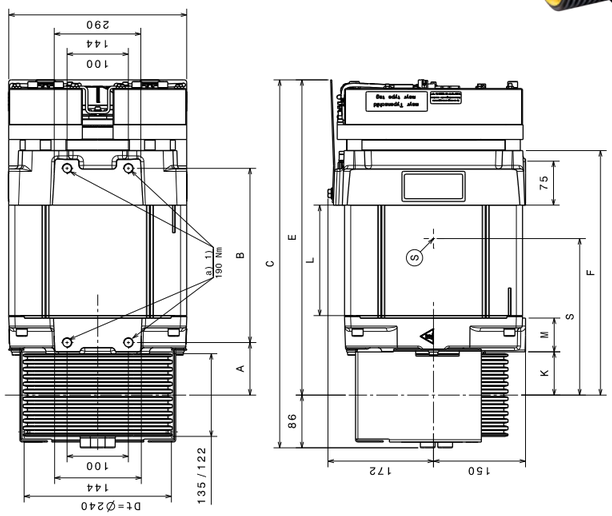
Technical Data

Type of machine		PMC145-3**M**							PMC145-3**XM**		
Suspension	r	1:1				2:1					
Rated Load	Q [kg]	300	400			480	630				450
Rated Speed max.	v [m/s]	1,0		1,2		1,0			1,6	1,75	2,0
Diameter of Traction Sheave	DT [mm]	320	240	210	240	320	240	210	240		320
Diameter of Ropes	d [mm]	8	6								8
Number of Grooves max.	z	5	8 / 9								6
Type of Groove		seat / vee groove, hardened									
Rated Power	PN [kW]	1,79	2,38	2,72	2,86	3,1	3,91	3,9	6	6,9	5,5
Rated Torque	MN [Nm]	285				245	235	205	225	236	220
Permitted radial Shaft Load	[kN]	18							19		
Weight	[kg]	185							202		
Number of Switching Operations		180				240					
Duty Cycle	%	50									
Rated Current	IN [A]	11,5				9,9	9,5	8,3	14,8	15,6	13,9
Output Factor	cos φ	0,94	0,93		0,92	0,93	0,94		0,97	0,96	
Version of Brake		2 x 350 Nm, 2-surface disc brake in double configuration (2 brake circuits)									
Brake Monitoring		1 microswitch per brake circuit									
Protection Class		IP 21									
Frequency inverter type	E300	150							220		
	MFC	21-15 / 31-15									

Subject to techn. modifications. For further information please refer to the current product catalog PMC145-3 drive

PMC145-3 L/XL

EN 81-
20/-50
-conform



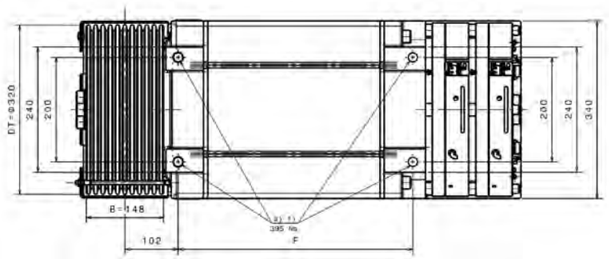
	A	B	C	E	F	K	L	M	S	G
PMC145L3	85.5	284	600	514	398.5	70.5	180	55	255	220 kg
PMC145XL3	85.5	314	630	544	428.5	70.5	210	55	270	230 kg

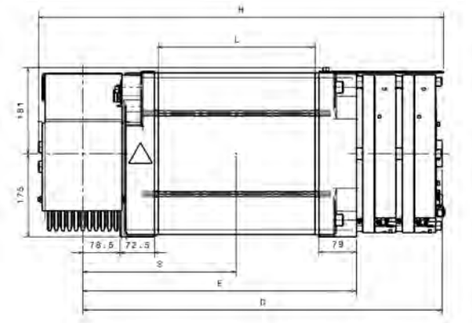
Technical Data										
Type of machine		PMC145-3**L**							PMC145-3**XL**	
Suspension	r	1:1				2:1				
Rated Load	Q [kg]	475	630			800	1000			630
Rated Speed max.	v [m/s]	1,0			1,2	1,0			1,6	1,75	2,0
Diameter of Traction Sheave	DT [mm]	320	240	210	240	320	240	210	240		320
Diameter of Ropes	d [mm]	8	6			8	6				8
Number of Grooves max.	z	6	10 / 11 / 13			6	10 / 11 / 13				6
Type of Groove		seat / vee groove, hardened									
Rated Power	PN [kW]	2,76	3,69	4,2	4,42	4,7	6,01	6	9,4	10,2	8
Rated Torque	MN [Nm]	440				375	360	315	352	350	320
Permitted radial Shaft Load	[kN]	32							30		
Weight	[kg]	225	216	214	216	225	216	214	229		238
Number of Switching Operations		180									
Duty Cycle	%	40				50					
Rated Current	IN [A]	18,3				15,5	14,9	13	24,7	24,6	22,4
Output Factor	cos φ	0,93	0,94	0,93		0,92		0,95	0,96		
Version of Brake		2 x 550 Nm, 2-surface disc brake in double configuration (2 brake circuits)									
Brake Monitoring		1 microswitch per brake circuit									
Protection Class		IP 21									
Frequency inverter type	E300	220							350		
	MFC	21-15 / 31-15							21-32 / 31-26		

Subject to techn. modifications. For further information please refer to the current product catalog PMC145-3 drive

PMC170 S - XL

EN 81-
20/-50
-conform





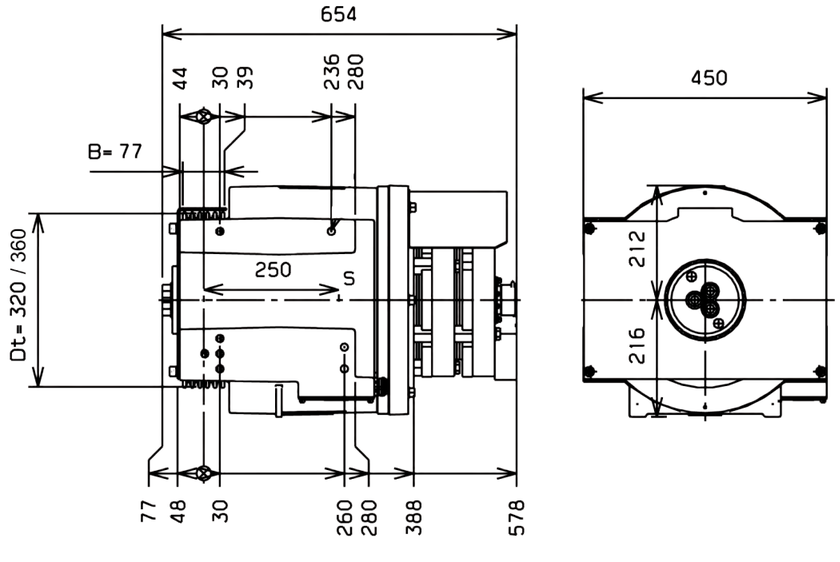
Dimensions							
	L (mm)	D (mm)	E (mm)	F (mm)	H (mm)	S (mm)	G (kg)
PMC170**S**	180	613	426	300	706	273	381
PMC170**M**	240	673	486	360	766	304	423
PMC170**L**	270	703	516	390	796	319	448
PMC170**XL**	330	763	576	450	856	350	492

Technical Data						
Type of machine		**PMC170S**	**PMC170M**		**PMC170L**	**PMC170XL**
Suspension	r	2:1				
Rated Load	Q [kg]	1050	1650			
Rated Speed max.	v [m/s]	1,6	1,0	1,6	1,75	2,0
Diameter of Traction Sheave	DT [mm]	320				
Diameter of Ropes	d [mm]	8				
Number of Grooves max.	z	10				
Type of Groove		seat / vee groove, hardened				
Rated Power	PN [kW]	9,7	9,8	15,6	17,1	19,5
Rated Torque	MN [Nm]	485	781			
Permitted radial Shaft Load	[kN]	30	42	40		42
Weight	[kg]	381	423	448		492
Number of Switching Operations		180				240
Duty Cycle	%	50				
Rated Current	IN [A]	23	27	40		45
Output Factor	cos φ	0,95	0,94	0,95		0,94
Version of Brake		2 x 1200 Nm, 2-surface disc brake in double configuration				
Brake Monitoring		1 microswitch per brake circuit				
Protection Class		IP 21				
Frequency inverter type	E300	300	350	470	660	
	MFC	31-26	31-40			31-60

Subject to techn. modifications. For further information please refer to the current product catalog PMC170 drive

DAF210M

EN 81-
20/-50
-conform

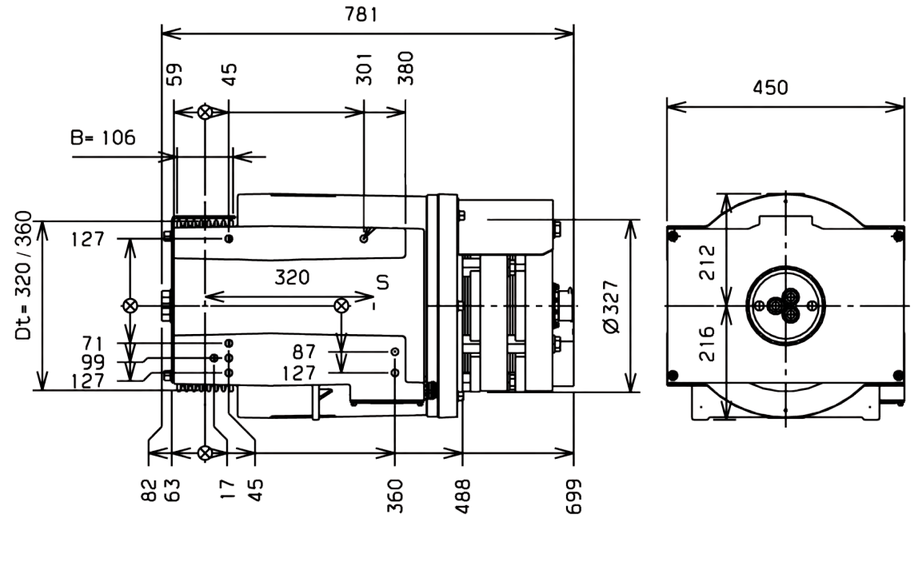


Technical Data										
Type of machine		DAF210M								
Suspension	r	1:1		2:1						
Rated Load	Q [kg]	450		630	700	630	700	630	700	630
Rated Speed max.	v [m/s]	1,0	1,6	1,0		1,6		1,75		2,0
Diameter of Traction Sheave	DT [mm]	320		360	320	360	320	360	320	360
Diameter of Ropes	d [mm]	8		8 / 9	8	8 / 9	8	8 / 9	8	8 / 9
Number of Grooves max.	z	5		5 / 4	5	5 / 4	5	5 / 4	5	5 / 4
Type of Groove		seat / vee groove, hardened								
Rated Power	PN [kW]	2,83	4,3	4,2	4,7	6,8	7,3	7,2	7,9	8,0
Rated Torque	MN [Nm]	450	430	378	380	382	365	370	360	
Permitted radial Shaft Load	[kN]	33 (≤ 75 1/min) / 37 (> 75 1/min)								
Weight	[kg]	250								
Number of Switching Operations		240	180	240						
Duty Cycle	%	50	60	50						
Rated Current	IN [A]	12,5	12,0	10,5	16,1	16,2	17,4	15,4	17,2	
Output Factor	cos φ	0,94		0,95	0,96	0,95				
Version of Brake		2-surface disc brake in double configuration (2 brake circuits)								
Brake Monitoring		1 microswitch per brake circuit								
Protection Class		IP 20								
Frequency inverter type	E300	150		220	172	220	172	220	172	
	MFC	31-15		31-26						

Subject to techn. modifications. For further information please refer to the current product catalog Mini gearless DAF210

DAF210L

EN 81-
20/-50
-conform

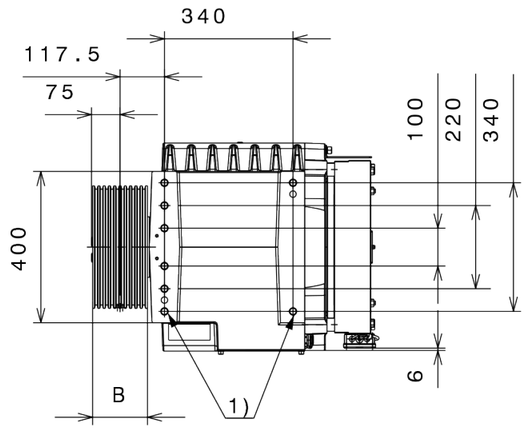


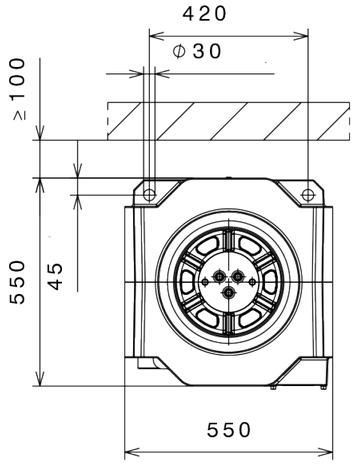
Technical Data										
Type of machine		DAF210**L**								
Suspension	r	1:1		2:1						
Rated Load	Q [kg]	630		630/900/1000/1125		630/900/1000/1125		1125		1000
Rated Speed max.	v [m/s]	1,0	1,6	1,0		1,6		1,75		2,0
Diameter of Traction Sheave	DT [mm]	320		520/400/360/320		520/400/360/320		320		360
Diameter of Ropes	d [mm]	8		8-13						
Number of Grooves max.	z	7		5-8						
Type of Groove		seat / vee groove, hardened								
Rated Power	PN [kW]	4,10	5,75	4,7/5,9/6,6/6,5/7,5		7,4/9,5/10,5/11,5		11,3/12,4		12,5
Rated Torque	MN [Nm]	650	575	610/590/586/520/600		600/595/590/575		580/565		563
Permitted radial Shaft Load	[kN]	for 320-, 360- and 400-traction sheave 38 (≤ 75 1/min) / 46 (> 75 1/min) for 520-traction sheave 37 (≤ 75 1/min) / 41 (> 75 1/min)								
Weight	[kg]	320/325/330								
Number of Switching Operations		240								
Duty Cycle	%	50								
Rated Current	IN [A]	16,0	14,0	15,4/15/15,2/13/16,8		23,4/23,2/23,0/25,5		25,7/25,1		25,0
Output Factor	cos φ	0,94	0,95	0,96/0,94/0,95		0,96/0,95/0,95		0,95/0,96		0,96
Version of Brake		2-surface disc brake in double configuration (2 brake circuits)								
Brake Monitoring		1 microswitch per brake circuits								
Protection Class		IP 20								
Frequency inverter type	E300	150		172		300				350
	MFC	31-15				31-26/40		31-40		

Subject to techn. modifications. For further information please refer to the current product catalog Mini gearless DAF210

DAF270S

EN 81-
20/-50
-conform





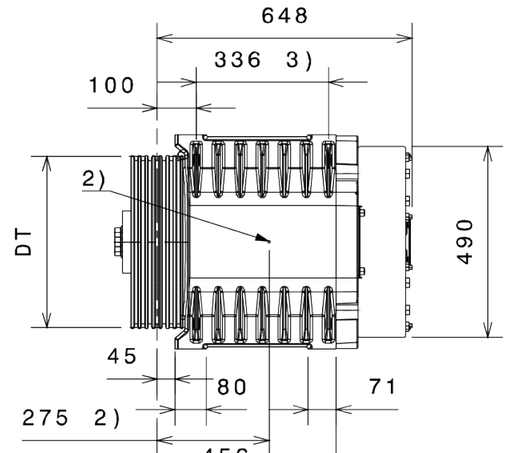
Technical Data

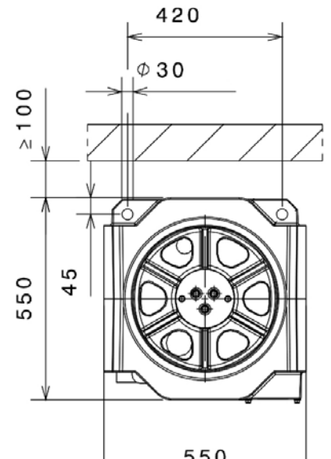
Type of machine		DAF270**S**				
Suspension	r	2:1				
Rated Load	Q [kg]	1250				
Rated Speed max.	v [m/s]	1,0	1,6	1,75	2,0	2,5
Diameter of Traction Sheave	DT [mm]	320				
Diameter of Ropes	d [mm]	8				
Number of Grooves max.	z	10				
Type of Groove		seat / vee groove, hardened				
Rated Power	PN [kW]	8	12,6	13,8	15	17,8
Rated Torque	MN [Nm]	640	630		600	570
Permitted radial Shaft Load	[kN]	43,5				
Weight incl. traction sheave	[kg]	475				
Number of Switching Operations	[F/h]	240				
Duty Cycle	[%]	50				
Rated Current	IN [A]	23	30,7		29,2	27,8
Output Factor	cos φ	0,94	0,95		0,96	
Version of Brake		2-surface disc brake in double configuration 2x1700 Nm option: with manual release				
Brake Monitoring		1 microswitch per brake circuit				
Protection Class		IP20, optional IP54				
Frequency inverter type	E300	300	470			
	MFC	31-26	31-40		21-50R	

Subject to techn. modifications. For further information please refer to the current product catalog Mini gearless DAF270

DAF270M

EN 81-
20/-50
-conform





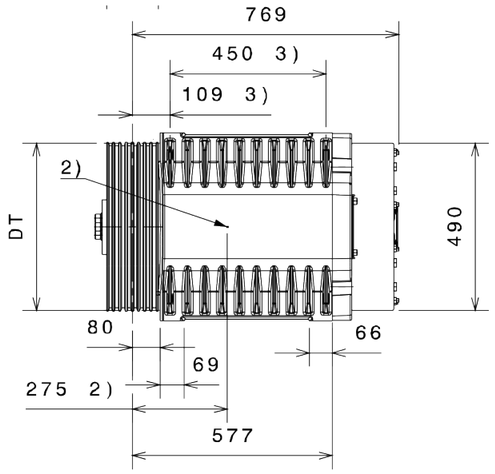
Technical Data

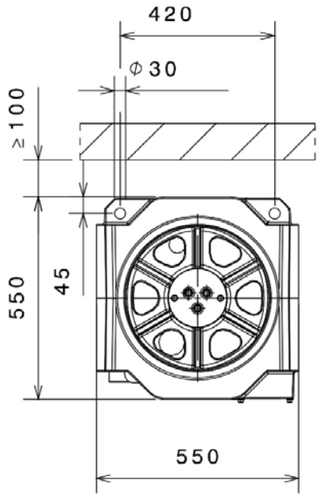
Type of machine		DAF270M																
Suspension	r	1:1						2:1										
Rated Load	Q [kg]	900	800	1000	900	800	1000	1350	2000	1350	1600	1350	1600		1150	1350	1600	
Rated Speed max.	v [m/s]	1,0			1,6			1,0		1,6		1,75		2,0		2,5		
Diameter of Traction Sheave	DT [mm]	440		320	440		320	520	440	520	440	520	440	520	440	520	440	
Diameter of Ropes	d [mm]	8-11																
Number of Grooves max.	z	7-9																
Type of Groove		seat / vee groove, hardened																
Rated Power	PN [kW]	5,4/7,4			7,8/10,6			9	11,4	13	15,3/14,9	14,2	16,3/16,7	15,8	18,2	16,6	19,5	21,6
Rated Torque	MN [Nm]	1200/1175			1075/1050			1175	1250	1050	1050/1025	1050	1025/1050	1025	1000	860	860	950
Permitted radial Shaft Load	[kN]	43,5/58																
Weight incl. traction sheave	[kg]	550/570																
Number of Switching Operations		180		240	180		240		180	240								180
Duty Cycle	%	40		50	40		50		40	50								
Rated Current	IN [A]	27,5	24,5	24	25	22	30	24	25,5	30	30/35	30	35/30,5	35	38/29	32,7	41,5/28,5	31,4
Output Factor	cos φ	0,96		0,94	0,92	0,93	0,95		0,94	0,95	0,95/0,94		0,95		0,96/0,95	0,96	0,95/0,96	0,96
Version of Brake		2-surface disc brake in double configuration 2x1250 / 2x1700 Nm option: with manual release																
Brake Monitoring		1 microswitch per brake circuit																
Protection Class		IP20, optional IP54																
Frequency inverter type	E300	300		220	300			350	470				660			470	660	470
	MFC	31-26/40						31-26	31-40			31-48	31-60					21-50R

Subject to techn. modifications. For further information please refer to the current product catalog Mini gearless DAF270

DAF270L

EN 81-
20/-50
-conform





Technical Data

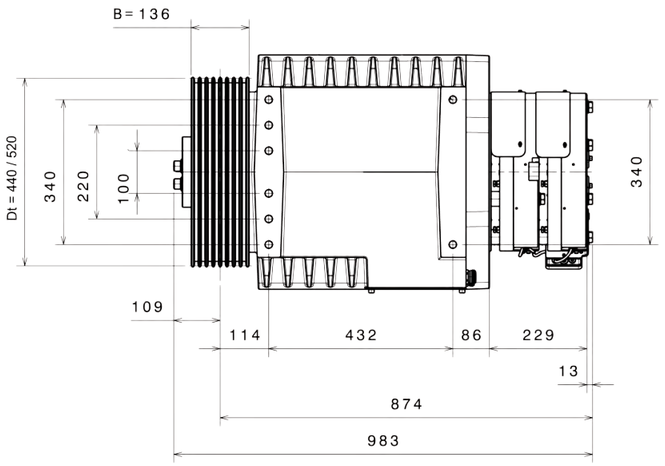
Type of machine		DAF270L (XL)								
Suspension	r	1:1	2:1							
Rated Load	Q [kg]	1100/1000	2000/2250/2500		1900	2000	1900	2200/2000	1700	1800/2000
Rated Speed max.	v [m/s]	1,0/1,6	1,0	1,6	1,75		2,0		2,5	
Diameter of Traction Sheave	DT [mm]	440	490/440		520	490	520	440/490	520	490/440
Diameter of Ropes	d [mm]	8-11	8-12							
Number of Grooves max.	z	7	6-10							
Type of Groove		seat / vee groove, hardened								
Rated Power	PN [kW]	6,6/10,1	11,7/12,8/14,6	18/20,4/23,3	1,8	20	21,2	24,6/22,5	25,1	26,5/30
Rated Torque	MN [Nm]	1475/1400	1433/1400/ 1600	1375/1400/ 1600	1400		1375	1350/1375	1300	1300/1325
Permitted radial Shaft Load	[kN]	58								
Weight	[kg]	730/740								
Number of Switching Operations		240	240/180		180		240			240/180
Duty Cycle	%	50		50/40	50					
Rated Current	IN [A]	26/24,5	25/36/41/28	42,5/43,5/36/ 50/41	43,5		60	41,5/60/ 35/60	58	58/40/59
Output Factor	cos φ	0,96	0,96/0,95	0,96/0,94	0,95		0,96			
Version of Brake		2-surface disc brake in double configuration 2x1700 option: with manual release								
Brake Monitoring		1 microswitch per brake circuit								
Protection Class		IP20, optional IP54								
Frequency inverter type	E300	660					770			
	MFC	31-40		31-60	31-60	31-60 / 21-105				

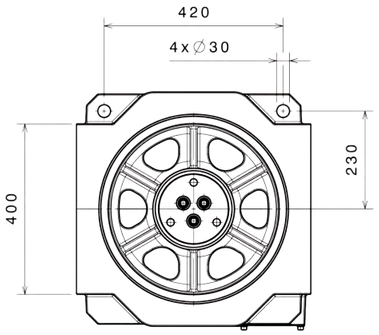
Subject to techn. modifications. For further information please refer to the current product catalog Mini gearless DAF270

DAF270XL

EN 81-
20/-50
-conform

Option: with manual release





Technical Data

Type of machine		DAF270XL					
Suspension	r	1:1	2:1				3:1
Rated Load	Q [kg]	1100/1000	1800/2000/2250/2500		2200	2000	4000/3400
Rated Speed max.	v [m/s]	1,0/1,6	1,0	1,6	2,0	2,5	1,0/1,6
Diameter of Traction Sheave	DT [mm]	440	520*/440		440		
Diameter of Ropes	d [mm]	8-11	8-13				
Number of Grooves max.	z	7	6-10				
Type of Groove		seat / vee groove, hardened					
Rated Power	PN [kW]	6,6/10,1	12,2/12,8/14,6	17,3/20,4/23,3	24,6	30	22,5/30,5
Rated Torque	MN [Nm]	1475/1400	1400/1600		1350	1325	1650/1400
Permitted radial Shaft Load	[kN]	73					
Weight	[kg]	770/780					
Number of Switching Operations		240	240/180		240	240/180	
Duty Cycle	%	50		50/40	50		50/40
Rated Current	IN [A]	26/24,5	36/41/28	43,5/36/50/41	41,5/60	59	42,5/51,5/62
Output Factor	cos φ	0,96	0,96/0,95	0,96/0,94	0,96	0,93	0,96/0,94
Version of Brake		2-surface disc brake in double configuration 2x2200 option: with manual release					
Brake Monitoring		1 microswitch per brake circuit					
Protection Class		IP20, optional IP54					
Frequency inverter type	E300	660			770	660	
	MFC	31-40		31-60	31-60		21-105

Subject to techn. modifications. For further information please refer to the current product catalog Mini gearless DAF270

Machine base frame for PMC - Gearless

ModKit MO61 D4

For more information see description ModKit MO61 D4

Technical Data			
Frame		**MODKit MO61 D4**	
Machine		PMC145-2 M, L, XL	
Suspension	r	1:1	2.1
Rated load	Q [kg]	up to 630	up to 1000
Rated speed	v [m/s]	up to 1,6	
Rope departure at drive flexible	[mm]	600 ≤ ASL ≤ 1400	
Diameter of traction sheave	DT [mm]	240	
Diameter of ropes	d [mm]	6 / 6,5	
Number of ropes max.		12	
Number of grooves max.	z	12	
Type of groove		seat / vee groove, hardened	
Pulley diameter	DT [mm]	240	
Vibration isolation elements		Yes	
Integrated rope end fastening points, rope anchorages		No (1:1)	Yes
Manual release, optional		Yes	
Hoist		Yes	

* ► Pre-assemble machine base frame on stock
► Machine available from stock

Machine base frame for DAF - Gearless

DAF210 on TW63B
machine base frame

DAF270 on
machine base frame

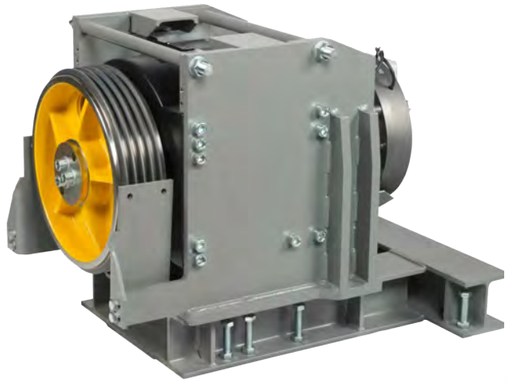
Technical Data				
Frame		**DAF210 on TW63 machine base frame**		**DAF270 on TW130 machine base frame**
Machine		DAF210M	DAF210L	DAF270S/M/L
Suspension	r	1:1		
ASL-dimension flexible*	[mm]	481 - 1073	501 - 1097	522 - 1297
Diameter of traction sheave	DT [mm]	320 / 360	360 / 400	320 / 360 / 440
Diameter of ropes	d [mm]	8 / 10		8 / 10 / 11
Vibration isolation elements		Yes		
Adapter plat		Yes		
Rope guard optional		Yes		
Manual release optional		Yes		

* ASL-dimension is dependent on the traction sheave

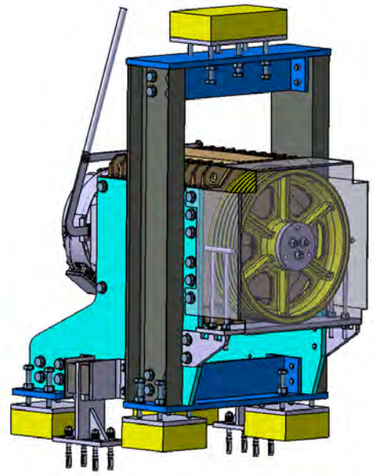
Further special frames on request. Contact us!

Modernisation solution "Geared to Gearless"

DAF210



DAF270



A flexible solution, adjustable to the specific situation of the machine room

Existing situation		Possible solution
Szenario 1		
Geared drive with extended shaft (SA9), Traction sheave located in the lift shaft and machine room located beside the lift shaft.	→	A gearless drive is installed in the already existing opening. The machine frame is especially designed to provide support upwards and downwards.
Szenario 2		
Geared drive is mounted below the lift shaft, the machine room is located under the lift shaft, rope departure in upward direction.	→	The gearless machine frame is especially designed for rope departure in upward direction. A support with isolations is included.
Szenario 3		
Geared drive is mounted above the lift shaft, the machine room is located abovethe lift shaft, rope departure in downward direction.	→	The gearless machine frame is especially designed for a rope departure in downward direction. A support with isolations is included.

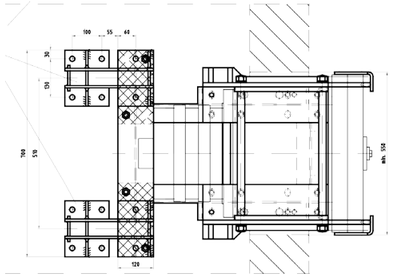
Mini-Gearless

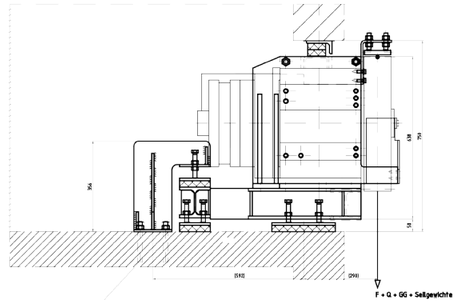
Modernisation solution "Geared to Gearless"

Example with DAF210L

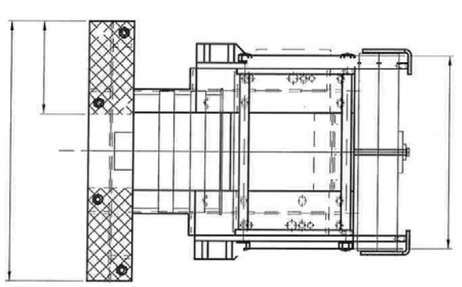
Gearless

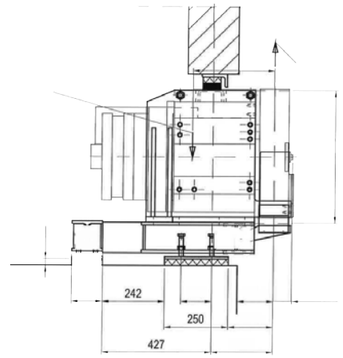
Rope departure in downward direction:





Rope departure in upward direction:





Advantages of this example:

- Energy-efficient Gearless Technology
- No additional safety gears required as the brake of the machine is certified for the overspeed in upward direction
- no replacement of the rope pulleys in the lift shaft required

Usage parameters:

Q ≤ 630 kg / 2:1 / 1,0 m/s / diameter = 520 mm / 13 mm ropes

Own Notes

MO61
Solutions with PMC Gearless

MO61 D4
Product Description

The powerful system solution in the modernisation of installations up to 1000 kg / 1.0 m/s (1:1) or up to 1000 kg / 1.6 m/s (2:1).

Safety

- Type-approved safety brake
- EN 81-20/-50 compliant
- Integrated device for pulling out of the safety gear (optional)

Efficiency
- High level of efficiency of up to 92% provides for low energy consumption
- Ideally suited for energy recovery

Comfort
- Minimal noises and very smooth running
- Outstanding ride comfort, e.g. in combination with a matched frequency inverter from LiftEquip

Sustainability

- Small quantities of lubricants used and no oil change required
- Rolling bearings, life-time lubrication

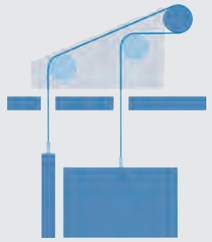
Innovation
- Well-conceived, flexible solution with integrated deflecting pulleys, rope fixing points and mountings on elevator car / counterweight
- Drives optimally matched to the lower to middle power segment
- Ideal for use in modernisation in exchange for a geared drive in the machine room, general without structural adaptations

Scope of supply

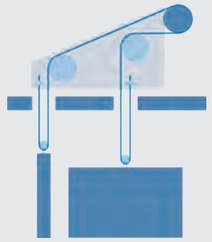
- Gearless drive: Gearless PMC145-3
- Machine base frame with elements for vibration isolation
- Additionally for 2:1: integrated rope suspension and universal diverter pulley mounting for car and counterweight
- Protective covers on traction sheave and diverter pulleys in acc. with EN 81-1 inclusive

Reliability
- All installed components and parts are high quality
- Ensuring a rapid and long lasting spare parts availability

IAvailable in versions for 1:1 or 2:1 rope suspension:



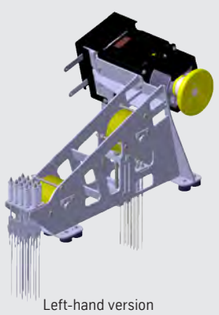
Suspension 1:1



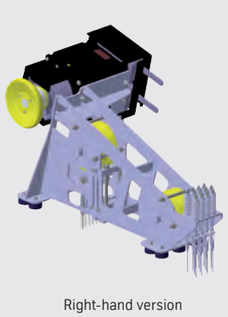
Suspension 2:1

As a rule the previous ceiling openings can be used to feed through the ropes with the machine base frame that can be individually adapted to the existing project planning. This avoids costly structural measures.

Available in left- or right-hand version::



Left-hand version



Right-hand version

ModKit

MO61 D4
Product Description

Gearless

Gearless PMC145-3

Powerful and compact
Exclusively the modern, tried-and-tested synchronous gearless drives of the PMC145-3 and PMC170 series are used in the ModKit MO61.

The low-noise and low-vibration drives operate at air-borne noise levels of less than 60 dB(A). The efficiency levels extend up to 92% and are therefore particularly efficient in both driving and generator operation with energy recovery. The PMC drives are designed for 180 trips per hour with a duty cycle of 50% and can therefore easily cope with high traffic volumes.

The traction sheaves have a diameter of 240 mm with wearresistant, hardened seat grooves. Ropes with diameters of 6 mm are used. The ratio between traction sheave diameter and rope diameter is thus always 40. In accordance with the standards the particu-larly favourable conditions for long-life design are therefore satisfied.

The PMC gearless drives have a type-approved safety brake. This eliminates the need during modernisation for additional measures, e.g. retrofits on the elevator car or a rope brake.

Braking device against overspeed according to EN 81-20 /5.6.6 and against unintentional movement of the car according EN 81-20 /5.6.7.

High energy efficiency

E300 frequency inverter

The perfect combination:
E300 frequency inverters
The ModKit MO61 is rounded off if required by a compact, optimally matched E300 series frequency inverter in which all the drive parameters of the gearless drive are already stored.

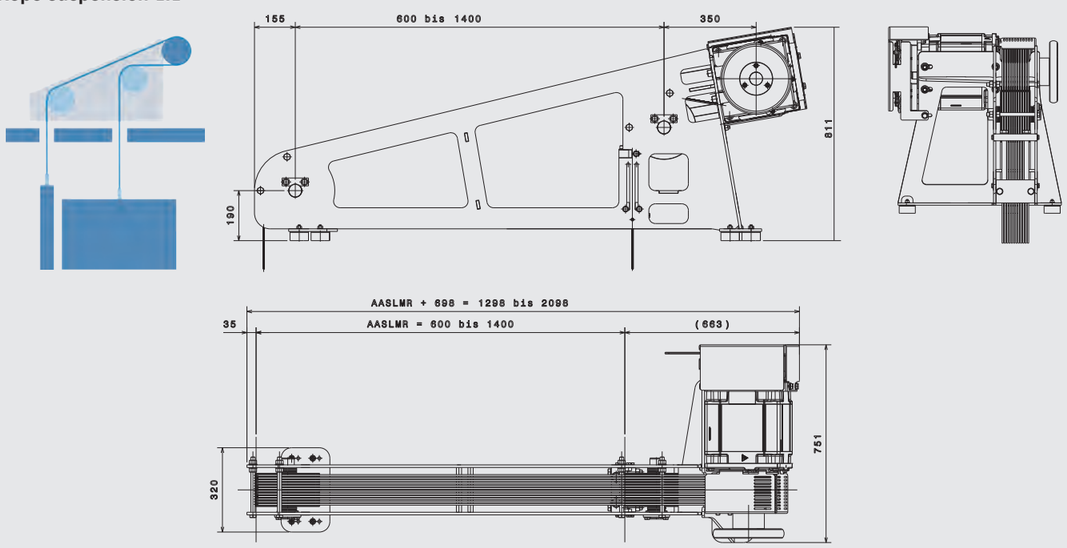
If required, you can operate the drive with an M600 series frequency inverter with integrated energy recovery unit. When the drive is in generator operation, electrical energy is fed back to the in-house system and additionally increases the efficiency of your installation.

The frequency inverters from LiftEquip are specially designed for the strict re-quire-ments in elevator construction. The high clock frequency and control quality ensure a high degree of smooth running of the drive and low noise development.

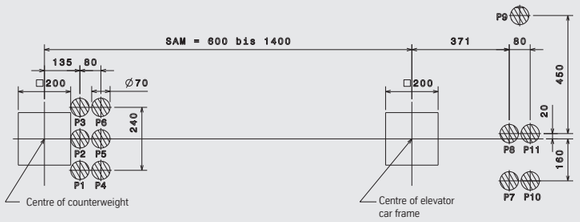
MO61 D4 Technical specifications – Rope suspension 1:1
with PMC145-3

Gearless

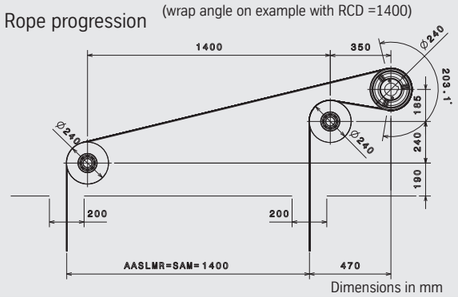
Rope suspension 1:1



Openings and load points in the machine room



Rope progression (wrap angle on example with RCD =1400)



Dimensions in mm

Performance chart (rope suspension 1:1)

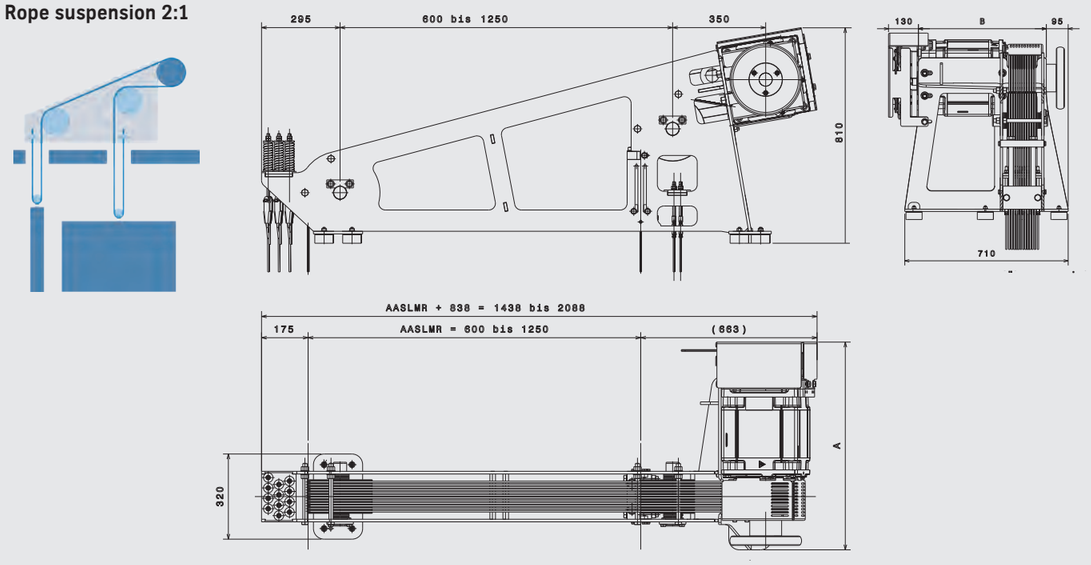
Nominal load max	Q	[kg]	320	450		630
Nominal speed	v	[ms]	0.6 - 1.0	0.6 - 1.0	1.6	0.6 - 1.0
Drive, gearless	PMC		145-3M	145-3L	145-3XL	145-3L
Rope suspension	r		1:1			
Travel height*.	FH	[m]	33			25
Car weight min./max.	FK	[m]	300 - 650	400 - 900		650 - 900
Rope clearance dimension	SAM	[mm]	600 - 1400			
Diameter, traction sheave	D_T	[mm]	240			
Suspension ropes	n x d_S	[mm]	8 x 6	12 x 6		
Diameter, diverter pulleys	D_A	[mm]	240			
Weight, drive	m_A	[kg]	172	216	229	216
Weight, sling	m_R	[kg]	max. 150			

*approximate value

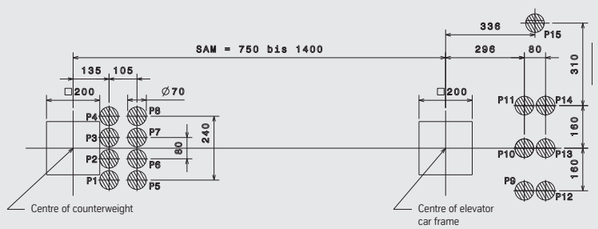
MO61 D4, Technical specifications – Rope suspension 2:1
with PMC145-3

Gearless

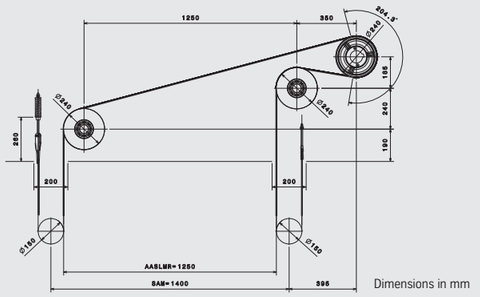
Rope suspension 2:1



Openings and load points P in the machine room



Rope progression (wrap angle on example with RCD = 1250)



Dimensions in mm

Performance chart (rope suspension 2:1)

Nominal load max	Q	[kg]	630		1000	
Nominal speed	v	[mm]	0.6 - 1.0	1.05 - 1.6	0.6 - 1.0	1.05 - 1.6
Drive, gearless	PMC	-	145-3M	145-3XM	145-3L	145-3XL
Rope suspension	r		2:1			
Travel height*	FH	[m]	33			
Car weight min./max.	FK	[m]	600 - 1200		870 - 1450	
Rope clearance dimension	SAM	[mm]	750 - 1250			
Diameter, traction sheave	D_T	[mm]	240			
Suspension ropes	n x d_S	[mm]	9 x 6		12 x 6	
Diameter, diverter pulleys	D_A	[mm]	240			
Weight, drive	m_A	[kg]	172	189	216	229
Weight, sling	m_R	[kg]	max. 150			

*approximate value

MO61 D4

Scope of Supply

SC-Series

Gearless

We supply a flexible modification set, consisting of the components

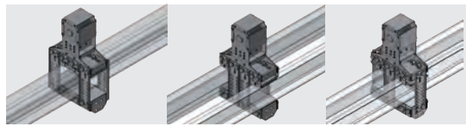
- Permanent-magnet, gearless synchronous machine:
  Gearless PMC 145-3
- Machine base frame with vibration isolation elements, in acc. with VDI 2566
  - for rope suspension 1:1
  - for rope suspension 2:1, integrated rope end fastening points, rope anchorages
  - Machine base frames are individually manufactured to the desired rope clearance dimension RCD
  - Both versions (1:1 and 2:1) are available in the left- or right-hand version
- Integrated plastic rope deflecting pulleys
- Variant for rope suspension 1:1:
  - Optional: Universal, highly flexible mounting with rope fixing points for car and counter weight
- Variant for rope suspension 2:1:
  - Universal, highly flexible mounting with diverter pulleys for car and counterweight
  - Complete rope kit: suspension ropes with dia. 6 mm, expert's report, conformity-tested with Directive 95/16/EC “Lifts / Elevator Directive”, all rope accessories
- Optional:
  - Device for pulling the car out of the safety gear
  - Optimally matched MFC or E300 series frequency inverter

Integrated device for pulling the car out of the safety gear (optional)

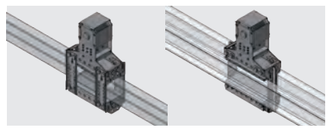
Diverter pulley mounting for car and counterweight (suspension 2:1)

Universal diverter pulley mounting
The pulley supports are fixed to the top beam of the elevator car sling and to the counter-weight. The freely rotatable suspension enables the diverter pulley to be mounted to match the rope suspension so that the ropes are not subjected to twisting.

Mounting on car sling, variable adaptation dep. on mounting profiles



Mounting on counterweight, variable adaptation dep. on frame profiles



Gearless

Compact-Gearless

SC
Product Description

regeneration

EN 81-
20/-50
-conform

Performance Matrix

The synchronous COMPACT-Gearless SC300B is our workhorse for superior lifts. Capable of rated loads up to 1600kg with 2:1 suspension or for operating speeds up to 3.5m/s.
The synchronous COMPACT-Gearless SC400B is the drive for high-speed lifts and heavy loads. Capable of rated loads up to 2750 kg with 2:1 suspension or for operating speeds up to 4.0 m/s.
The SC500 rounds the performance spectrum of the SC series upwards with speeds of 4.0 to 5.0 m/s at nominal loads of 630 to 1800 kg (1:1).

Excellent Motor Control
The vector controlled, synchronous machines with permanent magnet excitation are known for outstanding driving comfort. They are available in several power classes ranging from 10 kW up to 24.8 kW and as standard in protection class IP 43 for SC300B. The SC400B is available in several power classes ranging from 19.4 kW up to 48.6 kW and IP20 as standard protection class.
The power spectrum of the SC500 ranges from 63 kW to 104 kW with protection class IP21.

Compact Design
As synchronous machine with a monobloc housing the SC-Series is very space-saving in both the S- an the M-version.

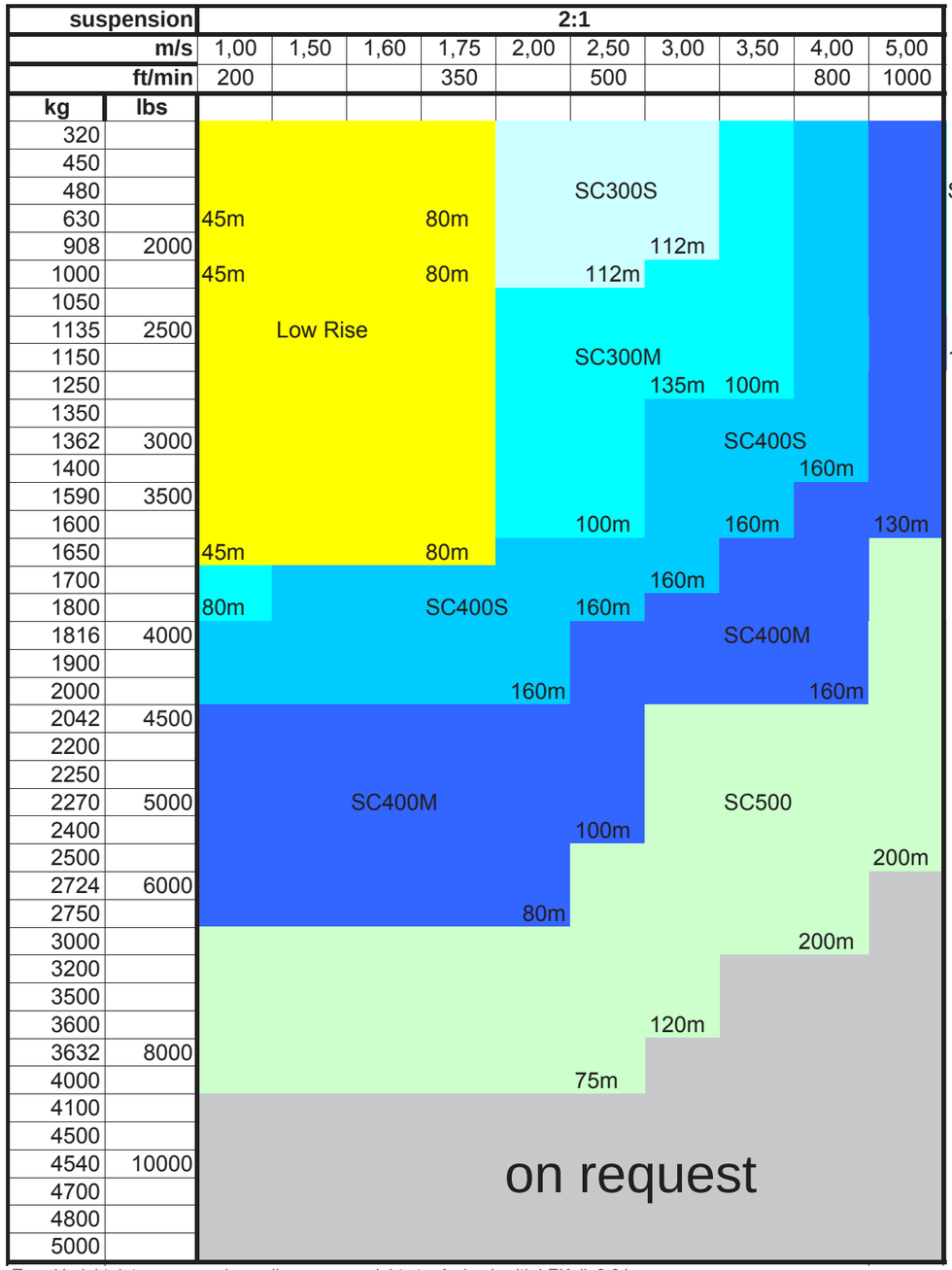
Double Safety
The type-tested dual-circuit disc brake ensures safety at the best. This device is certified as safety brake according to the European standard for lifts EN 81-20/-50. An additional and costly braking system for upwards braking operation is thus not necessary.

Super Quiet Machine
Thanks to its excellent efficiency the SC300B can pass on an additional ventilation. This results in a comfortable low sound-pressure level.

Package Solution
High precision machine frames facilitate the construction of lifts with double wrap. If desired you can also obtain a frame for single wrap.

Maintenance-Free
Due to its design our COMPACT-Gearless has a small number of mechanical components. In addition, since no oil is needed, a positive effect on maintenance and product life is achieved.

suspension		2:1									
m/s		1,00	1,50	1,60	1,75	2,00	2,50	3,00	3,50	4,00	5,00
ft/min		200			350		500			800	1000
kg	lbs										
320											
450											
480											
630											
908	2000										
1000											
1050											
1135	2500										
1150											
1250											
1350											
1362	3000										
1400											
1590	3500										
1600											
1650											
1700											
1800											
1816	4000										
1900											
2000											
2042	4500										
2200											
2250											
2270	5000										
2400											
2500											
2724	6000										
2750											
3000											
3200											
3500											
3600											
3632	8000										
4000											
4100											
4500											
4540	10000										
4700											
4800											
5000											



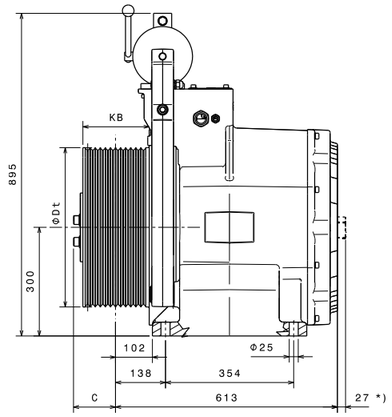
Travel height data can vary depending on car weight etc. A check with LEKalk 3.0 is necessary.

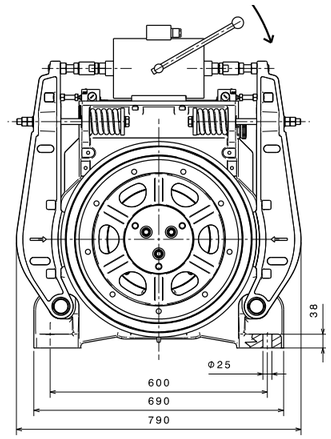
Gearless

SC300B

regeneration

EN 81-
20/-50
-conform





SC300 auf Maschinenrahmen

	ΦDt	KB	C	SP
SC300S	410	152	115	250
SC300M	440	180	118	254

*) nur bei Option zweiter Drehgeber bei SC300M/
only for version with second encoder for SC300M

Technical Data

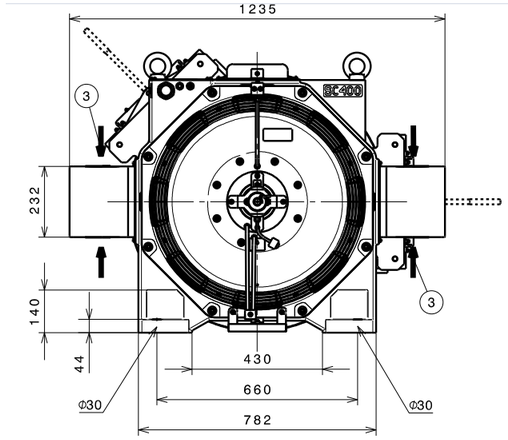
Type of machine		S003		S004			M000	M001			M002		M005	M006
Suspension	r	2:1												
Rated Load	Q [kg]	1000				900	1800	1600			1350	1600	1250	
Rated Speed max.	v [m/s]	1,6	1,75	2,0	2,5	3,0	1,0	1,6	1,75	2,0	2,5		3,0	3,5
Diameter of Traction Sheave	DT [mm]	410					440							
Diameter of Ropes	d [mm]	10												
Number of Grooves max.	z	8												
Type of Groove		seat / vee groove, hardened												
Rated Power	PN [kW]	10,0	11,0	12	14,2	15,0	10,7	15,3	16,7	18,2	19,5	21,6[1)]	21,3	24,8
Rated Torque	MN [Nm]	640		616	582	512	1175	1050		1000	860	950	780	
Number of Switching Operations		240												
Duty Cycle	%	60												
Rated Current	IN [A]	23		30	29	25	24	30,5		29	28,5	31,4	31,2	36,5
Output Factor	cos φ	0,95		0,96			0,94	0,95		0,96				
Brake Monitoring		Ventilation monitoring / Wear monitoring (microswitch)												

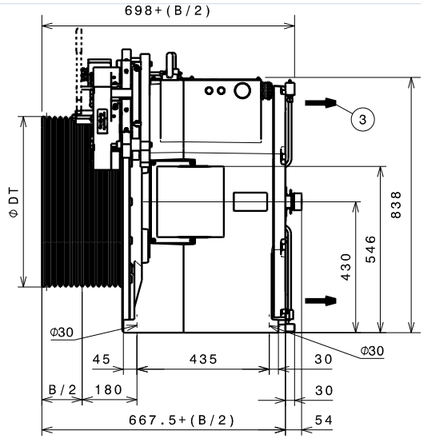
1) With current limitation to 100 A

SC400B

regeneration

EN 81-
20/-50
-conform





Technical Data

Type of machine		M011	S004		M001		M008	S004	S007		S005	S003	M011	M012	M009		M010		M014
Suspension	r	1:1						2:1											
Rated Load	Q [kg]	1150	1000		1590			2000	1800	1700	1600	1400	2750	2500	2000		2000		1600
Rated Speed max	v [m/s]	3,5	4,0		1,52	1,78	2,54	2,0	2,5	3,0	3,5	4	2	2,5	3		3,5	4	5
Diameter of Traction Sheave	DT [mm]	560			440			440					560						
Diameter of Ropes	d [mm]	13			10			10					14						
Number of Grooves max.	z	14			9			9					13/14						
Type of Groove		seat / vee groove, hardened[1)]																	
Rated Power	PN [kW]	24	24,5	23	14,8	17,2	23,7	23	26	31	32	33	29,5	34		34,5	40	46	47
Rated Torque	MN [Nm]	1926	1720	1615	2135		2060	1615	1452	1444	1279	1154	2071	1899	1900	1607	1598	1609	1316
Number of Switching Operations		240																	
Duty Cycle	%	50						60											
Rated Current	IN [A]	46	41	36,5	50		55	36,5	50		51	50	49	54	63	54	72		74
Output Factor	cos φ	0,93		0,94	0,93		0,94	91,1	91,3	90,7	91,1	91,4	0,93	0,95		0,96	0,96		0,95
Brake Monitoring		Ventilation monitoring / Wear monitoring (microswitch)																	

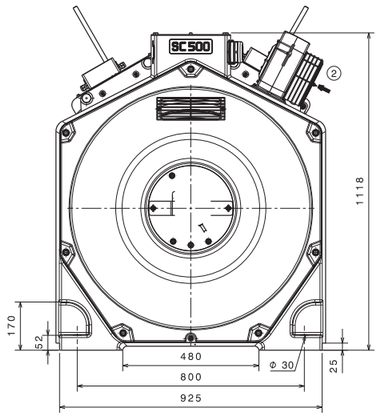
1) Optional double wrap with semicircular groove

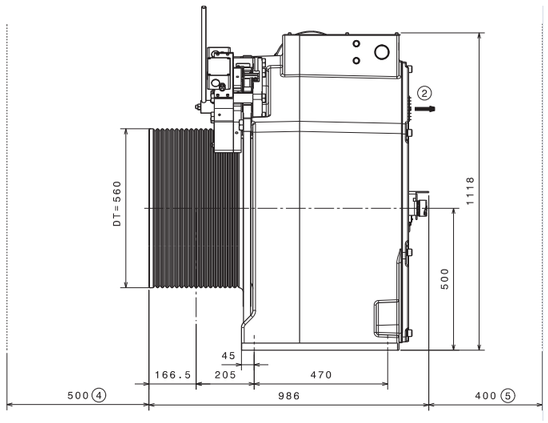
SC500

regeneration

EN 81-
20/-50
-conform

DAB-Series





Technical Data						
Type of machine		M001	M002	M003	M004	M005
Suspension	r	1:1			2:1	
Rated Load	Q [kg]	1800	1600		3000	2500
Rated Speed max	v [m/s]	4,0	5,0	6,0	4,0	5,0
Diameter of Traction Sheave	DT [mm]	560				
Diameter of Ropes	d [mm]	13				
Number of Grooves max.	z	8 - 10				
Type of Groove		seat / vee groove, hardened[1)]				
Rated Power	PN [kW]	63	93	104	76	102
Rated Torque	MN [Nm]	4400	5200	4850	2650	2850
Number of Switching Operations		240				
Duty Cycle	%	50				
Rated Current	IN [A]	105	163	176	110	149
Output Factor	cos φ	0,87	0,83	0,85	0,95	
Brake Monitoring		Ventilation monitoring / Wear monitoring (microswitch)				

1) Optional double wrap with semicircular groove

External Rotor Gearless

DAB
Product Description

EN 81-
20/-50
-conform

regeneration

DAB530

Gearless

General description

The DAB external rotor gearless systems consist of the following main assemblies:

- Pedestal bearing AS with add-on lifting magnets, braking device and terminal box
- Pedestal bearing BS
- Axle screw-connected to pedestal bearing AS and BS.
- Traction sheave with integrated brake disc mounted on roller bearings on axle
- Rotor with vanes bolted onto both sides of the traction sheave
- Stator screw-connected with axle
- Protective hood for cover of rotor and vanes
- The pedestal bearings are fixed via the machine base frame. In the case of separate transport without the machine base frame, a transport frame is required.

The DAB external rotor gearless systems correspond to description IM B3 in accordance with EN 60034-7 and comply with the European standard.

The machines are conceived for the machine room for various rope pull directions in combination with the standardised machine base frame. Deviating rope pull directions (e.g. vertically upwards or horizontally) must be technically tested

The roller bearings for traction sheave mounting can be re-lubricated via lubrication nipples.

The machines are configured for thermal class F and are used according to class B. Thermal monitoring is by means of a PTC thermistor (130 °C ± 5 °C).
For cooling the machine, there are fan wheels on both sides of the rotor for self-cooling.

Brake

The redundant brake (unit type: outside brake shoe) of the machine consists of two separately arranged brake circuits (brake shoes with compression springs) that directly affect the brake disc. The brake serves as the operational brake and additionally performs the function of a braking device for protection of the upwardly moving elevator car against overspeed in accordance with EN81-20/5.6.6 and against unintended movements of the elevator car in accordance with EN81-20/5.6.7.

The brake circuits can be manually released individually or jointly with a plug-in brake release lever.

The brake circuits are released electromagnetically during operation via lifting magnets. The brake circuits are each equipped with a test switch for monitoring (brake release and brake lining wear). Moreover, each brake has an integrated overvoltage suppressor circuit (varistor).
For the electric connection, a terminal box with terminal strip and cable gland are fitted on each lifting magnet.

The braking device with the brake test switches is part of the type approval.

Traction sheave

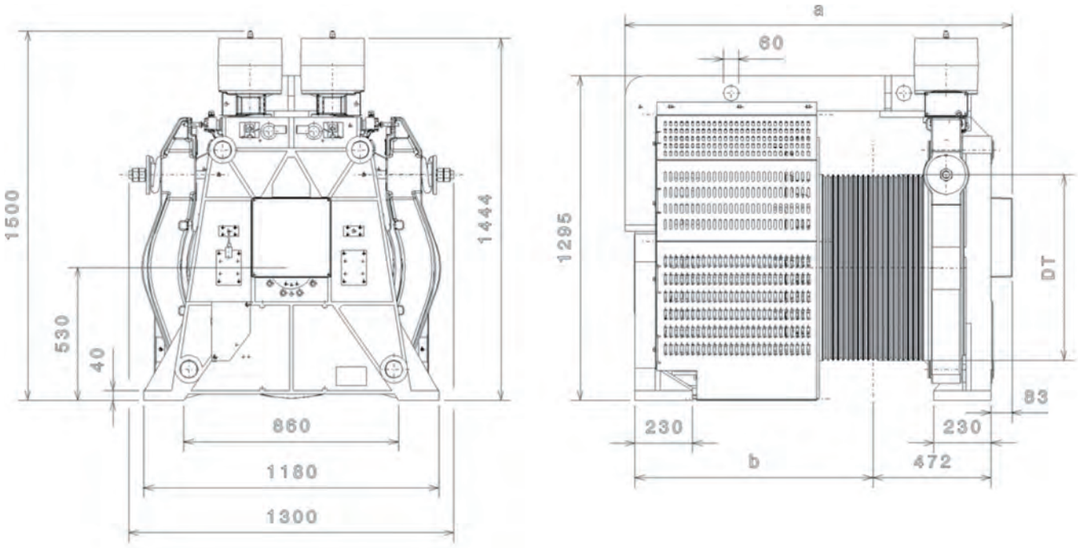
The DAB external rotor gearless systems have a traction sheave mounted on roller bearings with integrated brake disc.

- Version with semi-circular grooves preferably with DW.
- Version with seat and vee grooves preferably with SW.

Different diameters of traction sheave are available for DAB530L/XL.

Actual-value sensor

The speed of the DAB external rotor gearless is picked up by a magnetic encoder with square wave pulses built into the pedestal bearing AS.
For additional safety monitoring, a second pulse encoder of the type for speed monitoring is possible as an option.



Technical DataDAB530*							
Machine		DAB530L				DAB530XL	
Suspension	r	1:1		2:1			
Rated load	Q [kg]	2400	2250	5000	4500	4700	4100
Rated speed	v [m/s]	3,5	4,0	2,0	2,5	3,5	4,0
Diameter Traction Sheave	DT [mm]	700				740	
max. Numbers of Grooves	z	20 x Ø 16 // 20 Ø 5/8 “ // 14 x Ø 18					
Type of Groove		seat / vee / semicircular groove					
Rated Power	PN [kW]	50,6	57,5	64,0	77,3	88,5	
Rated Torque	MN [Nm]	5040		5600	5430	4670	4083
permitted radial Axle Load	[kN]	450					
Weight	[kg]	4000				4300	
Number of Operations		240					
Duty Cycle	%	60					
Rated Current	IN [A]	103	106	115	132	169	164
Output Factor	cos φ	0,77	0,82	0,83	0,86	0,77	0,8
Version of Brake		external dual circuit shoe brake					
Brake Monitoring		temperature monitoring					
Protection Class		IP20					

* Standard values

Colouring for all Drives
and machine frame

RAL 7021 – Black grey

RAL 7005 – Mouse grey

The paintwork of drives is the environmentally friendly hydro-paint in the colour RAL 7021 (Black grey).

Advantages of the new hydro-paint:

- Two-component water-based paint with higher impact strength
- Complies with the VOC Directive (Volatile Organic Compounds) and thus very environmentally compatible
- Resistant to solvents, alkaline solutions and synthetic oils

Colour of the machine base frames

The machine base frames will continue to be supplied with a high-quality powder coating in a colour similar to RAL 7005 (Mouse grey). A polyester epoxy powder mix with a coating thickness of approx. 60 µm is used. Galvanised add-on parts are not painted.

This changeover means that the drives and the optional machine base frame will consistently have a technologically superior and environmentally compatible surface coating. It will also lend the entire drive unit an even more attractive appearance.

Drive Accessories

Brake Control for Operational Brakes and NBS

In gearless and geared drives

BS3

Drive Assessories

The operational brakes and NBS systems of the gearless and geared drives are closed in de-energised condition. To enable the brake to be opened, the brake magnets of the two brake circuits must be energised. Depending on the brake design, the brake is opened with high-speed excitation and kept open with reduced voltage. There are also brakes that are opened without high-speed excitation.

Selection of the brake control for different brakes depends on the high-speed excitation voltage and holding voltage required and the current needed.

The table below shows the assignment of the drives with brakes to the different brake controls:

Overview brake control, assigned to drive.

			BS 3	BSV 2	BSV 2	BSV 4	BSV 1
Drive unit			(50-60 Hz)	(50 Hz)	(60 Hz)	(50 Hz)	(50-60 Hz)
The brake circuits are connected in series. Exceptions DAF210L with manual release.			180/90V, 207/104V, 207/207V, 207/144V	180/90V	180/90V	207/144V	2,0-7,8A
			6510 000 9263	65 100 27 68 0	6510 000 9262	6510 000 92 65	65 000 06 67 0
Geared machine	TW45C	180/90V	x	x	x		
	TW63B		x	x	x		
	TW130		x	x	x		
	TW130 200Nm			x	x		
	TW160			x	x		
	W322C						x
Gearless machine	DAF210	207/104V	x				
	DAF210, manually released*	207/104V 207/207V	x				
	DAF270	207/207V	x				
	DAF270, manually released*		x				
	DAF270XL 2x2200Nm	180/90V					x
	SC300		x	x	x		
	SC400						x
	SC500	207/144V					x
	PMC125		x			x	
	PMC145-3		x			x	
	PMC145-2, manually released*		x			x	
	PMC170		x			x	
	PMC170, manually released*		x			x	
	DAB450/530	180/90V					x

*) with optional manual release

When using the drives with the MFC 30/31-xx inverters in plug&play design, the brake control is integrated in the inverter. For the E300 inverter, the brake control modules are recommended.
The different brake controls with their technical data are described below.

Brake control 3 serves to activate brake magnets for elevator drives.

Design
Brake control 3 consists of a control board, an integrated power filter and the
connection terminals for mounting on a top hat rail.

Operation
The direct voltage required for the brake magnets is generated via a bridge
rectifier and downstream pulse width modulation with output filter. A varistor
protection circuit is provided at the output.
An integrated power filter ensures compliance with the EMC limit values.

Technical Data	
Part number:	6510 000 9263
Nominal system voltage:	230 V AC
Line fuse (glass fuse on the PCB)	230V F,4AT
Frequency of system voltage:	48-63 Hz
Braking voltages:	• 180/90V • 207/103V • 207/144V • overexcitation continously on 180V or 207V • additional freely programmable braking voltage
Nominal output current:	1,5 A
Maximum output current:	3 A (for overexcitation time, max. 2 sec.)
Switch ON duration:	100 % ED; 60% ED with continuous overexcitation
Level of protection:	IP20
Ambient operating temperature:	0° - 50°C
Relative air humidity:	no condensation 10…95%r.H., annual mean 70 %
Max. site altitude above sea level:	1000 m without derating
EMC check:	compliance with EN 12015 and EN 12016
Mounting:	top hat rail
Dimensions (LxBxH)	170 x 125 x 78 mm
Weight	approx. 1,00 kg

BSV2 and BSV4

BSV1

The brake control 2 and 4 is used to activate brake magnets for elevator drives with rated currents of 0.25 - 1.25 A

Structure
The brake control 2 and 4 consists of a control board, a power filter and the connection terminals. The components are mounted on a steel bracket and covered with a perspex sheet to prevent human contact with live parts.

Operation
The direct current for the brake magnets is generated via a semi-controlled bridge rectifier. The bridge rectifier is activated by a phase-control module. The bridge rectifier is equipped with a free wheeling diode as well as a varistor protection circuit at the output. An integrated power filter ensures compliance with the EMC limit values. After applying the mains voltage (230 V AC), there is an output voltage according to Table 1 at the output of terminal 10 - and terminal 20 + . Connecting connections 10 and 22 reduces the output voltage after approx. 1 second to approx. retentive voltage.

Technical data Brake control 2 and brake control 4			
	Brake control 2	Brake control 2 60Hz	Brake control 4
Part number	65 100 27 68 0	6510 000 9262	6510 0009265
Nominal system voltage:	230VAC		
Line fuse (glass fuse on the PCB)	230V F 3,15A		
Frequency of system voltage:	50Hz	60Hz	50Hz
Output voltage (retentive voltage)*	90V	90V	144V
Overexcitation voltage*	180V	180V	200V
Output current	max. 2,5A		
Activation period	100% ED		
Type of protection	IP00		
Ambient operating temperature	0° - 50°C		
Relative air humidity:	max. 70%		
max. site altitude amsl	2000m without derating (derating above this to 3500m: derating 1% pro 100m		
EMV check	The requirements of EN 12015 and EN 12016 are complied with		
Dimensions L*B*H	180mm*120mm*103mm		
Weight	1,1 kg		

* all data refer to the rated connection voltage

The brake control BSV1 is designed for activating brake magnets at rated currents of 2.0 A to 7.8 A. With BSV 1 the preselected current will always flow independent of line voltage fluctuations. The effective force of the brake magnets and consequently their noise response during activation can be influenced by means of the current to be set through jumpers.

Configuration
The brake control BSV1 consists of the power part, the control board and the filter board. All parts are mounted on a heat sink, including the terminals for the main connections. The heat sink is isolated from the remaining assemblies and is applied to protective earth potential (PE). The heat sink is also used for fastening the assembly in the control cabinet.

Mode of operation
BSV1 is designed as current controller and has PI characteristic. The reference current value is generated on the control board. The desired continuous current (which normally corresponds to the holding current of the brake release magnets) is preselected by means of jumpers J1 and J2 in increments of 0.2 A in the range of 2 A to 7.8 A.

Technical data of BSV1	
Part number	65 000 06 67 0
Nominal system voltage:	230 V AC – 15% to 400 V AC + 10%, 2- phase or phase – N (note operating conditions of connected brake release magnets)
Frequency of system voltage:	50 Hz bzw. 60 Hz
Supply voltage for internal power supply:	230V AC + 10% / - 15%, 50/60 Hz
Output current:	Continuous (stabilized) current is equivalent to holding current of brake: 2A to 7.8 A, to be preselected in increments of 0.2 A.
(Stabilized) pick-up current:	Twice the value of the preselected continuous current for one second
Mode of operation:	S4
Activation period:	75% ED
Max. operating frequency:	260 circuits / hour
Type of protection:	IP00
Ambient operating temperature:	0°C to 45°C
Relative air humidity:	max. 70%
max. site altitude amsl:	2000 m without derating derating of 1% per 100m above 2000 m to 3500 m
EMV check:	compliance with requirements of EN 12015 (interference) and EN 12016 (immunity).
Dimensions L*B*H:	165 x 200 x 93 mm
Weight	2,2 kg

UCM-Modul

Incl. Shaf Encoder

Incl. Shaft Encoder

Control

The twin encoder is mounted in the shaft.
Our mounting-set consists of:

- An universal fixing for the guide rails
- Toothed belt (length depends on the travel height) for the encoder drive
- Diverter pulleys for the shaft pit.

The UCM-module has to be integrated in to the control. Due to the small dimensions of the module the installation is very easy and doesn´t pose any problems.

For the operation with an overspeed governor an additional emergency power supply is neccessary. Therefore the governor doesn´t stop the machine in case of power breakdown unless there is no error message.

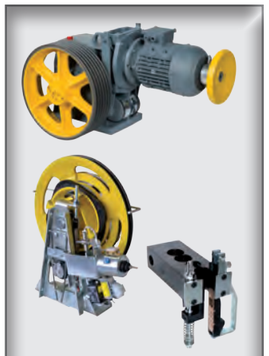
Gearless machine

- Stopping the machine
- Activating the UCM brake device

Geared machine incl. NBS

- Stopping the machine
- Activating the UCM brake device

Geared machine without NBS

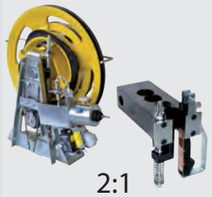


- Stopping the machine
- activates locking device
- activates safety gear

Hydraulic

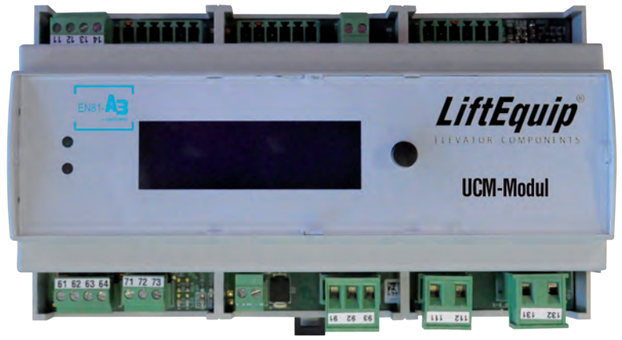
1:1

- Bucher DSV-A3 valve stopps the flow at the piston



2:1

- activates locking device
- activates safety gear



With our **type-examination tested** combination of UCM-module and twin shaft encoder, fulfillment of UCM very easy.

This solution can be integrated very fast and easy in **rope elevators** and also in **hydraulic elevators**.

Thanks to its **autonomous operation** the module can be **used universally with almost any controller** and N 81-20/-50 certified emergency stop facilities.

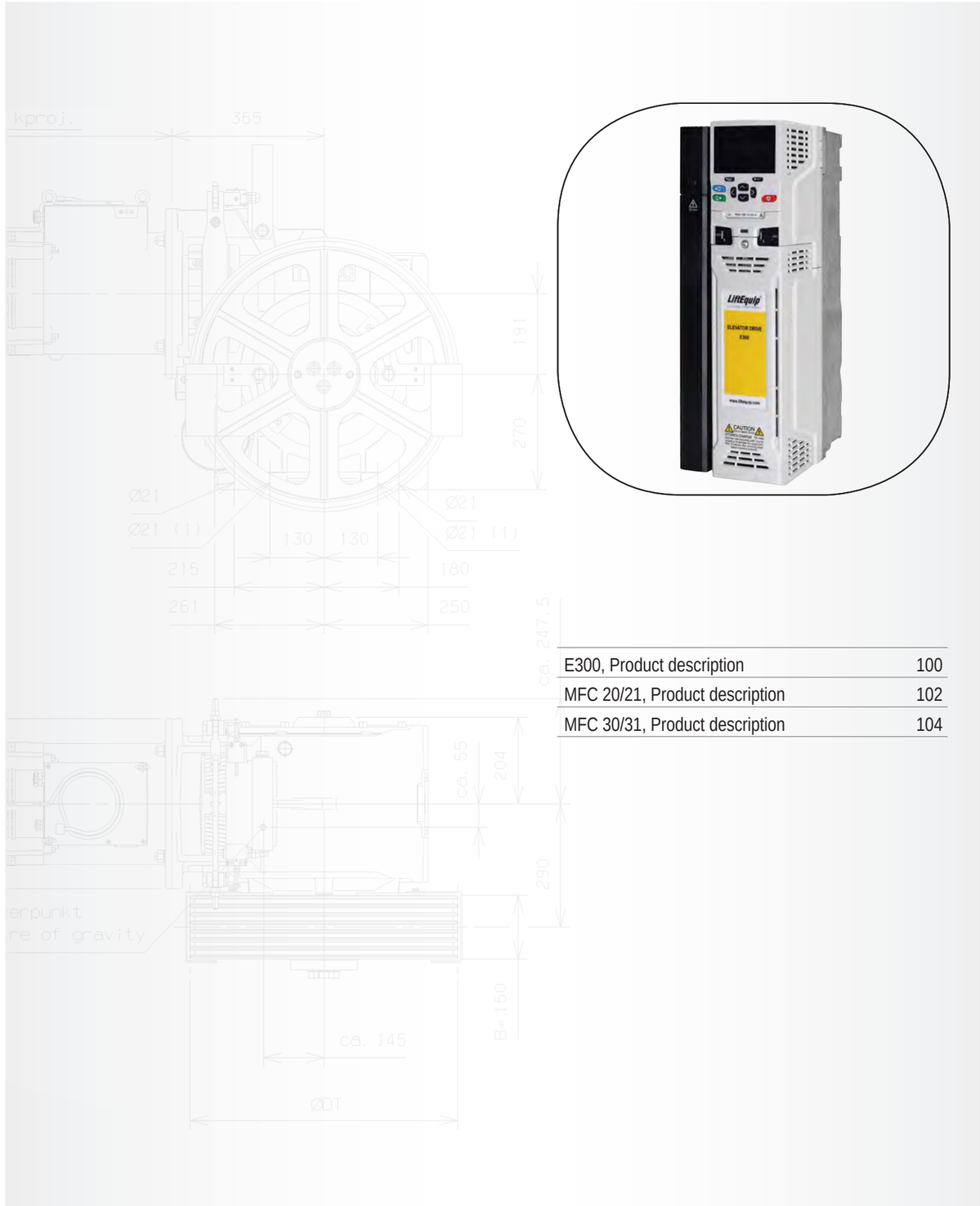
Technical data	
Supply voltage	24V
Power consumption	4 W
Safety circuit voltage	230V
Triggering speed max.	0,2 m/s
Triggering distance max.	100 mm
Triggerung time max.	50 ms
Speed max.	3,5 m/s
Type of incremental encoder	HTL-1024 Imp./U.
Travel height	55 m (higher travel heights on request)

And that´s how it works:

The device monitors the movement of the car through two independent evaluation channels. The speed and traveling distance are monitored as from the start of the travel operation. As soon as the door contact is interrupted and the speed exceeds a value of 0.2 m/s, or the covered distance is greater than 100 mm, safety relays will be turned off.

The redundant encoder system consists of two encoders and has a belt crack monitoring incl. safety switch.

Own Notes



Frequency Inverter

E300

E300

Frequency Inverter

E300, the new, compact frequency inverter for LiftEquip

A new generation of frequency inverters specially designed to meet the needs of elevator technology, offering maximum comfort and reliability. Flexible, user-friendly and energy-efficient, our new E300 frequency inverter offers the optimum solution for your lift system in combination with our high-quality drives.

Complete inverter package
The E300 frequency inverter includes a mains choke for the input, an EMC-compliant mains filter and various expansion modules for the various control options. Here we offer the classic terminal control, DCP3 and DCP4 interface as well as a CANopen interface. The brake control is external, here we also offer various brake modules, which are optimally matched to our drives.

EN81-A3
The possibility of driving without contactors, as well as very fast monitoring electronics, allow you to switch off the drive safely and quickly. With integrated acceleration monitoring and appropriate control, you have a safe and fast solution to meet UCM requirements.

Power saving function
A partial recovery as well as a complete energy recovery are available in conjunction with the M600 inverter. Furthermore, the inverter switches to a standby mode, thus ensuring a contribution to energy savings.

Parameterization of the inverter
There is an extensive possibility, via a modern and integrated display, to optimize the settings of the inverter and to adapt it to your lift system. But we offer you the possibility to set all important parameters on an input level A. To make your work even easier, all our drive data and pre-assignments (suspension, traction sheave diameter, etc.) are preprogrammed on a smart card. This allows you a fast and optimized commissioning.

Technical data (excerpt*)							
Inverter type E300-		100	172	220	350	660	1570
Frame size		size 3	size 4	size 5	size 6	size 7	size 8
Motor power	[kW]	4	7,5	9	15	30	75
INPUT DATA (MAINS SIDE)							
Line voltage range	[V]	Maximum 480V, at -20 to 40°C					
Maximum input current	[A]	16	24	29	36	74	177
OUTPUT DATE (MOTOR SIDE)							
Rated output current (8kHz)	[A]	10	17,2	22	35	66	157
Rated output current (16kHz)	[A]	9,5	16,3	21	33,3	62,7	141
Peak current	[A]	18	31	38,5	62	116	275
MECHANICAL DATA							
Height	[mm]	382	391	391	391	557	804
Width	[mm]	83	124	143	210	270	310
Depth	[mm]	200	200	200	227	280	290
Weight	[kg]	4,5	6,5	7,4	14	28	54
ACOUSTIC DATA							
Min. acoustic level	[dBA]	42,9	45,8	41,9	48,2	49,6	49,8
Max. acoustic level	[dBA]	50,9	56,9	56,9	55,6	66,8	67,9

*This overview only shows a few inverters, of course you will find other sizes and voltage ranges (200V, 575V and 690V).

In summary, we can offer you and your customers a compact and optimized drive package for all service areas.
Reliability and longevity included!

Frequency Inverter

MFC 20/21

MFC 20/21

Frequency Inverter

Current vector-controlled frequency inverters from LiftEquip are designed for controlling asynchronous (MFC 20) or synchronous (MFC 21) drives.

Frequency inverter package
In addition to the inverter, it contains the mains filter and the power choke for connecting to TN, TT and IT power supply systems. The connection is established via the parallel or the DCP interface. The braking resistor is supplied in a separate housing.

Safe evacuation and maintenance
In the event of failure of the power supply, a single-phase UPS (uninterruptible power supply) enables emergency operation. If, during maintenance, the controller is switched-off and the operational brake of a synchronous gearless machine is released, an optional coasting device limits the car speed to safe values by connecting an additional resistor.

Fast start-up
The data sets of our motors are stored entirely in the device. You can thus easily and quickly select the relevant motor. Special and time-consuming motor parameterisation is thereby avoided. The motor data of third-party motors is determined through autotuning.

Simple parameter entry
The MFC 20/21 inverter is equipped with a control panel with a two-line LCD display. Parameters such as speed, acceleration, jerk, rated motor speed, number of encoder marks, traction sheave diameter, etc., can be entered directly in physical values.

Technical data						
Inverter type MFC 20/21-...		15	32	48	60	105
Motor power	[kW]	7,5	15	22	30	45
INPUT DATA (MAINS SIDE)						
Line voltage range	[V]	3 AC 380, -10 % up to 415, +10 %				
Nominal input current	[A]	16	27	43	52	92
Maximum input current	[A]	26	42	64	95	145
Line fuses AFF (external)*	[A]	25	40	63	80	
Conductor cross section	[mm²]	2,5	6	10	16	25
OUTPUT DATA (MOTOR SIDE)						
Nominal output voltage	[V]	3 AC 350				
Nominal output current, I_{rated}	[A]	18	32	50	60	115
Maximum output current for 10 s, I_{max}	[A]	30	48	75	110	180
Nominal output power	[kVA]	11	20	31	36	70
Maximum output power for 10 s	[kVA]	18,5	30	46	60	110
Conductor cross section	[mm²]	2,5	6	10	16	35
Loss at rated power	[W]	350	600	900	1200	2100
Total efficiency		0,97	0,97	0,97	0,97	0,97
MECHANICAL DATA						
Width	[mm]	305	305	330	334	440
Height	[mm]	345	345	460	523	900
Depth	[mm]	207	207	223	295	278
Additional for connector	[mm]	+ 70	+ 70	+ 70	0	0
Minimum top / bottom clearance	[mm]	100 / 100				
Fan power, free blowing	[m³/h]	140	140	360	360	620
Weight	[kg]	17	18	26	35	59

* Duty class gR

Frequency Inverter

MFC 30/31

MFC 30/31

Frequency Inverter

Plug&Play current vector-controlled frequency inverters from LiftEquip are the optimal addition for controlling asynchronous (MFC 30) or synchronous (MFC 31) drives.

Ready-to-install inverter package
In addition to the inverter, it contains the brake controller, the mains filter, the power choke and the travel contactors completely wired and integrated in the housing for connection to TN, TT and IT power supply systems. The connection is established via the parallel or the DCP interface. The braking resistor is supplied in a separate housing.

EN81-A3
With integrated speed monitoring and the standard HSD circuit board, our MFC 30/31 frequency inverter, when used together with a suitable controller, is ideal for satisfying the requirements of UCM.

Safe evacuation and maintenance
In the event of a power failure, emergency operation is possible via a UPS (uninterruptible power supply). If, during maintenance, the controller is switched-off and the operational brake of a synchronous gearless machine is released, an optionally available coasting device limits the car speed by connecting an additional resistor.

Simple parameter entry
The MFC 30/31 inverter is equipped with a control panel with a two-line LCD display. Parameters such as speed, acceleration, jerk, rated motor speed, number of encoder marks, traction sheave diameter, etc., can be entered directly in physical values.

Additional safety
Our inverter package controls the release of the operational brake via the integrated control unit. The brake monitoring switches of our drives (version SA3) for evaluating the brake condition must be connected to the controller in accordance with EN 81. The integrated travel contactors are also monitored for "switching of the contactors after change of run direction" as set out in EN 81.

Fast start-up
The data sets of our motors are stored entirely in the device. The motor data of third-party motors is determined through autotuning.

Technical data										
Inverter type MFC 30/31-...		10	15	26	40	60	50R	100R	155R	310R
Motor power	[kW]	5	7,5	11	18,5	30	18,5	37	55	110
Input data (mains side)										
Line voltage range	[V]	3 AC 380, -10 % up to 415, +10 %								
Nominal input current	[A]	10	16	23	34	52	36	72	105	180
Maximum input current	[A]	17	26	38	55	95	85	170	315	630
Line fuses AFF (internal)	[A]		25	40	63	80	80	135	200	400
Conductor cross section	[mm²]	2,5	2,5	4	6	16	10	25	35	95
Output data (motor side)										
Nominal output voltage	[V]	3 AC 350 - 10					3 AC 440		3 AC 450	
Nominal output current, I_{rated}	[A]	12	18	27	42	60	35	64	104	180
Maximum output current for 10 s, I_{max}	[A]	18	30	43	67	110	75	150	225	450
Nominal output power	[kW]	7,2	11	16	25	36	24	48	81	140
Maximum output power for 10 s	[kVA]	11	18,5	26	40	60	51	102	187	375
Conductor cross section	[mm²]	2,5	2,5	4	10	16	6	16	35	95 / 2x35
Loss at rated power	[W]	220	330	500	800	1200	750	1500	2000	4000
Total efficiency		0,97	0,97	0,97	0,97	0,97	0,94	0,94	0,94	0,94
Mechanical data										
Width	[mm]	244	309	309	333	344	401	600	1000	1400
Height	[mm]	387	715	715	1090	1263	1105	2000	2200	2200
Depth	[mm]	260	263	263	270	340	284	470	600	600
Fan power, free blowing	[m³/h]	80	140	140	360	360	360	700	1000	1000
Weight	[kg]	19	35	38	55	81	80	195	460	750

Visualization of system data – Energy efficiency by energy recovery

UK

Jörg Hellmich[1)], Volker Lenzner[2)]

Using the CANopen-Lift standard, system data from the control system and components are available on the bus in real time. With the flexiPage system of Elfin the data are edited and visualized in a flexible manner. On the occasion of the interlift 2015 the LiftEquip company presented the energy recovery topic by way of the energy data example.

In the past the elevator energy efficiency topic has already been discussed on numerous occasions also in connection with the energy recovery and several papers have been presented on different conferences.

Since the energy saving ordinance (EnEV) fails to name the elevator, no concrete measures are defined which need to be taken and met. But even without these specific EnEv requirements there have been various approaches in the past to reduce the energy demand of elevator systems.

The directive VDI 4707 in parts 1 and 2 first of all considered on a national level the energy topic for elevators and elevator components which was later also described on an international scale in the ISO 25745-1 standard which is largely based on the principles of the VDI directive.

For the operation of the elevator this paper takes a look at the ‚riding' and 'standby' operating conditions and uses defined utilization categories to take into account the rides needed to determine the overall efficiency of the system. In the 'riding' operating mode the converter is the component which by using the energy recovery instrument can make a major contribution to the elevator's energy efficiency.

In the past energy recovery systems have been used primarily in high-frequency systems and plants with high frequency converter outputs to reduce the generation of heat of the regeneration resistors which is critical in many applications and which sometimes can only be controlled using additional air-conditioning systems in the machine room.

In standard applications and in elevator systems that are not very frequented, an energy recovery system has often been excluded since most of the energy (70 to 80 %) of these systems is needed during standby. It made more sense for these particular elevator systems only to take measures which reduce the standby consumption.

Many frequency converter systems that are available on the market and allow energy to be recovered consist of two separate components; the actual frequency converter and the separate energy recovery unit. In this constellation the extra costs must be identified and the standby energy demand of the energy recovery unit must be examined. Often the investment for systems with a low performance and utilization is economically unwise.

With the converter of the MFR series LiftEquip offers a system with an integrated energy recovery unit which recovers energy from the first ride onward at no extra cost and as such contributes to the economic efficiency of the elevator system.

In discussions held with planners, operators and elevator manufacturers the following questions frequently crop up:

- How much energy is recovered?
- When is energy recovery worthwhile?
- What does the energy recovery cost?
- What happens to the recovered energy?

It is obvious from explanations earlier in this paper that there is no collective answer to these questions since a lot of individual parameters need to be taken into account.

Prior the interlift exhibition, LiftEquip, Böhnke + Partner and Elfin jointly thought about ways to visualise the "energy recovery" topic in a simple and informative manner.

For this purpose an elevator in one of LiftEquip's buildings was modified. In the elevator with CANopen-Lift capabilities a converter of the MFR series is controlled by a bp308 control system. The following table shows the system parameters of the system used.

For measuring the energy demand the elevator was equipped with an energy measuring system of Janitza and the measured data were made available on the CANopen bus. Using the Elfin flexyPage system the measured data were read from the bus and transferred together with the current position values, the ride counter and the live picture of a video camera via a safe VPN connection to the exhibition stand where they were visualized on a big screen. With

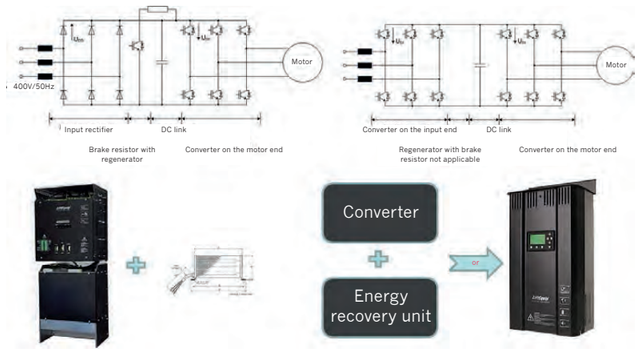


Fig. 1: Converter operation with and without energy recovery

1) Elfin
2) LiftEquip

Table: System data of the measured elevator system	
Passenger elevator	
Rated Load	1.000 kg
Passenger	13
Rated Speed	1.6 m/s
Travel height	13.93 m
Landing	4
Suspension	2:1
Location drive	down/beside
Drive	LiftEquip PMC 170L007
Diameter of traction sheave	400 mm
Ropes	5 x 8 mm (Drako 250 T)
Frequency inverter	LiftEquip MFR 18
Control system	Böhnke&Partner bp308 CANopen
Car light	LED
Energy measurement	Janitza
Screen	Elfin flexyPage

the aid of this system the exhibition visitors could enter car calls and directly follow the ride movements of the elevator and the flow of energy caused by the operation.

Apart from the system parameters and the system's position, the screen also displayed the system's calls, the current floor position and the ride direction. A new pointer instrument was developed for displaying the performance

Fig. 3: Presentation of the current system data and measurements

which indicates whether the elevator is drawing energy from the power system or is working in a regenerative mode and supplies energy back into the power system. In conjunction with the two measured data of the total energy drawn from and supplied back to power system and the direct display of the energy costs saved, the observer got an idea of the efficiency of the energy recovery system.

In order to be able to display the mode of operation of the energy recovery system in connection with the load condition, it is planned to equip the elevator with new load measuring sensors which can make available the current load on the CAN bus.

Since the MFR converter of LiftEquip is offered at no extra cost compared to the MFC converter with the same performance, every kilowatt hour supplied back to the power system is a direct saving.

Since elevators are not subject to the Renewable Energy Act a refund for energy not consumed in the building and

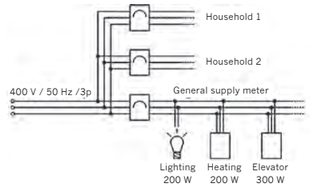


Fig. 4: Energy drawn from the power supply in the building

supplied back to the power supply network is not possible. But since every building has a regular basic energy demand, the energy as a rule is consumed in the building. So energy is available to the building which does not have to be procured from an external source.

During the four days of the interlift 2015 exhibition a total of 1982 rides were made with the elevator, 27.5 kWh being drawn from the power supply for the traction operation and 8.1 kWh being produced in the regenerative mode and supplied back to the building's power supply network. With a charge of 0.29 € per kWh this corresponds to savings of 2.35 € for the four days and annual savings of 214.40 €.

Energy recovery not only results in a better energy classification of the elevator system but also directly yields an economic benefit. Depending on the degree of utilization elevators provide different savings which may sometimes prove to be quite small. But in view of the total number of elevators (in Germany approx. 700,000 systems) the saving potential cannot be ignored. Whenever this is economically possible, one should therefore always include the energy recovery option when installing new elevator systems. And even when systems are only modernized and the drive system is replaced, energy recovery is an option to contribute to a reduction of the CO_2 level and to the protection of the overall environment.

Summary

The publication of VDI 4707 turned the spotlight on the energy demand of elevators. The project described in this paper clearly shows how intelligent energy recovery applications allow energy to be saved from the first ride onward. Other savings are achieved by networking the components via the open standard CANopen-Lift allowing energetically optimized ride curves and a distinct reduction of the energy demand in standby mode. CANopen-Lift is also the basis for the measurement, visualization and transmission of energy values with the flexyPage system. In conjunction with other sensor data, the networking option provides additional possibilities for an energetic optimization of components and systems in special operating conditions.

E300 frequency inverters
re-orientation for LiftEquip

Technical Report - E300 frequency inverters

E300 frequency inverters – re-orientation for LiftEquip

UK

Volker Lenzner [1], Dr. Holger König [2]

The components used in modern lift design should not only reflect the state of the art, but also satisfy the diverse requirements of the market. Today's products must already embrace the concepts and technological needs of the future in order to accommodate future strategic developments, such as smart lifts.

LiftEquip has been serving customers for many years not only as a component supplier, but also as a leading player in the kit and end-to-end system markets. Certain market developments are also illustrating, however, that suppliers do not need to develop, manufacture and continuously update all of their components themselves. In fact, we have always attached importance to identifying partners who are capable of meeting our product and quality demands. In connection with the certification and type testing of the lift system LEA Comfort, its manufacturer decided to collaborate with the motion control manufacturer Kollmorgen, whose range includes several inverters.

Figure 1: Inverter E300 and energy recovery module M600

The springboard for the project described below was a long track record of successful cooperation between some major customers and the inverter manufacturer Control Techniques (Figure 1), whose products have been installed alongside the worm gears and gearless drives made in Neuhausen. Several critical systems, moreover, including gearless drives with 1:1 suspension and low speeds, as well as high-performance systems offering a very comfortable ride, had been commissioned in the past with inverters built by Control Techniques. In view of such favourable experiences, the new E300-series lift inverters produced by Control Techniques were selected as strategic components.

Among the compelling technical arguments supporting the decision were the inverters' ability to cover the drive portfolio's entire performance spectrum and their compliance with market requirements as regards control, load measurement, contactorless operation, and the option of energy recovery (Figs. 2 to 4). They also allow an emergency power mode (Fig. 5). The devices can be used with both synchronous and asynchronous drives without any hardware or firmware modifications.

Figure 2: Energy recovery with M600

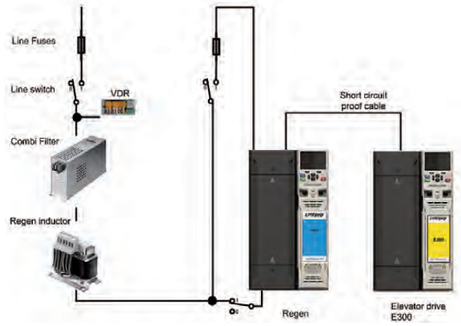


Figure 3: Full energy recovery with M600

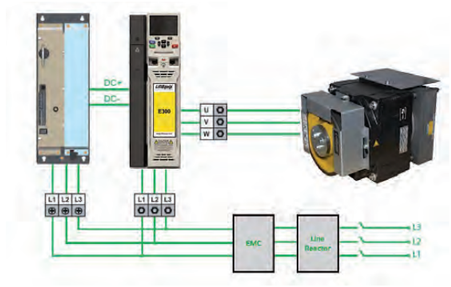


Figure 4: Partial energy recovery with SP1

1) LiftEquip GmbH
2) Control Techniques

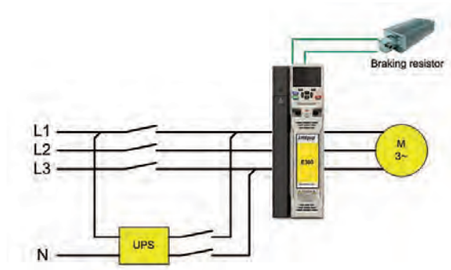


Figure 5: UPS mode

In relation to ease of use, the requirement arose to modify the data parameters so that the motor data of the LiftEquip drives are easily retrievable for commissioning purposes. Control Techniques met this requirement by storing the drive parameters on a memory card (Fig. 6) and allowing their retrieval, in combination with the LiftEquip firmware, through selection of the relevant motor. A LiftEquip label is attached to this generation of devices to set them apart visually.

The motors can be supplied with various encoder systems at the customer's request. The lift systems can also be operated with a variety of controllers. The non-standard inverter and controller interface can be modified with the smartcard (Figure 6) by way of optional macros.

Figure 6: Smartcard

The product is only as good as the support offered to the controller engineers and installers. The familiar hotline number is therefore to be retained as a source of technical support in case of any problems. Members of the LiftEquip technical support team will be available to answer controller engineers' questions and resolve problems that are beyond the scope of the hotline. Control Techniques will also be on standby to provide advice as necessary.

An installation video accessible from the homepage www.liftequip.de describes the modular design as well as the inverter's installation and commissioning.

To cater for installation in the headroom or wall mounting in the machine room (Figure 7), a shaft installation kit (SIK) with integrated choke and EMC filter for device sizes up to 22 kW has been developed. These device versions are similar to the existing devices in the series MFC 30/31. At pre-

Figure 7: Inverter E300 for wall mounting

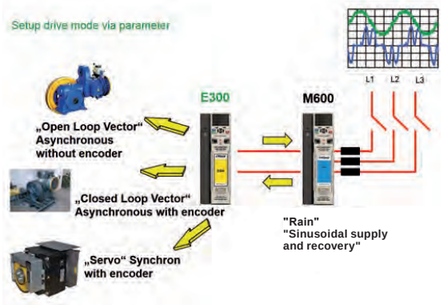


Figure 8: E300 control modes

sent the brake control still has to be implemented externally in the controller. The various controls and control modes are illustrated in Fig. 8.

As regards UCM monitoring (Fig. 9), the functionality of the inverter is also important – if a speed threshold is exceeded, a fast shutdown has to be implemented to disconnect the lift from the power supply and bring it to a standstill.

Our training centre offers customers tailored inverter courses that allow them to practise inverter installation, commissioning and ride quality optimisation using a model of a lift.

Thanks to its modular design, the inverter can be configured for the necessary interfaces and ports (Fig. 10) according to the customer's wishes. Parameterisation (Fig. 11) can be performed by way of the display on the inverter. The display is detachable, which allows the parameters to be entered outside the shaft by way of a cable. The most elegant option, however, is to perform parameterisation from the controller by way of the interface.

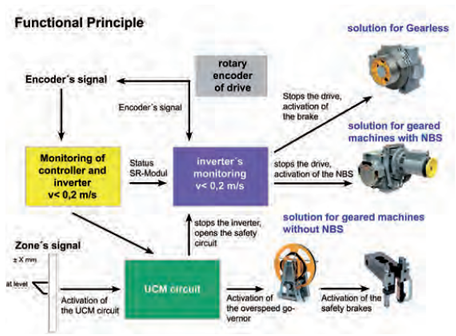


Figure 9: UCM shutdown

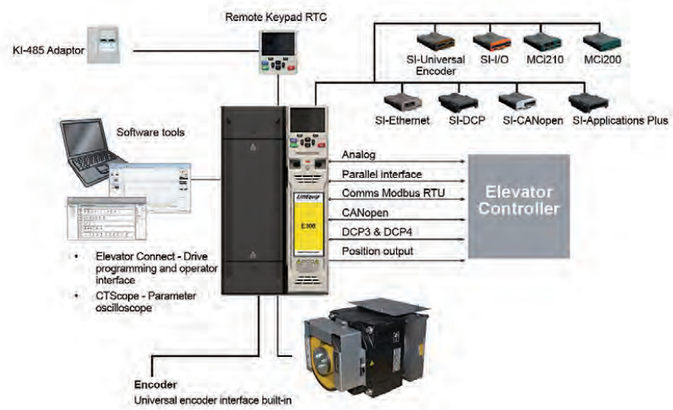


Figure 10: Flexible Integration

Figure 11: Commissioning and parameterisation

The E300-series inverters are the successors to the LiftEquip MFC range. In this connection they have been integrated in the configurator LEKalk 3.0 to allow users to configure the drive design, specify the desired scope of supply and produce the associated documentation as before.

Replacement devices and modernisation

MFC inverters are to remain available as replacements for old models. With an eye to the future, the E300 is a conversion set that allows the new model to replace existing MFC 20/21 devices in the controller or serve as a wall-mounted replacement for the MFC 30/31. Adaptation work is in progress for each of these variants which will allow the existing connectors to remain in use.

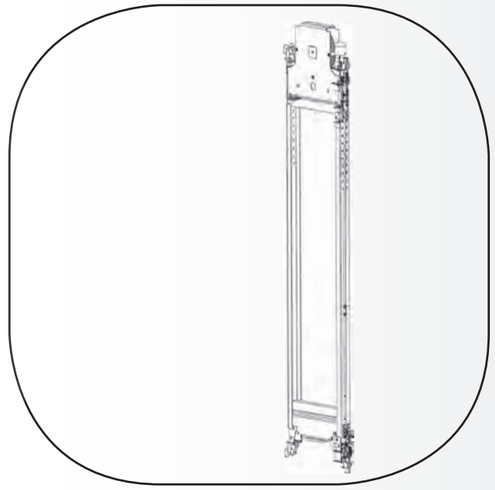
Conclusion and outlook:

This E300 series, with its diverse interfaces and options, is capable of implementing practically all customer wishes. It can be installed as a new system, replace an existing MFC inverter, or form part of a comprehensive modernisation project. Energy recovery where necessary and appropriate, and emergency operation with UPS or a diesel generator, can easily be accommodated. LiftEquip is thus already well positioned to respond to future needs, including automated emergency evacuation. In addition to its collaboration with Kollmorgen, which was initiated in the context of type testing the LEA Comfort, LiftEquip has added another system component to its range by adopting the E300 series of inverters. By working together with two capable partners, LiftEquip is able to fulfil the demand of planners and operators for a free choice of components, kits and systems in every category.

Own Notes

GTK 700/1050/1370

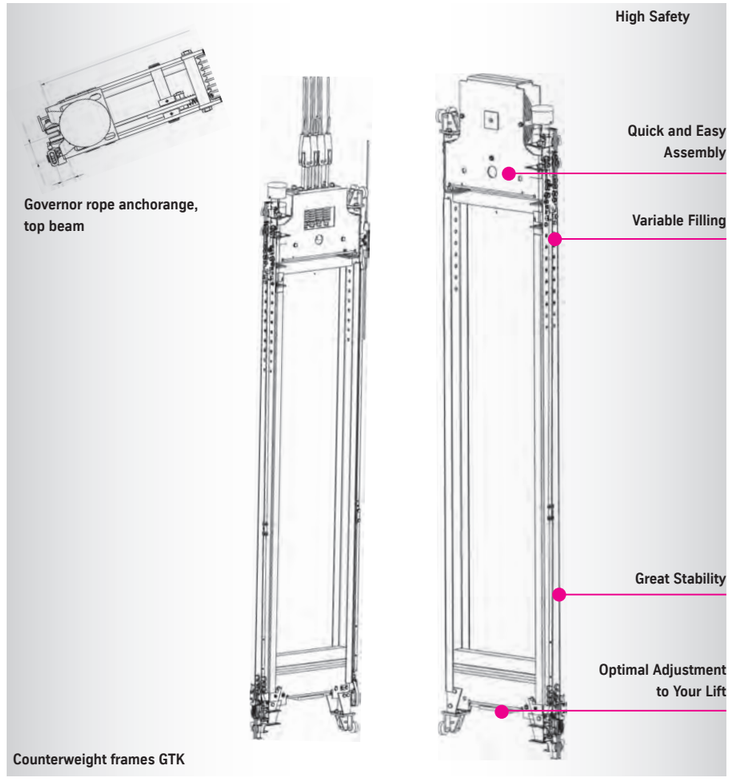
The variable solution for many installation situations



GTK 700/1050/1370
Product Description

For a counterweight mass of up to 6460 kg in various versions

The counterweight frames calculated for an overall mass up to 6240 kg (special fillers). The various necessary widths, gauges between rails and suspensions (1:1 and 2:1) are available in the modular system:



Counterweight frames GTK

Optimum adjustment to your installation
With the variations in length, width and gauge between rails, the counterweight is an optimum fit for the most diverse project planning dimensions. In the standard versions, the counterweight frames with rope attachment for 1:1 arrangement or rope pulleys are available for 2:1 arrangement. Besides the standard gauge between rails of 700, 1050 and 1370 mm, other clearance dimensions can be produced as well.

Additional options
Various special versions such as sliding and pulley guides, and a safety gear on the counterweight can be selected. For aesthetic purposes, the counterweight can be encased in a glass shaft. Diverse accessories for the mounting of compensation chains and compensating ropes are selectable. The path cover in the pit area in compliance with EN81-1, adjusted to the mass of the counterweight, is available in the program.

Variable filling
The two lengths for a multilayer filling with max. 30 or 40 levels (a layer is 60 mm) and various filler materials such as Gussolith, steel and lead allow variable adjustment to the dimensions of the shaft.

High level of safety
The frame construction of angular sheet metal profiles in the top and bottom beams and reinforced knot junctions and their connections were calculated and optimised with the Finite Element Method (FEM), whereby the necessary proofs of solidity were also provided.

Filler materials
- Steel
- Gussolith
- Concrete
- Lead

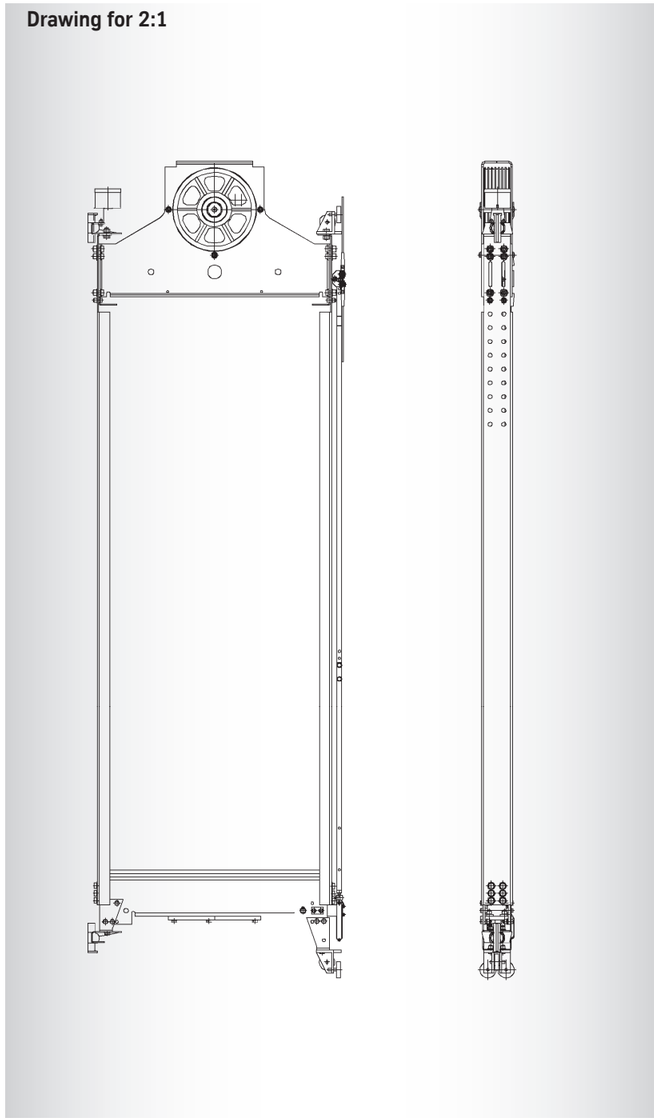
Counterweight (CW) GTK - Data table 2:1

	Width of CW [mm]	Total Mass [kg][1]	Pulleys [mm]
GTK 700	135	≤ 1650	360
GTK 1050	135	≤ 2435	360
GTK 1050	200	≤ 3630	450 / 540
GTK 1370	270	≤ 6240	540

[1]Total Mass (filler+frame)

GTK 700/1050/1370
Special Versions

Drawing for 2:1



Counterweight Mass
The following approximated values do include the masses of the counterweight frame, the hitch plate or the rope pulley, one or two buffer plates and the sliding guides:
GTK 700/135: 159 kg, 1:1 suspension;
187 kg, 2:1 suspension;
GTK 1050/135: 184 kg, 1:1 suspension;
211 kg, 2:1 suspension;
GTK 1050/200: 210 kg, 1:1 suspension;
287 kg, 2:1 suspension;
GTK 1370/270: 374 kg, 1:1 suspension;
422 kg, 2:1 suspension.

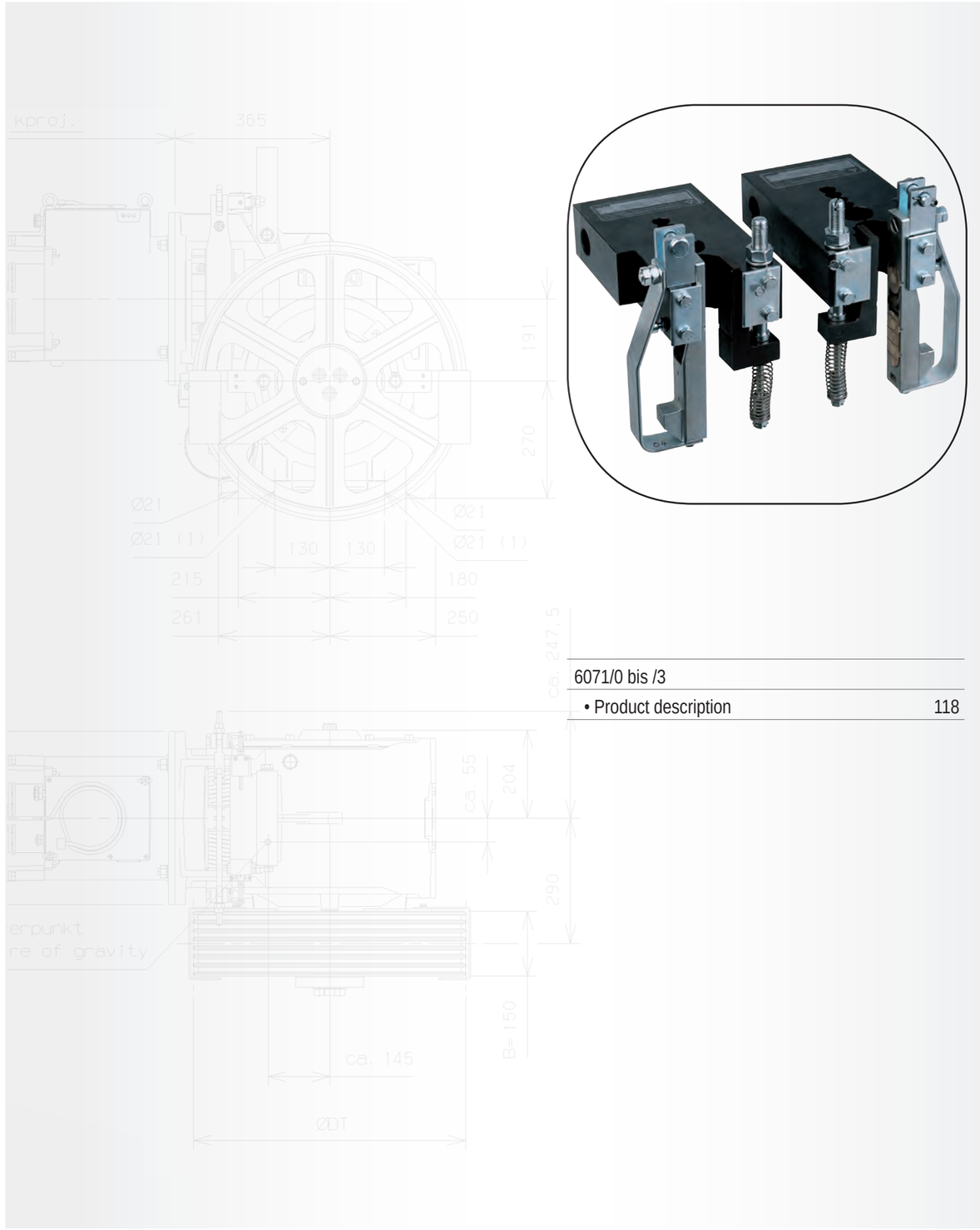
Colour
The products shown are available in mouse-grey - RAL 7005 - as standard and with zinc coated parts.

The variable gauges are:
- GTK 700/135: 612 ≤ gauge ≤ 700 mm
- GTK 1050/135/200: 701 ≤ gauge ≤ 1050 mm
- GTK 1370/270: 1051 ≤ gauge ≤ 1370 mm
-

Special Versions
- Roller guides
- Rope pulleys for 2:1 suspension fixed in a pulley carrier on the top beam
- Progressive safety gears (type 0, 1 and 2)
- Buffer plates additionally
- Panelling of counterweight on one or on both sides
- Compensation chain or compensation rope mounting

Own Notes

Progressive safety/Braking system



Safety Gears

6071/0 bis /3

Product Description

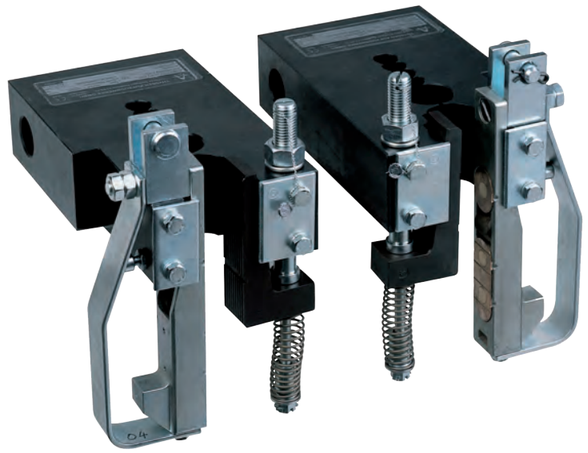
EN 81-
20/-50
-conform

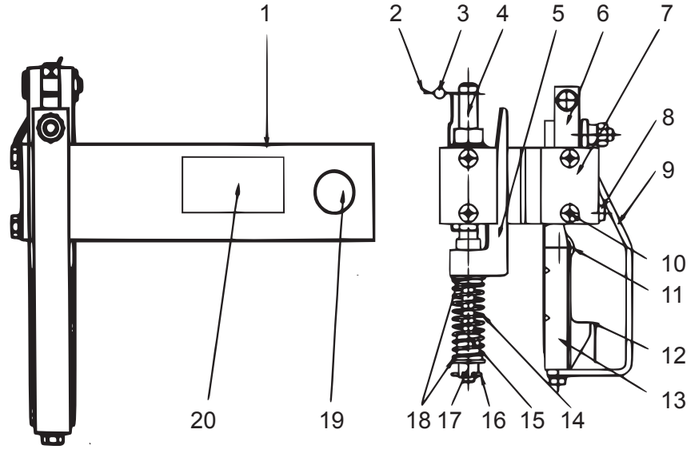
6071/0 bis /3

Product Description

Safety Gears

The safety device can be deployed as a progressive safety gear or braking device. They are 2 identical components but turned in their installation position by 180°, and depending on how they are deployed they have a set braking or gripping force.
In everyday language, the safety device is also referred to as a jaw.





Item	Designation	Item	Designation
1	Jaw body	2	Seal wire
3	Seal	4	Threaded bolts
5	Counter wedge	6	Fork element
7	Guide plate	8	Stop bolt
9	Guide bracket	10	Flat countersunk nib bolt
11	Safety gear roller	12	Limit stop
13	Grip wedge	14	Compression spring
15	Spacer sleeve	16	Split pin
17	Slotted nut	18	Spring plate
19	Mounting borehole	20	Name plate

Functional description
In the event of overspeed, the safety gear rope connected with the grip wedge on the safety gear frame is blocked. The grip wedge is held in place while the elevator car continues to move. A transport roller in the grip wedge draws the grip wedge in the direction opposing the moving direction of the elevator car on a chamfer on the jaw body between the rail and jaw body. In doing so, it expands the spring range of the jaw body.
The jamming effect of the jaw body is configured in such a way that the frictional forces between the grip wedge, counter wedge and rail decelerate the elevator car to a standstill. The jaw is released by moving the elevator car in the opposite direction. Here, the jaw body slips back over the chamfer on the counter wedge until the counter wedge is pressed by the return spring into its initial situation and thus releases the rail.

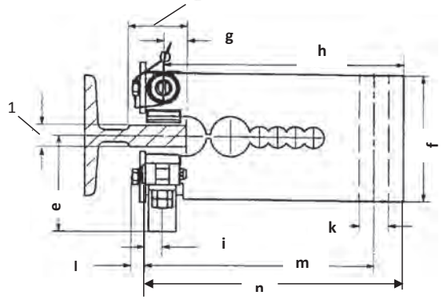
Safety device with function as progressive safety gear (AFV)
On the elevator car and when required on the counterweight, a safety braking system is prescribed that takes effect in the downward direction as a safety device against the risk of falling. On reaching the tripping speed on the speed governor, this must be able to brake the elevator car with rated load at the guide rails and to hold it there (this also applies in the event of failure of the suspension gear).
The regulations of EN 81-1:98 are to be adhered to.

Safety device with function as braking system (ABV)
On the elevator car, a safety braking device is prescribed that takes effect in the upward direction as a protection device against overspeed for the elevator car moving upwards. On reaching the tripping speed on the speed governor, this must be able to brake the empty elevator car at the guide rails.
The regulations of EN 81-1:98 are to be adhered to.

Distinction by construction size
In ascending order according to power output (0, 1, 2, 3), corresponding to the characteristics:
- Mass of car and load
- Speed
- Guide rail dimension and surface (drawn, machined)
- Operating mode (dry, oiled)

Distinction by deployment according to the application
Safety device / progressive safety gear (AFV) for safety gear operation downwards.
Progressive safety gears are type approved safety devices with type approval marking and CE marking in accordance with EN 81-1:98.
The progressive safety gear on the elevator car may only take effect in a downward direction and must be able to brake the loaded elevator car from the tripping speed of the speed governor and hold it in place.

In country-specific certifications you hesitate to contact us..



Item	Designation
1	Rail blade thickness
2	Guide blade width

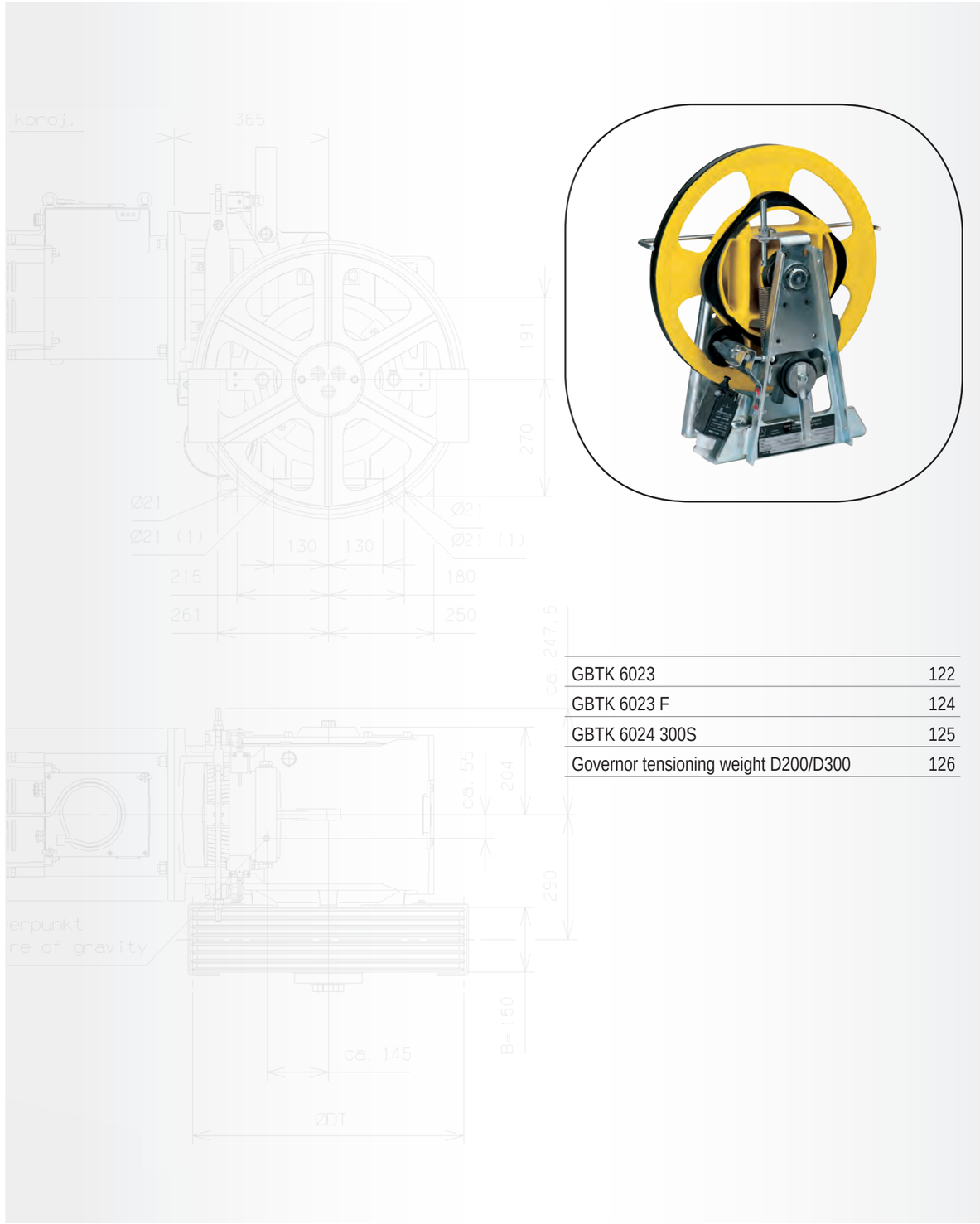
Type	a	b	c	d	e	f	g	h	i	k	l	m	n
0, 1	50	64	31	106	~ 70	81	15	179	13	Ø 22	4	170	192
2	50	64	31	106	70	94	15	179	13	22	4	170	192
3	60	82	40	132	85	138	20	216	16,5	28	11,5	195	233

Assignment of the safety devices to the rail blade thickness

Type 6071/	Rail blade thickness [mm]	Part number	
		Safety gear	Braking System
0	9 - 16	60 710 59 03 0	60 710 63 03 0
1	9 - 16	60 710 60 03 0	60 710 64 03 0
2	9 - 19	60 710 61 03 0	60 710 65 03 0
3	16 - 35	60 710 62 03 0	60 710 66 03 0

Own Notes

GBTK 6023, 6023F, 6024 and Accessories



Overspeed Governor

GBTK 6023

EN 81-
20/-50
-conform

EN 81-
20/-50
-conform

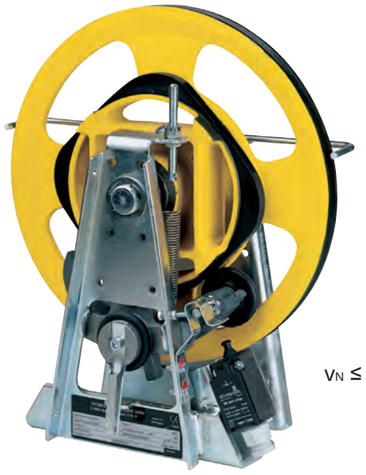
GBTK 6023 in EN81-A3

Overspeed Governor

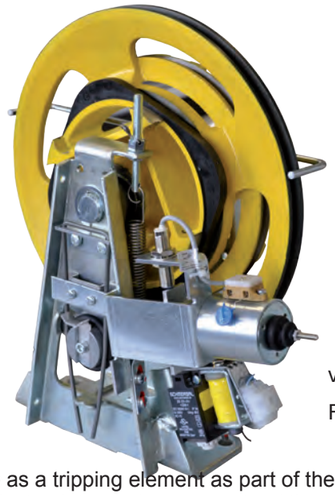
Technical data			
Pulley diameter D	mm	300	250*
Rated speed v_{rated}	m/s	2.5	2.0
Tripping speed v_T	m/s	0.6 - 3.13	0.5 - 2.6

*with test groove diameter 170 mm

Standard version as shown side on
Options:
- Remote tripping (blockable rocker with voltage)
- Blocking device (blockable rocker without voltage)
- Bracket with final limit switch OFF
- Many other functions on request



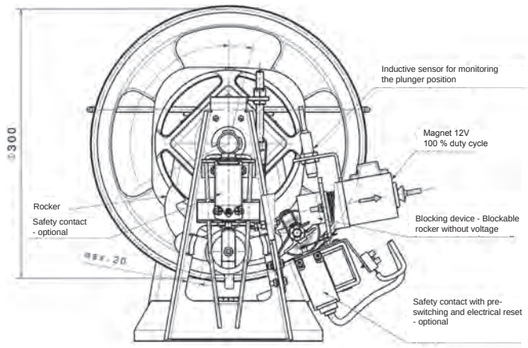
$v_N \leq 2,5$ m/s



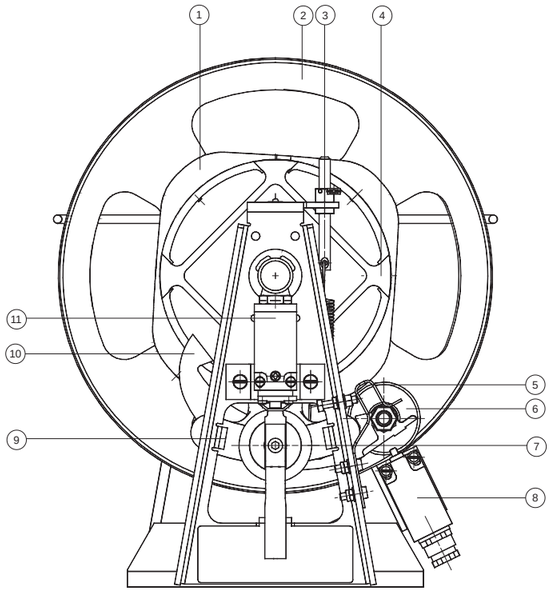
$v_N \leq 2,5$ m/s

$FH_{max}= 175$ m

Use as a tripping element as part of the protection device against unintended movements of the elevator car in acc. with EN 81-1:1998+A3:2009-9.11.

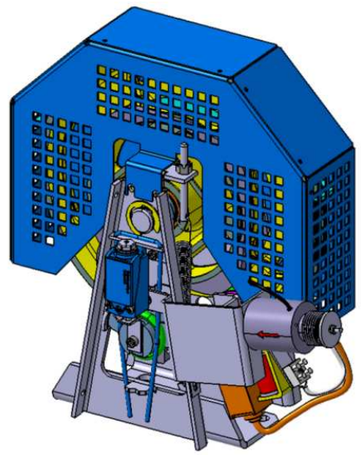


Technical data		
Pulley diameter D	mm	300
Rated speed v_{rated}	m/s	≤ 2.5
Tripping speed v_T	m/s	0.6 - 3.13
Max. engaging time of magnet	ms	39
Max. total travel	mm	310



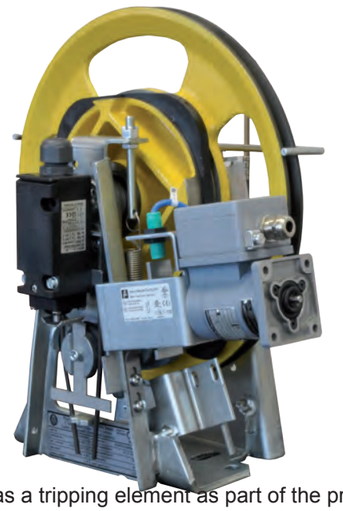
1	Cam disc	7	Lever with rubber ring and locking plate
2	Governor pulley	8	Locking position switch
3	Captive-type adjusting screw	9	Limit stop
4	Cast-on lug	10	Latch on rocker
5	Cap spring	11	Non-locking position switch
6	Pulley with rubber ring on rocker		

Version by EN 81-20/-50



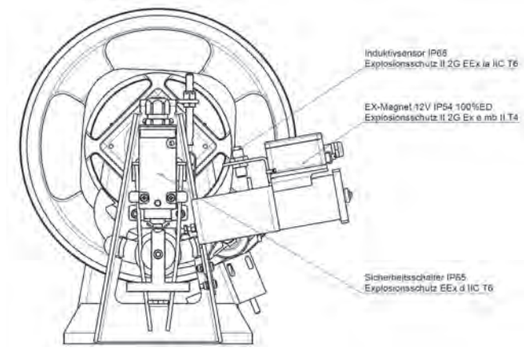
EX
Explosion proved

GBTK 6023 in EN81-A3 compliant and EX version



v_N= 1,0 m/s

Use as a tripping element as part of the protection device against unintended movements of the elevator car in acc. with EN 81-1:1998+A3:2009-9.11.
The EX evaluation of this component is conducted within the framework of the overall EX evaluation of the installation.



Technical data		
Pulley diameter D	mm	300
Rated speed v_{rated}	m/s	1.0
Tripping speed v_T	m/s	1.2 - 1.3
Max. engaging time of magnet	ms	39
Max. total travel	mm	310

Overspeed Governor

GBTK 6023 F

EN 81-
20/-50
-conform

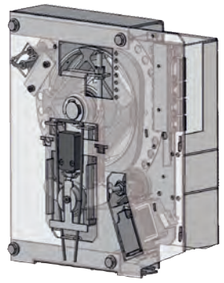
GBTK 6024 300S

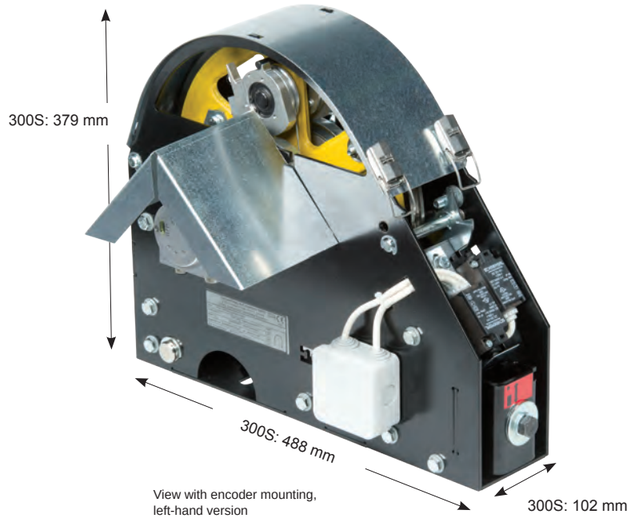
EN 81-
20/-50
-conform

Standard version with electrical remote reset
- Hardened groove (wear-resistant)
- Finish-wired and tested
- Connections to system plug connector
- Specially developed for MRL installations

Options:
- Remote tripping (blockable rocker with voltage)
- Blocking device (blockable rocker without voltage)
- Many other functions on request

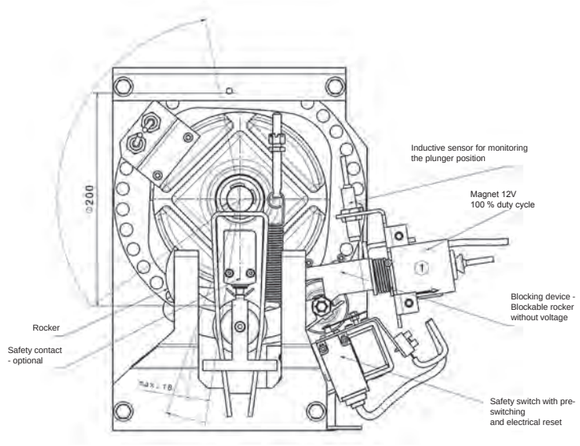
Technical data		
Pulley diameter D	mm	200
Rope diameter d	mm	6.5
Rated speed v_{rated}	m/s	≤ 1.6
Tripping speed v_T	m/s	0.7 - 2.09





v_N = 2,00 - 4,00 m/s

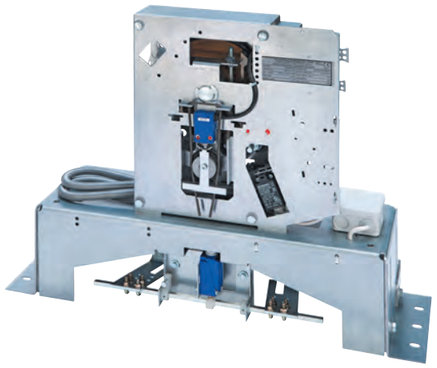
GBTK 6023 in EN81-A3 compliant version



Use as a tripping element as part of the protection device against unintended movements of the elevator car in acc. with EN 81-1:1998+A3:2009-9.11.

Max. engaging time of magnet	40 ms
Max. total travel	205 mm

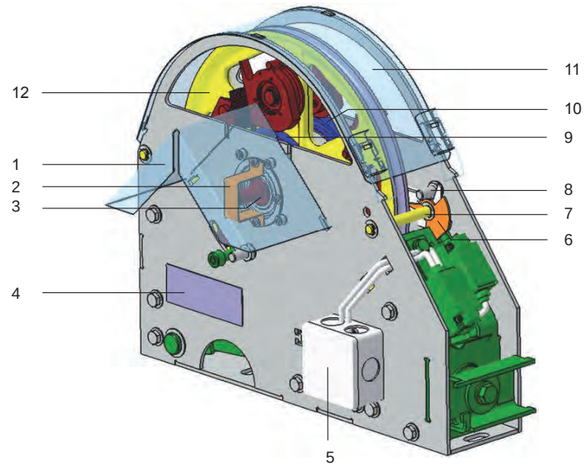
Technical details as for above version



Bracket with integrated final limit switch OFF

Technical data		
Type		**300S**
Pulley diameter D with 8 mm Drako 300T	mm	304
Axle load FA_{max}	N	12.000
Rated speed v_{rated}	m/s	2,0 - 8,0
Tripping speed v_T	m/s	2,35 - 10,5
Braking force F_B	N	400 - 2100

- Left- / right-hand version available
- Encoder mounting optional



1	Cover for encoder	7	Rope slip-off guard
2	Shaft cover	8	Cam, downwards
3	Connection for encoder	9	Tripping wheel for rope brake
4	Type plate	10	Tripping wheel for pre-switching
5	Electr. connection	11	Cover plate
6	Cam, upwards	12	Governor pulley

Overspeed Governor

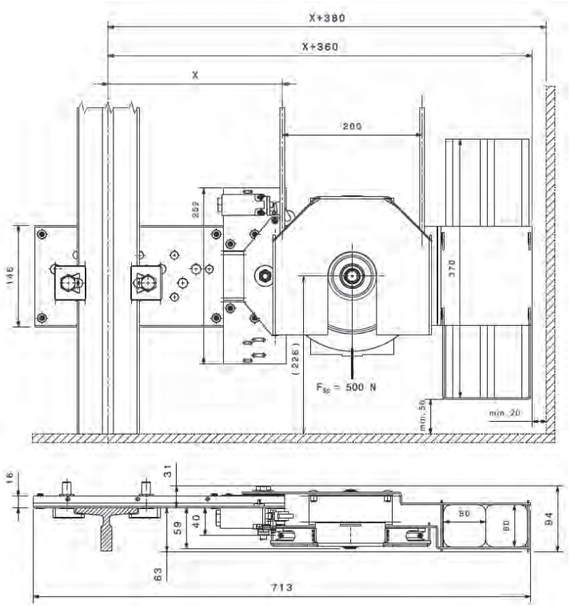
Governor tensioning weight D200

Accessories

Technical data	
Tension force	500 N
Governor rope diameter	6.5 mm
Governor tensioning pulley	D=200/ 6.5-PA
Rated speed v_{rated}	≤ 1.6 m/s
Travel height, TH	≤ 100 m
Type of protection, rope breaking switch	IP 54 (optional IP67)
Rope engagement point (back of rail)	40 mm

Distance **X** Guide rail	T70	T89 / T90	T125 / T127
150 mm	●	---	---
200 mm	●	●	●
250 mm	●	●	●

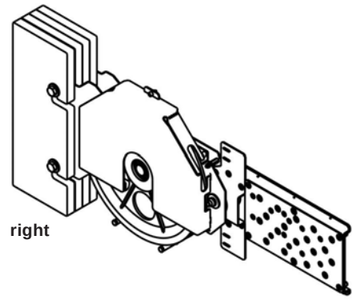
- Galvanised sheet metal design
- Mounting in left- and right-hand versions possible
  → On-site modification possible!
- Bracket for mounting the overspeed governor to the guide rail available



Governor tensioning weight D300

Accessories

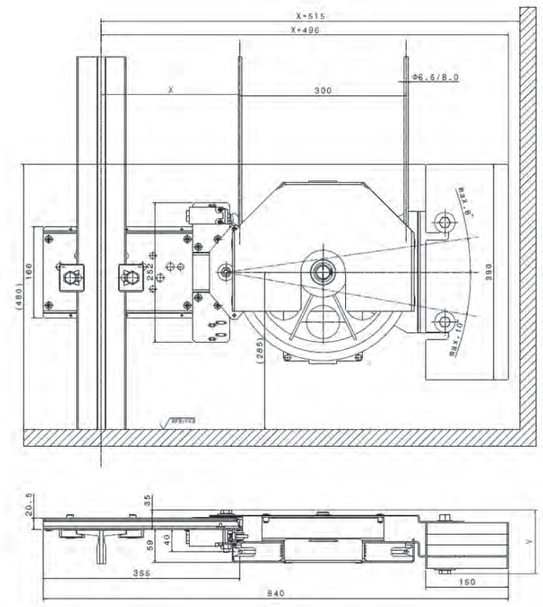
Overspeed Governor

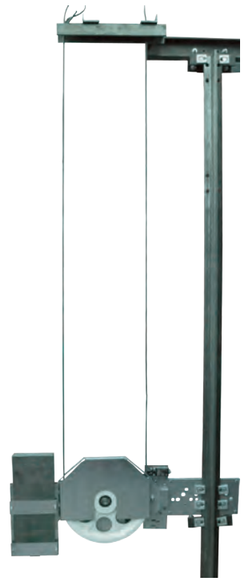


- Easy to install thanks to individual attached weight plates

Technical data	
Tension force	648 N / 870 N
Governor rope diameter	6.5 mm / 8.0 mm
Governor tensioning pulley	D=300: 6.5-PA / 8.0-PA
Rated speed v_{rated}	≤ 2.5 m/s
Travel height, TH	≤ 175 m
Type of protection, rope breaking switch	IP 67 or EEx d IIc T6
Rope engagement point (back of rail)	40 mm

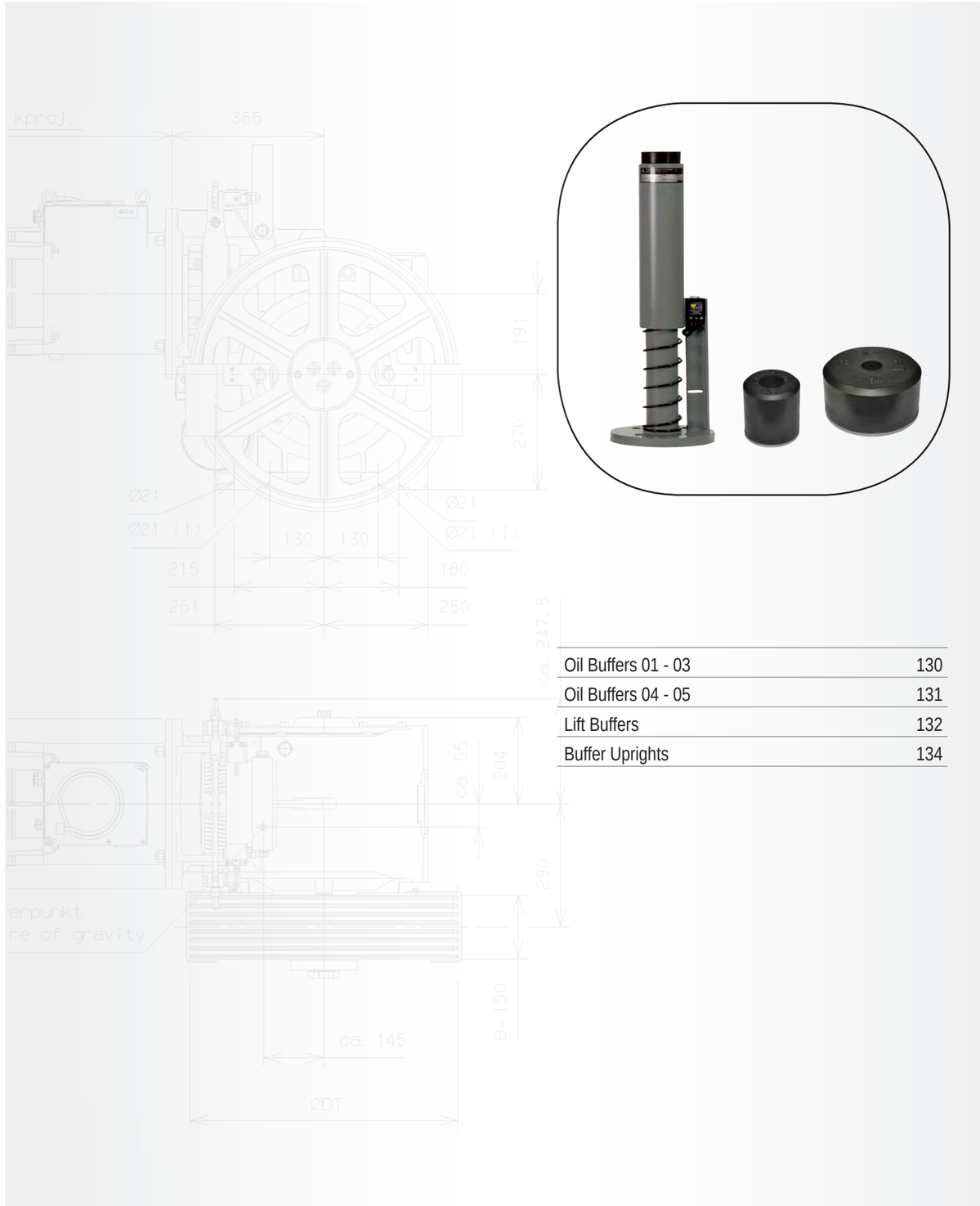
Rail width		T70	T89 / T90	T125 / T127	T140-1 / T140-2
Distance X	150 mm	●	---	---	---
	200 mm	●	●	●	---
	250 mm	●	●	●	---
Distance X with extension	300 mm	---	---	●	●
	350 mm	---	---	●	●
	400 mm	---	---	●	●





Own Notes

Oil and Lift Buffers

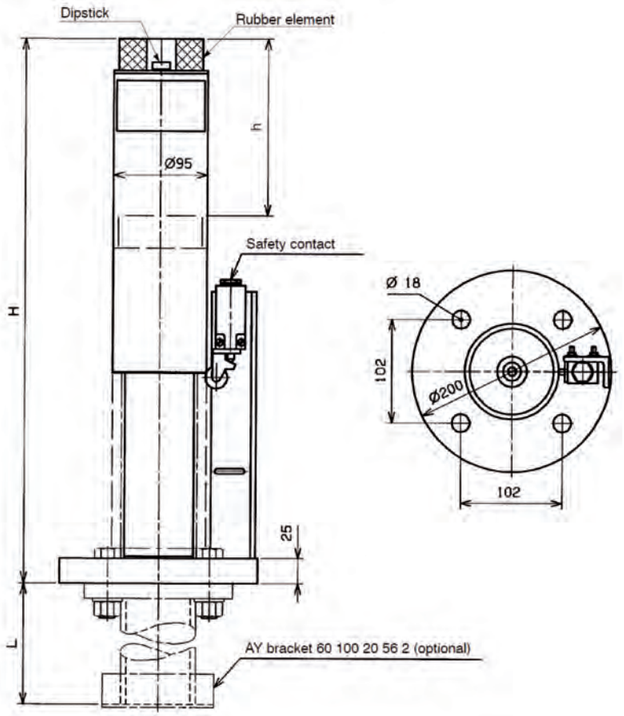


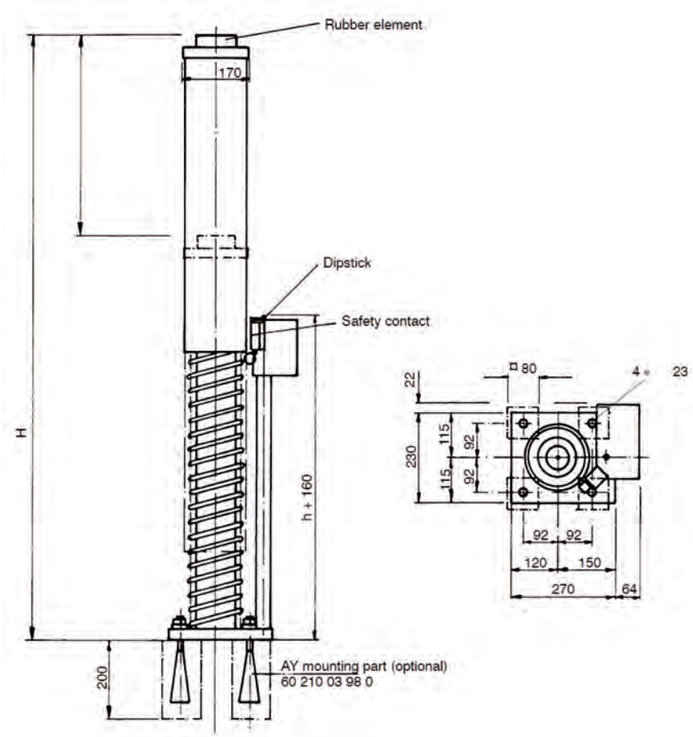
Oil Buffers O1 - O3

EN 81-
20/-50
-conform

EN 81-
20/-50
-conform

Oil Buffers O4 - O5





AY oil buffer			Desi-gnation no.	Speeds max. Impact...	Speeds max. Rated ...	Stroke	Height	Oil quantity	Weight	Permissible total load			
Part no.	Type / Version		EU-B	V_A [m/s]	V_N [m/s]	h [m/m]	H [m/m]	[l]	min [kg]	min [kg]	max [kg]	min [N]	max [N]
60 540 71 01 0	O1	A	001	1,84	1,6	175	540	0,4	14,3	430	1370	4218	13439
60 540 72 01 0		B	002							620	2000	6082	19620
60 540 73 01 0		C	003							970	3020	9515	29626
60 540 74 01 0	O2	A	004	2,3	2,0	275	790	0,61	18,2	430	1370	4218	13439
60 540 75 01 0		B	005							620	2000	6082	19620
60 540 76 01 0		C	006							970	3020	9515	29626
60 540 77 01 0	O3	A	007	2,88	2,5	430	1180	0,94	23,5	430	1370	4218	13439
60 540 78 01 0		B	008							620	2000	6082	19620
60 540 7901 0		C	009							970	3020	9515	29626

AY oil buffer			Desi-gnation no.	Speeds max. Impact...	Speeds max. Rated ...	Stroke	Height	Oil quantity	Weight	Permissible total load			
Part no.	Type / Version		EU-B	V_A [m/s]	V_N [m/s]	h [m/m]	H [m/m]	[l]	min [kg]	min [kg]	max [kg]	min [N]	max [N]
60 540 61 01 0	O1	A	001	1,84	1,6	175	540	0,4	14,3	430	1370	4218	13439
60 540 62 01 0		B	002							620	2000	6082	19620
60 540 63 01 0		C	003							970	3020	9515	29626
60 540 64 01 0	O2	A	004	2,3	2,0	275	790	0,61	18,2	430	1370	4218	13439
60 540 65 01 0		B	005							620	2000	6082	19620
60 540 66 01 0		C	006							970	3020	9515	29626

Buffer

Lift Buffer

EN 81-
20/-50
-conform

EN 81-
20/-50
-conform

Lift Buffer

Buffer

D0

D1

D2

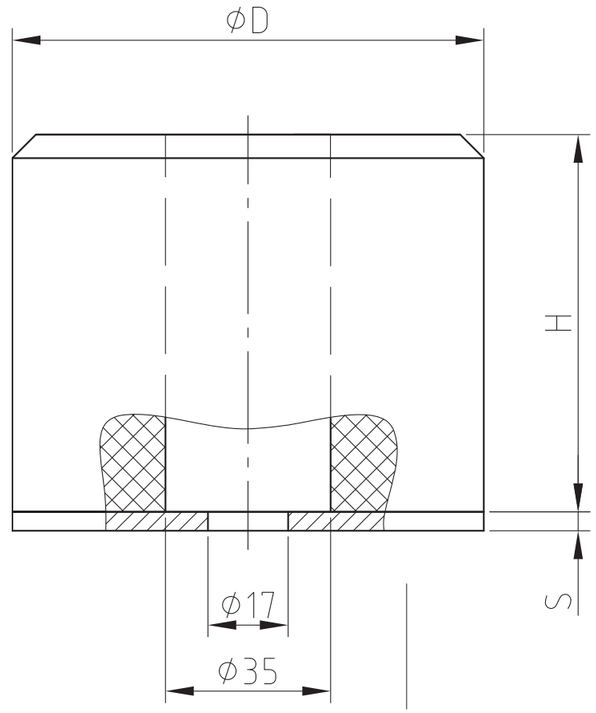
D3

D5

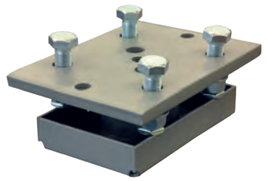
The profile of properties

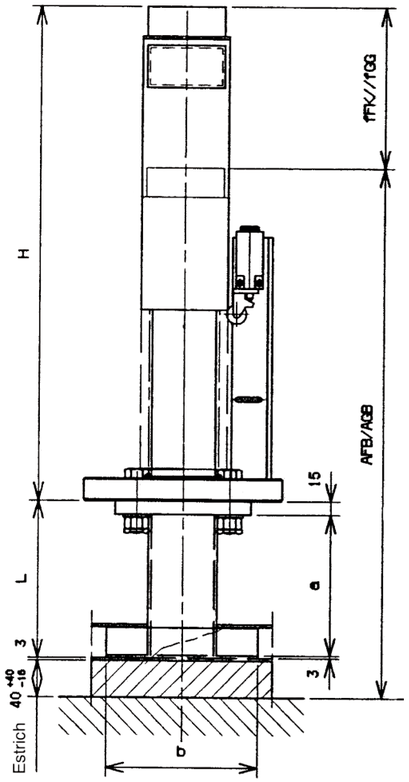
- excellent damping characteristics
- high volume compressibility with manimal transverse expansion
- wide range of permissible loads
- good resistance to ozone as well as ultraviolet and energyrich radiation
- temperature range -30°C bis +80°C
- hydrolysis resistant
- all current fixing variants available

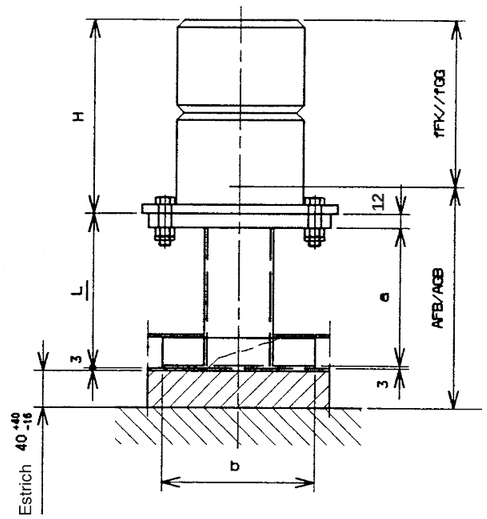
Lift buffers - Version Type A							
			D0	D1	D2	D3	D5
Height	H	[mm]	80	80	80	80	80
Active buffer height	h	[mm]	76	74	74	74	74
Buffer diameter	D	[mm]	80	100	100	125	165
S (+1.0)		[mm]	4				6
Max. rated speed	v	[m/s]	1,0				
Loads			kg				
P+Q (min-max)	0.63	[m/s]	150 - 1200	200 - 1500	250 - 3200	500 - 5200	600 - 7500
	1.0	[m/s]	180 - 600	220 - 700	330 - 1250	600 – 1850	650 - 2700
Material number			6021 000 9222	6021 000 9223	6021 000 9224	6021 000 9225	6021 000 9226

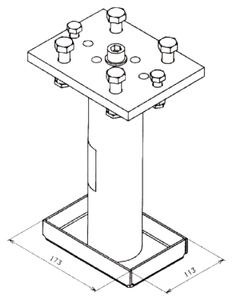


Buffer Uprights



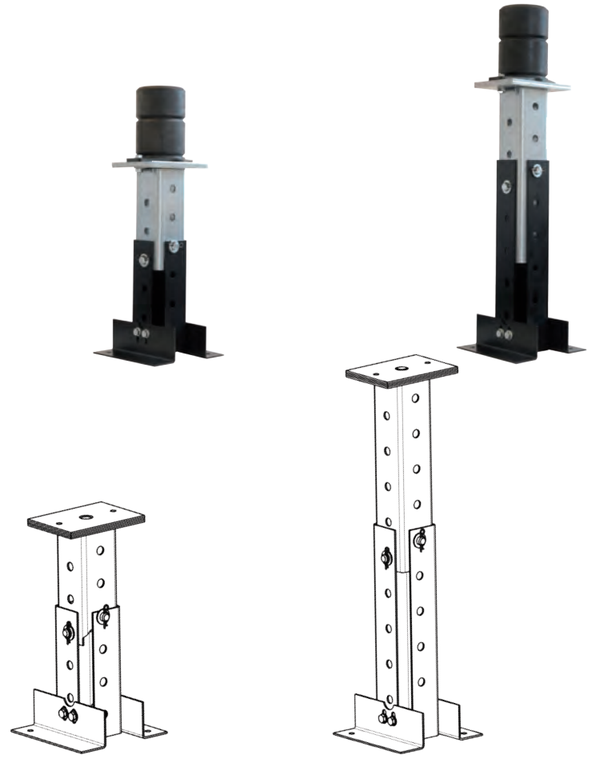






Part number.	Type	Spring buffer perm. Q+P 2600 kg L	Oil bufer perm. Q+P 3020kg L	d in mm
6010 000 9441	FK	715<L≤1115	315<L≤815	82.5
6010 000 9440	GG	715<L≤1115	315<L≤815	82.5
60 100 45 56 0	FK	73<L≤715	73<L≤315	76.1
60 100 46 56 0	GG	73<L≤715	73<L≤315	76.1

Telescopic Buffer Uprights



Telescopic Buffer Upright		
	Buffer Upright 530	Buffer Upright 930
Heights	330 mm - 530 mm	570 mm - 930 mm
Adjustable Range	200 mm (40mm-steps)	360 mm (45mm-steps)
Steel thickness	4 mm	4 mm
Part No.	6010 000 9403	6010 000 9400

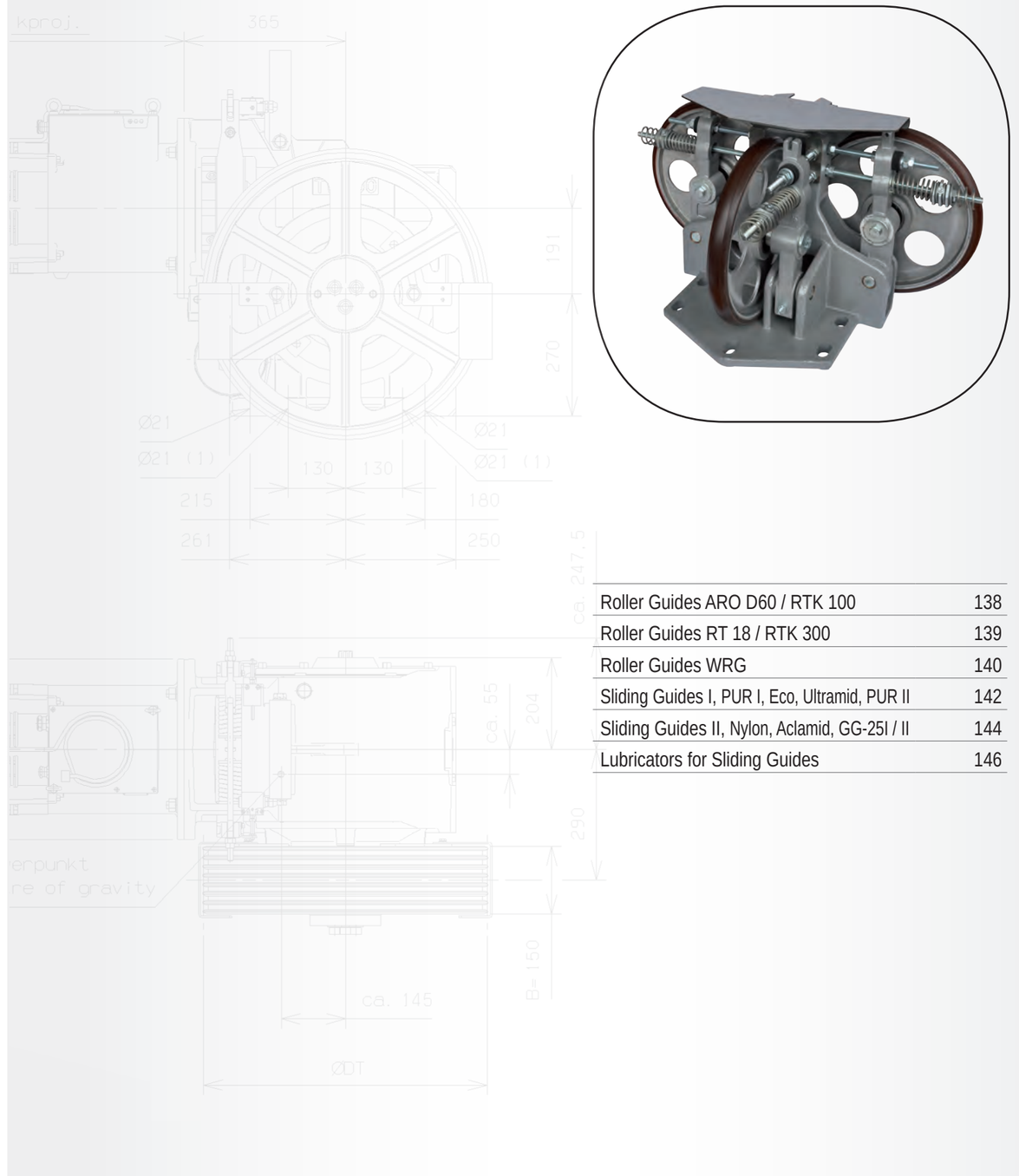
- maximum load: 2600 kg (each buffer upright)
- speeds of up to max. 1 m/s
- suitable for spring buffer type D2 and D5

Mounting advantage

The height can be adjusted to the shaft pit
- to compensate tolerances
- to adjust the height when speed has changed

Own Notes

Roller Guides and Sliding Guides



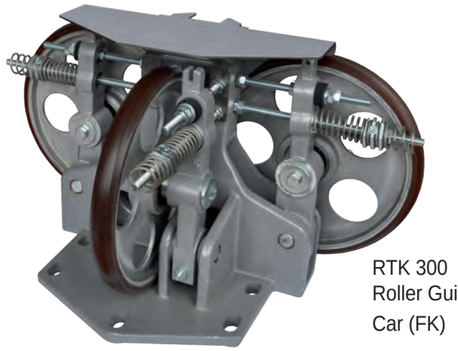
Roller Guides
ARO D60 / RTK 100

Roller Guides
RT 18 / RTK 300

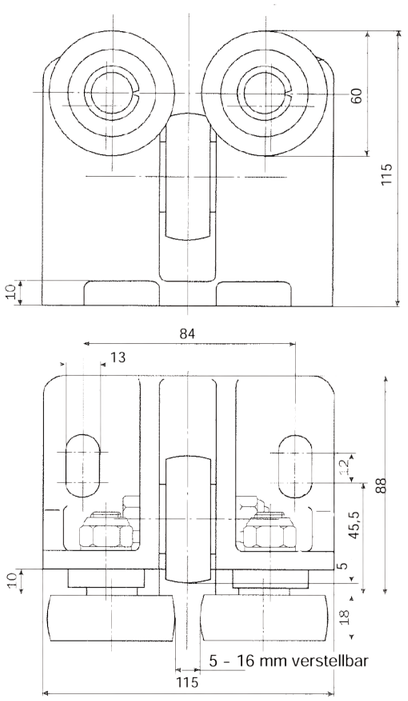
AR0 D60
Roller Guide
Counterweight (GG)

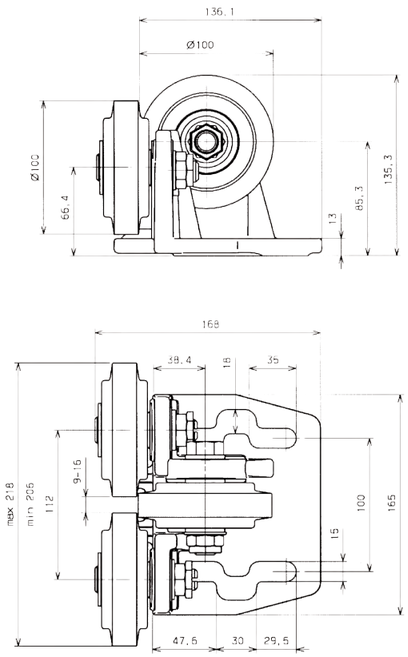
RTK 100 Roller Guide
Car (FK) &
Counterweight (GG)

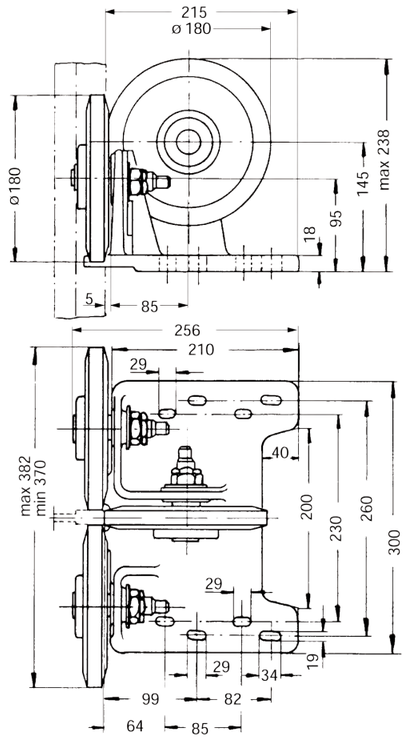
RT 18
Roller Guide
Car (FK)

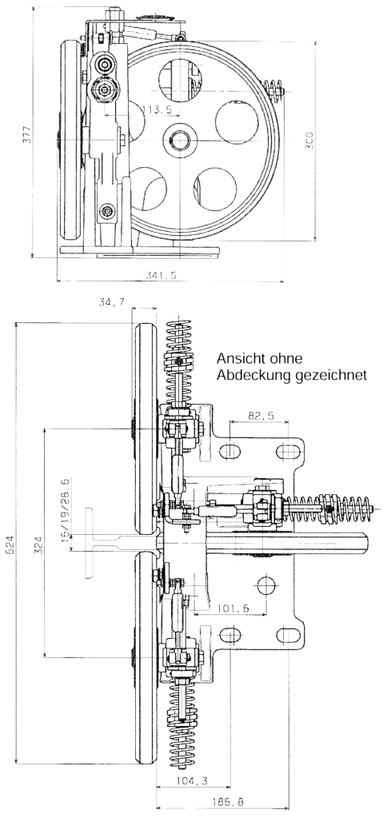


RTK 300
Roller Guide
Car (FK)









Roller Guide AR0 D60	
	6073078010
Speed v_n max. -> FK	---
Speed v_n max. -> GG	2,5 m/s
Width of guide blade SKB [mm]	5 - 16
Counterweight Force G [kN]	35

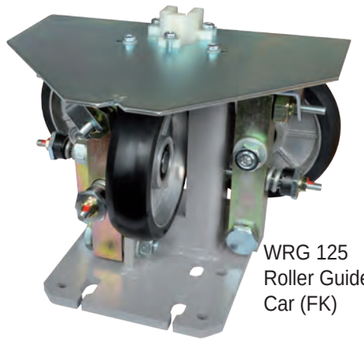
Roller Guide RTK 100	
	60730002940
Speed v_n max. -> FK	1,75 m/s
Speed v_n max. -> GG	3,0 m/s
Width of guide blade SKB [mm]	9 - 16
Conterweight Force G [kN]	50
Guiding Force P_{stat} [N]	1250 // 1350
Guiding Force P_{dyn} [N]	500 // 600

Roller GuideRT 18	
	6073008010
Speed v_n max. -> FK	3,0 m/s
Speed v_n max. -> GG	---
Width of guide blade SKB [mm]	16
Guiding Force P_{stat} [N]	2500
Guiding Force P_{dyn} [N]	800

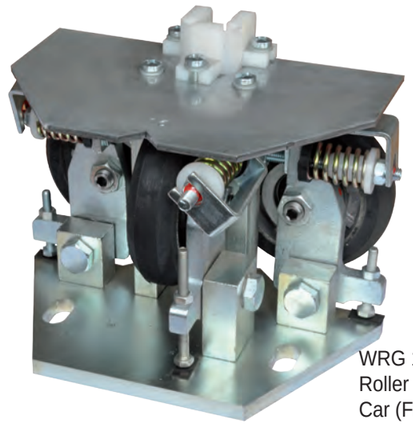
Roller Guide RTK 300	
	60730002079
Speed v_n max. -> FK	10 m/s
Speed v_n max. -> GG	---
Width of guide blade SKB [mm]	16 // 19 // 28,6
Guiding Force P_{stat} [N]	3000
Guiding Force P_{dyn} [N]	depends on spring calibrationg

Roller Guides
WRG

Roller Guides
WRG

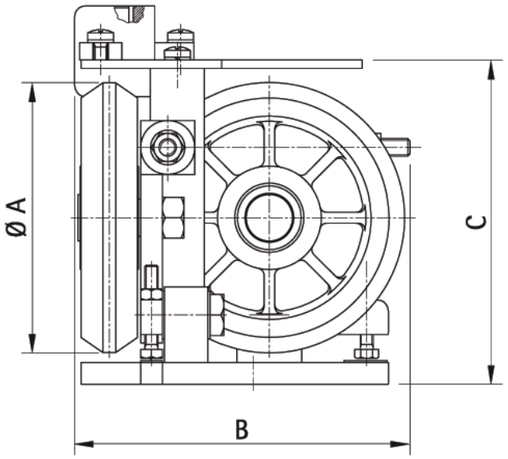


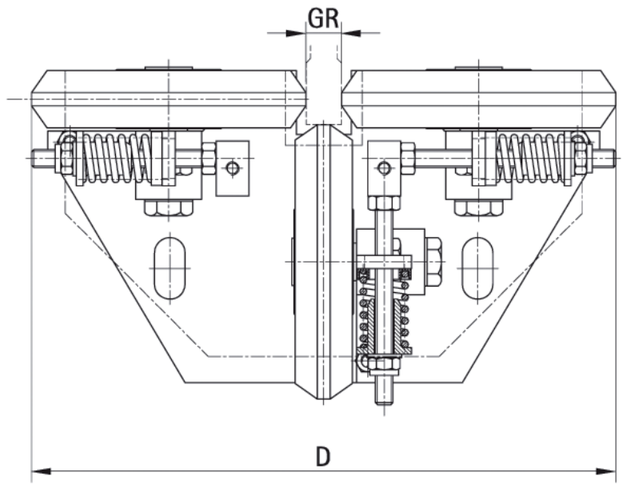
WRG 125
Roller Guide
Car (FK)



WRG 150
Roller Guide
Car (FK) & Counterweight (GG)

WRG 200
Roller Guide
Car (FK)





WRG Roller Guides					
	WRG 80 60730009208	**WRG 100** 60730009209	**WRG 125** 60730009210	**WRG 150** 60730009206	**WRG 200** 60730009211
Speed v_n max. -> FK	---	---	---	3,5 m/s	5,0 m/s
Speed v_n max. -> GG	2,5 m/s	3,5 m/s	7,0 m/s	7,0 m/s	---
Width of the guide blade SKB [mm]	9 16	9 16	9 16	16 19	16 19
Counterweight Force G [N]	100	100	100	100	---
Guiding Force P_{stat} [N]	---	---	---	3000	3000
Guiding Force P_{dyn} [N]	---	---	---	900	900
Dimensions					
A [mm]	80	100	125	150	200
B [mm]	126	143,5	151	200	250
C [mm]	175	150	150	220	220
D [mm]	200	228	266	300+SKB	555

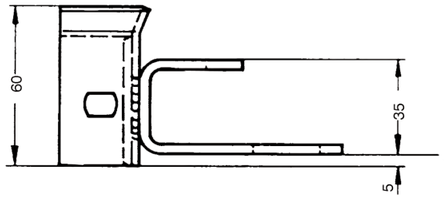
Guides

Sliding Guides I

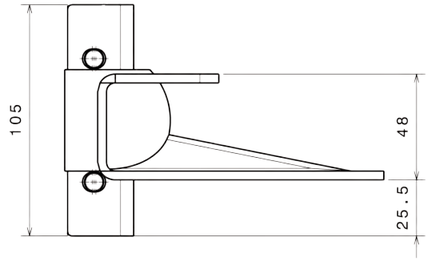
PUR I, Eco

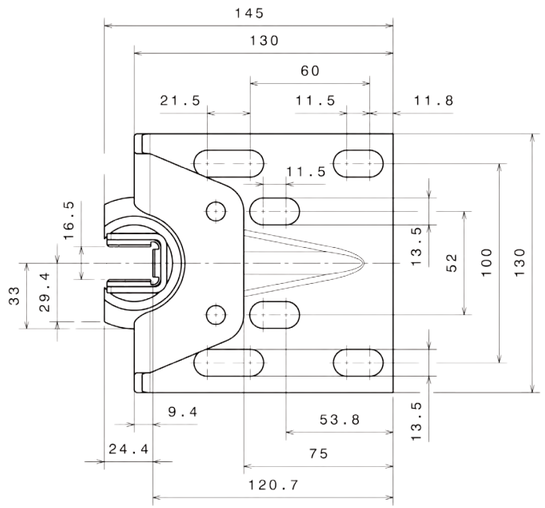
Guides

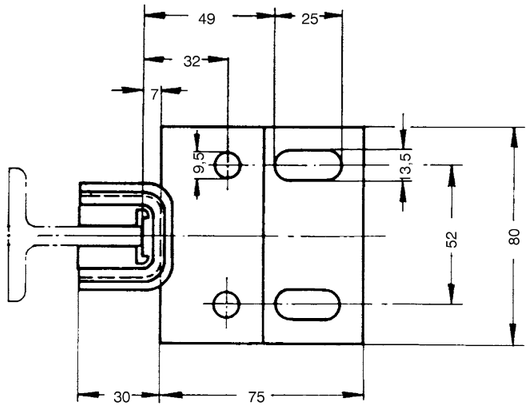
Sliding Guide: Counterweight (GG)
PUR I



Sliding Guide: Car (FK)
Eco





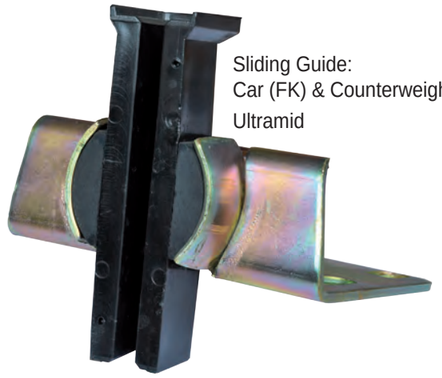


Sliding Guides PUR I	
	6073073010
Speed v_n max. -> FK	---
Speed v_n max. -> GG	1,75 m/s
Width of guide blade SKB [mm]	5
Counterweight Force G [kN	20

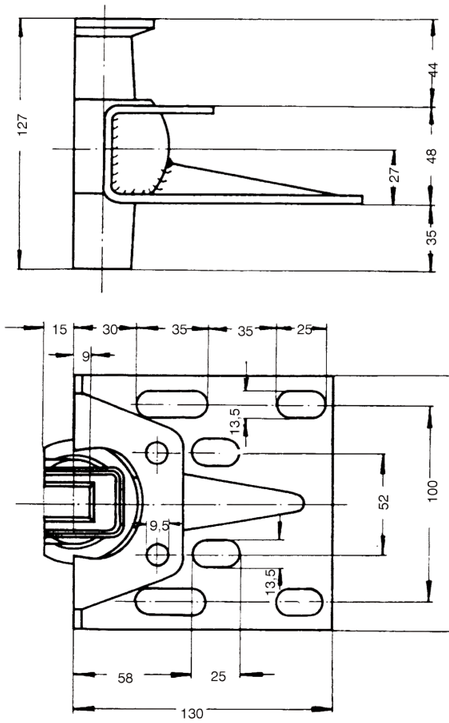
Sliding Guides Eco		
	60730009222	60730009204
Speed v_n max. -> FK	1,0 m/s	1,0 m/s
Speed v_n max. -> GG	---	---
Width of guide blade SKB [mm]	9	16
Guiding Force P_{stat} [N]	1700	1700
Guiding Force P_{dyn} [N]	600	600

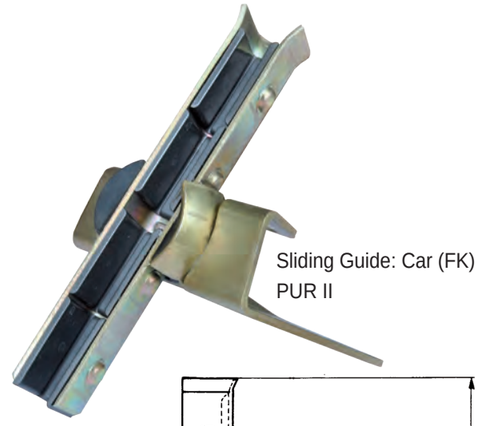
Sliding Guides I

Ultramid, PUR II

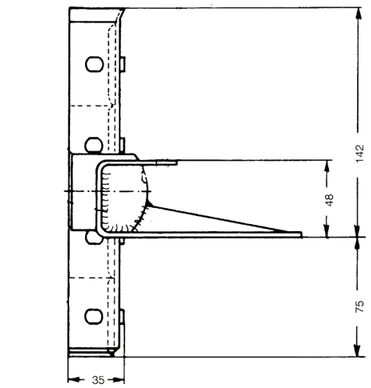


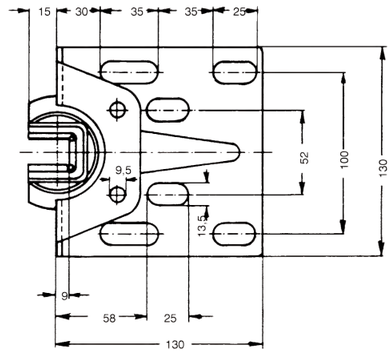
Sliding Guide:
Car (FK) & Counterweight (GG)
Ultramid





Sliding Guide: Car (FK)
PUR II





Sliding Guides Ultramid			
	6073069010	6073063010	6073027010
Speed v_n max. -> FK	---	1,75 m/s	1,75 m/s
Speed v_n max. -> GG	3,5 m/s	3,5 m/s	---
Width of guide blade SKB [mm]	5	9	16
Counter Weight Force G [kN]	50	100	---
Guiding Force P_{stat} [N]	---	1700	1700
Guiding Force P_{dyn} [N]	---	600	600

Sliding Guides PUR II	
	6073066010
Speed v_n max. -> FK	1,75 m/s
Speed v_n max. -> GG	---
Width of tguide blade SKB [mm]	16
Guiding Force P_{stat} [N]	2000
Guiding Force P_{dyn} [N]	800

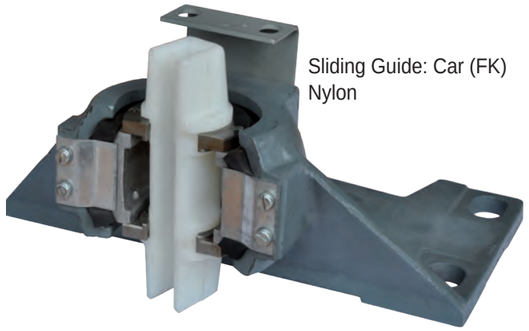
Guides

Sliding Guides II

Nylon, Aclamid

Sliding Guides II

GG-25I, GG25 II

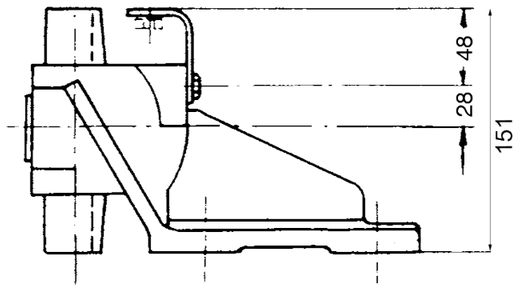


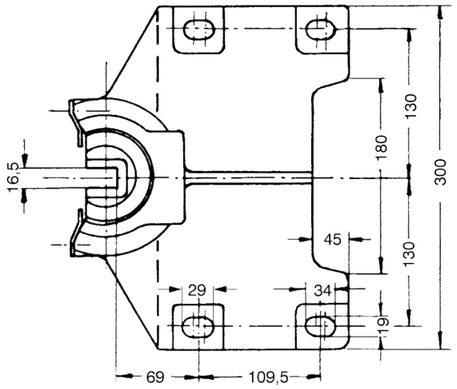
Sliding Guide: Car (FK)
Nylon

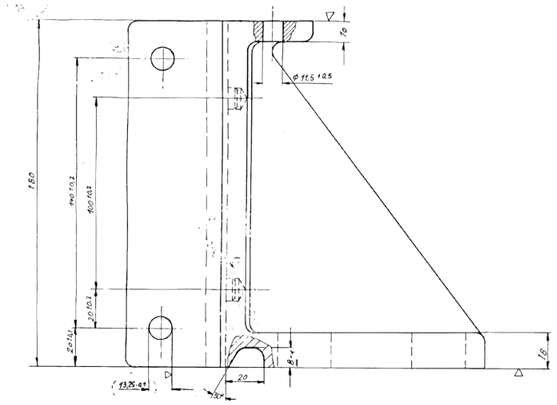
Sliding Guide: Car (FK)
Aclamid

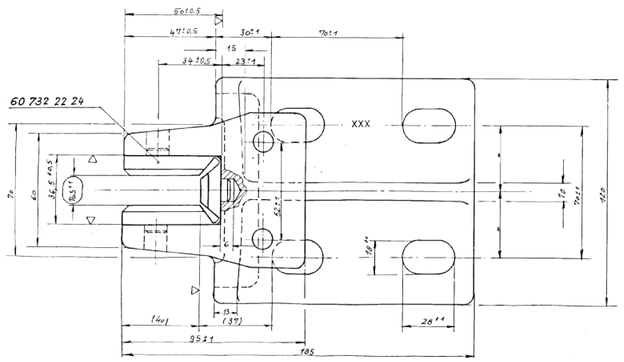
Sliding Guide: Car (FK)
GG-25 I

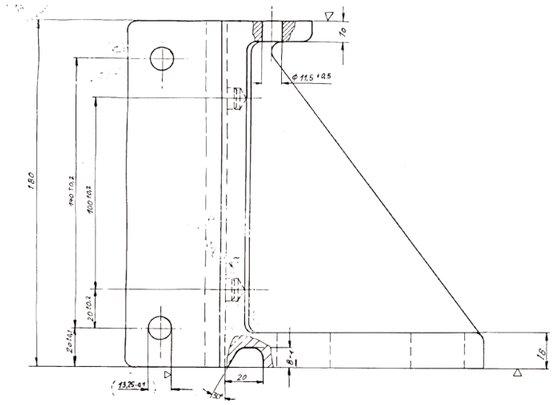
Sliding Guide: Car (FK)
GG-25 II

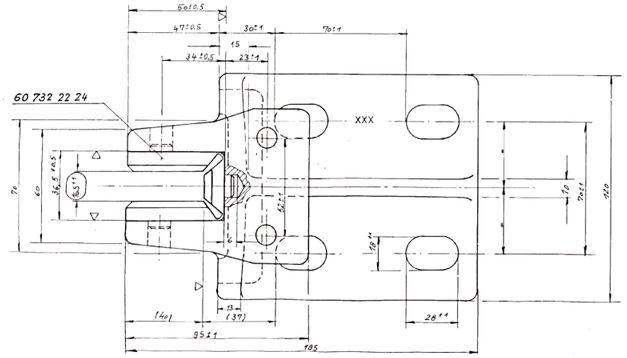


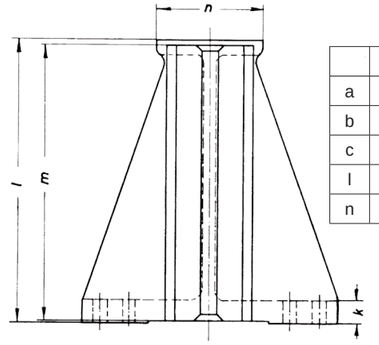




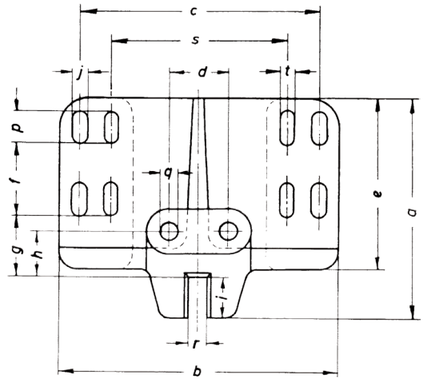








	06240	13242
a	205	280
b	250	480
c	200	400
l	280	300
n	92	130



Sliding Guide Nylon		
	6073047010*	6073046010
Speed v_n max. -> FK	2,0 // 2,5 m/s	2,0 // 2,5 m/s
Width of guide blade SKB [mm]	16	16
Guiding Force P_{stat} [N]	2500 // 2000	2500 // 2000
Guiding Force P_{dyn} [N]	1000 // 800	1000 // 800

Sliding Guide Aclamid	
	6073068010
Speed v_n max. -> FK	1,0 // 1,75 m/s
Width of guide blade SKB [mm]	16
Guiding Force P_{stat} [N]	6000 // 5000
Guiding Force P_{dyn} [N]	3000 // 2500

Sliding Guide GG-25 I	
	6073214240
Speed v_n max. -> FK	0,63 m/s
Width of guide blade SKB [mm]	16
Guiding Force P_{stat} [N]	8000
Guiding Force P_{dyn} [N]	3500

Sliding Guide GG-25 II		
	6073206240	6073213242
Speed v_n max. -> FK	0,63 m/s	0,63 m/s
Width of guide blade SKB [mm]	16	28,6
Guiding Force P_{stat} [N]	18000	34000
Guiding Force P_{dyn} [N]	7000	13000

* inkl. Befestigungsteile für Schmierapparat 60 740 04 01 0

Guides

Lubricators for Sliding Guides

Lubricators for Sliding Guides

Lubricator
60740009201
for Sliding Guides
PUR I 6073073010
Ultramid 6073069010
Ultramid 6073063010
Ultramid 6073027010
GG-25 II 6073213242

Lubricator
6074004010
for Sliding Guides
Nylon 6073046010
Nylon 6073047010
GG-25 I 6073214240
GG-25 II 6073206240

Sliding Guide Car
With guide shoe HSM
6073208250

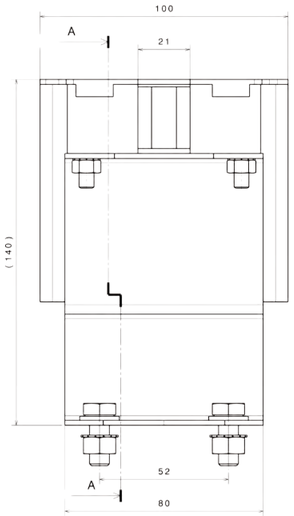
And Aclathan inserts
6073217240 (9 mm)
6073216240 (16 mm)

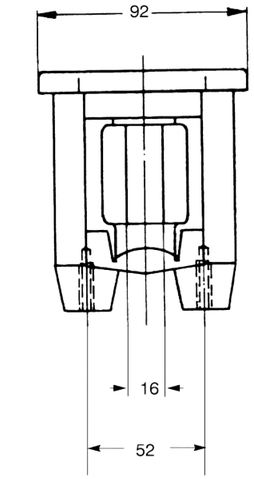
(Mounting on bottom beam)

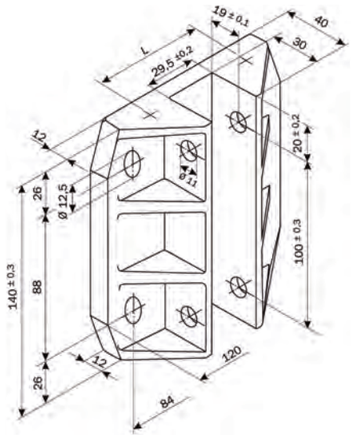
Lubricator AK10
6074009010

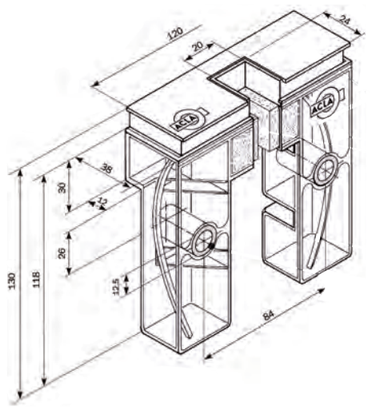
For sliding guide car

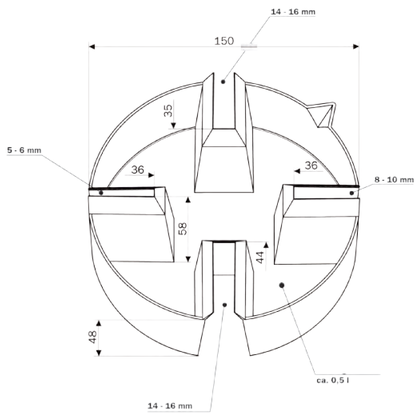
Oil drip receptacle (SKB = 5-16 mm)
60160006205

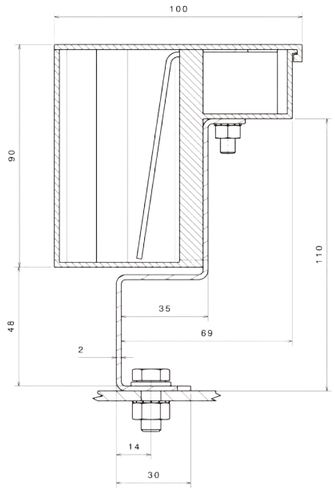


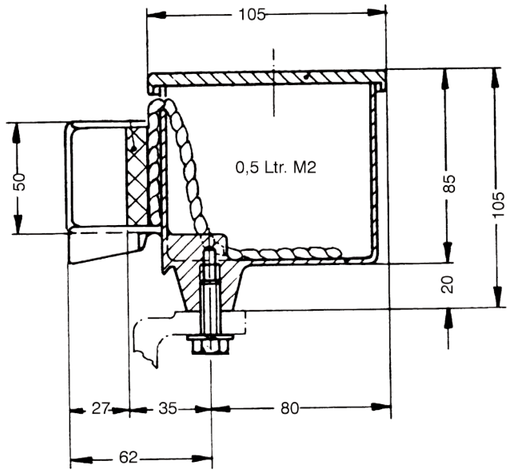






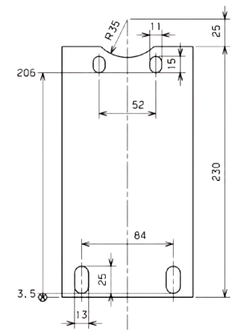






Sliding Guide	
	6073208250 (Guide shoe) inkl. insert
Speed v_n max. -> FK	0,5 - 2,0 m/s
Speed v_n max. -> GG	---
Width of guide blade SKB [mm]	5-16

OPTIONAL:
Mounting elbow for mounting the lubricator AK10 above/below the car sling 60748902980
(Lubricator AK10 is available for every type of sliding guide)



Own Notes

Rope Pulleys and Accessories

Rope Pulleys

Cast iron-/Polyamid-Pulleys

Roller bearings

Accessories

Rope Pulleys

- Highest precision and smoothness
- Extremely resilient
- Extremely attractive price / performance ratio

D [mm]	Ropes z*Ø	RA [mm]	Bp3[5] [mm]	Axle	Bearing Type	Part number
150	7x6	12	110	X	6310 2RS	6072 000 9255
150	10x6	12	145	Y	6310 2RS	6072 000 9229
150	12x6	10	145	Y	6310 2RS	6072 000 9265
240[1]	12x6	10	132	Z	6310 2RS	6250 000 0057
260[1]	6*6,5	11	82	0	6310 2RS	6072 000 7798
320[1]	8*8	14	130	1	NSK 6310	6072 000 9341
360[1]	7*8	14	127	1	6310 2RS	60 720 76 42 0
360	7*8	15	118	2	6310 2RS	6072 000 3603
360	7*8	18	140	3	6310 2RS	60 720 54 42 0
360[2]	7*8	18	140	3	NJ 310 E	60 720 60 42 0
360[3]	z*d	-	140	3	6310 2RS	60 720 71 42 0
360[4]	z*d	-	140	3	NJ 310 E	60 720 71 42 0
400	4*10	18	90	4	6310 2RS	60 720 67 42 0
400[1]	8*10	18	163	5	6312 2RS	6072 000 9342
450[1]	7*10	18	160	5	6312 2RS	6072 000 4885
450[1]	7*10	20	160	5	6312 2RS	6072 000 4884
450	7*10	18	160	5	6312 2RS	60 720 68 42 0
450	7*10	20	160	5	6312 2RS	60 720 55 42 0
450[2]	7*10	20	160	5	NJ 312 E	60 720 62 42 0
450	8*10	18	160	5	6312 2RS	60 720 58 42 0
450[3]	z*d	-	160	5	6312 2RS	60 720 72 42 0
450[4]	z*d	-	160	5	NJ 312 E	60 720 72 42 0
540	7*8	18	160	6	6216 2RSR	60 720 69 42 0
540	7*13	20,5	160	6	6216 2RSR	60 720 65 42 0
540[2]	7*13	20,5	160	6	NJ 216 E	60 720 44 42 0
540[3]	z*d	-	160	6	6216 2RSR	60 720 73 42 0
540[4]	z*d	-	160	6	NJ 216 E	60 720 73 42 0
540	8*13	20,5	190	7	6216 2RSR	60 720 66 42 0
540[2]	8*13	20,5	190	7	NJ 216 E	60 720 59 42 0
540[3]	z*d	-	190	7	6216 2RSR	60 720 73 42 0
540[4]	z*d	-	190	7	NJ 216 E	60 720 73 42 0
640[4]	z*d	-	240	8	NJ 2218	6072 000 0984
740[4]	z*d	-	240	9	NJ 224	6072 000 0976

Specialty: [1]Polyamide-pulley, [2]High load, [3]Variabele*, [4]Variabele* and High load, [5]Overall width of rope pulley, incl. bearing
*Variabele with grooves (z), groove diameter (d), groove distance (RA) .

Axles for Rope Pulleys

Axle[1]	Ø-Axle	Length	Part number
X	50 mm	147 mm	6072 000 9240
Y		182 mm	6072 000 9234
Z		200 mm	6250 000 0058
0		111 mm	6072 000 8541
1		166 mm	60 723 53 32 0
2		135 mm	6072 000 3604
3.0		190 mm	60 723 34 32 0
3.1		240 mm	60 723 50 32 0
4		132 mm	60 723 37 32 0
5	60 mm	216 mm	60 723 35 32 0
		240 mm	60 723 51 32 0
6	80 mm	230 mm	60 723 47 32 0
7		260 mm	60 723 32 32 0
8	90 mm	305 mm	6072 000 0981
9	120 mm	310 mm	6072 000 0980

[1)] relevant axle-numers see page before

Axle Brackes

For Rope Pulley		Part number
Ø 240 mm	40x3x65	6250 000 0059
Ø 360 mm		00 981 03 61 0
Ø 400 mm		00 981 03 61 0
Ø 450 mm		00 981 03 61 0
Ø 540 mm		00 981 04 61 0
Ø 640 mm		00 981 04 61 0
Ø 740 mm		00 981 05 61 0

Pedestal Bearing for Deflection Pulley Fixed on Concrete Foundation (including axle)

For Axle	Part number
3	61 720 07 25 0
5	61 720 08 25 0
6	60 720 64 25 2
8	60 720 65 25 2

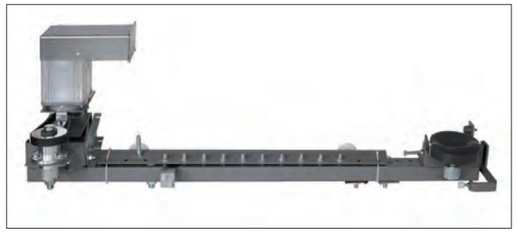
Own Notes

Modernisation for Door Drive F9

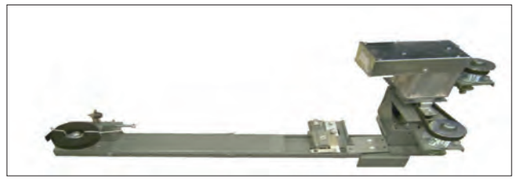
- gearless, frequency-controlled asynchronous motor drive
- quiet operation
- maintenance-free and compact unit of motor and controller
- Controller with clock frequency of 16 kHZ
- high-resolution shaft encoder
- high car heights
- vibration-free drive
- Protection type IP54
- Door width 700-2500 mm
- after reserving, the width that opens the door can be reduced if desired
- programmable special output (virtual switch, closing force limitation, additional end positions signal)
- Power limitation according to EN81
- Diagnostics and Parameterisation automatically or via Laptop
- Mains voltage: 230V (+10% / -15%) AC voltage, 50/60Hz signal voltage
- ambient temperature range: -10°C to + 50°C
- relative humidity max. 70%
- EMV tested according to EN12015/16
- 24V logic level

Door-Modernisation Kits:

- The modernisation solution has been specially designed for the different doors
- Transmission from the drive to the door through a belt
- The modernisationkits are independent from the doorwidth, as they can be adjusted on site
- No necessity for limit switches



Haushahn, TSS72K:
This modernisation kit consists of a console that can be adjusted according to the door width and a special cam that fits to the old door.



Thyssen, M2TD4:
This Modernisation Kit consists of the doordrive F9 which replaces the old telescopic arm by the belt. Furthermore it has a console that can be adjusted according to the existing door width and an instruction manual with drawings.

Thyssen, M3TK/2:
With this solution the old doordrive is replaced by the F9 door drive with a belt.

Thyssen, M2Z/ M2T/ M4TZ (D1,G1,D2,W1,W2,W3,W7):
This Modernisation Kit consists of the F9 door motor, a simple bracket that fits to the above listed old door drives and a drawing for the installation.

Further Modernisation Kits are available for:
Schindler QKS6/QKS8/QKS9/QKS11
For more type of doors that can be modernised, please do not hesitate to contact our sales team.

Own Notes

LEMoS®

The Modular Modernisation Solution

- **Variable modernisation cabin**
- **320 - 1050 kg**
- **Configurable in millimeter increments**
- **Flexible adaptation of various door manufacturers**

System Advantages

Flexible degree of modernisation

With LEMoS, you can individually modernise by using single components in your elevator installation or perform a complete modernisation. The limits are fluid.

What is special about this system is that you can also leave parts in your installation for which replacement would not be technically necessary or make economic sense. This flexibility is unique and carves out a distinct place for LEMoS!
LEMoS opens the possibility of a dust-free conversion process and shortening of the conversion time.
LEMoS can provide all the mechanical components that can be combined with any control systems available on the market.

Optimisation possibilities

The LEMoS elevator system is specially tailored to the high, individual requirements in modernisation.

Regardless of which aspects are important to you during modernisation, with LEMoS you can optimise and combine them with one another unlike with any other system.

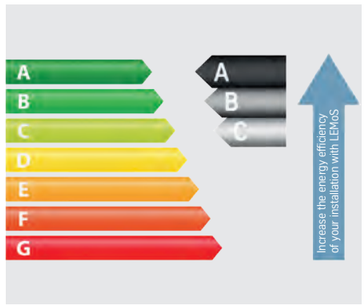
We will work together with you to find the optimal solution for your elevator installation, individually tailored to your requirements and wishes.

LEMoS with gearless drive

LEMoS with geared drive

Flexibility in the drive solution

At LEMoS we use cutting-edge drive solutions which are matched to the particular requirements in modernisation. The optimum solution for your installation is chosen from a wide range of gearless and geared drives to suit the application.



Energy efficiency

With the flexible LEMoS system, you can – depending on the scope of the modernised components – considerably improve energy efficiency compared to your existing installation.
You can make significant savings for example with the use of standby operation mode or by using frequency inverters with energy recovery capability.
Modern LED lighting also increases your energy savings.

All components used by LEMoS are designed so that your modernised installation achieves high levels of energy efficiency in accordance with VDI 4707.

You can thereby make a considerable contribution to the reduction of ongoing operating and energy costs and the lowering of CO_2 emissions.

LEMoS®

System Advantages / Elevator Car P450SV/P1000SV

Modernisation

System perspective

The existing installation is adapted using state of the art technology to provide the very best technical solution within the framework of a modernisation.

The customers requirements with regard to his installation and compliance with all current regulations are also considered during planning, project implementation.

For a comprehensive modernisation the elevator car component is of central importance. Important aspects here are:

- Safety requirements in acc. with EN81-20
- Requirements from the German regulation for operational safety of machinery
- Requirements in acc. with EN 81-70 regarding access for persons with disabilities
- Energy efficiency in acc. with VDI 4707
- Sound insulation requirements
- Improved comfort and design with of space utilisation
- Reusing as many non-value existing components as possible, such as rails, counterweight and possibly door frame, i. e. dust-free conversion and a reduction of costs to the customer.
- Rapid conversion and short down times

Scope of supply and performance

- Project planning base on the existing shaft dimensions provide the best shaft utilisation thanks to variable elevator car dimensions
- Modular modernisation in various stages as an option
- Drive technology, safety components, elevator car, doors as per customer requirements, shaft equipment (rails, bracket, counterweight)

- Combination with any control systems and operating and elements available on the market

The elevator car, flexible for modernisation

In modernisation there are many constraints that must be taken into consideration in the complex planning of a lift modernisation. From the customer perspective the elevator car is one of the main visible components that must satisfy the requirements with regard to size – disability friendly requirements and design.
With the P450SV and P1000SV elevator car series we offer an elevator car that is flexible and adaptable to modernisation needs. The elevator car is a self-supporting construction with integrated car sling for 1:1 suspension.
The shaft width and depth dimensions can be adapted in millimetre increments to the existing site conditions ensuring all available area is used. Different elevator car heights are available, together with doors of different manufacturers.
As a result of planning the shaft cross-section we can prepared the offer precisely meeting the customers needs.

Innovation

- Specially developed for modernisation
- Enlarged elevator car thanks to optimum shaft utilisation
- Variable concept with flexible width, depth and height dimensions
- Integrated ventilation slots in the car front wall
- Flexible door mountings
- Fast and simple assembly (thanks to integrated positioning aids)
- Adaptable off-centre suspension during assembly (for subsequent alignment of the installed elevator car in the shaft)

Efficiency

- Self-supporting elevator car without car sling with 1:1 suspension
- Compact and variable elevator car
- Largest possible available car floor area
- Elevator car configurable in millimetre increments

Reliability

- Strict quality inspection ensures high quality of all installed components
- Guarantee of the long term supply of spare parts
- Reduced down times and faults

Variability

- From the basic model (galvanised elevator car) to individual full equipment specification – everything is possible
- Large number of interfaces (e.g. doors of different manufacturers)
- Different materials possible

Environment

- Energy-efficient production with cutting-edge manufacturing technologies
- Use of recyclable materials
- Optimised use of materials
- Energy-saving LED lighting

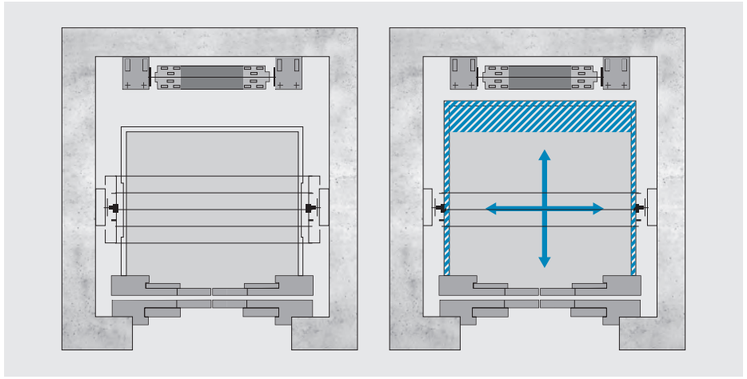
Modernisation – Optimised to your Requirements

Space optimisation

Older elevator installations frequently have smaller car dimensions which fail to meet today's demands for comfort and legal requirements. In existing buildings you cannot however, change the shaft dimensions.

With the LEMoS system, we offer you the unique possibility to make better use of the existing shaft and use the largest possible elevator car.

The new, self-supporting elevator car has a compact, load-bearing structure and can be adjusted to fit the existing shaft in millimetre increments. In addition, space-optimised shaft equipment and doors with reduced depth can be used.



All measures serve to offer the passengers a more spacious elevator car and to improve the handling capacity of the installation. Older people and people with disabilities will, in particular, be very much appreciate the additional freedom of movement.

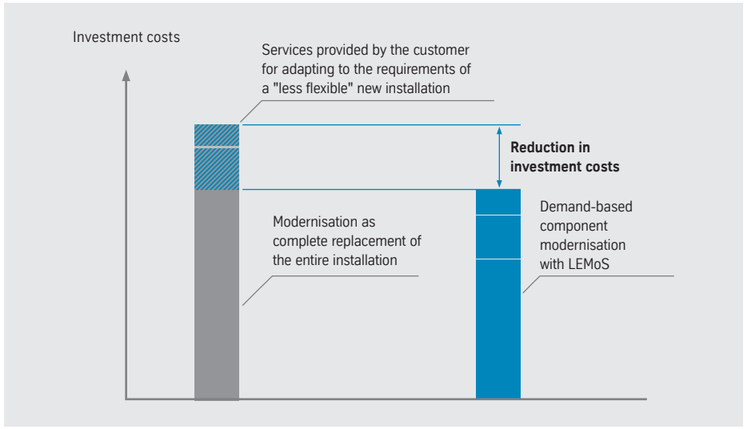
With the flexible LEMoS system you can if you wish naturally use your existing elevator car or retain the car dimensions.

Cost optimisation

In the development of the LEMoS system, we have placed special emphasis on the aspect of economic efficiency in modernisation. This applies both to the investment for the modernisation itself as well as to the ongoing running costs.

The LEMoS components have such flexible interfaces that all parts which are exposed to little wear and do not need to be replaced, such are for example guide rails and counterweights.
This reduces the modernisation costs as well as the installation time. Parts of the shaft equipment, landing doors or door frames can frequently be re used.

The LEMoS components represent the latest state of the art equipment and manufacturing techniques. They are optimised for long service life and low power consumption.



The ongoing operating expenses are significantly reduced.

LEMoS®

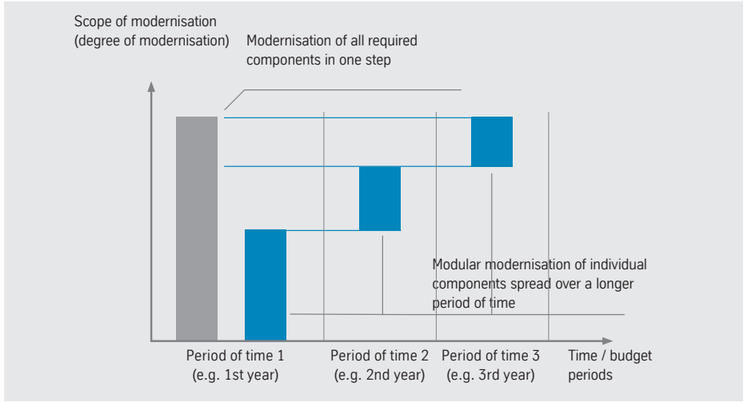
Modernisation – Optimised to your Requirements

Modernisation

Budget optimisation
'Step by Step' modernisation

Depending on scope, the modernisation of your elevator installation may represent a larger investment. If you prefer to spread these costs over several budget periods or years, we can prepare a modernisation plan work within your budget. This takes into account both the technical necessities as well as your budget.

The modernisation of individual components then takes place over a longer period of time, spread over several stages. The down time is, of course, kept to a minimum during the work. Between the individual stages of the modernisation, you will always have available a safe and fully functional elevator installation.



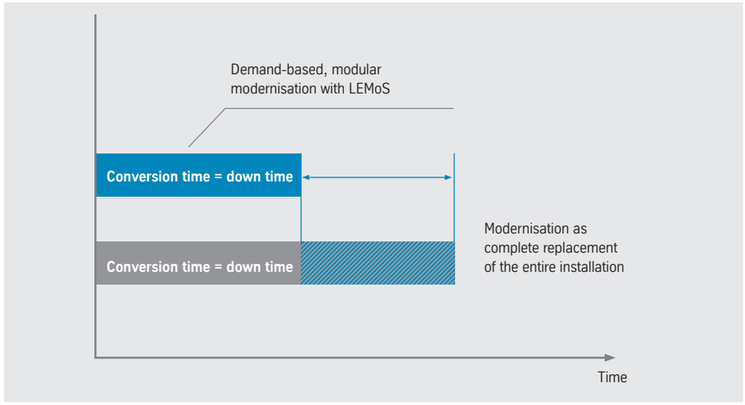
The scope and features of the individual modernisation packets can be freely selected and can be adapted to the available budget. The matched LEMoS system ensures that all components go together perfectly. When all measures have been completed, you get a modernised elevator that represents the latest state of the art equipment.

Optimisation of the conversion time

During extensive modernisation, down times of your elevator installation cannot be completely avoided. With the LEMoS system, we can, however, keep this to a minimum with concern for the passengers.

Parts of the system which are exposed to minimal wear or which would require considerable time to replace, such as the shaft equipment (rails, bracket, counterweight), can be integrated in your modernised elevator and continue to be used due to the high flexibility of the components.

Compared to a complete replacement, this eliminates time-intensive and costly measures. In addition, with the modular LEMoS system, we can prepare a phased modernisation schedule for you in which the modernisation measures are performed during times of low use.



A shortened conversion time and fewer measures performed by the customer also reduce stress for the building tenants caused by noise and dirt. Less additional work is necessary for adapting the doors on the landing.

Modernisation according to Individual Requirements

Control system

- Our components are tested with all the control systems available on the market
- Energy efficiency options such as standby and sleep mode can be activated in our components

Drive and control

- Very smooth running
- Reduction of operating costs through energy savings
- Increase in safety level
- Maximum efficiency
- Energy recovery optional

Safety technology

- Increase in the safety level to the current state of the art
- Fulfilment of the obligations of the installation operator
- Reliable increase in the availability of the installation

Shaft equipment

- Optimal utilisation of space in the shaft
- Larger dimensions of the elevator car possible
- Flexible components, such as counterweight, rail bracket ...
- Reduction of running noise

Pictured:
- with gearless drive in the machine room

Modernisation according to Individual Requirements

Modernisation

Landing and car door

- Reduction of door operating times
- Increase in safety level
- Designed to accommodate disabled passengers by means of light grid
- Increase in installation availability
- Modern, attractive appearance
- Doors with different door mounting dimensions

Elevator car

- Maximization of car dimensions possible
- Increase in the rated load possible
- Modern, attractive design
- Positive effect on image & increase in building value

Lighting

- Design possibilities through light for a relaxing atmosphere
- Energy- and cost-saving LED lighting
- Integrable emergency light function
- Long working life, considerably reduced maintenance expenses

Operating and indicator elements

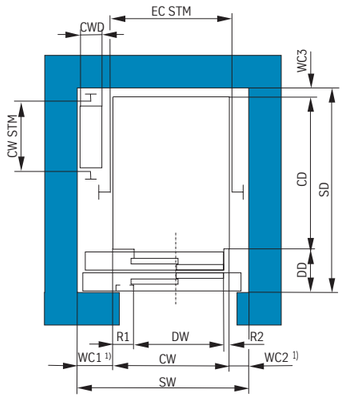
- The choice can be made with all the elements combinable for the selected control system
- Elderly- and disabled-friendly design in acc. with EN 81-70

Pictured:
- with geared drive in the machine room

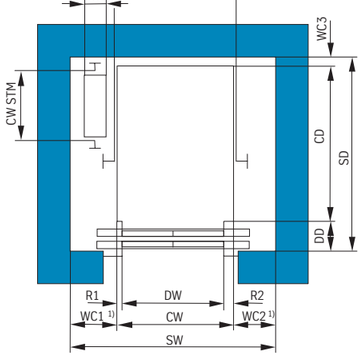
Project Planning and Performance Data (side counterweight)

Rated load 320 kg ≤ Q ≤ 550 kg

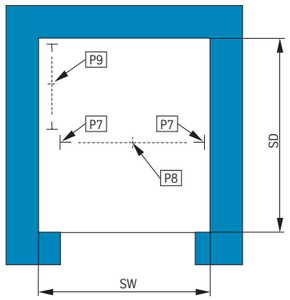
Shaft layout with side-opening door



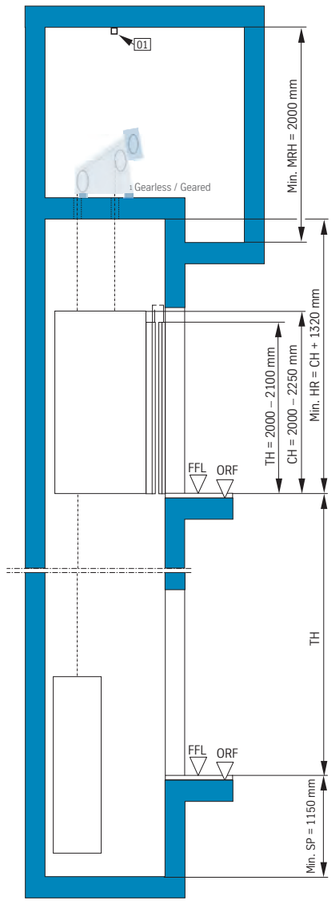
Shaft layout with centre-opening door



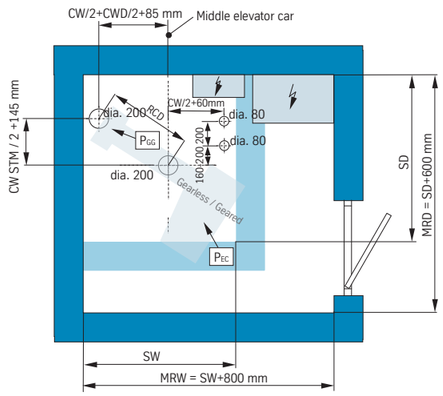
Shaft pit



R1 - door recess, left
R2 - door recess, right
[1] The larger value is valid.
For the values C1 and C2
see table on Pages 17/18.
Pictured load points in the machine room for gearless drive.



Machine room



Project Planning and Performance Data (side counterweight)

Rated load 320 kg ≤ Q ≤ 550 kg

Modernisation

Performance data and principal dimensions with side counterweight without dual entrance (rope suspension 1:1)

Rated load [1]		Q	[kg]	**320**	**350**	**375**	**400**	**425**	**450**	**500**	**550**
Speed		v	[m/s]	1.0							
Max. travel height		TH	[m]	40							25
Dual entrance				No							
Number of passengers				4		5			6		7
Car width	(in 1 mm	Min. CW	[mm]	800						850	
	steps)	Max. CW	[mm]	850	900	950	1000	1100	1150	1250	1350
Car depth	(in 1 mm	Min. CD	[mm]	1050							
	steps)	Max. CD	[mm]	1100	1200	1300	1350	1450	1500	1550	1650
Car height		CH	[mm]	2000 – 2250 (min. CH = DH; max. CH = DH + 150 mm)							
Side wall clearance, side GG		WC1	[mm]	225 (for counterweight depth 100 mm)							
		WC2	[mm]	140 – 300							
Shaft width		Min. SW [2]	[mm]	1165						1215	
		Max. SW [2]	[mm]	1375	1425	1475	1525	1625	1675	1775	1875
Rear wall clearance		Min. WC3 [3]	[mm]	70							
Door packet thickness		DD	[mm]	155 – 295 (depending on door model and door type, see Pages 17/18)							
Shaft depth		Min. SD	[mm]	1300							
		Max. SD	[mm]	1490	1590	1690	1740	1840	1890	1940	2040
Headroom height		Min. HR	[mm]	3320 – 3570 (Min. HR = CH + 1320 mm)							
Pit depth		Min. SP	[mm]	1150 / 1550 [4]							
Clearance - rail bracket		Max. l	[mm]	2500	2450	2400	2200	2150	2100	2000	2000
Distance between elevator car guide rails		EC STM	[mm]	CW + 40							
Rope clearance dimension		RCD	[mm]	variable							
Load point in machine room		P_{GG}	[kN]	35.7	36.8	37.5	38.5	39.9	40.9	43.0	48.4
Load point in machine room		P_{EC}	[kN]	19.2	19.9	20.3	20.8	21.5	22.1	23.2	26.1
Installation eye in machine room		E1	[kN]	5.0							
Load point in the shaft pit		P7	[kN]	13.1	13.6	13.9	14.3	13.7	14.1	16.0	17.4
Load point in the shaft pit		P8	[kN]	40.5	42.2	43.8	45.3	43.1	44.8	52.3	58.7
Load point in the shaft pit		P9	[kN]	32.3	33.4	34.1	34.9	36.4	36.9	39.4	44.1

[1] The rated load depends on the car dimensions and on the installed car door. To determine the actual rated load, see table "Rated load depending on car width and car depth" on Page 15. [2] The values for the lateral wall clearances WC1/WC2 and the resulting shaft widths have unrestricted validity only if the existing doors are retained. As soon as new doors are installed, the permissible values for the shaft width must be determined depending on the door model, the door type and the door width. See table "Dimensions of the landing doors for project planning" on Pages 17/18. [3] The horizontal, free clearance between outer edge of the elevator car and shaft rear wall must be at least 50 mm (including installation tolerances). The specified dimension also contains the installation depth of the wall panels of 20 mm, because it is referred to the car inner side. [4] The minimum pit depth is 1550 mm for CW x CD = 800 x 1100 - 1200 mm and for CW x CD = 850 x 1150 - 1200 mm.

Determination of the maximum possible car dimensions with side counterweight (rope suspension 1:1)

Car width	=	Shaft width	–	Wall clearance, left	–	Wall clearance, right
CW	=	SW	–	WC1	–	WC2
CW	=	SW	–	(C1 - R1 + IT + "air")	–	(C2 - R2 + IT + "air")
CW	=	SW	–	(C1 - R1 + 25 mm + 10 mm)	–	(C2 - R2 + 25 mm + 10 mm)
Max. CW	=	**SW**	–	**225 mm**	–	**140 mm**

Car width	=	Car gauge between rails	–	2 x distance from elevator car to rail
CW	=	**CGBR**	–	**2 x 20 mm**

Without dual entrance

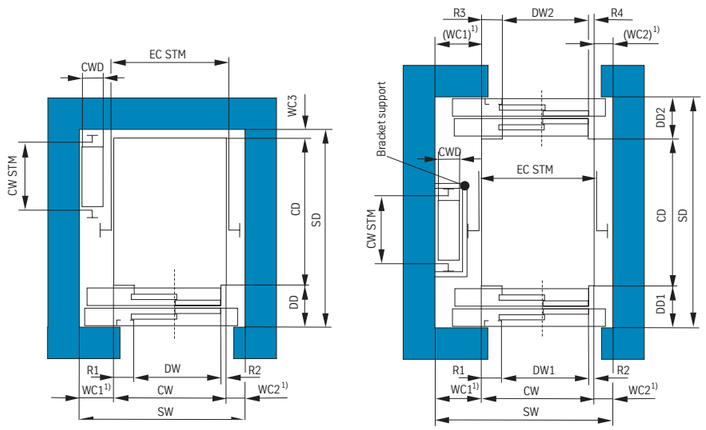
Car depth	=	Shaft depth	–	Door packet thickness	–	Rear wall clearance	–	Installation tolerance, door side
CD	=	SD	–	DD	–	WC3	–	IT
CD	=	SD	–	(155 to 295 mm)	–	70 mm	–	25 mm
Max. CD	=	**SD**	–	**155 mm**	–	**70 mm**	–	**25 mm**

IT – installation tolerance (± 25 mm); C1 / C2 – door dimensions, space requirements of the door panels in shaft width; R1 – door recess, left; R2 – door recess, right; installation tolerances of ± 25 mm each are included in wall clearance dimensions WC1, WC2 and WC3.

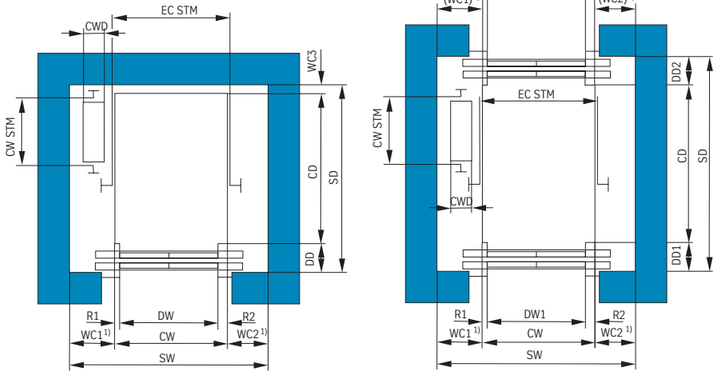
Project Planning and Performance Data (side counterweight)

Rated load 630 kg ≤ Q ≤ 1050 kg

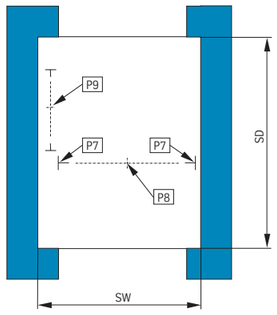
Shaft layout with side-opening door



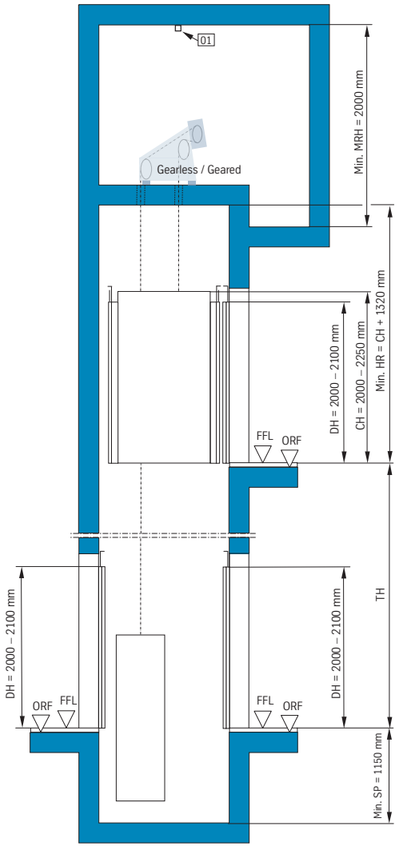
Shaft layout with centre-opening door



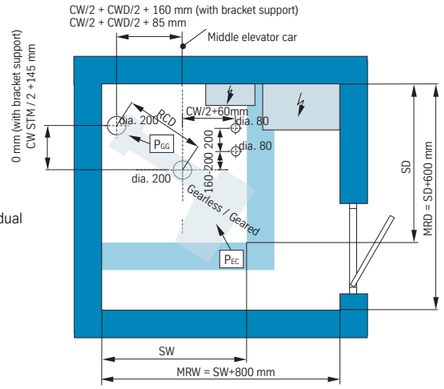
Shaft pit



Prerequisites for version with dual entrance:
Door recess dimension R1 or R2 >= 90 mm on main entrance side and R3 or R4 >= 90 mm on rear side; dual entrance is not otherwise possible.
R1 - door recess, left
R2 - door recess, right
1) The larger value is valid.
For the values C1 and C2 see table on Pages 17/18.
Pictured load points in the machine room for gearless drive.



Machine room



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Project Planning and Performance Data (side counterweight)

Rated load 630 kg ≤ Q ≤ 1050 kg

Modernisation

Performance data and principal dimensions with side counterweight without / with dual entrance (rope suspension 1:1)

Rated load [1]		Q	[kg]	**630**	**750**	**825**	**900**	**1000**	**1050**
Speed		v	[m/s]	1.0					
Max. travel height		TH	[m]	40					
Dual entrance				Yes/No					
Number of passengers				8	10	11	12	13	14
Car width	(in 1 mm	Min. CW	[mm]		900		1000	1100	
	steps)	Max. CW	[mm]	1500			1600		
Car depth	(in 1 mm	Min. CD	[mm]	1050	1150	1200	1300	1450	
	steps)	Max. CD	[mm]	1750	2000	2100			
Car height		CH	[mm]	2000 – 2250 (min. CH = DH; max. CH = DH + 150 mm)					
Side wall clearance, side GG		WC1	[mm]	255 (without bracket support); 330 (with bracket support) [2]					
		WC2	[mm]	140 – 300					
Shaft width		Min. SW [3]	[mm]		1295		1395	1495	
		Max. SW [3]	[mm]	2130	2230				
Rear wall clearance		Min. WC3 [4]	[mm]	70 (without dual entrance)					
Door packet thickness		DD	[mm]	155 – 295 (depending on door model and door type, see Pages 17/18)					
Shaft depth	(without dual entrance)	Min. SD	[mm]	1300	1400	1450	1550	1700	
	(without dual entrance)	Max. SD	[mm]	2140	2390	2490			
	(with dual entrance)	Max. SD	[mm]	2390	2640	2740			
Headroom height		Min. HR	[mm]	3320 – 3570 (min. HR = CH + 1320 mm)					
Pit depth		Min. SP	[mm]	1150					
Clearance - rail bracket		Max. I	[mm]	2750			2500		2200
Distance between elevator car guide rails		EC STM	[mm]	CW + 40					
Rope clearance dimension		RCD	[mm]	variable					
Load point in machine room		P_{GG}	[kN]	63.9	68.2	70.9	73.6	77.4	
Load point in machine room		P_{EC}	[kN]	34.4	36.7	38.2	39.7	41.7	
Installation eye in machine room		E1	[kN]	10.0					
Load point in the shaft pit		P7	[kN]	24.0	25.5	26.5	27.5	29.0	30.5
Load point in the shaft pit		P8	[kN]	75.0	81.5	86.0	90.5	97.0	101.5
Load point in the shaft pit		P9	[kN]	59.0	62.5	65.5	68.0	69.0	72.5

1) The rated load depends on the car dimensions and on the installed car door. To determine the actual rated load, see table "Rated load depending on car width and car depth" on Pages 15/16. 2) Without dual entrance: WC1 = 255 mm (without bracket support) with min. CD >= 1520 mm, otherwise WC1 = 330 mm (with bracket support). With dual entrance: WC1 = 255 mm (without bracket support) with min. CD >= 1680 mm, otherwise WC1 = 330 mm (with bracket support). 3) The values for the lateral wall clearances WC1/WC2 and the resulting shaft widths have unrestricted validity only if the existing doors are retained. As soon as new doors are installed, the permissible values for the shaft width must be determined depending on the door model, the door type and the door width. See table "Dimensions of the landing doors for project planning" on Pages 17/18. 4) The horizontal, free clearance between outer edge of the elevator car and shaft rear wall must be at least 50 mm (including installation tolerances). The specified dimension also contains the installation depth of the wall panels of 20 mm, because it is referred to the car inner side.

Determination of the maximum possible car dimensions with side counterweight (rope suspension 1:1)

Car width	=	Shaft width	–	Wall clearance, left	–	Wall clearance, right
CW	=	SW	–	WC1	–	WC2
CW	=	SW	–	(C1 - R1 + IT + "air")	–	(C2 - R2 + IT + "Luft")
CW	=	SW	–	(C1 - R1 + 25 mm + 10 mm)	–	(C2 - R2 + 25 mm + 10 mm)
Max. CW	=	**SW**	–	**255 mm**	–	**140 mm**

Car width	=	Car gauge between rails	–	2 x distance from elevator car to rail
CW	=	**CGBR**	–	**2 x 20 mm**

Without dual entrance

Car depth	=	Shaft depth	–	Door packet thickness	–	Rear wall clearance	–	Installation tolerance, door side
CD	=	SD	–	DD	–	WC3	–	IT
CD	=	SD	–	(155 to 295 mm)	–	70 mm	–	25 mm
Max. CD	=	**SD**	–	**155 mm**	–	**70 mm**	–	**25 mm**

With dual entrance

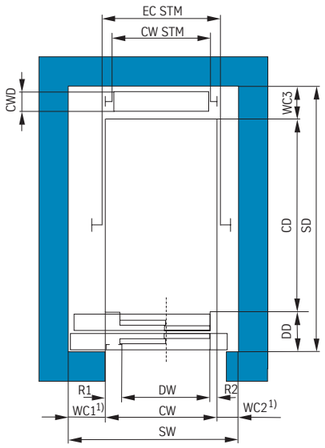
Car depth	=	Shaft depth	–	Thickness of door packet (1st entrance)	–	Thickness of door packet (2nd entrance)	–	2 x installation tolerance, door sides
CD	=	SD	–	DD (1st entrance)	–	DD (2nd entrance)	–	2 x IT
CD	=	SD	–	(155 to 295 mm)	–	(155 to 295 mm)	–	2 x 25 mm
Max. CD	=	**SD**	–	**155 mm**	–	**155 mm**	–	**50 mm**

IT – installation tolerance (± 25 mm); C1 / C2 – door dimensions, space requirements of the door panels in shaft width; R1 – door recess, left; R2 – door recess, right; installation tolerances of ± 25 mm each are included in wall clearance dimensions WC1, WC2 and WC3.

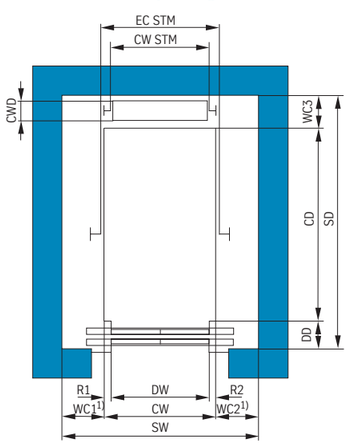
Project Planning and Performance Data (rear counterweight)

Rated load 320 kg ≤ Q ≤ 550 kg

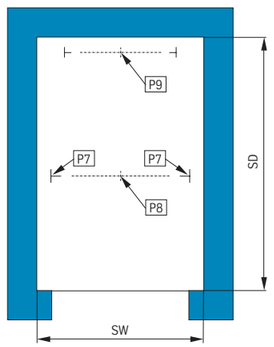
Shaft layout with side-opening door



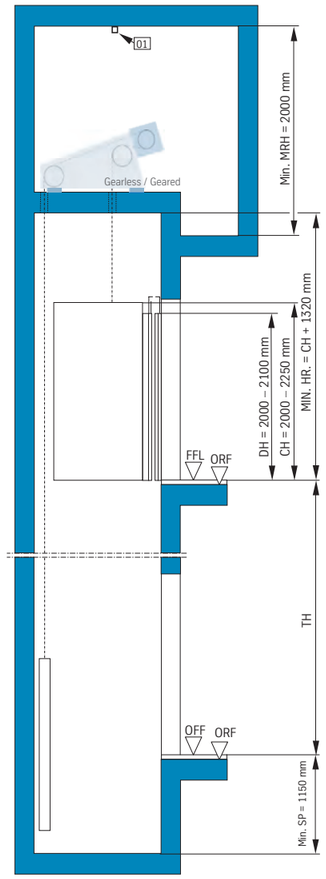
Shaft layout with centre-opening door



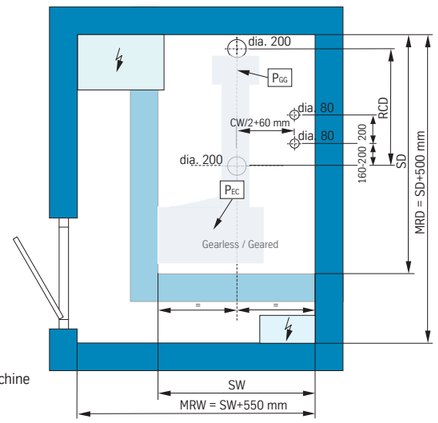
Shaft pit



R1 - door recess, left
R2 - door recess, right
1) The larger value is valid.
For the values C1 and C2
see table on Pages 17/18.
Pictured load points in the machine room for gearless drive.



Machine room



Performance data and principal dimensions with rear counterweight without dual entrance (rope suspension 1.1)

Rated load [1]		Q	[kg]	**320**	**350**	**375**	**400**	**425**	**450**	**500**	**550**
Speed		v	[m/s]	1.0							
Max. travel height		TH	[m]	40							25
Dual entrance				No							
Number of passengers				4		5			6		7
Car width	(in 1 mm	Min. CW	[mm]	800						850	
	steps)	Max. CW	[mm]	1050	1100	1200	1300	1350	1400		
Car depth	(in 1 mm	Min. CD	[mm]	850							950
	steps)	Max. CD	[mm]	1100	1200	1300	1350	1450	1500	1550	1650
Car height		CH	[mm]	2000 – 2250 (min. CH = DH; max. CH = DH + 150 mm)							
Side wall clearance, side GG		WC1/WC2	[mm]	140 – 300							
Shaft width		Min. SW [2]	[mm]	1080						1130	
		Max. SW [2]	[mm]	1650	1700	1800	1900	1950	2000		
Rear wall clearance		WC3 [3]	[mm]	225 (for counterweight 100 mm)							
Door packet thickness		DD	[mm]	155 – 295 (depending on door model and door type, see Pages 17/18)							
Shaft depth		Min. SD	[mm]	1255 [4]							1355
		Max. SD	[mm]	1645	1745	1845	1895	1945	2045	2095	2195
Headroom height		Min. HR	[mm]	3320 – 3570 (min. HR = CH + 1320 mm)							
Pit depth		Min. SP	[mm]	1150 / 1550 [5]							
Clearance - rail bracket		Max. l	[mm]	2500	2450	2400	2200	2150	2100	2000	2000
Distance between elevator car guide rails		EC STM	[mm]	CW + 40							
Rope clearance dimension		RCD	[mm]	variable							
Load point in machine room		P_{GG}	[kN]	35.7	36.8	37.5	38.5	39.9	40.9	43.0	48.4
Load point in machine room		P_{EC}	[kN]	19.2	19.9	20.3	20.8	21.5	22.1	23.2	26.1
Installation eye in machine room		E1	[kN]	5.0							
Load point in the shaft pit		P7	[kN]	13.1	13.6	13.9	14.3	13.7	14.1	16.0	17.4
Load point in the shaft pit		P8	[kN]	40.5	42.2	43.8	45.3	43.1	44.8	52.3	58.7
Load point in the shaft pit		P9	[kN]	32.3	33.4	34.1	34.9	36.4	36.9	39.4	44.1

[1] The rated load depends on the car dimensions and on the installed car door. To determine the actual rated load, see table "Rated load depending on car width and car depth" on Page 15. [2] The values for the lateral wall clearances WC1/WC2 and the resulting shaft widths have unrestricted validity only if the existing doors are retained. As soon as new doors are installed, the permissible values for the shaft width must be determined depending on the door model, the door type and the door width. See table "Dimensions of the landing doors for project planning" on Pages 17/18. [3] The horizontal, free clearance between outer edge of the elevator car and outer edge of the counterweight must be at least 50 mm (including installation tolerances). The specified dimension also contains the installation depth of the wall panels of 20 mm, because it is referred to the car inner side. [4] Smaller shaft depths are possible on request and after the project planning has been technically reviewed. [5] The minimum pit depth is 1550 mm for CW x CD = 800 x 1100 - 1200 mm and for CD = 850 to 950 mm.

Determination of the maximum possible car dimensions with rear counterweight (rope suspension 1:1)

Car width	=	Shaft width	–	Wall clearance, left	–	Wall clearance, right
CW	=	SW	–	WC1	–	WC2
CW	=	SW	–	(C1 - R1 + IT + "air")	–	(C2 - R2 + IT + "air")
CW	=	SW	–	(C1 - R1 + 25 mm + 10 mm)	–	(C2 - R2 + 25 mm + 10 mm)
Max. CW	=	**SW**	–	**140 mm**	–	**140 mm**

Car width	=			Car gauge between rails	–	2 x distance from elevator car to rail
CW	=			**CGBR**	–	**2 x 20 mm**

Without dual entrance

Car depth	=	Shaft depth	–	Door packet thickness	–	Rear wall clearance	–	Installation tolerance, door side
CD	=	SD	–	DD	–	WC3	–	IT
CD	=	SD	–	(155 to 295 mm)	–	225 mm	–	25 mm
Max. CD	=	**SD**	–	**155 mm**	–	**225 mm**	–	**25 mm**

IT – installation tolerance (± 25 mm); C1 / C2 – door dimensions, space requirements of the door panels in shaft width; R1 – door recess, left; R2 – door recess, right; installation tolerances of ± 25 mm each are included in wall clearance dimensions WC1, WC2 and WC3.

Project Planning and Performance Data (rear counterweight)

Rated load 630 kg ≤ Q ≤ 1000 kg

Performance data and principal dimensions with rear counterweight without dual entrance (rope suspension 1:1)

Rated load [1]		Q	[kg]	630	750	825	900	1000
Speed		v	[m/s]	1.0				
Max. travel height		TH	[m]	40				
Dual entrance				No				
Number of passengers				8	10	11	12	13
Car width	(in 1 mm	Min. CW	[mm]		900		1000	1100
	steps)	Max. CW	[mm]	1500	1600			
Car depth	(in 1 mm	Min. CD	[mm]	1050	1150	1200	1300	1450
	steps)	Max. CD	[mm]	1750	2000	2100		
Car height		CH	[mm]	2000 – 2250 (min. CH = DH; max. CH = DH + 150 mm)				
Side wall clearance, side GG		WC1	[mm]	255 (without bracket support); 330 (with bracket support) [2]				
		WC2	[mm]	140 – 300				
Shaft width		Min. SW [2]	[mm]		1180		1280	1380
		Max. SW [2]	[mm]	2100	2200			
Rear wall clearance		WC3 [3]	[mm]	255 (for counterweight 135 mm)				
Door packet thickness		DD	[mm]	155 – 295 (depending on door model and door type, see Pages 17/18)				
Shaft depth		Min. SD	[mm]	1485	1585	1635	1735	1885
		Max. SD	[mm]	2325	2575	2675		
Headroom height		Min. HR	[mm]	3320 – 3570 (min. HR = CH + 1320 mm)				
Pit depth		Min. SP	[mm]	1150				
Clearance - rail bracket		Max. I	[mm]	2750			2500	
Distance between elevator car guide rails		EC STM	[mm]	CW + 40				
Rope clearance dimension		RCD	[mm]	variable				
Load point in machine room		P_{GG}	[kN]	63.9	68.2	70.9	73.6	77.4
Load point in machine room		P_{EC}	[kN]	34.4	36.7	38.2	39.7	41.7
Installation eye in machine room		E1	[kN]	10.0				
Load point in the shaft pit		P7	[kN]	24.0	25.5	26.5	27.5	29.0
Load point in the shaft pit		P8	[kN]	75.0	81.5	86.0	90.5	97.0
Load point in the shaft pit		P9	[kN]	59.0	62.5	65.5	68.0	69.0

[1] The rated load depends on the car dimensions and on the installed car door. To determine the actual rated load, see table "Rated load depending on car width and car depth" on Page 15. [2] The values for the lateral wall clearances WC1/WC2 and the resulting shaft widths have unrestricted validity only if the existing doors are retained. As soon as new doors are installed, the permissible values for the shaft width must be determined depending on the door model, the door type and the door width. See table "Dimensions of the landing doors for project planning" on Pages 17/18. [3] The horizontal, free clearance between outer edge of the elevator car and outer edge of the counterweight must be at least 50 mm (including installation tolerances). The specified dimension also contains the installation depth of the wall panels of 20 mm, because it is referred to the car inner side.

Determination of the maximum possible car dimensions with rear counterweight (rope suspension 1:1)

Car width	=	Shaft width	–	Wall clearance, left	–	Wall clearance, right
CW	=	SW	–	WC1	–	WC2
CW	=	SW	–	(C1 - R1 + IT + "air")	–	(C2 - R2 + IT + "air")
CW	=	SW	–	(C1 - R1 + 25 mm + 10 mm)	–	(C2 - R2 + 25 mm + 10 mm)
Max. CW	=	**SW**	–	**140 mm**	–	**140 mm**

Car width	=	Car gauge between rails	–	2 x distance from elevator car to rail
CW	=	**CGBR**	–	**2 x 20 mm**

Without dual entrance

Car depth	=	Shaft depth	–	Door packet thickness	–	Rear wall clearance	–	Installation tolerance, door side
CD	=	SD	–	DD	–	WC3	–	IT
CD	=	SD	–	(155 to 295 mm)	–	255 mm	–	25 mm
Max. CD	=	**SD**	–	**155 mm**	–	**255 mm**	–	**25 mm**

IT – installation tolerance (± 25 mm); C1 / C2 – door dimensions, space requirements of the door panels in shaft width; R1 – door recess, left; R2 – door recess, right; installation tolerances of ± 25 mm each are included in wall clearance dimensions WC1, WC2 and WC3.

Project Planning Data (without dual entrance)

Rated load depending on car width and car depth

Rated loads Q [kg]		Car width CW [mm]																
		800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600
Car depth CD [mm]	**850**					320	350	350	375	375	400	425	425	450	475	500	500	525
	900				320	350	350	375	400	400	425	450	450	475	500	525	550	575
	950			320	350	350	375	400	425	425	450	475	500	525	550	575	600	600
	1000		320	350	350	375	400	425	425	450	475	500	525	550	575	600	630	650
	1050	320	350	350	375	400	425	425	450	475	500	525	550	575	630	630	675	700
	1100	320	350	375	400	425	425	475	475	500	550	575	600	630	650	675	700	725
	1150	350	375	400	425	425	450	475	525	550	575	600	630	650	675	725	750	775
	1200	350	375	400	425	450	475	500	550	575	600	630	650	700	725	750	775	800
	1250	375	400	425	450	475	500	550	575	600	630	675	700	725	750	800	825	850
	1300	400	425	450	475	500	525	575	600	630	675	700	725	750	800	825	850	900
	1350	400	425	450	500	525	550	600	630	650	700	725	775	800	825	875	900	925
	1400	425	450	475	525	550	575	630	650	700	725	750	800	825	875	900	925	975
	1450	425	475	500	550	575	630	650	675	725	750	800	825	875	900	950	975	1000
	1500	450	475	525	575	600	630	675	725	750	800	825	875	900	950	975		
	1550	475	500	550	600	630	675	700	750	775	825	850	900	925	975			
	1600	475	525	575	600	650	700	725	775	800	850	900	925	975	1000			
	1650	500	550	600	630	675	725	750	800	850	875	925	975	1000				
	1700	525	575	630	650	700	750	775	825	875	925	950	1000					
	1750	550	600	630	675	725	775	825	850	900	950	1000						
	1800	575	600	650	700	750	800	850	875	925	975							
	1850	575	630	675	725	775	825	875	925	950	1000							
	1900	600	650	700	750	800	850	900	850	1000								
	1950	630	675	725	775	825	875	925	975									
	2000	650	700	750	800	850	900	950	1000									
	2050	675	725	775	825	875	925	975										
	2100	675	750	800	850	900	950	1000										

Determination of the rated loads in accordance with DIN EN 81-1:1998+A3:2009, edition 06.2010, item 8.2.1, table 1.1 for passenger elevators, with consideration given to an available area in the entrance area with closed door of 0.072 m² (door model ThyssenKrupp K8A, door type M2T / dual panel, one-sided telescoping, side-opening, door width DW = 900 mm). When using other door models and door types, rated loads may vary from these values.

Number of persons depending on rated load Q

Rated loads	**Q [kg]**	**100**	**180**	**225**	**320**	**350**	**375**	**400**	**425**	**450**	**500**	**525**
Number of persons		1	2	3	4			5		6		7
Min. available area in elevator car	**[m²]**	0.28	0.49	0.60	0.79			0.98		1.17		1.31

Rated loads	**Q [kg]**	**630**	**675**	**750**	**800**	**825**	**900**	**975**	**1000**	**1050**
Number of persons		8	9	10		11	12	13		14
Min. available area in elevator car	**[m²]**	1.45	1.59	1.73		1.87	2.01	2.15		2.29

Determination of the number of persons in accordance with DIN EN 81-1:1998+A3:2009, edition 06.2010, item 8.2.3 (person weight 75 kg) or table 1.2.

Project Planning Data (with dual entrance)

Rated load depending on car width and car depth

Rated loads Q [kg]		Car width CW [mm]																
		800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600
Car depth CD [mm]	850												575	600	630	630	675	700
	900											575	600	630	650	675	700	725
	950										575	600	630	650	700	725	750	775
	1000									575	600	630	675	700	725	750	775	800
	1050								575	600	630	675	700	725	750	800	825	850
	1100							575	600	630	675	700	725	775	800	825	850	900
	1150						575	600	630	675	700	725	775	800	825	875	900	925
	1200					575	600	630	675	700	725	775	800	825	875	900	950	975
	1250					600	630	650	700	725	775	800	825	875	900	950	975	1000
	1300				575	630	650	700	725	750	800	825	875	900	950	975	1025	1050
	1350			575	600	630	675	725	750	800	825	875	900	950	975	1025	1050	
	1400			600	630	675	700	750	775	825	850	900	950	975	1025	1050		
	1450			600	650	700	725	775	800	850	900	925	975	1000	1050			
	1500			630	675	725	750	800	850	875	925	975	975	1050				
	1550			650	700	750	775	825	875	900	950	1000	1050					
	1600			675	725	775	800	850	900	950	975	1025						
	1650			700	750	800	825	875	925	975	1025	1050						
	1700			725	775	825	875	900	950	1000	1050							
	1750			750	800	850	900	925	975	1025								
	1800			775	825	875	925	950	1000	1050								
	1850			800	850	900	950	975	1025									
	1900			825	875	925	975	1000	1050									
	1950			825	900	950	1000	1050										
	2000			850	900	950	1000	1050										
	2050			875	925	975	1025											
	2100			875	925	975	1025											

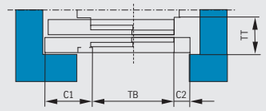
Determination of the rated loads in accordance with DIN EN 81-1:1998+A3:2009, edition 06.2010, item 8.2.1, table 1.1 for passenger elevators, with consideration given to an available area in the entrance area with closed door of 0.072 m² (door model ThyssenKrupp K8A, door type M2T / dual panel, one-sided telescoping, side-opening, door width DW = 900 mm). When using other door models and door types, rated loads may vary from these values.

Project Planning Data (door mountings)

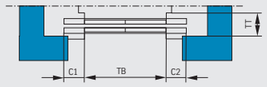
Decision-making aid for selecting a suitable door model

Door model	S8A / K8A	2000 C-MOD	FINELINE
Special advantages	- High-quality, elegant and efficient door series - Robust and reliable, even under challenging application conditions - Extensive range of fire protection certifications and many options	- Economical solution for many common applications - Further usage of existing swing landing doors possible	- Compact dimensions: low installation depth and width, ideal for narrow shafts - Version with asymmetric entrance offers additional planning freedom - Further usage of existing swing landing doors possible

Dimensions of the landing doors for project planning



Dimensioned drawing for side-opening door
(left-opening version shown)



Dimensioned drawing for centre-opening door
(dual panel version shown)

Door model	Door type	Door width DW [mm]	Space requirement of door panels (in shaft width)		Door packet thickness
			C 1 [mm]	C 2 [mm]	DD [mm]
S8A / K8A	**M2T** (dual panel, one-sided telescoping, left-opening)	700	400	150	295 (incl. door frame)
		750	425		
		800	450		
		850	475		
		900	500		
S8A / K8A	**M2T** (dual panel, one-sided telescoping, right-opening)	700	150	400	295 (incl. door frame)
		750		425	
		800		450	
		850		475	
		900		500	
S8A / K8A	**M2Z** (dual panel, centre-opening)	700	400	400	235 (incl. door frame)
		750	425	425	
		800	450	450	
		850	475	475	
		900	500	500	
S8A / K8A	**M4TZ** (quadruple panel, telescoping, centre-opening)	800	250	250	295 (incl. door frame)
		850	265	265	
		900	275	275	

For dimensions C1 and C2 and for the dimension of door packet thickness TT, no shaft and dimensional tolerances are included in the calculation. To determine the maximum car width and maximum car depth in an existing elevator shaft, the space requirements of the doors must be taken into consideration. Listed in the above table are the values for C1, C2 and DD for the various door models and door types. Further door designs possible on request.

Project Planning Data (door mountings)

Technical Data

Dimensions of the landing doors for project planning

Door model	Door type	Door width DW [mm]	Space requirement of door panels (in shaft width)		Door packet thickness
			C 1 [mm]	C 2 [mm]	DD [mm]
2000 C-MOD	2L (dual panel, one-sided telescoping, left-opening) 	650	390	100	230 (not including depth of the door frame)
		700	415		
		750	440		
		800	465		
		850	490		
		900	515		
2000 C-MOD	2R (dual panel, one-sided telescoping, right-opening) 	650	100	390	230 (not including depth of the door frame)
		700		415	
		750		440	
		800		465	
		850		490	
		900		515	
2000 C-MOD	4Z (quadruple panel, telescoping centre-opening) 	650	210 (DH 2000) / 235 (DH 2100)	210 (DH 2000) / 235 (DH 2100)	230 (not including depth of the door frame)
		700	210 (DH 2000) / 235 (DH 2100)	210 (DH 2000) / 235 (DH 2100)	
		750	225	225	
		800	235	235	
		850	250	250	
		900	260	260	
FINELINE	4S (quadruple panel, telescoping centre-opening, symmetric) 	650	205	205	155 (not including depth of the door frame)
		700	205	205	
		750	215	215	
		800	230	230	
		850	240	240	
		900	255	255	
FINELINE	4/AS-L (quadruple panel, telescoping centre-opening, asymmetric left) 	650	255	145	155 (not including depth of the door frame)
		700	260		
		750	290		
		800	310		
		850	340		
		900	360		
FINELINE	4/AS-R (quadruple panel, telescoping centre-opening, asymmetric right) 	650	145	255	155 (not including depth of the door frame)
		700		260	
		750		290	
		800		310	
		850		340	
		900		360	

For dimensions C1 and C2 and for the dimension of door packet thickness, no shaft and dimensional tolerances are included in the calculation. To determine the maximum car width and maximum car depth in an existing elevator shaft, the space requirements of the doors must be taken into consideration. Listed in the above table are the values for C1, C2 and DD for the various door models and door types.

Technical data, installed components and electrical data

Rated load	Q	[kg]	320	350	375	400	425	450	500	550
Speed	v	[m/s]	1.0							
Max. travel height	Max. TH	[m]	40							
Dual entrance			No							
Mass of car (P 450 SV)	EC [1]	[kg]	400 – 540	410 – 550	415 – 555	420 – 560	430 – 580	435 – 590	450 – 610	475 – 725
Drive Geared			TW 45 C							
Nominal power		[kW]	2.7	2.9	3.0	3.2	3.4	3.6	3.9	4.3
Max. mains power [2, 3]		[kVA]	6.4	6.7	7.0	7.3	7.6	7.9	8.6	9.4
Mains rated current [2, 3]		[A]	5.1	5.5	5.8	6.1	6.5	6.8	7.6	8.3
Max. mains current [2, 3]		[A]	9.2	9.7	10.1	10.5	11.0	11.4	12.4	13.6
Diameter of traction sheave	D_T	[mm]	440							
Suspension ropes	n x d_S	[mm]	7 x 8							
Drive Gearless			PMC 145-2 M	PMC 145-2 L						
Nominal power		[kW]	2.38	3.69						
Max. mains power [2, 3]		[kVA]	4.1	6.3						
Mains rated current [2, 3]		[A]	4.1	6.6						
Max. mains current [2, 3]		[A]	5.9	9.1						
Diameter of traction sheave	D_T	[mm]	240							
Suspension ropes	n x d_S	[mm]	6 x 6	7 x 6		8 x 6			10 x 6	12 x 6
Elevator-car guide rails			T 70/B							
Counterweight guides			T 50/A							
Elevator-car buffer	n x type		1 x 100x80 A				2 x 100x80 A			
Counterweight buffer	n x type		1 x 100x80 A							

Rated load	Q	[kg]	630		750	825	900	1000	1050
Speed	v	[m/s]	1.0						
Max. travel height	Max. TH	[m]	40						
Dual entrance			possible						Yes
Mass of car (P 1000 SV)	EC [1]	[kg]	550 – 680	550 – 950	590 – 980	610 – 1000	630 – 1020	650 – 1050	700 – 1100
Drive Geared			TW 45 C	TW 63 B					
Nominal power		[kW]	4.8	4.8	5.3	5.8	6.7	7.4	7.7
Max. mains power [2, 3]		[kVA]	10.2	12.3	13.6	14.6	15.6	16.7	17.4
Mains rated current [2, 3]		[A]	9.3	9.4	10.3	11.2	12.9	14.2	14.9
Max. mains current [2, 3]		[A]	14.7	17.7	19.6	21	22.5	24.1	25.1
Diameter of traction sheave	D_T	[mm]	440		590		510		
Suspension ropes	n x d_S	[mm]	7 x 8	5 x 10	6 x 10		7 x 10		
Drive Gearless			PMC 145 M / PMC 170 M / DAF 210 L			PMC 170 XL / DAF 270 M			
Nominal power		[kW]	4.8			5.8			
Max. mains power [2, 3]		[kVA]	8.8			11.9			
Mains rated current [2, 3]		[A]	9.3			13.1			
Max. mains current [2, 3]		[A]	12.7			17.1			
Diameter of traction sheave	D_T	[mm]	320						
Suspension ropes	n x d_S	[mm]	7 x 8		8 x 8				
Elevator-car guide rails			T 89/B						
Counterweight guides			T 50/A						
Elevator-car buffer	n x type		2 x 100x80 A					2 x 125x80 A	
Counterweight buffer	n x type		1 x 125x80 A		2 x 100x80 A				

[1] Equipment features for determining the elevator car weights: Min. EC: without dual entrance, door model FINELINE, hand-rail, without mirror, plastic flooring material, 2 mm. Max. EC: with dual entrance, door model K8A, hand-rail, mirror, plastic flooring material, 2 mm. [2] For 400 V / 50 Hz. [3] The specified powers and currents are average values for orientation, are based on the actually installed components and increase depending on the project according to elevator control unit, the number of landings, the type and number of operating and indicator elements, the car lighting and other electrical power consumers (e.g. fans).

Elevator Car Design

Colours / materials


WVSG
Galvanised steel


WVCW
Traffic White RAL 9016 / powder coating


WVCC
Colour RAL / powder coating


WVSE
Leather / stainless steel


WVSL
Linen / stainless steel


WVSF
Grain 220/stainless steel ferritic


WVSA
Grain 220/stainless steel austenitic

Car ceiling and lighting systems


SpotLED
Traffic white RAL 9016 / powder coating, CWFS
stainless steel grain 220, CSFS o


SlimLED
Traffic white RAL 9016 / powder coating, CWSL o
stainless steel grain 220, CSSL


Without lighting
Traffic white RAL 9016 / powder coating, CWNL

Mirrors


Half mirror
BTHM o

Mirror, entire height
BBWD o

Flooring material

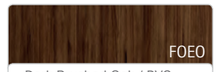

FNES
Black Stone / rubber


FRKB
Kayar Black / rubber


FRKG
Kayar Grey / rubber


FRIC
Ice / rubber


FPDG
Dove Grey / vinyl


FOEO
Dark Brushed Oak / PVC

Prepared for flooring material of up to 25 mm to be provided by customer

Handrails


Stainless steel
Grain 220 dia. 40 mm
straight version o
Rear wall, side walls


Stainless steel
Grain 220 dia. 40 mm
bowed version o
Rear wall, side walls


Stainless steel
Grain 220 dia. 40 mm
bowed version, all round o
L-layout, U-layout

Skirt guards


Grain 220 stainless steel
50 mm
SBSS o


Aluminium
30 mm
SBAA

o Optional

Elevator Car Design

Modernisation

Design variants

VERTICAL A	VERTICAL B	VERTICAL C
Colours / materials		
 Galvanised steel WVSG	 Traffic White / powder coating WVCW	 Grain 220 stainless steel WVSF
Wall		
WVSG	WVCW	WVSF
Car ceiling with lighting systems		
CWFS	CWFS	CSSL
Skirt guard		
SBAA	SBAA	SBSS
Flooring material		
without	FRKG	FRKB
Hand rail		
without	HSRE + HSLT	HCIL
Mirrors		
without	BTHM	BBWD

The elevator car can also be supplied in galvanised sheet metal as the design for customer lining. Please specify the customer-designed equipment with weight.

VERTICAL

The elevator car is prepared for installation of a COP (car operating panel) as installation panel by the customer. On account of the self-supporting construction no through-holes or openings may be provided in the walls (exception: cable lead-through).

Car Design Options

Lighting System

Elevator car P450SV / P1000SV design options

Colours / materials	Code	VERTICAL selection
Walls (VERTICAL design line)		
Galvanised steel	WVSG	○
Traffic White RAL 9016 / powder coating	WVCW	○
Colour / RAL powder coating	WVCC	○
Leather / stainless steel	WVSE	○
Linen / stainless steel	WVSL	○
Grain 220 / stainless steel ferritic	WVSF	○
Grain 220 / stainless steel austenitic	WVSA	○
Car front walls		
Galvanised steel	DPSG	○
Traffic White RAL 9016 / powder coating	DPCW	○
Colour / RAL powder coating	DPCC	○
Leather / stainless steel	DPSE	○
Linen / stainless steel	DPSL	○
Grain 220 / stainless steel ferritic	DPSF	○
Grain 220 / stainless steel austenitic	DPSA	○
Car ceiling and lighting		
SpotLED Traffic White RAL 9016 / powder coating	CWFS	○
SpotLED grain 220 / austenitic stainless steel	CSFS	○
SlimLED Traffic White RAL 9016 / powder coating	CWSL	○
SlimLED grain 220 / austenitic stainless steel	CSSL	○
Without lighting Traffic White RAL 9016 / powder coating	CWNL	○
Flooring material in the elevator car		
Black Stone / rubber	FNES	○
Kayar Black / rubber	FRKB	○
Kayar Grey / rubber	FRKG	○
Ice / rubber	FRIC	○
Dove Grey / vinyl	FPDG	○
Dark Brushed Oak / PVC	FOEO	○
Without flooring material		○

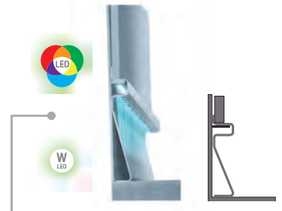
Colours / materials	Code	VERTICAL selection
Mirror on the rear wall of the car		
Half mirror from height of hand-rail to cover	BTHM	○
Full height mirror without dots pattern	BBWD	○
Handrails in the elevator car		
Stainless steel grain 220 I 40 mm version, straight		
on rear wall, rear	HSRE	○
on side wall, right	HSRI	○
on side wall, left	HSLT	○
Stainless steel grain 220 I 40 mm, bowed version		
on rear wall, rear	HBRE	○
on side wall, right	HBRI	○
on side wall, left	HBLT	○
Stainless steel grain 220 I 40 mm, bowed version, surrounding		
L-layout (on rear and side wall, opposite CIOP)	HCIL	○
U-layout (on three sides)	HCIU	○
Skirt guards in the elevator car		
Stainless steel grain 220 h = 50 mm without lighting	SBSS	○
Aluminium h = 30 mm without lighting	SBAA	○

○ Option

LED Lighting

Through the use of highly efficient and energy-saving LED lighting, energy savings up to 78% over fluorescent lamps can be achieved.

White LED



LED strips

With indirect lighting over the skirt guard, the LED lighting system offers you a special accent with soft light. Our atmospheric RGB LED lighting system offers you a broad spectrum of colored light.

RGB LED:
all colors available on the skirt guard

Technical Report

Technical Report

Solutions for modernisation with components

Technical Report

Solutions for modernisation with components

Technical Report - Solutions for modernisation with components

Solutions for modernization with components

UK

The elevator markets in Germany and many parts of Europe have a high number of existing installations, some of which are more than 25 years old. Due to the considerable age of these installations and safety-related considerations, as well as the need for necessary repairs and conversions, many of these installations have to be fundamentally renovated. It may also be necessary to modernize existing elevators as part of building renovation programmes and changes of use. In such cases, the installation is often completely replaced.

The market potential in terms of modernization is therefore significantly greater than for new installations which are either in planning or have already been fitted.

The majority of these installations still have a machine room, which it would then be advisable to keep in service, even in the case of modernization.

Modernizations which, without a compelling reason, forgo the continued use of an existing machine room, should therefore be carefully examined in order to check that measures in place for rescuing elevator passengers, maintenance and installation inspection are not encumbered as a result. Complete replacement with an MRL system is frequently proposed as a modernization solution when suppliers are not able to offer project-related and customized solutions.

Whenever a modernization is planned, it is therefore necessary to check the current situation regarding the installation in terms of up-to-dateness, by using the available drawings and technical documents (register), and to document the actual status with photographs.

Modernization concepts, the selection of components and schedules must always be coordinated in detail.

When installations are modernized, experience shows that noise behaviour in the building can change perceptibly in connection with changes made to the elevator.

It is therefore recommended that noise and passenger comfort should be measured before the conversion, in order for these measurements to then be used as comparison measurements after the modernization is completed.

Because the total amount of time and resources required for modernization is not limited only to the elevator components, the surrounding area should also be included in the examination during the planning stage.

The following general conditions should also be considered:

- Changes that affect structural aspects (ceiling loads, wall fastenings and pit stressas)
- Further usage of existing ceiling and wall openings
- Bracket fastenings (masonry situation)
- Shaft openings (position and size)
- Existing concrete foundations in machine room and pit (retain or remove)
- Dust-free conversion
- Access to the building during the conversion
- Transport paths in the building for the conversion
- ...

This means that, in the area surrounding the modernization, it must be possible to adapt the solutions and packages flexibly to the particular application conditions of the installation.

Some requirements that should be taken into consideration are detailed below. Some requirements may also arise in combination:

- Optimization of the elevator car size

  With an elevator car that can be flexibly configured with integrated car sling for gauge reduction, the internal car area can be optimized, given the available shaft cross section. When doors with corresponding pad

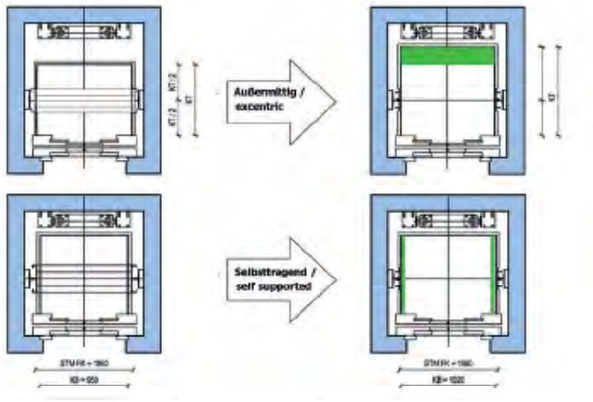


Figure 1: Shaft utilisation

Figure 2: Elevator car with integrated car sling and flexible dimensions

thicknesses and installation dimensions are also used, in many cases this optimization makes it is possible to use a door with a width of 900 mm and a floor area which fulfil the requirements for a type of elevator that can be used by the disabled.

- Door openings

  When the existing door openings on the floors can continue to be used as a result of appropriate planning, this means a considerable reduction in the additional measures taken by the customer. Old hinged-door frames can be retained and the sliding doors placed behind them. By panelling the frames, the closure to the masonry on the floor can then be made dust-free.

Figure 3: Panelled hinged-door frame with telescopic door

- Operating and indicator elements

  On the landing, LOP, LIOP, LIP panels with integrated electrics for simple cabling to the control system can be fitted as desired on the door frame or the masonry as flat attachment elements with different button designs. The requirements of EN 81-70 are then also met.

- Gearless or geared

  For the drive, a check must be made to see whether an existing gear with large traction sheave should be replaced by a gear with large traction sheave or whether a gearless system with 2:1 suspension and smaller traction sheave is used. In modernization, the use of a frequency converter is also state-of-the-art practice and energy-efficient solutions with power regeneration are used more frequently even in the lower range of performance. Machine base frames for adaptation to local conditions can also be supplied in many cases.

Figure 4: LIOP, LOP, LIP

In terms of service and maintenance, both drive concepts are comparable, since brake manufacturers can alternatively also supply brakes with manual release for gearless brakes.

Gears can be placed either with an adapter onto the existing frame or onto the foundation. For using gearless drives in the machine room, corresponding solutions with an optional traction sheave cover are available.

All solutions are designed with appropriate insulation for sound-optimized installation.

When adjacent drives are replaced, solutions with a gearless system and traction sheave in the shaft are available, which are placed in the wall opening.

Figure 6: ModKit with PMC 170

Figure 6: DAF210 with adaptation to TW63 frame with rope guard

Figure 7: DAF270 with adaptation to TW130 frame with rope guard

Figure 8: DAF210 as a replacement for lower

- Drum drive as a special solution

  Where space is very restricted, the solution with a drum drive is a possible alternative to the hydraulic or traction sheave elevator. EN 81-1 also describes the standard requirements for drum-drive elevators. Worm gears are generally used for the drive, while the use of gearless drives is limited in terms of rated load due to the required diameter of the traction sheave.

Technical Report

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Solutions for modernisation with components

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Figure 9: DAF220 with traction sheave in the shaft

Figure 10: Drum drive with gear TW150

▸ Installation part replacement

When replacing parts, a check must be made to see whether components such as rails, brackets and the counterweight can, in fact, be used again. If they can, a considerable amount of installation time and effort, using dowels and transporting material, can be avoided. As a result, it may also be possible to reduce the length of time required for the conversion.

▸ Modular modernization

Based on an overall concept for the modernization, it is possible to implement the measures in several steps, when this is not possible in one step for budgetary reasons, for example. It is then ensured that, on completion of the entire modernization, the installation features state-of-the-art technology and no unnecessary costs are incurred through repeatedly replacing components.

▸ Energy efficiency

Depending of the type of use (number of runs, equipment, etc.), the focus must be placed on reducing either the travelling requirement or the standby requirement. In VDI 4707 Part 2, the process has now been defined as to how, using component characteristic values, an energy efficiency analysis can be carried out even as part of the modernization planning (forecast tool).

▸ Structural aspects

When the loads on an installation are increased, a change in or recalculation of the statics is always necessary. In many cases, one solution here can be to distribute the loading onto the shaft ceiling via a load distribution beam. This measure can also be helpful on occasions when, because of the installation situation, new ceiling openings have to be created. The drives are protected from vibration when placed on these beams.

To further optimise the noise situation, it may be advisable in certain cases to also provide additional anti-vibrating elements underneath the beams. In this case, the rubber-metal connections should be designed accordingly.

When individual components are replaced, all components to be changed and the different effects on the overall system during replacement must be assessed.

▸ UCM (unintended car movement)

As part of a modernization operation, a check must always be made to see what measures must be implemented in relation to the requirements according to A3. Replacing a drive always makes it necessary to carry out an assessment according to EN 81-1:A3 (UCM) and implement the necessary measures. In this case, comprehensive planning is required, which, in many cases, should be combined with simultaneous replacement of the control system, since the majority of control system developers offer A3 functionality as a pre-integrated feature in their current control systems. The solution is often easier to implement than networking the different components with additional detection systems. When a control system is later replaced, these components may no longer be required.

When implementing the requirements of A3, it may be easier to forgo a levelling operation with early-opening doors and demonstrate via rope elongation that, due to the buffering during loading, relevelling is not necessary. In this case, it is sufficient if the installation is securely stopped at the landing via a safety brake, as found on the gearless system in the form of an operational brake, or via an emergency brake system (NBS) on the gear.

Summary

In Germany and in parts of Europe, the market volume in terms of modernization is significantly greater than the market for new installations.

Types of modernization may turn out to be very different according to the local situation and the particular supplier.

Approaches to modernization range from the typical replacement of individual components to modular and scalable replacement solutions, through to the complete replacement of the entire elevator system.

All these solution options should be viewed in terms of a project in order for a solution to be found, on the basis of a technical and economic assessment, that is customized to the requirements of both customer and operator.

In the process, flexibly adjusted car dimensions can be assessed for optimum space utilisation.

In the report, the different concepts will also be assessed on the basis of examples, in order for a technical and economic assessment of the solution options to be made.

In the view of the operators and in respect of safety for servicing personnel, continuing to use existing machine rooms is to be preferred, provided that this space is not otherwise required for reasons of building use (e.g addition).

In existing installations, headrooms and shaft pits are generally sufficiently large, so that measures for temporary safety spaces are not necessary.

A special application where space is restricted may take the form of a solution with a drum drive.

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European
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September 2019

KW	Mo	Di	Mi	Do	Fr	Sa	So
35							1
36	2	3	4	5	6	7	8
37	9	10	11	12	13	14	15
38	16	17	18	19	20	21	22
39	23	24	25	26	27	28	29
40	30						

October 2019

KW	Mo	Di	Mi	Do	Fr	Sa	So
40		1	2	3	4	5	6
41	7	8	9	10	11	12	13
42	14	15	16	17	18	19	20
43	21	22	23	24	25	26	27
44	28	29	30	31			

November 2019

KW	Mo	Di	Mi	Do	Fr	Sa	So
44					1	2	3
45	4	5	6	7	8	9	10
46	11	12	13	14	15	16	17
47	18	19	20	21	22	23	24
48	25	26	27	28	29	30	

December 2019

KW	Mo	Di	Mi	Do	Fr	Sa	So
48							1
49	2	3	4	5	6	7	8
50	9	10	11	12	13	14	15
51	16	17	18	19	20	21	22
52	23	24	25	26	27	28	29
1	30	31					

January 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
1			1	2	3	4	5
2	6	7	8	9	10	11	12
3	13	14	15	16	17	18	19
4	20	21	22	23	24	25	26
5	27	28	29	30	31		

February 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
5						1	2
6	3	4	5	6	7	8	9
7	10	11	12	13	14	15	16
8	17	18	19	20	21	22	23
9	24	25	26	27	28	29	

March 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
9							1
10	2	3	4	5	6	7	8
11	9	10	11	12	13	14	15
12	16	17	18	19	20	21	22
13	23	24	25	26	27	28	29
14	30	31					

April 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
14			1	2	3	4	5
15	6	7	8	9	10	11	12
16	13	14	15	16	17	18	19
17	20	21	22	23	24	25	26
18	27	28	29	30			

May 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
18					1	2	3
19	4	5	6	7	8	9	10
20	11	12	13	14	15	16	17
21	18	19	20	21	22	23	24
22	25	26	27	28	29	30	31

June 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
23	1	2	3	4	5	6	7
24	8	9	10	11	12	13	14
25	15	16	17	18	19	20	21
26	22	23	24	25	26	27	28
27	29	30					

Juliy 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
27			1	2	3	4	5
28	6	7	8	9	10	11	12
29	13	14	15	16	17	18	19
30	20	21	22	23	24	25	26
31	27	28	29	30	31		

August 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
31						1	2
32	3	4	5	6	7	8	9
33	10	11	12	13	14	15	16
34	17	18	19	20	21	22	23
35	24	25	26	27	28	29	30
36	31						

September 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
36		1	2	3	4	5	6
37	7	8	9	10	11	12	13
38	14	15	16	17	18	19	20
39	21	22	23	24	25	26	27
40	28	29	30				

October 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
40				1	2	3	4
41	5	6	7	8	9	10	11
42	12	13	14	15	16	17	18
43	19	20	21	22	23	24	25
44	26	27	28	29	30	31	

November 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
44							1
45	2	3	4	5	6	7	8
46	9	10	11	12	13	14	15
47	16	17	18	19	20	21	22
48	23	24	25	26	27	28	29
49	30						

December 2020

KW	Mo	Di	Mi	Do	Fr	Sa	So
49		1	2	3	4	5	6
50	7	8	9	10	11	12	13
51	14	15	16	17	18	19	20
52	21	22	23	24	25	26	27
53	28	29	30	31			

Holiday 2019/2020

Date	Feiertag	Geltungsbereich
03.10.2019	Tag der Deutschen Einheit	Nationwide
31.10.2019	Reformationstag	BB, HB, HB, MV, NI, SN, ST, SH, TH
01.11.2019	Allerheiligen	BW, BY, NW, RP, SA
20.11.2019	Buß- und Bettag	SN
25.11.2019	1. Weihnachtstag	Nationwide
26.12.2019	2. Weihnachtstag	Nationwide
01.01.2020	Neujahrstag	Nationwide
06.01.2020	Heilige Drei Könige	BW, BY, ST
08.03.2020	Internationaler Frauentag	BE
10.04.2020	Karfreitag	Nationwide
12.04.2020	Ostersonntag	BB
13.04.2020	Ostermontag	Nationwide
01.05.2020	Tag der Arbeit / 1. Mai	Nationwide
08.05.2020	75. Jahrestag der Befreiung vom Nationalsozialismus	BE
21.05.2020	Christi Himmelfahrt	Nationwide
31.05.2020	Pfingstsonntag	BB
01.06.2020	Pfingstmontag	Nationwide
11.06.2020	Fronleichnam	BW, BY, NW, RP, SA
15.08.2020	Mariä Himmelfahrt	BY (kathol. Gebiete), SL
20.09.2020	Weltkindertag	
03.10.2020	Tag der Deutschen Einheit	Nationwide
31.10.2020	Reformationstag	BB, HB, HB, MV, NI, SN, ST, SH, TH
01.11.2020	Allerheiligen	BW, BY, NW, RP, SA
18.11.2020	Buß- und Bettag	SN
25.12.2020	1. Weihnachtstag	Nationwide
26.12.2020	2. Weihnachtstag	Nationwide

School holidays Germany2019/20

	Autumn	Christmas	Winter	Easter	Pentecost	Summer
School year	2019	2019/20	2020			
BW	28.-31.10.	23.12.-4.1.	-	6.-18.4.	2.-13.6.	30.7.-12.9.
BY	28.-31.10./20.11.	23.12.-4.1.	24.-28.2.	6.-18.4.	2.-13.6.	27.7.-7.9.
BE	4.-19.10.	23.12.-4.1.	3.-8.2.	6.-17.4.	22.5.	25.6.-7.8.
BB	4.-18.10./1.11.	23.12.-3.1.	3.-8.2.	6.-17.4.	22.5.	25.6.-8.8.
HB	4.-18.10.	21.12.-6.1.	3.-4.2.	28.3.-14.4.	22.5./2.6.	16.7.-26.8.
HH	4.-18.10./1.11.	23.12.-3.1.	31.1.	2.-13.3.	18.-22.5.	25.6.-5.8.
HE	30.9.-12.10.	23.12.-11.1.	-	6.-18.4.	-	6.7.-14.8.
MV	4.-12.10./1.11.	23.12.-4.1.	10.-21.2.	6.-15.4.	22.5./29.5.-2.6.	22.6.-1.8.
NI	4.-18.10.	23.12.-6.1.	3./4.2.	30.3.-14.4.	22.5./2.6.	16.7.-26.8.
NRW	14.-26.10.	23.12.-6.1.	-	6.-18.4.	2.6.	29.6.-11.8.
RP	30.9.-11.10.	23.12.-6.1.	17.-21.2.	9.-17.4.	-	6.7.-14.8.
SL	7.-18.10.	23.12.-3.1.	17.-25.2.	14.-24.4.	-	6.7.-14.8.
SN	14.-25.10.	21.12.-3.1.	10.-22.2.	10.-18.4.	22.5.	20.7.-28.8.
ST	4.-11.10./1.11.	23.12.-4.1.	10.-14.2.	6.-11.4.	18.-30.5.	16.7.-26.8.
SH	4.-18.10.	23.12.-6.1.	-	30.3.-17.4.	22.5.	29.6.-8.8.
TH	7.-19.10.	21.12.-3.1.	10.-14.2.	6.-18.4.	22.5.	20.7.-29.8.

All information without guarantee

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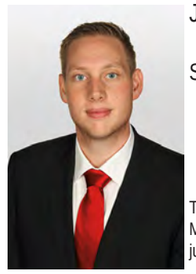

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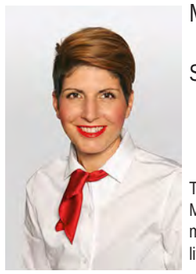

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