Selecting a Conveyor Type

1

Factors that Influence the Configuration of the Conveyor

The following factors influence the choice of conveyor to be used for your task and environmental conditions.

The product to be transported

- Weight of the individual product
- Total weight
- Shape of the contact surface
- Size
- Temperature
- Sensitivity to shock
- Dry vs. damp
- Oil content
- Sharp edges
- Other product-specific properties

The ambient conditions

- Temperature
- Contamination, for example, by dust or chemicals
- EX protection requirements
- Cleanroom conditions
- Food production areas
- Humidity

The transportation route

- Transport on straight lines or around curves
- Transport on one level or at different heights
- Output quantity and speed
- Specified or unspecified orientation/ transfer/handling of the product

The operating mode

- Continuous operation or accumulated operation
- Cycling operation, on/off operation
- Stopping/positioning
- Reverse operation

Information Required for Inquiries and Orders

To ensure that the conveyor works in the optimum way for your requirements and environmental conditions, we require all the specifications for the influence factors specified above and a specification of the conveyor that is as detailed as possible.

Specification

GUF-P 2000 AC /.... /...

System designation

Drive version

- Conveyor length L [mm]
- Conveyor width B [mm]
- Drive location with motor orientation
- Tail (infeed end and discharge end)
- Belt type and any cleats or side walls
- Max. speed
- Speed mode (constant or controllable)
- Reglomat (if controllable speed is required)
- Stand version, including working height
- Side rail type
- Any other accessories

Drive packages

- 0 without motor (drive AA or BA)
- 1 with motor (drive AC-AU, BC, BF, CA)
- 2 with motor and switch
- 3 with motor and control of speed and direction
- 4 with motor and small controller
- 5 with motor and positioning controller

Make the process simple and use our QuickDesigner online configurator at **www.quickdesigner.com** or complete one of our request forms at **www.mk-group.com/service**. Our Technical Sales team is also happy to help you on site.



Ambient Conditions

When configuring a conveyor, we assume the usual ambient conditions in the production facility. That is, the application is indoors at room temperature (RT), in a clean environment with the usual humidity of < 60% and there is no condensation or dripping water.

Generally the range from +10° to +60° C is non-critical. In special cases (e.g. over longer lengths with a temperature differential greater than 50° C), the elongation of the installed components in length must be taken into account. Low temperatures down to -20° C are possible on request. Ambient temperatures above 80° C are only briefly permissible for most plastics. Ambient temperatures higher than 150° C are only permissible for aluminium base structures after testing. However, the temperatures for contact between the product and transport medium of up to 200° C are possible when using steel chains.

We are happy to provide consultation for applications in cleanrooms and sterile areas, applications with hygiene or pharmaceutical specifications, usage in harsh environmental conditions, potentially explosive atmospheres and painting applications.

Continuous Operation/Accumulated Operation

In continuous operation, the conveyor and the product run without interruption. The goods to be conveyed are supplied to the running conveyor and conveyed further. During accumulated operation, the conveyor continues to run below the accumulated, stationary product. Note that the motor power during accumulated operation must be approximately twice as high as it is in continuous operation (see diagram on page 12).

On/Off Operation

The conveyor is switched on and off as needed. This is usual for parts discharge or manual removal. We also always recommend on/off operation to reduce wear if it is foreseeable that no action will occur for more than 30s. For clean rooms especially, this is strongly recommended to avoid unnecessary contamination. If the conveyor is deactivated more than four times per minute, this is classified as cycling operation (startup with a load only with a soft start).

Cycling Operation

As a rule, the cycling operation is a fixed cycle that is repeated. If there are more than 30 cycles per minute, servo drives are usually required. Rates of more than 60 cycles per minute are available on request, but they require a detailed assessment of the application. The time available for transport and the required acceleration are important for the motor configuration. During acceleration, pay attention to the static friction of the product on the transport medium. See page 12 for additional information.

Positioning Operation

For positioning operation, the product is usually positioned with pinpoint precision in a controlled machining process, so that it then can be picked off, for example. For positioning operation, the specification of the accuracy to be achieved is important. Repeatability means that the product is repeatedly moved to the same point under the same conditions. Positioning accuracy is the absolute accuracy even with changing loads.

Positioning accuracy in a range of \pm 10 mm is possible with simple devices, such as initiators or light barriers. As a rule, the range of \pm 5 mm requires a positive-locking drive and control with signal transducers. The range of \pm 1 mm represents the transition to the linear technology. This accuracy, including transverse to the conveying direction, requires the means of transport to be guided precisely and the position of the product to be fixed on the conveyor.



Conveyor Width

The conveyor width is the width of the conveyor frame without the tails. The belt is narrower to allow for self-adjusting tracking, between 10 and 50 mm depending on the system.

Conveyor Length

The conveyor length is a nominal dimension and is defined as the outer distance of the head parts when the system is not tensioned. The actual conveyor length is longer and is calculated based on the following aspects (specifications apply at an ambient temperature of 20°):

- Belt tensioning distance of approx. 0.3% of the conveyor length
- Belt length tolerance of up to 0.8% of the conveyor length
- Belt thickness tolerance of 1 to 5 mm per side
- Rollers protruding over the head parts by 1 to 3.5 mm per side

If a precisely defined installation length is strictly required, this can be accomplished using lower belt drives.

Length-Width Ratio

To ensure that the belt runs safely and stably, the conveyor must not fall below or exceed a specific length-width ratio (1:1 to 50:1).

A stable area without restrictions has a ratio of length to width from 2:1 to 20:1 (i.e. from twice as long as wide, to 20 times as long as wide).

Likewise, a range from 1.5:1 to 2:1 is also usually possible without restrictions, but requires a design test. The range of 1:1 to 1.5:1 can only be implemented with supplemental measures and restrictions.

In the range of 20:1 to 50:1, only laterally stiff belts must be used; in addition, transverse forces are no longer permissible. They occur, for example, when there is lateral movement, lateral product discharge, lateral product transfer, lateral product alignment using a side rail and asymmetric load distribution.

Speed

The maximum conveying speed depends on the motor selected, the load capacity, the operating mode and other factors.

With an indirect chain drive with a ø 50 mm roller, a speed of up to 80 m/min is possible. The selection of a timing belt for force transmission is recommended for 30 m/min or higher, and is standard for 60 m/min or higher and cycling operation. Slim rollers are balanced for speeds of 60 m/min or higher, and dynamically balanced for 100 m/min or higher.

For high speeds, it is sensible to choose large driving rolls (e.g. for 80 m/min with the GUF-P 2000, a BC drive with a ϕ 88 mm roller).

Adjustment Ranges

The mk reglomat lets you control the conveyor speed within a range of 1:7 (10–70 Hz), assuming an alternating current and the nominal speed at 50 Hz. For internal drives (drum motors), the adjustment range is 1:3 (20–60 Hz). With direct current, the range is 1:6 (0.25-1.5 A or 0.5-3 A).

Belt Conveyor GUF-P 2000



>>> The all-rounder with the maximum number of variants. 《《

The combination of standard parts based on the profile mk 2000 results in a conveyor system that allows for the widest possible range of drives and tails and extremely short delivery times. Despite its low height of 50 mm and the ø 53 mm driving roll, which can be coated with rubber according to the application, the conveyor offers a wide range of different belt types. As with all mk belt conveyor systems, the round design of the driving and idler rollers make belt adjustment significantly easier.

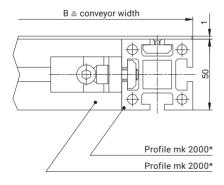
System slots running along both sides (10 mm slot width based on our profile technology) allow you to easily integrate the conveyors into existing machine frames or attach stands, side rails and other accessories. A further quality feature of this conveyor system is the stainless steel sheet installed below where the belt runs, which ensures long-term wear resistance of the belt. In addition to our wide selection of side rails and stands, we also offer a standard range of end stops and electrical accessories.



Benefits of the GUF-P 2000

- Wide range of different drives, tails, stands and belt types
- Built with the profile mk 2000 for a high load capacity and torsion-resistant structure
- Optionally available with a stationary or rolling knife edge
- Flexible operation in reverse, accumulated and cycling mode
- Very short delivery times

Cross Section



* For conveyor widths 75, 100, 150, 200 and 250 mm, custom profiles are used









Selecting a Drive

Speed - continuous operation compared to cycling operation

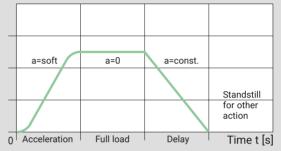
The diagrams show the need for a higher maximum speed in cycling operation compared to continuous operation. In addition, they show an example of the course of a cycling operation with soft start-up and standstill for a different action (e.g. to process the conveyed product).

Continuous operation compared to cycling operation

Speed v [m/s] V_{max} V_{medium} Continuous operation (a=0) 0 a = acceleration Time t [s]

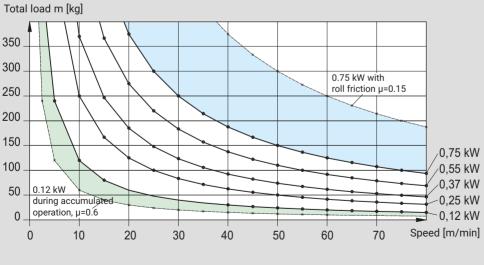
Example of cycling operation





Selecting motors based on speed and load

This diagram can be used to determine the motor power required based on the total load (transported material + medium of transport) and the speed. The values shown correspond to a kinetic friction value of μ =0.3, which is the friction between the belt and the underlying plate in a belt conveyor.



Example of the effect on the permissible total load and speed when the friction coefficient is halved from a belt conveyor (μ =0.3) to a roller conveyor (μ =0.15)

Example of the effect on the permissible total load and speed when the friction coefficient is doubled from continuous operation (μ =0.3) to accumulated operation (μ =0.6)



Drive Location

The **head drive** is located on the discharge end of the conveyor and pulls the transport medium, e.g. the belt. This is the most common, safest and most affordable drive position. If you have location restrictions, you can also install a head drive on the infeed end for use as a rear drive (pushing). In this case, however, you must provide adequate pre-tension and prevent the transport medium from getting kinked.

Lower belt drives, which are also called centre drives, can be installed in various locations below the transport level. The primary application for these drives is reverse operation (reversible conveying direction), since the transport medium is always pulled, preventing the problems that arise when the belt is pushed. You can achieve fixed installation lengths by selecting the design with a tensioning roller in the centre drive. Since two snub rollers are typically used, this drive is also known as an omega drive. A further benefit of this drive is the option to install knife edges on both the infeed and discharge ends for transferring small products.

Internal drives with a drum motor produce small obstructing edges, making them particularly popular for applications with limited installation space. They are also popular in clean environments, since they exhibit low particle emissions and have few surfaces on which dirt can deposit.

Drive Type

In the most commonly used **indirect drives**, force is transferred using a chain or timing belt. This additional option to adjust the transmission ratio allows you to achieve very fine speed increments and compensate for alignment errors. With servo and stepper motors, a timing belt can be used to dampen the abrupt, jerky starting behaviour.

With a **direct drive**, the motor is connected directly to the drive shaft, offering a compact and low-maintenance alternative.

Motor Selection

Our standard product range also includes a variety of different stock equipment motors from well-known manufacturers. These gearmotors, consisting of asynchronous AC motors as standard or DC motors, combined with a Spiroplan, helical-worm or helical gearbox, meet efficiency class II and IP 54. Custom motors, servomotors, UL-CSA approval and multi-range motors are also available as options.

Speeds

The maximum conveying speed depends on the motor selected, the load on the belt, the operating mode and other factors. The speeds provided here are nominal values and may deviate due to the speed tolerances of the motors (up to \pm 10%). For indirect drives using chains or timing belts, the tolerance tends to be even higher, at up to 20% above the nominal speed. Higher speeds are also achieved when the system is operated on a 60 Hz grid, for example in the USA. If you need a precisely defined speed, this can be accomplished with an mk reglomat.

Adjustment Ranges

The mk reglomat lets you control the conveyor speed within a range of 1:7 (10–70 Hz), assuming an alternating current and the nominal speed at 50 Hz. For internal drives (drum motors), the adjustment range is 1:3 (20–60 Hz). With direct current, the range is 1:6 (0.25-1.5 A or 0.5-3 A).

Selecting a Drive

1	A – Head Drives						
		AA	Head drive without motor This drive version with an open drive journal can be connected to a conveyor with a motor for parallel operation				
		AC	Standard head drive Drive version with a variety of combination options for motors, gearboxes and sprocket wheels				
		AF	Direct head drive Compact and low-maintenance drive version with a motor that is fitted directly on the drive shaft				
		AD AG	Head drive, compact Drive version with minimal interference contours thanks to small gear motor, available with direct current motor or three-phase motor				
		AM	Head drive, offset Thanks to the variably configurable head drive, there are no interference contours at the discharge end of the conveyor				
		AS	Head drive, laterally on the outside, compact A drive version restricted to a minimum total height with motor mounted on the outside				
		AU	Head drive, laterally on the outside Since the motor is mounted laterally from the outside, the space underneath and above the conveyor remains free of interference contours				





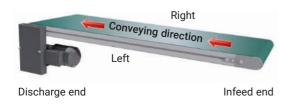
The drive versions are shown on the belt conveyor in the example

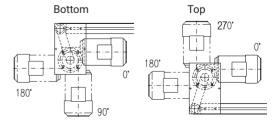
Drive Location

The drive location determines how and where the drive, including the motor, is installed. You can choose to position the drive on the infeed or discharge end, above or below the conveyor frame, on the left or on the right.

Motor Orientation

As shown in the figures, the motor orientation can vary between 0° , 90° , 180° and 270° . If the customer does not specify the drive location, the drive is delivered on the discharge end, on the left side, below the conveyor and with a motor orientation of 0° .



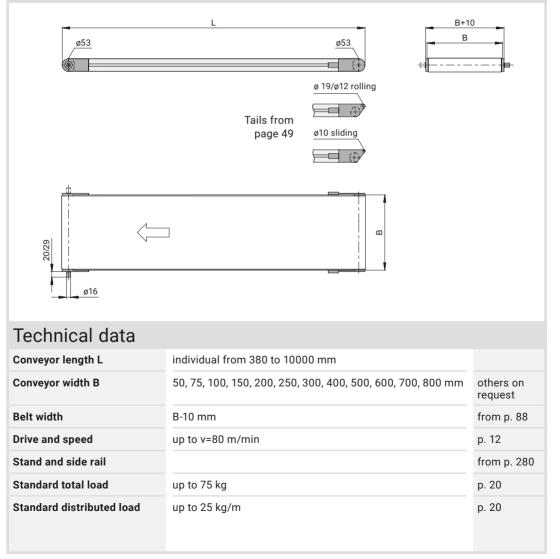


GUF-P 2000 AA



Properties

The drive variant AA without a motor offers the advantage of operating multiple conveyor belts in parallel or in series with one drive. The compact conveyor frame design makes it easier to integrate the conveyor into existing systems. The driving roll ø 53 mm has a round design for simple belt control. Operation with cleated belts is possible with this version. The ø 16 mm shaft journal has a usable length of 20 mm with a chain drive or 29 mm with a timing belt drive and is equipped with a DIN 6885 key.

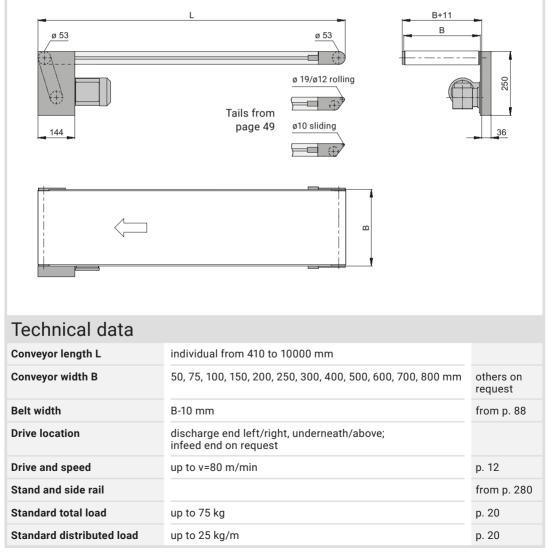


GUF-P 2000 AC



Properties

The compact conveyor frame design with the most popular drive variants makes it easier to integrate the conveyor into existing systems. The ø 53 mm driving roller ensures excellent transmission of the motor power. Operation with cleated belts is possible with this version.

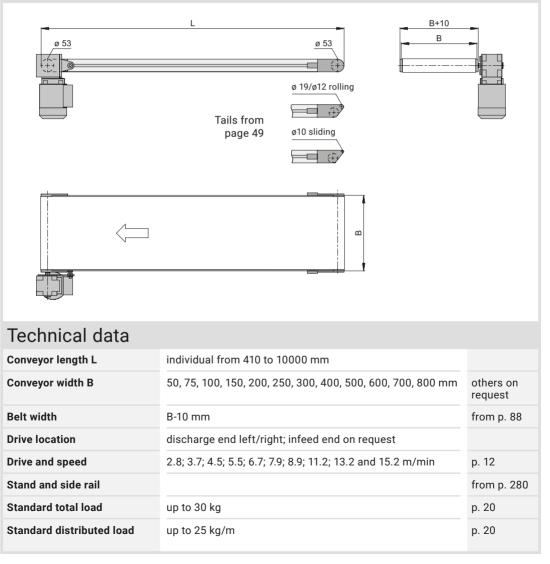




Properties

Since the motor is fitted directly onto the drive shaft, the space requirements and maintenance effort for this drive version are reduced to a minimum.

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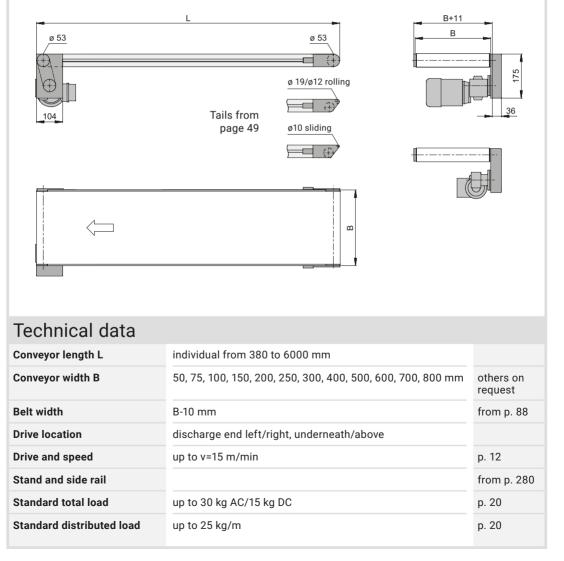
2

GUF-P 2000 AG



Properties

The compact drive version AG for small gearmotors (direct current or three-phase motors) has fewer interfering edges in comparison to the AC drive version thanks to the gearbox type used. The compact conveyor frame design makes it easier to integrate the conveyor into existing systems. Without a snub roller, the \emptyset 53 mm driving roller enables the use of cleated belts. In comparison to the drive version AC, the dimensions of the drive are much more compact.

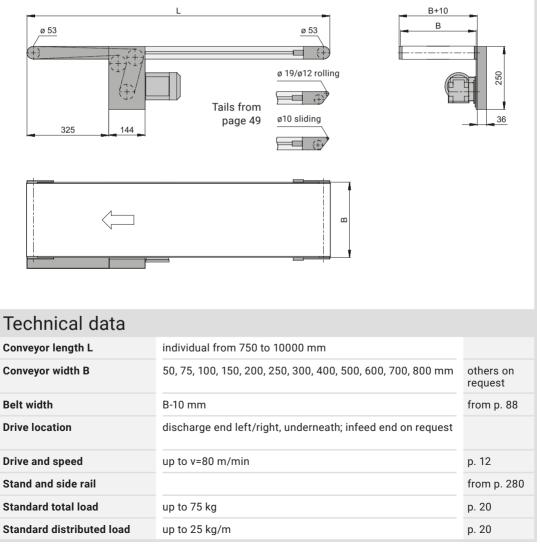




Properties

2

The compact conveyor frame design with the offset head drive makes it easier to integrate the conveyor into existing systems. The ø 53 mm driving roller ensures excellent transmission of the motor power. Operation with cleated belts is possible with this version.

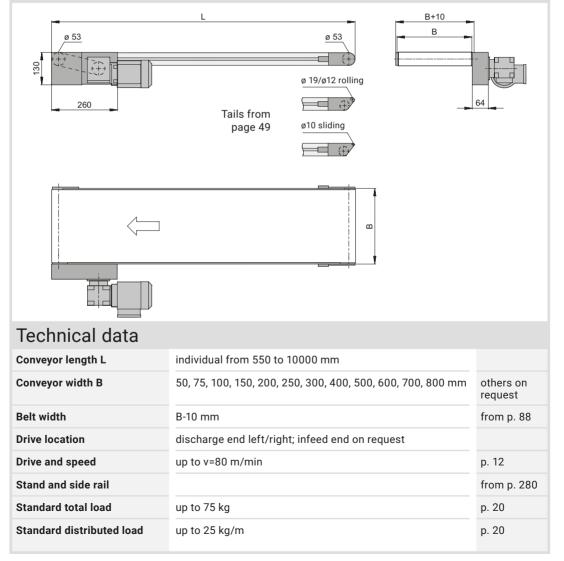


GUF-P 2000 AS



Properties

The drive located laterally on the outside allows the total height of the conveyor to be restricted to a minimum. The ø 53 mm driving roller ensures excellent transmission of the motor power. Operation with cleated belts is possible with this version.



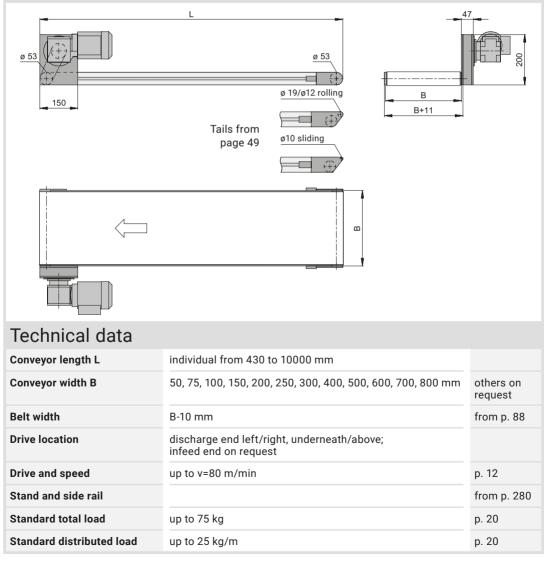
GUF-P 2000 AU



Properties

2

The advantage of the drive version AU is that the motor is fitted on the outside of the conveyor belt, which protects it from dirt. The space requirements for the conveyor in the lower run are much smaller in comparison. This drive version can transport even very tall products with ease. The ø 53 mm driving roller ensures excellent transmission of the motor power. Operation with cleated belts is possible with this version.

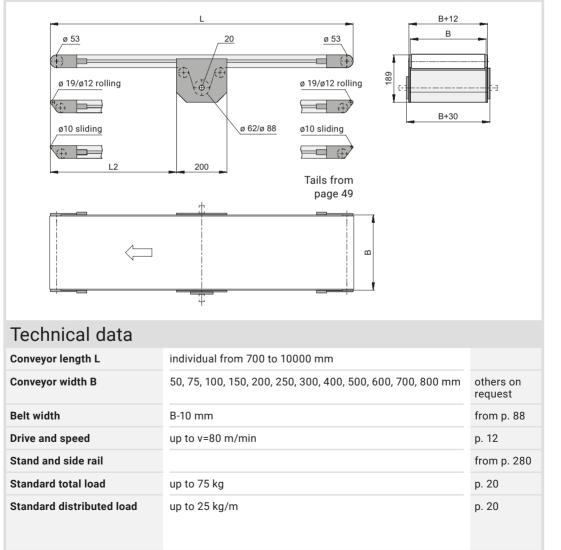


GUF-P 2000 BA



Properties

The drive variant BA without a motor provides the advantage of operating multiple conveyor belts in parallel with one drive. The compact conveyor frame design and the ability to freely select the drive position over the entire length of the conveyor make it easier to integrate the conveyor into existing systems. The conveying direction is reversible. Knife edges can be configured on both the infeed and discharge end. Operation with cleated belts is not possible with this version. The driving roller has a hollow shaft design with ø 20 mm with keyway in accordance with DIN 6885.

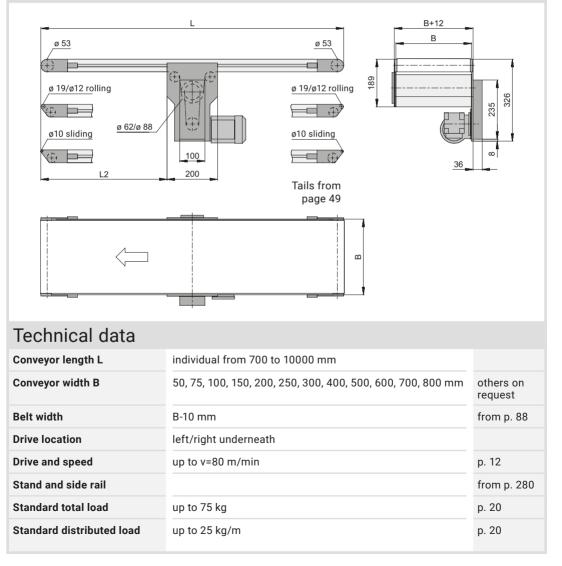


GUF-P 2000 BC



Properties

The compact conveyor frame design and the ability to freely select the drive position over the entire length of the conveyor make it easier to integrate the conveyor into existing systems. The conveying direction is reversible. Knife edges can be configured on both the infeed and discharge end. Operation with cleated belts is not possible with this version.

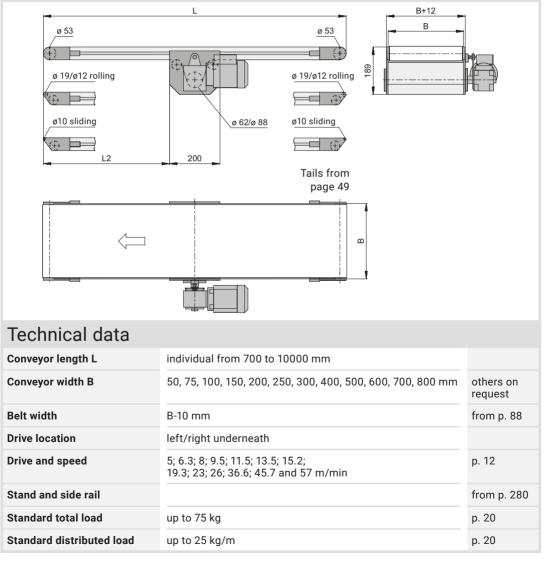


GUF-P 2000 BF



Properties

Since the motor is fitted directly onto the drive shaft, the space requirements and maintenance effort for this drive version are reduced to a minimum. The compact conveyor frame design and the ability to freely select the drive position over the entire length of the conveyor make it easier to integrate the conveyor into existing systems. The conveying direction is reversible. Knife edges can be configured on both the infeed and discharge end. Operation with cleated belts is not possible with this version.



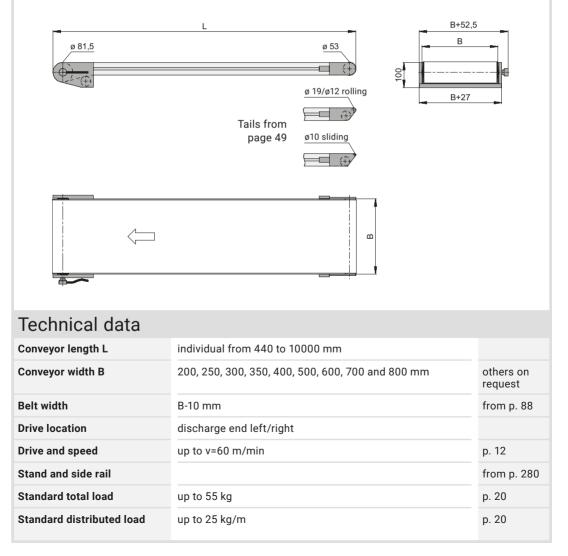
GUF-P 2000 CA



Properties

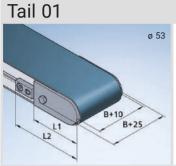
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The drive version CA with drum motor is the most compact variant of the conveyors in the GUF-P 2000 system. Since the motor is integrated into the driving roller, no obstructing edges protrude over the conveyor frame structure. The conveyor can therefore easily be integrated into existing systems. Operation with cleated belts is not possible with this version.



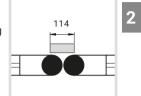
GUF-P 2000 Tails



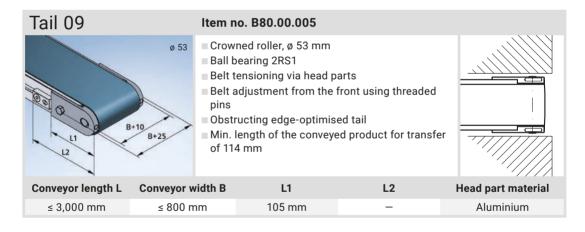


Item no. B80.00.001

- Crowned roller, ø 53 mm
- Ball bearing 2RS1
- Belt tensioning and adjustment on the side using the tensioning elements
- Min. length of the conveyed product for transfer of 114 mm



Conveyor length L	Conveyor width B	L1	L2	Head part material
≤ 2,900 mm	≤ 300 mm	105 mm	145 mm	Plastic
≤ 2,900 mm	> 300 mm	105 mm	145 mm	Aluminium
> 2,900 mm	≤ 800 mm	155 mm	195 mm	Aluminium



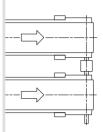


GUF-P 2000 Tails



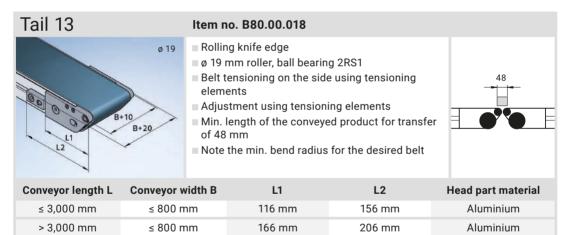
Item no. B80.00.006

- Crowned roller, ø 53 mm
- ø 16 mm shaft journal, usable length of 20 mm with roller for chain drive or 30 mm with roller for timing belt drive, keyway in accordance with
- Connection of two conveying lines through one
- Output shaft available on the right, left or both sides



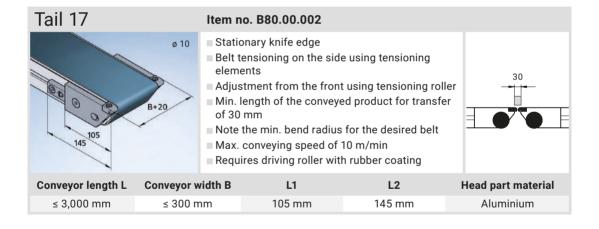
Conveyor length L	Conveyor width B	L1	L2	Head part material
≤ 2,900 mm	≤ 300 mm	105 mm	145 mm	Plastic
≤ 2,900 mm	> 300 mm	105 mm	145 mm	Aluminium
> 2,900 mm	≤ 800 mm	155 mm	195 mm	Aluminium

*Does not apply for the drive end









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Simply enter quickdesigner.com in your browser, click Start, and that's it.

Your on-screen entries are checked for plausibility immediately, to ensure that you are always offered the optimal conveyor. All the entry fields have an info button with detailed instructions to make the tool as easy as possible to use.

When your desired conveyor is complete, you can immediately generate a CAD model and a quote. In "My Account", you can also access and edit the configurations you create and their models and quotations at any time.

If you place an order, we have all the relevant data in the system, which makes the whole process, including the delivery, much quicker. Even if you require a special solution, we design it on the basis of the created standard model. A cost advantage for you.





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Benefits of mk QuickDesigner

- Quick, simple and based on your specific requirements
- Available any time, anywhere (24/7)
- Can be used on a mobile device
- Live view during configuration
- CAD model and quotations
- Save configurations and edit them later
- In-depth support
- German/English

CAD model + quotation



