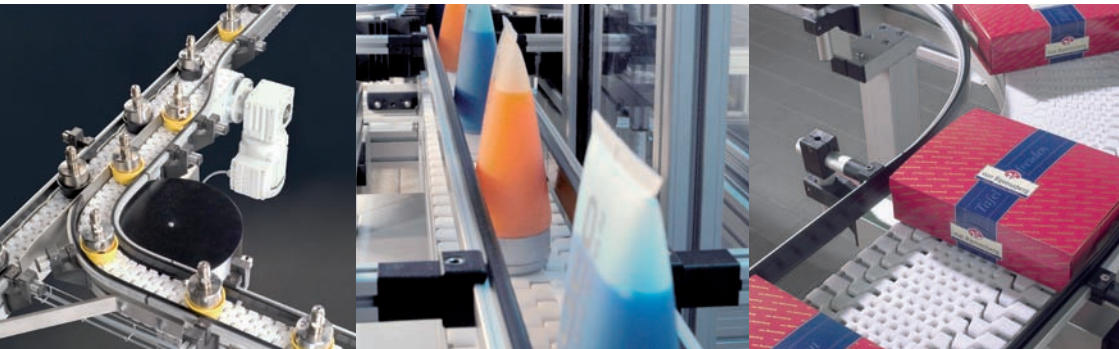


Assembly instructions
Slat band chain conveyor systems CS SL



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1 General



These assembly instructions for partly completed machines comply with DIN EN ISO 12100-2/A1. The manufacturer has included them with the product to provide the owner and operator of the machine with the fundamental knowledge required for its safe and proper operation.

The assembly instructions should always be kept within easy reach in machine proximity.

The assembly instructions provide assistance in using, servicing and maintaining the machine. They are intended to contribute towards extending the system's useful life under high-capacity use and help prevent accidents.

Caution! Read the assembly instructions through carefully before putting the machine into / back into operation. The manufacturer accepts no liability for damage and malfunctions resulting from any failure to observe these operating instructions!



1.1 Reservation

We reserve the right to make technical modifications diverging from the illustrations and information provided in these assembly instructions if such help to improve the machine.

The assembly instructions may only be duplicated for internal use. They must not be passed on to third parties.

1.2 Explanation of safety symbols

The safety symbols together with the wording of the safety warning are intended to draw attention to unavoidable residual risks involved in handling and using the machine.

These residual risks relate to persons, the machine, other property and objects as well as to the environment.

The following safety symbols are used in these assembly instructions. In particular, these symbols are intended to draw the reader's attention to the wording of the safety warning appearing next to them.

Caution! Warning of a point of danger.



This symbol points draws attention to dangers posing a particular threat to life and health – in addition to this, risks may also exist for machine, property or the environment.

Caution! Warning of dangerous voltage.

This symbol draws attention to particular threats to life and health from dangerous voltages.

Any work necessary must only be performed by persons in possession of the requisite expertise (e.g. qualified electricians or persons with electrotechnical training) and who have been instructed to do so by the company owning the system.

Caution! Important note that must be observed.

This note without additional safety symbol marks passages in these assembly instructions where it is necessary to observe guidelines, regulations, information and the correct sequence of work as well as avoid causing damage to the machine.

2 Proper use

The vertical and centre drives as well as the vertical idlers and horizontal curves with disk of type CS SL in CS 065 SL, CS 090 SL and CS 200 SL overall widths – also referred to below as drives and idlers – are only intended for use as components in constructing an overall system.

This overall system is slat band chain conveyor for moving unit loads and in which a curve-going link chain is guided in a guide profile.

The drives have the purpose of transferring motor power to the conveyor chain. They are used at the end/centre of the line. The vertical idlers are used for returning the chain to the start of the line.

Caution! The conveyor system must only be set up indoors where it is protected from the elements. The system must not be operated in potentially explosive atmospheres.



Caution! Proper use also includes reading these assembly instructions as well as following all of the information contained in them – in particular the safety warnings. This also includes carrying out all servicing and maintenance work at the prescribed intervals.



If the conveyor system is not used for its intended purpose, safe operation will not be ensured. It is the owner and operator of the conveyor system, and not the manufacturer, who is responsible for all personal injury and damage to property resulting from improper use!

2.1 Declaration of Incorporation

Declaration of Incorporation under Directive 2006/42/EC on machinery for partly completed machinery (in accordance with Directive 2006/42/EC, Annex II, Section 1, Part B)

The manufacturer: MS Plus Automation
Höfeweg 62a
D-33619 Bielefeld

Tel. +49 521 30 430 0
Fax +49 521 30 430 153

info@msplusautomation.com
www.msplusautomation.com

hereby declares that the following product:

Product denomination: Slat band chain conveyor system CS SL
Type designation: CS 065 SL
CS 090 SL
CS 200 SL

complies with the following fundamental requirements of the **Directive on machinery (2006/42/EC)**:
Annex I, Article 1.1.2, 1.1.3, 1.1.5, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.7, 1.3.8, 1.4.2 and 1.5.8.

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive on machinery (2006/42/EC), where appropriate.

The manufacturer undertakes to transmit to national authorities, in response to their request, relevant information on the partly completely machinery.

The relevant technical documentation belonging to the machinery has been compiled in accordance with Part B of Annex VII.

Person responsible for documentation: Jürgen Kuhlmann, Tel. +49 521 30 430 228

Place, date: Bielefeld, 10-01-2010

Manufacturer's signature:



Details of the undersigned: i.V. Stefan Pedall
Head of Division
MS Plus Automation

3 General operating conditions

Description

The conveyor system is a slat band chain conveyor for handling unit loads.

The aluminium guide profile accommodates a curve-going link chain made of plastic. Clip-on sliding strips minimise sliding friction between chain and profile.

Plastic chains

The plastic chains required for operation are made of POM.

The individual links are fitted together without connecting bolts. The chains exhibit good resistance to chemicals as well as to liquids with a pH value of 4.5 to 9 (list on request).

Ambient conditions

Permissible operating temperature range from -20 to +80°C.

Conveyor chain lubrication

CS SL conveyor systems can in general be operated without lubrication. This is made possible by the excellent material properties of the sliding strip.

4 General technical conditions

Width of conveyed item

The maximum width of items being conveyed is governed by their shape and the position of their gravitational centre.

Weight of conveyed item

Horizontal conveyance:

The maximum weight of individual conveyed items is limited by sliding-strip wear and chain pulling force.

Vertical conveyance:

The maximum weight of individual conveyed items is governed by the strength of the catch plates.

Maximum conveyor system load

The conveyor's maximum loading capacity is governed by the power of the drive unit and pulling force in the chain. The maximum load per chain link is 1.5 kg.

Conveyor system rating must take both criteria into account.

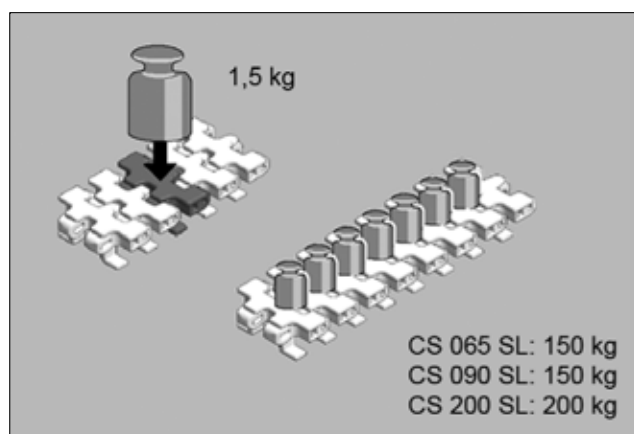


Fig. 1: Maximum load per chain link and total load

Line length and conveying speed

Maximum line length conveying speed is governed by line configuration, power of the drive unit and weight carried by the conveyor system.

Type	Conveyed item			Conveyor system		
	max. width [mm]	max. weight [kg]		max. load [kg]	max. line length [m]	max. speed [m/min]
		Horizontal conveyance	Vertical conveyance			
CS 065 SL	15-140	10	5	150	30 / 8 *	80
CS 090 SL	20-200	10	5	150	30 / 8 *	80
CS 200 SL	100-400	15	5	200	30	60

*) Maximum line length for vertical clamp conveyor.

4.1 Chain pulling force

The maximum permissible chain pulling force depends on conveying speed and line length. Values can be read from the diagrams below. The lower value is authoritative.

If the calculated chain pulling force is too high, you may select one of the following options:

- Divide up system into shorter subsections.
- Replace horizontal sliding curves with horizontal curves with disk.
- Shorten accumulating line section
- Reduce conveying speed
- User higher-powered drive units.

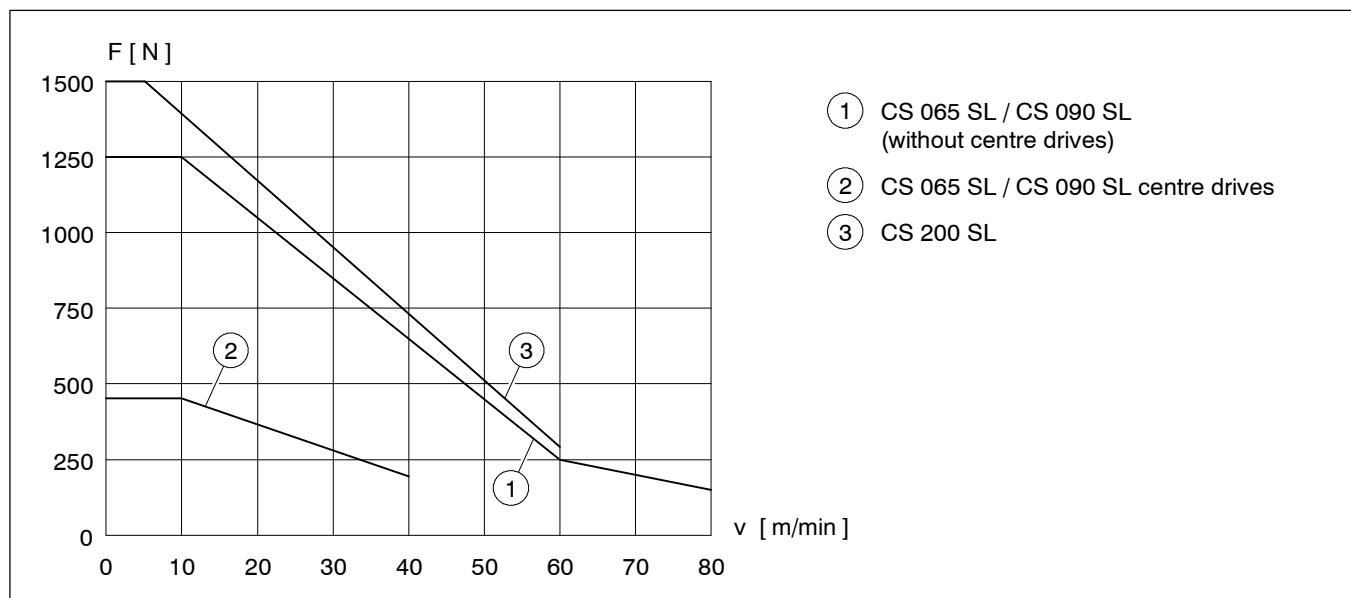


Fig. 2: Permissible chain pulling force F as a function of conveying speed v

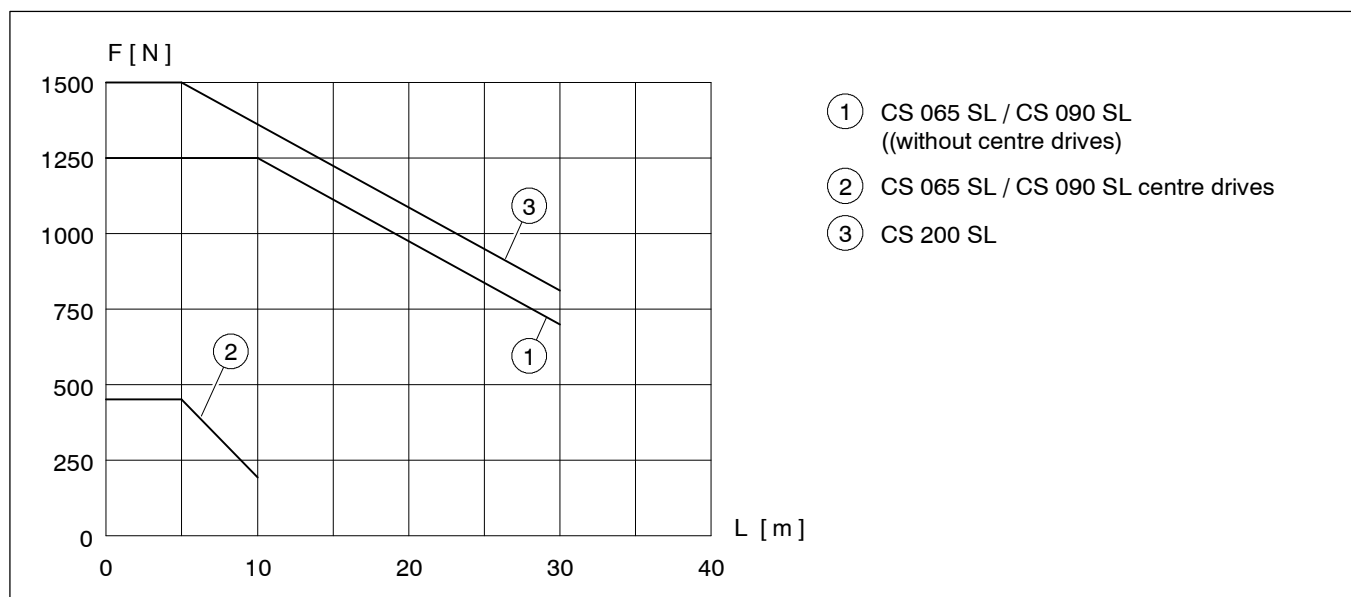


Fig. 3: Permissible chain pulling force F as a function of line length L

4.2 Noise emission

Noise emission from the conveyor system also depends on conveying speed. For the reference line section, this is below 75 dB(A) in accordance with Directive 2003/10/EC on noise.

The reference line is set up at a height of 1.0 m above the floor. The measuring points for drive, curve and idler are positioned at:

- 0.5 m above and
- 1.0 m to the side of the line.

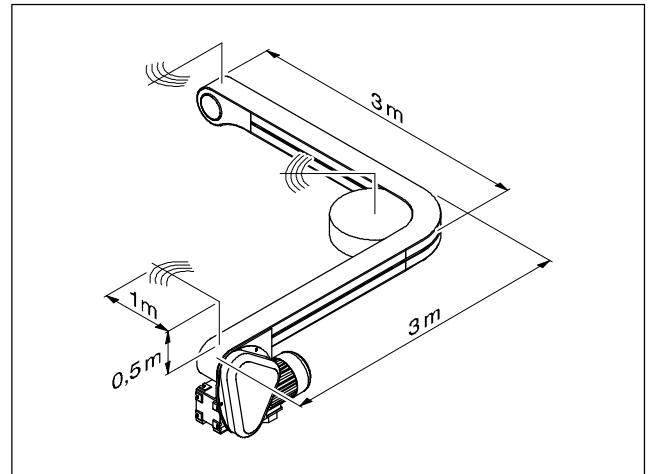


Fig. 4: Reference line set-up

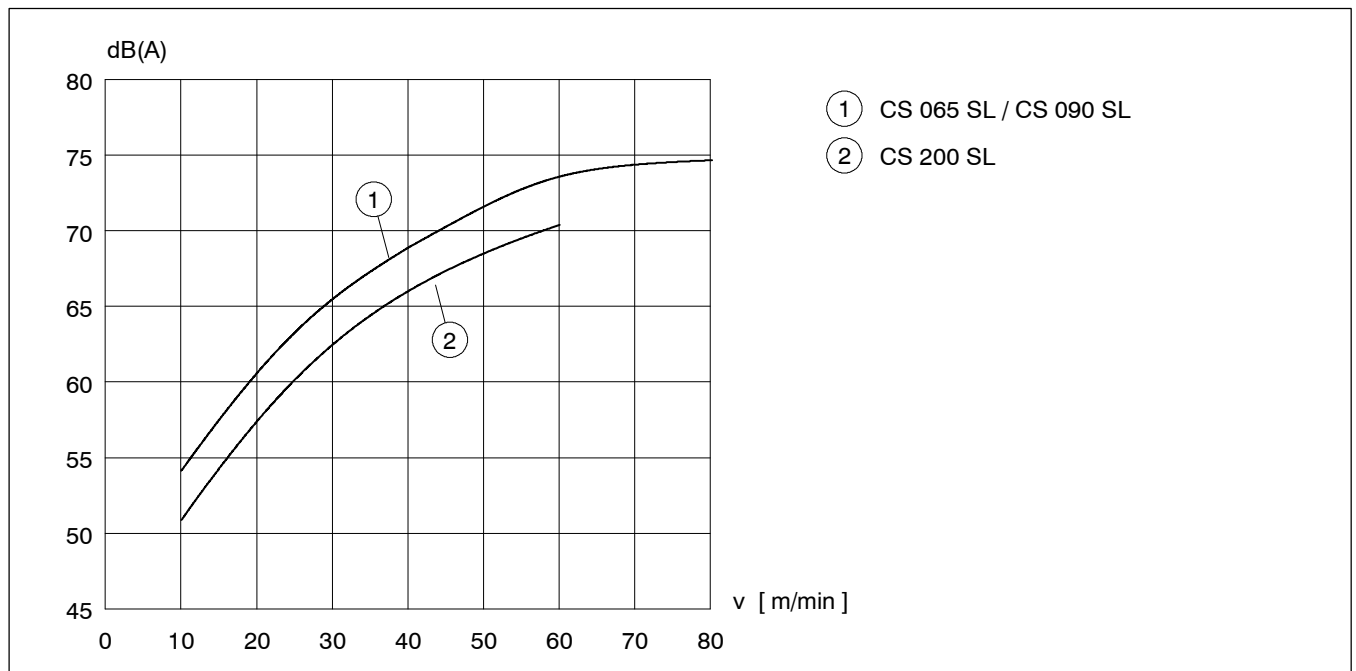


Fig. 5: Noise emission in dB as a function of conveying speed v

5 Technical specifications

5.1 CS 065 SL

- Overall width 65 mm
- Guide profile material EN AW-6063 T66, E6/EV1 anodised finish

5.1.1 Conveyor chains

- Type Curve-going link chain with pins
- Chain width 62.0 mm
- Chain pitch 25.4 mm
- Max. chain pulling force, chain material

Chain type	Max. chain pulling force	Chain material
Standard	1250 N	POM
with catch plates	1250 N	POM
with friction lining	1250 N	PA
Antistatic	300 N	POM
with flocked surface	500 N	PA
with steel lining	1250 N	POM
Universal	1250 N	POM
with catch rollers	1250 N	POM
with accumulating rollers	1250 N	POM
with gripper	750 N	POM

- Chain pin material Stainless steel (1.4305)

5.1.2 Drives

- Conveying speed, chain pulling force, line length:
The maximum permissible chain pulling force depends on conveying speed and line length. The values must be read from the diagrams in section 4.1 "Chain pulling force". The lower value is authoritative.
- Gear motor 400 V / 50 Hz (3 phases)
- Drive pitch diameter 118.5 mm

Drive type	Max. line length [m]	Max. chain pulling force F [N]	Max. conveying speed v [m/min]	Chain length required [m]
Vertical drive with belt reducing gear	30	1250	80	0.55
Vertical drive with chain gear	30 / 20	800 / 250	60 / 80	0.55
Direct drive	30	1250	80	0.55
Centre drive with belt reducing gear	10	400 / 240	40 / 80	0.83
Centre drive with chain gear	10	400 / 240	40 / 80	0.83

5.1.3 Idlers

Idler type	Idler angle [°]	Chain length required [m]
Vertical idler	180	0.55
Horizontal curve with disk	45	2x 0.27
	60	2x 0.31
	90	2x 0.40
	180	2x 0.67

5.2 CS 090 SL

- Overall width 90 mm
- Guide profile material EN AW-6063 T66, E6/EV1 anodised finish

5.2.1 Conveyor chains

- Type Curve-going link chain with pins
- Chain width 87.0 mm
- Chain pitch 25.4 mm
- Max. chain pulling force, chain material

Chain type	Max. chain pulling force	Chain material
Standard	1250 N	POM
with catch plates	1250 N	POM
with friction lining	1250 N	PA
Antistatic	300 N	POM
with flocked surface	500 N	PA
with steel lining	1250 N	POM
Universal	1250 N	POM
with catch rollers	1250 N	POM
with accumulating rollers	1250 N	POM
with gripper	750 N	POM

- Chain pin material Stainless steel (1.4305)

5.2.2 Drives

- Conveying speed, chain pulling force, line length:
The maximum permissible chain pulling force depends on conveying speed and line length. The values must be read from the diagrams in section 4.1 "Chain pulling force". The lower value is authoritative.
- Gear motor 400 V / 50 Hz (3 phases)
- Drive pitch diameter 118.5 mm

Drive type	Max. line length [m]	Max. chain pulling force F [N]	Max. conveying speed v [m/min]	Chain length required [m]
Vertical drive with belt reducing gear	30	1250	80	0.55
Vertical drive with chain gear	30 / 20	800 / 250	60 / 80	0.55
Direct drive	30	1250	80	0.55
Centre drive with belt reducing gear	10	400	40	0.83
Centre drive with chain gear	10	400 / 240	40 / 80	0.83

5.2.3 Idlers

Idler type	Idler angle [°]	Chain length required [m]
Vertical idler	180	0.55
Horizontal curve with disk	45	2x 0.28
	60	2x 0.34
	90	2x 0.44
	180	2x 0.74

5.3 CS 200 SL

- Overall width 200 mm
- Guide profile material EN AW-6063 T66, E6/EV1 anodised finish

5.3.1 Conveyor chains

- Type Curve-going link chain with pins
- Chain width 194.0 mm
- Chain pitch 25.4 mm
- Max. chain pulling force, chain material

Chain type	Max. chain pulling force	Chain material
Standard	1500 N	POM
with friction lining	1000 N	PA
Antistatic	1500 N	POM
Universal	1000 N	POM
with catch plates	1500 N	POM
with catch rollers	1000 N	POM

- Chain pin material Stainless steel (1.4305)

5.3.2 Drives

- Conveying speed, chain pulling force, line length:
The maximum permissible chain pulling force depends on conveying speed and line length. The values must be read from the diagrams in section 4.1 "Chain pulling force". The lower value is authoritative.
- Gear motor 400 V / 50 Hz (3 phases)
- Drive pitch diameter 118.5 mm

Drive type	Max. line length [m]	Max. chain pulling force F [N]	Max. conveying speed v [m/min]	Chain length required [m]
Vertical drive with belt reducing gear	30	1250	60	0.55
Vertical drive with chain gear	30	800	60	0.55
Direct drive	30	1500	60	0.55

5.3.3 Idlers

Idler type	Idler angle [°]	Chain length required [m]
Vertical idler	180	0.55

6 Safety warnings

The individual machine components of the conveyor system being assembled have been designed and manufactured in allowing for a risk assessment and after carefully selecting the applicable harmonised standards as well as other technical specifications. As a result, they reflect the state of the art and guarantee a maximum of safety.

However, this safety can only be achieved in working practice if all of the measures necessary to do so are taken. Planning these measures and monitoring their implementation falls within the machine owner's obligation to exercise due care.

Caution! Never work in any manner posing a safety hazard!



6.1 Owner's obligation to exercise due care

In particular, the owner must ensure that:

- the system is only used for its intended purpose (see section 2 for details).
- the system is only operated if it is in proper working order and, in particular, that the safety devices are regularly inspected for effective operation.
- requisite personal protective equipment is provided for and used by operating, servicing and repair personnel.
- the assembly instructions are kept in a legible state and are available in full at the place of machine use.
- the system is only operated, serviced and repaired by adequately qualified and authorised personnel.
- these persons receive regular instruction on all matters concerning work safety and environmental protection and are familiar with the assembly instructions and, in particular, with the safety warnings they contain.
- the system's main switch is switched off and protected from being switched back on again without authorisation before conducting servicing, repair and cleaning work.

6.2 Operator's obligation to exercise due care

In particular, the operator must ensure that:

- any identified defects with the potential to impair safe operation are reported to the owner for the owner to take care of rectifying them.
- the system's main switch is switched off and protected from being switched back on again without authorisation before conducting cleaning work.

6.3 Potential residual risks

The conveyor system being assembled from the machine components is a machine with moving parts.

Movement of the chain links presents the following potential mechanical hazards:

- Standard conveyor chain (on system CS 200 SL only): The slot-shaped gap between the chain links presents a risk of getting drawn in and crushed.
- Conveyor chains with catch plates, grippers, accumulating rollers or catch rollers, as well as chains fitted with client-specific components:
 - Risk of being pulled in and crushing hazard in the area of drive and idler units, as well as small-radius horizontal curves.
 - Crushing hazard between railing and chain in the upper run.
 - Crushing hazard between leg joint and chain returning in the lower run.
- Line transitions (if fitted): Risk of being pulled in and crushing hazard at transition to downstream line.

6.3.1 Measures to avoid residual risks

The potential risk must be minimised by taking appropriate protective measures.

- Standard conveyor chain (on system CS 200 SL only):
Guards must be in place to make the area inaccessible to operating personnel.
The system owner must draw the hazard to the attention of operating personnel working at manual workstations located directly at the conveyor system.

Caution! Do not reach into the gap between the chain links. You could be injured.

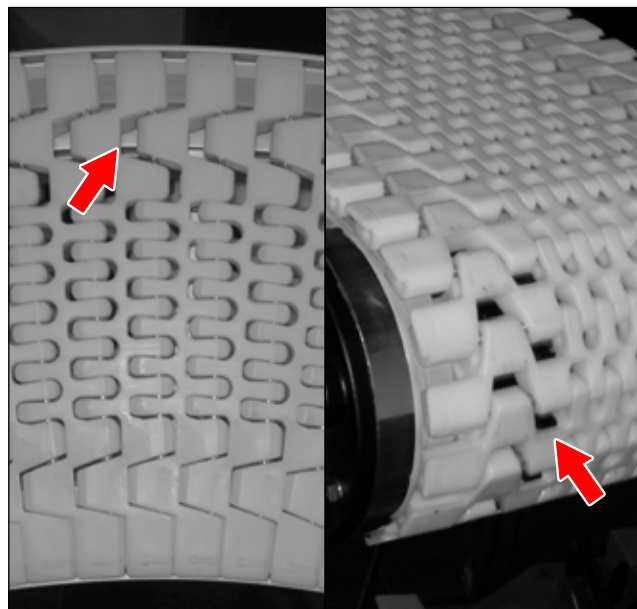


Fig. 6: CS 200 SL conveyor chain

- Conveyor chains with catch plates, accumulating rollers and catch rollers:
When using these chain types, drive and idler units must be made inaccessible to operating personnel by means of guards (e.g. protective covers). The lower run must be screened off by guards (e.g. protective grilles or protection plate) at places where manual work is carried out directly on the conveyor system.
- Line transitions:
These zones must be made accessible to operating personal by means of guards (e.g. protective covers).
If this is not possible, you must observe the information in Section 8.6 "Line crossovers".

7 Transportation and storage

Improper transportation may result in damage that can persistently impair proper working order.

Caution! System components must only be handled and moved by skilled personnel or properly trained persons. System components must only be handled and moved using suitable means.



The machine components are shipped out in pre-assembled units. During transit, the components should be protected from the elements.

The site of installation or intermediate storage is of importance to proper working order. The following requirements must be met:

- Room protected from the elements (indoor space).
- Room temperature 5 - 40°C.
- Low air humidity, low dust accumulation.
- Free from excessive vibration.

8 Assembly

The following information applies to overall widths of CS 065 SL, CS 090 SL and CS 200 SL.

The drive and idler units are delivered fully pre-assembled. The units must merely be connected to the end of the line.

8.1 Installing guide profiles

8.1.1 Installing line section joints

Line section joints are used for installing the guide profiles.

Line section joints (prod. no. J927 803, see Fig. 7) are made up of two steel tabs that are pushed into the end of the guide profile that is being connected. The joint is fixed in place by tightening the grub screws.

Caution! Exercise care when installing the guide profiles. The profile ends have sharp edges that can cause injury.

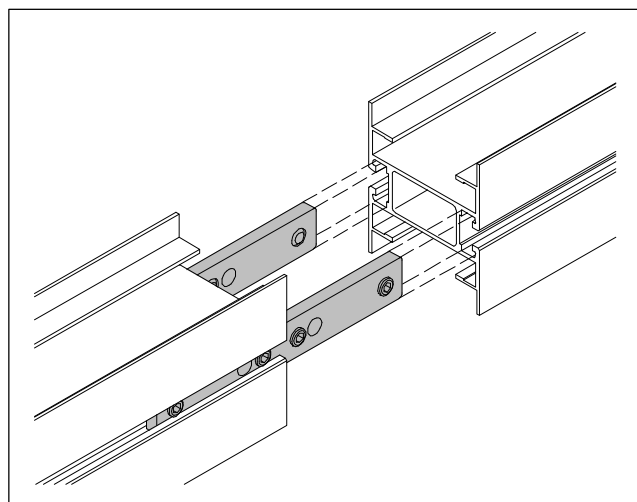


Fig. 7: Installing line section joints

8.2 Installing function units

8.2.1 Vertical idler

With vertical idlers the line section joints are an integral part of the unit.

The line section joints are pushed into the end of the guide profile that is being connected. The joint is fixed in place by tightening the grub screws.

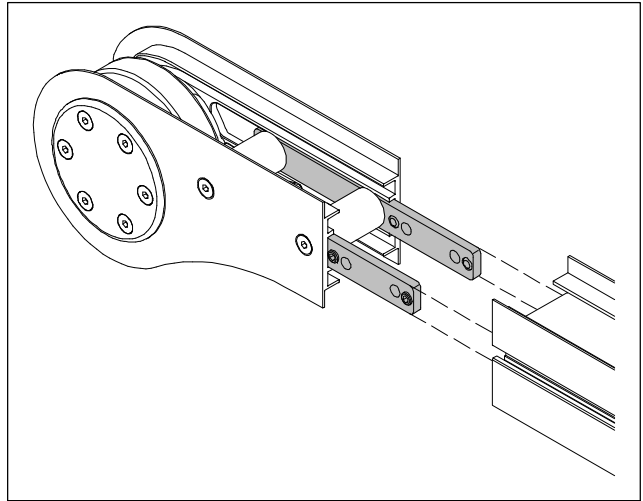


Fig. 8: Installing idler

8.2.2 Drives

With all drives the line section joints are an integral part of the unit.

Procedure

- The line section joints are pushed into the end of the guide profile that is being connected. The joint is fixed in place by tightening the grub screws.
- Connect drive motor of vertical drive to control system (or local power supply).

Caution!



This work must only be performed by persons in possession of the requisite expertise (e.g. qualified electricians or persons with electrotechnical training) and who have been instructed to do so by the company owning the system.

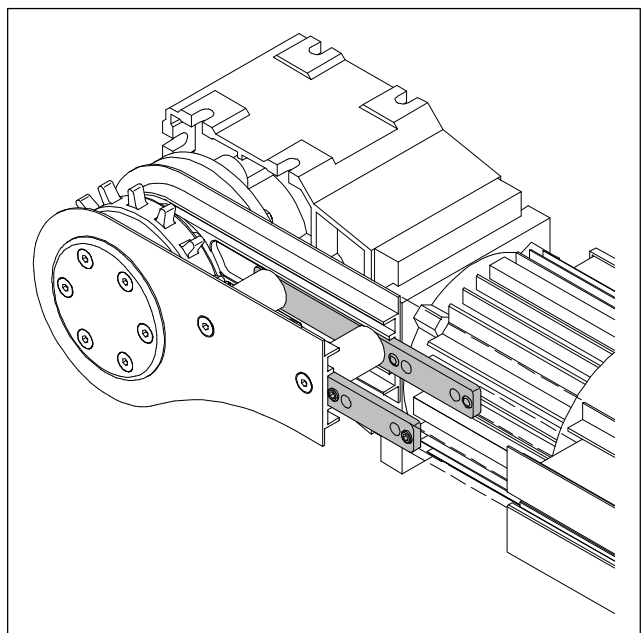


Fig. 9: Installing drives

- Adjust slip clutch (not for direct drives). For an exact description, see section 8.2.2.1 "Setting slip-clutch torque".
- Fit sliding strips to guide profiles. For an exact description, see section 8.3 "Installing sliding strips".

8.2.2.1 Setting slip-clutch torque

In the event of overload, the slip clutch engages after 30° back into the next hole.

Configuration

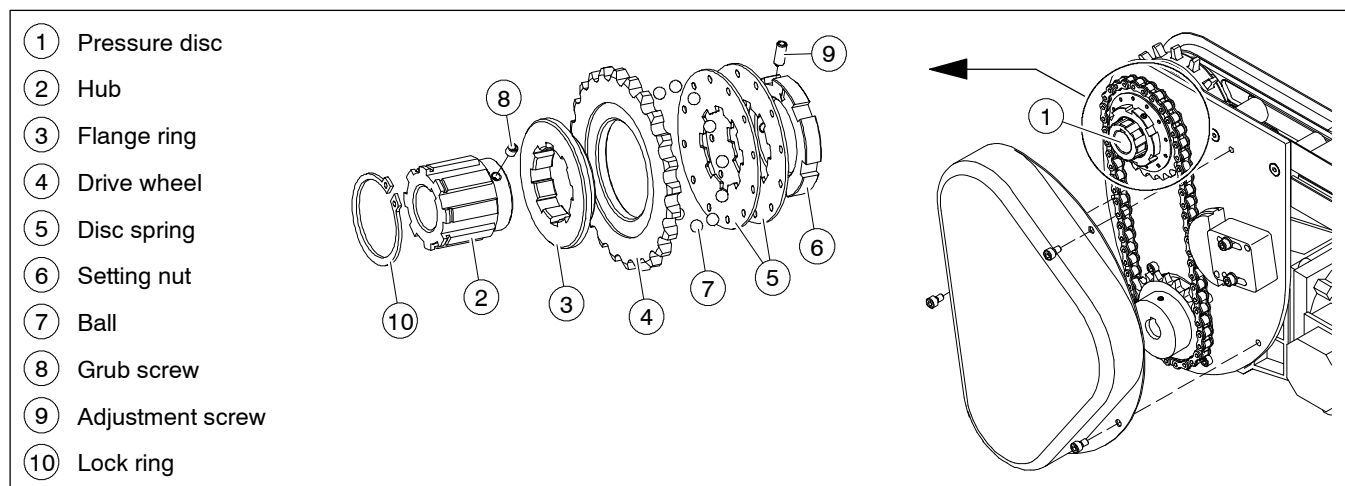


Fig. 10: Configuration of slip clutch

General information

The slip clutch must only be operated if it is in proper technical working order.

Setting torque

Achtung! Before commencing work, make sure that the drivetrain is without load and protected from being switched on unintentionally. The points described in section 6 "Safety warnings" must also be followed.



- Increase torque:
 - Remove pressure disc (see Fig. 10) to read the scale.
 - Fix hub to prevent it from turning: This is normally the case when it is installed in the conveyor system.
 - Undo adjustment screw in the setting nut.
 - Using a hook spanner, turn the setting nut clockwise until the arrow points towards the required chain pulling force (see Fig. 11). Chain pulling force is continuously adjustable.

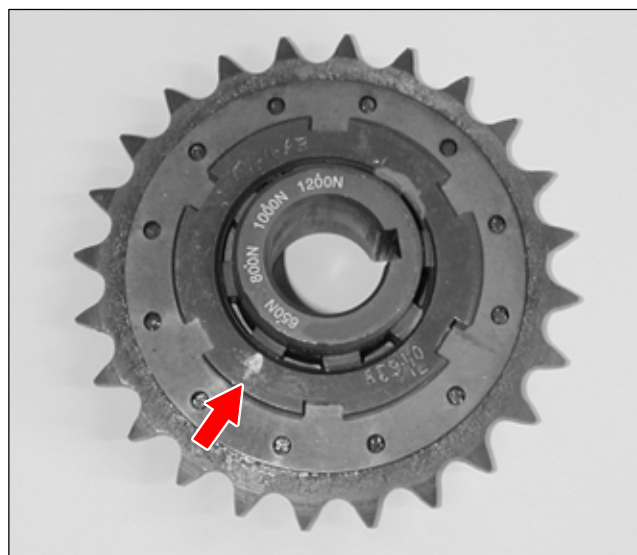


Fig. 11: Setting slip-clutch torque

Caution! The value set must not exceed the maximum permissible pulling force for the chain type selected (see section 5 "Technical specifications")!



- After setting the chosen chain pulling force, the setting nut must be fixed in place again by tightening the adjustment screw on the threaded part of the hub.
- Re-fit pressure disc.

- Reduce torque:
 - Remove pressure disc to read the scale.
 - Fix hub to prevent it from turning: This is normally the case when it is installed in the conveyor system.
 - Undo adjustment screw in the setting nut.
 - Using a hook spanner, turn the setting nut anticlockwise until the arrow points towards the required chain pulling force (see Fig. 11). Chain pulling force is continuously adjustable.
 - After setting the chosen chain pulling force, the setting nut must be fixed in place again by tightening the adjustment screw on the threaded part of the hub.
 - Re-fit pressure disc.

8.2.2.2 Reducing slip-clutch torque

On all drives with belt reducing or chain gears (except centre drives), the chain-pulling force transferred can be reduced by about a half by removing a disc spring (see Fig. 10).

Procedure

- Remove pressure disc.
- Fix hub to prevent it from turning: This is normally the case when it is installed in the conveyor system.
- Undo adjustment screw in the setting nut.
- Remove setting nut with a hook spanner.
- Remove a disc spring. Achievable chain force is now about half the level printed on the unit.
- Re-fit the setting nut and, using a hook spanner, turn the setting nut anticlockwise until the arrow points towards the required chain pulling force (see Fig. 11). Chain pulling force is continuously adjustable.
- After setting the chosen chain pulling force, the setting nut must be fixed in place again by tightening the adjustment screw on the threaded part of the hub.
- Re-fit pressure disc.

8.2.2.3 Setting pretensioning force of tensioning box

For the drives with chain gear, the roller chain is pretensioned by a tensioning box (prod. no.: J537 748 / J537 753).

The pretensioning force is indicated by the coloured marker (2) on the tensioning arm. Using the elongated holes, the tensioning box (1) must be positioned in such a way that the green colour marker is covered by the housing about as far as the middle.

Caution! If it not possible to achieve the required level of pretension (green coloured marker) despite repositioning the tensioning box, the roller chain (3) must be changed. Slip clutch (4), chain sprocket (5) and tensioning box (1) must additionally be checked for wear and changed if necessary.

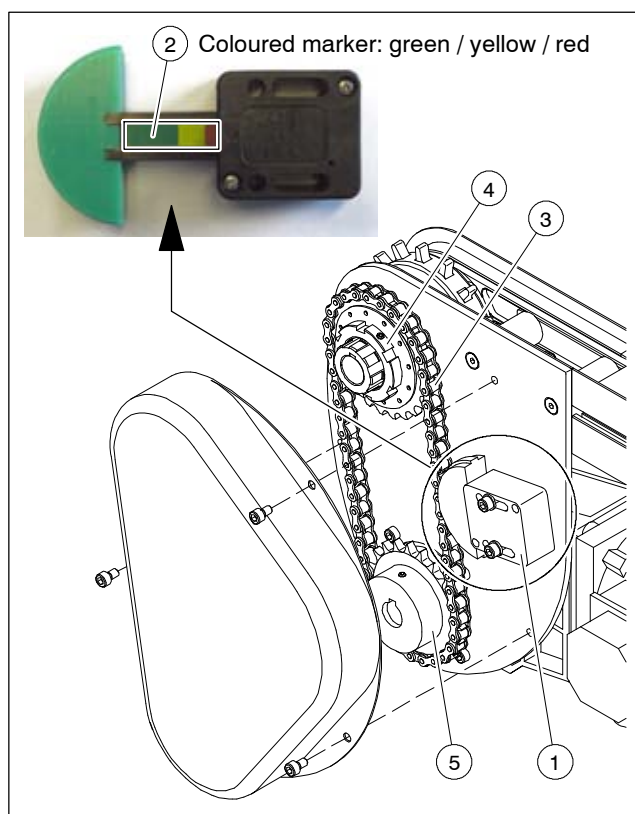


Fig. 12: Setting tensioning box

8.2.2.4 Setting tension of flat belt

The tension of the flat belt must be checked for drives with belt reducing gear.

If belt tension is too low, it can be increased by moving the motor.

Procedure

- Undo hexagon head cap screws (4x), see Fig. 13.
- Move drive motor in direction of arrow (down).
- Re-tighten hexagon head cap screws (4x).

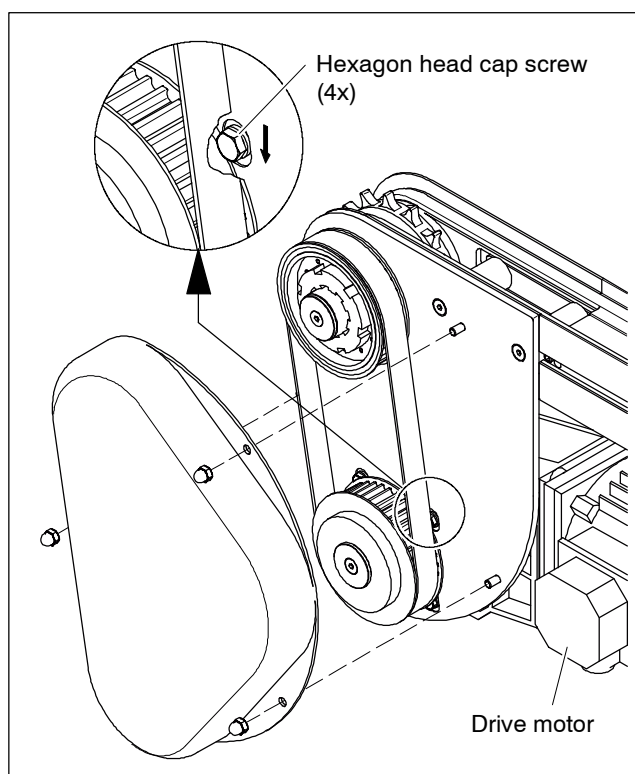


Fig. 13: Moving drive motor

8.3 Installing sliding strips

After assembling the line, the sliding strips must be installed to make the transition between line section components as smooth as possible. At the same time, correct any alignment errors that may have occurred while installing the line section components.

Procedure

The sliding strips are clipped onto all four receiving webs of the guide profile:

- sliding strip, standard (grey), prod. no.: J537 015
- sliding strip, antistatic (black), prod. no.: J537 016

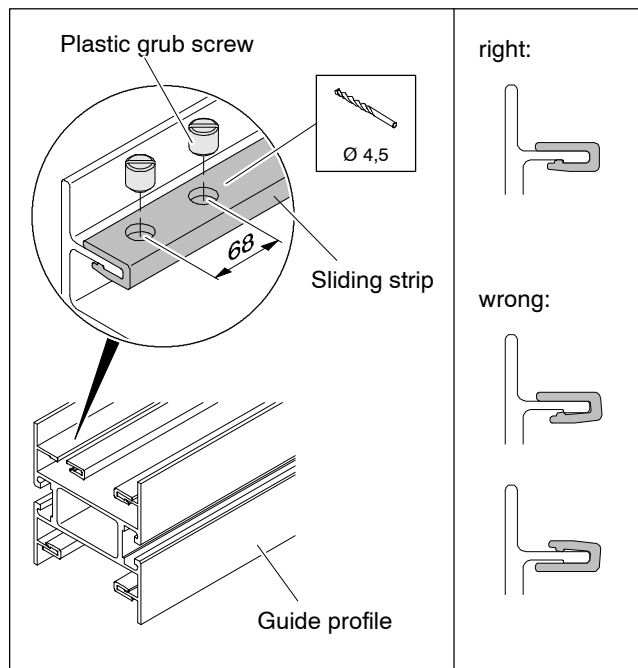


Fig. 14: Installing sliding strip

The sliding strips are easily installed using the assembly mandrel:

- Assembly mandrel CS 065 SL, prod. no.: J537 135
- Assembly mandrel CS 090 SL, prod. no.: J537 146

The first sliding strip is installed using the side of the assembly mandrel marked with **one** ring (see Fig. 15).



Fig. 15: Assembly mandrel - Installing the 1st sliding strip

The second sliding strip is installed using the side of the assembly mandrel marked with **two** rings (see Fig. 16).



Fig. 16: Assembly mandrel - Installing the 2nd sliding strip

8.3.1 Screwing down sliding strip

The sliding strip must be fastened at all four receiving webs using plastic grub screws (see Fig. 17).

Two plastic grub screws must be mounted at each screw-down point, spacing them apart by the distance on the drilling jig ($L_B = 68 \text{ mm}$).

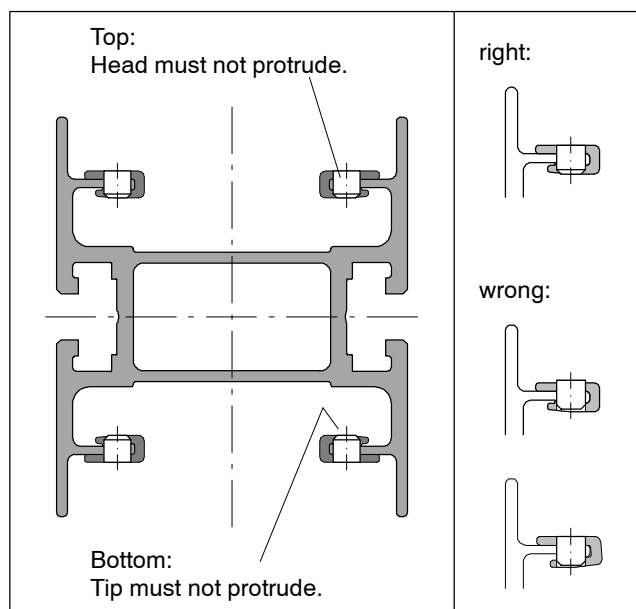


Fig. 17: Screw-down positions

Caution! The max. distance between two screw-down points must be no more than 3 m irrespective of line configuration.

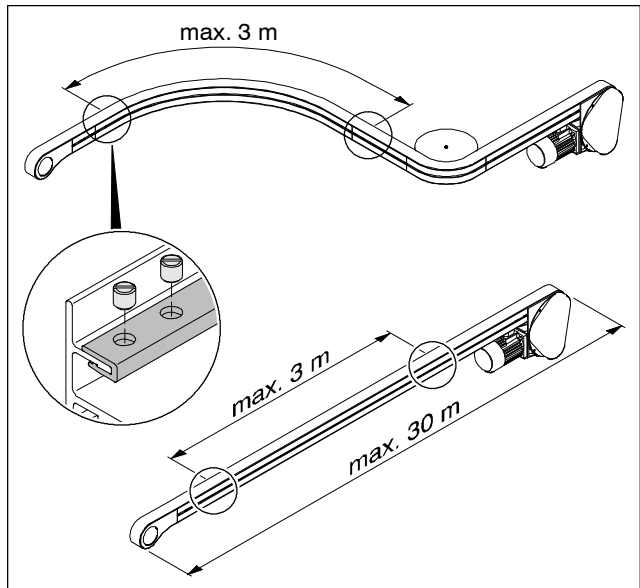


Fig. 18: Max. spacing of screw-down points

After clipping on, the sliding strips are fixed to the guide profile with plastic grub screws (M5x5-DIN 551, prod. no.: J535 380) to absorb the axial displacement forces.

The drilling jig (prod. no.: J927 786, see Fig. 19) makes it easier to drill the necessary holes ($\varnothing 4.5$ mm, $L_B = 68$ mm).

Caution! To avoid burr, only use sharp metal drill bits.

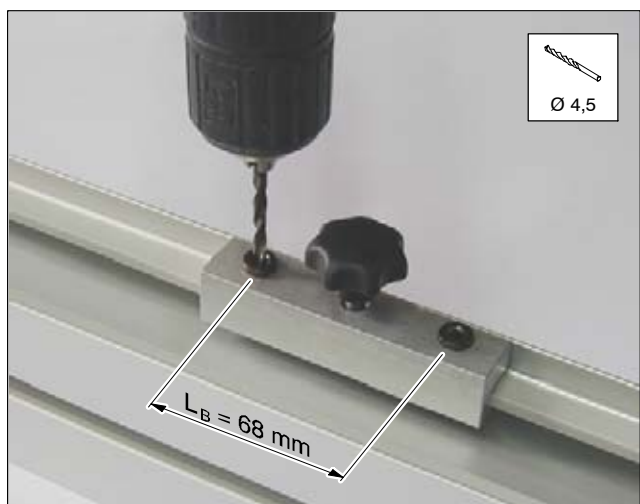


Fig. 19: Drilling jig

After pressing in the plastic grub screw, the head (top) or tip (bottom) must not protrude beyond the sliding strip (see Fig. 17).

If necessary, any burring or protruding grub screws must be cut off or ground down.

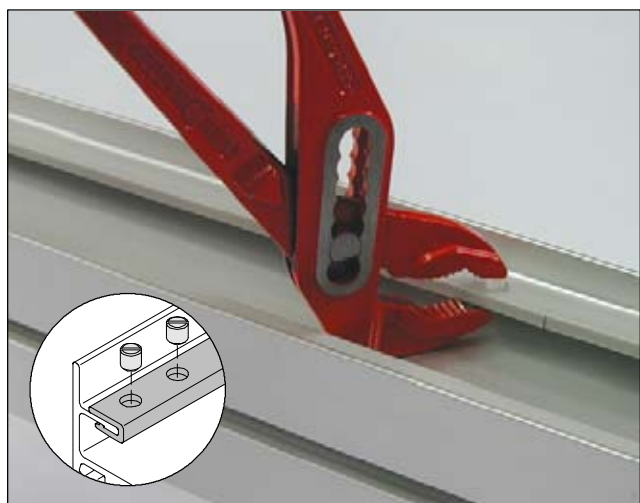


Fig. 20: Mounting plastic grub screw

8.3.1.1 Screwing down at joints

It is important to make sure that joints in sliding strips do not coincide with joints in guide profiles (see Fig. 21).

The sliding strips must be cut at right angles and installed with a spacing of approx. 1 mm.

Caution! Joints in the guide profile must not coincide with joints in the sliding strip. Joints in the sliding strip are to be offset by at least 100 mm.

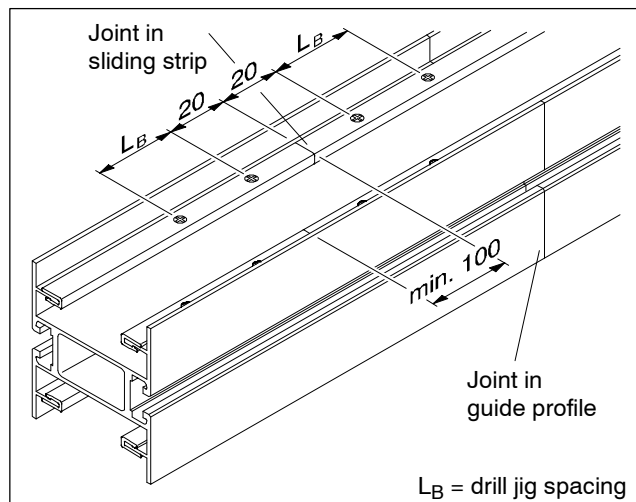


Fig. 21: Screwing down at joints

If the conveyor system is subject to major temperature fluctuations, it is wise to cut the sliding strips at an angle of 45° where they are joined (see Fig. 22).

Pay attention to the conveying direction (see arrow).

Smooth transitions reduce noise emission.

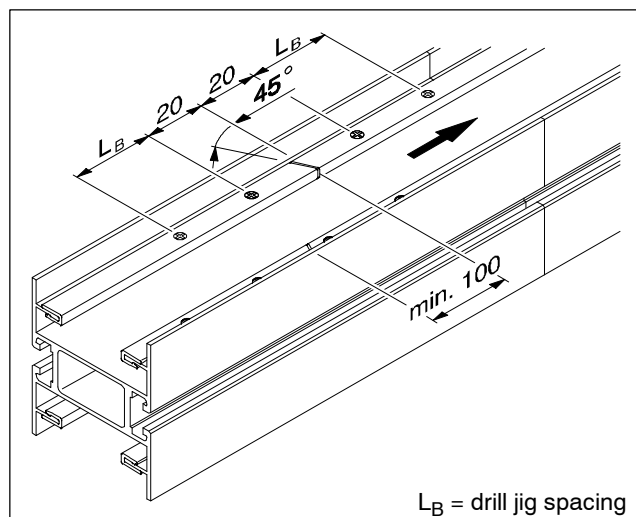


Fig. 22: Joint cut at an angle

8.3.1.2 Screwing down upstream of function units

Screws must be set at a distance of approx. 50 mm upstream of the drive or idler unit (see Fig. 23).

Caution!



The sliding strip must always be screwed down upstream of drive units. This reliably prevents the sliding strip from being pulled into the drive.

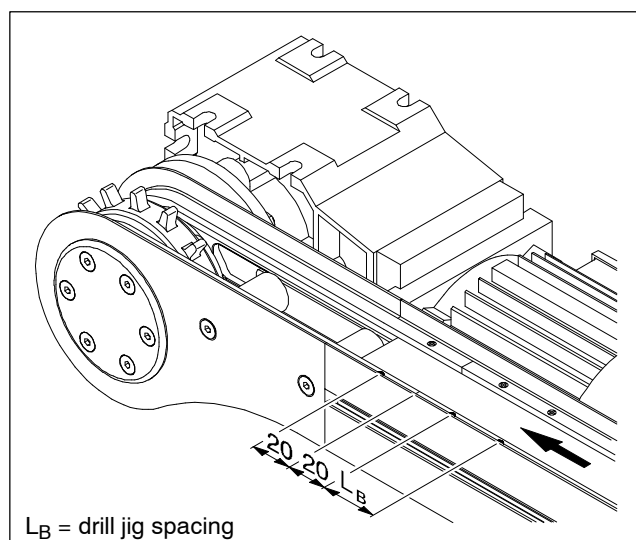


Fig. 23: Screwing down upstream of function units

8.3.2 Sliding-strip projection at the horizontal curve with disc

The sliding strip must project by max. 5 mm on the inner side of the curve of the guide profiles fitted on both sides of the horizontal curve with disc. The edges are cut at an angle of 45° (see Fig. 24).

It must be ensured that the sliding strip is installed in a continuous run on the outer curve.

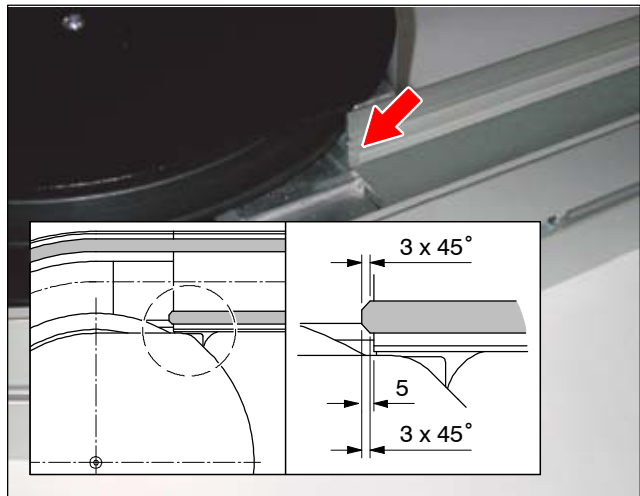


Fig. 24: Sliding-strip projection on inner side of curve

8.4 Checking assembled line

After completing assembly work, the entire line run should be re-checked.

This involves checking the following points:

- Installation of individual line section components: Line section joints are fixed in place, no gap between individual profile sections.
- Installation of subframe or suspension system if installed over head.
- Installing the sliding strips: Joints, screw connections and well as spacing between screw-down points are in conformity with Section 8.3.
- To check the line's smooth running action, a chain section of approx. 300 mm in length is pushed through the entire line run in conveying direction (see Fig. 25). It must be possible to push the chain section forwards applying little force.

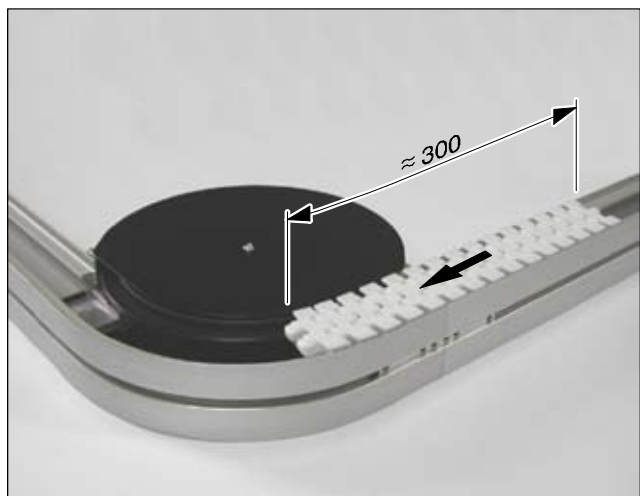


Fig. 25: Checking line run

8.5 Drawing conveyor chain into the line

The chain assembly unit allows you to draw the chain into the assembled line.

The unit can be mounted at any point in the line. Installation takes place using the line section joints belonging to the unit. For an exact description, see Section 8.1.1 "Installing line section joints".

Use of the chain assembly aid facilitates feeding the conveyor chain into the line:

- Chain assembly aid CS 065 SL, prod. no.: J927 823
- Chain assembly aid CS 090 SL, prod. no.: J927 824
- Chain assembly aid CS 200 SL, prod. no.: J927 821

The split-pin driver helps to fit/remove the chain pin: prod. no. J537 131.

Procedure

- Swing up side cover plates and fasten. Remove bottom section of the chain assembly unit (see Fig. 26).
- Fasten chain assembly aid to the underside of the assembly unit.

Caution! Not suitable for chains with catch plates, catch/accumulating rollers or grippers.

- Pull chain through opened chain assembly unit into guide profile.

Caution! Do not draw chain into the guide profile using power from the drive motor.

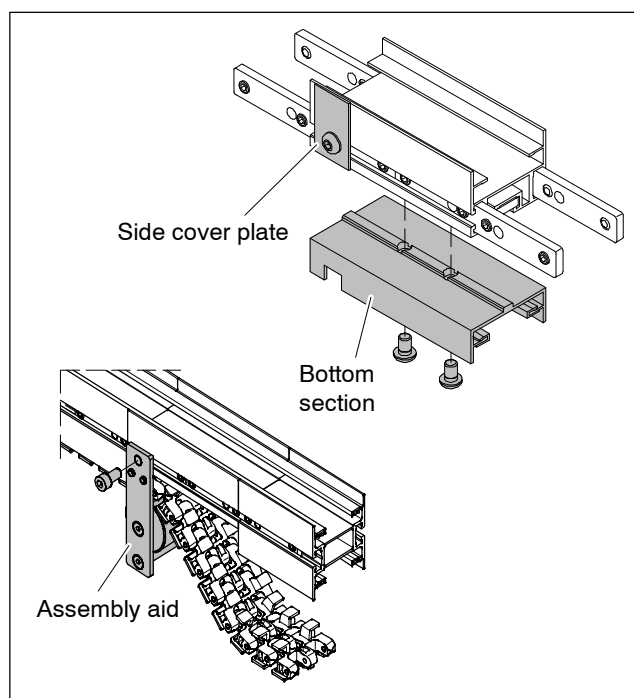


Fig. 26: Chain assembly unit

- Check chain length (see Fig. 27). Shorten or lengthen chain as necessary.
- Using the stretch-line effect, push chain to the side out of the chain assembly unit.
- Re-fit bottom section of chain assembly unit.

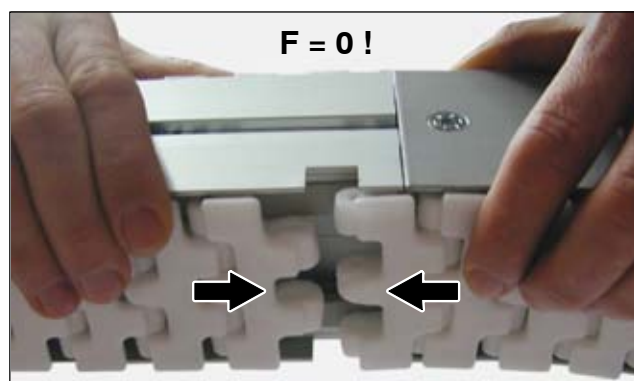


Fig. 27: Check chain length

- Do up chain (see Fig. 28):
CS 065 SL and CS 090 SL:
 - Fit chain pin. To do this, use the split-pin driver.

CS 200 SL:

- Press in lock (1)
- Fit pin (2) and push through as far as lock (1)
- Press in lock (3)

Caution! Do not fit chain in a pretensioned state.



- Re-fit side cover plates.

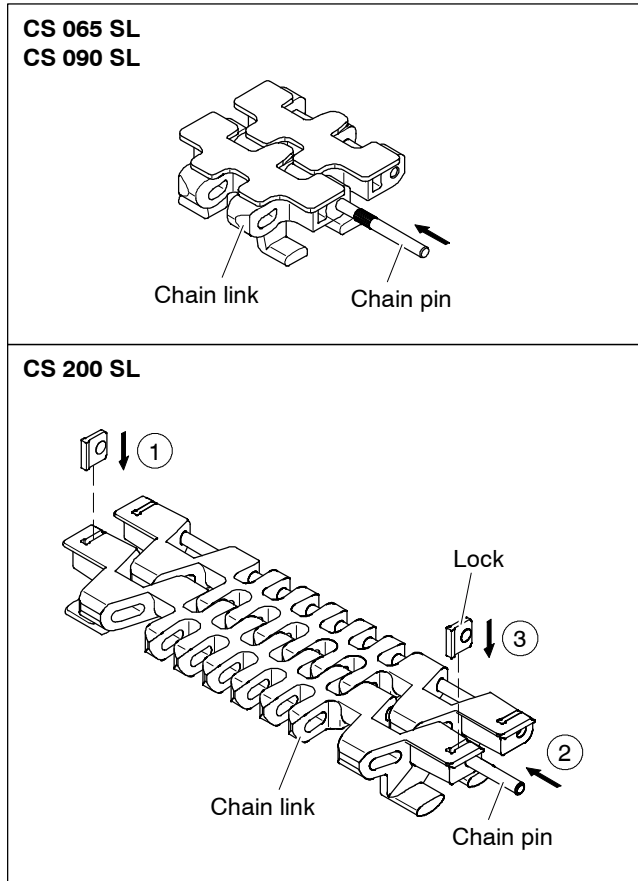


Fig. 28: Doing up chain

8.6 Line crossovers

8.6.1 Roll transfer

The roll transfer interconnects two line sections at an angle of 90° or 180°.

It is fitted to the line using the fixing material supplied.

The oblong holes in the mounting plates allow the roll transfer to be moved at right angles to the line for adjusting the gap between chain and transfer (see Fig. 29, detail "X").

Caution! The gap between chain and roll transfer must be no greater than 5 mm.

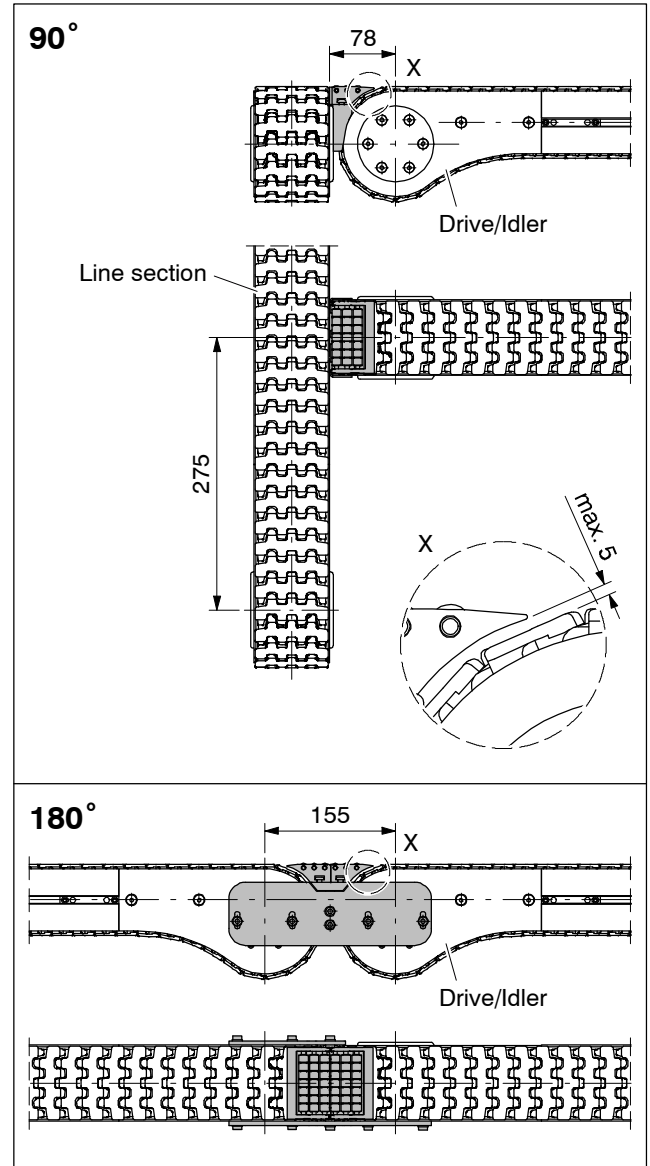


Fig. 29: Roll transfer - max. gap

8.6.2 Crossover with railing

In this crossover option, two line sections are connected with a continuous railing.

8.6.2.1 Parallel crossover

The curved railing makes the conveyed item change track. Although the conveyor chains in both line sections run in the same direction, their speeds may differ.

Caution! Do not reach into the gap between the conveyor chains. You could be injured.

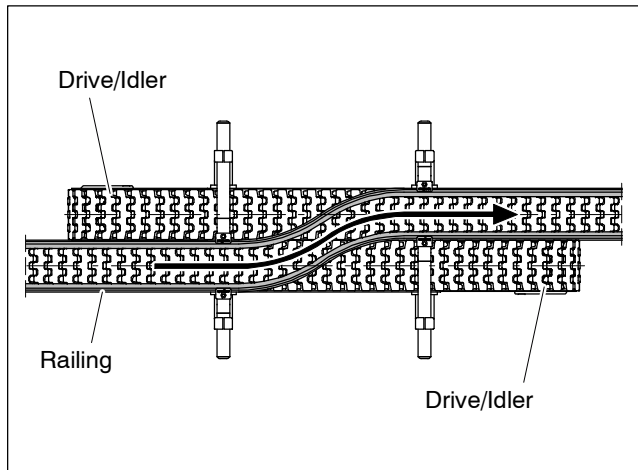


Fig. 30: Parallel crossover

8.6.2.2 Curved crossover

Horizontal sliding curves are mounted at either end of the line section. These are aligned to permit the installation of a continuous railing. Although the conveyor chains in both line sections run in the same direction, their speeds may differ.

Caution! In running direction, the front angle between the horizontal curves must be closed off with a wedge-shaped cover (see Fig. 31).

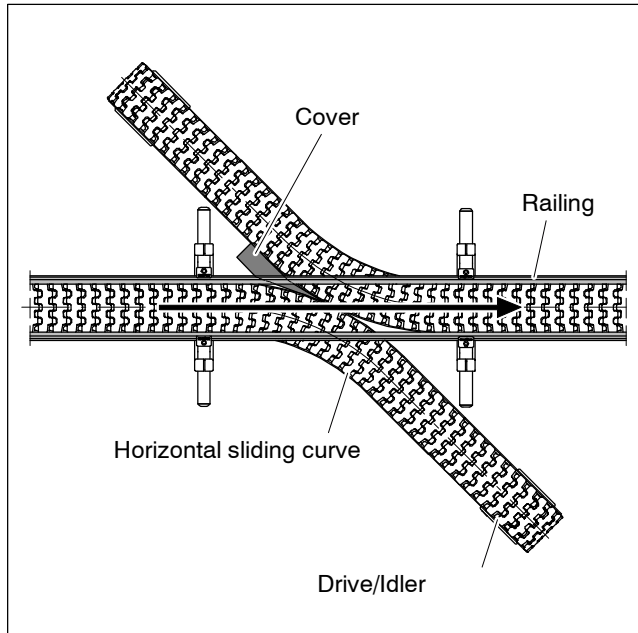


Fig. 31: Curved crossover

9 Start-up

After completing final assembly, check the following points before starting up for the first time:

- check all mechanical joints and connections, such as screws, pins or rivets, for tight fit, tightening them if necessary.
- all protective covers (e.g. vertical-drive chain guard) are in place.
- all danger zones are guarded (see Section 9.1).

Caution!

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive on machinery (2006/42/EC), where appropriate.

9.1 Danger zones

If the whole or part of a conveyor system is installed above a headroom height of approx. 1.8 m, the danger zone below the system must be marked and, if necessary, segregated by means of suitable guards. Loads could fall from the conveyor.

If traffic routes cross the danger zone, safe passages must be created.

Caution! Persons must not enter the danger zone below the system.



Caution! Safety helmets must be worn by operating and service personnel entering the danger zone for servicing and repair work.



9.2 Normal operation

It is important to ensure that the servicing intervals for normal operation (see Section 10 "Cleaning, servicing and maintenance") are observed.

The "Safety precautions" described in Section 6 must also be followed.

Caution! Never work in any manner posing a safety hazard!



Only operate the system if all guards and safety equipment are in place and in proper working order!

Check the system for externally visible damage or deficiencies at least once every shift!

Immediately report any changes that have occurred (including operating behaviour) to the department / person responsible!

Immediately shut down and immobilise the system!

In the event of malfunctions, immediately shut down and immobilise the system!

Immediately take steps to rectify faults!

Before switching the system on/setting the system in motion, make sure that nobody is exposed to any danger when the system starts running!

9.3 Hot motors

Motors in permanent operation heat up to high temperatures.

Caution! Do not touch motor casing!
You could burn your skin!



Beware of
hot surface

10 Maintenance, cleaning and servicing

The entire conveyor system must be checked at regular intervals to ensure trouble-free, quiet operation.

Depending on the length of conveyor run and loads carried by the conveyor system, servicing must be carried out at **intervals of 250 to a maximum of 500 operating hours**.

The servicing and maintenance work listed below is intended to contribute towards extending the machine's useful life under high-capacity use and help prevent accidents.

Caution! Only perform this work if you are qualified to do so. Before commencing work, read Section 6 "Safety warnings".



The following work must be carried out at regular intervals:

- The entire conveyor system must be protected from dirt.
- Chain and sliding strips in particular must be kept free of dirt, pieces of broken glass, sand etc.

Caution! Always wear protective goggles when cleaning the system with compressed air.



- Regularly clean off dirt with steam, water or soapy water. Cleaning agents may be used with a pH value of between 4.5 and 9.0.

Caution! Due to their caustic effect, cleaners containing solvent must not be used on chain and sliding strips.

- Irregularities on guides and sliding strips must be eliminated to ensure that the chain runs smoothly.
- Check conveyor chain for damage: Defects, such as broken chain links or high levels of abrasion, may occur if actual pulling force is higher than permissible pulling force. This may also result in the drive chain sprocket slipping.
- Check conveyor chain for elongation: The chain may lengthen under load and must be shortened if necessary. For further details, see Section 10.4 "Shortening or renewing conveyor chain".
- Check sliding strips for wear: If grooving or cracking occurs, the sliding strip must be changed.
- Check the points at which the sliding strips are screwed down. These may tear out under heavy loads. The sliding-strip section concerned must be changed and screwed back in place more frequently.
- Drives with chain gears: Lubricate roller chain. For further details, see Section 10.2 "Drive units with chain gear".
- Drives with belt reducing gear: Re-tension flat belt. For further details, see Section 10.3 "Drive units with belt reducing gear".
- Check all wear parts (conveyor chain, chain wheels, chain guides, bearings, idler wheels etc.) for proper working order.

10.1 Conveyor chain lubrication

CS SL conveyor systems can in general be operated without lubrication. This is made possible by the excellent material properties of the sliding strip.

10.2 Drive units with chain gear

The condition of the roller chain must be checked at regular intervals of 250 operating hours.

Caution! Do not spray lubricant (prod. no. J180 003) into slip clutch as this will drastically reduce transferrable drive torque.

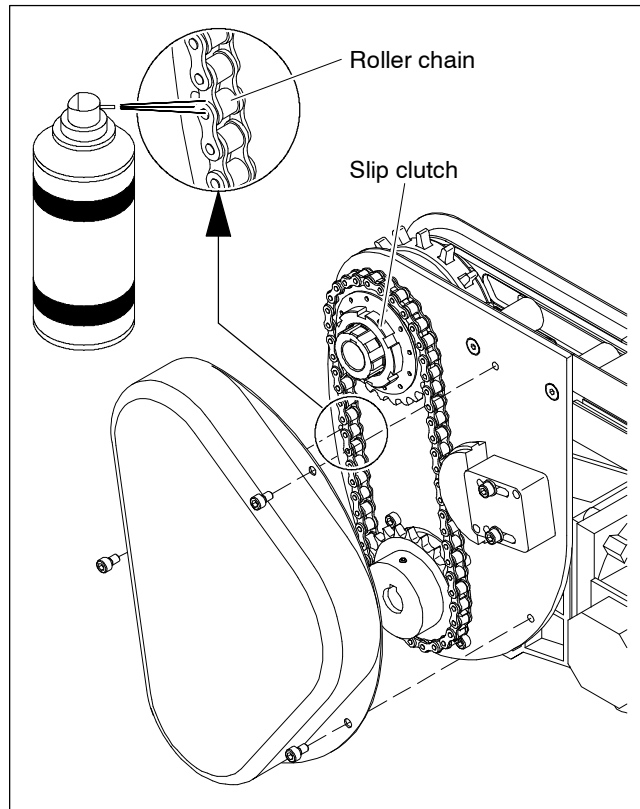


Fig. 32: Lubricating roller chain

10.3 Drive units with belt reducing gear

The condition of the flat belt must be checked at regular intervals of 2500 operating hours.

If belt tension is too low, it can be increased by moving the motor.

Procedure

- Undo hexagon head cap screws (4x), see Fig. 33.
- Move drive motor in direction of arrow (down).
- Re-tighten hexagon head cap screws (4x).

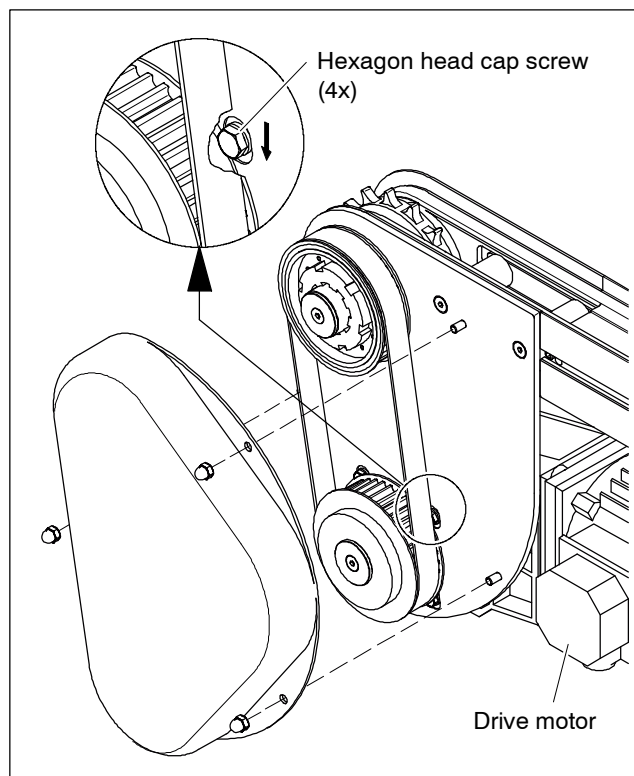


Fig. 33: Moving drive motor

10.4 Shortening or renewing conveyor chain

In case of elongation, wear or irreparable damage, the entire chain or only individual chain links may be removed and renewed.

To remove the chain or individual links, the chain loop must be undone with the aid of the chain assembly unit.

Use of the chain assembly aid facilitates feeding the conveyor chain into the line:

- Chain assembly aid CS 065 SL, prod. no.: J927 823
- Chain assembly aid CS 090 SL, prod. no.: J927 824
- Chain assembly aid CS 200 SL, prod. no.: J927 821

The split-pin driver helps to fit/remove the chain pin: prod. no. J537 131.

Procedure

- Swing up side cover plates and fasten. (see Fig. 34).

- Undoing chain:

CS 065 SL and CS 090 SL:

- Force out chain pin using the split-pin driver.

CS 200 SL:

- Force out lock (pin lock) with a flat-ended screwdriver.

Note Using the play, move chain across the guide profile as it will otherwise not be possible to force the lock out.

- Push out chain pin using the split-pin driver.

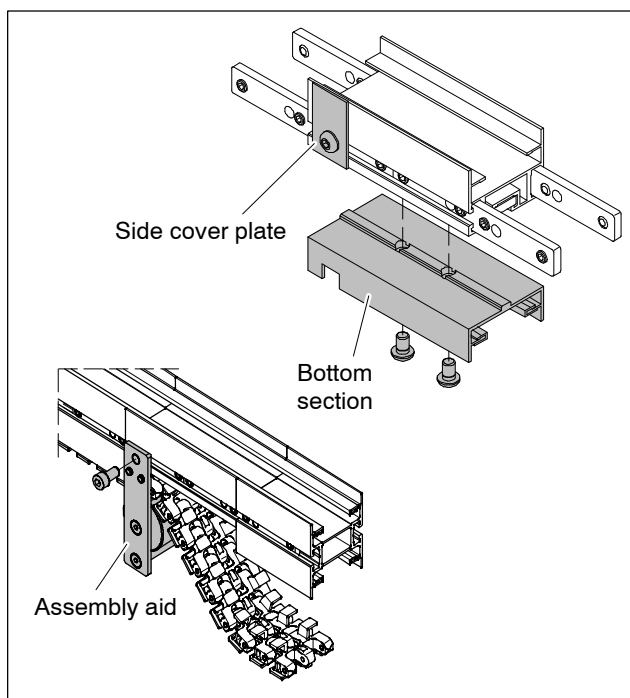


Fig. 34: Chain assembly unit

- Using the stretch-line effect, push chain ends out of the chain assembly unit.
- Remove bottom section of chain assembly unit.
- Depending on necessity, you can remove individual links or change the entire chain. Changing the entire chain: An exact description of how to do this is provided in Section 8.5 "Drawing conveyor chain into the line".

Caution! Assembly aid not suitable for chains with catch plates, catch/accumulating rollers or grippers.

- Check chain length (see Fig. 35).
- Re-fit bottom section of chain assembly unit.

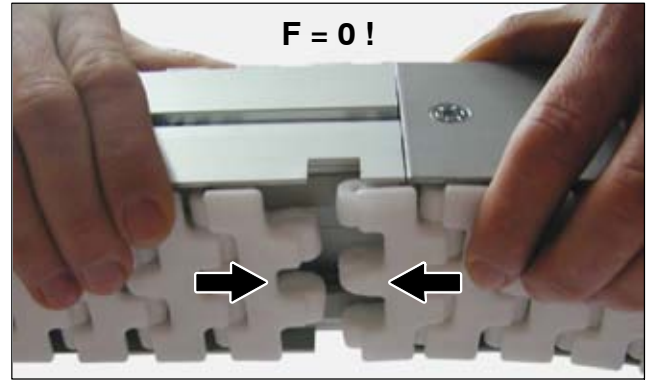


Fig. 35: Check chain length

- Do up chain (see Fig. 36):
CS 065 SL and CS 090 SL:
 - Fit chain pin. To do this, use the split-pin driver.
- CS 200 SL:*
 - Press in lock (1)
 - Fit pin (2) and push through as far as lock (1)
 - Press in lock (3).

Caution! Do not fit chain in a pretensioned state.



- Re-fit side cover plates.

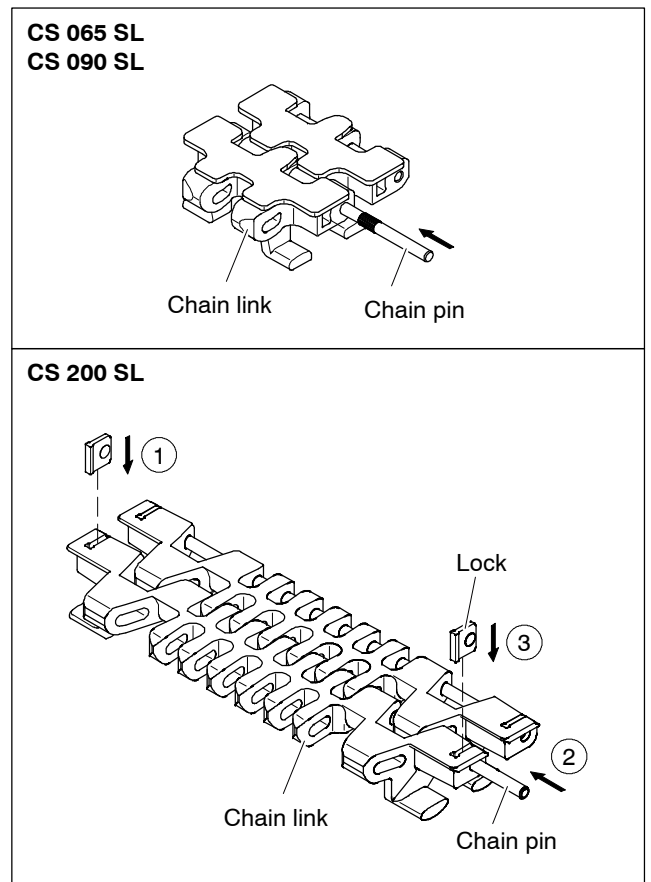


Fig. 36: Doing up chain

11 Troubleshooting

Caution! Only correct any faults that occur if you are qualified to do so. Before commencing work, read Section 6 "Safety warnings".



The following faults may occur while the conveyor system is in operation:

Fault	Corrective action
<ul style="list-style-type: none"> Conveyor system won't start. 	<ul style="list-style-type: none"> Check power supply.
<ul style="list-style-type: none"> Drive motor starts but conveyor chain remains stationary. 	<ul style="list-style-type: none"> Adjust slip clutch: Proceed as described in Section 8.2.2.1
<ul style="list-style-type: none"> Conveyor chain is causing operating noises that are louder than usual. 	<ul style="list-style-type: none"> Check condition of chain. Shorten chain by removing individual links. Check transitions between sliding strips.
<ul style="list-style-type: none"> Drive unit with chain gear is causing loud operating noises. 	<ul style="list-style-type: none"> Check condition of roller chain. Lubricate roller chain. For procedure and suitable lubricants, see Section 10.2
<ul style="list-style-type: none"> Drive unit with belt reducing gear is causing loud operating noises. 	<ul style="list-style-type: none"> Check condition of flat belt. Re-tension flat belt if necessary. Proceed as described in Section 10.3
<ul style="list-style-type: none"> Transmission ratio of conveyor chain in drive unit. 	<ul style="list-style-type: none"> Check condition of chain with regard to elongation. Shorten chain by removing individual links. If heavily worn, renew chain: Proceed as described in Section 10.4 Check chain load (pulling force), reducing if necessary.
<ul style="list-style-type: none"> Conveyor chain not turning smoothly. 	<ul style="list-style-type: none"> Check condition of chain. Shorten chain by removing individual links. In accumulating mode: Clean chain surface.
<ul style="list-style-type: none"> Conveyor chain jerks severely on starting up the conveyor system. This causes operating noise that is louder than usual. 	<ul style="list-style-type: none"> Conveying speed and/or load too high due to weight of items being conveyed and must be reduced. Slow down start-up (soft start) of drive motor.

12 Taking out of operation

To take the conveyor system out of operation, disconnect the drive motor from the control system (or local power supply).

Caution! This work must only be performed by persons in possession of the requisite expertise (e.g. qualified electricians or persons with electrotechnical training) and who have been instructed to do so by the company owning the system.



To store the conveyor system, following the points described in Section 7 "Transportation and storage". This is important, particularly in relation to putting the system back into operation at a later date.

13 Disposal

The conveyor system is disassembled at the end of its useful life. Doing so, individual components should be dismantled by skilled personnel or properly instructed persons and reusable materials recycled.

Caution! Any hazardous materials involved must be disposed of in the proper manner.



14 Appendix: Drawings and parts lists

Drives and idlers

The following figures show the configuration of drive and idler units in detail.
The parts lists contain all wearing parts that can be reordered individually.

Conveyor chain and sliding strip

Conveyor chain and sliding strip are defined as wearing parts.

15 CS 065 SL

15.1 CS 065 SL vertical drive, with belt reducing gear

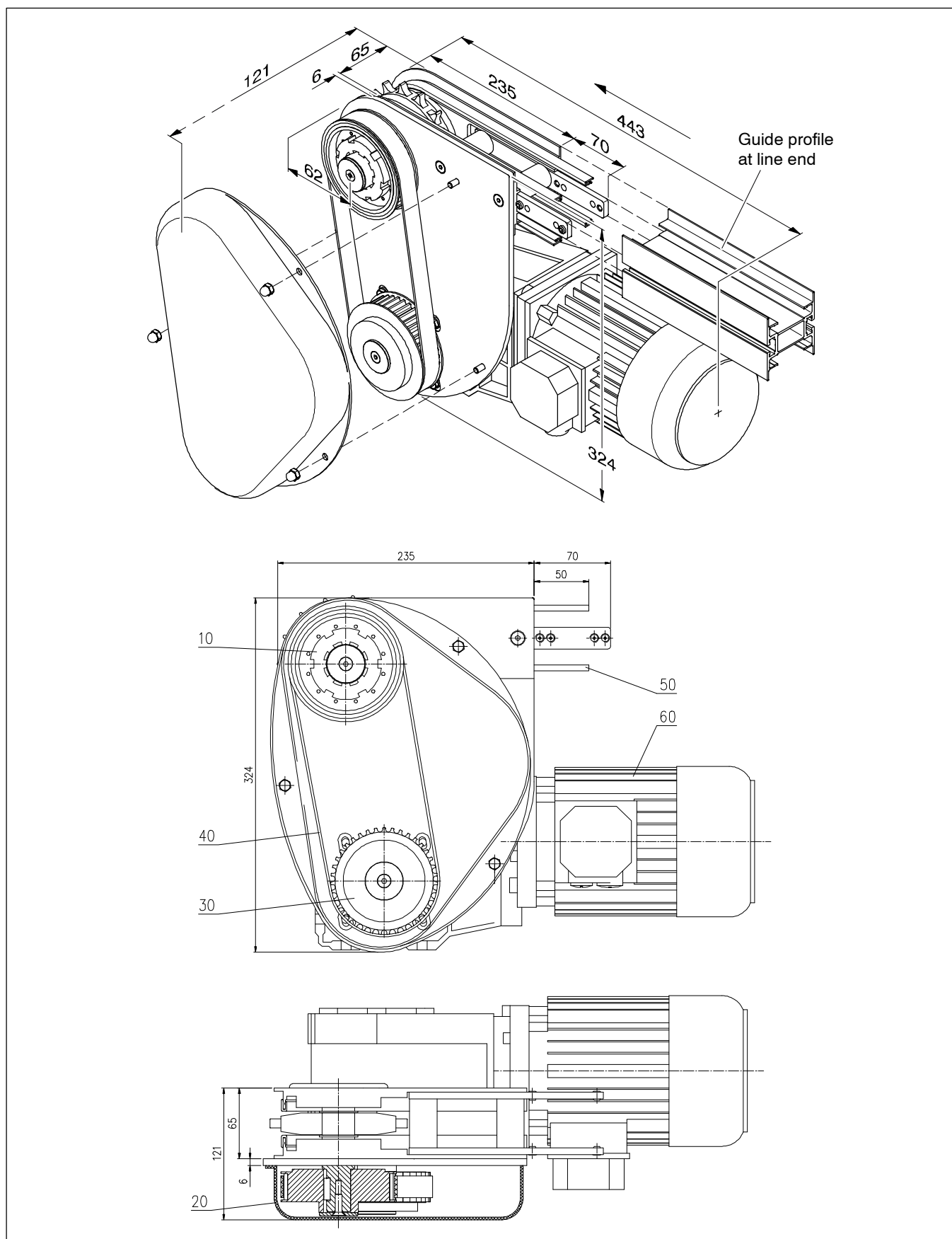


Fig. 37: CS 065 SL vertical drive, with belt reducing gear - left-hand version

15.1.1 Parts list for CS 065 SL vertical drive, with belt reducing gear

Item no.	Designation	Prod. no.	Quantity
	CS 065 SL vertical drive, with belt reducing gear: Left-hand version, without drive motor Left-hand version, with drive motor	J927856.00.99 J927857.00.99	
	CS 065 SL vertical drive, with belt reducing gear: Right-hand version, without drive motor Right-hand version, with drive motor	J927858.00.99 J927859.00.99	
10	Slip clutch with toothed wheel HTD-8M-20, 40 teeth	J537359.00.00	1
20	Chain guard: Left-hand version Right-hand version	J537093.00.00 J537127.00.00	1
30	Toothed wheel ST 38 HTD-8M/39-0	J537409.00.00	1
40	Toothed belt HTD8M-20	J537410.00.00	1
50	Sliding strip section CS SL	J927704.00.01	2
60	Bevel gear motor		1

15.2 CS 065 SL vertical drive, with chain gear

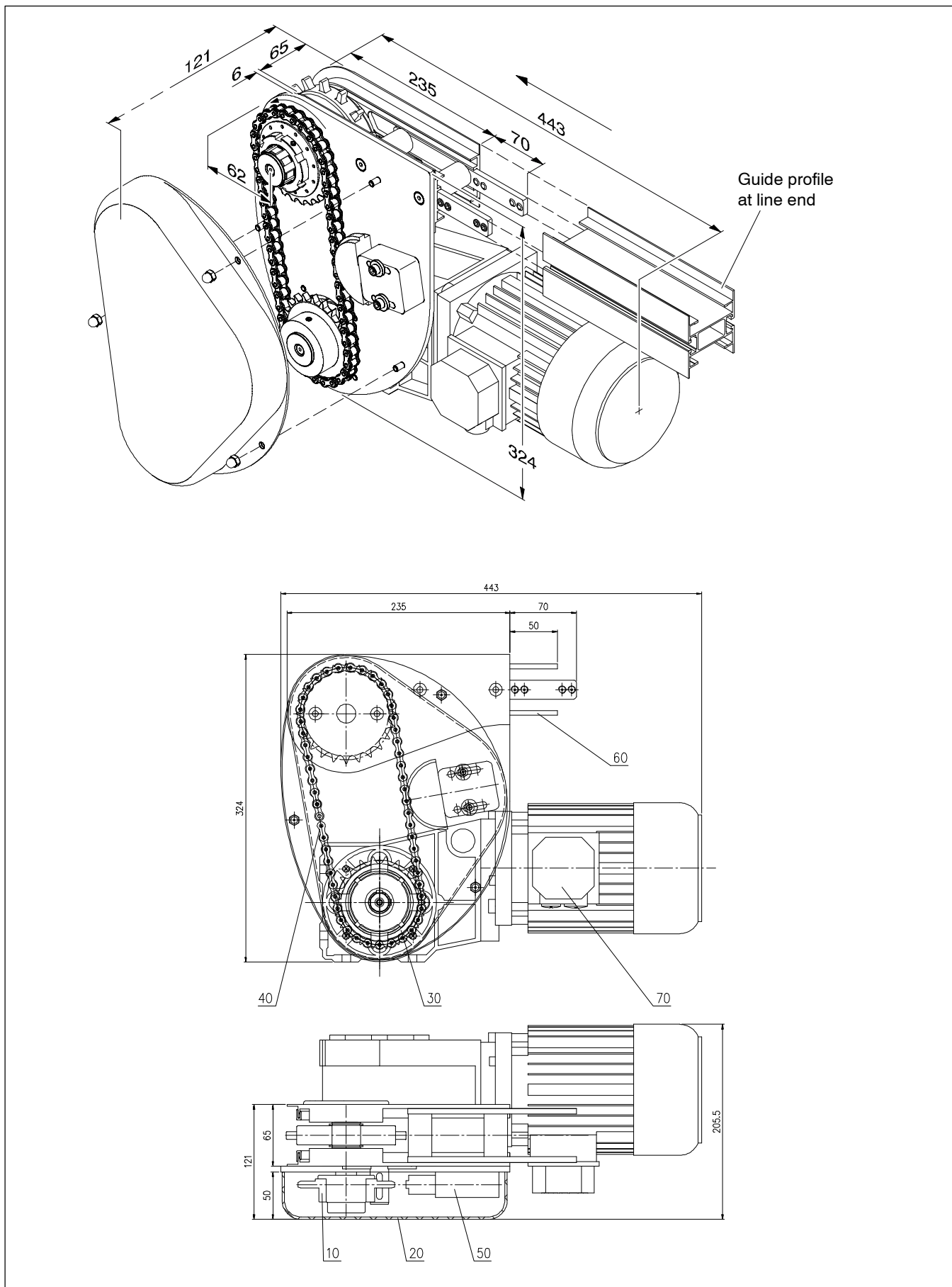


Abb. 38: CS 065 SL vertical drive, with chain gear - left-hand version

15.2.1 Parts list for CS 065 SL vertical drive, with chain gear

Item no.	Designation	Prod. no.	Quantity
	CS 065 SL vertical drive, with chain gear, left-hand version, up to 60 m/min: without drive motor with drive motor	(1) J927706.00.99 J927709.01.99 to J927709.09.99	
	CS 065 SL vertical drive, with chain gear, right-hand version, up to 60 m/min: without drive motor with drive motor	(1) J927719.00.99 J927712.01.99 to J927712.09.99	
	CS 065 SL vertical drive, with chain gear, left-hand version, up to 80 m/min: without drive motor with drive motor	(2) J927706.10.99 J927709.10.99	
	CS 065 SL vertical drive, with chain gear, right-hand version, up to 80 m/min: without drive motor with drive motor	(2) J927719.10.99 J927712.10.99	
10	Slip clutch with sprocket 08-B1, 24 teeth	J535035.00.00	1
20	Chain guard: Left-hand version Right-hand version	J537093.00.00 J537127.00.00	1
30	Chain sprocket with hub on one side, 1/2"x5/16", 22 teeth	J537770.00.00	1
40	(1) Standard roller chain 08-B1, 55 links including connecting link (2) Marathon roller chain 08-B1, 55 links including connecting link	J537095.00.00 J537502.00.00	1
50	Tensioning box, size 0, light-duty	J537753.00.00	1
60	Sliding strip section CS SL	J927704.00.01	2
70	Bevel gear motor		1

15.3 CS 065 SL direct drive

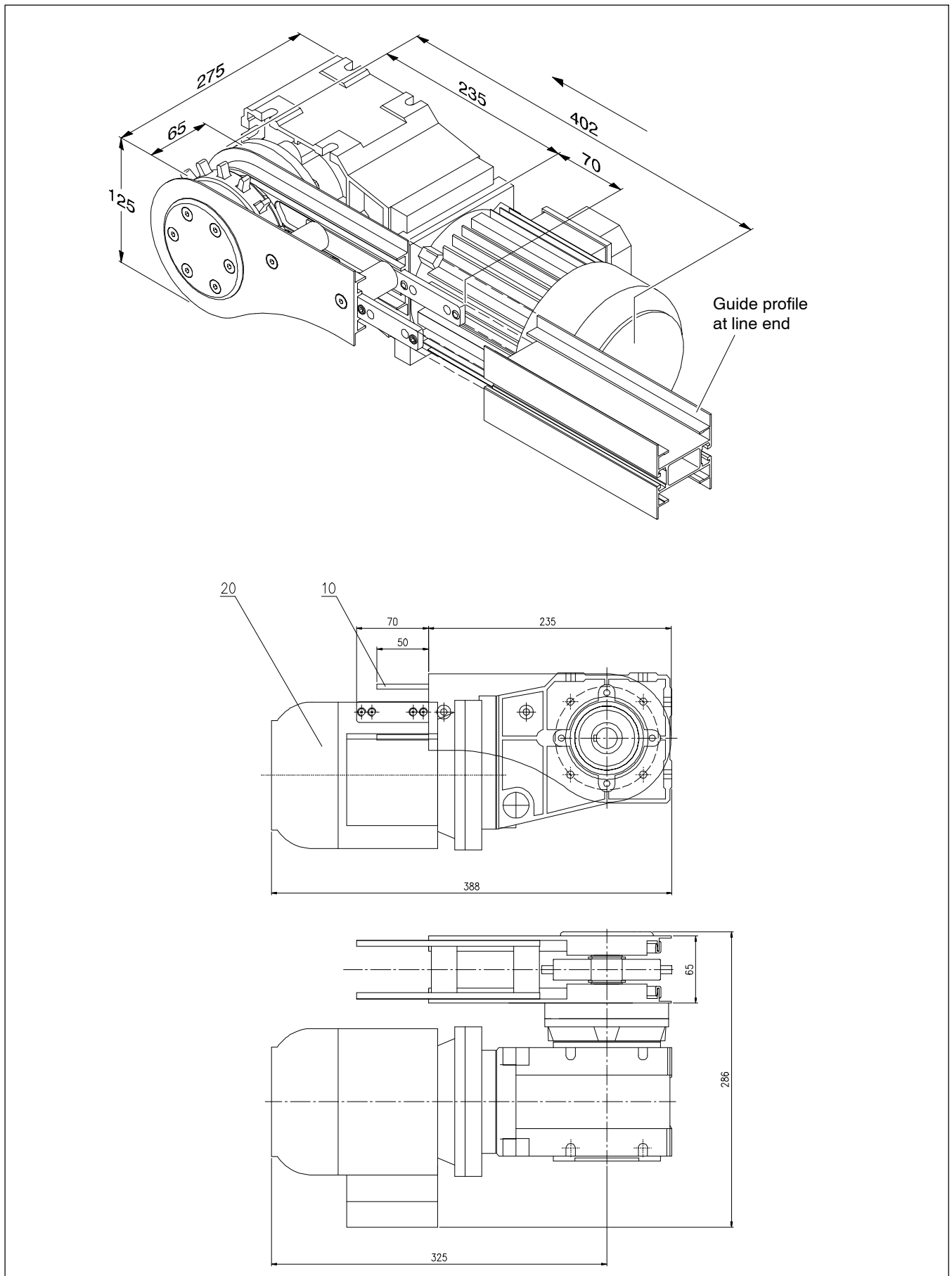


Abb. 39: CS 065 SL direct drive - right-hand version

15.3.1 Parts list for CS 065 SL direct drive

Item no.	Designation	Prod. no.	Quantity
	CS 065 SL direct drive - left-hand version: without drive motor with drive motor	J927715.00.99 J927716.00.99	
	CS 065 SL direct drive - right-hand version: without drive motor with drive motor	J927717.00.99 J927718.00.99	
10	Sliding strip section CS SL	J927704.00.01	2
20	Bevel gear motor		1

15.4 CS 065 SL centre drive, with belt reducing gear

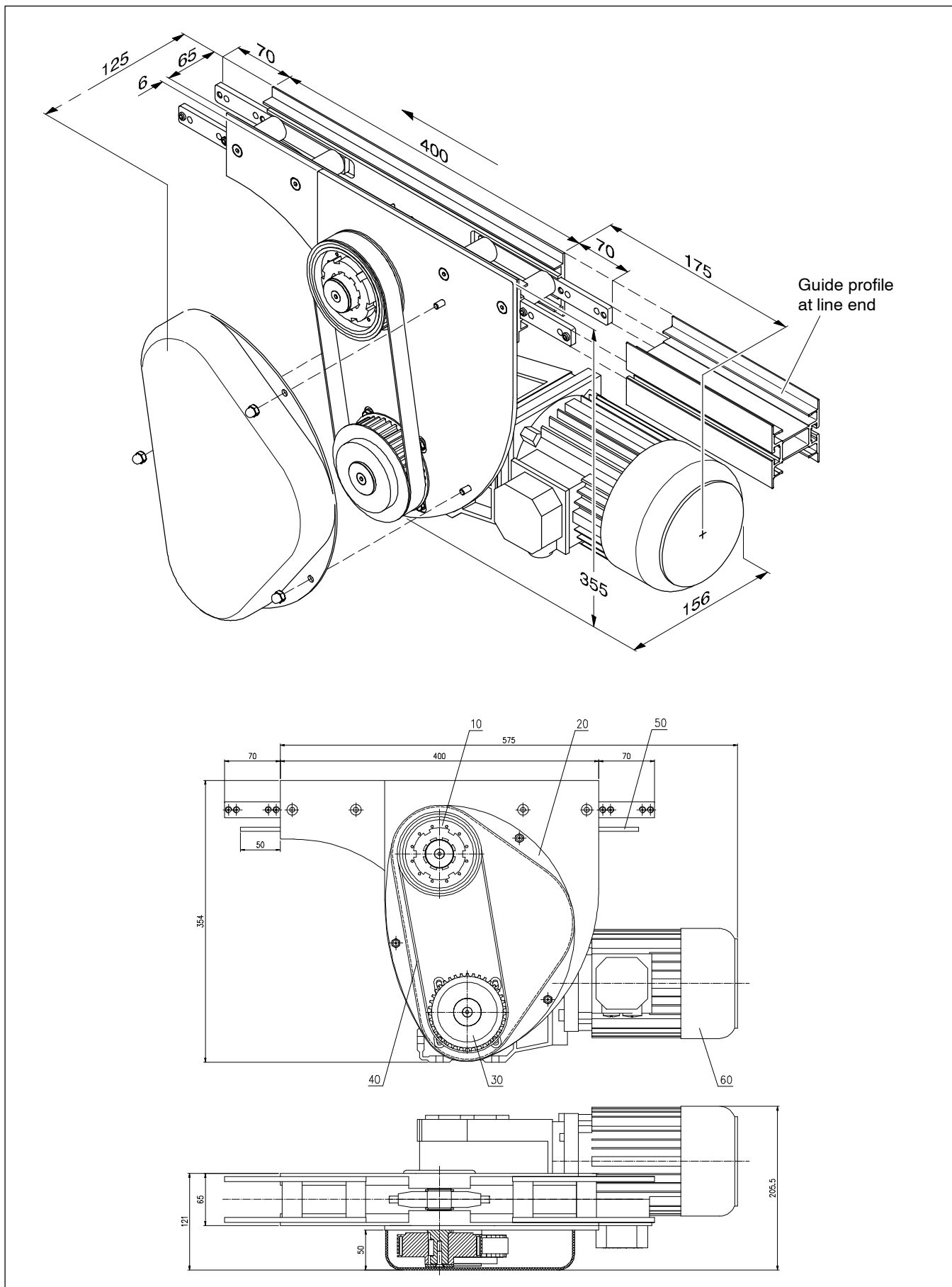


Abb. 40: CS 065 SL centre drive, with belt reducing gear - left-hand version

15.4.1 Parts list for CS 065 SL centre drive, with belt reducing gear

Item no.	Designation	Prod. no.	Quantity
	CS 065 SL centre drive, with belt reducing gear: Left-hand version, without drive motor Left-hand version, with drive motor	J927860.00.99 J927861.00.99	
	CS 065 SL centre drive, with belt reducing gear: Right-hand version, without drive motor Right-hand version, with drive motor	J927862.00.99 J927863.00.99	
10	Slip clutch with toothed wheel HTD-8M-20, 40 teeth	J537360.00.00	1
20	Chain guard: Left-hand version Right-hand version	J537093.00.00 J537127.00.00	1
30	Toothed wheel ST 38 HTD-8M/39-0	J537409.00.00	1
40	Toothed belt HTD8M-20	J537410.00.00	1
50	Sliding strip section CS SL	J927789.00.01	2
60	Bevel gear motor		1

15.5 CS 065 SL centre drive, with chain gear

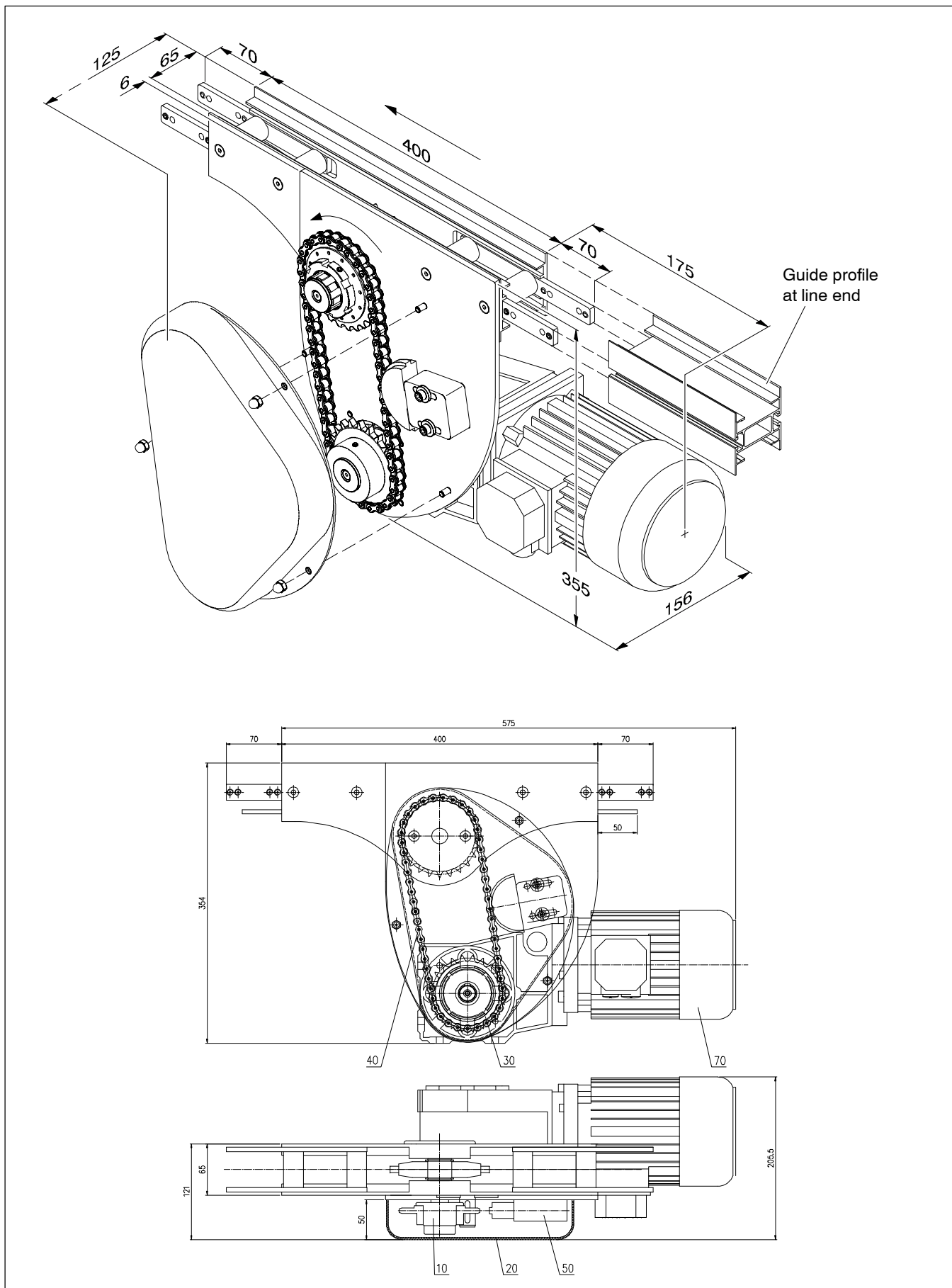


Abb. 41: CS 065 SL centre drive, with chain gear - left-hand version

15.5.1 Parts list for CS 065 SL centre drive, with chain gear

Item no.	Designation	Prod. no.	Quantity
	CS 065 SL centre drive, with chain gear: Left-hand version, without drive motor Left-hand version, with drive motor	J927789.00.99 J927790.00.99	
	CS 065 SL centre drive, with chain gear: Right-hand version, without drive motor Right-hand version, with drive motor	J927792.00.99 J927793.00.99	
10	Slip clutch with sprocket 08-B1, 24 teeth	J535046.00.00	1
20	Chain guard: Left-hand version Right-hand version	J537093.00.00 J537127.00.00	1
30	Chain sprocket with hub on one side, 1/2"x5/16", 22 teeth	J537770.00.00	1
40	Roller chain 08-B1, 55 links including connecting link	J537095.00.00	1
50	Tensioning box, size 0, light-duty	J537753.00.00	1
60	Sliding strip section CS SL	J927789.00.01	2
70	Bevel gear motor		1

15.6 CS 065 SL direct centre drive

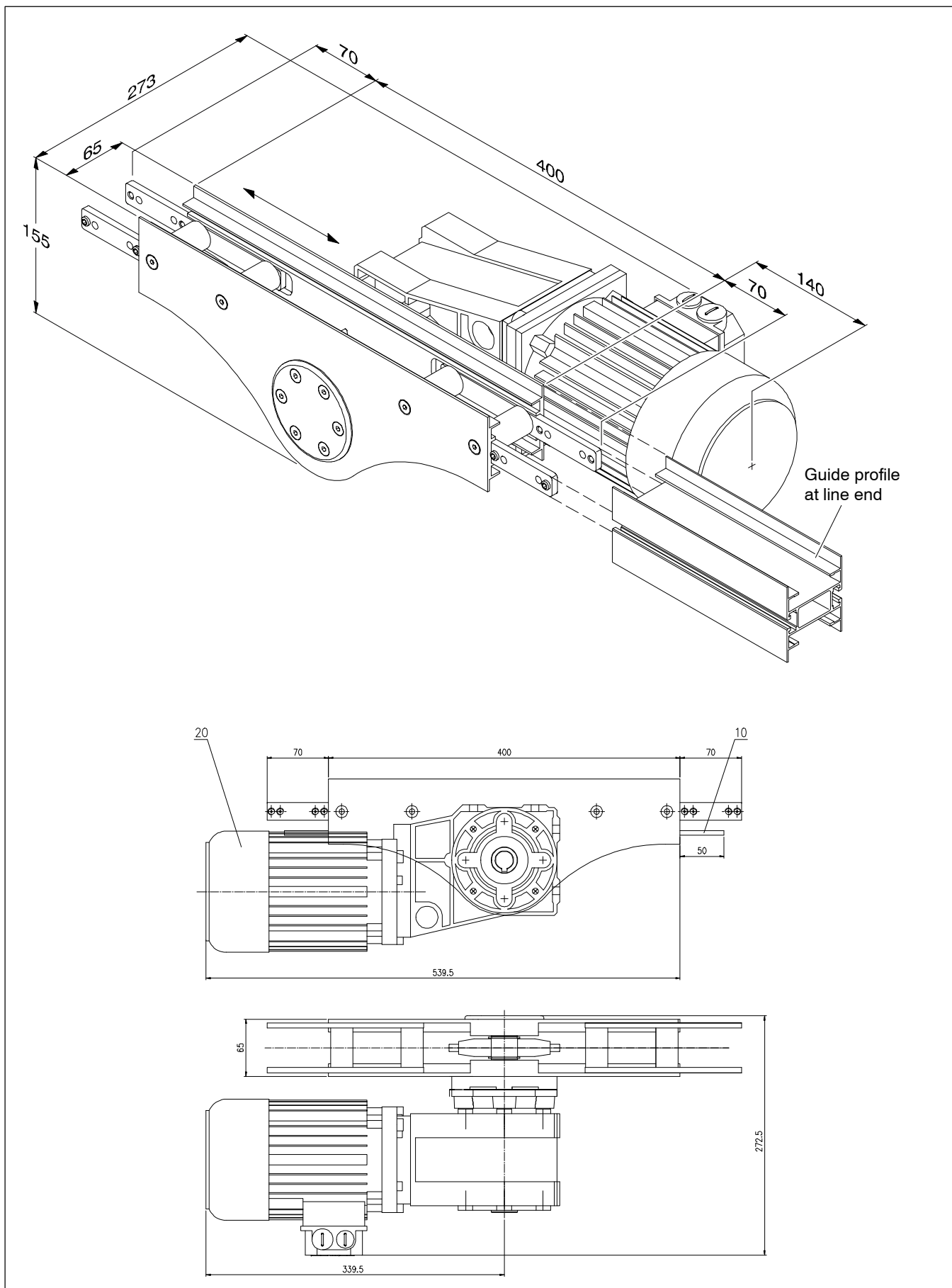


Abb. 42: CS 065 SL direct centre drive - right-hand drive motor

15.6.1 Parts list for CS 065 SL direct centre drive

Item no.	Designation	Prod. no.	Quantity
	CS 065 SL direct centre drive - version: without drive motor with drive motor	J927795.00.99 J927796.00.99	
10	Sliding strip section CS SL	J927789.00.01	2
20	Bevel gear motor		1

15.7 CS 065 SL vertical idler, 180°

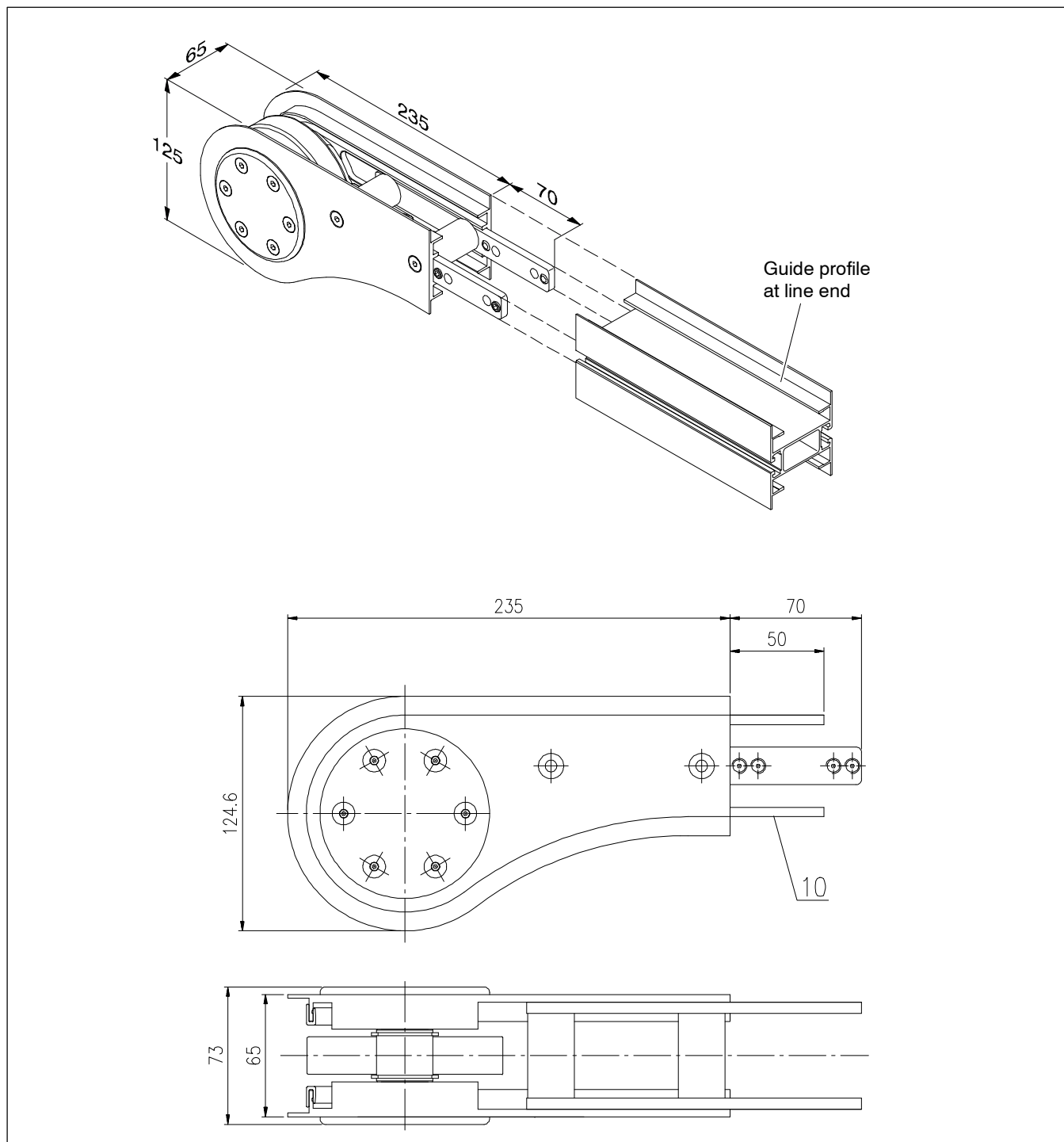


Abb. 43: CS 065 SL vertical idler, 180°

15.7.1 Parts list for CS 065 SL vertical idler, 180°

Item no.	Designation	Prod. no.	Quantity
	CS 065 SL vertical idler, 180°	J927804.00.99	
10	Sliding strip section CS SL	J927704.00.01	2

15.8 CS 065 SL horizontal curve with disk

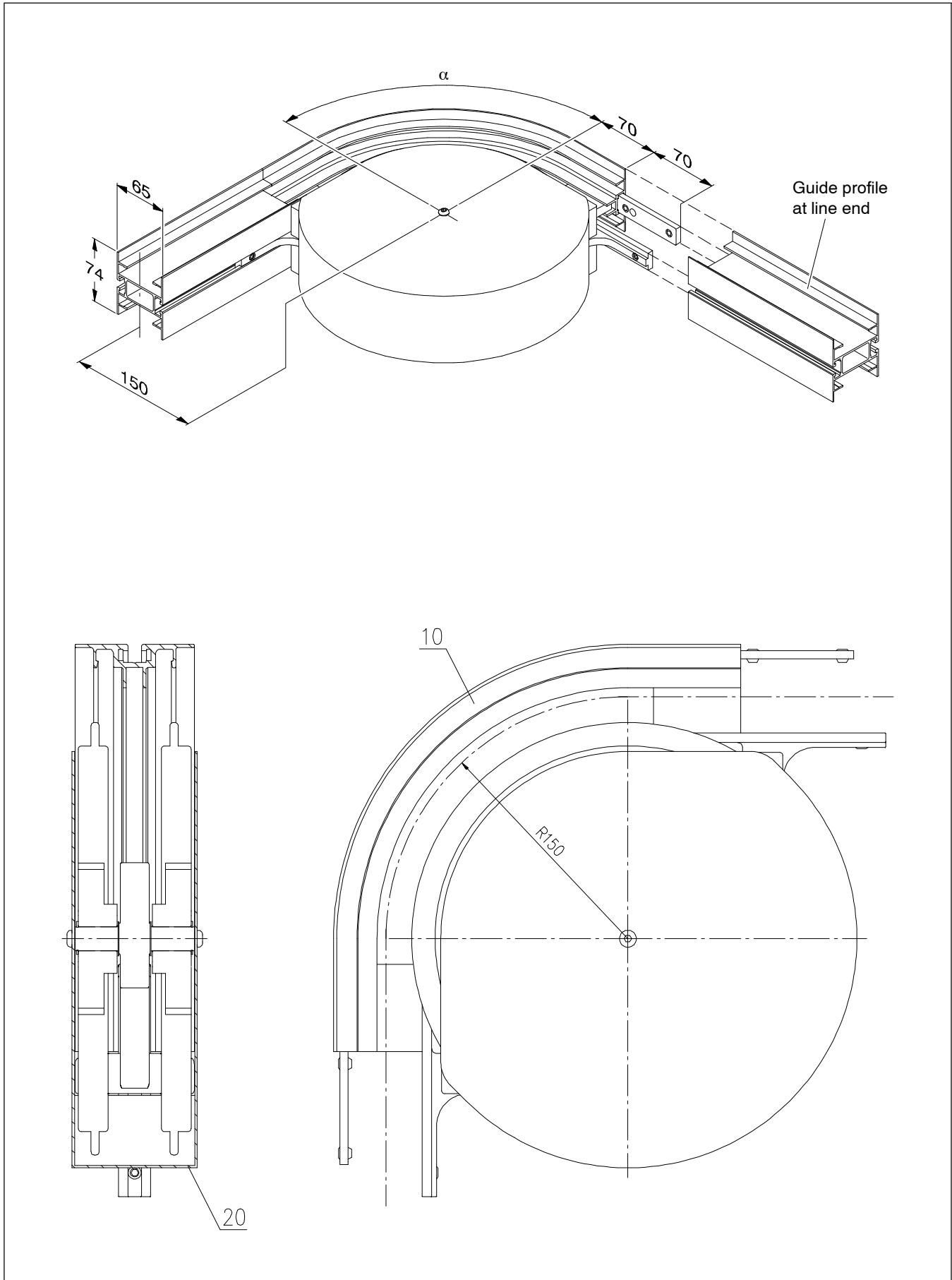


Abb. 44: CS 065 SL horizontal curve with disk, 90°

15.8.1 Parts list for CS 065 SL horizontal curve with disk

Item no.	Designation	Prod. no.	Quantity
	CS 065 SL horizontal curve with disk: R150/45° R150/60° R150/90° R150/180°	J927788.00.99 J927769.00.99 J927720.00.99 J927721.00.99	
10	CS 065 SL outside curve for horizontal curve with disk: 45° 60° 90° 180°	J927788.61.01 J927769.61.01 J927720.61.01 J927721.61.01	1
20	Cover for CS SL horizontal curve with disk: 45° 60° 90° 180°	J537122.00.00 J537117.00.00 J537121.00.00 J537120.00.00	1

16 CS 090 SL

16.1 CS 090 SL vertical drive, with belt reducing gear

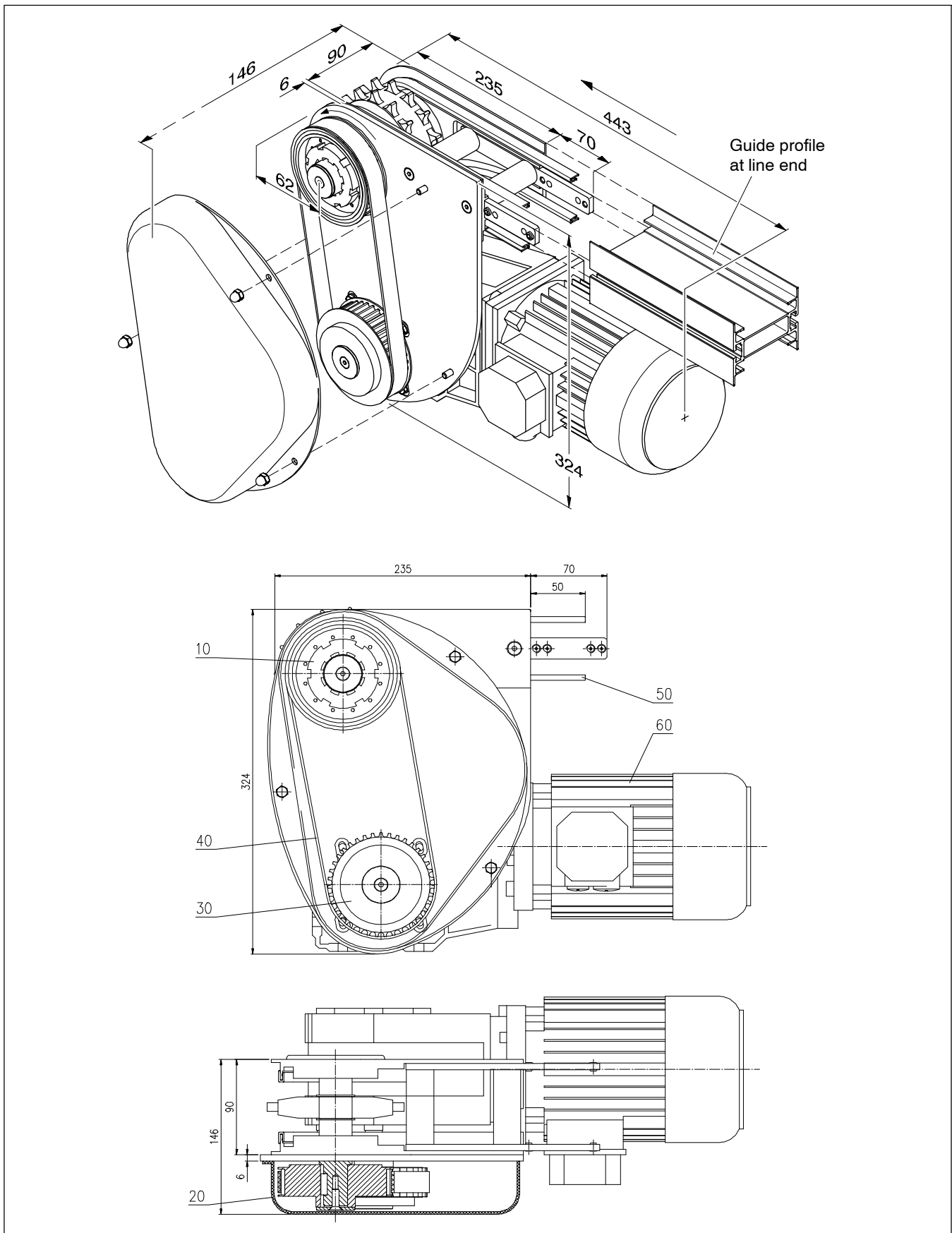


Abb. 45: CS 090 SL vertical drive, with belt reducing gear - left-hand version

16.1.1 Parts list for CS 090 SL vertical drive, with chain gear

Item no.	Designation	Prod. no.	Quantity
	CS 090 SL vertical drive, with belt reducing gear: Left-hand version, without drive motor Left-hand version, with drive motor	J927866.00.99 J927867.00.99	
	CS 090 SL vertical drive, with belt reducing gear: Right-hand version, without drive motor Right-hand version, with drive motor	J927868.00.99 J927869.00.99	
10	Slip clutch with toothed wheel HTD-8M-20, 40 teeth	J537359.00.00	1
20	Chain guard: Left-hand version Right-hand version	J537093.00.00 J537127.00.00	1
30	Toothed wheel ST 38 HTD-8M/39-0	J537409.00.00	1
40	Toothed belt HTD8M-20	J537410.00.00	1
50	Sliding strip section CS SL	J927704.00.01	2
60	Bevel gear motor		1

16.2 CS 090 SL vertical drive, with chain gear

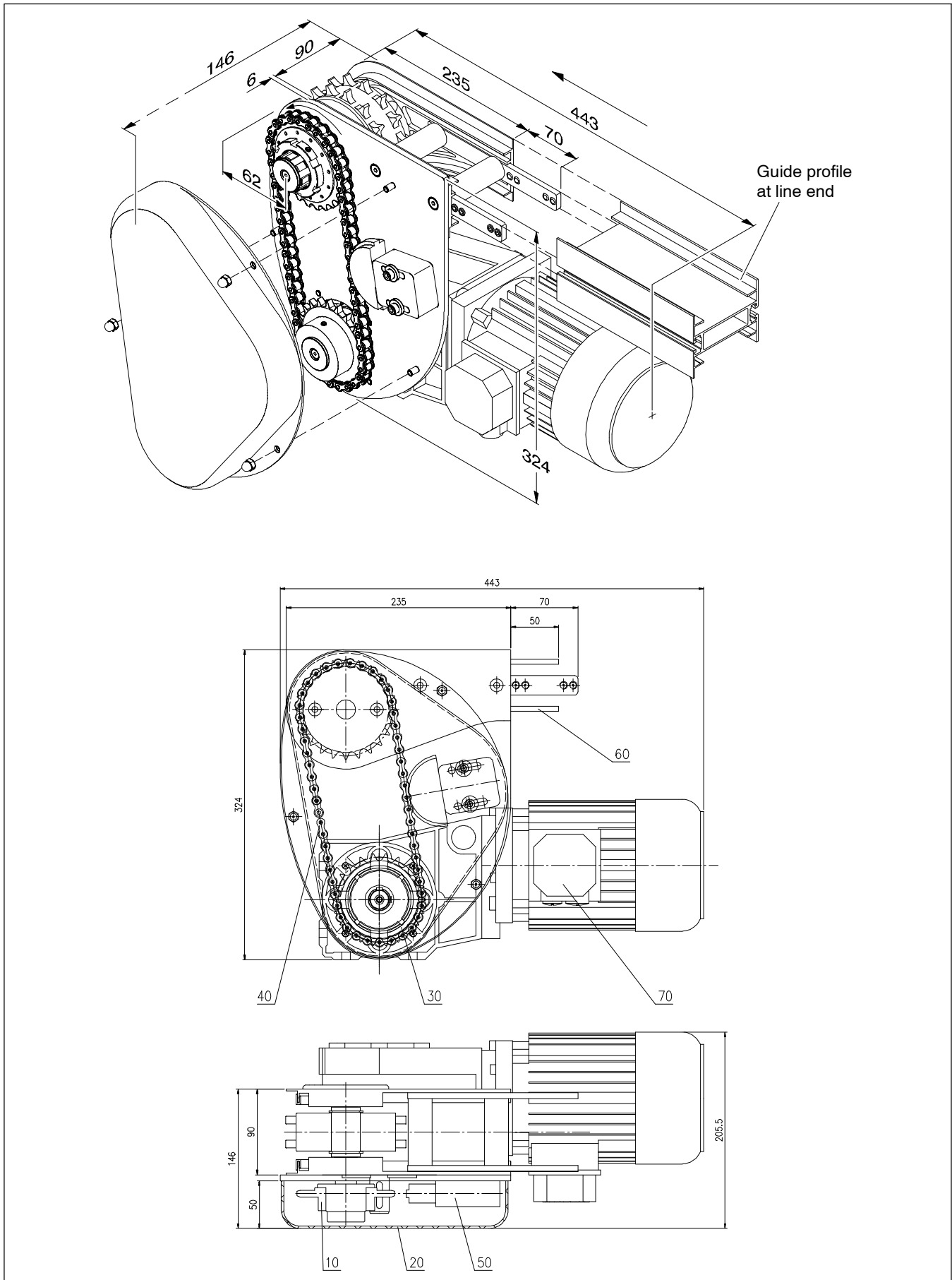


Abb. 46: Vertical drive CS 090 SL, with chain gear - left-hand version

16.2.1 Parts list for CS 090 SL vertical drive, with chain gear

Item no.	Designation	Prod. no.	Quantity
	CS 090 SL vertical drive, with chain gear, left-hand version, up to 60 m/min: without drive motor with drive motor	(1) J927736.00.99 J927737.01.99 to J927737.09.99	
	CS 090 SL vertical drive, with chain gear, right-hand version, up to 60 m/min: without drive motor with drive motor	(1) J927738.00.99 J927739.01.99 to J927739.09.99	
	CS 090 SL vertical drive, with chain gear, left-hand version, up to 80 m/min: without drive motor with drive motor	(2) J927736.10.99 J927737.10.99	
	CS 090 SL vertical drive, with chain gear, right-hand version, up to 80 m/min: without drive motor with drive motor	(2) J927738.10.99 J927739.10.99	
10	Slip clutch with sprocket 08-B1, 24 teeth	J535035.00.00	1
20	Chain guard: Left-hand version Right-hand version	J537093.00.00 J537127.00.00	1
30	Chain sprocket with hub on one side, 1/2"x5/16", 22 teeth	J537770.00.00	1
40	(1) Standard roller chain 08-B1, 55 links including connecting link (2) Marathon roller chain 08-B1, 55 links including connecting link	J537095.00.00 J537502.00.00	1
50	Tensioning box, size 0, light-duty	J537753.00.00	1
60	Sliding strip section CS SL	J927704.00.01	2
70	Bevel gear motor		1

16.3 CS 090 SL direct drive

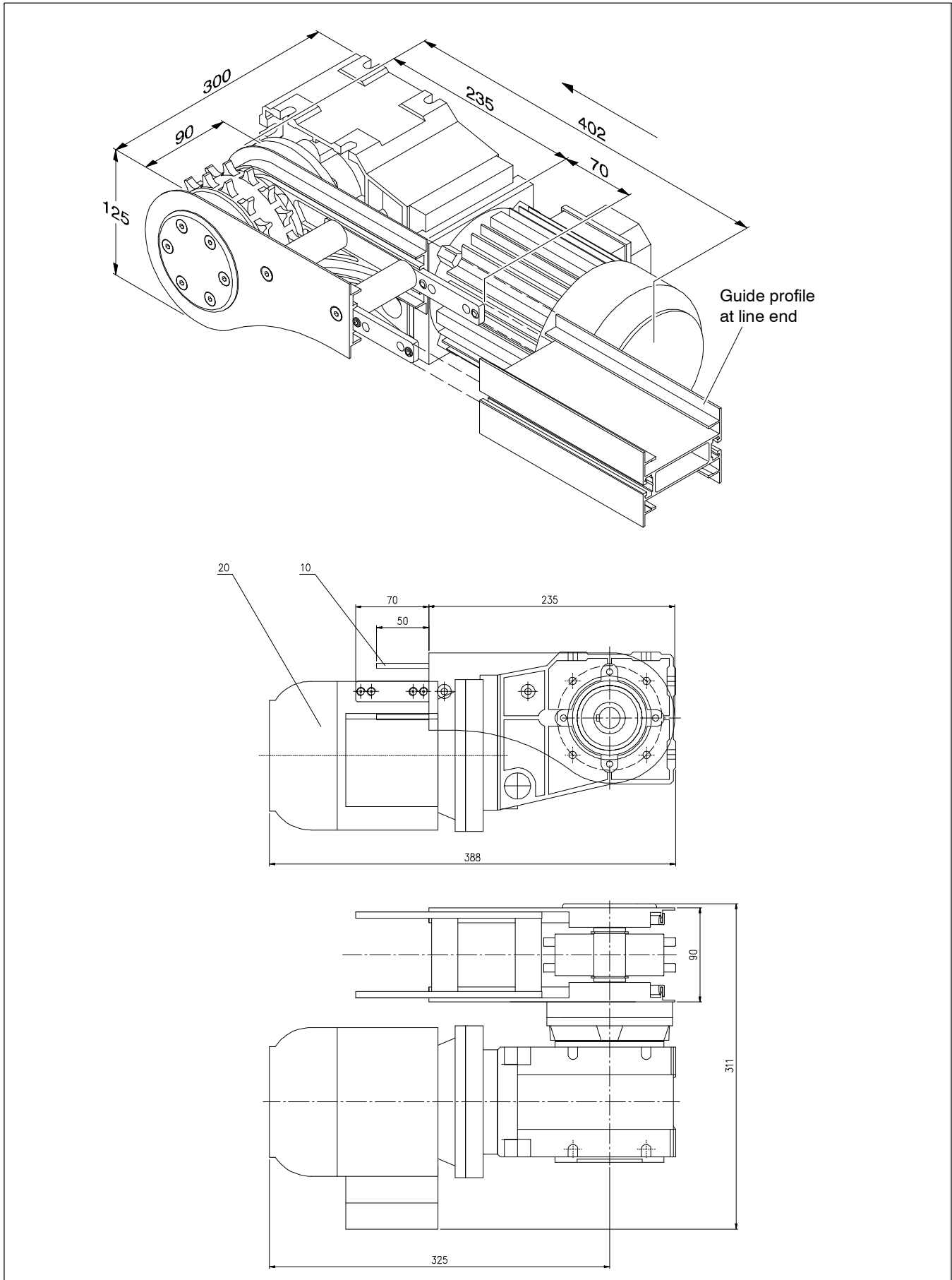


Abb. 47: CS 090 SL direct drive - right-hand version

16.3.1 Parts list for CS 090 SL direct drive

Item no.	Designation	Prod. no.	Quantity
	CS 090 SL direct drive - left-hand version: without drive motor with drive motor	J927740.00.99 J927742.00.99	
	CS 090 SL direct drive - right-hand version: without drive motor with drive motor	J927743.00.99 J927744.00.99	
10	Sliding strip section CS SL	J927704.00.01	2
20	Bevel gear motor		1

16.4 CS 090 SL centre drive, with belt reducing gear

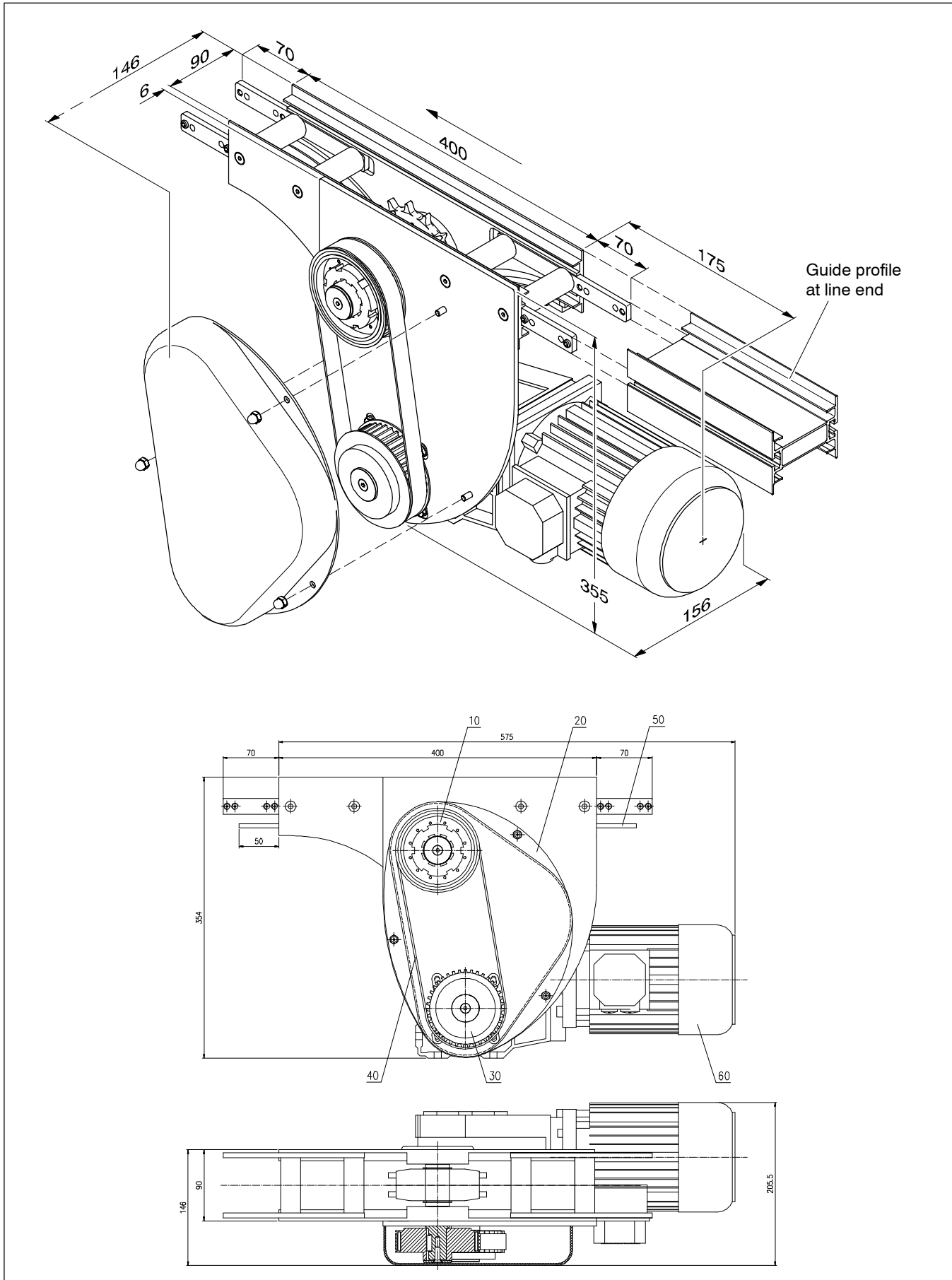


Abb. 48: CS 090 SL centre drive, with belt reducing gear - left-hand version

16.4.1 Parts list for CS 090 SL centre drive, with belt reducing gear

Item no.	Designation	Prod. no.	Quantity
	CS 090 SL centre drive, with belt reducing gear: Left-hand version, without drive motor Left-hand version, with drive motor	J927870.00.99 J927871.00.99	
	CS 090 SL centre drive, with belt reducing gear: Right-hand version, without drive motor Right-hand version, with drive motor	J927872.00.99 J927873.00.99	
10	Slip clutch with toothed wheel HTD-8M-20, 40 teeth	J537360.00.00	1
20	Chain guard: Left-hand version Right-hand version	J537093.00.00 J537127.00.00	1
30	Toothed wheel ST 38 HTD-8M/39-0	J537409.00.00	1
40	Toothed belt HTD8M-20	J537410.00.00	1
50	Sliding strip section CS SL	J927789.00.01	2
60	Bevel gear motor		1

16.5 CS 090 SL centre drive, with chain gear

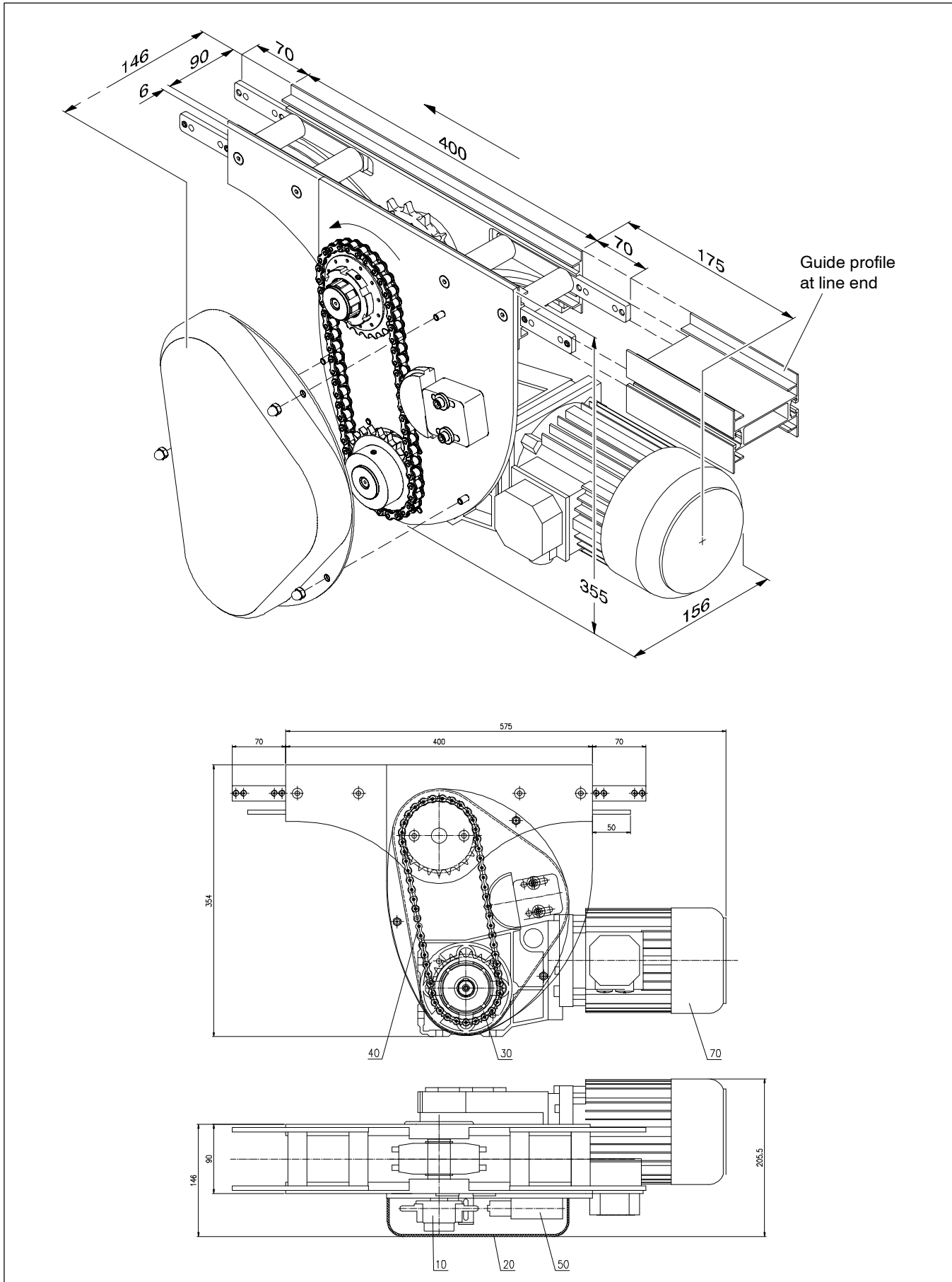


Abb. 49: CS 090 SL centre drive, with chain gear - left-hand version

16.5.1 Parts list for CS 090 SL centre drive, with chain gear

Item no.	Designation	Prod. no.	Quantity
	CS 090 SL centre drive, with chain gear: Left-hand version, without drive motor Left-hand version, with drive motor	J927813.00.99 J927815.00.99	
	CS 090 SL centre drive, with chain gear: Right-hand version, without drive motor Right-hand version, with drive motor	J927816.00.99 J927817.00.99	
10	Slip clutch with sprocket 08-B1, 24 teeth	J535046.00.00	1
20	Chain guard: Left-hand version Right-hand version	J537093.00.00 J537127.00.00	1
30	Chain sprocket with hub on one side, 1/2"x5/16", 22 teeth	J537770.00.00	1
40	Roller chain 08-B1, 55 links including connecting link	J537095.00.00	1
50	Tensioning box, size 0, light-duty	J537753.00.00	1
60	Sliding strip section CS SL	J927789.00.01	2
70	Bevel gear motor		1

16.6 CS 090 SL direct centre drive

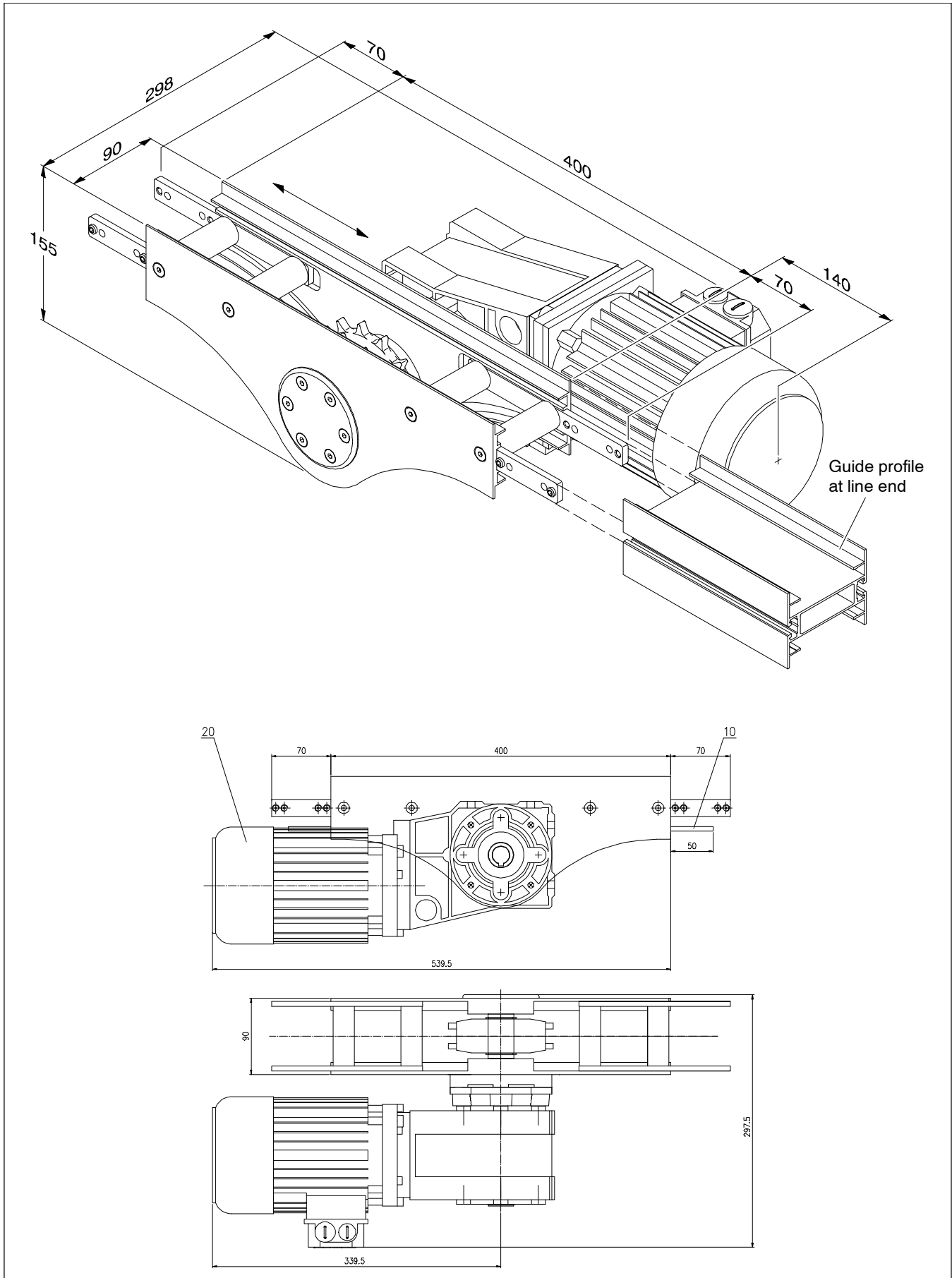


Abb. 50: CS 090 SL direct centre drive - right-hand drive motor

16.6.1 Parts list for CS 090 SL direct centre drive

Item no.	Designation	Prod. no.	Quantity
	CS 090 SL direct centre drive - version: without drive motor with drive motor	J927819.00.99 J927820.00.99	
10	Sliding strip section CS SL	J927789.00.01	2
20	Bevel gear motor		1

16.7 CS 090 SL vertical idler, 180°

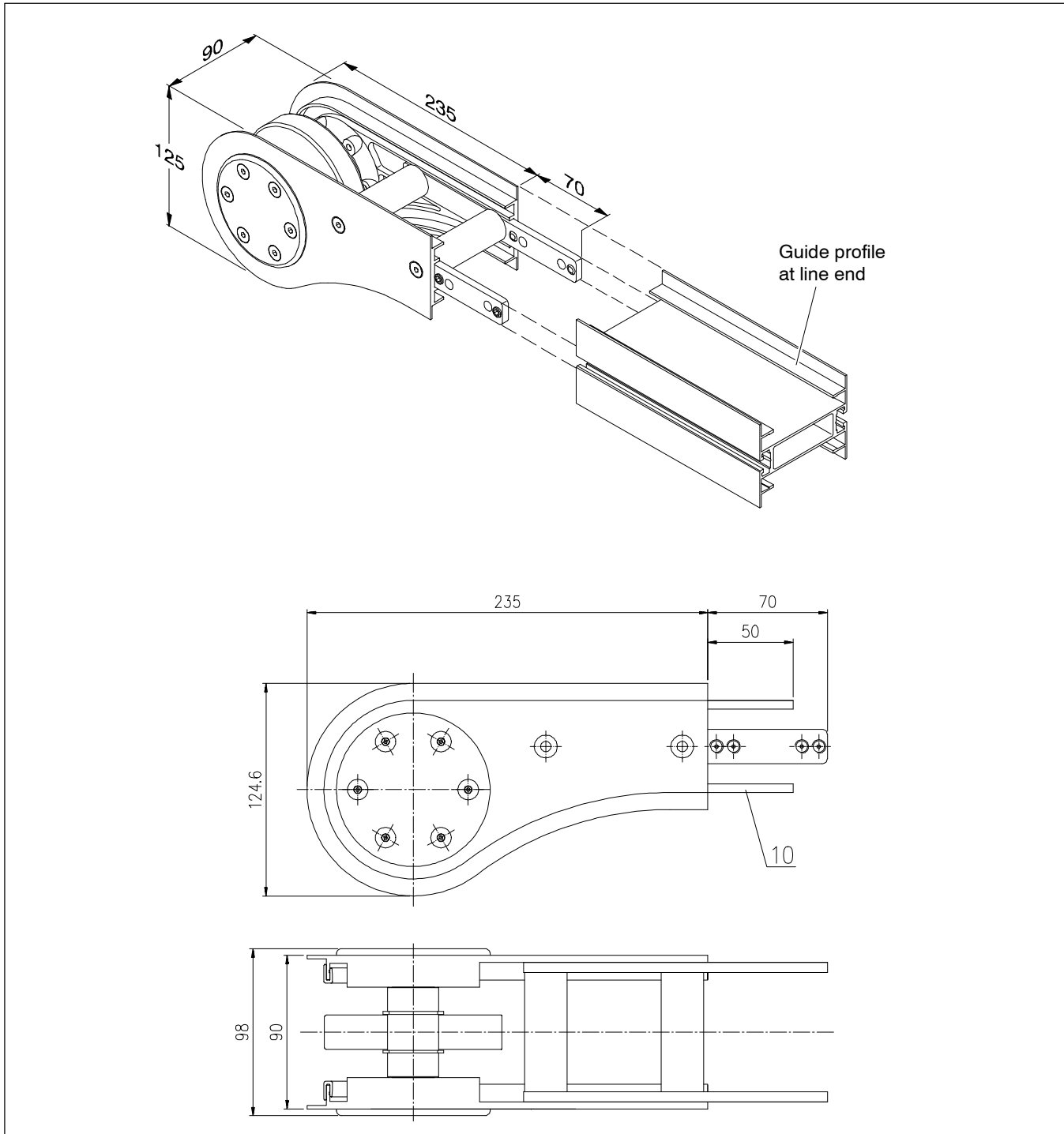


Abb. 51: CS 090 SL vertical idler, 180°

16.7.1 Parts list for CS 090 SL vertical idler, 180°

Item no.	Designation	Prod. no.	Quantity
	CS 090 SL vertical idler, 180°	J927749.00.99	
10	Sliding strip section CS SL	J927704.00.01	2

16.8 CS 090 SL horizontal curve with disk

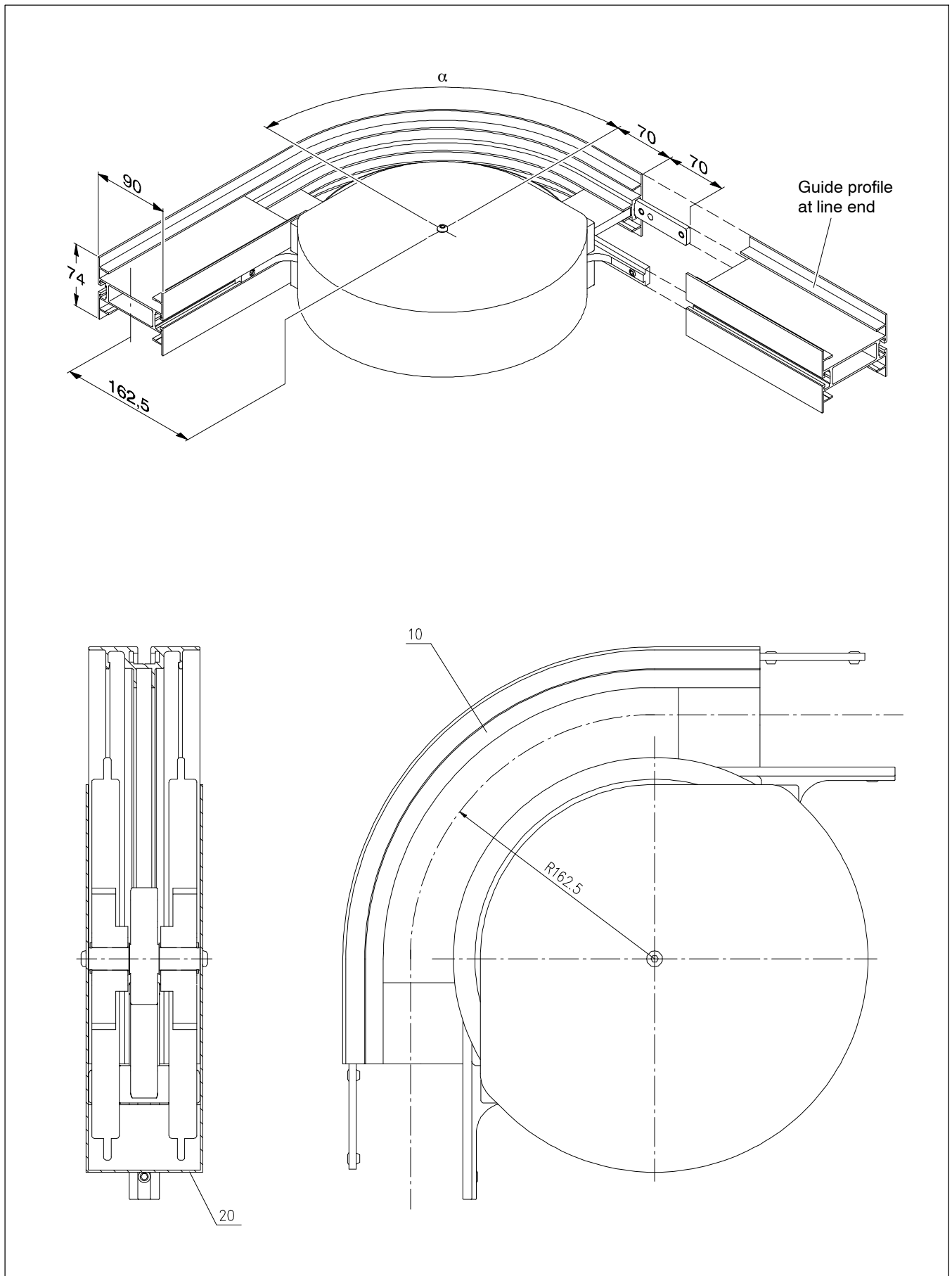


Abb. 52: CS 090 SL horizontal curve with disk, 90°

16.8.1 Parts list for CS 090 SL horizontal curve with disk

Item no.	Designation	Prod. no.	Quantity
	CS 090 SL horizontal curve with disk: R162.5/45° R162.5/60° R162.5/90° R162.5/180°	J927770.00.99 J927771.00.99 J927751.00.99 J927752.00.99	
10	CS 090 SL outside curve for horizontal curve with disk: 45° 60° 90° 180°	J927770.61.01 J927771.61.01 J927751.61.01 J927752.61.01	1
20	Cover for CS SL horizontal curve with disk: 45° 60° 90° 180°	J537122.00.00 J537117.00.00 J537121.00.00 J537120.00.00	1

17 CS 200 SL

17.1 CS 200 SL vertical drive, with belt reducing gear

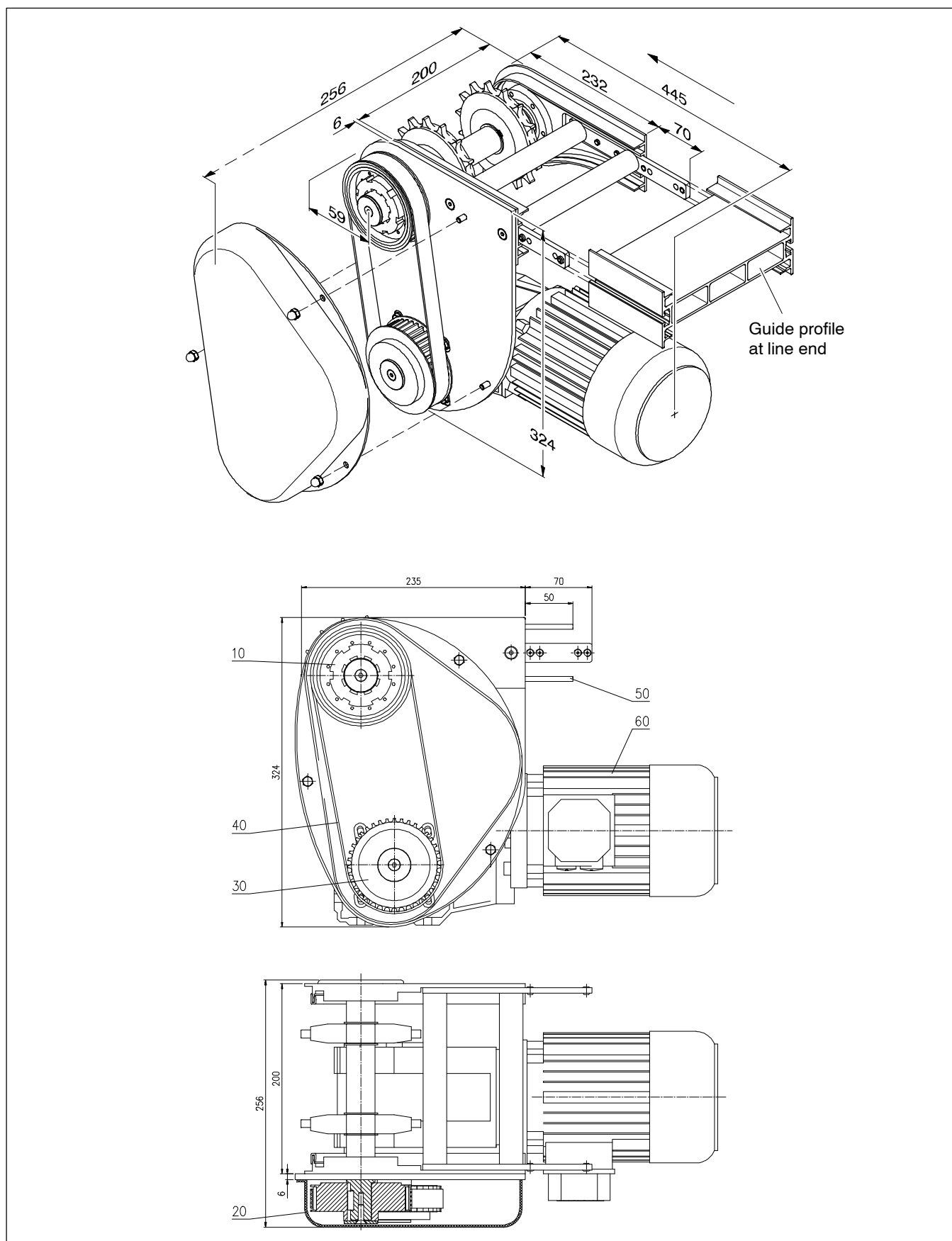


Abb. 53: CS 200 SL vertical drive, with belt reducing gear - left-hand version

17.1.1 Parts list for CS 200 SL vertical drive, with belt reducing gear

Item no.	Designation	Prod. no.	Quantity
	CS 200 SL vertical drive, with belt reducing gear, left-hand version, without drive motor	J927876.00.99	
	CS 200 SL vertical drive, with belt reducing gear, right-hand version, without drive motor	J927877.00.99	
10	Slip clutch with toothed wheel HTD-8M-20, 40 teeth	J537359.00.00	1
20	Chain guard: Left-hand version Right-hand version	J537093.00.00 J537127.00.00	1
30	Toothed wheel ST 38 HTD-8M/39-0	J537409.00.00	1
40	Toothed belt HTD8M-20	J537410.00.00	1
50	Sliding strip section CS SL	J927704.00.01	2
60	Bevel gear motor		1

17.2 CS 200 SL vertical drive, with chain gear

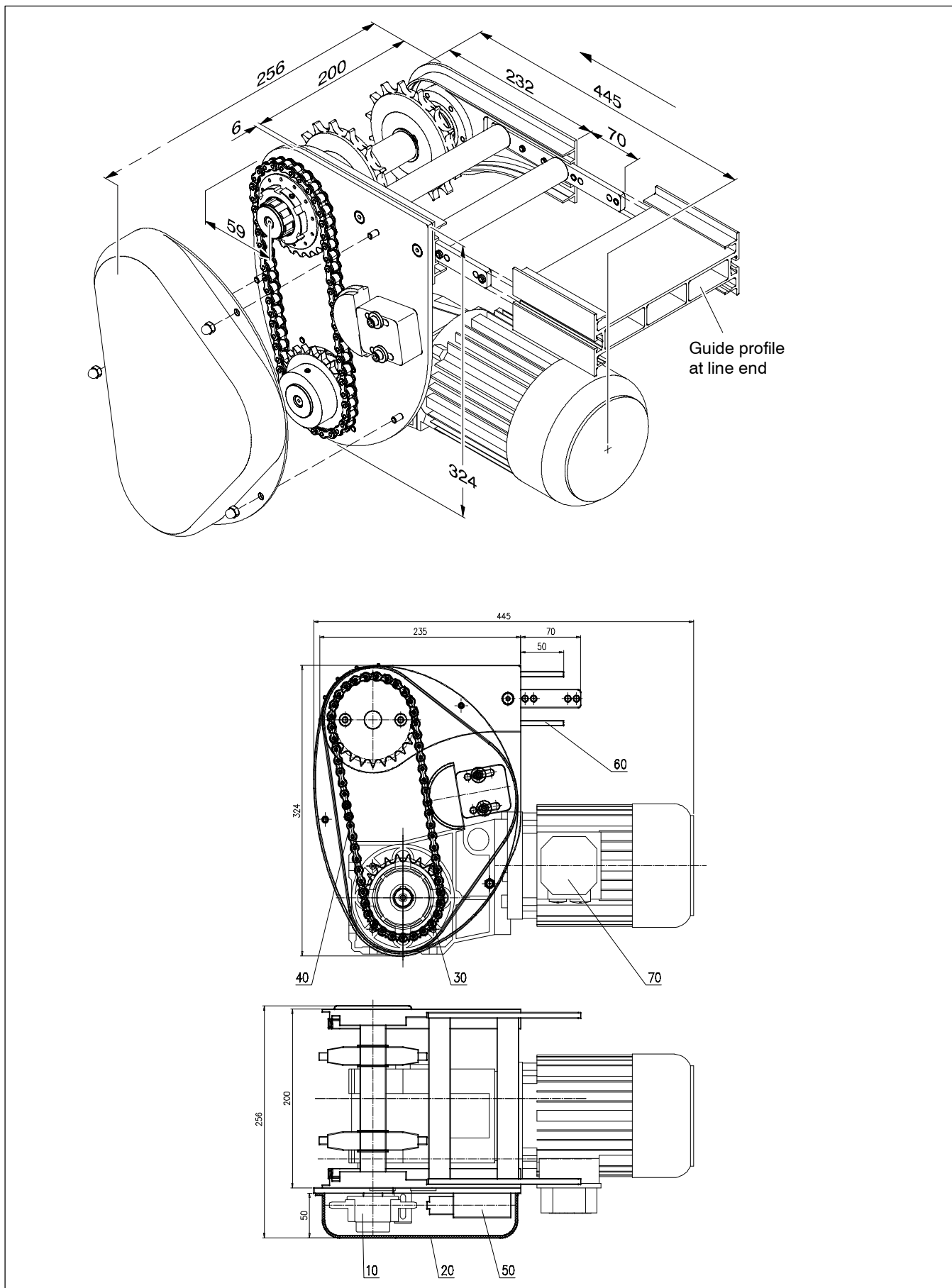


Abb. 54: CS 200 SL vertical drive, with chain gear - left-hand version

17.2.1 Parts list for CS 200 SL vertical drive, with chain gear

Item no.	Designation	Prod. no.	Quantity
	CS 200 SL vertical drive, with chain gear, left-hand version, without drive motor	J927797.00.99	
	CS 200 SL vertical drive, with chain gear, right-hand version, without drive motor	J927798.00.99	
10	Slip clutch with sprocket 08-B1, 24 teeth	J535035.00.00	1
20	Chain guard: Left-hand version Right-hand version	J537093.00.00 J537127.00.00	1
30	Chain sprocket with hub on one side, 1/2"x5/16", 22 teeth	J537770.00.00	1
40	Roller chain 08-B1, 55 links including connecting link	J537095.00.00	1
50	Tensioning box, size 0, light-duty	J537753.00.00	1
60	Sliding strip section CS SL	J927704.00.01	2
70	Bevel gear motor		1

17.3 CS 200 SL direct drive

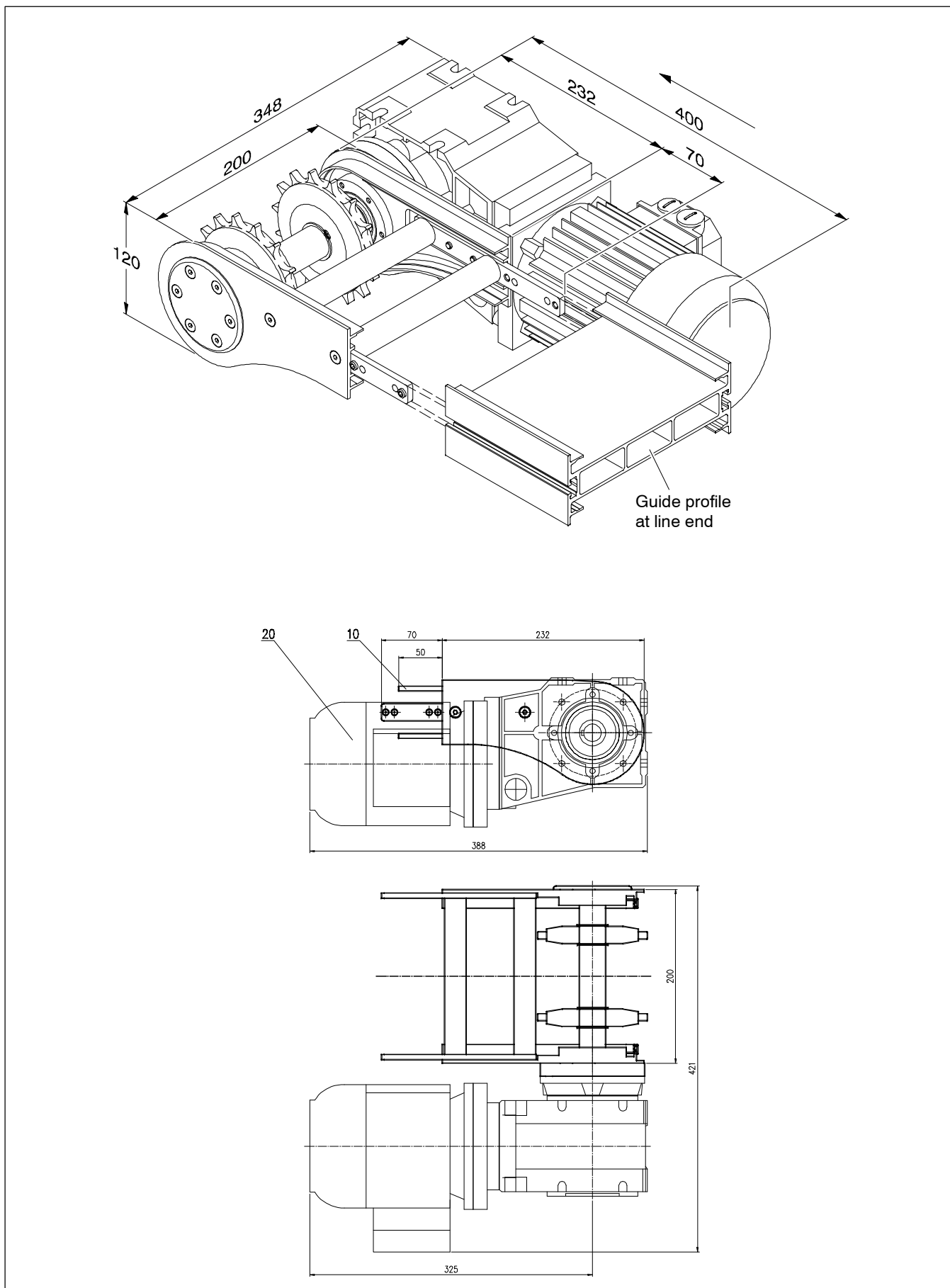


Abb. 55: CS 200 SL direct drive - right-hand version

17.3.1 Parts list for CS 200 SL direct drive

Item no.	Designation	Prod. no.	Quantity
	CS 200 SL direct drive - left-hand version, without drive motor	J927799.00.99	
	CS 200 SL direct drive - right-hand version, without drive motor	J927801.00.99	
10	Sliding strip section CS SL	J927704.00.01	2
20	Bevel gear motor		1

17.4 CS 200 SL vertical idler, 180°

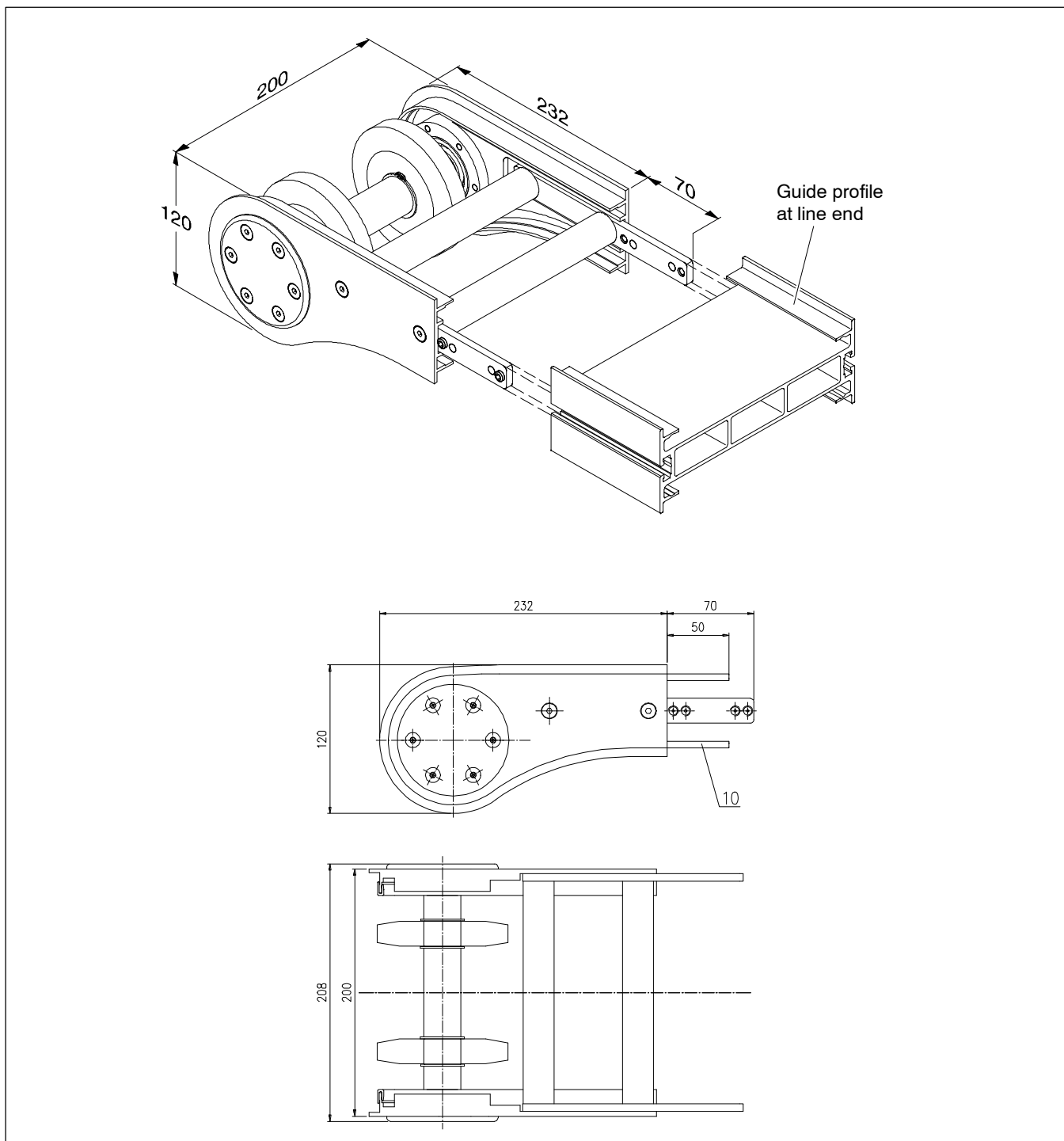


Abb. 56: CS 200 SL vertical idler, 180°

17.4.1 Parts list for CS 200 SL vertical idler, 180°

Pos.-Nr.	Bezeichnung	Art.-Nr.	Anzahl
	CS 200 SL vertical idler, 180°	J927827.00.99	
10	Sliding strip section CS SL	J927704.00.01	2



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