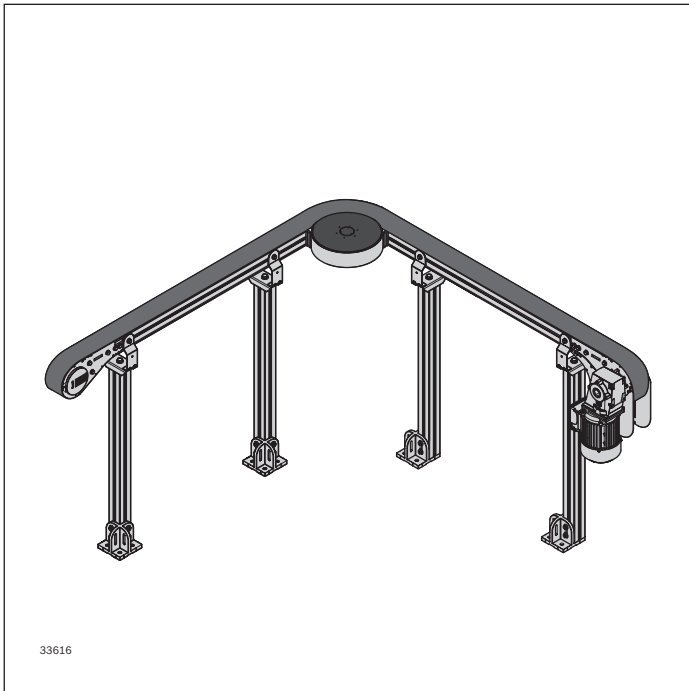




# ESD system VarioFlow *plus*



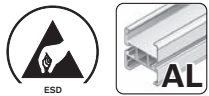
- ▶ Components and parts suitable for use in an EPA (ESD Protected Area)
- ▶ Conductive components
- ▶ Dissipative connection technology
- ▶ Size: 65, 90
- ▶ Max. speed: 30 m/min
- ▶ Max. chain tensile force: 600 N

**Notice:**

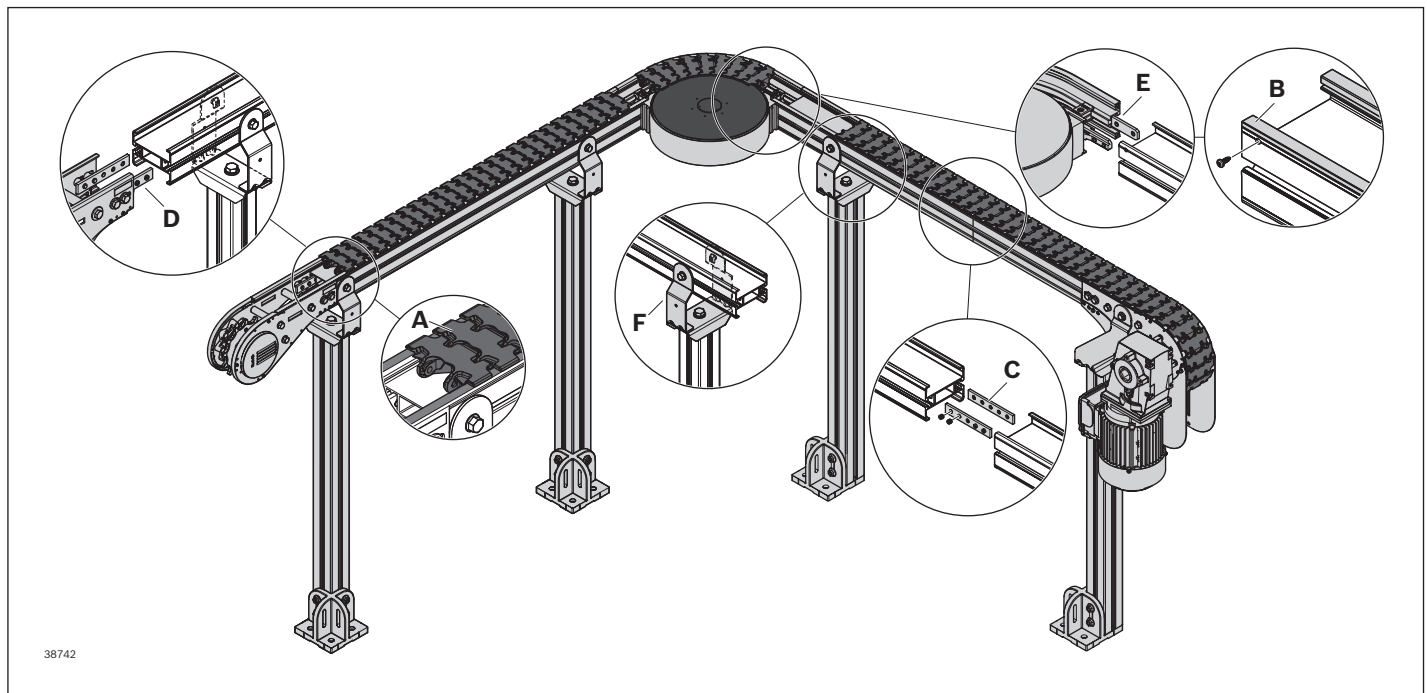
Because sliding friction is involved with the transport medium (chain), static charges cannot be completely avoided. Depending on customer requirements, additional measures may be necessary.

	<b>Design of an ESD system</b>	<b>186</b>
	<b>Conveyor chain ESD</b>	<b>190</b>
	<b>Sliding rail ESD</b>	<b>192</b>
	<b>Curve wheel AL ESD</b>	<b>194</b>
	<b>Drive and return unit ESD</b>	<b>196</b>
	<b>Basic unit</b> <b>Curve wheel drive AL ESD</b>	<b>198</b>
	<b>Adapter AL-STs</b>	<b>200</b>
	<b>Leg set ESD</b> <b>Motor leg set ESD</b>	<b>202</b>

## Design of an ESD system



The ESD system comprises a combination of AL, STS and special ESD components.



- **A:** The conveyor chain ESD is deflected to the sliding rail ESD via the extensive support.
- **B:** The sliding rail ESD is deflected to the section profile AL (see p. 54) via the side standard mount<sup>1)</sup>
- **C:** The section profile AL is mounted using the profile connector AL<sup>1)</sup>
- **D:** The drive/return unit STS are mounted on the section profile AL using the adapter AL-STS<sup>1)</sup>. The use of the drive/return unit STS instead of the version AL is necessary to minimize the load creation
- **E:** The curve wheel AL ESD (see p. 194) is screwed with the section profile AL<sup>1)</sup>
- **F:** The leg sets AL are mounted on the section profile AL via holders STS (screws in the slot)<sup>1)</sup>

<sup>1)</sup> T-bolts, nuts and self-tapping screws break through the anodized layer and form a connection to the conductive aluminum core.

**Notice:**

When assembling an ESD system, ensure that all components are conductively connected to each other. Horizontal sliding curves are not suitable for use in an EPA due to the high friction.

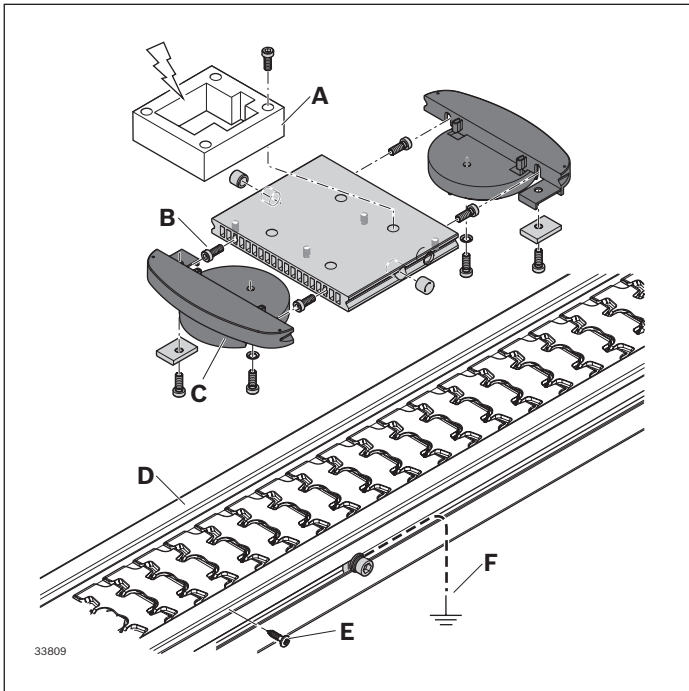
In an environment designed for ESD, all components should be made from volume or surface conductive material. Since this is not always possible in the VarioFlow *plus* system for technical and economic reasons, the occurrence of charges (that are strongly dependent on the humidity – 40 % minimum should not be fallen short of) cannot be completely excluded for certain components.

No ESD critical processes should be carried out in the vicinity of components such as drives, return units, or bridges. You should move processing-related processes into straight sections and design the complete system according to what your ESD coordinator thinks.

Charges occurring can be discharged through the use of conductive brushes. For machining processes involving particularly sensitive parts, there are numerous components that can be found in Rexroth's Manual Production Systems product range with which individual workstations can be integrated in a VarioFlow *plus* system. These workstations can be implemented, both simply and economically, as completely conductive "islands" according to the ESD requirements.

**Caution:**

Personal safety always comes before ESD safety!

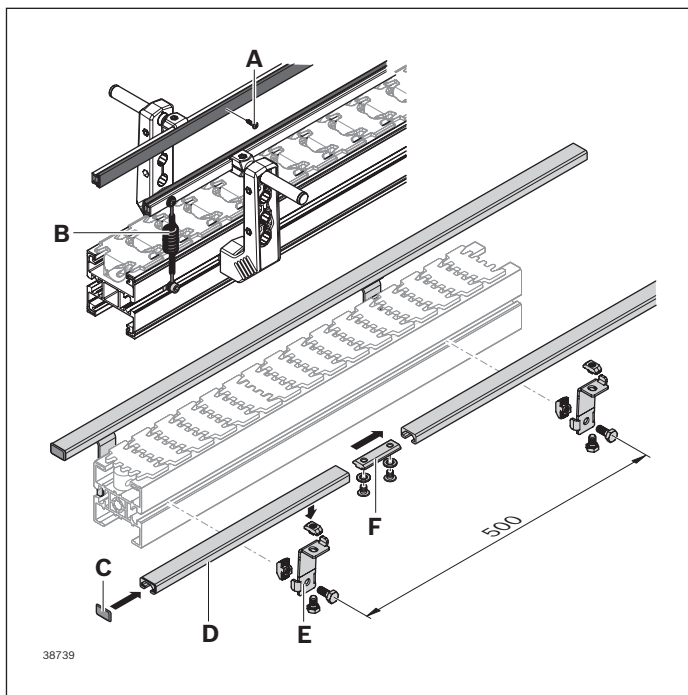


### Workpiece pallets

- Product carrier connection made of metal or conductive plastic connections to the plate WT via screw **(A)** (pierced anodized coating)
- Connection to the end caps and the steel wear pad via screws **(B)**
- Connection to the conveyor chain via a large contact area **(C)**
- Connection between the conveyor chain and the sliding rail via a large contact area **(D)**
- Sliding rail connection with section profile via screws **(E)**
- Example connection to the hall potential equalizer with a 1 MΩ protective resistor **(F)**

### Notice:

Only the steel wear pad is ESD capable.

**Product guide**

- Sliding rail connection narrow with profile rail AL via sheet metal screw (3 842 547 908) (**A**)
- Connection between profile rail – section profile AL using a screw (3 842 547 908 or 3 842 533 915), cable and T-nut (**B**) (piercing through the anodized coating and establishing a connection to the conductive aluminum core)

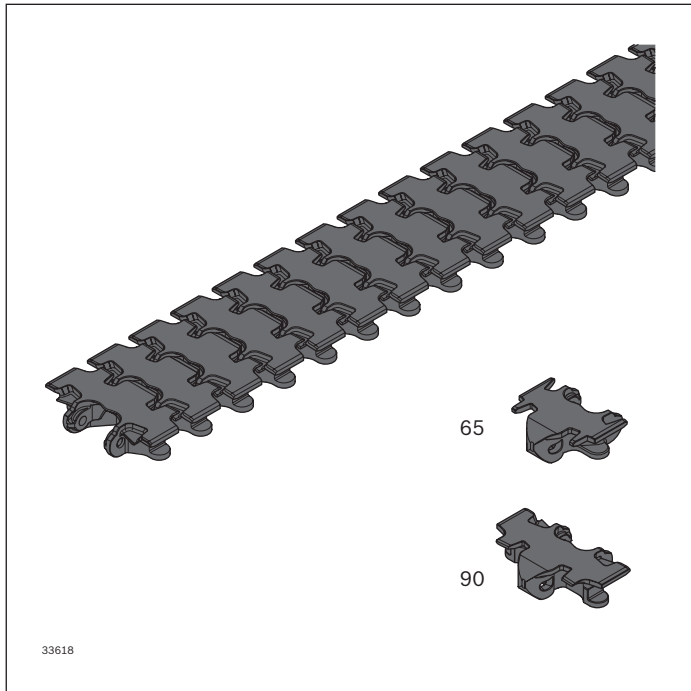
**Workpiece pallet product guide**

- Connection of lateral guide profile (**D**) with holder (**E**) using T-nuts (broken eloxal layer)
- Connection between 2 lateral guide profiles via profile connector (**F**) with T-nuts (broken anodized layer)

**Notice:**

The extension of the profile rail AL is only permitted with the profile connector on the outside (see p. 218).

## Conveyor chain ESD



The conveyor chain ESD is used to transport products directly or indirectly via workpiece pallets in electrostatically dissipative systems.

- Transport on ascending or descending sections up to about 7° possible, depending on the product (test required)
- Accumulation operation permitted, depending on the product
- Maximum chain tensile force: 600 N
- Conduction resistance:  $< 10^8 \Omega$
- Size: 65, 90
- A combination with other types of chains is not permitted, since these are non-conductive

- Drilling the flat conveyor chain links allows for the simple attachment of superstructures.  
A mold cavity for accommodating a flat hexagon nut/screw M5 is present.  
Max. drilling up to  $\varnothing 5$  mm since at this point there are no interfering contours in the chain conveyor.

- Extremely quiet chain running thanks to the patented chain design

Required accessories for individual chain links:

- Chain pin and pivot pin, see p. 191

Scope of delivery:

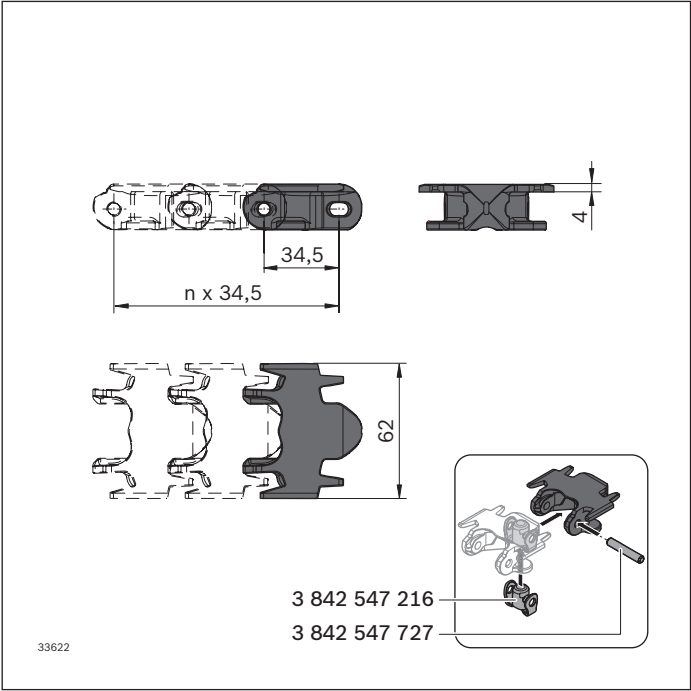
- Chain: Complete, incl. chain pin and pivot pin

Condition on delivery:

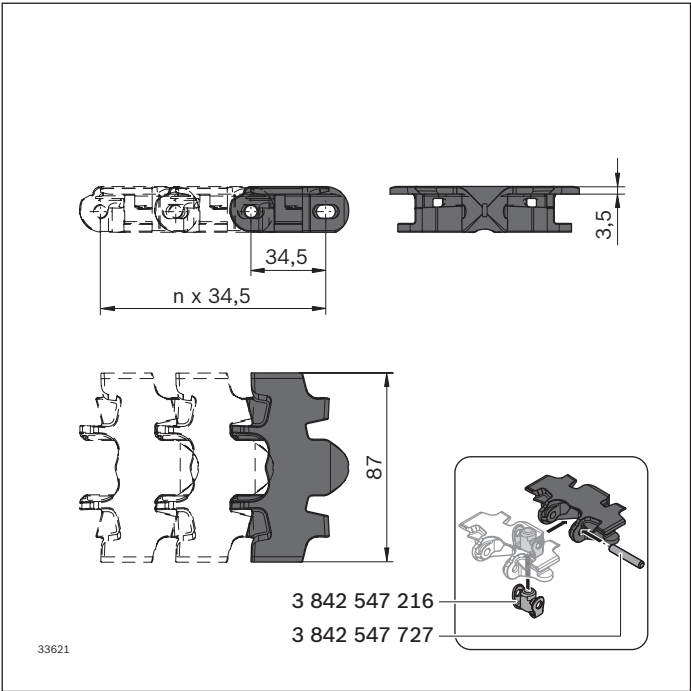
- Chain: Fully assembled

Material:

- Chain link: POM; black
- Chain pin: Non-rusting steel 1.4301
- Pivot pin: PA66



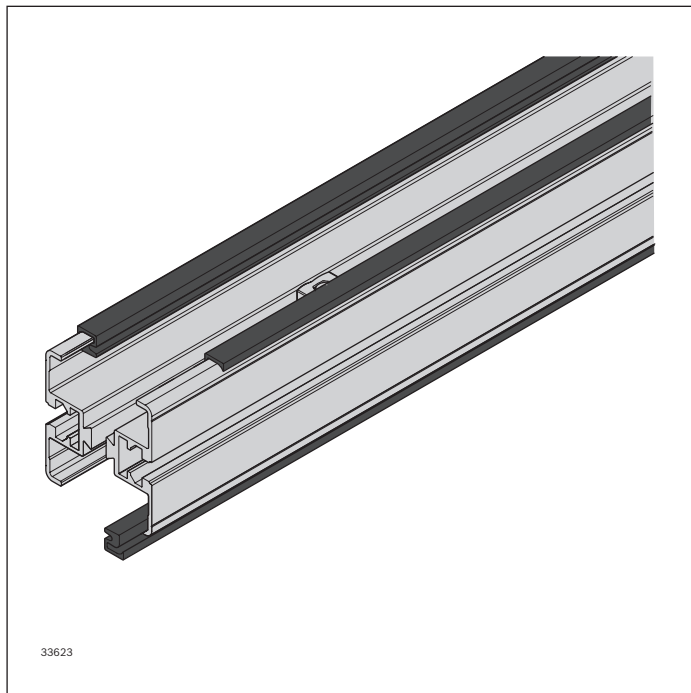
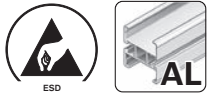
Conveyor chain ESD VFplus 65	L (mm)		No.
Conveyor chain	4968	1	<b>3 842 546 088</b>
Chain pin		100	<b>3 842 547 727</b>
Pivot pin		100	<b>3 842 547 216</b>



Conveyor chain ESD VFplus 90	L (mm)		No.
Conveyor chain	4968	1	<b>3 842 546 089</b>
Chain pin		100	<b>3 842 547 727</b>
Pivot pin		100	<b>3 842 547 216</b>



## Sliding rail ESD



- ▶ Easy assembly – simply clip onto the section profile
- ▶ Secured against axial shifting with lateral screw fittings
- ▶ Gliding surface machining: Not required

### Required accessories:

- Sliding rail assembly tool, see p. 288
- Sheet metal screw 2.9x9.5 DIN 7982; DIN EN ISO 7050  
1 screw for each sliding rail section

### Material:

- PE-UHMW

The sliding rail ESD is clipped into the section profile and guides the conveyor chain.

Lateral securing means the sliding surface does not need to be machined. Wear and noise level are thus reduced to a minimum.

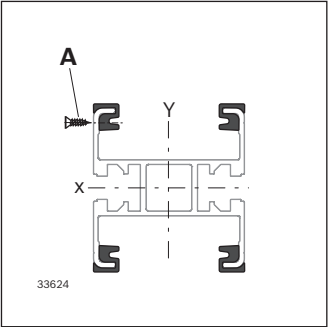
The ESD sliding rail screwed to the section profile helps to safely discharge loads.


- Size: 65, 90
- Only for systems AL
- $V_{\max}$ : 30 m/min
- Conduction resistance:  $< 10^8 \Omega$
- Only suitable for dry operation

Extend the sliding rail over the component interfaces to ensure minimum wear and noise emissions.

Interruptions to the profile or component connection must be avoided. If an interruption is necessary after 10 m and to ensure that charges are transferred safely, the sliding rail must be attached laterally with a sheet metal screw (**A**).

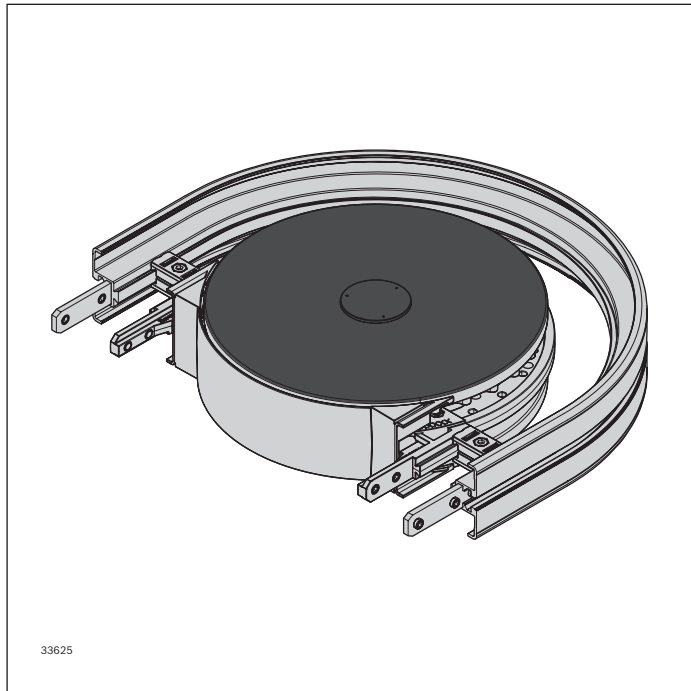
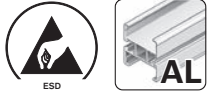
**Notice:** No horizontal sliding curves allowed.



Sliding rail ESD VFplus	L (mm)		No.
	30000	1	3 842 557 000

Sheet metal screw			No.
A		100	3 842 547 908

## Curve wheel AL ESD



The curve wheel AL ESD provides a horizontal direction change for the conveyor chain. It enables low-friction direction changes with very small radii. For attachment options, see the matrix on page "Combination matrix" of page 313

- Size: 65, 90
- Deflection angles see table on page 195, other deflection angles on request
- Suitable chain type: Conveyor chain ESD
- For circuit systems without conveyor chain return in bottom run (using a curve wheel or connection drive), the appropriate cover must be used for personal safety reasons
- With conductive wheel

**Notice:** High-pressure cleaning of the ball bearings is not permitted.

- No interfering contours above chain plate height

### Scope of delivery:

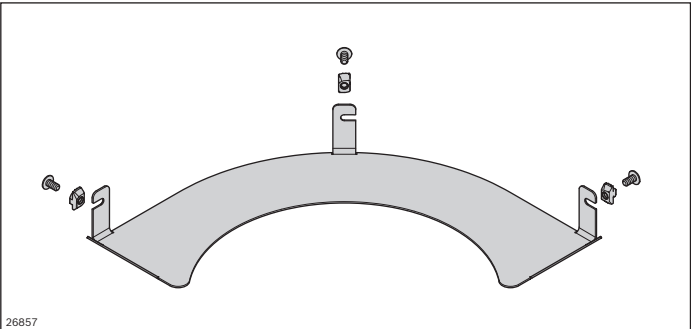
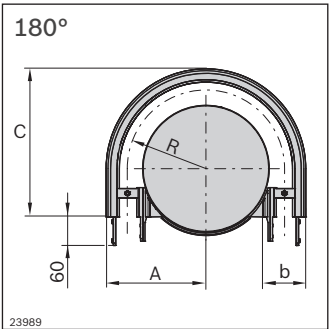
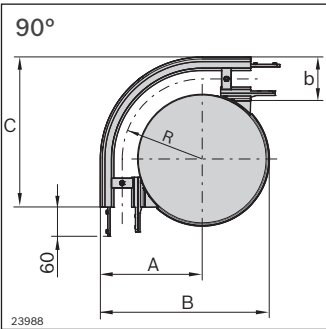
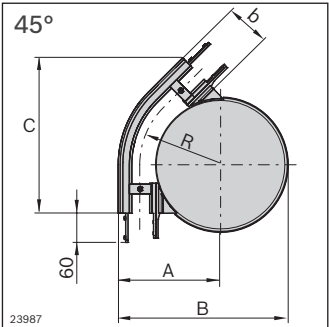
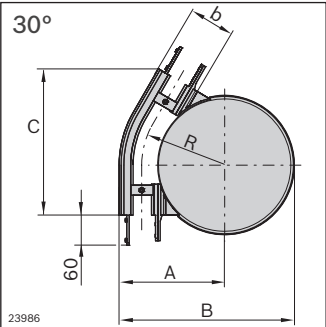
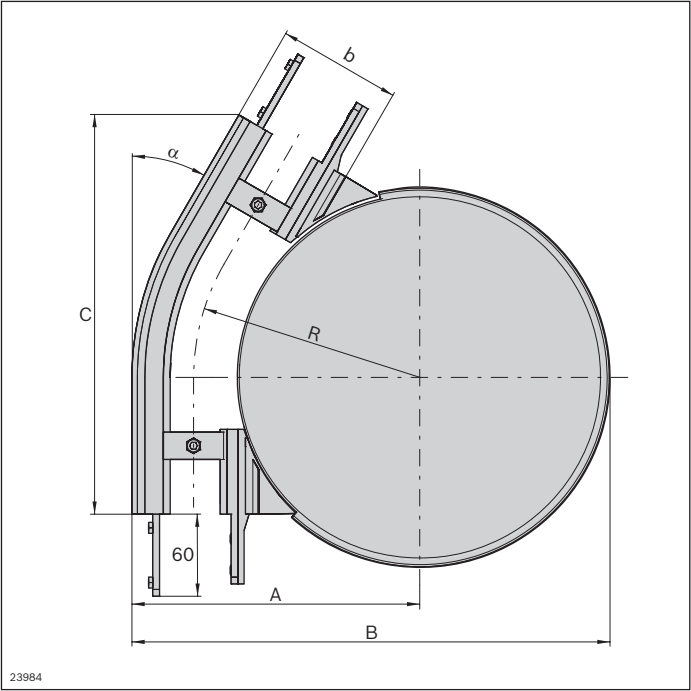
- Including fastening material for mounting to the section profile AL

### Condition on delivery:

- Assembled

### Material:

- Housing: Diecast aluminum
- Chain wheel: PA ESD; black
- Ball bearing: Non-rusting steel 1.4301/FDA

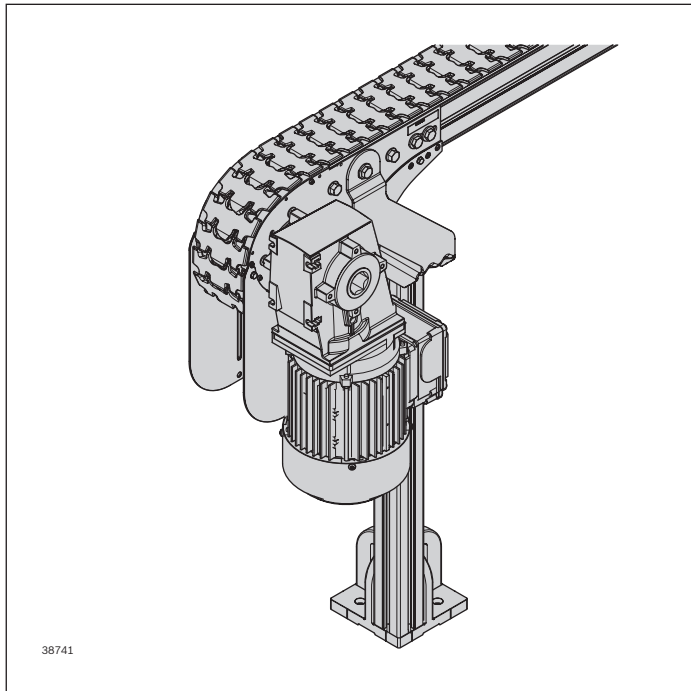


Curve wheel AL ESD	$\alpha$ (°)	No.
VFplus 65	30	<b>3 842 553 029</b>
	45	<b>3 842 553 030</b>
	90	<b>3 842 553 031</b>
	180	<b>3 842 553 032</b>
VFplus 90	30	<b>3 842 553 033</b>
	45	<b>3 842 553 034</b>
	90	<b>3 842 553 035</b>
	180	<b>3 842 553 036</b>

b (mm)	$\alpha$ (°)	R (mm)	A (mm)	B (mm)	C (mm)
65	30	153.0	185.5	324.5	279.4
	45	153.0	185.5	324.5	301.9
	90	153.0	185.5	324.5	285.5
	180	153.0	185.5	–	285.5
90	30	165.5	210.5	349.5	291.9
	45	165.5	210.5	349.5	319.6
	90	165.5	210.5	349.5	310.5
	180	165.5	210.5	–	310.5

Protective cover AL	$\alpha$ (°)	No.
VFplus 65	30	<b>3 842 551 545</b>
	45	<b>3 842 551 546</b>
	90	<b>3 842 551 547</b>
	180	<b>3 842 551 548</b>
VFplus 90	30	<b>3 842 551 549</b>
	45	<b>3 842 551 550</b>
	90	<b>3 842 551 551</b>
	180	<b>3 842 551 552</b>

## Drive and return unit ESD



**Base unit STS**  
(head drive direct or  
connection or center drive)  
**or return unit STS**

+

**Configurable drive kit STS**  
(standard gear motor or round shaft)

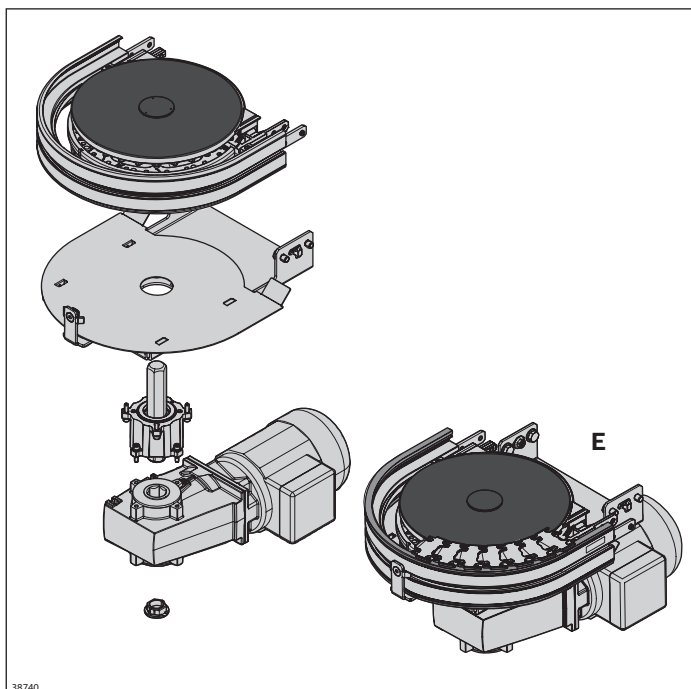
+

**Adapter AL-STS**

=

**Complete drive for ESD systems**

**Notice:** The active and passive bridges are not conductive,  
meaning that no ESD-critical processes should be carried  
out near bridges.



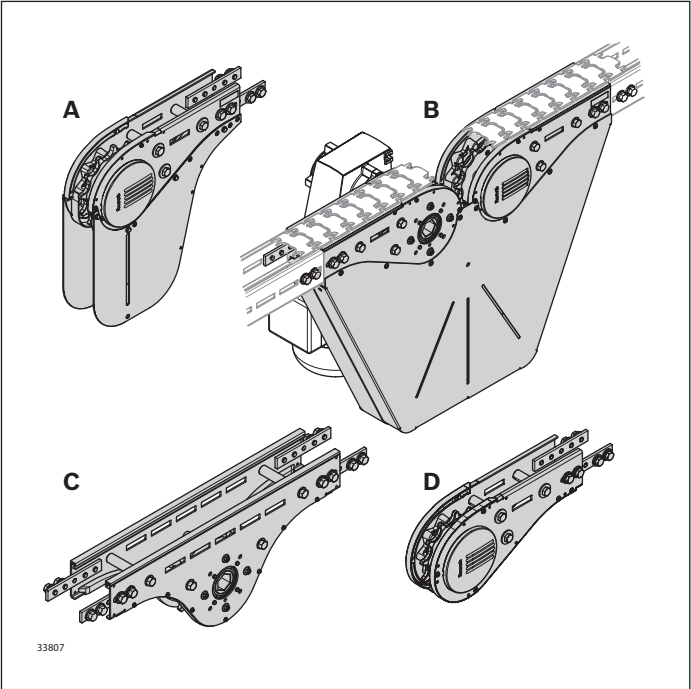
**Basic unit curve wheel drive ESD**

+

**Configurable drive kit**  
(standard gear motor or round shaft)

=

**Complete drive**



A Basic unit head drive direct STS	No.
VFplus 65 direct	3 842 547 522
VFplus 90 direct	3 842 547 523

see p. 154

B Basic unit connection drive STS	No.
VFplus 65 direct	3 842 553 914
VFplus 90 direct	3 842 553 915

see p. 156

C Basic unit center drive STS	No.
VFplus 65 direct	3 842 552 940
VFplus 90 direct	3 842 552 941

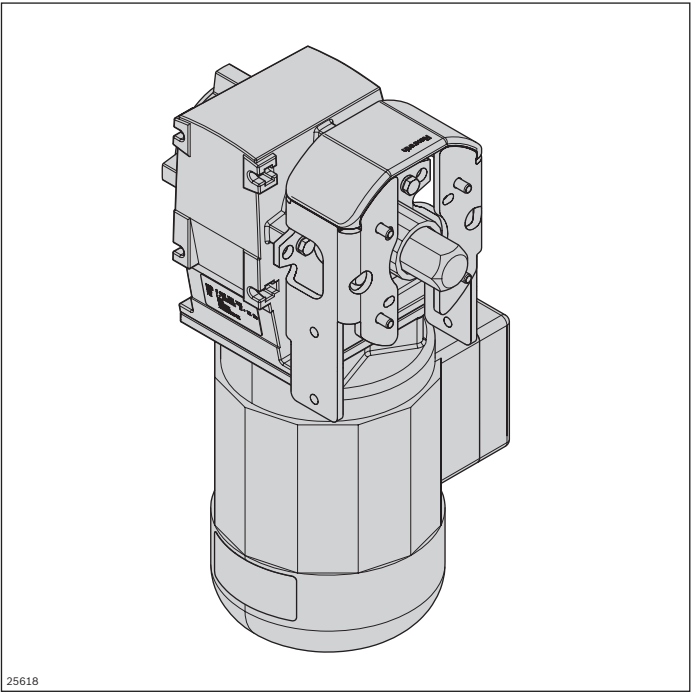
see p. 158

D Return unit STS	No.
VFplus 65	3 842 547 528
VFplus 90	3 842 547 529

see p. 160

E Basic unit curve wheel drive ESD	No.
VFplus 65, 180°	3 842 553 037
VFplus 90, 180°	3 842 553 038

see p. 198



Drive kit VFplus	SP	No.
	STS	3 842 998 291

SP = STS, see p. 164

Drive kit curve wheel VFplus AL	No.
	3 842 998 742

See also page 94

**Notice:**

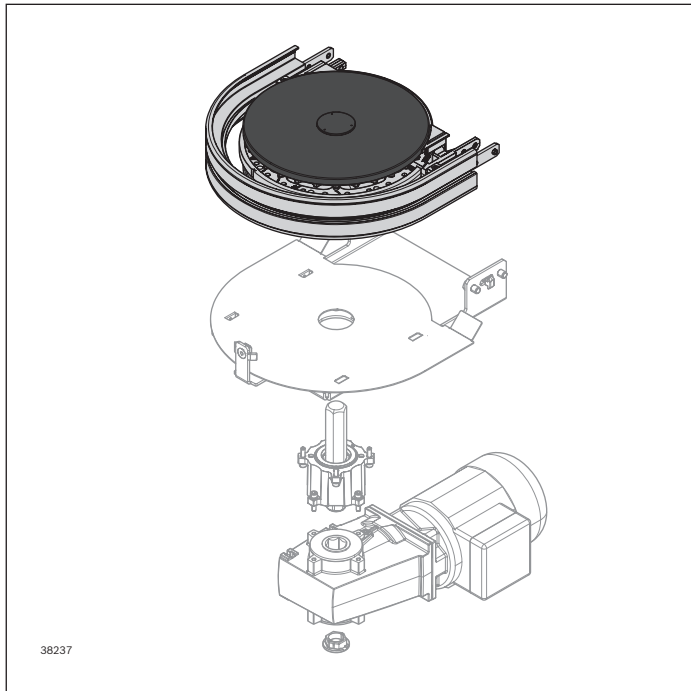
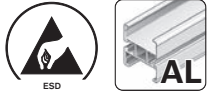
- The drive kit is to be supported with the holder motor leg set STS (3 842 549 365) and an motor leg set ESD
- The selection of the parameter SP = STS is imperative. Even if an aluminum track is used because centering is not possible on an flange AL.

**Required accessories:**

- Motor leg set ESD, see p. 202

## Basic unit

### Curve wheel drive AL ESD



The curve wheel drive AL ESD is used for driving the conveyor chain in circuit systems with a top-running chain. Combining the base unit curve wheel 180° AL ESD with the appropriate drive kit quickly turns it into a curve wheel drive.

- Size: 65 and 90
- Suitable chain types: All
- Permissible chain tensile force:  $F_{\max} = 400 \text{ N}$  per level  
Section length for closed circuits  $L \leq 10 \text{ m}$
- Permissible torque:  $M_{\max} = 60 \text{ Nm}$   
When combining several curve wheel base units, the motor torque must be distributed across the individual levels
- Conveying speed:  $v_N = 4 \dots 21 \text{ m/min}$   
For drives with frequency converters (FU), the speed must be limited to a maximum of 21 m/min using control technology
- Recommendation: No accumulation operation until 1000 mm after the curve wheel drive
- Can only be used with a closed profile

- Driving several superimposed basic curve wheel units is easily implemented via the integrated hexagonal hollow shafts
- Ball bearing made of non-rusting steel (1.4301), with seal on both sides and FDA-compliant grease filling
- Side elements with slot to attach holders for lateral guides, or similar

#### Required accessories:

- Curve wheel drive kit, see p. 94
- Assembly module, see p. 62
- Sliding rail: Length calculation, see p. 302
- Leg set, see p. 119

#### Optional accessories:

- Alpine conveyor connection kit, see p. 112

#### Scope of delivery:

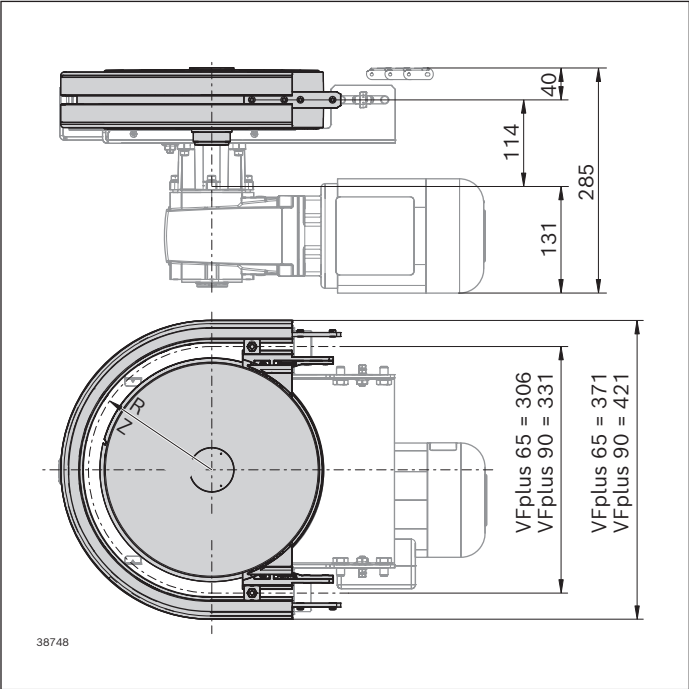
- Including fastening material

#### Condition on delivery:

- Assembly required

#### Material:

- Housing: Diecast aluminum
- Chain wheel: PA; black
- Ball bearing: Non-rusting steel 1.4301/FDA



Basic unit curve wheel AL ESD	$\alpha$ (°)	No.
VFplus 65	180	3 842 553 037
VFplus 90	180	3 842 553 038

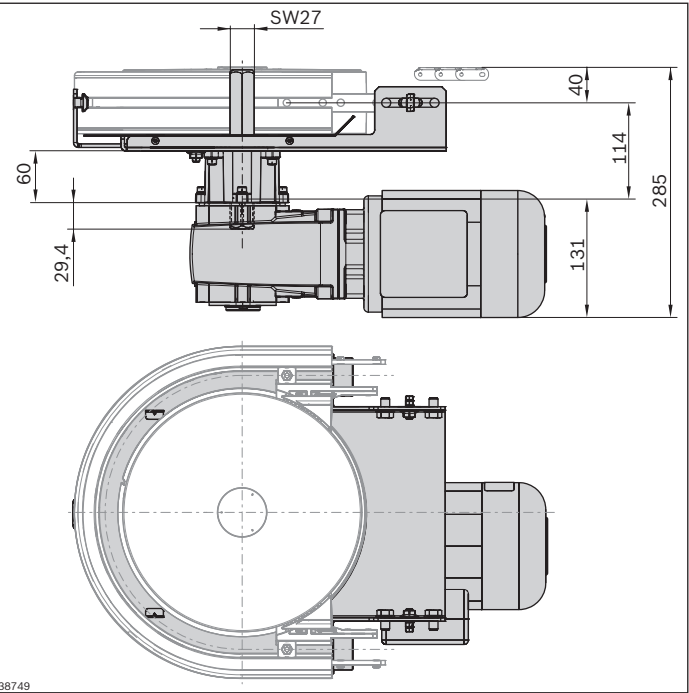
	R (mm)	Z <sup>1)</sup>
VFplus 65	153.0	28
VFplus 90	165.5	30

<sup>1)</sup> Number of teeth

Drive kit curve wheel VFplus AL	No.
	3 842 998 742

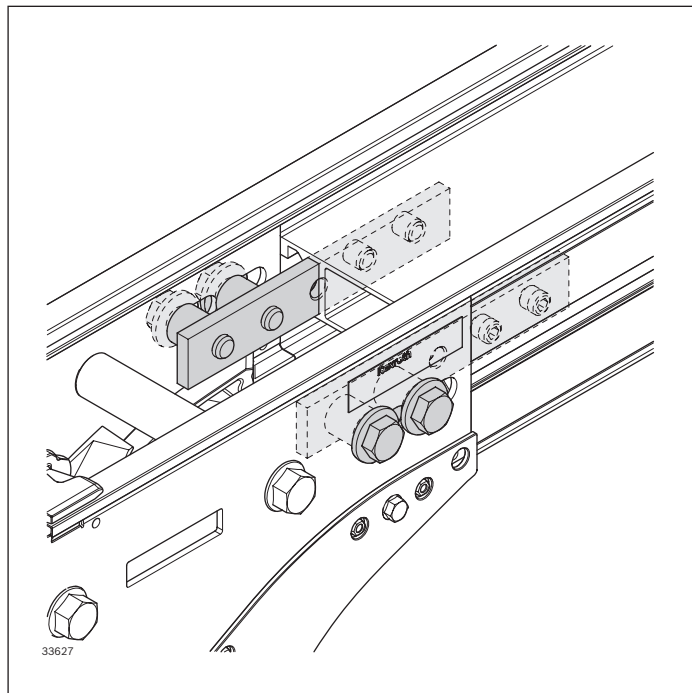
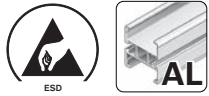
See also page 94

**Notice:** The selection of parameter AC = 1 (alpine conveyor) is not permitted





## Adapter AL-STS



The kit enables the simple connection of the basic unit head STS, connection drive, as well as the return unit with the aluminum system.

When the connection drive is used, the closed section profile AL is to be used for safety reasons.

Scope of delivery:

- 8x hexagon screws
- 8x headless setscrew
- 8x spacers

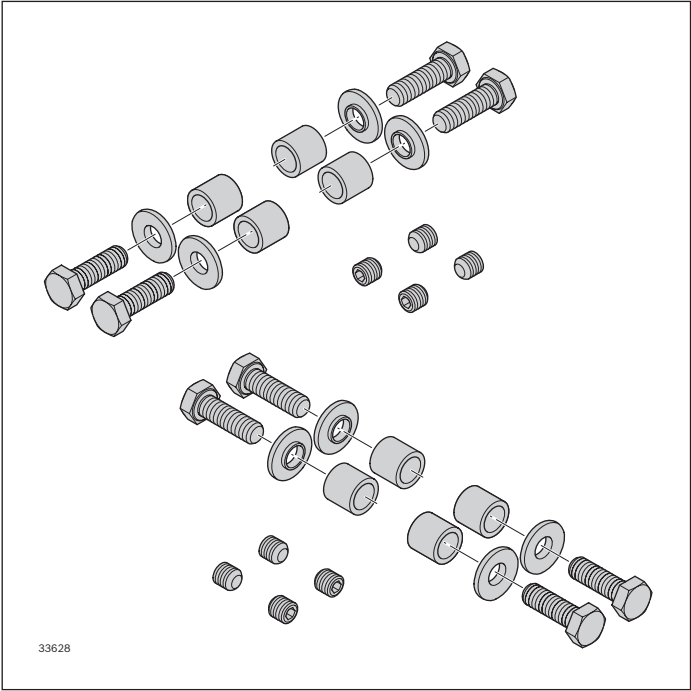
(Scope of delivery for 2 interfaces AI-STS, e.g. 1 x basic unit head drive + 1 x return unit or 1 x connection, or center drive)

Material:

- Aluminum, steel; galvanized

Condition on delivery:

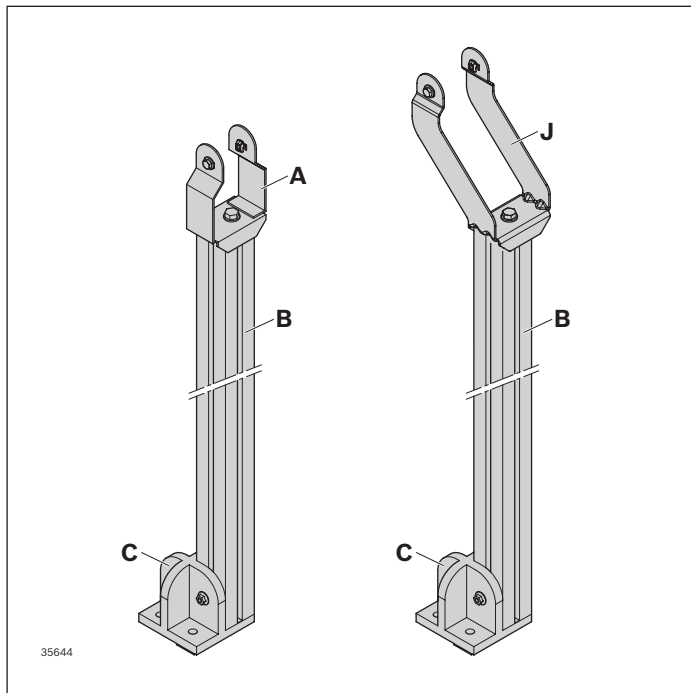
- Assembly required



Adapter VFplus AL-STS	No.
	3 842 552 948

# Leg set ESD

## Motor leg set ESD



The T-nuts STS included in the scope of delivery of the holder STS (**A**) must be replaced with T-nuts MGE M8. The anodized layer is thereby pierced and connected to the conductive holder STS.

It is imperative that a holder (**J**) is used to support the motors/drives.

The connection between the holders STS (**A+J**) and the core pull of the strut profile AL (**B**) is established via the hexagon screw M12 of the holder STS.

Instead of the coated foot VarioFlow *plus*, the 120x120 base plate (**C**) included in the MGE program must be used. The connection of the base plate to the strut profile is done using T-bolts and flange nuts.

Required accessories for base plate (**C**):

- 4x T-bolts M8x30, 3 842 528 721, see p. 64
- 4x flange nuts, 3 842 345 081, see p. 64

Required accessories for holder attachment (**A**):

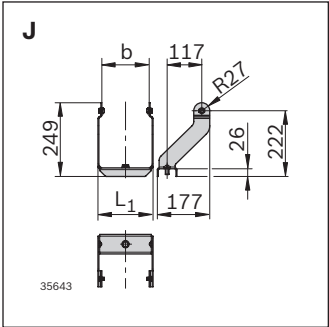
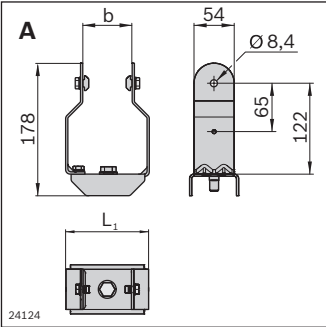
- 2x T-nuts M8 for each holder, 3 842 530 287


Scope of delivery:


- Including fastening material

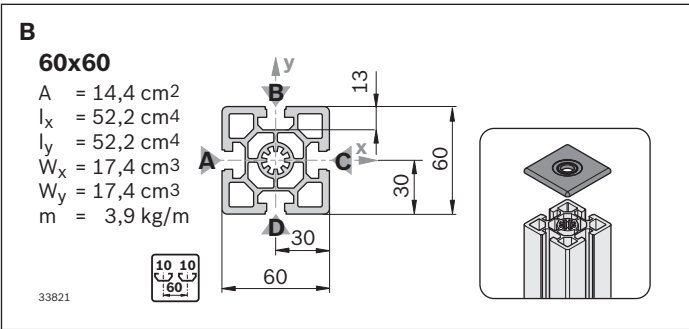
Material:


- **A, J:** Non-rusting steel 1.4301
- **B:** Aluminum
- **C:** Diecast aluminum




Holder STS (A)	b (mm)	L <sub>1</sub> (mm)	 No.
VFplus 65 support STS	65	111	Set <b>3 842 546 658</b>
VFplus 90 support STS	90	136	Set <b>3 842 546 659</b>


Holder STS (J)	b (mm)	L <sub>1</sub> (mm)	 No.
VFplus 65 drive STS	65	91	Set <b>3 842 559 114</b>
VFplus 90 drive STS	90	116	Set <b>3 842 559 115</b>




Strut profile 60x60	L (mm)	No.
1 pc M12 	60 ... 5600	<b>3 842 990 351/L</b>

Profile finishing: Thread cutting M12,  
see MGE catalog, chapter Strut profiles

Cover cap with hole	ESD 	No.
60x60, black	20	<b>3 842 548 811</b>

Base plate (C)	ESD 	No.
120x120		<b>3 842 527 553</b>

T-nut, 10 mm slot	Slot	M	ESD 	No.
Steel; zinc-plated	10	M8	100	<b>3 842 530 287</b>

