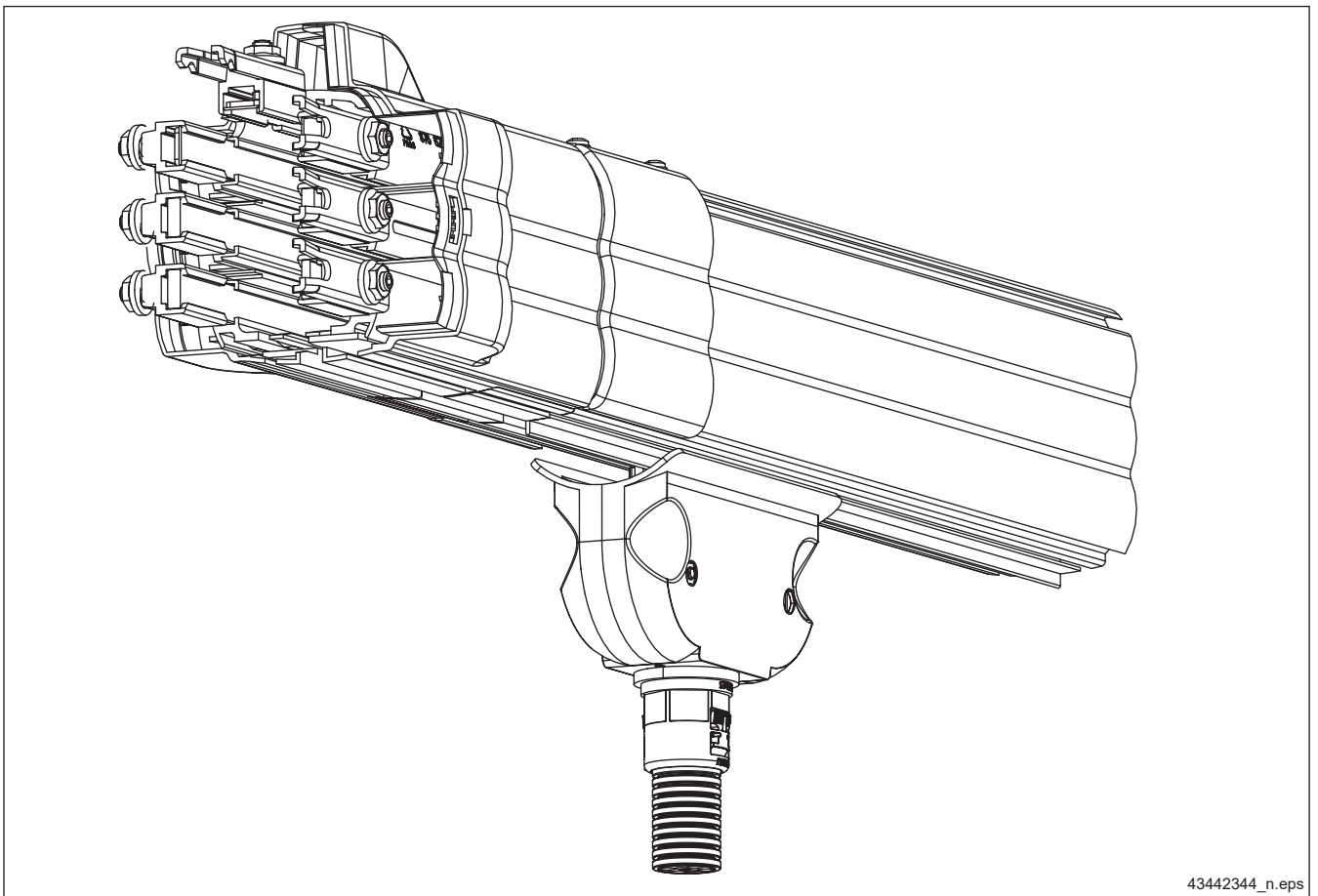


Technical data

Demag DCL-Pro compact conductor line



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Symbols

The following symbols and instructions warn against possible injuries or damage and are intended to assist you in your work.



DANGER.

This symbol indicates an immediate hazard which can result in serious injury or death.



WARNING.

This symbol indicates a possibly hazardous situation which might result in serious injury or death.



CAUTION.

This symbol indicates a possibly hazardous situation which might result in medium to light injury.



NOTE

Operating hazard for the installation.

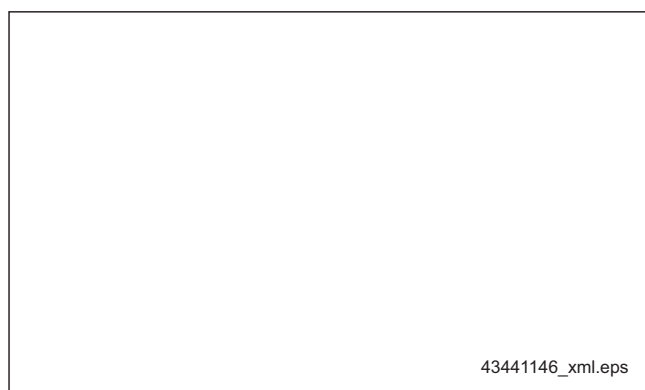
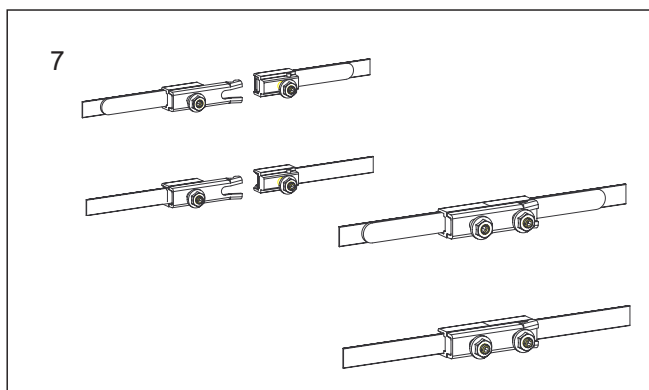
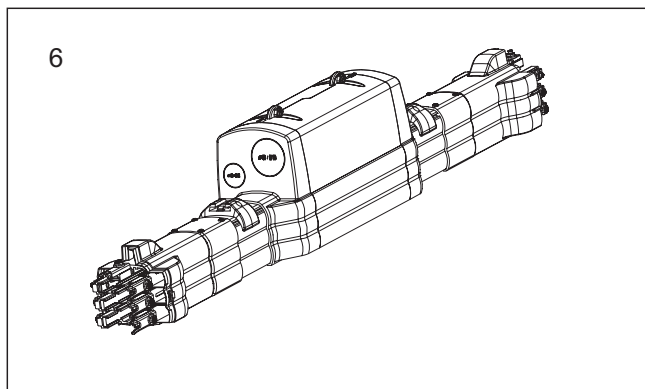
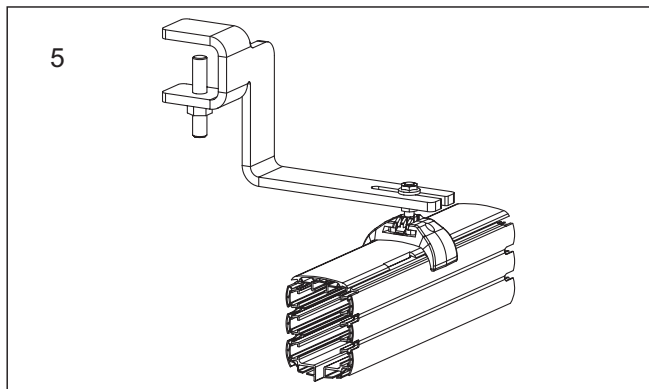
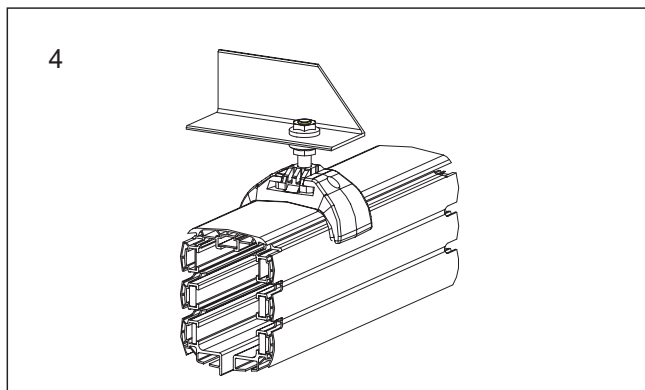
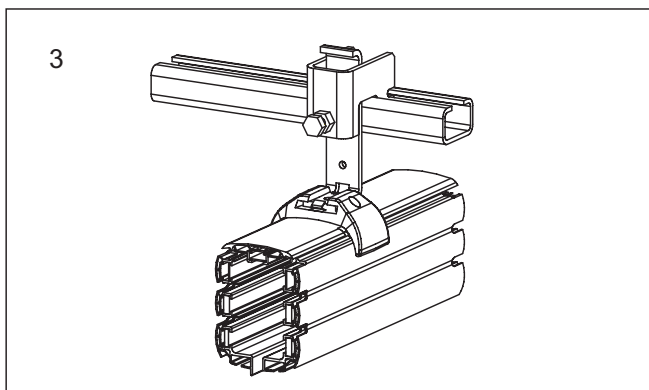
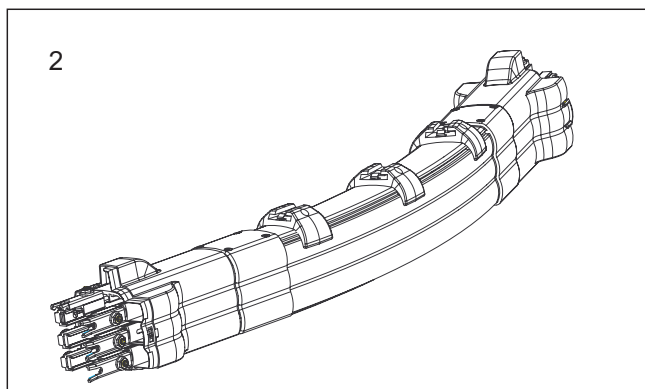
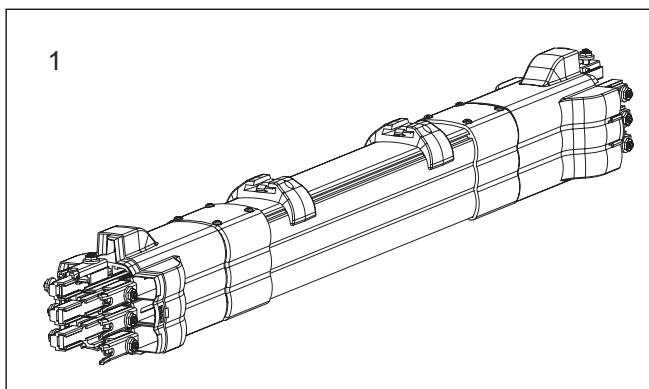
- This symbol indicates information on the appropriate use of the control installation.
- Failure to follow these instructions may result in malfunctions, damage or pollution of the environment.

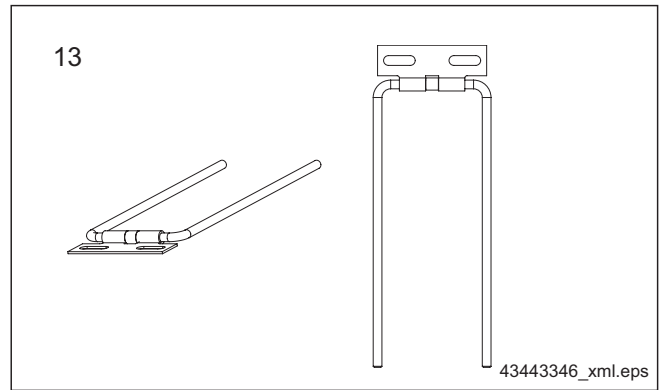
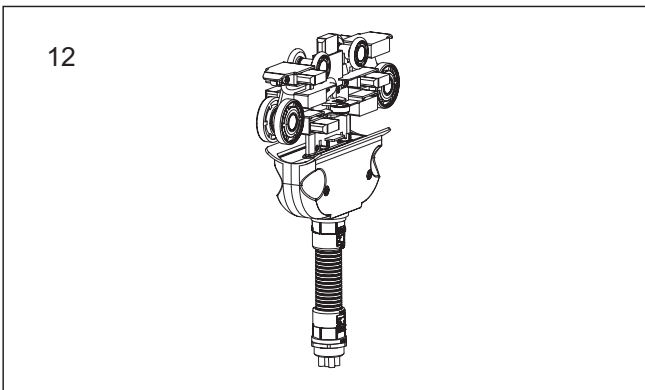
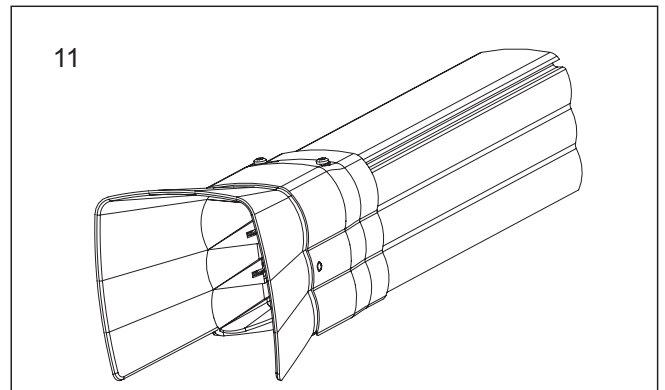
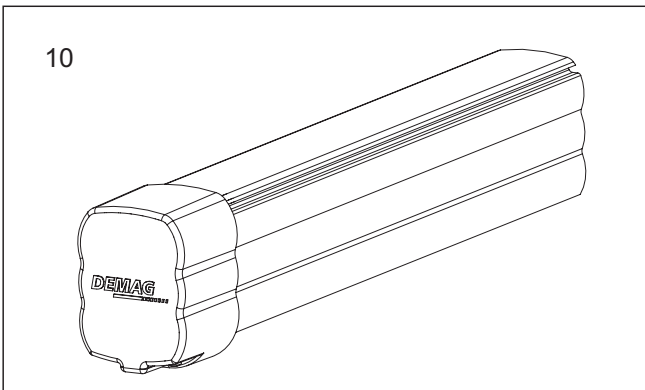
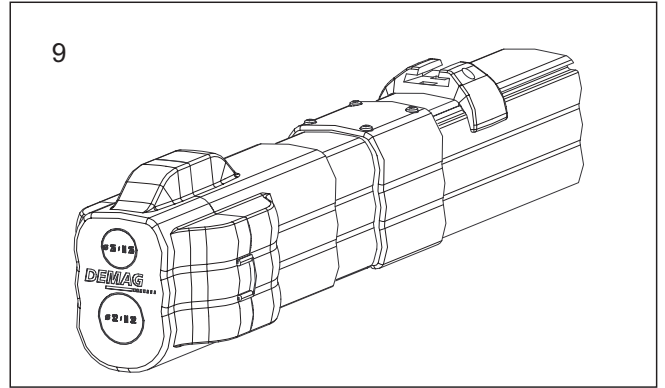
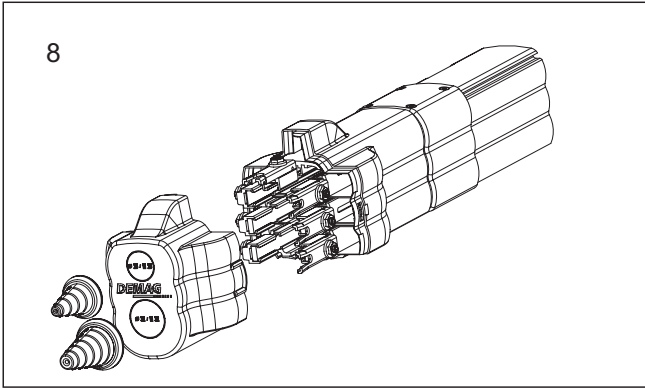
NOTE

This note provides you with useful information and is intended to assist you in your work when handling the installation.

1 General

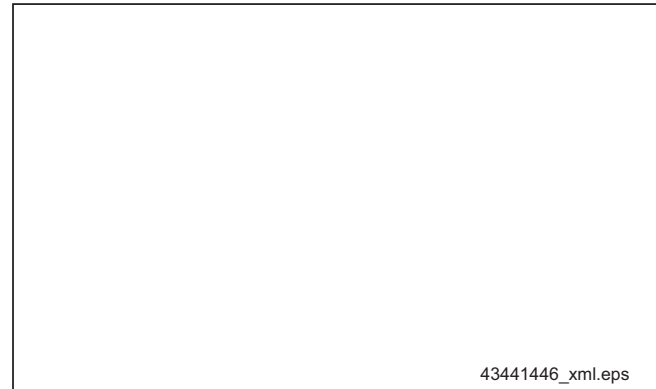
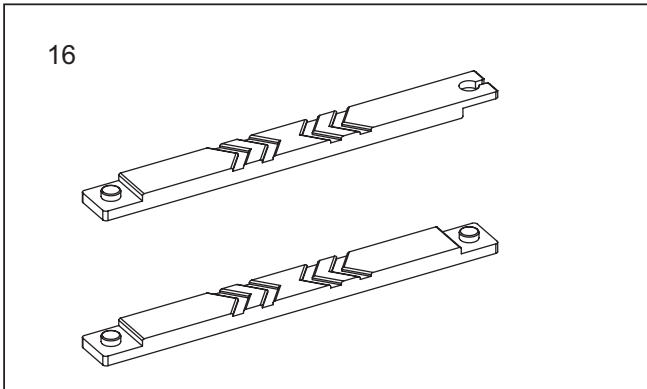
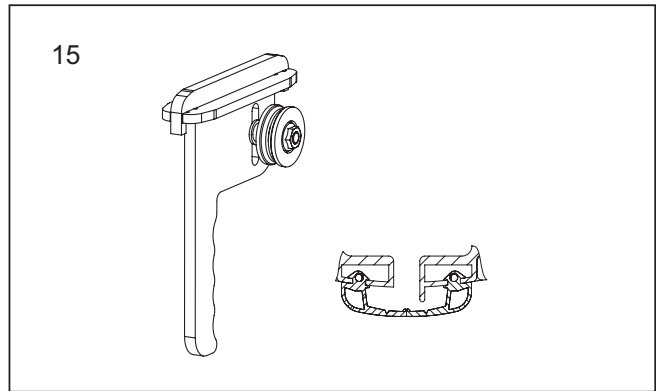
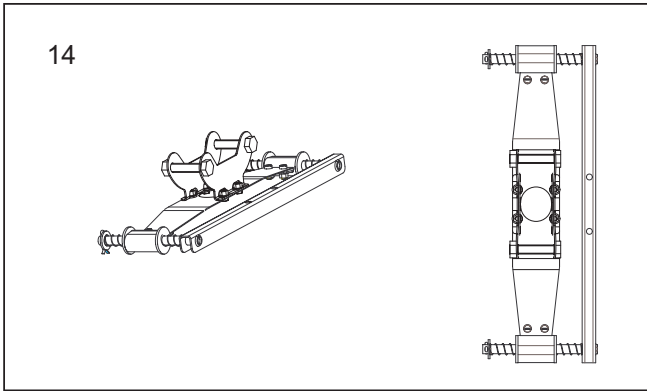
1.1 Components of the DCL-Pro power supply system





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- 1 Straight section
- 2 Curved section
- 3 Suspension from C-rail
- 4 Suspension with threaded pin
- 5 Suspension with retaining bracket
- 6 Line powerfeed
- 7 Conductor connector
- 8 Connector end cap for end powerfeed
- 9 Connector end cap for track end
- 10 End cap for track end
- 11 Entry/transfer ramp
- 12 Current-collector trolley
- 13 Towing arm (standard)



14 Towing arm for transfer points

15 Profile seal and insertion tool

16 Isolating sections

1.2 DCL-Pro model code

	Demag compact line	Component	No. of conductors/poles	Size	1)	PE conductor: Yes (PE) No (OPE)	Only for neutral conductor (N)	Length/radius [mm]	Angled connection cable	Angle [°]	Curve inside/ outside	Special project eng. (S)	
Straight track (installation)	DCL-Pro	-GB		-10									
Straight section		-GS	-4	-15									
Straight section with end cap left		-GSEKL	-5	-25 ⁵⁾	-VA	-PE -OPE	-N	-Section length				-S	
Straight section with end cap right		-GSEKR	-6	-38 ⁵⁾									
Line powerfeed		-ES	-7	-56 ⁵⁾									
End powerfeed		-AK-ES		-70 ⁵⁾									
End cap		-EK											
Connector end cap		-AK											
Entry/transfer ramp left 2), 3), 4)	DCL-Pro	-UTL	-4										
Entry/transfer ramp right 2), 3), 4)		-5	-25		-PE	-N	-500					-S	
		-UTR	-6		-OPE								
Curved track (installation)	DCL-Pro	-BB	-4	-10									
Curved section		-BS	-5	-15	-VA	-PE -OPE	-N	-R=Radius		-α=Angle	-BI -BA	-S	
			-6	-25									
			-7	-38									
			-7	-56									
		-70											
Current collector trolley	DCL-Pro	-SAWG	-4	-40									
Current collector trolley (universal) for straight and curved section travel		-SAWU	-5	-20		-PE		-Cable length	-W				-S
			-6	-40-M		-OPE							
			-7										
Towing arm for current collector (standard)		-MIT											
Towing arm for current collector (suitable for transfer sections)	-MITU												

Examples of rating plates

Straight section

DEMAG Demag Cranes & Components GmbH

DCL-Pro-GS-4-10-PE-4000mm

	I[A]	ED[%]	[mm ²]
U _{max} (VAC) 690	L1-L3 64	100	10
876 640 84	PE 64	100	10

CE

Made in Germany

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Current collector trolley

DEMAG Demag Cranes & Components GmbH

DCL-Pro-SAWG-4-40-PE-2000mm

U_{max} (VAC) 690

	I[A]	ED[%]	[mm ²]
L1-L3	40	80	6
PE	40	80	6

876 581 84

Made in Germany

CE

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- 1) -VA: only for 10 mm² stainless steel-plated rail
- 2) Only 25 mm² conductor cross-section
- 3) Neutral conductor only up to 25 mm² conductor cross-section
- 4) Stainless steel-plated rail not possible
- 5) Small line powerfeed not possible

1.3 DCL-Pro conductor line

DCL-Pro consists of a conductor rail system with a PVC enclosure.

The standard enclosure can accommodate 4, 5, 6 or 7 conductors/poles, depending on customer needs. Copper is used as the standard material for the conductors.

As an alternative to the standard conductor material, a stainless steel-plated copper conductor is available for a 10 mm² conductor cross-section. The special feature compared to copper is the highly-resistant stainless steel contact surface.

The stainless steel-plated copper rail is ideally suited for applications close to the sea, outdoors, in environments where chemicals are present or in installations used for only short periods.

Any oxidation of the sliding contact surface is avoided.

The available conductor cross-sections and materials are shown in the following table.

Conductor line							
Enclosure material		PVC					
Standard length	mm	4000					
Conductor/number of poles		4...7					
Max. distance between suspensions 1)	mm	1000 1) / 2000					
Voltage U _N	V AC	24 to 690					
Size/conductor cross-section 2)	mm ²	10	15	25	38	56	70
Permissible current (100% CDF up to 35 °C) 2)	A	65	80	100	130	175	200
Copper conductor		X	X	X	X	X	X
Stainless steel-plated conductor 3)		X	-	-	-	-	-
Ambient temperature/enclosure temperature	°C	-30 to +70					
Type of enclosure DIN VDE 0470 P.1/EN 60529	IP code	IP 23/IP 24 with profile seal					
Curved section smallest radius	mm	≥ 800 mm					
Flammability of the plastic enclosure		flame-resistant; self-extinguishing to UL94/V0; not halogen-free					
Current collector trolley							
No. of poles		4...7					
Sliding contact material		Bronze	Graphite	Silver graphite			
Rated current I _N (80% CDF)		40 A	20 A				
Connection cross-section for power connection (L1 (1), L2 (2), L3 (3), PE (4))	max. mm ²	6	4				
Connection cross-section for control cable (5/N, 6, 7)	max. mm ²	2,5					
Connection cable length (standard) 4)	mm	2000					
Max. fusing	A	100					
Max. travel speed	m/min	100 5) / 200					

1) With effect of heat on one side.

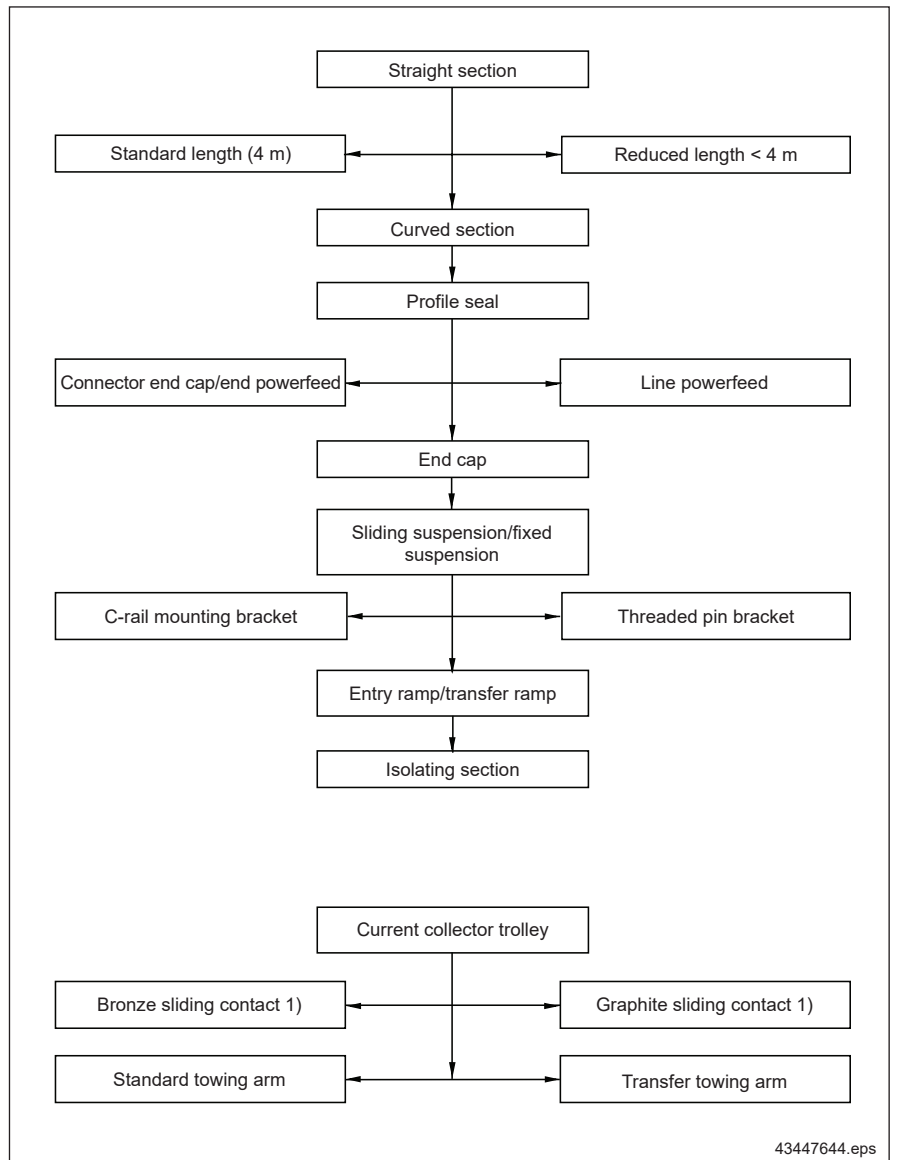
2) The voltage drop must be checked for installations that have large powerfeed sections and a high current load. See section 3 for calculation.

3) 10 mm² copper conductors plated with stainless steel on the contact surface.

4) Other cable lengths possible.

8 5) For straight sections with entry/transfer ramps.

1.4 DCL-Pro basic structure



1) As an option, the sliding contacts of the control conductors (poles 5, 6, 7) are available as silver-graphite sliding contacts in combination with bronze sliding contacts (poles 1, 2, 3, 4).

1.5 Compatibility between DCL and DCL-Pro

DCL-Pro conductor line is compatible with DCL. This means that it can also be used to supply components for and extend existing DCL track systems.

Extending existing DCL track systems/replacing individual DCL track sections with DCL-Pro

Owing to their interface geometry, DCL conductor line straight and curved sections can be combined with DCL-Pro straight and curved sections.

Components	Valid for type	Compatibility
Connector covers	DCL and DCL-Pro	1:1
10, 15, 25, 38 and 56 mm ² copper conductor	DCL and DCL-Pro	1:1
70 mm copper conductor	DCL-Pro	—

NOTE

DCL and DCL-Pro conductor connectors are **not** compatible with each other.

If a DCL track section is replaced by a DCL-Pro track section in an existing DCL system, the DCL conductor connectors adjacent to the DCL-Pro track section must be replaced by DCL-Pro conductor connectors.

If a section needs to be replaced within an installation, i.e. where there are DCL track sections on the left and right, then a DCL-Pro conductor connector set is required for each conductor rail.

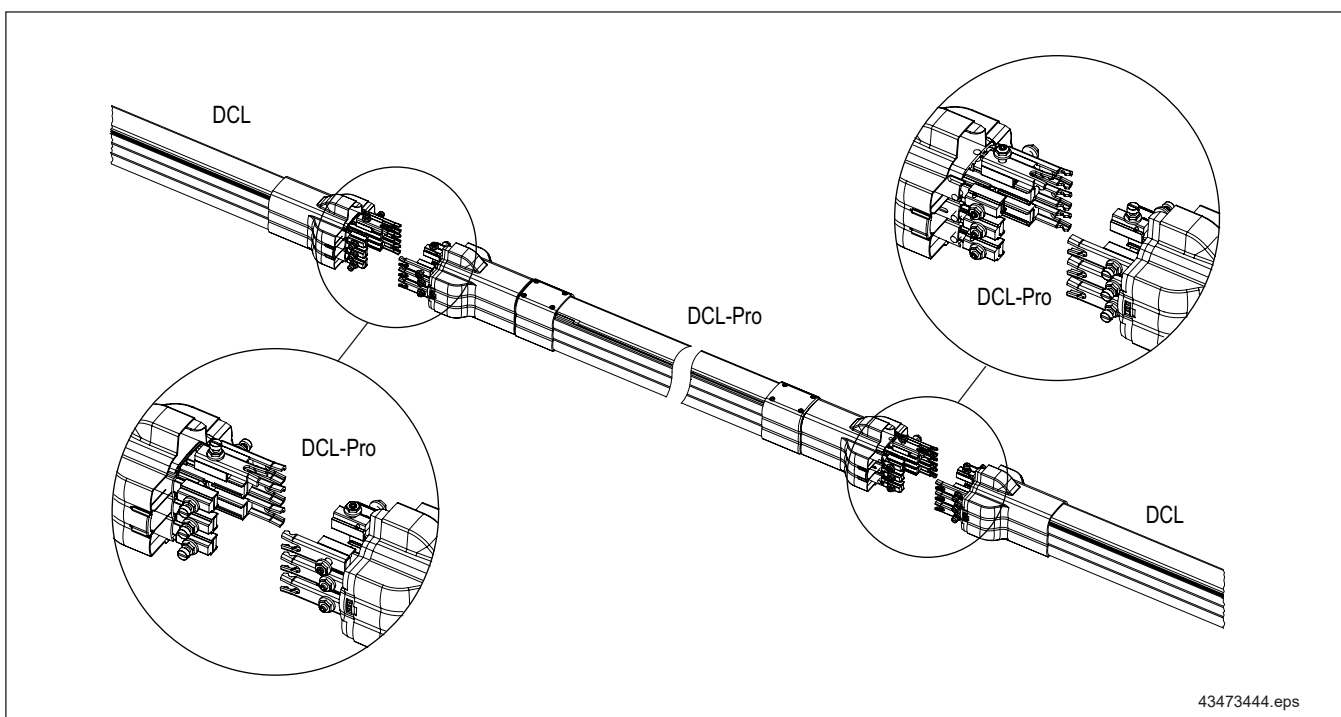
If a DCL installation is extended, i.e. with a connection only at one end, one DCL-Pro conductor connector set can be used for two conductors.

Required conductor connector sets when a DCL-Pro track section is installed in a DCL system:

Installation variant 1: installation with DCL track sections connected on the left and right

Installation variant 2: extension to an existing DCL installation, i.e. with a connection only at one end

Quantity of sets	4-pole	5-pole	6-pole	7-pole
Installation variant 1	4	5	6	7
Installation variant 2	2	3	3	4



Use of the new DCL-Pro current collector trolley in DCL installations

DCL-Pro current collector trolleys can be used in existing DCL installations. They feature the same max. permissible current, but have been adapted to meet the special requirements of straight and curved track layouts.

For straight track layouts, current collector trolleys are available with guide wheels featuring a wide wheel contour (current collector trolley for straight track layout – DCL-Pro-SAWG); for straight and curved track layouts, trolleys are available with guide wheels that have a narrow wheel contour (universal current collector trolley – DCL-Pro-SAWU).

Current collector trolleys previously used for DCL can also be used in DCL-Pro installations.

2 Design and installation notes

Please note:

Conductor lines must be operated in accordance with generally accepted engineering standards. The regulations according to DIN VDE / EN, SEV, CSA and UL must be complied with. We expressly refer to the DIN VDE regulations, in particular DIN VDE 0100.

From the various regulations, we refer to the following specifications:

see DIN VDE 0100, part 200

2.1 Definitions

2.1.1 Arm's length

Arm's length is the area which a person's hand may reach in all directions from normal locations without any special equipment. Measured from the position where a person is standing, their reach is considered to be at least 2,5 m high and at least 1,25 m to the side and below (see DIN 31 001 Sheet 1).

For places where objects are moved which are normally long or bulky and which are not isolated from the operating voltage, the minimum arm's length distance must be increased accordingly.

2.1.2 Protection against indirect contact

Protection against direct contact constitutes all measures to protect people from hazards resulting from contact with live parts of electric equipment. This may be partial or full protection.

In the case of partial protection, only protection against accidental contact is provided. Protection against accidental contact does not mean any protection against deliberate contact.

IP 2X type of enclosure to DIN VDE 0470 p.1 provides protection against accidental contact. Complete protection only starts with IP 5X to DIN VDE 0470 T.1.

A current collector trolley only has protection against accidental contact when it is located completely inside the conductor line system.

Conductor line systems in which the current collector trolley leaves the conductor line in normal operation and, therefore, may be within hand's reach, must be provided by protection against accidental contact by the customer.

Measures for example: barriers or cut-off.

3 Calculation and selection of the conductor cross-section

Voltage drop 1. and permissible current 2. must be considered when calculating power supply cross-sections.

1. – Calculate the cross-section considering the max. permissible voltage drop of 2,5% for crane runways + 2,5% for crane bridge.
 - The relevant value is starting current $\cdot \cos \varphi_A$ of the largest motor + rated current $\cdot \cos \varphi_N$ of the next smaller motor.
 - The currents must be added for motors connected in parallel. The calculated cross-sections must be halved for power supplies to solo hoists.
2. – Calculate the cross-section considering the max. permissible current for cables to DIN VDE 100 Part 430/523.
 - The relevant value is the sum of all rated currents of all drives. The currents in the diagram in section 3.1.2 must not be exceeded.

Permissible voltage drop

Voltage drop is determined by current I_G .

Current I_G results from adding the starting ($I_A \cdot \cos \varphi_A$) and rated currents ($I_N \cdot \cos \varphi_N$) (see table 1 below).

The conductor cross-section may be determined according to the calculation method described in section 3.1.1 or the diagram in section 3.1.2.

Table 1 indicates the number of consumers to be considered for calculating I_G depending on the number of cranes fed by a conductor line.

Table 1

Number of cranes fed by a conductor line	Of all cranes taken together (in order of output)			
	1st motor	2nd motor	3rd motor	4th motor
1	$I_A \cdot \cos \varphi_A$	$I_N \cdot \cos \varphi_N$	-	-
2	$I_A \cdot \cos \varphi_A$	$I_N \cdot \cos \varphi_N$	$I_N \cdot \cos \varphi_N$	-
3	$I_A \cdot \cos \varphi_A$	$I_A \cdot \cos \varphi_A$	-	-
4	$I_A \cdot \cos \varphi_A$	$I_A \cdot \cos \varphi_A$	$I_N \cdot \cos \varphi_N$	-
5	$I_A \cdot \cos \varphi_A$	$I_A \cdot \cos \varphi_A$	$I_N \cdot \cos \varphi_N$	$I_N \cdot \cos \varphi_N$

Accordingly for double drive units: $2 \cdot I_A \cdot \cos \varphi_A$ or $2 \cdot I_N \cdot \cos \varphi_N$.

Exception: For double hoist units with delayed starting

$$I_A \cdot \cos \varphi_A + I_N \cdot \cos \varphi_N.$$

3.1 Calculating the conductor cross-section

3.1.1 Calculation method

Abbreviations used in the equations

A	=	Conductor cross-section of the DCL-Pro	[mm ²]
L	=	Cable length	[m]
I	=	Starting current ($I_A \cdot \cos \varphi_A$) or rated current ($I_N \cdot \cos \varphi_N$)	[A]
I_G	=	Sum total of currents according to table 1	[A]
f	=	Frequency in Hertz	[Hz]
χ	=	Conductivity (for $\chi_{Cu} = 56$)	[m/Ωmm ²]
ΔU	=	Permissible voltage drop	[V]
U	=	Voltage in volts	[V]

1. DCL-Pro conductor cross-section $A = \frac{1,73 \cdot L \cdot I_G}{\Delta U \cdot \chi}$ [mm²]

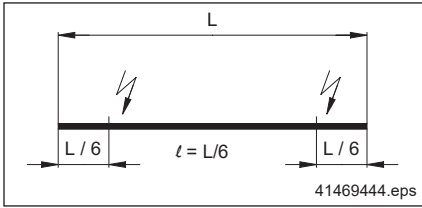
2. Required cable length $L_1 = \frac{\Delta U \cdot \chi \cdot A}{1,73 \cdot I_G} \cdot \frac{f_2}{f_1}$ [m]

3. Conversion for starting current $I_A \cdot \cos \varphi_A$ or rated current $I_N \cdot \cos \varphi_N$ $I_2 = \frac{U_1 \cdot I_1}{U_2}$ [A]
for non-standard voltage U

4. Conversion for conductor cross-section A_2 for non-standard conductor length L_2 $A_2 = \frac{L_2 \cdot A_1}{L_1}$ [mm²]

5. Permissible voltage drop $\Delta U = 2,5\% = 10 \text{ V (for 400 V)}$
 $\Delta U = \frac{U \cdot 2,5\%}{100\%}$ [V]

6. Conversion from 400 V, 50 Hz to new voltage and frequency $I_{new} = I_{old} \cdot \frac{400 \text{ V}}{U_{new}} \cdot \frac{f_{new}}{50 \text{ Hz}}$ [A]



The conductor cross-section or the voltage drop may be reduced by the position and number of power feeds.

l = Powerfeed length

L = Conductor line length

$l = L$ For end powerfeed

$l = L/2$ For centre powerfeed

$l = L/4$ For end powerfeed at both ends

$l = L/6$ For line powerfeed section, $L/6$ from the ends, each

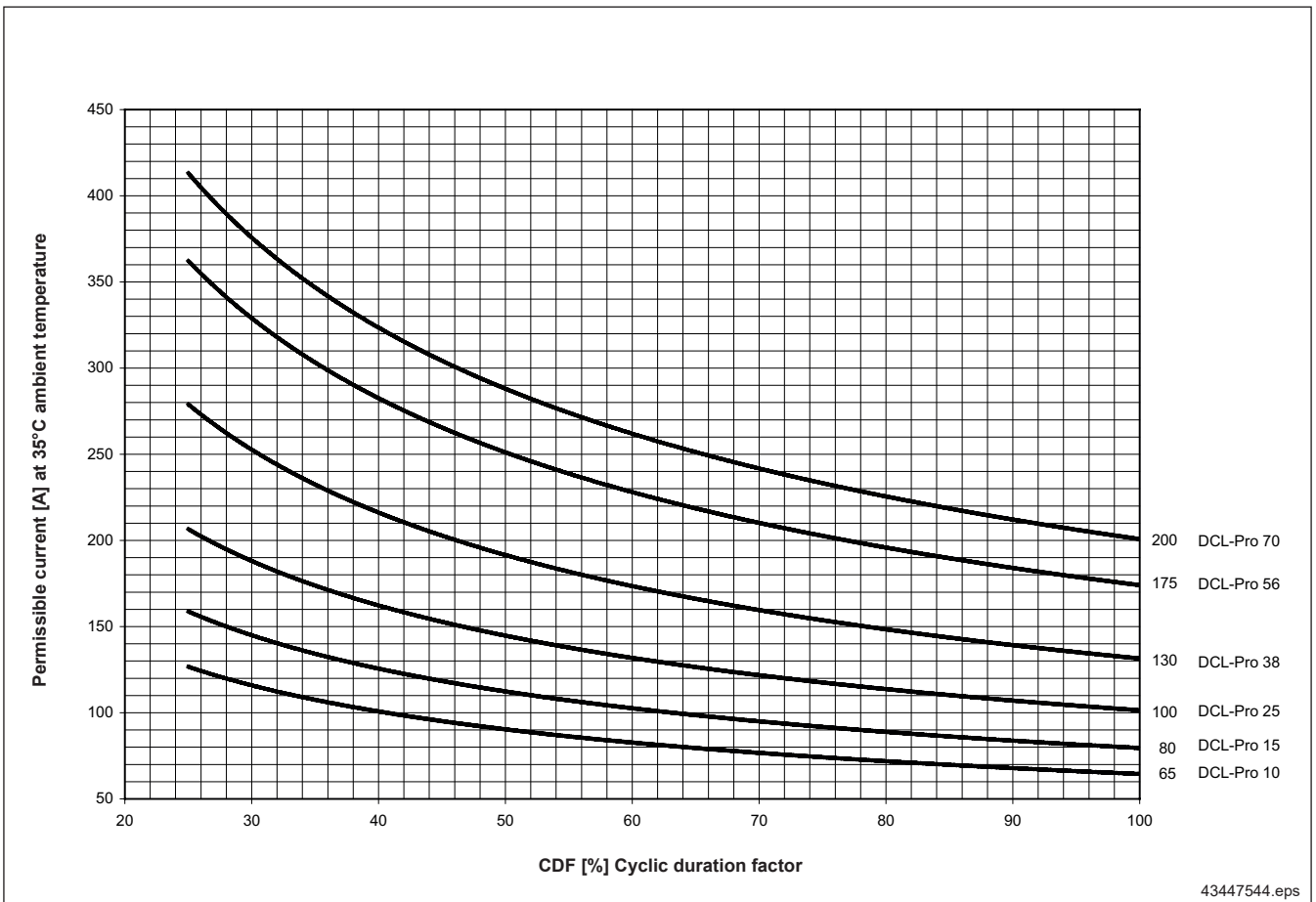
$l = L/10$ For centre powerfeed and line powerfeed, $L/10$ from the ends, each

3.1.2 DCL-Pro maximum permissible current I_{35} [A] for an ambient temperature of 35 °C

Check the maximum permissible current for the conductor cross-section as a function of the cyclic duration factor (CDF) at an ambient temperature of 35 °C.

For other ambient temperatures, the current (I_{ϑ}) must be calculated with the conversion factor (f_u) according to the table below.

The same or the next largest conductor cross-section must be selected.



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Calculating the maximum permissible current I_{ϑ} [A] for other ambient temperatures

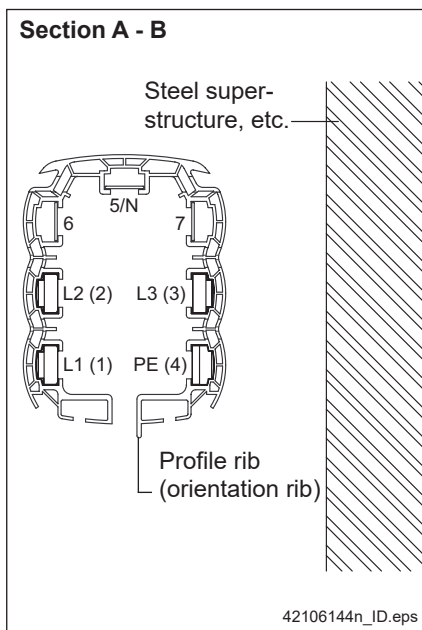
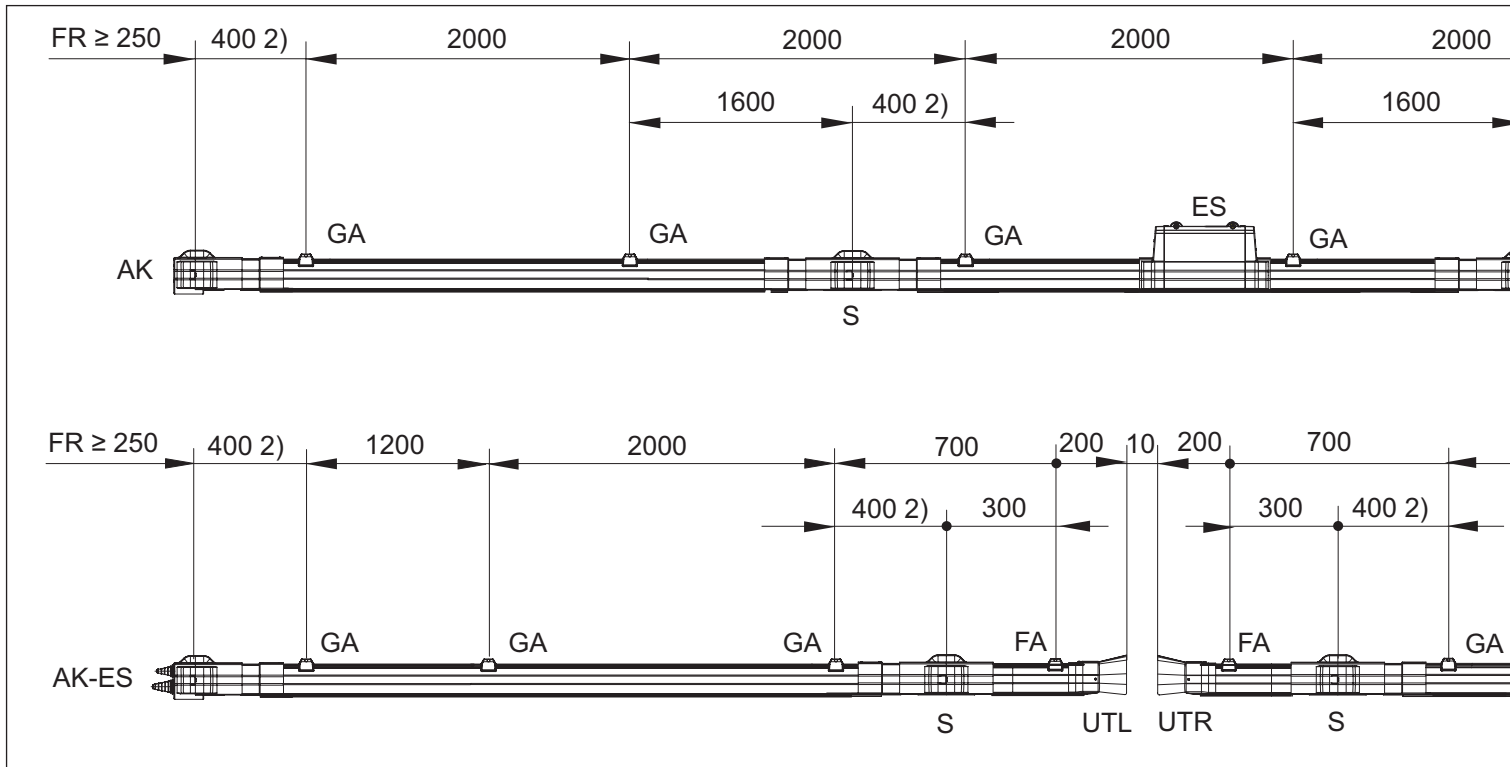
Ambient temperature	ϑ [°C]	20	25	30	35	40	45	50	55	60	65
Conversion factor	f_u	1,14	1,09	1,05	1,00	0,92	0,86	0,78	0,72	0,64	0,55
CU cross-section	mm ²	10, 15, 25, 38, 56, 70									

Permissible current

$$I_{Tempnew} = I_{35C} * f_u$$

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4 General layout/suspension arrangement



Abbreviation	Designation	Section	Dimensions
AK	Connector end cap as track end cap	6.6	
AK-ES	Connector end cap as powerfeed	6.5	
BS	Curved section	6.3	R ≥ 800 mm
EK	End cap	6.7	
ES	Line powerfeed	6.4	4000 mm
FA	Fixed suspension	5.2	
FR	Clearance	-	
GA	Sliding point suspension	5.2	
GS	Straight section	6.1	4000 mm
	Towing arm 3)	6.10.1	
	Towing arm for transfer sections 3)	6.10.2	
S	Joint connection	-	
	Current collector trolley 3)	6.9	
UTL or UTR	Entry/transfer ramp	6.8	

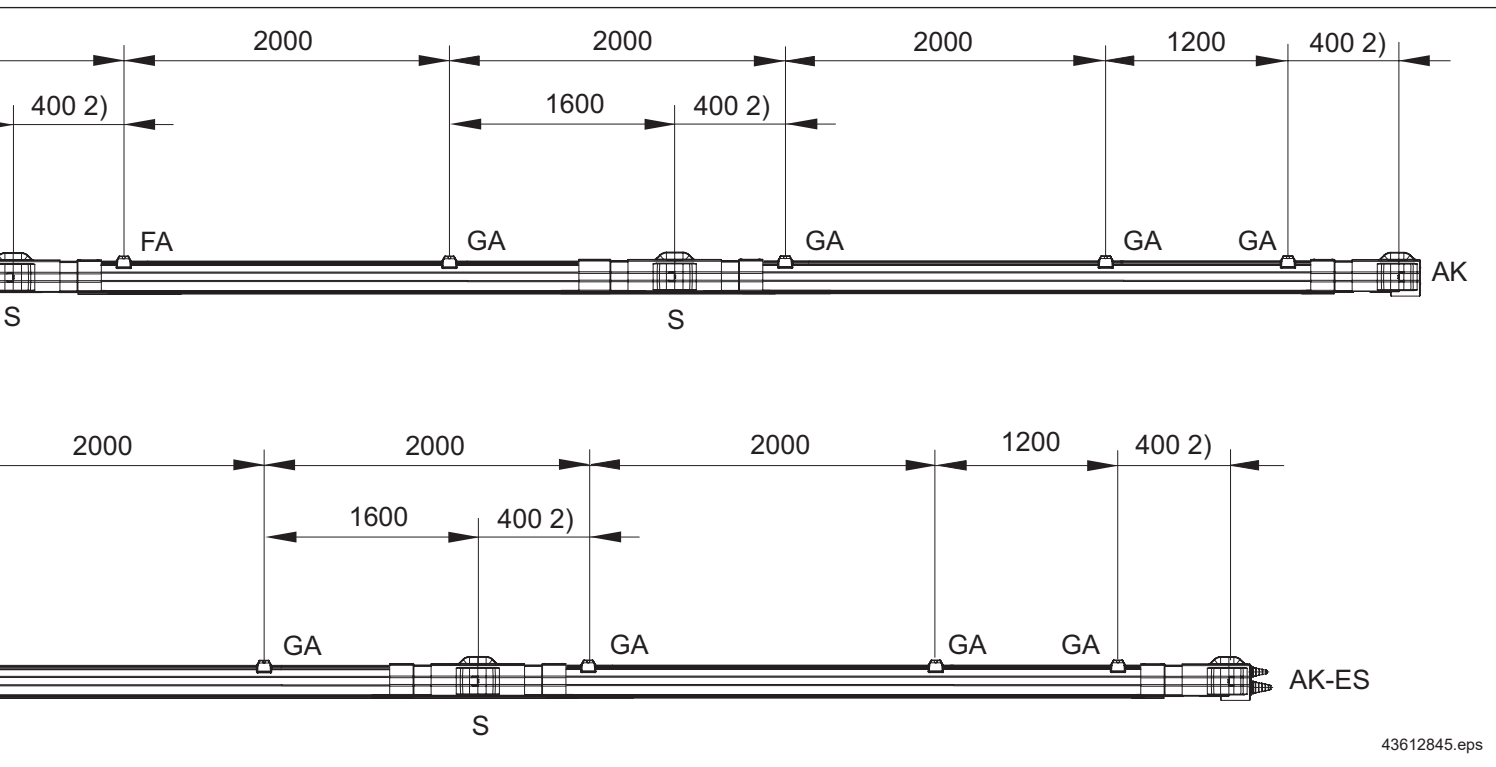
Note.

In place of an AK connector end cap,

- an entry/transfer ramp
- or a track extension may be fitted.

An additional suspension must be installed at a distance of 200 mm if an entry or transfer ramp is fitted.

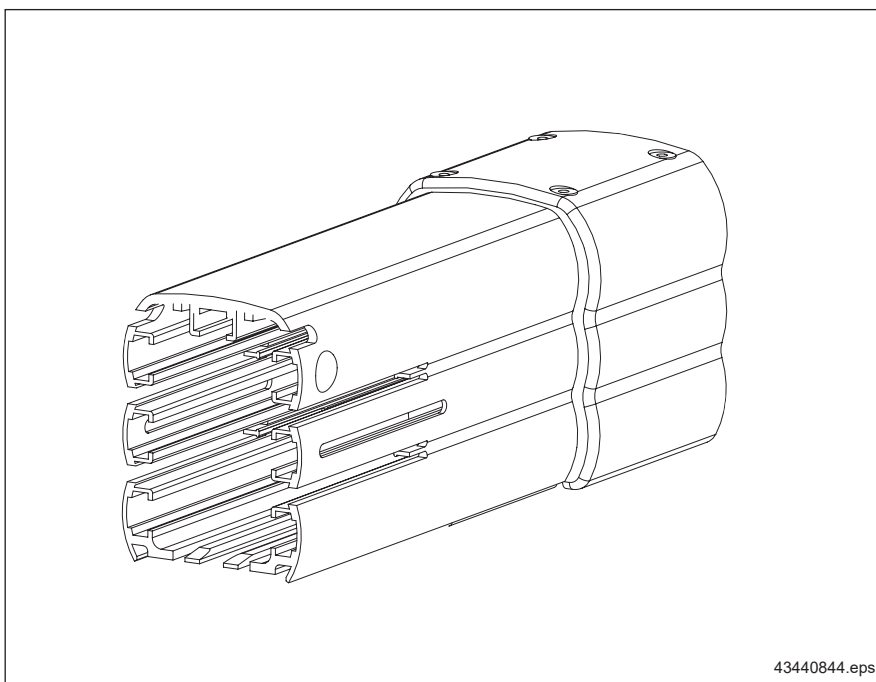
- 1) When large cable cross-sections (as of size M50) are used with a DCL-Pro section with a line powerfeed, a third additional sliding suspension must be fitted close to the powerfeed enclosure.
- 2) The minimum permitted distance between a GA sliding suspension and an S joint connector is 325 mm. The maximum distance is 400 mm (sliding range 325 mm–400 mm). Due to the thermal elongation of the copper conductors and the enclosure profile, particularly for long track lengths and large changes in temperature, the suspensions must be installed at a maximum distance of 400 mm.
- 3) Not shown



Connector cover adapter

In general, a DCL-Pro track system is designed precisely for the geometry of the installation. Therefore, it does not usually need to be modified at a later date.

The length of a straight section or track can, however, be adapted at a later stage on site by means of the connector cover adapter. The set for shortening the enclosure profile part no. 876 645 44 is available for this purpose.



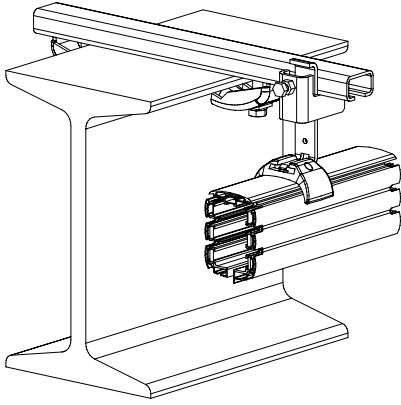
The connector cover adapter of the conductor line establishes the connection between enclosure profile and connector cover.

5 Suspension arrangements

5.1 Suspension with C-rail bracket

5.1.1 Sliding suspension

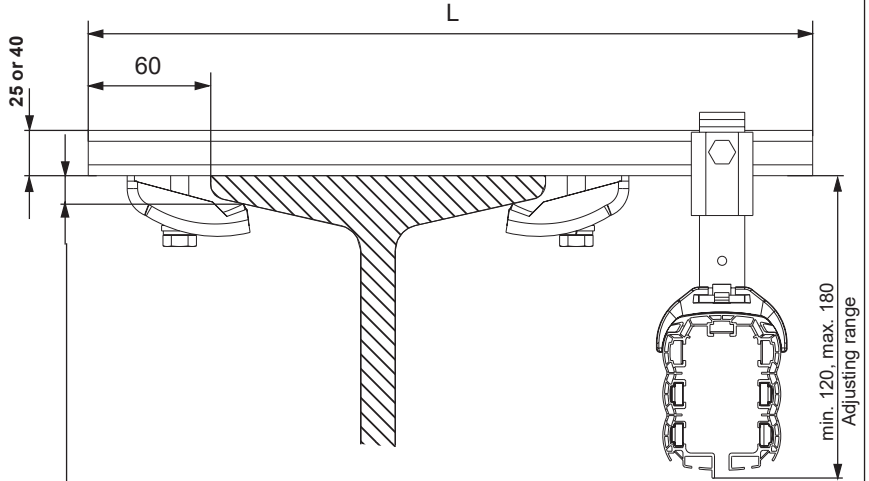
Attachment to upper flange I



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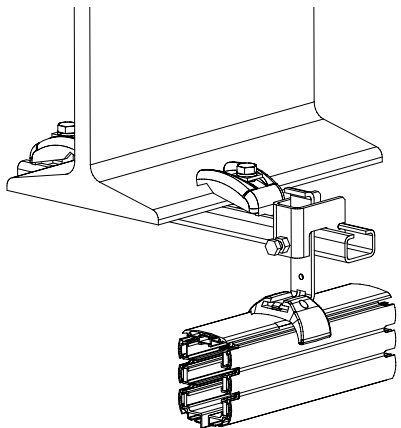
Flange clamp

Clamping range	Ident. no.
8 to 16 mm	974 548 44
16 to 30 mm	974 549 44

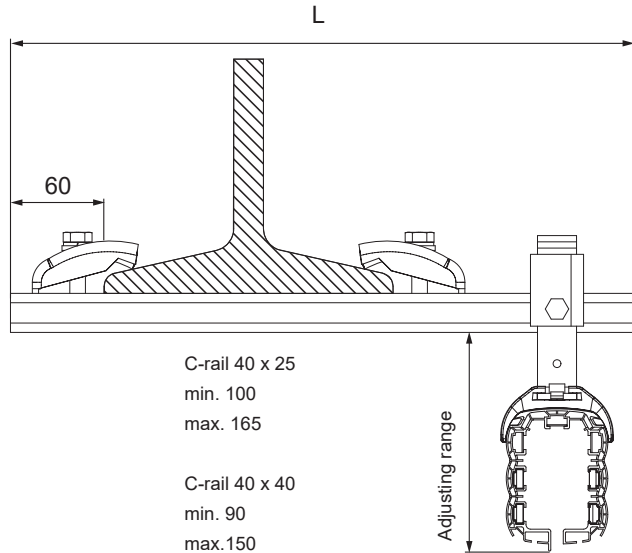


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Attachment to lower flange II



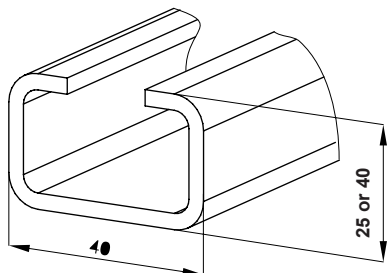
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C-rail 40 x 25
min. 100
max. 165

C-rail 40 x 40
min. 90
max. 150

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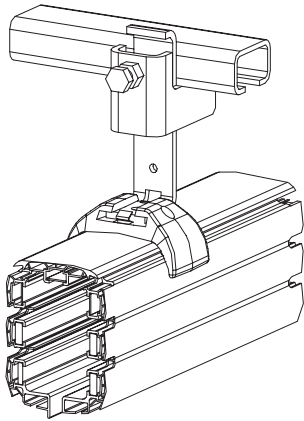


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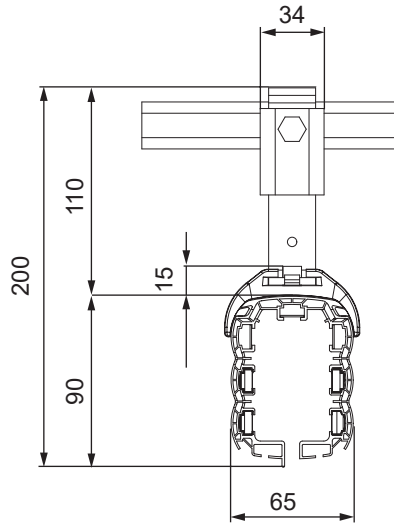
Part no. for C-rail 40 x 25	
L= 300	968 427 44
L= 500	850 184 44
L= 600	974 550 44
L= 700	974 551 44
L= 800	974 552 44
L= 920	974 553 44

Part no. for C-rail 40 x 40	
L= 1000	974 554 44
L= 1500	974 555 44
L= 1820	958 521 44

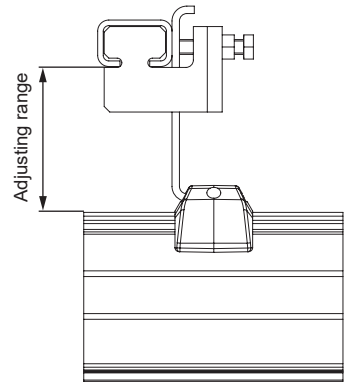
5.1.2 Mounting and operating dimensions



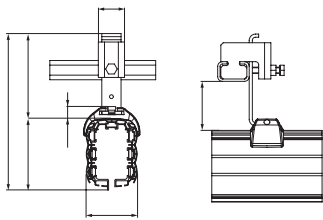
42106344_n.eps



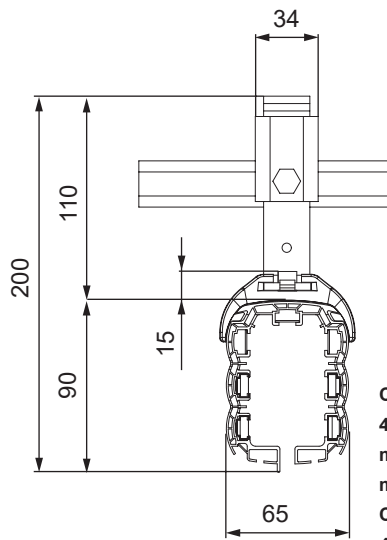
min. 30
max. 90



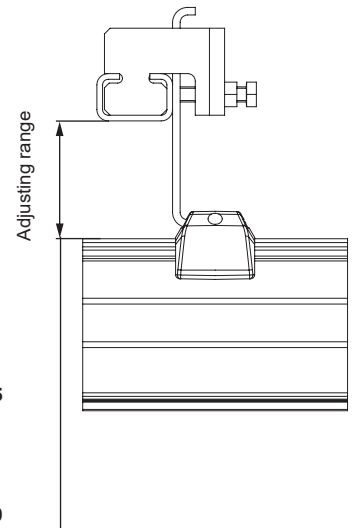
42206344_n.eps



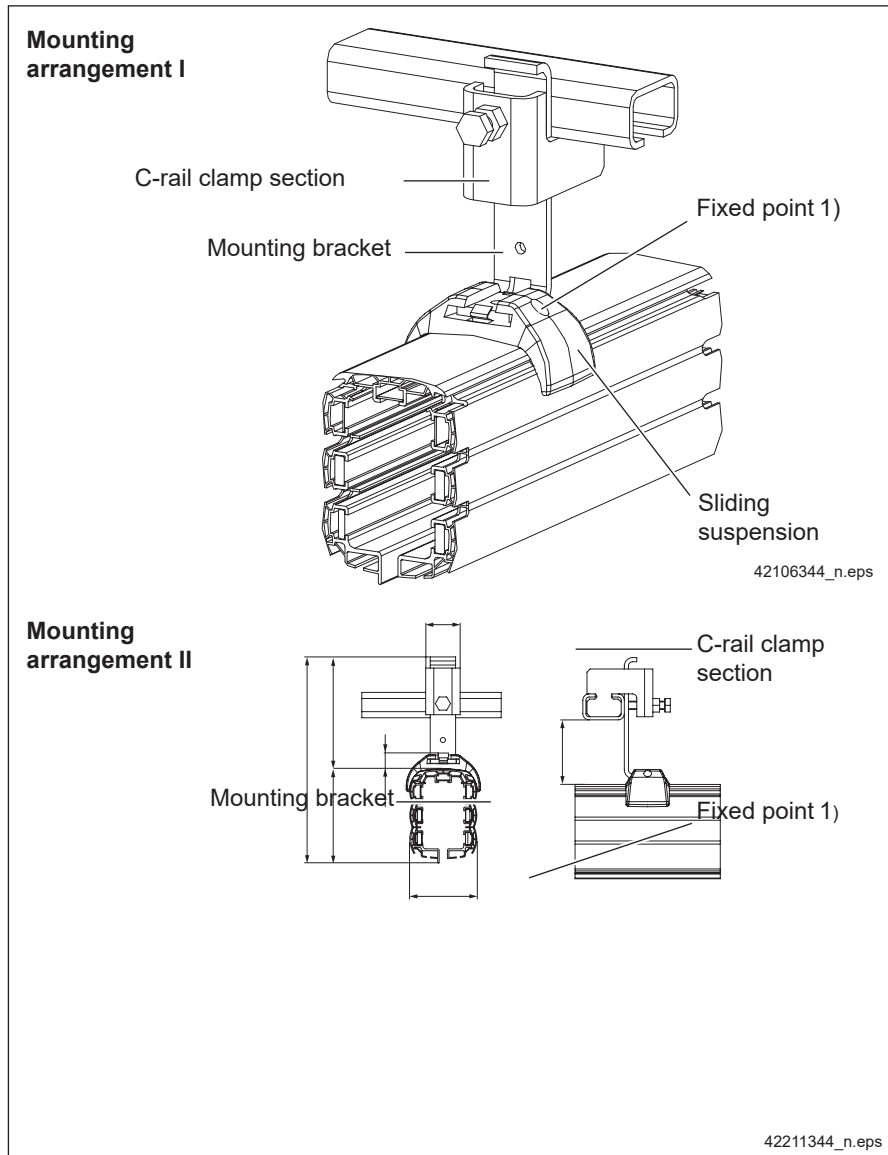
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C-rail
40 x 25
min. 10
max. 75
C-rail
40 x 40
min. 0
max. 60



42211244_n.eps



Component set for sliding suspension with C-rail bracket	Order no.
1 off C-rail clamp section	876 638 84
1 off mounting bracket	
1 off sliding suspension	

The following information is required for ordering C-rails and flange clamps for installation on I-beams:

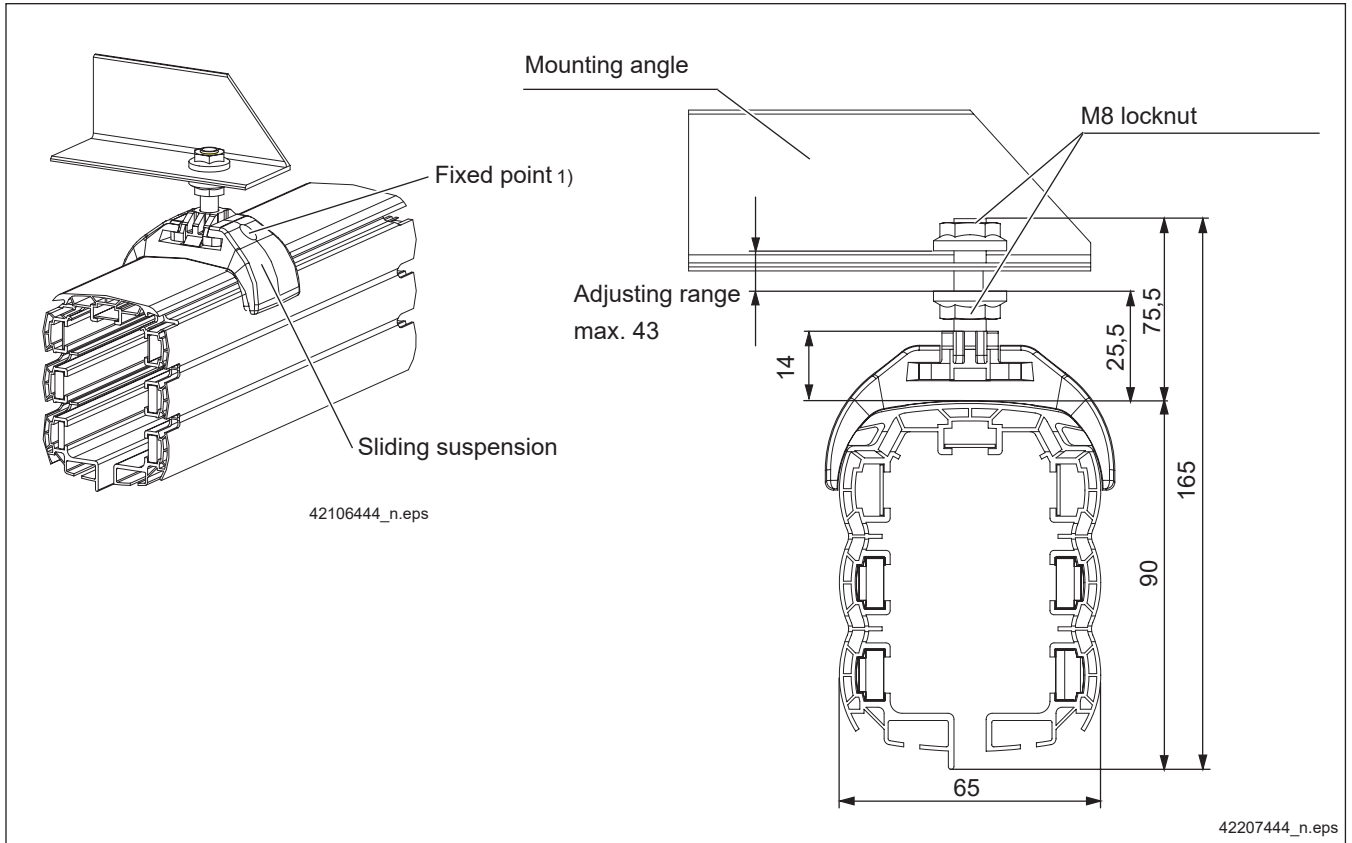
- C-rail type and length (see table on page 16).
- Flange clamps for I-beams (see below).

Girder width	Clamping range	Order no.
I 160 - I 400	8 - 16 mm	974 548 44
I 425 - I 600	16 - 30 mm	974 549 44

1) Only for fixed suspension. A fixed suspension is a sliding suspension which is fixed on the profile section by means of a self-tapping screw. 3,5 x 9,5 self-tapping screw to DIN 7981

5.2 Suspension with M8 threaded pin

5.2.1 Mounting and operating dimensions, sliding suspension



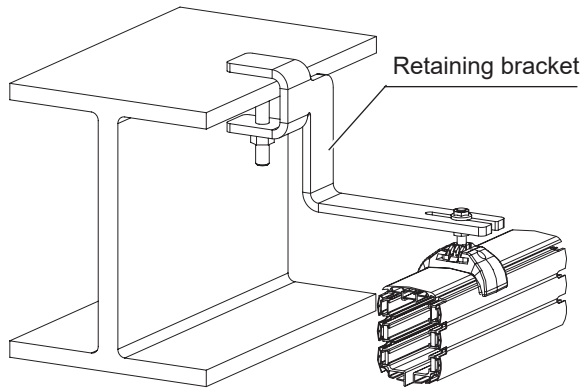
Component set for sliding suspension with M8 threaded pin	Order no.
1 off threaded pin fitting	876 637 84
1 off M8 x 70 countersunk screw	
2 off M8 locknut	
1 off sliding suspension	

5.3 Suspension with retaining bracket and M8 threaded pin

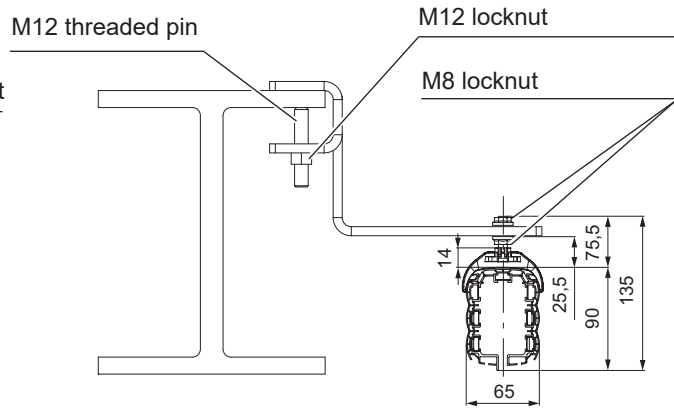
5.3.1 Mounting and operating dimensions for IPE and INP girders

IPE girders:

Attachment to upper flange

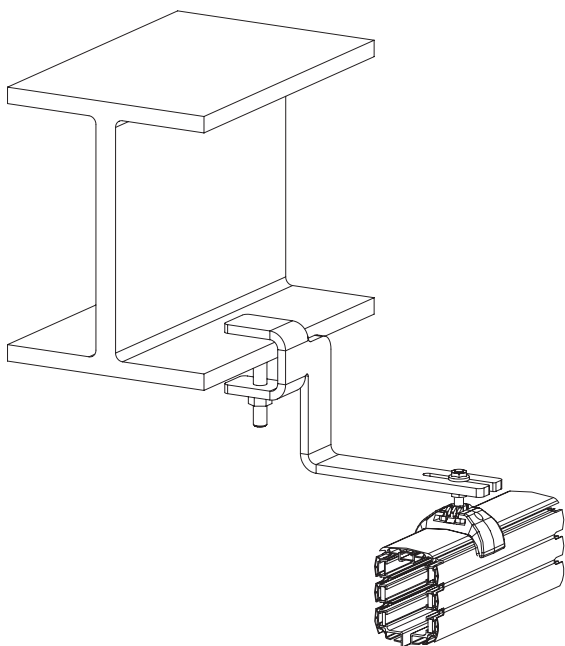


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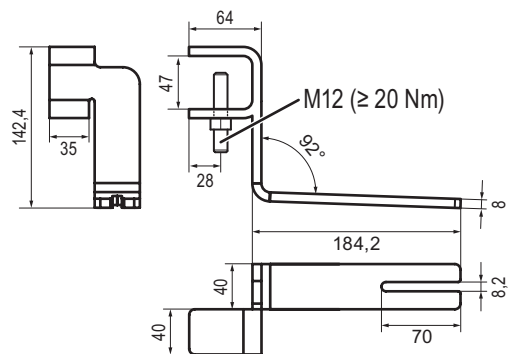


43613444.eps

Attachment to lower flange



43613144.eps

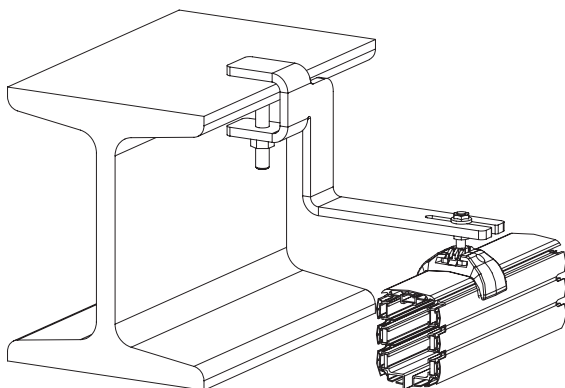


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DCL-Pro I-profile retaining bracket	Order no.
1 off retaining bracket	876 921 84
1 off M12 threaded pin with cup point (≥ 20 Nm)	
1 off M12 locknut	

INP girder:

Attachment only on upper flange



43613244.eps

5.4 Further fitting information

- Straight sections feature plastic sliding suspensions for connection to C-rail or threaded pin fittings.
- Line powerfeeds feature an additional sliding suspension.
- For C-rail fittings:
 - The mounting brackets must be clipped into the sliding suspensions.
 - The C-rail clamp section must be fitted according to mounting arrangement I or II (see section 5.1.1).
- For threaded pin fittings:
 - The threaded pin fitting with countersunk screw must be clipped into the sliding suspensions.
- The max. distance between the sliding suspensions is 2000 mm for straight sections.
- Sliding suspensions must be fitted every 500 mm (along the curve) for curved sections.
- The centre of every DCL-Pro installation must be secured by a fixed suspension.

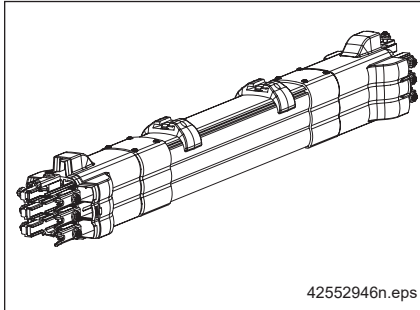
To do this, screw a 3,5 x 9,5 self-tapping screw into the sliding suspension. The transfer ramps must be fixed in place for DCL-Pro installations that have entry/transfer ramps.

Also see section 4 “General layout/suspension arrangement”

6 Technical data

6.1 Straight section

6.1.1 Basic variants



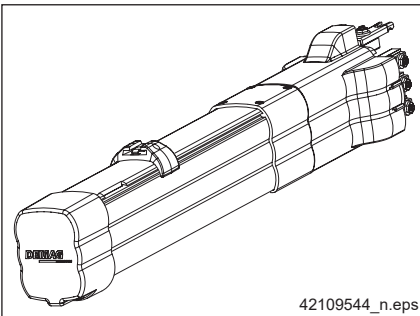
A distinction is made between two basic types of straight sections:

- single straight section
- straight section with end cap left or end cap right

Straight section

The straight section measures between 710 mm and 4000 mm in length (standard length). Straight sections with a length of less than 4000 mm are referred to as shortened lengths.

The straight section is provided with conductor connectors and connector covers on both ends which can be used to connect other DCL-Pro track elements on either side. It can therefore be integrated direct into existing installations – in the middle as well as at one end of the installation. In combination with a connector end cap with rubber sleeves (see section 6.5), it can be used as an end powerfeed.

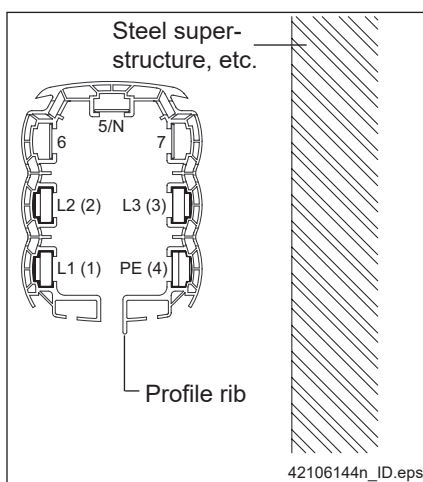


Straight section with end cap (fitted in the factory)

Straight sections with end cap only have conductor connectors on one side for assembly to other track elements. An end cap is fitted on the other end. A straight section with end cap is always shorter than 4000 mm. The min. length is 710 mm and the max. length is 3805 mm owing to the design.

A distinction is made between a straight section with “end cap left” and a straight section with “end cap right”. The definition of “left” and “right” is based on the side of the enclosure profile where the profile rib is located when you look at the side of the end cap.

6.1.2 Variants



Note

Unless the installation is designed otherwise, it must be ensured that all DCL-Pro straight and curved sections are fitted in such a way that the protective earth conductor (PE) and the profile rib of the enclosure face towards the track girder or the steel structure.

Variant without protective earth conductor (PE)

Installations and current collector trolleys that do not have a protective earth conductor (PE) connection are delivered as follows.

Installations

The green/yellow protective earth conductor marking is omitted. The conductor/pole is fitted or provided and can be used for the supply of power or control signals. In this case, the cross-section corresponds to the conductor cross-section for power supply (applies for conductor cross-sections measuring 38 mm² and larger).

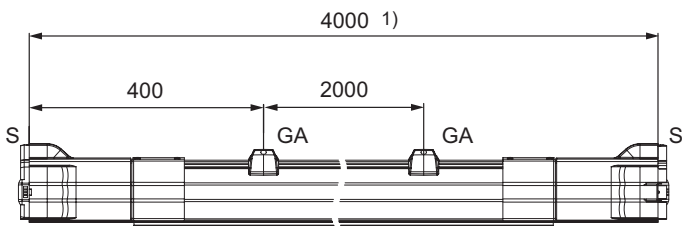
Current collector trolley

In this variant, the green/yellow conductor is replaced by a black cable. The protective earth conductor marking (PE) is omitted. Enough sliding contacts must be fitted to match the number of conductors/poles.

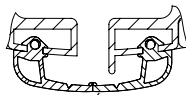
Suspension method

Attached to C-rail or suspended with threaded pin (must be ordered separately)

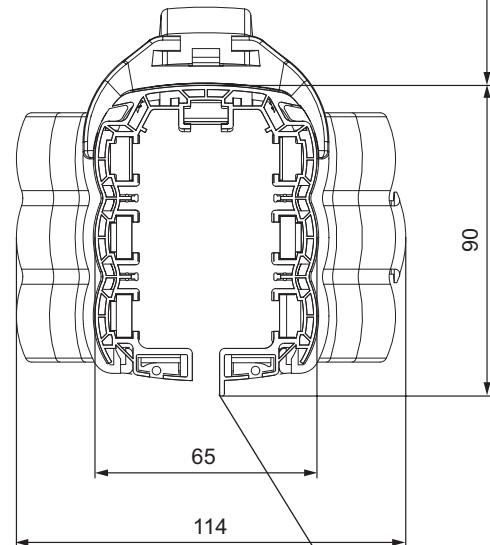
Protective earth symbol (only for conductor line with PE)



Profile seal: fitted as required.
Can be added to the order per metre.



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Profile rib (orientation rib)

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- S = Joint connections consisting of connector cover adapters, connector covers and conductor connectors are pre-assembled on the conductor enclosures.
- GA = Sliding suspensions: are fitted to the conductor enclosure and have to be positioned during installation.
- Additional sliding suspensions can be fitted.
 - Specify suspension method and order separately.
 - See section 4 for suspension diagram with dimensions.

Fixed point or fixed suspension:

When all DCL-Pro straight and curved sections have been assembled, one sliding suspension must be fixed (fixed point) at the middle of the track to prevent the DCL-Pro installation from wandering.

Screw the enclosed 3,5 x 9,5 self-tapping screw through the sliding suspension and into the DCL-Pro conductor enclosure.



WARNING
Live parts

There is a risk of contact with live parts if self-tapping screws are used which are too long.

Use only the enclosed 3,5 x 9,5 self-tapping screws to DIN 7981 as there is a risk of accidental contact with live parts if longer screws are used.

1) Standard length 4000 mm. Indicate reduced length in order text for part no. Minimum reduced length 710 mm.

For complete conductor line installations, the entire conductor line length including the powerfeed(s) must be specified in the order text.

Straight section order table (copper conductor material, design with PE protective earth conductor, 4000 mm long)

DCL-Pro-GS-x-xx-PE-4000 mm

Number of conductors/ No. of poles	Size/L1 - L3 conductor cross-section mm ²					
	10	15	25	38	56	70
	Permissible current [A] at 100% CDF and 35 °C 1)					
	65	80	100	130	175	200
4	876 640 84	876 606 84	876 607 84	876 608 84	876 609 84	876 736 84
Phase L1 - L3	3 x 10 mm ²	3 x 15 mm ²	3 x 25 mm ²	3 x 38 mm ²	3 x 56 mm ²	3 x 70 mm ²
PE protective earth	1 x 10 mm ²	1 x 15 mm ²	1 x 25 mm ²	1 x 25 mm ²	1 x 38 mm ²	1 x 56 mm ²
Control cable 2)	-	-	-	-	-	-
5	876 641 84	876 610 84	876 611 84	876 612 84	876 613 84	876 737 84
Phase L1 - L3	3 x 10 mm ²	3 x 15 mm ²	3 x 25 mm ²	3 x 38 mm ²	3 x 56 mm ²	3 x 70 mm ²
PE protective earth	1 x 10 mm ²	1 x 15 mm ²	1 x 25 mm ²	1 x 25 mm ²	1 x 38 mm ²	1 x 56 mm ²
Control cable 2)	1 x 10 mm ²	1 x 10 mm ²	1 x 10 mm ²	1 x 10 mm ²	1 x 10 mm ²	1 x 10 mm ²
6	876 642 84	876 614 84	876 615 84	876 616 84	876 617 84	876 738 84
Phase L1 - L3	3 x 10 mm ²	3 x 15 mm ²	3 x 25 mm ²	3 x 38 mm ²	3 x 56 mm ²	3 x 70 mm ²
PE protective earth	1 x 10 mm ²	1 x 15 mm ²	1 x 25 mm ²	1 x 25 mm ²	1 x 38 mm ²	1 x 56 mm ²
Control cable 2)	2 x 10 mm ²	2 x 10 mm ²	2 x 10 mm ²	2 x 10 mm ²	2 x 10 mm ²	2 x 10 mm ²
7	876 643 84	876 618 84	876 619 84	876 623 84	876 624 84	876 739 84
Phase L1 - L3	3 x 10 mm ²	3 x 15 mm ²	3 x 25 mm ²	3 x 38 mm ²	3 x 56 mm ²	3 x 70 mm ²
PE protective earth	1 x 10 mm ²	1 x 15 mm ²	1 x 25 mm ²	1 x 25 mm ²	1 x 38 mm ²	1 x 56 mm ²
Control cable 2)	3 x 10 mm ²	3 x 10 mm ²	3 x 10 mm ²	3 x 10 mm ²	3 x 10 mm ²	3 x 10 mm ²

The combinations of conductor/pole number and size specified in the order table are available as components. Copper is used as the standard material for the conductors. As an alternative, the 10 mm² cross-section conductor can be ordered as a stainless steel-plated version.

The above-mentioned order numbers only apply for copper conductor material. Versions with a stainless steel-plated copper conductor (10 mm²) must be specified separately in the order.

NOTE

The designation “**OPE**” must be specified in the order for straight sections that **do not have a protective earth conductor (protective earth symbol PE is omitted)**.

Suspensions with C-rail brackets or M8 threaded pins must be ordered separately. Suitable quantities of component sets must be selected for sliding suspensions with C-rail bracket or M8 threaded pins (see section 7.1).

Sliding suspensions are pre-assembled for a suspension spacing of 2000 mm (2 off, 4000 mm each).

The following information is required for ordering a straight section (see model code order text):

- ⇒ Conductor line type component **DCL-Pro-GS**
- ⇒ Number of conductors/poles (4, 5, **6**, or 7 conductor rails)
- ⇒ Size (10, 15, **25**, 38, 56, 70)
- ⇒ Protective earth conductor **PE** or **OPE** (fitted or none)
- ⇒ Section/installation length in mm 3)

- 1) The permissible current for the conductors must be checked. See section 3 for calculation or tables.
- 2) 10 mm² (L1-L3, PE and/or control line) available on request as stainless steel-plated copper rail.
- 3) Standard length 4000 mm. Indicate reduced length in order text for part no. Minimum reduced length 710 mm.

For complete conductor line installations, the entire conductor line length including the powerfeed(s) must be specified in the order text.

Model code

Order text, e.g.:

DCL-Pro-GS-6-25-PE-4000mm

or DCL-Pro-GS-7-10-OPE-3500mm (no PE, 3500 mm long)

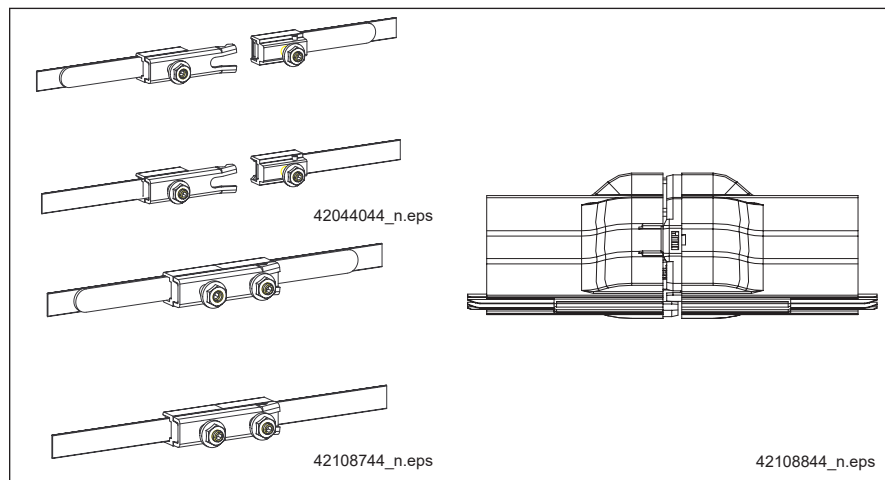
6.2 Conductor connectors

The notch of the conductor connector U-section in combination with the transverse web of the conductor connecting lugs ensures easy assembly and a flush conductor line joint with increased functional reliability.

To install two track sections, both conductor connectors previously had to be positioned with reference to each with great care to avoid any gap between the copper conductors. The new Demag safe locking connector allows both conductor connectors to snap into place already when they are connected and ensures that the conductors are flush when they are bolted and tightened.

NOTE

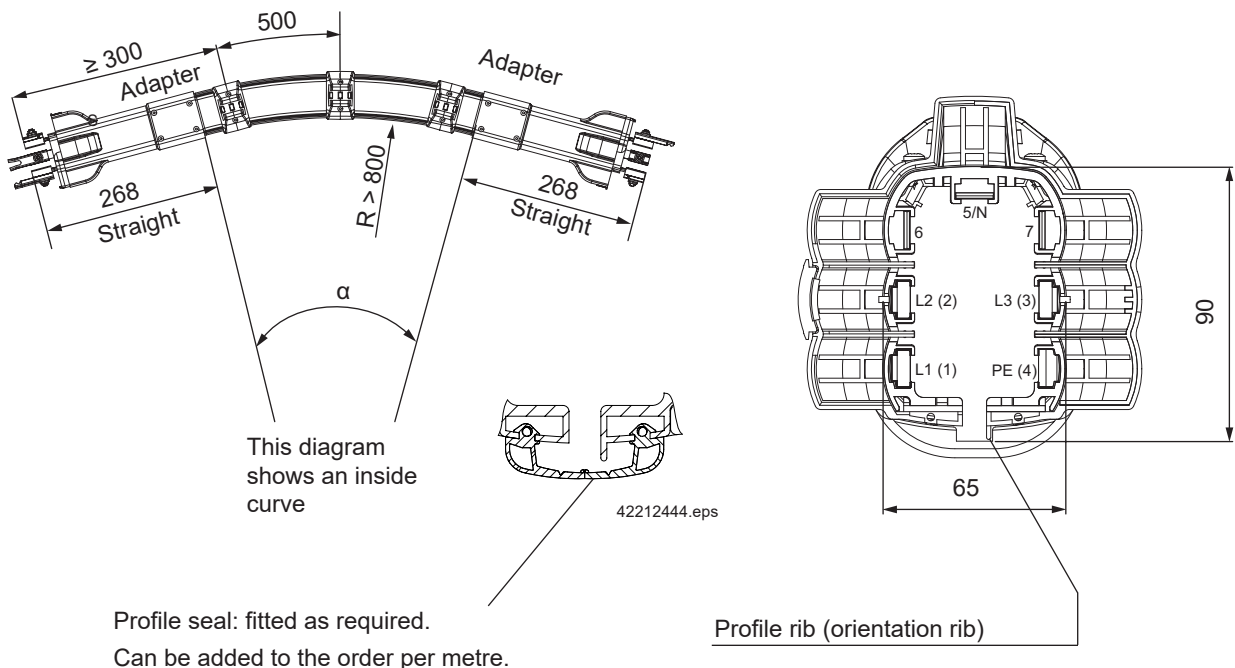
DCL-Pro conductor connectors are **not** compatible with DCL conductor connectors and cannot be combined with them (see section 1.5).



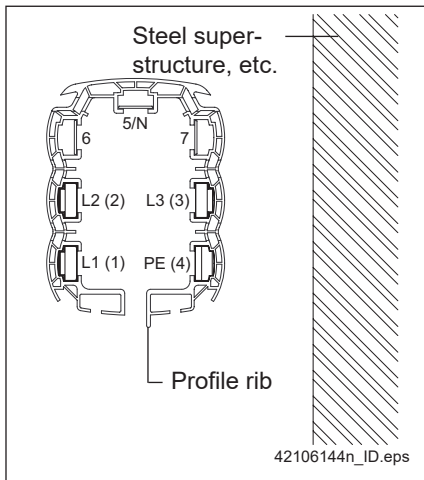
6.3 4, 5, 6 and 7-pole curved section

Suspension method

Attached to C-rail or suspended with threaded pin (must be ordered separately)



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- S = Joint connections consisting of connector cover adapters, connector covers and conductor connectors are pre-assembled on the conductor enclosures.
- GA = Sliding suspensions: are fitted to the conductor enclosure and have to be positioned during installation.
- Suspensions spaced at a distance of 500 mm along the curve.
 - Specify suspensions and order separately.
 - See section 4 for suspension diagram with dimensions.

Note

Unless the installation is designed otherwise, it must be ensured that all straight and curved sections are fitted in such a way that the protective earth conductor (PE) and the profile rib of the enclosure face towards the track girder or the steel structure.

NOTE

Pay attention to the following for project engineering and specification of installations with straight and curved sections:

The straight end sections of the curved sections measuring 268 mm are fixed values and must be deducted from the total length of the next section of straight track, as required.

NOTE

The designation “**OPE**” must be specified in the order for curved sections that **do not have a protective earth conductor (protective earth symbol PE is omitted)**.

The following information is required for ordering a curved section (see model code order text):

- ⇒ Conductor line type component **DCL-Pro-BS**
- ⇒ Number of conductors/poles (4, **5**, 6, or 7 conductor rails)
- ⇒ Size (10, 15, 25, 38, 56, 70) 1)
- ⇒ Protective earth conductor **PE** or **OPE** (fitted or none)
- ⇒ **Radius** (mm)
- ⇒ Angle α (degrees)
- ⇒ Curve I or **Curve A** 2)

1) The permissible current for the conductor must be checked. See section 3 for calculation or tables.

2) Definition of curve type I and curve type A:

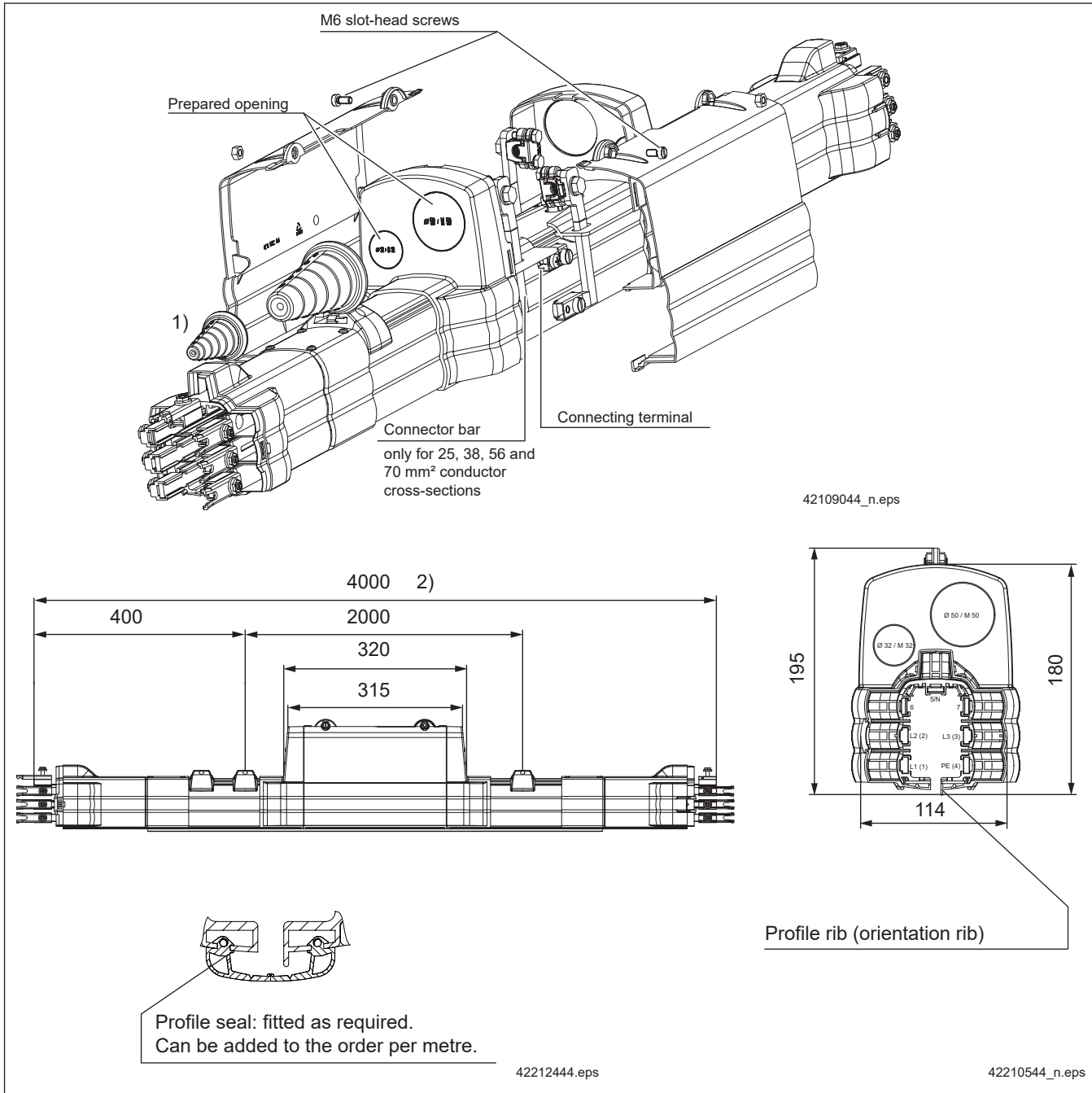
- For curve I the protective earth conductor and the profile rib are on the **inside** of the curved section.
- For curve A the protective earth conductor and the profile rib are on the **outside** of the curved section.

On curved sections that do not have a protective earth conductor, the profile rib is only for orientation. The view refers to the centre of the radius.

Model code	Order text, e.g.:
	DCL-Pro-BS-5-25-PE-R=1500mm,α=45,BA 3)
	3) Profile seal can be added to the order per metre. Please specify in the order.

6.4 Line powerfeed

6.4.1 4, 5, 6 and 7-pole line powerfeed



- S = Joint connections consisting of connector cover adapters, connector covers and conductor connectors are pre-assembled on the conductor enclosures.
- GA = Sliding suspensions: are fitted to the conductor enclosure and have to be positioned during installation.
- Line powerfeeds feature an additional sliding suspension.
- Additional sliding suspensions can be fitted.
 - Specify suspension method and order separately.
 - See section 4 for suspension diagram with dimensions.

- 1) Cut off the rubber sleeves to match the required cable diameters.
- $\varnothing 50$ M50 only with rubber sleeve for max. 43 mm cable diameter,
 - $\varnothing 32$ M32 only with rubber sleeve for max. 24 mm cable diameter
- The rubber sleeves are supplied loose inside the connection box.

- 2) Standard length 4000 mm. Indicate reduced length in order text for part no. Minimum reduced length 1170 mm.

Line powerfeed order table (copper conductor material, design with PE protective earth conductor, 4000 mm long)
DCL-Pro-ES-x-xx-PE-4000mm

Conductor cross-sections

Number of conductors/ No. of poles	Size/L1 - L3 conductor cross-section mm ²					
	10	15	25	38	56	70
	Permissible current [A] at 100% CDF and 35 °C 1)					
	65	80	100	130	175	200
4	876 646 84	876 650 84	876 651 84	876 652 84	876 653 84	876 679 84
Phase L1 - L3	3 x 10 mm ²	3 x 15 mm ²	3 x 25 mm ²	3 x 38 mm ²	3 x 56 mm ²	3 x 70 mm ²
PE protective earth	1 x 10 mm ²	1 x 15 mm ²	1 x 25 mm ²	1 x 25 mm ²	1 x 38 mm ²	1 x 56 mm ²
Control cable 2)	-	-	-	-	-	-
5	876 647 84	876 654 84	876 655 84	876 656 84	876 657 84	876 682 84
Phase L1 - L3	3 x 10 mm ²	3 x 15 mm ²	3 x 25 mm ²	3 x 38 mm ²	3 x 56 mm ²	3 x 70 mm ²
PE protective earth	1 x 10 mm ²	1 x 15 mm ²	1 x 25 mm ²	1 x 25 mm ²	1 x 38 mm ²	1 x 56 mm ²
Control cable 2)	1 x 10 mm ²	1 x 10 mm ²	1 x 10 mm ²	1 x 10 mm ²	1 x 10 mm ²	1 x 10 mm ²
6	876 648 84	876 658 84	876 659 84	876 660 84	876 661 84	876 683 84
Phase L1 - L3	3 x 10 mm ²	3 x 15 mm ²	3 x 25 mm ²	3 x 38 mm ²	3 x 56 mm ²	3 x 70 mm ²
PE protective earth	1 x 10 mm ²	1 x 15 mm ²	1 x 25 mm ²	1 x 25 mm ²	1 x 38 mm ²	1 x 56 mm ²
Control cable 2)	2 x 10 mm ²	2 x 10 mm ²	2 x 10 mm ²	2 x 10 mm ²	2 x 10 mm ²	2 x 10 mm ²
7	876 649 84	876 662 84	876 663 84	876 664 84	876 665 84	876 684 84
Phase L1 - L3	3 x 10 mm ²	3 x 15 mm ²	3 x 25 mm ²	3 x 38 mm ²	3 x 56 mm ²	3 x 70 mm ²
PE protective earth	1 x 10 mm ²	1 x 15 mm ²	1 x 25 mm ²	1 x 25 mm ²	1 x 38 mm ²	1 x 56 mm ²
Control cable 2)	3 x 10 mm ²	3 x 10 mm ²	3 x 10 mm ²	3 x 10 mm ²	3 x 10 mm ²	3 x 10 mm ²

Connecting cable cross-sections

Number of conductors/ No. of poles	Size/L1 - L3 conductor cross-section mm ²					
	10	15	25	38	56	70
	Permissible current [A] at 100% CDF and 35 °C 1)					
	65	80	100	130	175	200
4	876 646 84	876 650 84	876 651 84	876 652 84	876 653 84	876 679 84
L1 - L3 + PE	4 x 1,5 - 16 mm ²	4 x 1,5 - 16 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²
Control cable 2)	-	-	-	-	-	-
5	876 647 84	876 654 84	876 655 84	876 656 84	876 657 84	876 682 84
L1 - L3 + PE	4 x 1,5 - 16 mm ²	4 x 1,5 - 16 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²
Control cable 2)	1 x 1,5 - 16 mm ²	1 x 1,5 - 16 mm ²	1 x 1,5 - 16 mm ²	1 x 1,5 - 16 mm ²	1 x 1,5 - 16 mm ²	1 x 1,5 - 16 mm ²
6	876 648 84	876 658 84	876 659 84	876 660 84	876 661 84	876 683 84
L1 - L3 + PE	4 x 1,5 - 16 mm ²	4 x 1,5 - 16 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²
Control cable 2)	2 x 1,5 - 16 mm ²	2 x 1,5 - 16 mm ²	2 x 1,5 - 16 mm ²	2 x 1,5 - 16 mm ²	2 x 1,5 - 16 mm ²	2 x 1,5 - 16 mm ²
7	876 649 84	876 662 84	876 663 84	876 664 84	876 665 84	876 684 84
L1 - L3 + PE	4 x 1,5 - 16 mm ²	4 x 1,5 - 16 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²	4 x 25 - 70 mm ²
Control cable 2)	3 x 1,5 - 16 mm ²	3 x 1,5 - 16 mm ²	3 x 1,5 - 16 mm ²	3 x 1,5 - 16 mm ²	3 x 1,5 - 16 mm ²	3 x 1,5 - 16 mm ²

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1) The permissible current for the conductors must be checked. See tables in section 3 for calculation.
2) 10 mm² (L1-L3), PE and/or control line available on request as stainless steel-plated copper rail.

The combinations of conductor/pole number and size specified in the order table are available as components. Copper is used as the standard material for the conductors. As an alternative, the 10 mm² cross-section conductor can be ordered as a stainless steel-plated version.

The above-mentioned order numbers only apply for copper conductor material. Versions with a stainless steel-plated copper conductor (10 mm²) must be specified separately in the order.

NOTE

The designation “**OPE**” must be specified in the order for line powerfeeds that **do not have a protective earth conductor (protective earth symbol PE is omitted)**. Suspensions with C-rail brackets or M8 threaded pins must be ordered separately. Suitable quantities of component sets must be selected for sliding suspensions with C-rail bracket or M8 threaded pins (see section 7.1). Sliding suspensions are pre-assembled for a suspension spacing of 2000 mm.

The following information is required for ordering a line powerfeed (see model code order text):

- ⇒ Conductor line type component **DCL-Pro-ES**
- ⇒ Powerfeed, number of poles (**4, 5, 6 or 7 connections**)
- ⇒ Size (10, 15, 25, 38, 56, 70)
- ⇒ Protective earth conductor **PE** or **OPE** (fitted or none)

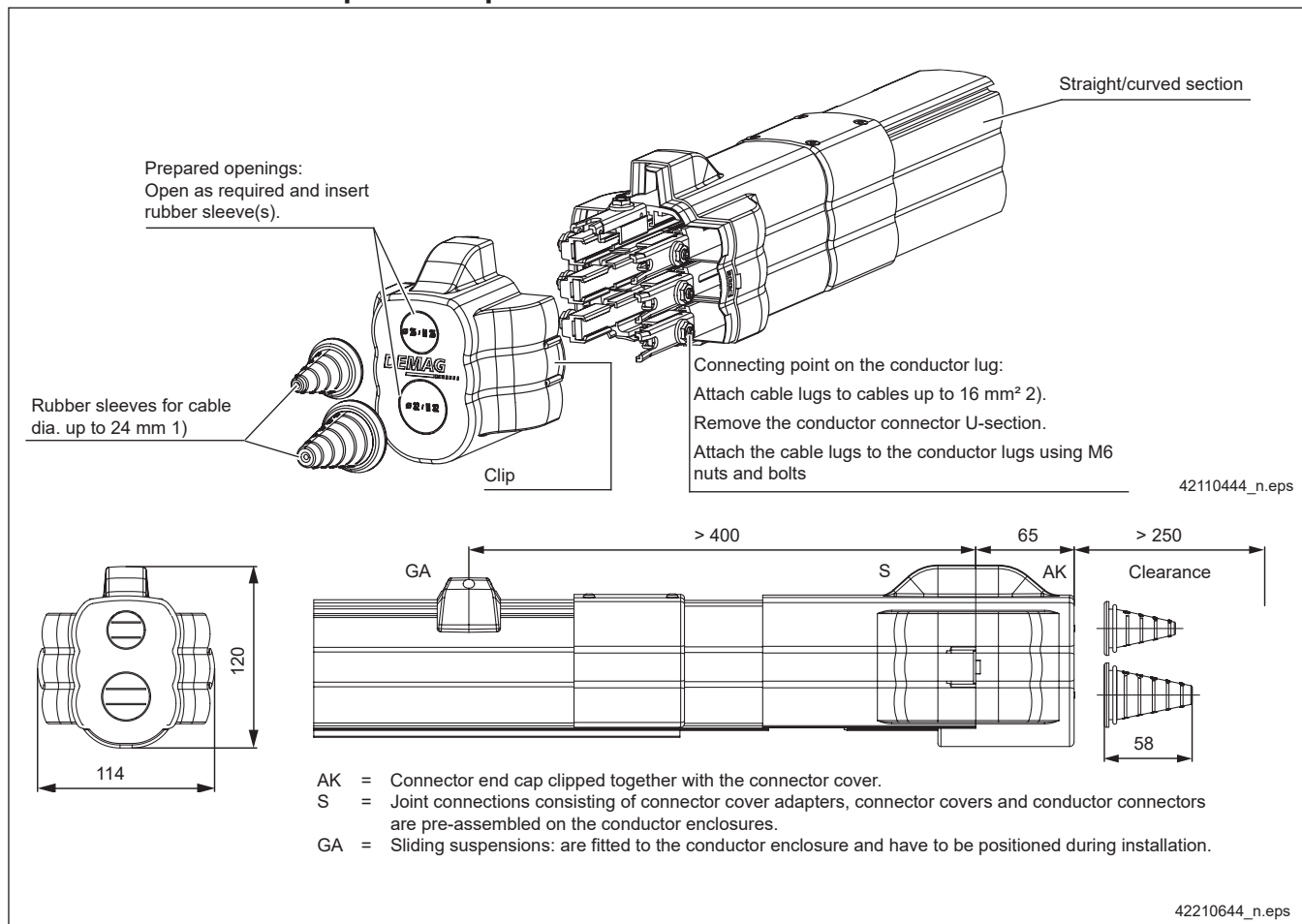
Model code

Order text, e.g.:

Line powerfeed
or

DCL-Pro-ES-4-38-PE-4000mm
DCL-Pro-ES-7-10-OPE-3000mm
(no PE, 3000 mm long)

6.5 Connector end cap for end powerfeed



The following information is required for ordering or selecting the connector end cap as a powerfeed (see model code order text):

- ⇒ Conductor line type **DCL-Pro**
- ⇒ Connector end cap
- ⇒ Connection cross-section ≤ **16 mm²** ($I_N \leq 60$ A)
- ⇒ An end powerfeed arrangement via a connector end cap is only possible for 10 and 15 mm² conductor cross-sections

Connector end cap for end powerfeed consisting of:

- ⇒ Connector end cap DCL-Pro-AK
- ⇒ M 32 rubber sleeve
- ⇒ M 25 rubber sleeve

NOTE

Connector end cap for end powerfeed DCL-Pro-AK-ES is part of the set with part no.: 876 785 84 (see section 7.1.4).

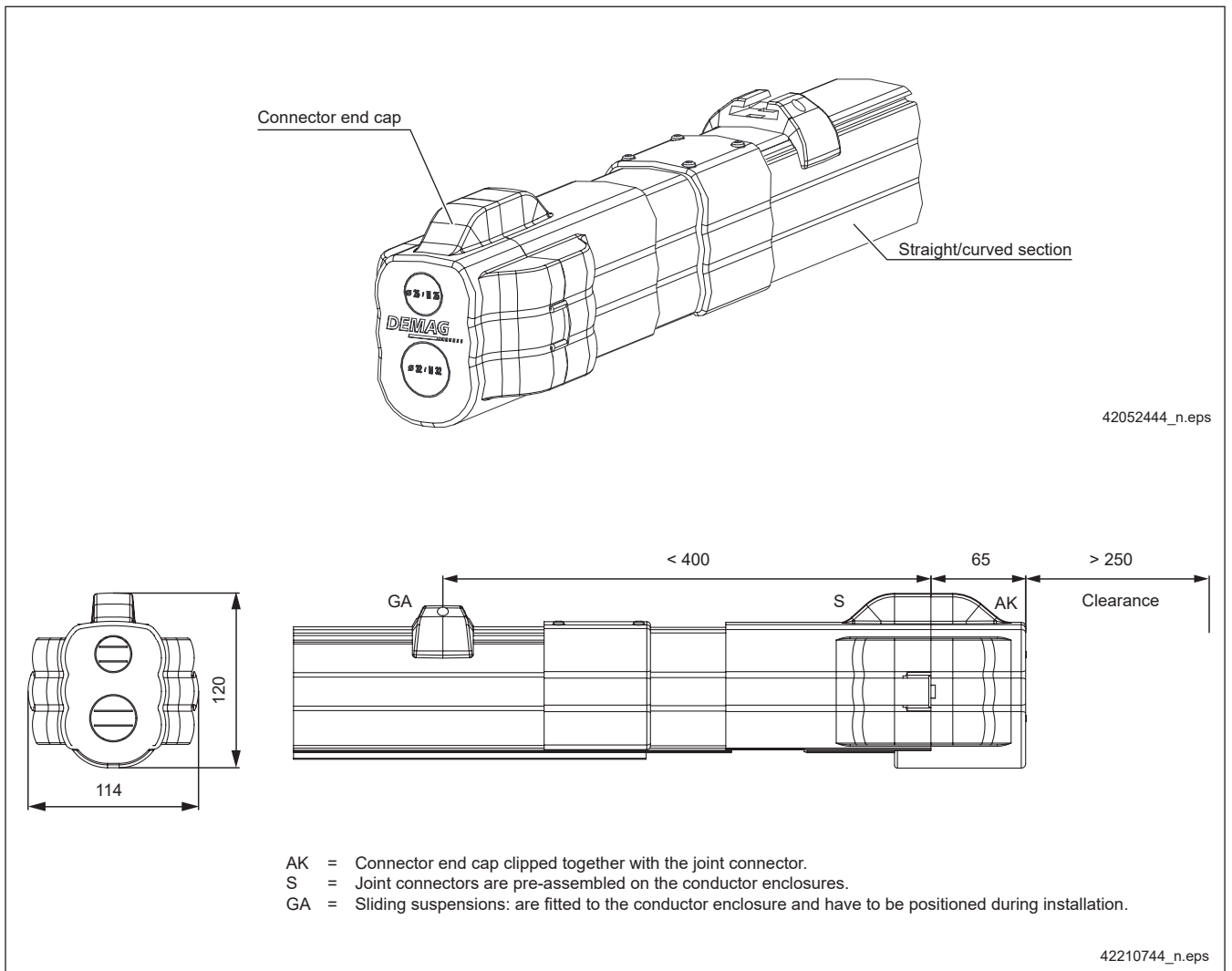
- 1) Not included in the scope of delivery. Cut off the rubber sleeves to match the required cable diameters.
- 2) Cable lugs are not included in the scope of supply.

Model code

Order text, e.g.:

Connector end cap for end powerfeed **DCL-Pro-AK-ES**

6.6 Connector end cap for track end



The following information is required for ordering or selecting the connector end cap as a track end cap (see model code order text):

- ⇒ Conductor line type **DCL-Pro**
- ⇒ Connector end cap

NOTE

Connector end cap for track end DCL-Pro-AK is part of the set with part no.: 876 785 84 (see section 7.1.4).

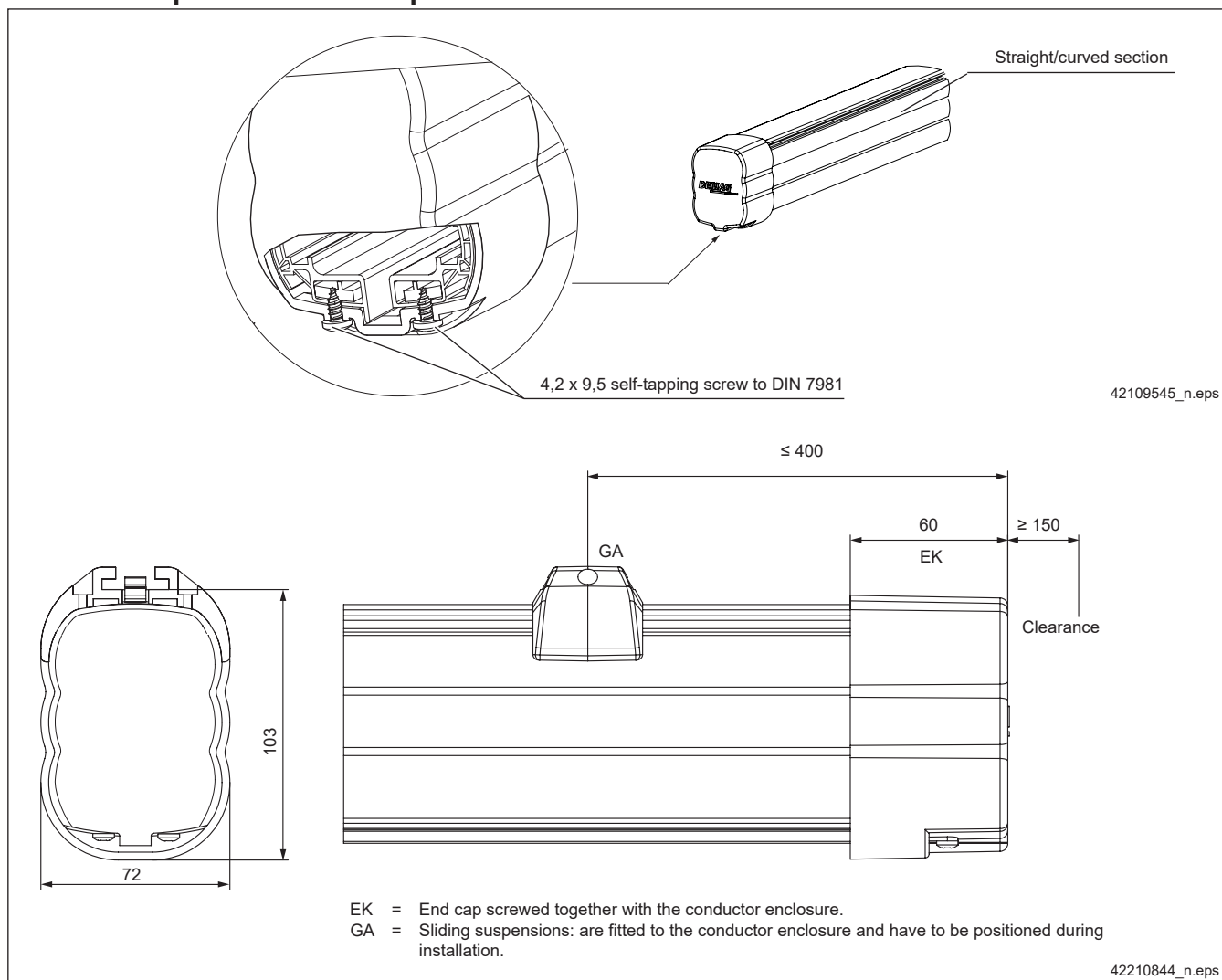
Model code

Order text, e.g.:

Connector end cap for track end

DCL-Pro-AK

6.7 End cap as track end cap



WARNING Live parts

There is a risk of contact with live parts if self-tapping screws are used which are too long.

Use only the enclosed 4,2 x 9,5 self-tapping screws to DIN 7981 as there is a risk of accidental contact with live parts if longer screws are used.

The following information is required for ordering or selecting an end cap (see model code order text):

- ⇒ Conductor line type **DCL-Pro**
- ⇒ End cap

NOTE

End cap for track end DCL-Pro-EK is part of the set with part no.: 876 785 84 (see section 7.1.4).

Model code

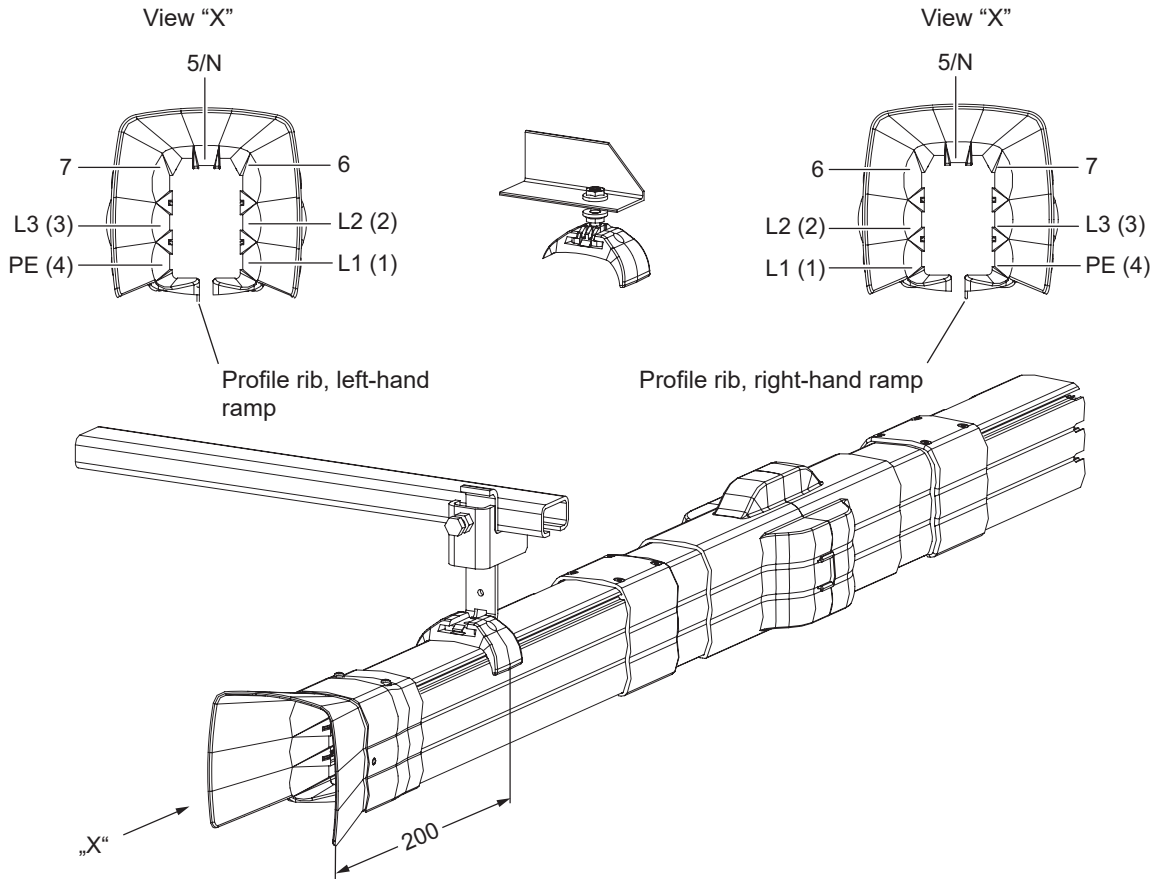
Order text, e.g.:

End cap **DCL-Pro-EK**

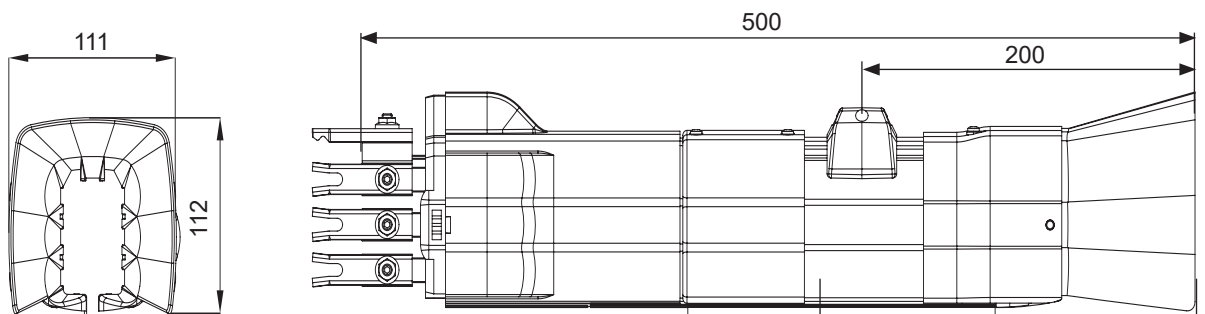
6.8 Entry/transfer ramp:

Suspension method

Attached to C-rail or suspended with threaded pin (must be ordered separately)



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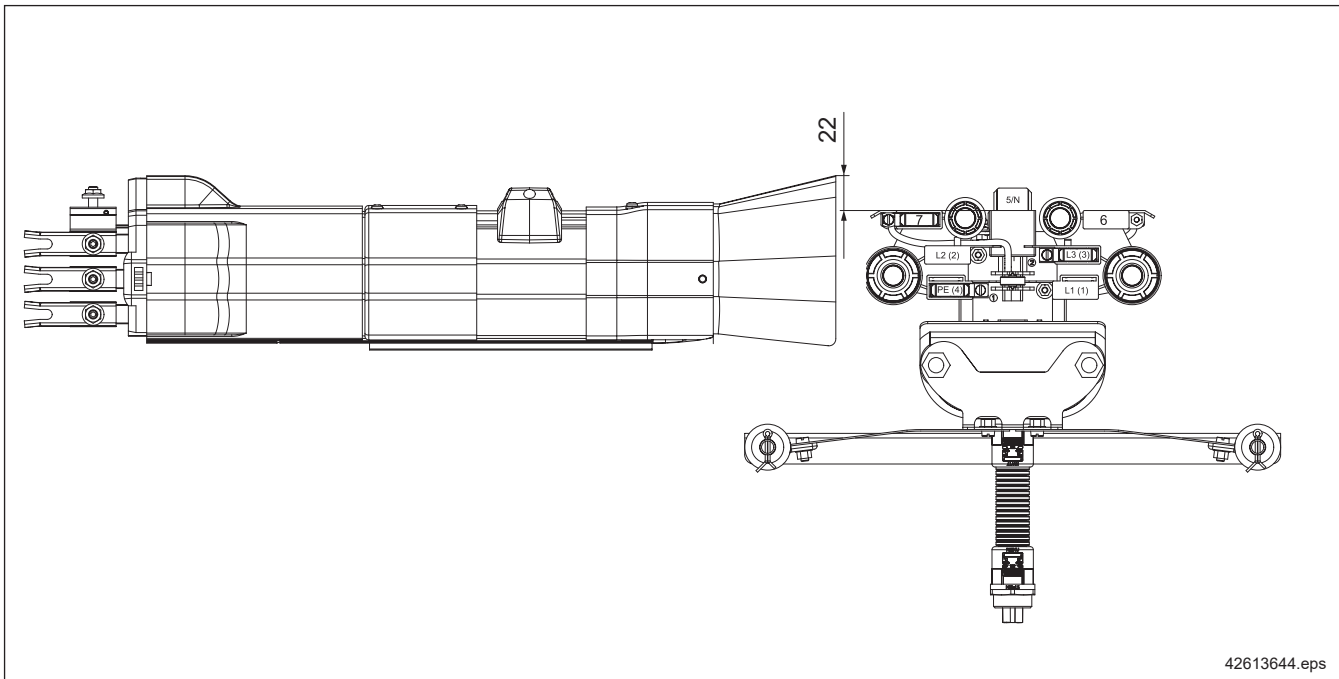


Profile rib (orientation rib)

Profile seal: fitted as required.
Can be added to the order per metre.

Dead transfer ramp area

Conductor rail	Dimension mm
L1, 1)	243
L2, 2)	
L3, 3)	
PE (4)	134
5/N	352
6	243
7	



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NOTE

Ensure that a distance of 22 mm is maintained from the top edge of the sliding contact channels (6 or 7) and the top edge of the ramp housing when the current collector trolley is installed.

Adjustment is via the DCL-Pro-MITU towing arm for transfer sections

Left-hand and right-hand ramps are required for transfer sections.

Entry/transfer speed 100 m/min.

Min. distance of ramp for transfer sections 10 mm.

Max. lateral misalignment between the ramps ± 10 mm.

Max. vertical misalignment between the ramps ± 8 mm.

S = Joint connections consisting of connector cover adapters, connector covers and conductor connectors are pre-assembled on the conductor enclosures.

FA = Fixed suspension is pushed onto the ramp enclosure and must be positioned and secured with a self-tapping screw when it is installed.



WARNING Live parts

There is a risk of contact with live parts if self-tapping screws are used which are too long.

Use only the enclosed 3,5 x 9,5 self-tapping screws to DIN 7981 as there is a risk of accidental contact with live parts if longer screws are used.

**Entry/transfer ramp order table
(Copper conductor material, type with PE protective earth conductor,
500 mm long)**

DCL-Pro-UTL-x-25-PE-500mm

DCL-Pro-UTR-x-25-PE-500mm

Number of conductors/ poles	Ramp type	Conductor line assignment	Conductor cross- section	Order no.
4	Right-hand	Phase L1-L3 Protective earth (PE)	3 x 25 mm ² 1 x 25 mm ²	876 695 84
	Left-hand	Control cable	—	876 700 84
5	Right-hand	Phase L1-L3 Protective earth (PE)	3 x 25 mm ² 1 x 25 mm ²	876 696 84
	Left-hand	Control line 5	1 x 25 mm ²	876 701 84
6	Right-hand	Phase L1-L3 Protective earth (PE)	3 x 25 mm ² 1 x 25 mm ²	876 697 84
	Left-hand	Control line 4, 6	2 x 25 mm ²	876 702 84
7	Right-hand	Phase L1-L3 Protective earth (PE)	3 x 25 mm ² 1 x 25 mm ²	876 698 84
	Left-hand	Control line 4–6	3 x 25 mm ²	876 703 84

The combinations of conductor/pole number specified in the order table are available as components. The above-mentioned order numbers only apply for copper conductor material.

NOTE

The designation “**OPE**” must be specified in the order for transfer ramps that **do not have a protective earth conductor (protective earth symbol PE is omitted)**.

NOTE

The current collector trolley must be prepared for operation in installations that have entry/transfer ramps or a profile seal.

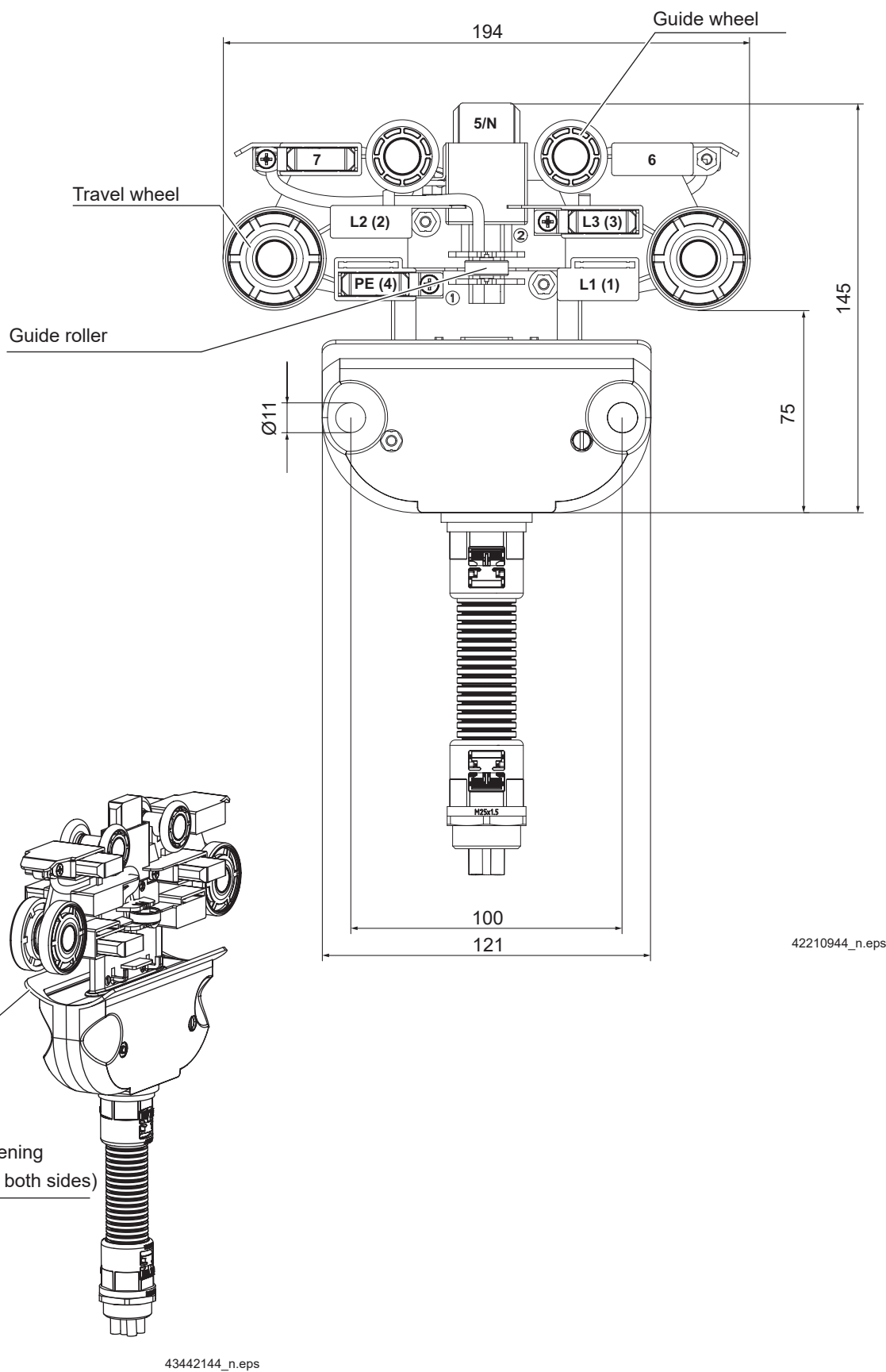
Open the terminal box on the current collector trolley and separate the upper terminal box enclosure half along the prepared opening (See diagram in section 6.9 for prepared opening).

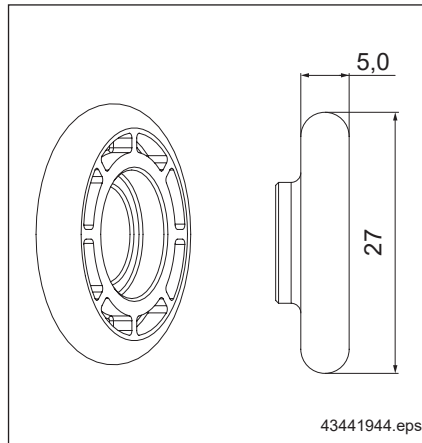
The following information is required for ordering or selecting a transfer ramp (see model code order text):

- ⇒ Conductor line type **DCL-Pro**
- ⇒ Transfer ramp type (L = left-hand or **R** = right-hand)
- ⇒ Number of poles (**4**, 5, 6 or 7 conductors)
- ⇒ Protective earth conductor **PE** or **OPE** (fitted or none)

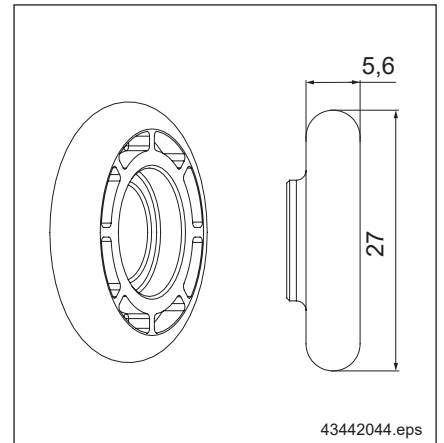
Model code	Order text, e.g.:
	Transfer ramp (right-hand ramp) DCL-Pro-UTR-4-25-PE-500mm
	or (left-hand ramp) DCL-Pro-UTL-7-25-OPE-500mm (no PE)

6.9 4, 5, 6 and 7-pole current collector trolleys





Guide wheel with narrow wheel contour (white) – optimised guidance of the current collector trolley for straight and curved track installations.



Guide wheel with wide wheel contour (black) – optimised guidance of the current collector trolley for straight track installations.

NOTE

The current collector trolley must be prepared for operation in installations that have entry/transfer ramps or a profile seal:

Open the terminal box on the current collector trolley and separate the upper terminal box enclosure half along the prepared opening.

Owing to its design features, the current collector trolley also fulfils increased requirements with reference to availability and service life of the track installation. The basis is provided by an optimised wheel and bearing system which has also been adapted to meet the requirements of straight and curved track layouts.

Major features are:

- Travel wheels mounted on ball bearings for low-wear operation and longer service life also at high speeds
- Optimised guide wheels with different wheel contours for travel on straight sections only or for travel on straight and curved sections

Current collector trolley for straight and curved section travel (narrow guide wheels) – universal

Type	Order no.	No. of poles			I _N , 80% CDF/sliding contact material		Metric cable union/corrugated tube	Connecting cable conductors
		Total	L1-L3 +PE	Control conductor	L1-L3 +PE	Control conductor		
DCL-Pro-SAWU-x-xx-PE-2000mm								
DCL-Pro-SAWU-4-40-PE-2000mm 1)	876 581 84	4	4	0	40 A / BR	-	M 25/NW 17	4 x 6 mm ²
DCL-Pro-SAWU-5-40-PE-2000mm 1)	876 583 84	5	4	1	40 A / BR	40 A / BR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWU-6-40-PE-2000mm 1)	876 585 84	6	4	2	40 A / BR	40 A / BR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWU-7-40-PE-2000mm 1)	876 587 84	7	4	3	40 A / BR	40 A / BR		(4 x 6 + 3 x 2,5) mm ²
DCL-Pro-SAWU-4-20-PE-2000mm 2)	876 582 84	4	4	0	20 A / GR	-		4 x 4 mm ²
DCL-Pro-SAWU-5-20-PE-2000mm 2)	876 584 84	5	4	1	20 A / GR	20 A / GR		(4 x 4 + 1 x 2,5) mm ²
DCL-Pro-SAWU-6-20-PE-2000mm 2)	876 586 84	6	4	2	20 A / GR	20 A / GR		(4 x 4 + 2 x 2,5) mm ²
DCL-Pro-SAWU-7-20-PE-2000mm 2)	876 588 84	7	4	3	20 A / GR	20 A / GR		(4 x 4 + 3 x 2,5) mm ²
DCL-Pro-SAWU-5-40-M-PE-2000mm 3)	876 777 84	5	4	1	40 A / BR	20 A / SIGR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWU-6-40-M-PE-2000mm 3)	876 778 84	6	4	2	40 A / BR	20 A / SIGR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWU-7-40-M-PE-2000mm 3)	876 779 84	7	4	3	40 A / BR	20 A / SIGR		(4 x 6 + 3 x 2,5) mm ²
DCL-Pro-SAWU-x-xx-PE-5000mm								
DCL-Pro-SAWU-4-40-PE-5000mm 1)	876 821 84	4	4	0	40 A / BR	-	M 25/NW 17	4 x 6 mm ²
DCL-Pro-SAWU-5-40-PE-5000mm 1)	876 823 84	5	4	1	40 A / BR	40 A / BR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWU-6-40-PE-5000mm 1)	876 825 84	6	4	2	40 A / BR	40 A / BR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWU-7-40-PE-5000mm 1)	876 827 84	7	4	3	40 A / BR	40 A / BR		(4 x 6 + 3 x 2,5) mm ²
DCL-Pro-SAWU-4-20-PE-5000mm 2)	876 822 84	4	4	0	20 A / GR	-		4 x 4 mm ²
DCL-Pro-SAWU-5-20-PE-5000mm 2)	876 824 84	5	4	1	20 A / GR	20 A / GR		(4 x 4 + 1 x 2,5) mm ²
DCL-Pro-SAWU-6-20-PE-5000mm 2)	876 826 84	6	4	2	20 A / GR	20 A / GR		(4 x 4 + 2 x 2,5) mm ²
DCL-Pro-SAWU-7-20-PE-5000mm 2)	876 828 84	7	4	3	20 A / GR	20 A / GR		(4 x 4 + 3 x 2,5) mm ²
DCL-Pro-SAWU-5-40-M-PE-5000mm 3)	876 860 84	5	4	1	40 A / BR	20 A / SIGR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWU-6-40-M-PE-5000mm 3)	876 861 84	6	4	2	40 A / BR	20 A / SIGR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWU-7-40-M-PE-5000mm 3)	876 862 84	7	4	3	40 A / BR	20 A / SIGR		(4 x 6 + 3 x 2,5) mm ²
DCL-Pro-SAWU-x-xx-PE-6000mm								
DCL-Pro-SAWU-4-40-PE-6000mm 1)	876 841 84	4	4	0	40 A / BR	-	M 25/NW 17	4 x 6 mm ²
DCL-Pro-SAWU-5-40-PE-6000mm 1)	876 843 84	5	4	1	40 A / BR	40 A / BR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWU-6-40-PE-6000mm 1)	876 845 84	6	4	2	40 A / BR	40 A / BR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWU-7-40-PE-6000mm 1)	876 847 84	7	4	3	40 A / BR	40 A / BR		(4 x 6 + 3 x 2,5) mm ²
DCL-Pro-SAWU-4-20-PE-6000mm 2)	876 842 84	4	4	0	20 A / GR	-		4 x 4 mm ²
DCL-Pro-SAWU-5-20-PE-6000mm 2)	876 844 84	5	4	1	20 A / GR	20 A / GR		(4 x 4 + 1 x 2,5) mm ²
DCL-Pro-SAWU-6-20-PE-6000mm 2)	876 846 84	6	4	2	20 A / GR	20 A / GR		(4 x 4 + 2 x 2,5) mm ²
DCL-Pro-SAWU-7-20-PE-6000mm 2)	876 848 84	7	4	3	20 A / GR	20 A / GR		(4 x 4 + 3 x 2,5) mm ²
DCL-Pro-SAWU-5-40-M-PE-6000mm 3)	876 870 84	5	4	1	40 A / BR	20 A / SIGR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWU-6-40-M-PE-6000mm 3)	876 871 84	6	4	2	40 A / BR	20 A / SIGR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWU-7-40-M-PE-6000mm 3)	876 872 84	7	4	3	40 A / BR	20 A / SIGR		(4 x 6 + 3 x 2,5) mm ²

1) Bronze sliding contact material, max. 6,0 mm² L1-L3+PE connecting conductor cross-sections. Control conductor connecting cable cross-section 2,5 mm². Other cross-sections on request.

2) Graphite sliding contact material, max. 4,0 mm² L1-L3+PE connecting conductor cross-sections. Control conductor connecting cable cross-section 2,5 mm². Other cross-sections on request.

3) Bronze and silver graphite sliding contact material, max. 6,0 mm² L1 - L3 + PE (bronze) connecting conductor cross-sections. Control conductor connecting cable cross-section (silver graphite) 2,5 mm². Other cross-sections on request.

Refer to the table in section 6.9.1 "Current collector technical data" for operating criteria.

Current collector trolley for straight section travel only (wide guide wheels) – straight travel

Type	Order no.	No. of poles			I _N , 80% CDF/sliding contact material		Metric cable union/corrugated tube	Connecting cable conductors
		Total	L1-L3 +PE	Control conductor	L1-L3 +PE	Control conductor		

DCL-Pro-SAWG-x-xx-PE-2000mm

DCL-Pro-SAWG-4-40-PE-2000mm 1)	876 881 84	4	4	0	40 A / BR	-	M 25/NW 17	4 x 6 mm ²
DCL-Pro-SAWG-5-40-PE-2000mm 1)	876 883 84	5	4	1	40 A / BR	40 A / BR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWG-6-40-PE-2000mm 1)	876 885 84	6	4	2	40 A / BR	40 A / BR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWG-7-40-PE-2000mm 1)	876 887 84	7	4	3	40 A / BR	40 A / BR		(4 x 6 + 3 x 2,5) mm ²
DCL-Pro-SAWG-4-20-PE-2000mm 2)	876 882 84	4	4	0	20 A / GR	-		4 x 4 mm ²
DCL-Pro-SAWG-5-20-PE-2000mm 2)	876 884 84	5	4	1	20 A / GR	20 A / GR		(4 x 4 + 1 x 2,5) mm ²
DCL-Pro-SAWG-6-20-PE-2000mm 2)	876 886 84	6	4	2	20 A / GR	20 A / GR		(4 x 4 + 2 x 2,5) mm ²
DCL-Pro-SAWG-7-20-PE-2000mm 2)	876 888 84	7	4	3	20 A / GR	20 A / GR		(4 x 4 + 3 x 2,5) mm ²
DCL-Pro-SAWG-5-40-M-PE-2000mm 3)	876 897 84	5	4	1	40 A / BR	20 A / SIGR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWG-6-40-M-PE-2000mm 3)	876 898 84	6	4	2	40 A / BR	20 A / SIGR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWG-7-40-M-PE-2000mm 3)	876 899 84	7	4	3	40 A / BR	20 A / SIGR	(4 x 6 + 3 x 2,5) mm ²	

DCL-Pro-SAWG-x-xx-PE-5000mm

DCL-Pro-SAWG-4-40-PE-5000mm 1)	876 780 84	4	4	0	40 A / BR	-	M 25/NW 17	4 x 6 mm ²
DCL-Pro-SAWG-5-40-PE-5000mm 1)	876 833 84	5	4	1	40 A / BR	40 A / BR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWG-6-40-PE-5000mm 1)	876 835 84	6	4	2	40 A / BR	40 A / BR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWG-7-40-PE-5000mm 1)	876 837 84	7	4	3	40 A / BR	40 A / BR		(4 x 6 + 3 x 2,5) mm ²
DCL-Pro-SAWG-4-20-PE-5000mm 2)	876 832 84	4	4	0	20 A / GR	-		4 x 4 mm ²
DCL-Pro-SAWG-5-20-PE-5000mm 2)	876 834 84	5	4	1	20 A / GR	20 A / GR		(4 x 4 + 1 x 2,5) mm ²
DCL-Pro-SAWG-6-20-PE-5000mm 2)	876 836 84	6	4	2	20 A / GR	20 A / GR		(4 x 4 + 2 x 2,5) mm ²
DCL-Pro-SAWG-7-20-PE-5000mm 2)	876 838 84	7	4	3	20 A / GR	20 A / GR		(4 x 4 + 3 x 2,5) mm ²
DCL-Pro-SAWG-5-40-M-PE-5000mm 3)	876 863 84	5	4	1	40 A / BR	20 A / SIGR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWG-6-40-M-PE-5000mm 3)	876 864 84	6	4	2	40 A / BR	20 A / SIGR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWG-7-40-M-PE-5000mm 3)	876 865 84	7	4	3	40 A / BR	20 A / SIGR	(4 x 6 + 3 x 2,5) mm ²	

DCL-Pro-SAWG-x-xx-PE-6000mm

DCL-Pro-SAWG-4-40-PE-6000mm 1)	876 851 84	4	4	0	40 A / BR	-	M 25/NW 17	4 x 6 mm ²
DCL-Pro-SAWG-5-40-PE-6000mm 1)	876 853 84	5	4	1	40 A / BR	40 A / BR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWG-6-40-PE-6000mm 1)	876 855 84	6	4	2	40 A / BR	40 A / BR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWG-7-40-PE-6000mm 1)	876 857 84	7	4	3	40 A / BR	40 A / BR		(4 x 6 + 3 x 2,5) mm ²
DCL-Pro-SAWG-4-20-PE-6000mm 2)	876 852 84	4	4	0	20 A / GR	-		4 x 4 mm ²
DCL-Pro-SAWG-5-20-PE-6000mm 2)	876 854 84	5	4	1	20 A / GR	20 A / GR		(4 x 4 + 1 x 2,5) mm ²
DCL-Pro-SAWG-6-20-PE-6000mm 2)	876 856 84	6	4	2	20 A / GR	20 A / GR		(4 x 4 + 2 x 2,5) mm ²
DCL-Pro-SAWG-7-20-PE-6000mm 2)	876 858 84	7	4	3	20 A / GR	20 A / GR		(4 x 4 + 3 x 2,5) mm ²
DCL-Pro-SAWG-5-40-M-PE-6000mm 3)	876 873 84	5	4	1	40 A / BR	20 A / SIGR		(4 x 6 + 1 x 2,5) mm ²
DCL-Pro-SAWG-6-40-M-PE-6000mm 3)	876 874 84	6	4	2	40 A / BR	20 A / SIGR		(4 x 6 + 2 x 2,5) mm ²
DCL-Pro-SAWG-7-40-M-PE-6000mm 3)	876 875 84	7	4	3	40 A / BR	20 A / SIGR	(4 x 6 + 3 x 2,5) mm ²	

- 1) Bronze sliding contact material, max. 6,0 mm² L1-L3+PE connecting conductor cross-sections. Control conductor connecting cable cross-section 2,5 mm². Other cross-sections on request.
- 2) Graphite sliding contact material, max. 4,0 mm² L1-L3+PE connecting conductor cross-sections. Control conductor connecting cable cross-section 2,5 mm². Other cross-sections on request.
- 3) Bronze and silver graphite sliding contact material, max. 6,0 mm² L1 - L3 + PE (bronze) connecting conductor cross-sections. Control conductor connecting cable cross-section (silver graphite) 2,5 mm². Other cross-sections on request.
Refer to the table in section 6.9.1 "Current collector technical data" for operating criteria.

6.9.1 Current collector technical data

Sliding contact material		Bronze	Graphite 1)	Silver graphite 1)
Application		Power supply	Power supply and control signal transmission	Control signal transmission
Permissible voltage		24 to 690 V AC		
Rated current 2)	with 80% CDF	40 A	20 A	20 A
	with 60% CDF	45 A	20 A	20 A
	with 40% CDF	50 A	25 A	25 A
Connecting cable 3)	L1 - L3 + PE	6 mm ²	4 mm ²	
	Control cable	2,5 mm ² , max. 25 A, 80% CDF		
	Cable length	500-8.000 mm		
Travel speed	Straight track	max. 200 m/min		
	Curved track	max. 100 m/min		
	Transfer sections			
Suitable for curves up to R		≥ 800 mm		

NOTE

The use of silver-graphite sliding contacts in connection with stainless steel-plated copper conductors is recommended for control signal transmission and low voltages (24 – 48 V, $I_N \leq 1$ A).

It may be useful to use at least 2 current collector trolleys.

The following information is required for ordering a current collector trolley (see model code order text):

- ⇒ Conductor line type **DCL-Pro**
- ⇒ **SAW** current collector trolley
- ⇒ **U**universal or **G** straight track
- ⇒ Number of poles (**4**, 5, 6 or 7 sliding contacts)
- ⇒ Permissible current (20 or **40** A)
- ⇒ Protective earth conductor **PE** or OPE (fitted or none)
- ⇒ Length of the connecting cable (x mm, standard 2000 mm)

NOTE

The designation “**OPE**” must be specified in the order for current collector trolleys that **do not have a protective earth conductor (protective earth symbol PE is omitted)**. In this variant, the green/yellow conductor is replaced by a black cable. The protective earth symbol (PE) is omitted.

The standard connecting cable length is 2000 mm. Other lengths are possible.

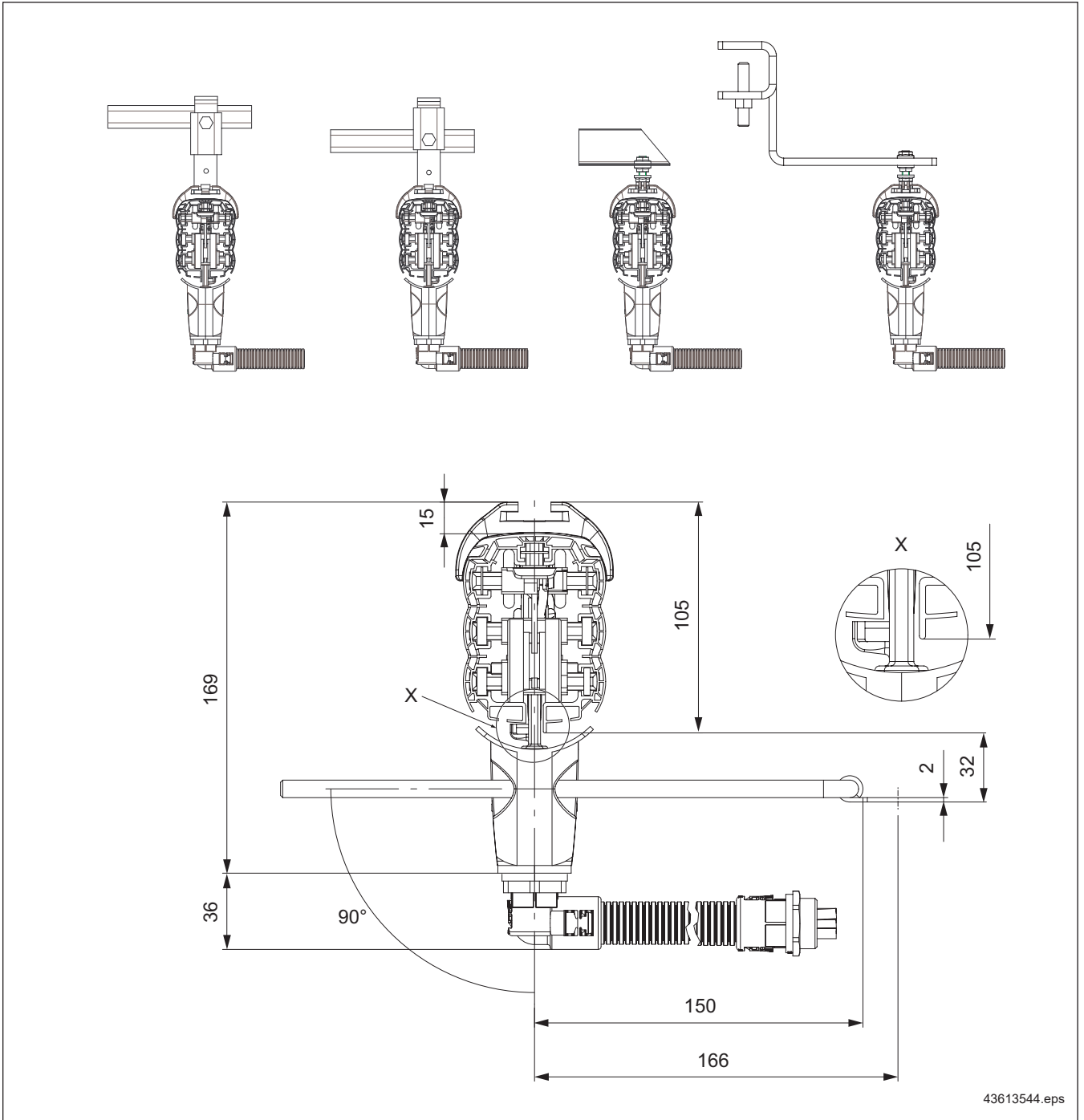
- 1) Current collector trolleys with graphite or silver-graphite sliding contacts should be employed when DCL-Pro installations are used in the open air, in chemical environments and near the sea. Increase the number of current collector trolleys for improved contact reliability. Consider the use of stainless steel-plated copper conductors, if necessary.
- 2) If 2 current collector trolleys are connected in parallel, twice the rated current can be expected to occur. If 3 current collector trolleys are connected in parallel, three times the rated current minus 10% can be expected to occur.
- 3) Single conductors in the corrugated tube. Standard cable length 2000 mm. Other lengths on request.

Model code

Order text, e.g.:

DCL-Pro-SAWU-4-40-PE-2000mm

or DCL-Pro-SAWU-7-20-OPE-4000mm
(no PE, 4000 mm connecting cable)



A special design with an angled cable guide (90°) can be ordered in addition to the standard design, i.e. vertical cable arrangement.

NOTE

The towing arm must be installed horizontally and at an angle of 90° to the current collector trolley.

Model code

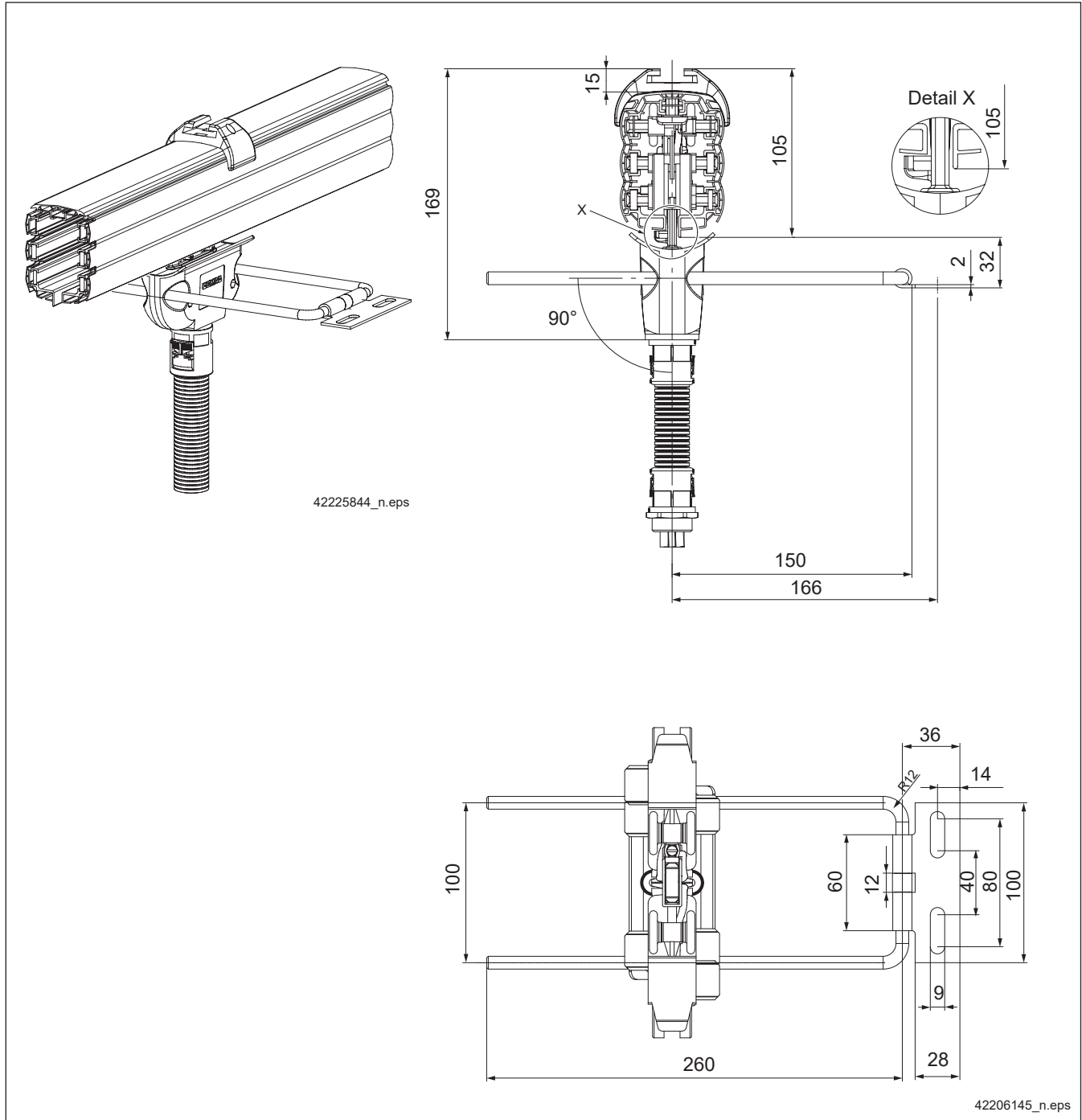
Order text, e.g.:

DCL-Pro-SAWX-4-40-PE-2000mm-W

or
 DCL-Pro-SAWX-7-20-OPE-4000mm-W
 (no PE, 4000 mm connecting cable)

6.10 Towing arm for current collector trolley

6.10.1 Towing arm (standard)



The DCL-Pro-MIT towing arm ensures that the current collector is towed along in parallel to the power supply line when the consumer is moving. It is not suitable for operation with entry and transfer ramps.

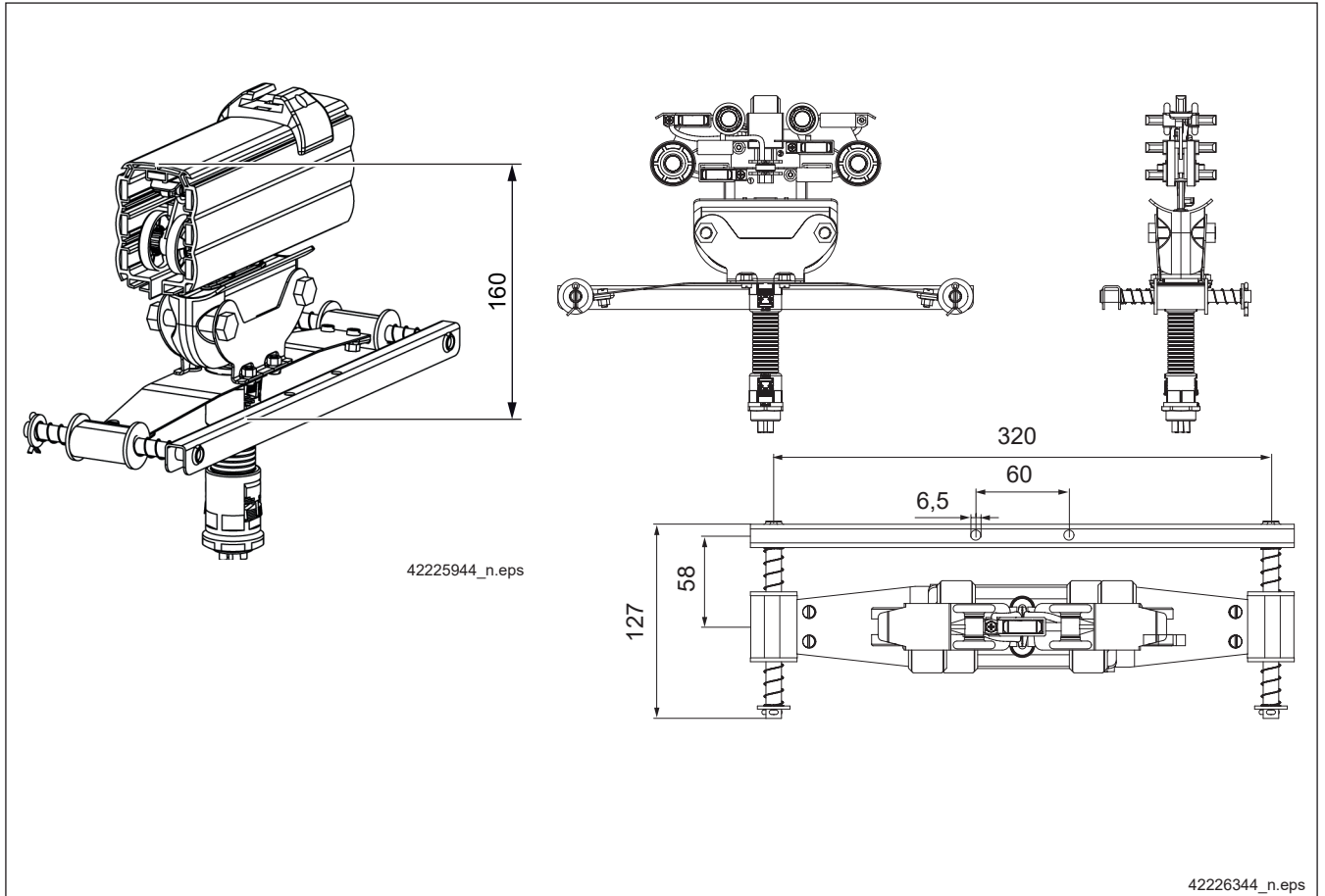
© Demag Cranes & Components GmbH

Model code

Order text, e.g.:

Towing arm **DCL-Pro-MIT 876 561 84**

6.10.2 Towing arm for transfer sections



The DCL-Pro-MITU towing arm ensures that the current collector is towed along in parallel to the power supply line when the consumer is moving. In contrast to DCL-Pro-MIT towing arms, it is used in installations that have entry and transfer ramps.

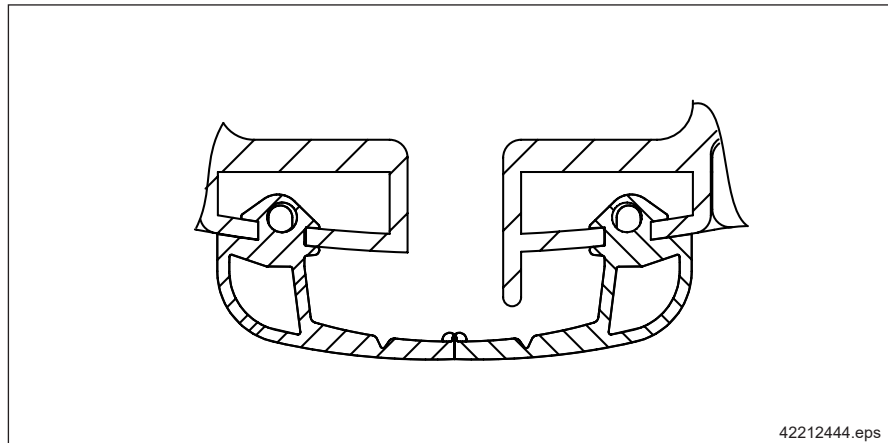
Model code

Order text, e.g.:

Towing arm for installations
that have entry/transfer ramps

DCL-Pro-MITU 876 680 84

6.11 Profile seal



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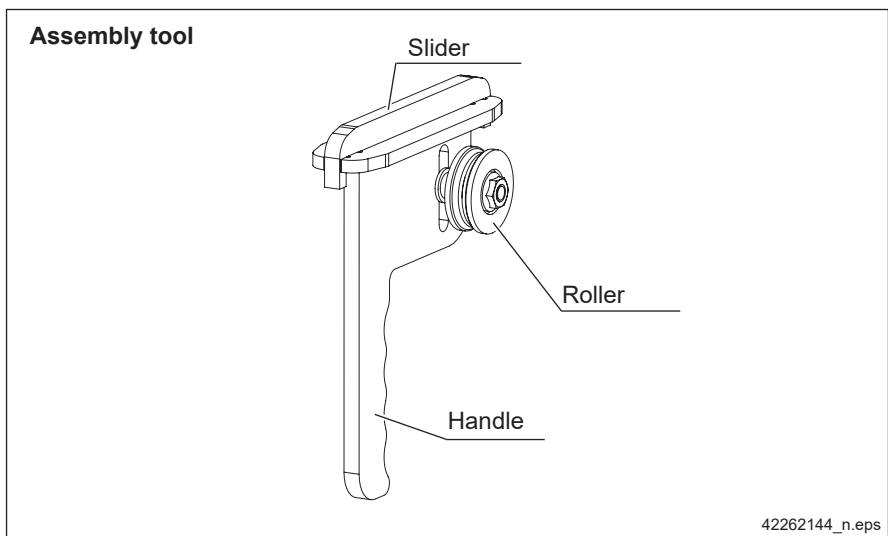
6.11.1 Assembly tool for installing the profile seal



WARNING
Live parts

There is a risk of contact with live parts when the profile seal is installed.

Disconnect the installation from the power supply before installing the profile seal.



42262144_n.eps

The profile seal is supplied on rolls in lengths measuring 40 m.

The profile seal sections have to be bonded together at the joints 1) using cyanoacrylate glue (super glue) 2) for longer DCL-Pro tracks.

Ensure the bonding surfaces are clean and fit together.

NOTE

Profile seal length = 2 x DCL-Pro installation length

The profile seals must be individually pushed into both sides of the conductor enclosure (see also assembly instructions 211 234 44).

If profile seals are used on the installation, the terminal box enclosure halves on the current collector trolley must be prepared (see note in section 6.9).

Order text

DCL-Pro profile seal	876 508 84 1)
DCL-Pro insertion tool	876 509 84
Cyanoacrylate superglue, 20 g	000 383 44 2)

1) Profile seal can be added to the order per metre. Please specify in the order.

2) Order as required.

6.12 Isolating section

For control purposes, the conductor line can be interrupted by means of isolating sections on straight sections or at line powerfeeds.

NOTE

Isolating sections can only be combined with conductor rails that have a cross-section of 25 mm².

Isolating sections are installed on the side of the ramp opening in entry/transfer ramps as standard to ensure protection against accidental contact. Ramps can be installed in systems that have conductor cross-sections larger than 25 mm² as the short length of the copper conductor (max. 257 mm) does not result in a thermal overload of the ramp.

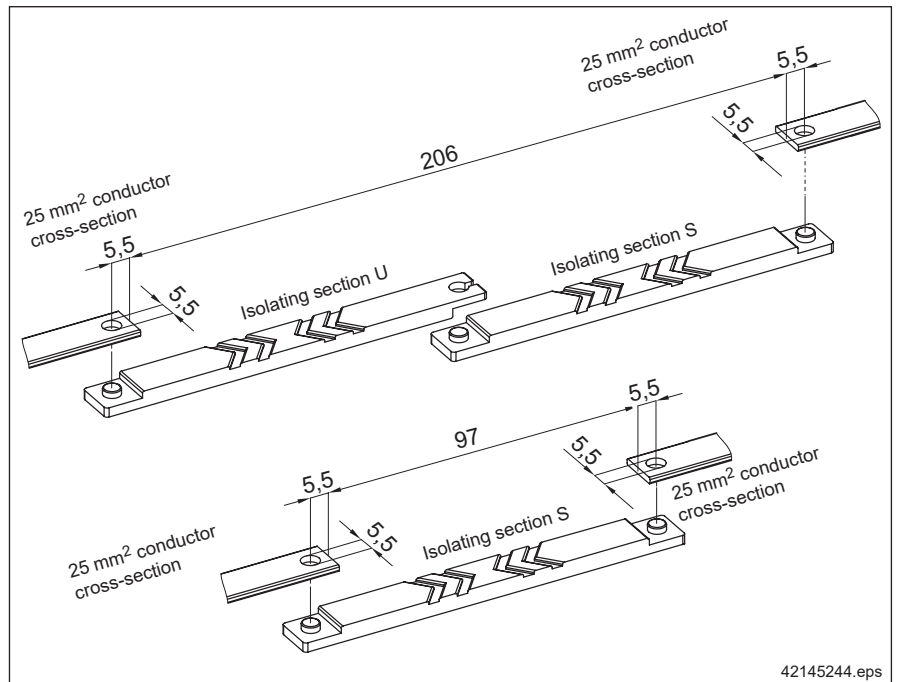
Regardless of this, isolating sections are also used to electrically isolate parts of installations without any mechanical disconnection. For this purpose, isolating sections can be installed in straight sections or line powerfeeds before leaving the factory.

Their lengths should be specified in such a way that no more than two current collector trolleys can collect electric power in the sub-section.

The position of the isolating section must be considered when planning and specifying the installation.

If an isolating section is fitted in the factory, the following detailed information is required:

- position of the isolating section/sections in the installation
- length of each isolating section



Order text

Isolating section U

876 676 84

Isolating section S

876 678 84

7 Component and spare parts

7.1 Component sets

7.1.1 DCL-Pro C-rail suspension set

Designation	Qty	Order no.
Sliding suspension	1	876 638 84
Mounting bracket	1	
Clamp section for C-rail	1	

For 1 suspension

7.1.2 DCL-Pro threaded pin suspension set

Designation	Qty	Order no.
Sliding suspension	1	876 637 84
M8 countersunk screw fitting	1	
M8 locknut	2	
M8 x 70 countersunk screw	1	

For 1 suspension

7.1.3 DCL-Pro conductor connector set

Designation	Qty	Order no.
Conductor connecting lug	2	876 693 84
Conductor connecting lug with clamp section 1)	2	
Conductor connector U-section	1	
M6 x 22 threaded pin	2	
M6 locknut	2	
Instructions	1	

NOTE

DCL and DCL-Pro conductor connectors are **not** compatible with each other.

If a DCL track section is replaced by a DCL-Pro track section in an existing DCL system, the DCL conductor connectors adjacent to the DCL-Pro track section must be replaced by DCL-Pro conductor connectors.

If a section needs to be replaced within an installation, i.e. where there are DCL track sections on the left and right, then a DCL-Pro conductor connector set is required for each conductor rail.

If a DCL installation is extended, i.e. with a connection only at one end, one DCL-Pro conductor connector set can be used for two conductors.

Required conductor connector sets when a DCL-Pro track section is installed in a DCL system:

Installation variant 1: installation with DCL track sections connected on the left and right

Installation variant 2: extension to an existing DCL installation, i.e. with a connection only at one end

Quantity of sets	4-pole	5-pole	6-pole	7-pole
Installation variant 1	4	5	6	7
Installation variant 2	2	3	3	4

7.1.4 DCL-Pro track end set

Designation	Qty	Order no.
End cap	2	876 785 84
DCL-Pro-AK-ES connector end cap	2	
M32 entry sleeve	2	
M25 entry sleeve	2	
ST 4,2 x 9,5 self-tapping screw	4	

1) The clamp section is only required for 10 and 15 mm² conductor cross-sections.

7.1.5 DCL-Pro enclosure profile shortening set

Designation	Qty	Order no.
Shortening template with attachment	1	876 645 84
Drilling protector (5-pole)	1	
Saw for cutting the enclosure	1	
5 mm cutter	1	
5 mm drill	1	
Wire brush for cleaning/deburring	1	
G clamp	1	
Instructions	1	

7.1.6 Electric isolating sections

Designation	Order no.
Isolating section U 1)	876 676 84
Isolating section S 1)	876 678 84

7.2 Spare part sets

7.2.1 Current collectors/current collector trolleys

The parts listed below are subject to a greater or lesser amount of wear while a current collector trolley is in operation.

Wear depends on various factors and is not determined by the current collector trolley operating period alone.

Preventive maintenance is, therefore, required.

NOTE

Worn current collector trolleys or components must be replaced without delay.

Bronze sliding contact set 2)

Designation	Order no.
5-pole 40 A sliding contact set (for 4 + 5-pole CCT)	876 715 33
7-pole 40 A sliding contact set (for 6 + 7-pole CCT)	876 716 33

Graphite sliding contact set 3)

Designation	Order no.
5-pole 20 A sliding contact set (for 4 + 5-pole CCT)	876 717 33
7-pole 20 A sliding contact set (for 6 + 7-pole CCT)	876 718 33

Bronze/silver-graphite sliding contact set 4)

Designation	Order no.
5-pole 40 A/20 A sliding contact set (for 5-pole CCT)	876 726 33
7-pole 40 A/20 A sliding contact set (for 6 + 7-pole CCT)	876 727 33

NOTE

Cleaning trolley available on request

1) Isolating section S = 97 mm isolating distance,
 Isolating section U = 109 mm isolating distance,
 Isolating section S + isolating section U = 206 mm isolating distance.
 The isolating distance can be extended by adding further U isolating sections (see assembly instructions 211 221 44).

2) Power and control conductor sliding contacts: Bronze
 3) Power and control conductor sliding contacts: Graphite
 4) Power conductor sliding contacts: Bronze
 Control conductor sliding contacts: Silver-graphite

8 Resistance to acids, chemicals and fuels

8.1 Acids

Medium			Remark
Acids	Conc.		
Chromic acid	40%	⊕	Avoid direct contact.
Chromic-sulfuric acid	20%	⊕	
Nitric acid	10%	+	Increased wear of sliding contacts
Sulphuric acid	10%	+	
Acetic acid	5%	+	
Carbonic acid	10%	+	
Oleic acid		+	
Tartaric acid	10%	+	Max. temperature + 30 °C Increased current collector wear from + 30 °C to + 60 °C
Formic acid	20%	+	
Arsenic acid	20%	+	
Boric acid	10%	+	
Hydrofluoric acid		+	
Lactic acid	10%	+	
Phosphoric acid	50%	+	
Oxalic acid	10%	+	
Hydrochloric acid	20%	⊕	
Citric acid	10%	+	

8.2 Fuels, oil, grease etc.

Medium			Remark
Petroleum spirit		⊕	Avoid direct contact
Regular petrol		⊕	
Supergrade petrol		⊕	
Kerosine		⊕	
White petroleum spirit		⊕	
Diesel oil		⊕	
Benzole		-	Avoid direct contact
Oil, grease (free from aromatics)		+	
Drilling oil		⊕	
ATE brake oil		⊕	
Foodstuffs		+	
Salt water	Distance < 5 km	+	Use double current collectors
	Distance > 5 km	+	

8.3 Chemicals

Medium			Remark
Alkaline solutions	< 1%	+	Minimum distance 5 m
	> 1%	⊕ / -	
Ammonia water		-	Cannot be answered in general terms.
Alcohol		+	
Hydrocarbons	aliphatic	-	
	aromatic	-	
Chloric solvents		-	
Ester		-	
Ketone		-	
Trichlorethylene		-	
Alcaline solvents			
Ethyl acetate		⊕	
Butanol		-	
Butyl acetate		-	
Methanol		-	
Tuluol		-	
Xylene		-	
Carbon tetrachloride		⊕	
Acetone		-	
Bleaching lye		⊕	

Applies to all chemicals:

Conductors subject to increased oxidation (corrosion).

Resistance information only valid for room temperature (20 °C).

+ resistant

⊕ resistant to a limited extent

52 - not resistant

Demag Compact Line DCL-Pro - _____ - _____

Selected/specified by Customer Demag in Wetter, Germany

Type _____ No. of conductors/poles _____ A (rated current)

Length _____ m

Rated voltage/frequency _____ V _____ Hz

Control voltage _____ V

Protective earth conductor Yes (= PE) No (= OPE)

Complete DCL-Pro track Yes _____ No. of DCL-Pro tracks
 No Spare parts → see remark

Track layout Straight Curved
according to enclosed drawing

Electric power infeed Line powerfeed _____ Quantity
 End powerfeed _____ Quantity

Current collector trolleys _____ Quantity _____ mm cable length
 Bronze sliding contacts (power and control conductors)
 Graphite sliding contacts (power and control conductors)
 Bronze (power) and silver graphite (control) sliding contacts
 Including standard towing arm (not for transfer sections)

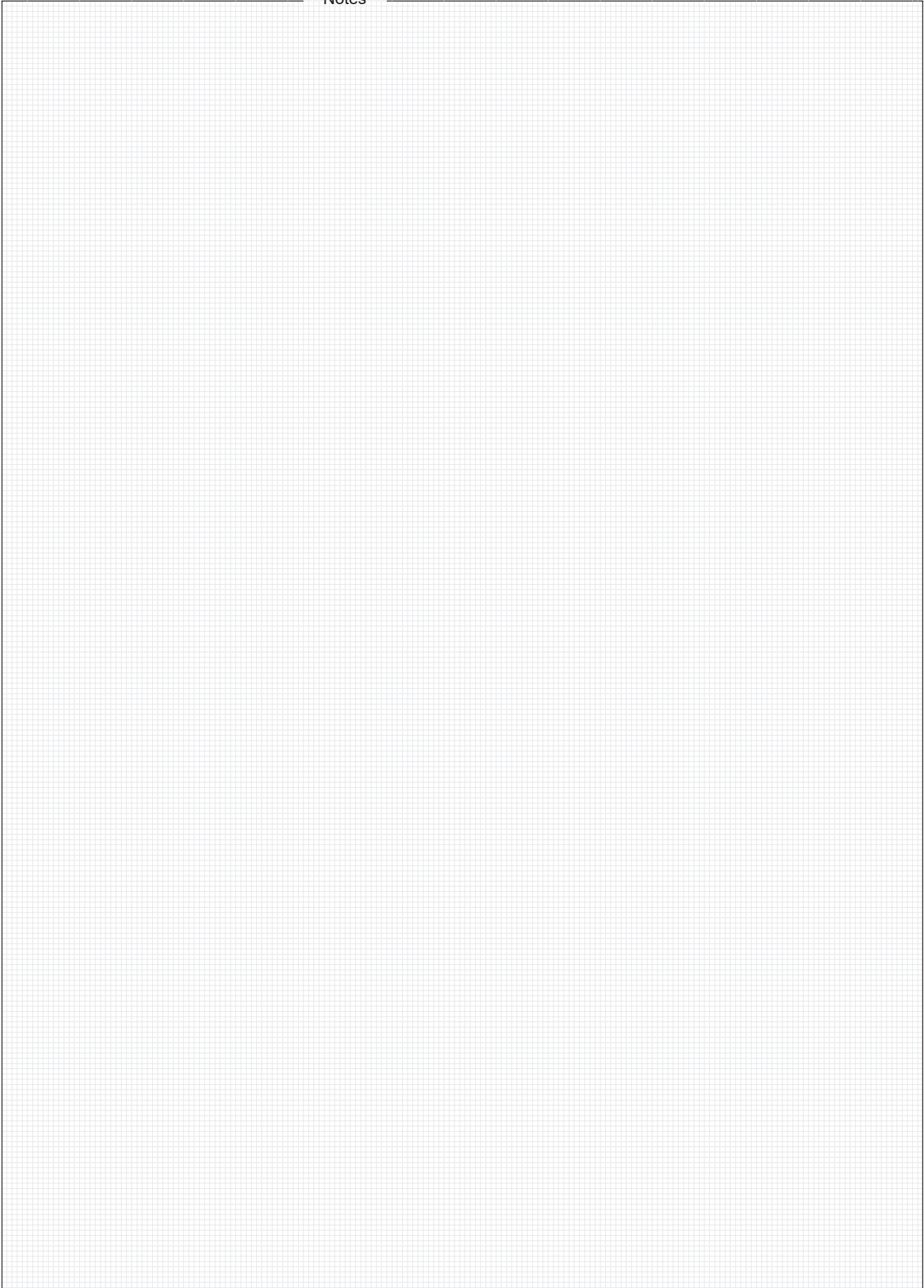
Suspension method C-rail M8 threaded pin

Additional accessories Yes, the following parts: No

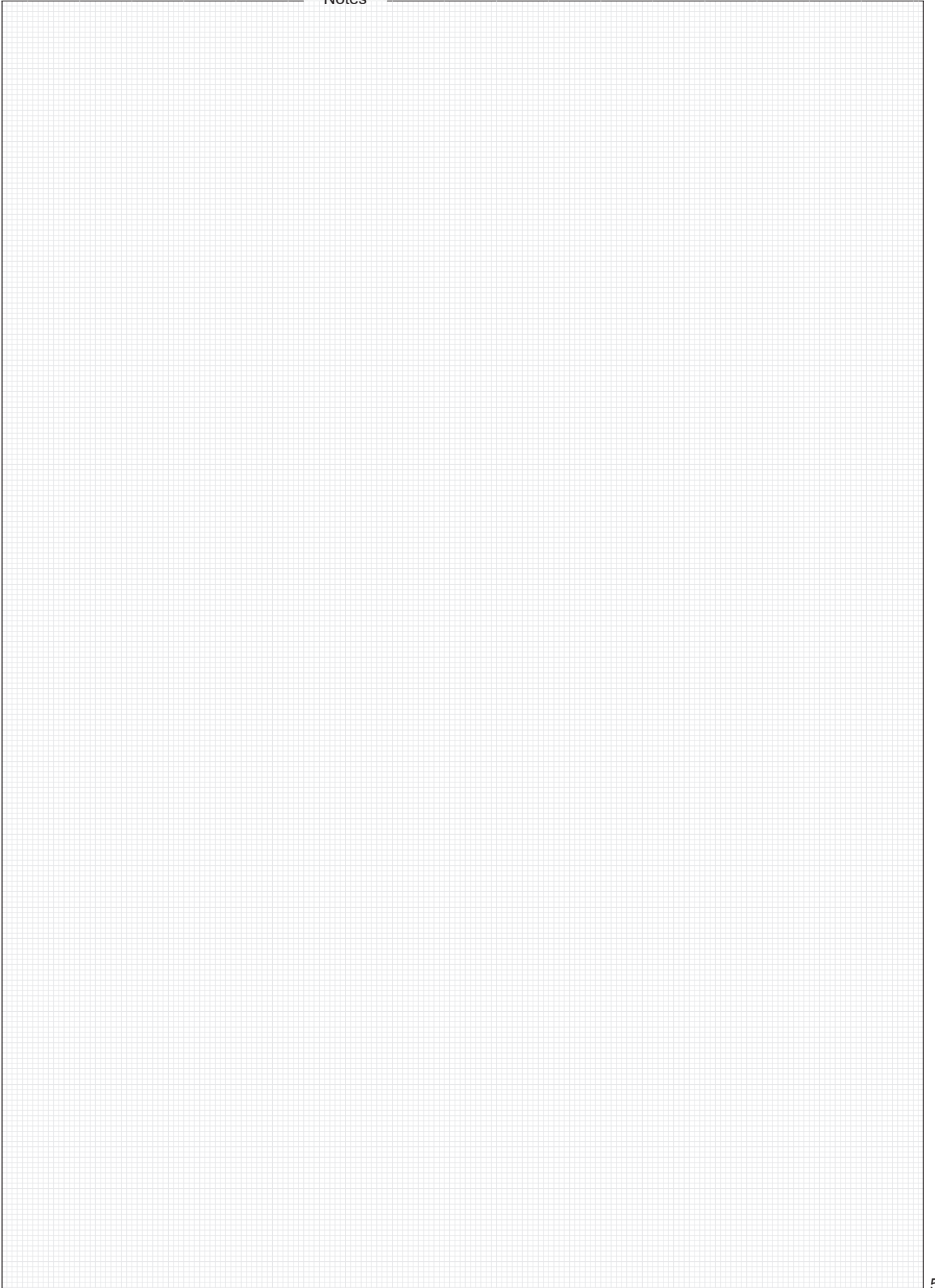
Remarks:

Customer's address and reference

Notes



Notes



**The current addresses of our sales offices, subsidiaries and agencies worldwide can be found on the homepage
www.demagcranes.com**

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