**KAGO AG**
**Railway Technology**
**Zaystrasse 3**
**CH-6410 Goldau**
Phone (+41) 41 859 16 00
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Member of SWISSRAIL



# List of contents complete catalogue


| **0. Installation** | **Coding** | **Page** |
|---|---|---|
| - Montagearbeiten (in german) | d_50_dstlstg | 2 |
| - Machinery | Titelblatt | 3 |
| **1. Rail Contact Clamps** | | |
| - Electrical Rail Connections | e_62_klemme | 4 |
| - Solutions for big return currents | de_62_EA20_erw | 5 |
| - 100 % rail contact: KAGO clamps | e_62_klemme_1-3 | 6-7 |
| - Electric rail connection | e_62_OA_1 / e_62_OA_2 | 8-9 |
| **2. Grounding Fittings and Cables** | | |
| - Contact Strips / Double Plug Strips | de_61_700k / de_61_700zk | 10-11 |
| - Grounding Set for Construction Equipment | e_61_be | 12 |
| - Mast Clamps | e_61_skk | 13 |
| - Grounding Fittings | e_80_erd_1 / e_80_erd_2 | 14-15 |
| - KAGO cables | e_20_kabel_1 / e_20_kabel_2 | 16-17 |
| - Welding and Screwing Fittings | e_80_schweiss_1 | 18 |
| - KAGO Grounding Busbars | e_61_es2x10 | 19 |
| **3. Cable Fastenings for Rails and Sleepers** | e_61_bef | 20 |
| - Cable Fastenings for Rails and Sleepers | e_61_bef_1 / e_61_bef_2 | 21-23 |
| - Special Sleeper Screws „Multi Monti“ without Spreading Pressure | e_61_multimonti | 24 |
| - Pipe Fastening at Masts | e_61_RbefM | 25 |
| **4. Rail Attachment Boxes** | e_61_box | 27 |
| - Rail Attachment Box for Electrical Rail Connections | e_61_gaksu | 28-29 |
| - Rail Attachment Box for axle counters | e_61_box 1 | 31 |
| - Rail Attachment Box for axle counters | e_61_gakaz | 32-33 |
| - Rail Attachment Box for rail sensors and rail contacts Type GAKS-R | e_61_gaks-r | 34-35 |
| - Rail Attachment Box for rail sensors and rail contacts Type GAKS-RG | e_61_gaks-rg | 36-37 |
| - Accessories for Rail Attachment Boxs | def_61_gaksu_zub | 38-40 |
| - Flame cutting for removal of groove | e_61_sb | 41 |
| - Non-metallic covers for ETCS balises | e_61_etcs | 42 |
| **5. Catenary and Insulation Products** | | |
| - High-voltage Resistant Insulation Slabs | de_82_folie | 43 |
| - Insulated contact wire hanger | e_82_fdh | 44 |
| - Electric shock protection | e_61_im | 45 |
| - Bird Protection Profiles | e_82_vsp | 46 |
| - General Terms and Conditions (GTC) | e_70_agb | 47 |


Ce catalogue est également disponible en français.
Dieser Katalog ist auch auf deutsch erhältlich.

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# Wenn's um die Bahn geht!

Erstellen von Stromrück-leitungen und Erdungen

Lieferung und Montage von Hochspannungsisolationen

Lieferung und Montage von Berührungs- und Vogelschutz-produkten

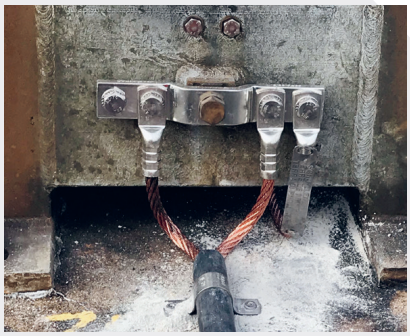
Erstellen von Schwer-befestigungen

Personalvermietung Sicherheitswärter

Maschinenvermietung

Kontaktklemmen und Schienenverbinder

Lieferung und Montage von Gleisanschlusskästen



Erdungszubehör

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# Machinery of KAGO AG

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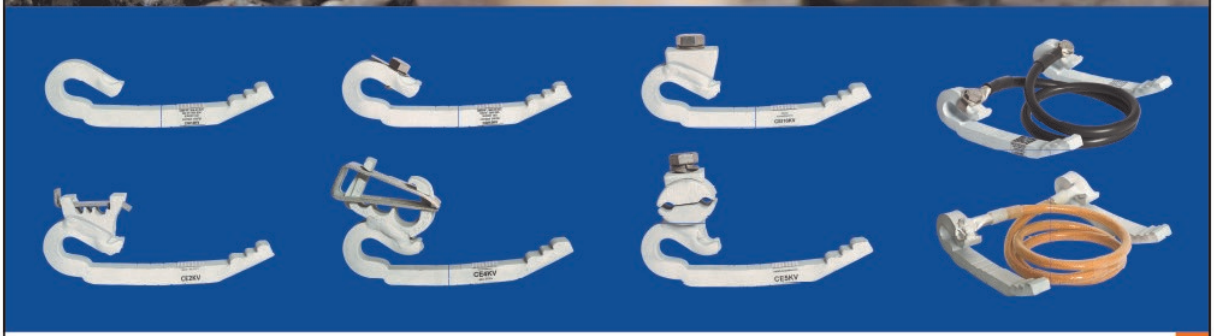
We are pleased to offer our machinery for rental.

Visit us at www.kago.com

# World's Fastest Rail Contact



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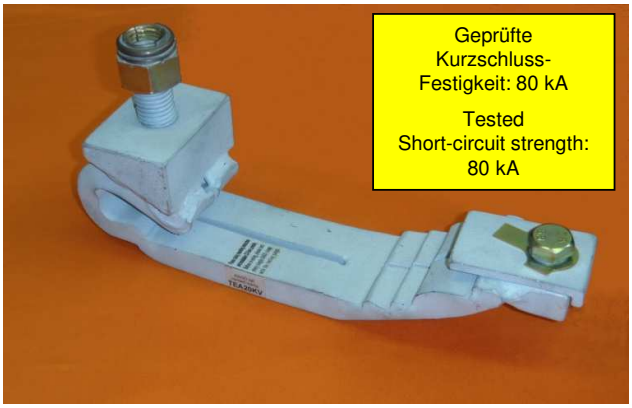
# Lösungen für grosse Rückströme!
# *Solutions for big return currents!*




Doppel-Kontaktklemme mit Aussengewinde M20 für Kabel bis 1000 mm².

*Double Contact Clamp with stud M20 for cables until 1000 mm².*

Spezialanordnung mit 6 Kontaktklemmen und Kupferschiene mit Aussengewinde M20.

*Special installation with 6 contact clamps and copper bar with stud M20.*

Zwei Kontaktklemmen E4 parallel für hochflexible Kabel bis 260 mm².

*Two Contact Clamps E4 in parallel for highly flexible cables up to 260 mm² .*

# 100% competence:

You can place your trust in KAGO rail contact clamps – a leader product worldwide ever since their invention in 1980. Today innumerable rail companies use KAGO clamps to ensure perfect electrical connections day in, day out. With ever-increasing train frequencies, in some cases only one minute apart, absolute dependability of return currents and signal circuits is indispensable for punctuality.

## 100% choice: *A product range well-proven worldwide*

### Clamped connectors

#### Connecting types E2 and E3

Clamps for stiff cables and wires.

Type E2 with grooves 3 / 6 / 7 and 10 mm. Some connecting possibilities: Wires with 7 mm diameter or cables with 25, 35 and 50 mm² cross section.
For other diameters and cross sections please ask.

Type E3 with grooves 3 / 5 / 8 and 10 mm. Some connecting possibilities: Wires with 8 mm diameter or cables with 16, 35 and 50 mm² cross section.
For other diameters and cross sections please ask.

#### Connecting type E4

Clamp for semi-stiff and high-flex cables.

Type E4 with grooves 2,5–5 / 6–10 / 11–16 and 17–21 mm. Some connecting possibilities: Cables with 35, 50, 70, 120 and 240 mm². For other cross sections please ask.

**NEW:** Connecting type E5 for diameters between 9 and 14 mm, this corresponds to cross sections of about 50-120 mm². Picture under http://www.kago.com/english/products/clamps/product_range/e5.html

Electrical rail contact with vibration-resistant cable fixing, for return currents, mast grounding, signal circuits etc.

Electrical rail contacts with vibration-resistant cable fixing. Typical arrangement with two clamps and 240 mm² cable. Ideal for networks with heavy return currents.

### Welded railbonds

#### Connecting type SLR

Electrical rail joint bridging with welded cable connection; cable length and insulation optional; cross-section 16-150 mm².

### Bolted railbonds

#### Connecting type GI12SLR etc.

Electrical rail joint bridging consisting of two GI12 clamps and high-flex cable (length and insulation optional; cross-section 16-150 mm²).

Bolted railbonds can also be manufactured with EA10 or EI16 clamp types.

All data subject to change. Design and product alterations reserved.

# *KAGO rail contact clamps*

New or modernized track sections are naturally more prone to electrical failures, since final joint welding is hardly ever possible straight away. This is where KAGO clamps are particularly valuable – but also for permanent use they have great advantages, because contact resistance between rail and clamp is almost as low as with welded or drilled connections.

Very simple and fast mounting and removal

## Bolted connectors

### Connecting type GI12

Clamp with M12 tapped thread.

Other threads like M8 or M10 on request.

To avoid loose cable connections, always use a locking plate!

### Connecting type EA10

Clamp with M10 stud.

Other threads like M8, M10 or M16 on request.

**NEW:** Connecting type EI16 with M16 tapped thread. Picture under http://www.kago.com/english/products/clamps/product_range/ei16.html

Other threads like M8, M10 or M12 on request.

Electrical rail contact tapped for vibration-resistant M12 screw fixing and cable lug, for return currents, mast grounding, signal circuits etc.

Electrical rail contact with reusable and vibration-proof M10 nut and cable lug for return currents, mast grounding, signal circuits, etc.
Advantages: fast and easy cable fitting, larger contact area.

### Need more details?

Just ask for our CD-Rom or video «Mounting instructions for KAGO clamps».

### 100% safety and nothing but benefits:

- Absolutely reliable electrical connections for all grounding needs, signal circuits and return currents! They make rail contact problems a thing of the past!
- Very fast and easy installation also by unskilled labour, no ballast removal, no drilling, no special tools, no rail flange cleaning – just fit and hammer!
- Reusable again and again thanks to «spring-clip» principle – they keep on biting just as hard!
- Suitable for both provisional and longer-term connections due to very low contact resistance and vibration strength!
- Easy stockkeeping because every clamp covers several rail types!
- A quality product of 100% Swiss origin!
- Available for most rail types!

### Price inquiries the easy way:

Just fill out the enclosed form and fax it back to us. No form available? Then contact us or fill out the online form under http://www.kago.com/english/products/clamps/price_inquiry.html, thank you!

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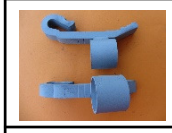
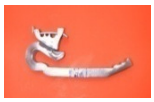
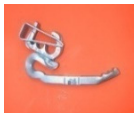
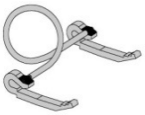
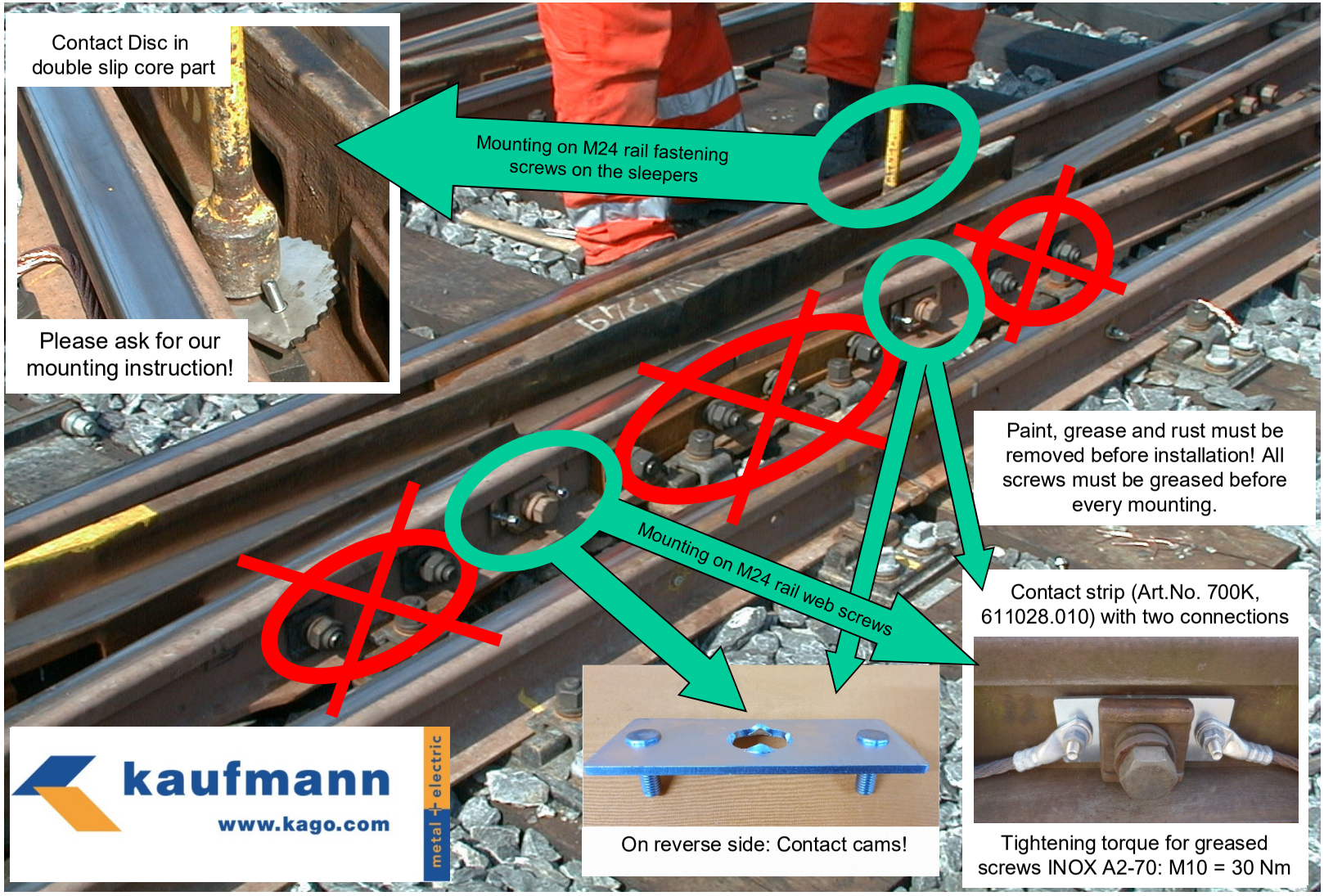
# The most common KAGO clamps and accessories

| Picture | KAGO No. | Art-No. | Description |
|---|---|---|---|
| *Marking clamps* | | | |
| | CQ40HVg | 620305.015 | KAGO Marking Clamp CQ40HVg, with yellow marking (RAL1023), for rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |
| *Fastening clamps* | | | |
| | CR28HKV | 620307.017 | Cable fastening clamp (under rail base), for pipe NW20, for rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. For continuous use. |
|  | CR50HKV | 620307.027 | Cable fastening clamp (under rail base), pipe welded vertically, for pipe NW40, for rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. For continuous use. |
| | CR39HKV | 620307.030 | Cable fastening clamp (under rail base), pipe welded diagonally, for pipe NW40, for rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. For continuous use. |
| | PR38HKV | 621607.016 | Cable fastening clamp (under rail base), for pipe NW20, for rails 36E3, SBB V, 40E1, 50E4, etc. For continuous use. |
| | PR39HKSV | 621607.027 | Cable fastening clamp (under rail base), pipe welded vertically, for pipe NW40, for rails 36E3, SBB V, 40E1, 50E4, etc. For continuous use. |
| *Contact clamps* | | | |
| | CE2KV | 620315.010 | Contact clamp with welded head E2 for stiff cables and wires. Grooves ø 3/6/7/10 mm for cross-sections 4-50 $mm^2$.<br>For rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |
|  | CE3KV | 620315.020 | Contact clamp with welded head E3 for stiff cables and wires. Grooves ø 3/5/8/10 mm for cross-sections 4-50 $mm^2$.<br>For rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |
| | FE2KV | 625010.010 | Spare spring for clamp type E2 and E3. |
|  | CE4KV | 620315.030 | Contact clamp with welded E4 head for high-flexible cables. Grooves ø 5-6/7-10/11-16/17-21 mm for cross-sections 15-240 $mm^2$. DB No. 720188. For rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |

| Picture | KAGO-No. | Art-No. | Description |
|---|---|---|---|
| | FE4KV | 625010.020 | Spare spring for clamp type E4. |
| | CE5KV | 620315.040 | Contact clamp with welded head E5 for stiff cables and wires with ø 9-14 mm, i.e. for cross-sections 50-120mm$^2$.<br>For rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |
| | CGI10KVb | 620310.004 | Contact clamp with tapped thread M10 and blue marking. Mounting fittings included. For rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |
| | CGI12KV | 620310.010 | Contact clamp (DB-No 666856) with tapped thread M12 **without** mounting fittings.<br>For rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |
| | CGI12KV SIBL | 620310.011 | Contact clamp (DB-No 666856) with tapped thread M12, incl. screw M12x20 and and locking plate M12 with two flaps.<br>For rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |
| | CGI12KV RL | 620310.014 | Contact clamp (DB-No 666856) with tapped thread M12, incl. screw M12x20 and RipLock washer M12 made of hardened spring steel, dacromet.<br>For rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |
| | PGI12KV | 621610.010 | Contact clamp with tapped thread M12 incl. mounting fittings, for rails 36E3, SBB V, 40E1, 50E4, etc. |
| | CEA12KV | 620310.020 | Contact clamp with welded head and stud M12 incl. reusable safety nut (other stud sizes available), for rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |
| | CEI16KV best. | 620310.132 | Contact clamp with welded head and tapped thread M16 incl. mounting fittings. For rails 46E1, 54E2, 60E1, 49E1, 54E3, etc. |
|  | SLR... | div. | Welded railbond:<br>- Cable length in cm: _____<br>- Cable cross-section: _____<br>- Isolation: ❑ black ❑ transparent |
| | GI12SLR... | div. | Screwed railbond:<br>- Cable length in cm: _____<br>- Cable cross-section: _____<br>- Isolation: ❑ black ❑ transparent |
| | PW14.0-V | 625050.040V | Testing gauge for contact clamp types A, C, R81a, 5.<br>Testing gauges for other clamp types on request. |
| | 700K | 611028.010 | Contact strip with two M10 connections. Mounting on M24 rail web screws. |
| | 700ZK | 611028.015 | Double plug strip. For all spots where two connections M10 are needed, but only one hole can be drilled. |

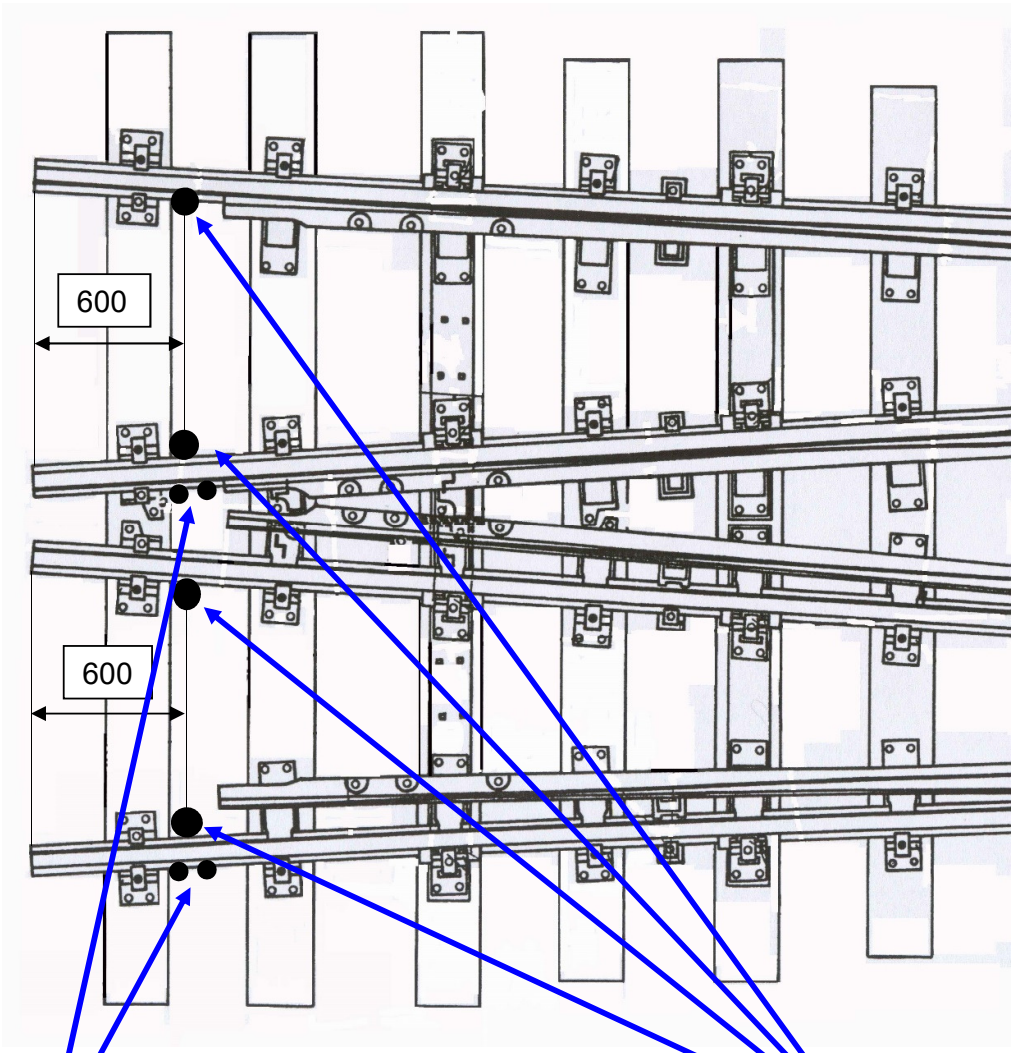
# Electrical rail connections in complex pointwork

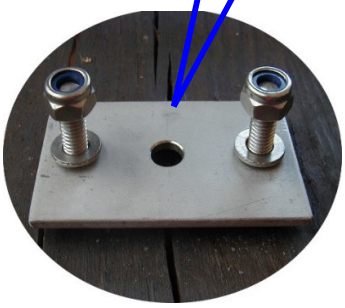


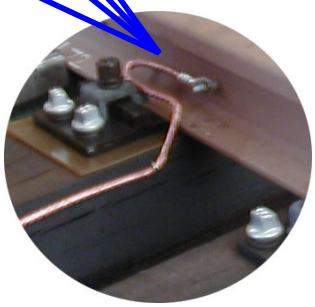
# ***KAGO double plug strip***

(Art.Nr. 700ZK, 611028.015)

For all spots where two connections are needed, but only one hole should be drilled.





700ZK

Requirements for 1 Double Slip:

4 KAGO double plug strips 700ZK
12 KAGO contact strips 700K
(without switch heating: instead of 12 only 8)
40-44 cable lugs

Paint, grease and rust must be removed before installation! All screws must be greased before every mounting.

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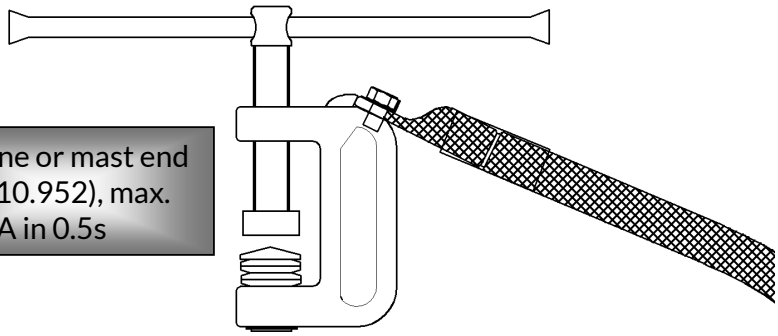
# Grounding set for construction equipment

As soon as excavators or other construction machines work near catenaries (closer than 5 metres), they must be grounded by the rail or by a mast.

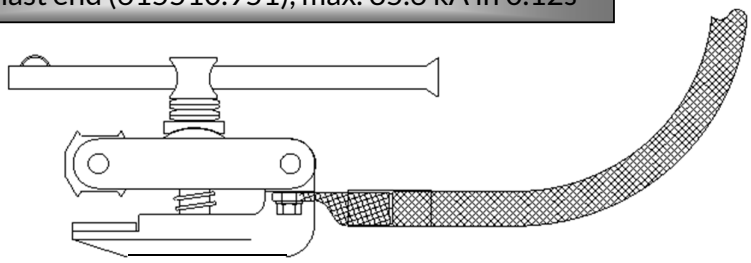
This is done most easily with the high-current proof KAGO Grounding set for construction equipment which consists of the following components:

- Special clamp (machine or mast end)
- Special clamp (rail or mast end)
- High flexible transparent grounding cable 50mm$^2$, length to suit
- Cable ends reinforced and sealed with shrinking tubes



Machine or mast end (615510.952), max. 26.5 kA in 0.5s

Rail or mast end (615510.951), max. 35.6 kA in 0.12s



Set 10 m item no. 615510.950
15 m item no. 615510.955
20 m item no. 615510.960
25 m item no. 615510.965
30 m item no .615510.970
40 m item no. 615510.980
50 m item no. 615510.990

Other length or variants on request.

Alternative with
SBB mast clamp M10,
with blue marking 615510.102

We also repair your existing sets!

27.07.23 / e_61_be

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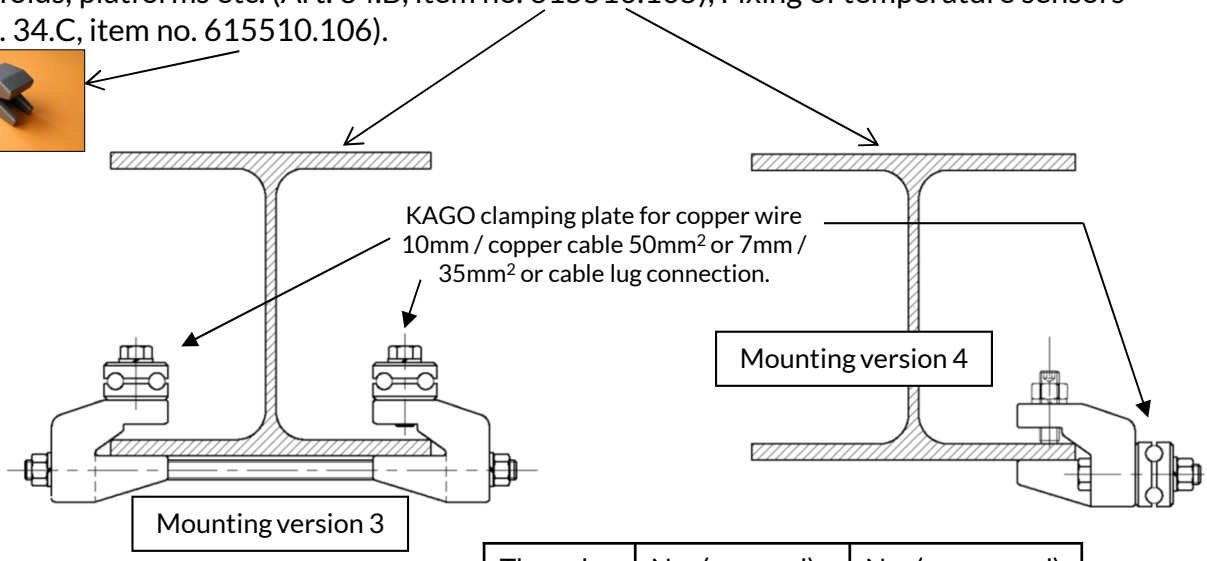
# KAGO mast clamps

Tested
Short-circuit
strength:
40 kA

Ideal for quick groundings at metal supports etc.
Not suitable for use on rails (for this purpose use KAGO rail contact clamps).

Time and money saving, because you can leave both your welding and drilling machines at home!

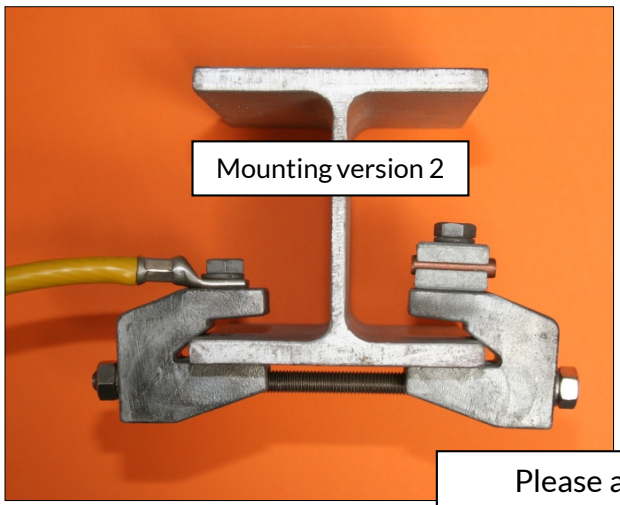
Examples of use: Grounding of construction equipment, machines, fences, railings, scaffolds, platforms etc. (Art. 34.B, item no. 615510.105); Fixing of temperature sensors (Art. 34.C, item no. 615510.106).

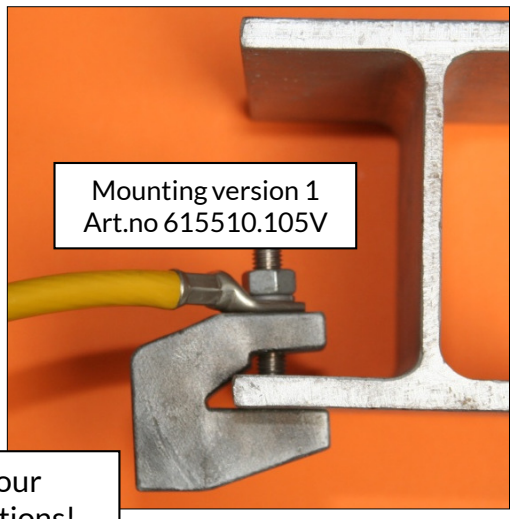



Recommended tightening torques:

| Thread | Nm (greased) | Nm (ungreased) |
|---|---|---|
| M12 | 50 | 100 |

All screws must be greased before every mounting.
Recommended grease: InnoTec Ceramic Grease.




Please ask for our mounting instructions!

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Track Return Current and Grounding / Electrical Insulations / Special Installations / Staff Hire and Machine Rentals / Infrastructure Products

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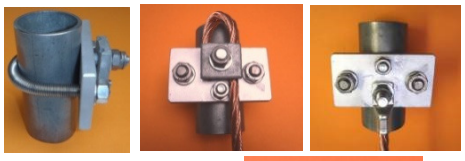
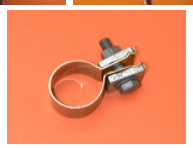
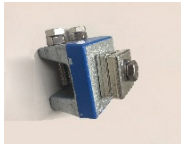
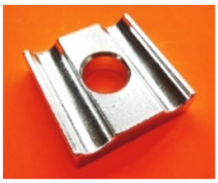
# KAGO grounding fittings

| | KAGO no. | | Item no. |
|---|---|---|---|
| Grounding set (hot-dip galvanised) for wire mesh fences, length 2.10 m. (Can be shortened itself to: 1.05 m, 1.25 m, 1.55 m, 1.85 m). Delivering without cable lug. | 30KVu | | 615510.045 |
| Pipe post grounding set (34KV, hot-dip galvanised), for pipe diameters ½" (21 mm) to 2" (60 mm), solid design. Approved by SBB. | |  | 615510.110 |
| Pipe post grounding set (Cu) for 1" pipe or $Ø_A$ 32.7 – 34.7 mm, light design.(without figures: for 3/8" or $Ø_A$16.2-18.2mm, 1/2" or $Ø_A$ 20.3 – 22.3mm, 3/4" or $Ø_A$ 25.9 – 27.9 mm) | 34.1K (34.3-8K / 34.1-2K / 34.3-4K) |  | 615510.130 (615510.115, 615510.120, 615510.125) |
| Pipe post grounding set (Cu) universal for 3/8" - 2". (without figure: universal 1½" - 4") | 34.3-8-2K (34.11-2-4K) | | 615510.200 (615510.210) |
| Parallel clamp for grounding gabions, Inox A4 | PK | | 615510.060 |
| Grounding clamp for construction equipment at machine or mast end (with screwed connection M12). | EFK | | 615510.952 |
| Grounding clamp for construction equipment at rail or mast end (with screwed connection M10). | SEK | | 615510.951 |
| Mast clamp version C for fixing temperature sensors at the rail (Please have a look at the separate flyer and mounting instructions). | 34.C | | 615510.106 |
| Mast clamp M10 with blue marking and with 2 tinned clamping pieces | 34.MKb |  | 615510.102 |
| Mast clamp version B for grounding of masts, steel beams (Please have a look at the separate flyer and mounting instructions). | 34.B | | 615510.105 |

| | KAGO no. | | Item no. |
|---|---|---|---|
| Grounding block M12 rough for 10 mm wire / 50 mm$^2$ cable. | 256.2Kr | | 615520.163 |
| Clamping piece copper tinned, with 2 grooves 10mm for 50 mm$^2$ cable. | 256.1Kcz |  | 615520.149 |
| Set: Grounding block M12 with clamping piece copper tinned and screw M12x30 INOX A2 (M12x30V2, 301010.0412) and spring washer M12 INOX A2 (M12FV2, 304010.0400) | 256Kc | | 615520.114 |
| Bus Bar copper tinnend, 10xM10-M for installation at catenary masts DIL 18-26. Suitable for cable lugs until max. 95mm$^2$. Fastening with U-bolts M10 or M12. | ES 10xM10-M | | 615510.600 |
| Bus Bar copper tinned, 12xM10 incl. two insulators M10. Suitable for cable lugs until max. 95mm$^2$. (without figures: 6xM10, 6xM12). | ES 12xM10 (ES 6xM10 ES 6xM12) | | 615510.646 (615510.643 615510.642) |
| Bus Bar copper tinned,16xM10. Suitable for cable lugs until max. 95mm$^2$ . Ideal for high speed turnouts and other locations with many groundings. | ES 16xM10 | | 615510.640 |
| Bus Bar copper tinned, 2xM10-g for installation on top of grounding block block or directly on thread in mast. Suitable for cable lugs until max. 95mm$^2$. (without figure: Copper Bus Bar 2xM12). | ES 2xM10-g | | 615510.621 |
| Bus Bar copper tinned,4xM10-g for installation on top of grounding block or directly on thread in mast. Suitable for cable lugs until max. 95mm$^2$. | ES 4xM10-g | | 615510.630 |
| Bus Bar copper tinned, 6xM10-g for installation on top of grounding block or directly on thread in mast. Suitable for cable lugs until max. 95mm$^2$. | ES 6xM10-g | | 615510.635 |

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# KAGO cables

| | KAGO-no. | | Item no. |
|---|---|---|---|
| Copper rope, 50 mm² cross-section, structure: 7x7x1.14mm, $Ø_{ext.}$≈ 10.0mm, semi-rigid, bare. | 50CUBHS | | 201010.020 |
| Copper rope, 95 mm² cross-section, structure: 19x2.52mm, $Ø_{ext.}$≈ 12.6mm, rigid, bare. | 95CUBS | | 201010.030 |
| Copper cable, 50 mm² cross-section, structure: ≈ 19x1.8mm, $Ø_{ext.}$≈ 11.2mm, stiff, insulation yellow-green, halogen-free, UV proof. | 50CUIGGShfuv | | 201025.022 |
| Copper cable, 50 mm² cross-section, structure: ≈ 19x1.8mm, $Ø_{ext.}$≈ 11.2mm, stiff, insulation yellow, halogen-free, UV proof. | 50CUIGShfuv | | 201025.026 |
| Copper cable, 50 mm² cross-section, structure: class 5, flexible, double insulated, insulation yellow-green, coating orange, halogen-free. For crane and building site grounding (without illustration: 95mm²/ 120mm²/ 150mm²) | 50 CUIOEhf (95mm²/ 120mm²/ 150mm²) | | 201030.020 (201030.030 / 201030.035 / 201030.040) |
| Copper cable, 95mm² cross-section, structure: ca. 19x2.5mm, $Ø_{ext.}$ ≈ 15.3mm, Cu-Ø = 12.6mm, insulation yellow, halogen-free. | 95CUIG | | 201025.043 |
| Copper cable, 25 mm² cross-section, structure: ca. 200x0.4mm, $Ø_{ext.}$≈ 9.0 mm, Cu-Ø = 6.2 mm, insulation black. | 25CUISP | | 201015.010 |
| Copper cable, 50 mm² cross-section, structure: ca. 400x0.4mm, $Ø_{ext.}$≈ 12.5 mm, Cu-Ø = 8.9 mm, insulation black. | 50CUISP | | 201015.020 |
| Copper cable, 70 mm² cross-section, structure: ca. 356x0.5mm, $Ø_{ext.}$≈ 13.9 mm, Cu-Ø = 10.5 mm, insulation black. | 70CUISP | | 201015.025 |

Further wires, ropes and cables on request!

| | KAGO-no. | | Item no. |
|---|---|---|---|
| Copper cable, 95 mm² cross-section, structure: 485x0.5mm, $Ø_{ext.}$=16.8 mm, Cu-Ø = 12.5 mm, insulation black. | 95CUISP | | 201015.030 |
| Copper cable, 120 mm² cross-section, structure: 614x0.5mm, $Ø_{ext.}$=17.6 mm, Cu-Ø = 13.7 mm, insulation black. | 120CUISP | | 201015.035 |
| Copper cable, 150 mm² cross-section, structure: 765x0.5mm, $Ø_{ext}$=19.7 mm, Cu-Ø = 15.0 mm, insulation black. | 150CUISP | | 201015.040 |
| Copper cable, 185 mm² cross-section, structure: 944x0.5mm, $Ø_{ext}$=21.9 mm, Cu-Ø = 17.7 mm, insulation black. | 185CUISP | | 201015.045 |
| Copper cable, 240 mm² cross-section, structure: 1225x0.5mm, $Ø_{ext}$=25.0 mm, Cu-Ø = 19.9 mm, insulation black. | 240CUISP | | 201015.050 |
| Copper cable 50 mm² cross-section with rubber sheathing, insulation black, UV resistant (without illustration: 95mm² / 150mm²). | 50CUISG (95CUISG 150CUISG) | | 201018.020 (201018.030 201018.040) |
| Copper cable, 50 mm² cross-section, structure: ≈ 6370x0.1mm, $Ø_{ext.}$≈ 13.8mm, high-flexible, insulation transparent, with additional meshwork. (For grounding of construction equipment, earthing connections, vehicles.) | 50CUITP | | 201020.020 |
| Copper cable, 70 mm² cross-section, structure: ≈ 2160x0.2mm, $Ø_{ext.}$≈ 14.8mm, high-flexible, insulation transparent. | 70CUITP | | 201020.025 |
| Copper cable, 95 mm² cross-section, structure: ≈ 2960x0.2mm, $Ø_{ext.}$≈ 18.4mm, high-flexible, Insulation transparent. | 95CUITP | | 201020.030 |
| Copper cable, 120 mm² cross-section, structure: ≈ 3700x0.2mm, $Ø_{ext.}$≈ 20.2mm, high-flexible, Insulation transparent. | 120CUITP | | 201020.035 |
| Copper cable, 150 mm² cross-section, structure: ≈ 4704x0.2mm, $Ø_{ext.}$≈ 23.2mm, high-flexible, Insulation transparent. | 150CUITP | | 201020.040 |

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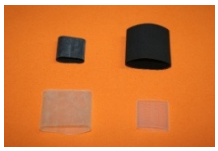
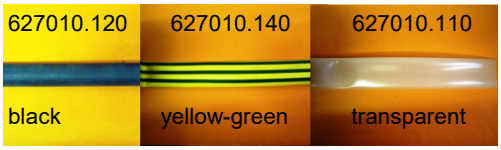
# KAGO welding and screwing fittings

| | Item no. | |
|---|---|---|
| Copper screwing rail connector, straight, 50 mm² cross-section, cable length and cable lugs according to customer's requirements. (without illustration: insulated connectors black, transparent, yellow and yellow-green with shrinking tubes) | div. | |
| Copper welding rail connector, type U or L, 50 mm² cross-section, cable length according to customer's requirements. | div. | |
| Rail connection M10 Cembre, for rail web 14-16.5mm (without illustration: also for rail web 11-14mm) | 611020.010 (611020.011) | |
| Rail connection M12 Contec, simple as well as double connection M12 | 611026.110 | |
| DIN Cable lug M10 for 50 mm² cross-section (without illustration: 35mm² / 70mm² / 95mm² / 120mm² / 150mm² / 185mm² / 240mm² / 300mm²) | div. | |
| DIN Cable lug M12 for 70 mm² cross-section (without illustration: 35mm² / 50mm² / 95mm² / 120mm² / 150mm² / 185mm² / 240mm² / 300mm²) | div. | |
| Heat shrink tubes with glue, black or transparent, standard, length 50mm (for Cable lugs 16-95mm²) and 70mm (for cable lugs 120-240mm²) | 627010.020 black small<br>627010.022 black big<br>627010.010 transp. small<br>627010.012 transp. big |  |
| Heat shrink tube, not gluey, per meter, yellow, for cable lugs 16-95 mm² (without illustration: for cable lugs 120-240mm²) | 627010.130 (627010.135) | |
| Heat shrink tubes, per meter, with glue, black, yellow-green or transparent, for cable lugs 16-95 mm² | |   |

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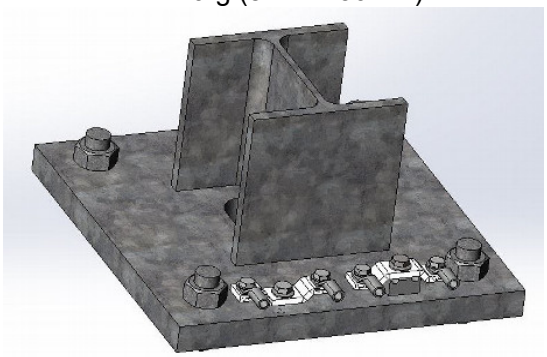
# KAGO grounding busbars

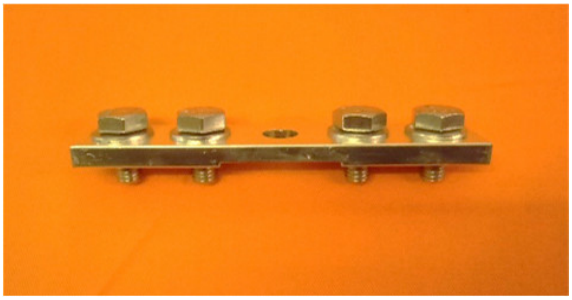
KAGO Grounding busbars allow the connection of two or more cables at the same place.

2xM10-g (8mm x 30mm)



615510.621

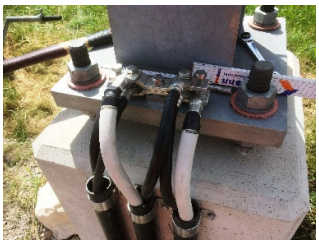
4xM10 Typ SBB light (8mm x 30mm)



615510.632

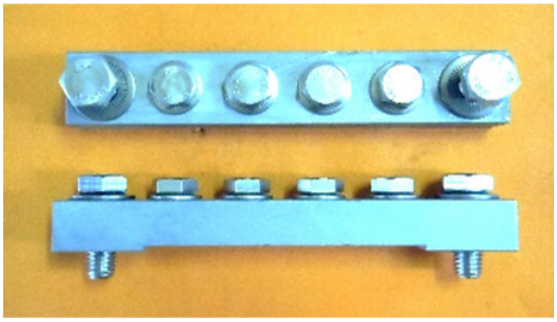
4xM10-g (8mm x 30mm)

Picture on the right: parallel installation for double cross-section



615510.630

4xM10 SBB heavy (20mm x 30mm)

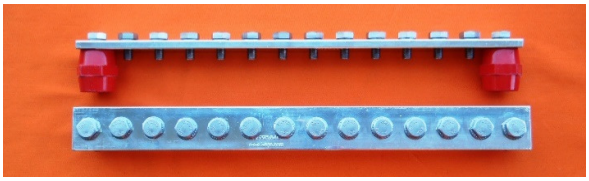


615510.631

6xM10-g (8mm x 30mm)

615510.635

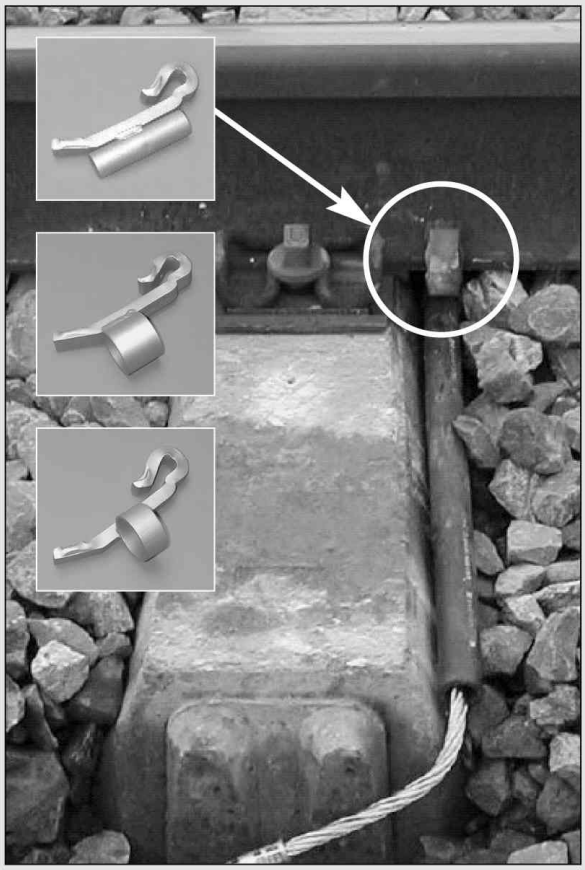
| | |
|---|---|
| 6xM10 (240mm x 8mm x 40mm) | 615510.643 |
| 12xM10 (420mm x 8mm x 40mm) | 615510.646 |
| 6xM12 (240mm x 8mm x 40mm) | 615510.642 |



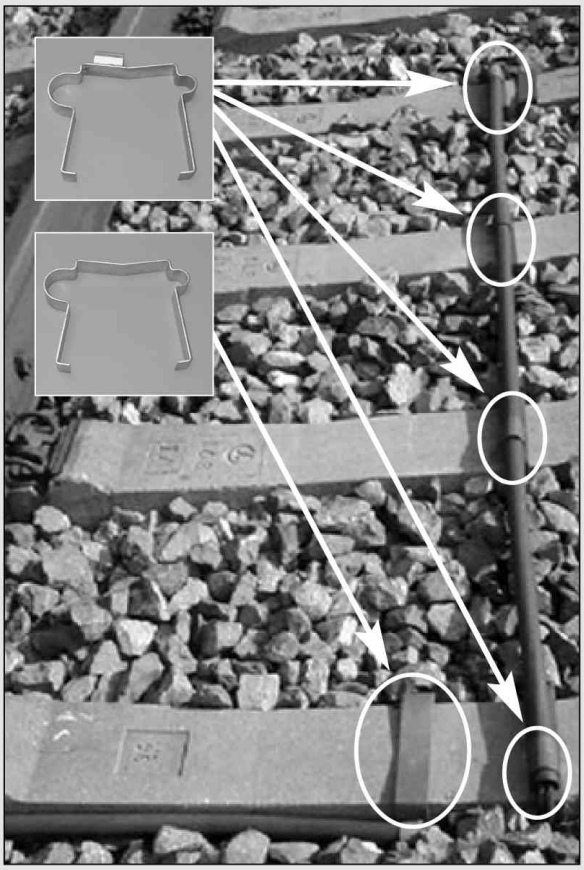
without mounting accessories (always M10): 306012.3095

Material: tinned copper except 615510.631. Connection for cable lugs up to max. 95 mm$^2$

# Cable fastenings for rails and sleepers



Cable fastening clamps (under rail base)

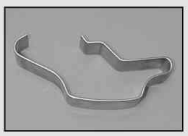


Cable fastening clamps (over or along sleepers)

Pipe fasteners (along sleepers)

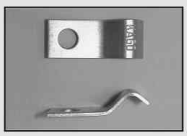
Multi Monti

Nail dowels



Cable fasteners (along rail base)

Cable clips (two-sided)



Cable clips (one-sided)

kaufmann

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**Please notice:**
**New company name and new address!**

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Electrical Rail Connections / High-Voltage Insulations / Cable Fastenings

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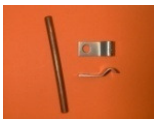
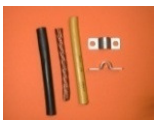
# KAGO cable fastenings for rails and sleepers

| | KAGO no. | | Item no. |
|---|---|---|---|
| Cable fastening clamp (under rail base), for PE pipe 28/22KR, pipe welded vertically, tempered. (without illustration: for other basic clamp types like P etc.) For continuous use. | CR28HKV (PR28HKV) | | 620307.017 (621607.016) |
| Cable fastening clamp (under rail base), for PE pipe 50/44KR, pipe welded vertically, tempered. (without illustration: for other basic clamp types like P etc.) For continuous use. | CR50HKSV (PR50HKSV) | | 620307.027 (621607.027) |
| Cable fastening clamp (under rail base), for PE pipe 50/44KR, pipe welded diagonally, tempered. For continuous use. | CR50HKV | | 620307.030 |
| Cable fastening bracket (over or along sleepers), for PE pipe 28/22KR (at the top), mono-block B91, sleeper centre. | 36.91KMV | | 613025.005 |
| Cable fastening bracket (over or along sleepers), for PE pipe 50/44KR & 28/22KR, mono-block B91, sleeper centre. | 37.91KMV | | 613020.005 |
| Cable fastening bracket (over or along sleepers), for PE pipe 50/44KR & 28/22KR, mono-block B91 and B70, sleeper head outside. | 37.91KAV B91 (37.91KAV B70) | | 613020.010 (613020.011) |
| Cable fastening bracket (over or along sleepers), for PE pipe 28/22KR, whole sleeper width, switch concrete sleeper (for standard gauge and narrow gauge). | 36KMVWa | | 613015.006 |
| Cable fastening bracket (over or along sleepers), for PE pipe 50/44KR & 28/22KR, whole sleeper width, switch concrete sleeper (for standard gauge and narrow gauge). | 37KMVWa | | 613010.006 |
| Cable fastening bracket (over or along sleepers), for sleeper FSV35P for PE pipe 28/22KR. | 36.99KMV | | 613025.090 |

| | |
|---|---|
| Plastic pipe 28/22KR | = Outer ø 28.3 / Inner ø 22.3 mm |
| Plastic pipe 32/24KRF | = Outer ø 32.0 / Inner ø 24.8 mm |
| Plastic pipe 50/44KR | = Outer ø 50.0 / Inner ø 44.0 mm |
| Plastic pipe 50/40KRF | = Outer ø 50.0 / Inner ø 40.0 mm |

| | KAGO no. | | Item no. |
|---|---|---|---|
| Cable fasteners along rail base for rail flanges of 100mm, 125mm or 150mm, spring steel | according to cable | | 612510.003<br>612510.004<br>612510.026 |
| Cable fasteners along rail base for rail flange of 140mm, INOX V4A, light design. | 45. UIC54L | | 612510.010 |
| Cable fasteners along rail base for rail flange of 140mm, INOX V4A, solid design. | 45. UIC54S | | 612510.015 |
| Cable fasteners for fixing cables to steel beams and masts. Clamping range from 10 to 14mm. Steel, hot-dip galvanized. | Caddy | | 304495.010 |
| Tempered clamp for rail markings.<br>(Not appropriate for electrical contacts, because no cable connection possibility available.) | CQ40HVg | | 620305.015 |
| Cable fastening clamp for S49, S54, UIC54, UIC60 etc. for cable fastening along the rail web.<br>(Without illustration: for VST-C/VST36/SBBI, not appropriate for electrical contacts, because no cable connection possibility available.) | CR45HKV<br>(PR45HKV) | | 620307.075<br>(621607.076) |
| Pipe fastener (on wood, steel, concrete sleepers), for PE pipe 28/22KR. Mounting with sleeper screws recommended. | 28-32KBV | | 613030.005 |
| Pipe fastener (on wood, steel, concrete sleepers), for PE pipe 50/44KR. With 2 mounting holes.<br>Mounting with sleeper screws recommended. | 50GKV2 | | 613030.021 |
| KAGO Retaining Bracket for Dilatations<br>(according to S+E Installation Guidelines p.53f) | HBD | | 613030.040 |
| Pipe socket 1" for PE pipe 28/22KR, for dilatations on all types of sleeper (wood, steel, concrete), untreated, length 125mm | 49K | | 613040.025 |
| Z holder 2" for PE pipe 50/44KR, for steel & two-block concrete sleepers as well as protective rails, length 50mm (without illustration: 1" 30mm for PE pipe 28/22KR). | 48GK<br>(48.1K) | | 613030.055<br>(613030.051) |
| Polyethylene (PE) protective cable pipe 28/22KR, 28.3/22.3 mm, halogen free, black, w= 0.23 kg/m, length 5 m. | 28/22KR | | 614010.010 |
| Polyethylene (PE) protective cable pipe 32/26KR, 32.0/26.0 mm, halogen free, black, w= 0.27 kg/m, length 5 m | 32/26KR | | 614010.012 |
| Polyethylene (PE) protective cable pipe 50/44KR, 50.0/44.0 mm, halogen free, black, w=0.45 kg/m, length 5 m | 50/44KR | | 614010.017 |
| Polyethylene (PE) protective cable pipe 28/22KR, halogen free, 28.3/22.3 mm, black, with four openings for cable entries, piece of 2.6 meters. For standard gauge. | 28/22KR2.6m | | 614010.014 |

| | | | |
|---|---|---|---|
| Polyethylene (PE) protective cable pipe 28/22KR, halogen free, 28.3/22.3 mm, black, with four openings for cable entries, piece of 2.0 meters. For narrow gauge. | 28/22KR2.0m | | 614010.011 |
| Socket for PE pipe 28/22KR<br>(without illustration: 50/44KM) | 28KM<br>(50KM) | | 613040.021<br>(613040.042) |
| Socket for PE pipe 32/26KR<br>(without illustration: socket 32KM.2 with riveted spring) | 32KM.1<br>(32KM.2) | | 613040.022<br>(613040.023) |
| Cable protection pipe 28/23KRF black, flexible, inner-ø 23mm (on coil). | 28/23KRF | | 614010.100 |
| Cable protection pipe 40/31KRF, black, flexible Innen-ø 32mm (on coil). | 40/31KRF | | 614010.140<br>Remaining stock |
| Metall protective cable 28/25KRi INOX 1.4301 for dilatations and Z-connections. Piece of 3.0 meters. | 28/25KRi | | 614011.014 |
| Cable clip, INOX, ø 6 mm, single lapping, for wires and cables with ø 7.0 to 9.5 mm. Delivery without copper wire. Hole ø 7.5 mm. | 7KBE |  | 615011. 007<br>Remaining stock |
| Cable clip, INOX, ø 8 mm, double lapping, for wires and cables with ø 7 or 8 mm. Hole ø 7.8 mm. | 8KB | | 615010.008 |
| Cable clip, INOX, ø 11 mm, double lapping, for wires and cables with ca. ø 11 mm (f.e. 50mm$^2$ bare). Delivery without copper cables. Hole ø 7.8 mm. | 11KB |  | 615010.011 |
| Cable clip, INOX, double lapping, ø 29 mm for PE pipe 28/22KR. Hole ø 7.8 mm. | 28KB | | 615010.028 |
| Cable clip, INOX, double lapping, ø 33 mm for flexible PE pipe 32/26KR. Hole ø 7.8 mm. | 32KB | | 615010.032 |
| Cable clip, INOX, double lapping, ø 50 mm for PE pipes 50/44KR. Hole ø 7.8 mm. | 50KB | | 615010.042 |
| Fastening plate for cable clip 50KB instead of a pipe clip (only one borehole necessary!). | HPE50KB | | 615010.043 |
| Fastening plate for two cable clips 50KB instead of a pipe clip (only one borehole necessary!) . | HPD50KB | | 615010.044 |
| Nail dowel for walls and foundations, INOX V2A, ø 6 x 40 mm. Not appropriate on rail sleepers! | 245K | | 615310.005 |

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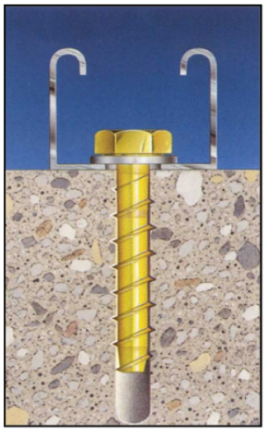

# Special sleeper screws
## with six-edge head

- ► ideal for all kinds of sleepers
- ► **no spread pressure**
  thanks to self-cutting thread
- ► over 25% less installation time
- ► high carrying capacity

**Attention**: The drill hole must be cleaned!
Then turn down the screws until a residual height of 1-2mm and tighten them to 20Nm.

| A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|
| 7,5 x 35 | 6 | 5 | 40 | 13 | INOX A4 | 306212.035 | | 230KV4 | 50 | 20 for concrete and steel sleepers |
| 7,5 x 60 | 6 | 5 | 65 | 13 | INOX A4 | 306212.060 | | 232KV4 | 50 | 20 for wooden sleepers |

A) ø length (mm)
B) ø Hole in concrete (mm)
C) ø Hole in wood (mm)
D) Drilling depth (mm)
E) Spanner width
F) Material quality
G) KAGO product number
H) Screw
I) Packing unit
J) Max. Tightening torque (Nm)
K) Kind of sleeper

For steel sleepers please use our self-cutting screws 35mm, INOX A2, product number 306210.100. ø drilling: 5.5 - 5.7 mm.

For steel sleepers please use our self-cutting screws 40mm, INOX A2, product number 306210.200, without pre-drilling.

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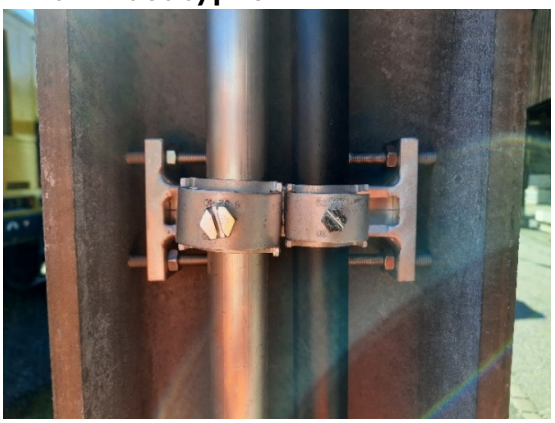
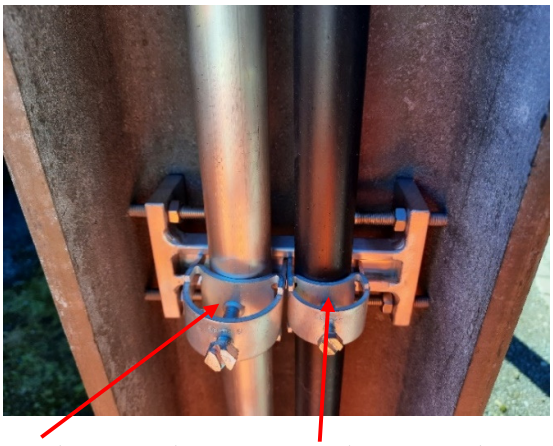
# KAGO Pipe Fastening at Masts

## One component for all mast types!





Fast fastenings visible in the pictures: 32-40mm (on the left) and 25-32mm (on the right)

Item no.: 618790.400. Material: Aluminium.

Choose from four different fast fastenings, suitable for pipes with external diameter: 25-32mm (618790.025) / 32-40mm (618790.035) / 40-48mm (618790.045) / 48-56mm (618790.055).

| Max. possibilities of combination: |
|---|
| 3x 25-32 mm |
| 2x 32-40 mm |
| 2x 40-48 mm |
| 2x 48-56 mm |
| 2x 25-32 mm + 1x 32-40mm |
| 1x 32-40 mm + 1x 40-48 mm |
| 1x 32-40 mm + 1x 48-56 mm |
| 1x 40-48 mm + 1x 48-56 mm |

# KAGO Rail Attachment Box

Type
**GAKSu**
for electrical rail connections

Standard box closed

With busbar and insulation for prevention of stray currents

KAGO AG – Switzerland
Railway Technology
info@kago.com

**kaufmann**
**www.kago.com**

metal + electric

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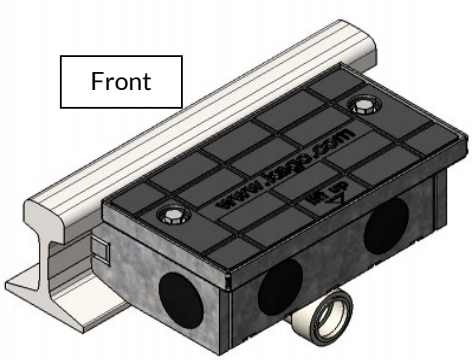
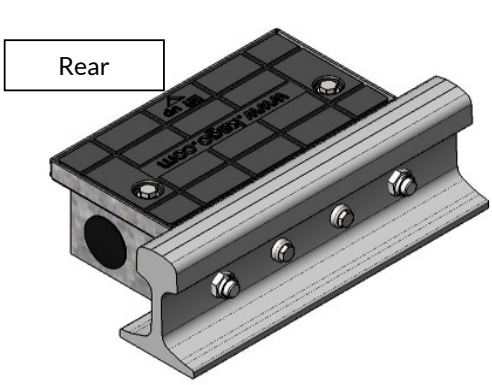
# KAGO Rail Attachment Box Type GAKSu for grounding connections



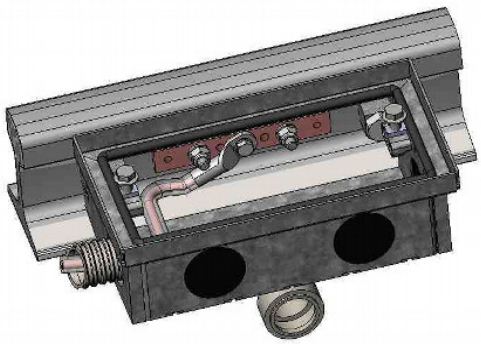




The KAGO Rail Attachment Box is form-closed to the rail and trafficable until 60 tons. It is self-supporting, this means the maximum carrying capacity is also guaranteed when used in lawn trace or other unfortified ground. The cable can be inserted from three sides and from underneath. Easy installation because of generous space inside the box. Cover screw connection with sliding blocks, i.e. replaceable when worn.
A separate box is available for each type of rail and each position (outer side or wheel flange side).

Possible variations:

- with or without copper busbar for large cross-sections or stiff cables
- with or without electrically isolated coating against stray currents
- with or without drainage connection 90°

Without busbar,
but with base plate for
three connections M10
and two connections M12



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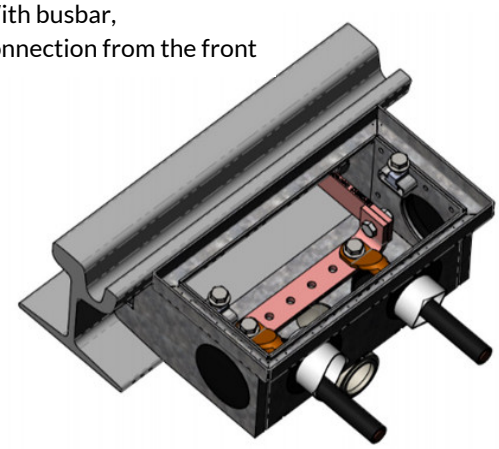
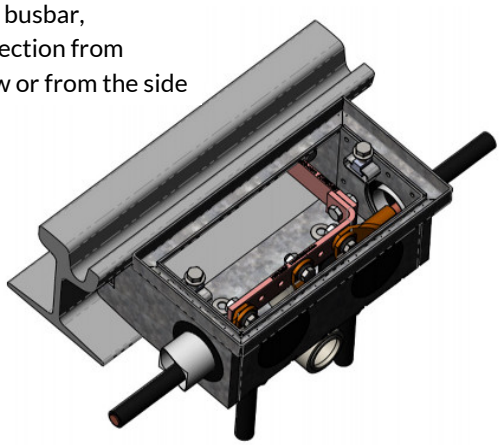
With busbar,
connection from the front



With busbar,
connection from
below or from the side



| | |
|---|---|
| Material (box): | Steel, weldings according to ISO 9692-1, ISO 5817 (D) and ISO 17637. |
| Surface (box): | Hot-dip galvanisation according to ISO 8501-1:2017 and ISO 1461:2009. |
| Material (cover): | Cast according to EN 1563. |
| External dimensions (LxWxH): | 386mm x 206mm x ca. 132mm (height according to rail type) |
| Dimensions according to: | According to EN 14811, RTE 29500 and RTE 41000 |
| Fastening to the rail: | By M20 bolts (INOX A2) and lock nut (INOX A4). Included in delivery. Drill diameter 22mm. |
| Concreting: | Not necessary, because self-supporting! |
| Trafficability/static load test: | D400 according to EN124. Maximal load:<br>Per wheel: 10 tons<br>Per axle: 20 tons<br>Per vehicle: 60 tons (lorries, forklifts, stackers etc.). |
| Weight: | ca. 21 kg. |
| Impermeability: | IP45. |
| Temperature range: | -50°C to +150°C. |
| CE conformity: | Not necessary. |
| RoHS and SVHC: | Not necessary. |
| REACH: | Not necessary. |
| Installation instructions: | Yes. We will be pleased to send you these. |
| References: | Yes. See reference list. |
| Zollnummer (Tares): | 7326.9033. |

# KAGO Rail Attachment Box

Cutting of the groove by new flame cutting system

Type
**GAKS-R**
**GAKAZ**

for axle counters and rail contacts

Available on one side of the rail or on both sides

KAGO AG – Switzerland
Railway Technology
info@kago.com

**kaufmann**
**www.kago.com**

metal + electric

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# KAGO Rail Attachment Box Type GAKAZ

## for axle counters

With rail attachment boxes type GAKAZ the problem of installation of rail sensors on lines with covered tracks is solved: No interference with the magnetic field!

| | |
|---|---|
| Material (box): | Steel, weldings according to ISO 9692-1, ISO 5817 (D) and ISO 17637 |
| Surface (box): | Hot-dip galvanized according to ISO 8501-1:2017 and ISO 1461:2009 |
| Material (cover): | Glass-fiber reinforced plastics (GRP), non-slip. |
| Fire safety (cover): | European fire protection certificate according to EN 45545-2, sets of requirements R22, R23, hazard levels HL1-3;<br>American fire protection standard according to UL-94, level FV0 (self-extinguishing). |
| External dimensions: | ca. 719mm x 330mm x 177mm plus ca. 719mm x 290mm x 177mm. |
| Dimensions according to: | EN 14811, RTE 29500 und RTE 41000. |
| Suitable for which rails: | For all rails, see questionnaire. |
| Sleeper spacing: | Min. 80 cm. Otherwise alternative: GAKS-RG. |
| Fastening to the rail: | By M12 bolts (INOX A2). Included in delivery. Drill diameter 13.5mm. |
| Suitable for which axle counters / rail sensor brands: | For all product, see questionnaire. |
| Concreting: | Necessary. The iron ties of the box have to be concreted. See mounting instructions point 11. |
| Weight: | ca. 45kg for both halfs. |
| Impermeability: | IP24 (the box is open at the bottom). |
| CE- conformity: | Not necessary. |

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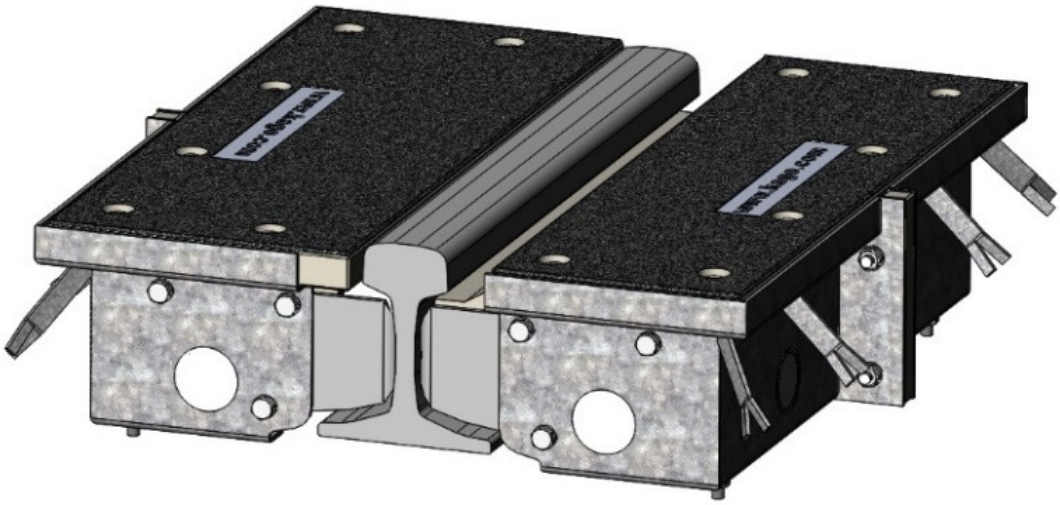
| | |
|---|---|
| RoHS and SVHC: | Not necessary. |
| REACH: | Not necessary. |
| Temperature range: | -50°C to +130°C. |
| Trafficability/static load test: | According to EN124, full functionality has been proven until 25 tons weight, i.e. unrestricted access for trucks, lift trucks or rescue vehicles. |
| Maximum deflection of cover: | 10.3mm (25 tons). |
| Winter practice test: | Yes, trialed in winter at below zero temperatures and with the use of salt. |
| Installation instructions: | Yes. We will be pleased to send you these. |
| References: | Yes. See reference list. |
| Zollnummer (Tares): | 7326.9033. |



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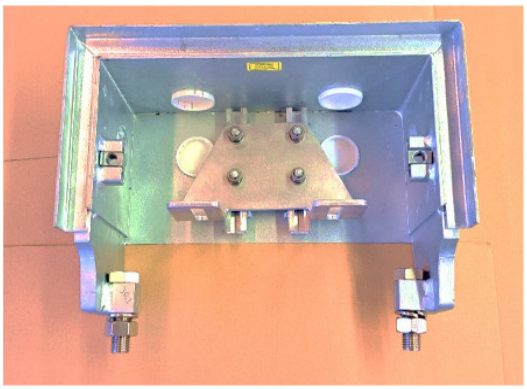
# KAGO Rail Attachment Box Type GAKS-R

## for rail sensors and rail contacts



With rail attachment boxes type GAKS-R the problem of installation of rail sensors on lines with covered tracks is solved: No interference with the magnetic field!

| | |
|---|---|
| Material (box): | Steel, weldings according to ISO 9692-1, ISO 5817 (D) and ISO 17637 |
| Surface (box): | Hot-dip galvanized according to ISO 8501-1:2017 and ISO 1461:2009 |
| Material (cover): | Glass-fiber reinforced plastics (GRP), non-slip. |
| Fire safety (cover): | European fire protection certificate according to EN 45545-2, sets of requirements R22, R23, hazard levels HL1-3;<br>American fire protection standard according to UL-94, level FV0 (self-extinguishing). |
| External dimensions GAKS-R: | 386mm x 206mm* x ca. 132mm (height according to rail type). |
| | * only cover area |
| Dimensions according to: | EN 14811, RTE 29500 and RTE41000. |
| Suitable for which rails: | For all rails, see questionnaire. |
| Fastening to the rail: | By M20 bolts (INOX A2) and lock nut (INOX A4). Included in delivery. Drill diameter 22mm. |
| Suitable for which axle counters / rail sensor brands: | For all products, see questionnaire. |
| Concreting: | Not necessary, because self-supporting! |
| Weight: | ca. 18 kg. |
| Impermeability: | IP24. |
| CE- conformity: | Not necessary. |

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| | |
|---|---|
| RoHS and SVHC: | Not necessary. |
| REACH: | Not necessary. |
| Temperature range: | -50°C to +130°C. |
| Trafficability/static load test: | According to EN124, full functionality has been proven until 18 tons weight, i.e. unrestricted access for trucks, lift trucks or rescue vehicles. |
| Maximum deflection of cover: | 10.8 mm (18 tons). |
| Winter practice test: | Yes, trialed in winter at below zero temperatures and with the use of salt. |
| Installation instructions: | Yes. We will be pleased to send you these. |
| References: | Yes. See reference list. |
| Zollnummer (Tares): | 7326.9033. |

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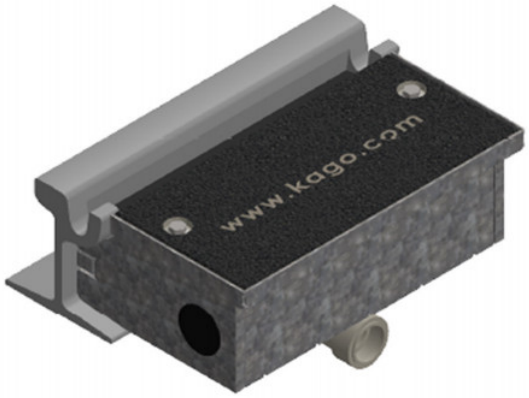
# KAGO-Rail Attachment Box Type GAKS-RG

## for rail sensors and rail contacts




With rail attachment boxes type GAKS-RG the problem of installation of rail sensors on lines with covered tracks is solved: No interference with the magnetic field!

| | |
|---|---|
| Material (box): | Steel, weldings according to ISO 9692-1, ISO 5817 (D) and ISO 17637 |
| Surface (box): | Hot-dip galvanized according to ISO 8501-1:2017 and ISO 1461:2009 |
| Material (cover): | Glass-fiber reinforced plastics (GRP), non-slip. |
| Fire safety (cover): | European fire protection certificate according to EN 45545-2, sets of requirements R22, R23, hazard levels HL1-3;<br>American fire protection standard according to UL-94, level FV0 (self-extinguishing). |
| External dimensions GAKS-RG: | 472mm x 330mm* x ca. 132mm (height according to rail type). |
| | * only cover area |
| Dimensions according to: | EN 14811, RTE 29500 and RTE41000. |
| Suitable for which rails: | For all rails, see questionnaire. |
| Fastening to the rail: | By M20 bolts (INOX A2) and lock nut (INOX A4). Included in delivery. Drill diameter 22mm. |
| Suitable for which axle counters / rail sensor brands: | For all products, see questionnaire. |
| Concreting: | Not necessary, because self-supporting! |
| Weight: | ca. 27 kg. |
| Impermeability: | IP24. |
| CE- conformity: | Not necessary. |

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| | |
|---|---|
| RoHS and SVHC: | Not necessary. |
| REACH: | Not necessary. |
| Temperature range: | -50°C to +130°C. |
| Trafficability/static load test: | According to EN124, full functionality has been proven until 18 tons weight, i.e. unrestricted access for trucks, lift trucks or rescue vehicles. |
| Maximum deflection of cover: | 20.2 mm (18 tons). |
| Winter practice test: | Yes, trialed in winter at below zero temperatures and with the use of salt. |
| Installation instructions: | Yes. We will be pleased to send you these. |
| References: | Yes. See reference list. |
| Zollnummer (Tares): | 7326.9033. |

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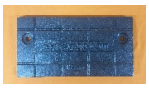
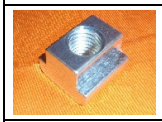
# Zubehör für KAGO-Gleisanschlusskästen
# Accessories for KAGO Rail Attachment Boxes
# Accessoires pour les boîtes KAGO

| | | | | |
|---|---|---|---|---|
|  | 615560.523 | Gussdeckel | Cast iron cover | Couvercle lourd |
| | 616020.603<br><br>(ohne Abb: 616020.606) | GFK-Deckel zu GAKS-R 372x195x26mm<br><br>GFK-Deckel zu GAKS-R 372x218x26mm | GRP cover for GAKS-R 372x195x26mm<br><br>GRP cover for GAKS-R 372x218x26mm | Couvercle PRV pour GAKS-R, 372x195x26mm<br><br>Couvercle PRV pour GAKS-R, 372x218x26mm |
| | 616020.610 | GFK-Deckel zu GAKS-RG 458x218x26mm | GRP cover for GAKS-RG 458x218x26mm | Couvercle PRV pour GAKS-RG, 458x218x26mm |
| | 616020.611 | GFK-Deckel zu GAKS-RG 458x273x26mm | GRP cover for GAKS-RG 458x273x26mm | Couvercle PRV pour GAKS-RG, 458x273x26mm |
| | 616020.900<br>616020.901 | Schmutzlappen und Halteband für GAKS-R | Dirt skirt and retaining strap for GAKS-R | Languette contre la saleté et bande de fixation pour GAKS-R |
|  | 615560.902 | Nutenstein (Verschleissteil für Deckelbefestigung) | Sliding block (wear part for cover fastening) | Tasseau (pièce d'usure pour fixer le couvercle) |
| | 301010.0413 | Deckel-Befestigungsschrauben M12x35, Inox A2 | Screw M12x35, Inox A2, for fastening of cover | Vis de fixation pour le couvercle M12x35, Inox A2 |
| | 304412.5400 | Federrippenscheibe M12, Inox A4 | Spring washer M12, Inox A4 | Rondelles élastiques M12, Inox A4 |
| | 615565.803 | Dichtschnur 10mm | Seal 10mm for cover | Cordon d'étanchéité 10mm |
| | 615580.609 | Befestigungsschraube M20x70 + Befestigungsmutter M20 + Federring M20 | Fastening screw M20x70 + fastening nut M20 + spring washer M20 | Vis de fixation M20x70 + écrou de fixation M20 + rondelle-ressort M20 |
| | 615550.802 | Abdeckkappe weiss, ø 50mm | Protection cap white, ø 50mm | Capuchon blanc, ø 50mm |
| | 615550.803 | Abdeckkappe schwarz, ø 64mm | Protection cap black, ø 64mm | Capuchon noir, ø 64mm |

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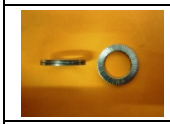
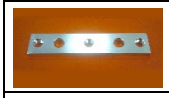
| | | | | |
|---|---|---|---|---|
| | 615550.805 | Abdeckkappe schwarz, ø 89mm | Protection cap black, ø 89mm | Capuchon noir, ø 89mm |
| | 615560.592 | Entwässerungs-winkel 90°, grau | Drainage connection 90° grey | Coude de drainage 90°, gris |
| | 615560.900 | Entwässerungs-auslass gerade | Drainage connection straight (grey) | Raccord de drainage droit |
| | 615560.899 | Gegenmutter Ent-wässerungsauslass | Locknut for drainage connection straight | Contre-écrou pour le raccord de drainage droit |
| | 614010.025 | Entwässerungsrohr 50KRF | Drainage pipe 50KRF (white) | Tube de drainage 50KRF |
| | 611026.110 | Schienenanschluss Contec M12 | Rail connection Contec M12 | Connexion de rail Contec M12 |
| | 615580.850 | Kupfergrundplatte verzinnt 3xM10 + 2xM12 | Tinned copper base plate 3xM10 + 2xM12 | Plaque de base en cuivre étamé, 3xM10 + 2xM12 |
| | 615580.851 | Sammelschiene lang: Distanzbügel Rillen-schiene innen, verzinnt, M10/M12 | Busbar long: Tinned distance bracket for inner groove rails, M10/M12 | Barre de cuivre longue: Étrier de distance pour des rails à ornière à l'intérieur étamé, M10/M12 |
| | 615580.852 | Sammelschiene: Anschlussbügel M10/M12 aussen, verzinnt | Busbar: Tinned connecting bracket (outside) M10/M12 | Barre de cuivre: Étrier de raccordement extérieur étamé, M10/M12 |
| | 615580.853 | Distanzbügel kurz für Vignolschiene oder Rillenschiene aussen, verzinnt, M10/M12 | Short tinned distance bracket for vignol rails or outer groove rails, M10/M12 | Étrier de distance court pour des rails vignole ou des rails à ornière à l'ex-térieur, étamé, M10/M12 |
|  | 304412.9300<br>304412.9400 | Nordlockscheibe M10<br>Nordlockscheibe M12 | Nordlock washer M10 / Nordlock washer M12 | Rondelle Nordlock M10 /<br>Rondelle Nordlock M12 |
|  | 615580.857 | Kupfergrundplatte verzinnt 3xM16 | Tinned copper base plate 3xM16 | Plaque de base en cuivre étamé, 3xM16 |
| | 615580.858 | Sammelschiene: Distanzbügel lang für Rillenschiene innen, verzinnt, M16 | Busbar: Long tinned distance bracket for inner groove rails, M16 | Barre de cuivre: Étrier de distance longue pour des rails à ornière à l'intérieur étamé, M16 |

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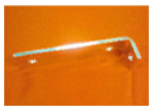
|---|---|---|---|---|
|  | 615580.859 | Sammelschiene: Anschlussbügel M16 aussen, verzinnt | Busbar: Tinned connecting bracket (outside) M16 | Barre de cuivre: Étrier de raccordement extérieur étamé, M16 |
| | 616010.526 | Kurzer Deckel Spurkranzseite GAKAZ | Short cover for wheel flange side, without tongue | Couvercle court pour côté gorge |
| | 616010.527 | Langer Deckel Aussenseite GAKAZ | Long cover for outer side | Couvercle long pour côté extérieur |
| | 616010.522 | Abdeckplatte zu Deckel kurz .526 | "Tongue" for short cover (groove rails) .526 | Plaque protectrice (côté gorge) pour couvercle court .526 |

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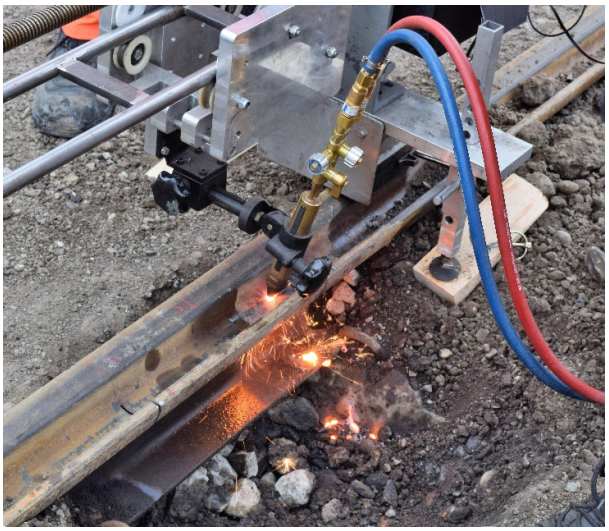
# Flame cutting for removal of groove

If you want to install axle counters at groove rails, first the groove must be cut off.
Until now this work was done by a big cutting-off wheel in a very energy-sapping and time-consuming way.
Nowadays KAGO AG has adopted the much more efficient process of flame cutting for cutting off the groove. This saves a lot of time and money. Just ask for an offer!


Flame cutting process to cut off the groove.

The separated groove will be knocked out with a hammer.

Installed box at separated groove, still without an axle counter.

Axle counter on holding bracket.

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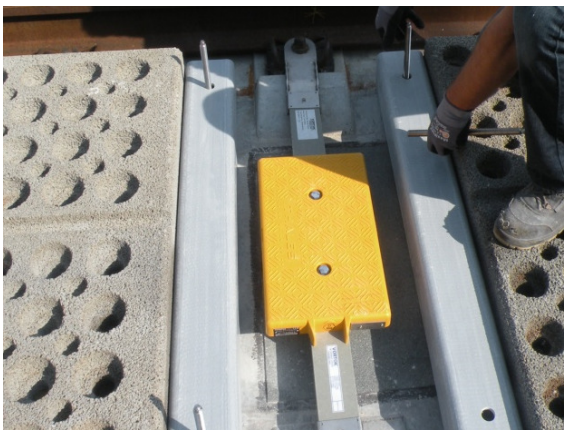
# Non-metallic covers for ETCS balises

## capable of bearing lorries



ISO 60 heavy duty *

Concave surface (Slipping class R13)

Corrosion and saltwater resistant

Electrically insulating, not magnetic

* maximum bending 5 mm with a wheel load of 18 tons.

Self-extinguishing and halogen free

Operating conditions from -100°C to +180°C

Weather and UV resistant

High strength

Standard size:

Grating closed for normal gauge 1113 x 657 x 60 mm, item no. 616090.100 and 616090.150.

Other dimensions on request.

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kaufmann
www.kago.com
metal + electric

# High-Voltage Insulations

*Voltage flashovers finally under control*

Goldau, Kaschirandbrücke

*Undercut of the minimum distances also with 15kV and 25kV!*

**Specifications Slab:**
- Material: Polyethylene
- Thickness: Standard 5.0 mm (others on request)
- Single plate size: max. 3x 1,5m
- Electrical strength: 235 kV according to EN 50124
- Colours: black RAL 9017 or grey RAL 7042

Depot Zürich

**We need the following information:**
1. Object (tunnel or bridge? location?)
2. Photos (surface wall: concrete, gunite, stone etc.?)
3. Plans
4. Tension (V)
5. Max. pantograph wideness (cm)
6. Shall insulation be removable or not?

Ask for the Swiss Railways approval!

KAGO – Our Know-how: Your advantage!

References in Switzerland, Austria, Australia and Malaysia.

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# Insulated contact wire hanger

Near bridges, tunnels, depots etc. it is often necessary to insulate the catenary in order to maintain safety distances. In such areas the new non-conductive KAGO Hanger will provide safe suspension of the contact wire. Even in high humidity, electrical flashovers are completely eliminated.

With roll for temporary and permanent installation. Article No. 618250.450V

New: Special version for situations without catenary wire

Installation: To cut to the correct length on site, an iron saw, a drill and a 10.5 mm drill bit are required. Caution: When cutting off, keep to minimum distance of 1cm/kV between contact wire and bridge or tunnel.

Technical data: High quality synthetic material / Non-ageing / Weather and UV resistant / Non-hygroscopic / Colour: black / Width: 30 mm / Standard length 750 mm. Material thickness: 5 mm.

Maintenance recommendation: Hanger should be cleaned every 24 months.

KAGO – Your specialist for electrical insulations

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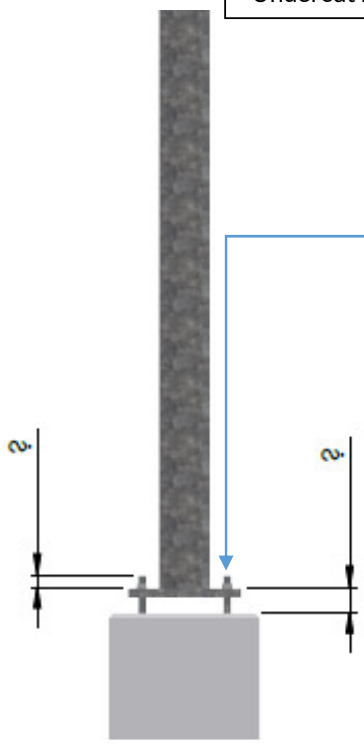
# Electric Shock Protection for masts and other objects

In the zone of „simultaneous touchability“ (<1.75m) people can be endangered by potential differences (rail vs. power station potential). More pictures (also from other objects like fences, anchor rod, etc.) on https://www.kago.com/en/installation/electrical-insulations/electric-shock-protection/ .

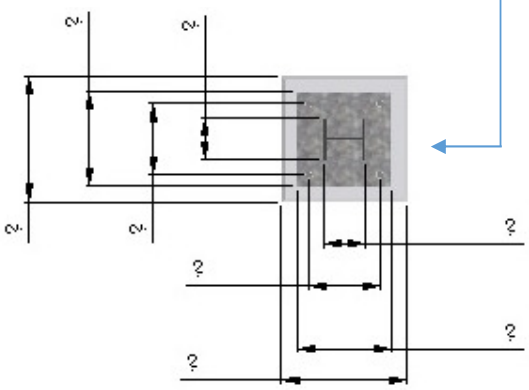
* Undercut minimum



**We need the following information:**

Customer:_____

1. Shape: ☐ square / ☐ H-shape / ☐ polygonal (round masts)
2. Colour: ☐ black RAL 9017/ ☐ grey RAL 7042
3. Grounding connection: ☐ yes / ☐ no
4. Total height to insulate _____
5. Nut size (see A): _____
6. Mast type: please fill in the desired measurements below
7. Please send us photos and plans



In Switzerland: Installation made by KAGO AG! In foreign countries: Riveted version available!

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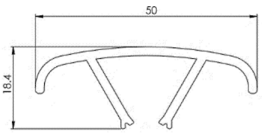
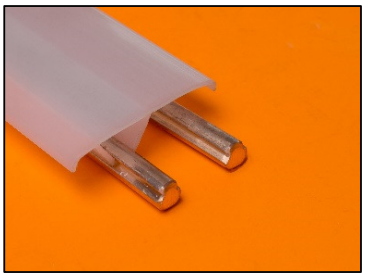
# Bird Protection Profiles for Contact Wires

## Bird protection profile for simple contact wire

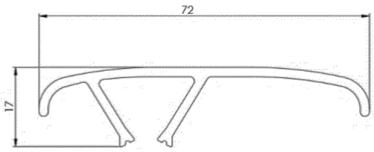
| | |
|---|---|
| 618740.100 | VSP |
| Weight: | 0.332 kg/m |
| Bird protection profile for simple contact wire (Length 4.5m) | |




## Bird protection profile for twin-wire



| | |
|---|---|
| 618740.550 | VSPD |
| Weight: | 0.440 kg/m |
| Bird protection profile for twin-wire (Length 3.0m) | |

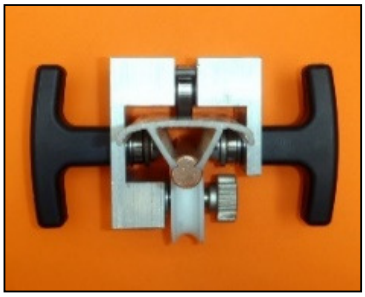



Large birds walking the contact wire often cause short circuits when flying off. This is effectively avoided by our bird protection profiles.

The bird protection profiles are suitable for the following contact wires: AC-100, BC-100, AC-107, BC-107, AC-120, BC-120, AC-150 und BC-150. For other contact wires please contact us.

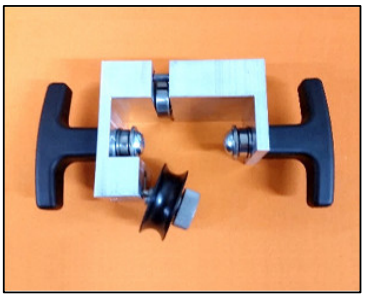
Ask for our installation instructions.

## Installation tool for simple contact wire



| | |
|---|---|
| 618740.900 | VSP-M |
| Weight: | 0.610 kg/m |
| Installation tool for VSP | |

## Installation tool for twin- wire



| | |
|---|---|
| 618740.902 | VSP-MD |
| Weight: | 0.681 kg/m |
| Installation tool for VSPD | |

KAGO – Our Know-how: Your advantage!

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# General Terms and Conditions (GTC)

## 1. Definitions

1.1 *Content:* The following conditions rule settlement, content and transaction of purchase contracts between KAGO AG and its clients and suppliers (both shall be called „partners“ in the following paragraphs for reasons of simplicity). These conditions apply to all our deliveries, services and contracts, as long as no diverging written agreements have been made.

1.2 *Validity:* The partner acknowledges these Terms and Conditions with his order or the acceptance of our contract. Legal or commercial conditions of the partners are only valid when explicitly accepted by us. References to conditions in the inquiry will be ignored.

1.3 *Language:* The german version of these Terms and Conditions („Allgemeine Geschäftsbedingungen“) is the original and only legally binding one.

## 2. Conditions of purchase

2.1 ***Invoice- and Delivery and pick up address*** KAGO AG, Zaystrasse 3, CH-6410 Goldau, Switzerland. Consignments outside of working hours (0800 –1200 / 1300–1700 h) are to be arranged in writing. **Costs arising due to non-adherence to these regulations will be charged solely to the partner.**

2.2 *Orders* by KAGO AG will only be accepted if effected in writing. All work done on basis of orally conferred instructions occur at the partner's risk alone.

2.3 *Surpluses:* If, due to technical reasons, an excess of the ordered quantity is manufactured, KAGO AG is not obliged to pay these.

2.4 *Immaterial law of property* on technical records, drawings, projects, inventions and so forth, which KAGO AG provide, remain their property and may not be copied, multiplied nor be brought to the attention of a third party, without the written permission from the above named.

2.5 *Proprietary rights:* Data, prototypes, theories, engineering drawings, tools and such, ordered and paid for by KAGO AG, unless otherwise agreed – remain their property and are to be returned without enquiry or stored free of charge, at the conclusion of contract. Property of KAGO AG may not be destroyed within 15 years of production without written permission.

2.6 *Observance of secrecy:* The partner and KAGO AG treat all data which is neither public knowledge nor generally accessible as confidential. If in doubt treat all data as confidential. This observance of secrecy must be adhered to before the completion of the contract and also after the conclusion of the contract terms. Rights reserved for legal clarification.

2.7 *Penalties:* If the partner infringes his duty on §§ 2.4, 2.5, and 2.6, he then owes KAGO AG a penalty of 20% of the selling price of the business concerned, or a minimum of CHF 10'000.- per case.

## 3. Conditions of sale

3.1 *Quotes:* As long as not otherwise stated, the validity of quotes is 30 days. Rights reserved for prior sale at any time.

3.2 *Incoterms:* Our delivery conditions are – as long as not otherwised stated – according to the Incoterms 2010 (ICC Publication 715).

3.3 *Delivery periods:* The delivery periods are normally valid as from receipt of order, but only start on the day when KAGO AG is in possession of all necessary information from the partner concerning execution, modification etc. The delivery deadline is calculated from the day the goods are ready for despatch, regardless of whether the despatch can result or not due to circumstances which KAGO AG cannot be held responsible for.

3.4 *Exceptions:* The delivery periods are normally considered binding and are deemed as observed when the delivery follows accordingly, or respectively the partner has been advised of dispatch. The delivery may be prolonged under following circumstances:
- if the information KAGO AG needs in order to fulfill the contract is not received on time, or if the partner subsequently requires modifications or amendments and causes herewith a delay on performance.
- if hindrances arise beyond the control of KAGO AG, regardless of whether the cause is due to the above named, the partner or a third party, such as factory breakdowns, delays by subcontractors, acts of God such as natural catastrophes, war, strikes etc. In such a case, the partner must be prepared to renegotiate the contract as necessary.
- if the partner or a called upon third party is behind schedule with the work or the fulfilment of the contract terms.
- if the partner does not adhere to payment conditions.

3.5 *Delays:* KAGO AG is obliged to inform the partner of delays. The partner is not entitled to withdraw from the contract nor to demand indemnification on account of delayed deliveries. This is possible only in cases of gross negligence or illegal intention.

3.6 *Inspection of goods:* The partner alone is responsible for the costs of all inspections he desires.

3.7 *Usage and risk* of deliveries pass over to the partner at the place of hand-over. KAGO AG will not accept responsability for belated deliveries caused by the partner. The risk of damage passes over to the partner on the originally scheduled delivery date, whether the commodity is still stored on site or already delivered to the end destination.

3.8 *Rights to use:* The partner obtains the non-transferable right to use and application of the contract matter. But advertising and publications relating to contract specific performance require the prior written agreement from KAGO AG.

3.9 Cancellation or suspension of contracts by the partner is only possible with KAGO AG's explicit agreement in writing. In any case, the accumulated costs for special consignments must be covered. A deduction of at least 20% of the gross amount or CHF 100.- per returned consignment will be claimed for deliveries retracted due to reasons KAGO AG cannot be held responsible for. Only stock products will be accepted as returns. Transport costs will be charged separately.

## 4. Conditions of rental

Omitted in the english version

## 5. Prices

5.1 *Settlement:* Our products and services will be invoiced in Swiss Francs (CHF) or in Euro (EUR) according to the customer's wish.

5.2 *Prices:* All prices are valid per quantity unit, VAT excluded and ex works. Costs for packing, administration, transport, insurance, customs etc. will be charged separately.

5.3 *Price modifications:* If conditions of price formation like raw material prices, currency parities, taxes, duties, etc. change between offering and delivery date, KAGO AG is authorized to adapt prices and conditions to the new circumstances without prior notice.

5.4 *Extra charge for small quantities:* KAGO AG has the right to claim an extra charge of CHF 50.- on accounts under CHF 300.-. All discounts are inapplicable.

5.5 *Express charge:* KAGO AG has the right to claim an express charge of 10% of the cost price, at least CHF 50.- for deliveries which are to ensue within five working days, or earlier than the quoted delivery date, or which on account of their urgency lead to production changes.

5.6 *Extra charge for expensive material supply:* KAGO AG has the right to claim an expenses charge of 10% or at least CHF 6.- per sales item, if within a delivery items are requested for in uncustomary quantities (no whole packages or wire rolls etc.), which have a work intensive consequence (counting, measuring etc.).

## 6. Conditions of payment

6.1 *Advance Payment:* KAGO AG has the right at any time to insist on advance payment for goods, without stating reasons herefore, especially with first time customers or foreign clients.

6.2 *Terms of payment:* Goods not paid in advance are to be paid for without reductions for cash or other discount within 30 days of the account date. The payment is considered effective once the amount owing has been credited to the designated bank account and is at free disposal to KAGO AG. A settlement with counter claim is not permitted. All outstanding accounts must be fully paid up before subsequent deliveries.

6.3 *Defaults in the payment conditions:* If the partner doesn't adhere to the arranged payment date then he will be liable without further warning and must pay a default interest of 5% from the 31st day after the accout date. A sum of CHF 20.- will be charged for each posted reminder. The non-adherence to the payment conditions dispenses KAGO AG from their delivery obligation, but not the partner from their obligation to accept.

6.4 *Reservation of proprietary rights:* The parties agree that the deliveries only then transfer into possession of the partner when all payment obligations have been fulfilled. The partner will maintain the delivered products at their own cost during the duration of reservation, insure against theft, breakage, fire, water and other risks and overall take measures so that the claim to possession of KAGO AG will neither be impaired nor dismissed.

## 7. Faults – Guarantee – Liability

7.1 Contract fulfillment: KAGO AG is obliged in all cases to fulfill contracts competently. But as they strive to continually develop their products and to adjust to the latest technical standards, they retain the right at all times, without prior notice, to make adjustments to construction and fittings. Hence, content of advertising brochures or descriptions in technical documents are only binding as long as they have been explicitly expressed for the present project.

7.2 *Faults:* The partner must check the condition of the delivery and immediately notify KAGO AG in writing of possible defects. Defects are considered to be evidently poor material, defects in construction, faulty design and non-adherence to the ensured specifications. If no advice follows within 8 days of the delivery time, then the delivery and the performance of KAGO AG is considered approved. Faults which despite accurate inspection cannot be detected within this time frame are to be reported immediately upon being detected, or no later than 3 months after goods being received. Later notification of faults will not be accepted.

7.3 *Guarantee:* The guarantee responsibility of two years is only valid to the direct partner and is restricted by choice of KAGO AG to improvement or replacement delivery. If an improvement or a replacement isn't economically reasonable, then a right to an appropriate reduction of the price exists. All other claims, also for time or indemnification will be rejected. Excluded from the guarantee are damages resulting from natural wear, non-adherence to our mounting instructions or excessive strain. Furthermore the guarantee ceases or lapses in case of the partner undertaking changes or repairs on the goods themselves or through a third party, without advising or without authorization from KAGO AG; likewise if the partner does not take immediate steps to prevent more damage and to enable KAGO AG to rectify the defect.

7.4 *Guarantee time limit:* The guarantee term is 24 months unless explicitly otherwise agreed. The term begins with the dispatch of the goods. If dispatch is delayed for reasons beyond the control of KAGO AG, the guarantee term shall expire no later than 18 months after the notification for dispatch. The guarantee term for replaced or repaired parts is 6 months from their replacement if guarantee of other parts expires beforehand.

7.5 *Liability:* All installation manuals must be strictly obeyed and no KAGO products must be modified mechanically or by welding, otherwise any product liability will be rejected.
Other claims of the partner than those explicitly expressed in this GTC, no matter on what legal grounds they are raised, especially all not explicitly named claims on indemnity, reduction, annulment of or withdrawal from contract are invalid. The partner has especially no claim to indemnity which is not incurred on the delivered product itself, like production failures, utilisation loss, loss of contracts, lost returns, as also direct or indirect damages of others. This liability exception is invalid in cases of gross negligence or illegal intentions or as long as opposed to compelling rights.

## 8. Litigations

8.1 *Applicable law:* All regulations shall only be governed by the Swiss „Obligationenrecht“. The UN Convention on Contracts for the International Sale of Goods, signed in Vienna on 11th April 1980, is explicitly excluded.

8.2 *Place of performance and jurisdiction* is exclusively our legal domicile in CH-6430 Schwyz, Switzerland.

8.3 *Partial invalidity:* If any provision in these GTC is held to be invalid or unenforceable by any court or regulatory agency or body, such invalidity or unenforceability shall attach only to such provision. The validity of the remaining provisions shall not be affected thereby and these GTC shall be carried out as if such invalid or unenforceable provision were not contained herein.