VAHLE

COMPACT CONDUCTOR SYSTEM
VKL2

US 2018

GENERAL

The compact two-pole conductor system, VKL2, was developed specifically for various intralogistics applications. With its compact size and durability, the VKL2 possesses the ideal properties for small parts warehouse shuttle applications or other transfer carriages. Additionally, installing VKL2 is simple and efficient due to minimal parts and an easy clip-fastening system.

SAFETY

The compact conductor system, VKL2, has been designed according to VDE 0100. It complies with current conductor system safety requirements and is protected against accidental contact according to VDE 0470, part 1 (protection class IP 2X).

The current collectors are protected against contact only if the carbon brushes are fully located in the conductor rails. For conductor bar systems located at arm's length, where under normal operation the current collectors leave the conductor rails, contact protection must be provided on site, e. g. by means of barriers or by switching off. This, however, only applies to voltages above 25 volts AC or 60 volts DC.

Fig. 1 shows that the VDE finger cannot touch live parts. The insulation rail covering the conductor bars offers good insulation for maximum safety. Any number of conductors can be installed side by side at minimum space requirement.

Fig 1: VDE finger

Standard rail sections are 4 m long, but shorter sections are available. The ground conductor is yellow, marked with a continuous green stripe at the insulating housing.

APPLICATION

For indoor systems with travel speeds of up to 300 m/min.

HANGERS

The maximum support distance between the hangers is 0.8 m.

JOINTS

Joints are used for the electrical and mechanical connection of the conductor rail sections. Every joint is protected against contact with a joint cap.

APPROVALS

UL listing pending.

EXPANSION

System lengths of up to 150 meters can be installed without additional expansion sections.

FEEDS

The feeds can be realized as an end feed via the transfer guides or anywhere as a line feed.

TRANSFER GUIDES

Transfer guides are the contact-protected ends of the conductor rails at the end of the lines and mechanical line interruptions (switches, dropout sections, etc.). Transfer guides are available with or without feed capability.

CURRENT COLLECTORS

The current collectors are manufactured from impact-resistant plastic and stainless steel parts. The current is drawn via a carbon brush.

The length of the current collector connection cable may not exceed 3 m if the downstream overcurrent protection device is not designed to handle the capacity of the connection cable. Refer also to DIN VDE 0100, part 430 and DIN EN 60204-32. (Note: this is often the case if more than one collector is used in the system).

The cross section of the supplied connecting cables is designed for the stated nominal currents. The reduction factors according to DIN VDE 0298-4 must be observed for the various laying procedures.

According to DIN EN 60204-1 and DIN EN 60204-32, the continuity of the ground conductor system via sliding contacts must be ensured using suitable measures. As a simple and suitable measure, it is recommended to double the PE current collector.

SAFETY INFORMATION

To avoid pinching, ensure that the arrangement of the conductor system and current collectors / tow arms provides a minimum distance of 0.5m between fixed and mobile plant parts.

TECHNICAL SPECIFICATIONS

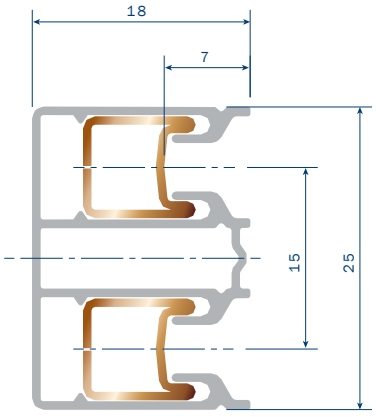
ISOLATING PROFILE

Electrical values: Dielectric strength according to DIN 53481	Specific resistance according to IEC 60093	Surface resistance according to IEC 60093	Comparative tracking index according to IEC 60112	Service temperature*	Flammability
> 22.4 kV/mm	> 8 x 10^{15} ohm x cm	2 x 10^{13} ohm x cm	CTI >400	-22 °F to +131 °F	Flame-retardant, self-extinguishing, UL 94 V0

CONDUCTOR SYSTEM VALUES

Type	Conductor cross section**	Creepage distance of insulation	Maximum voltage	Maximum continuous current	Resistance ohm/1000 m	Impedance*** ohm/1000 m
VKL 2/100C	25mm²	32mm	24/48 V AC/DC 230/400 V AC	100A	0.721	0.723
VKL 2/40F****	25mm²	32mm	24/48 V AC/DC 230/400 V AC	40A	6.053	6.053

VKL2 SECTIONS



LENGTH

4 m standard length, shorter sections are available

SUPPORT SPACING

0.8 m for installation in straight runs

CONDUCTOR SPACING

2 conductors per profile

15 mm spacing

AMPERAGE

40 - 100 amps

CONDUCTOR MATERIAL

Copper (C) or Galvanized Steel (F)

APPLICATION

Only for indoor systems

Type	Weight (lb)	Length	Order no. w/o ground	Order no. w/ ground
VKL2/100C	5.4	4 meters	281 524	281 534
VKL2/40F	5.4	4 meters	281 544	281 554

* For applications permanently below 0 °C (cold storage), please inquire separately.

** C = conductor material copper; F = conductor material galvanized steel

*** At phase spacing of 15 mm and frequency of 50 Hz.

**** VKL2 / 40F max. feed length 100 meters

ORDER NUMBERS - VKL2

CONNECTING MATERIAL

Type	Description	Weight (lb)	Order no.
VKL2-7	Joint connector, plug-in	0.12	281 559

END SEGMENT**

Installed at line start and end.
Must be considered for total system length.
Left and right hand versions for lines w/ PE.

Type	Weight (lb)	Length (meters)	Order no. PH (No PE)	Order no. PH + PE
VKL2-100 C-SSD	0.71	1.0	281 510	-
VKL2-100 C-HSC-R*	0.71	1.0	-	281 515
VKL2-100 C-HSC-L*	0.71	1.0	-	281 518
VKL2-40 F-SSD	0.71	1.0	281 516	-
VKL2-40 F-HSC-R*	0.71	1.0	-	281 517
VKL2-40 F-HSC-L*	0.71	1.0	-	281 519

TRANSFER GUIDE**

Installed on end segments
Use as end feeds, end caps and/or as a fixpoint in connection with the provided carrier profile
Max. vertical and lateral offset ± 3 mm to each other,
Contact factory if greater tolerances are required.
Max 50 amp. when used as end feed.

Type	Description	Weight (lb)	Order no.
VKL2-7-F	Transfer guide with fixpoint	0.13	281556
VKL2-7	Transfer guide without fixpoint	0.13	281555

* Lines with PE marking require 1x end segment...-HSC-R and 1x end segment...-HSC-L

** Pre-assembled unit with transfer guide or transfer guide with connecting cable on request

ORDER NUMBERS - VKL2

HANGER

For clip or screw fastening, expanding rivet is included in scope of delivery

Type	Description	Weight (lb)	Order no.
VKL2-7	Support	0.1	281 520

Customer-specific supports on request

LINE FEED*

Max. current 50 A

1 meter section length

Must be considered for total system length

Type	Weight (lb)	Length (meters)	Order no. PH (No PE)	Order no. PH + PE
VKL2/100 C-SSD	0.71	1	281 502	-
VKL2/100 C-HSC	0.71	1	-	281 503
VKL2/40 F-SSD	0.71	1	281 504	-
VKL2/40 F-HSC	0.71	1	-	281 505

*100 ampere on request

** Pre-assembled straight section with connection on request

EXPANSION JOINT

Max. current 50 A

1 meter section length

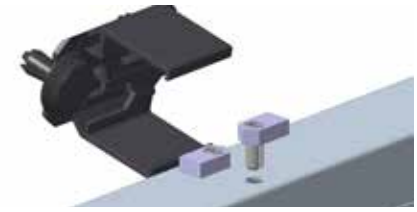
Must be considered for total system length.

Type	Weight (lb)	Length (meters)	Order no. PH(No PE)	Order no. PH + PE
DVKL2/100 C-SSD	0.71	1	281 506	-
DVKL2/100 C-HSC	0.71	1	-	281 507
DVKL2/40 F-SSD	0.71	1	281 508	-
DVKL2/40 F-HSC	0.71	1	-	281 509

ACCESSORIES - VKL 2

LOCATING CLAMP*

Permissible only for voltages up to 48 volt



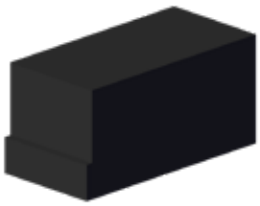
Type	Description	Weight (lb)	Order no.
FK-AH-VKL2	locating clamp VKL2	0.08	281 527

DRILL TEMPLATE

For fixpoint terminal

Type	Description	Weight (lb)	Order no.
MZ-BS-AH-VKL2	Drilling template for fixpoint	0.12	281 525

ASSEMBLY SAFETY DEVICE



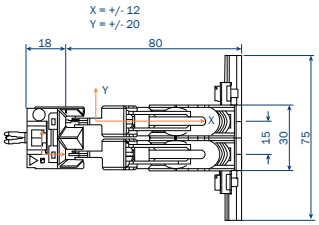
Type	Description	Weight (lb)	Order no.
MZ-MK-VKL2	Assembly safety device	0.12	281 526

* Can be applied in special cases if the transfer guide cannot be used and a fixpoint is needed for technical reasons.

CURRENT COLLECTORS - VKL 2

CURRENT COLLECTOR SET D-EAS

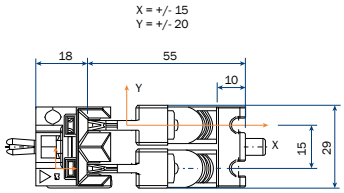
Suitable for funnel
Phase spacing: 15 mm
Max. current: 30 A
Lift ± 12 mm, Swifel ± 20 mm
Contact pressure: approx. 4 N per carbon brush
HS version with PE current collector



Type	Number of poles	Weight (lb)	Order no.
D-EAS 2/30 SS	2	0.66	2 823 983
D-EAS 2/30 HS	2 (1x PE)	0.66	2 823 998

CURRENT COLLECTOR SET EASL

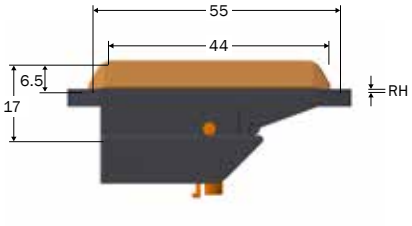
Phase spacing: 15 mm
Max. current: 20 A
Lift ± 15 mm, Swifel ± 20 mm
Contact pressure: approx. 4 N per carbon brush
HS version with PE current collector



Type	Number of poles	Weight (lb)	Order no.
EASL-20-2-SS	2	0.25	2 823 982
EASL-20-2-HS	2 (1x PE)	0.25	2 823 997

SPARE PARTS FOR CURRENT COLLECTOR

COLLECTOR BRUSHES FOR CURRENT COLLECTOR



EAS

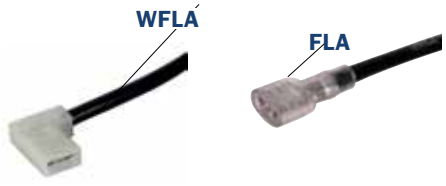
DEAS

Type	Collector model	Description	RH/mm	Weight (lb)	Order no.
D-EAS-2/30-PH-32-6.3-H	D-EAS	PH Rear collector brush	0.5	0.05	2 808 580
D-EAS-2/30-PH-32-6.3-V	D-EAS	PH Front collector brush	0.5	0.05	2 808 575
D-EAS-2/30-PE-36-6.3-H	D-EAS	PE Rear collector brush	0.5	0.05	2 808 581
D-EAS-2/30-PE-36-6.3-V	D-EAS	PE Front collector brush	0.5	0.05	2 808 576
SK-EK-EAS-20-PH-36-6.3-PA	EASL	Collector brush	0.5	0.05	2 820 750
SK-EK-EAS-20-PE-36-6.3-HG-PA	EASL	Collector brush	0.5	0.05	2 820 751

CONNECTING CABLE

CONNECTING CABLE, DOUBLE INSULATED, HIGHLY FLEXIBLE

For current collector, cable length: 1 m



Type	Cross section mm²	A Ø mm	Weight kg	Order no. Phase black	Order no. PE green/yellow
WFLA 2.5PH1-6.3	2.5	4.5	0.038	2 809 179	-
WFLA 2.5PE1-6.3			0.034	-	2 809 183
FLA 2.5PH1-6.3	2.5	4.5	0.078	2 809 171	-
FLA 2.5PE1-6.3			0.034	-	2 809 175
FLA 4PH2-6.3	4.0	5.3	0.064	2 823 085	-
FLA 4PE1-6.3			0.058	-	2 823 086

CONNECTING CABLE, DOUBLE INSULATED, FLEXIBLE

For line feed with cable lug M6, cable length: 1 m

Type	Cross section mm²	A Ø mm	Weight kg	Order no. Phase black	Order no. PE green/yellow
RKLA 2.5PH1-M6	2.5	4.5	0.038	2 808 979	-
RKLA 2.5PE1-M6			0.036	-	2 808 978
RKLA 4PH1-M6-HL	4.0	5.3	0.058	2 808 751	-
RKLA 4PE1-M6			0.052	-	2 808 752
RKLA 6PH1-M6	6.0	6.5	0.084	2 808 745	-
RKLA 6PE1-M6-HL			0.086	-	2 808 759

CONNECTING CABLE, DOUBLE INSULATED, FLEXIBLE

For transfer guide with cable lug M5, cable length: 1 m

Type	Cross section mm²	A Ø mm	Weight kg	Order no. Phase black	Order no. PE green/yellow
RKLA 2.5PH1-M5	2.5	4.5	0.038	2808971	-
RKLA 2.5PE1-M5			0.036	-	2 808 958
RKLA 4PH1-M5-HL	4.0	5.3	0.059	2821809	
RKLA 4PE1-M5-HL					2 821 810
RKLA 6PH1-M5-HL	6.0	6.5	0.110	2808965	
RKLA 6PE1-M5-HL					2 808 967

MOUNTING ACCESSORIES FOR VKL2

TABLE SAW

For cutting insulating profile and conductor rails. Connection: 230 Volt, 50 Hz.

Type	Weight kg	Order no.
TABLE SAW KS 10	6.500	165 276
SPARE BLADE SB	0.070	165 263

HEXAGON SOCKET SW 4

Type	Weight kg	Order no.
Hexagon screwdriver 4 MM	0.036	2 812 962

MOUNTING HANDLE FOR PLUG-IN JOINT CONNECTOR

Type	Weight kg	Order no.
MZ-MGF100	0.010	2 809 348

DEBURRING TOOL FLAT BLUNT FILE FSF

For deburring the outside of the conductor rail in case of cut lengths.

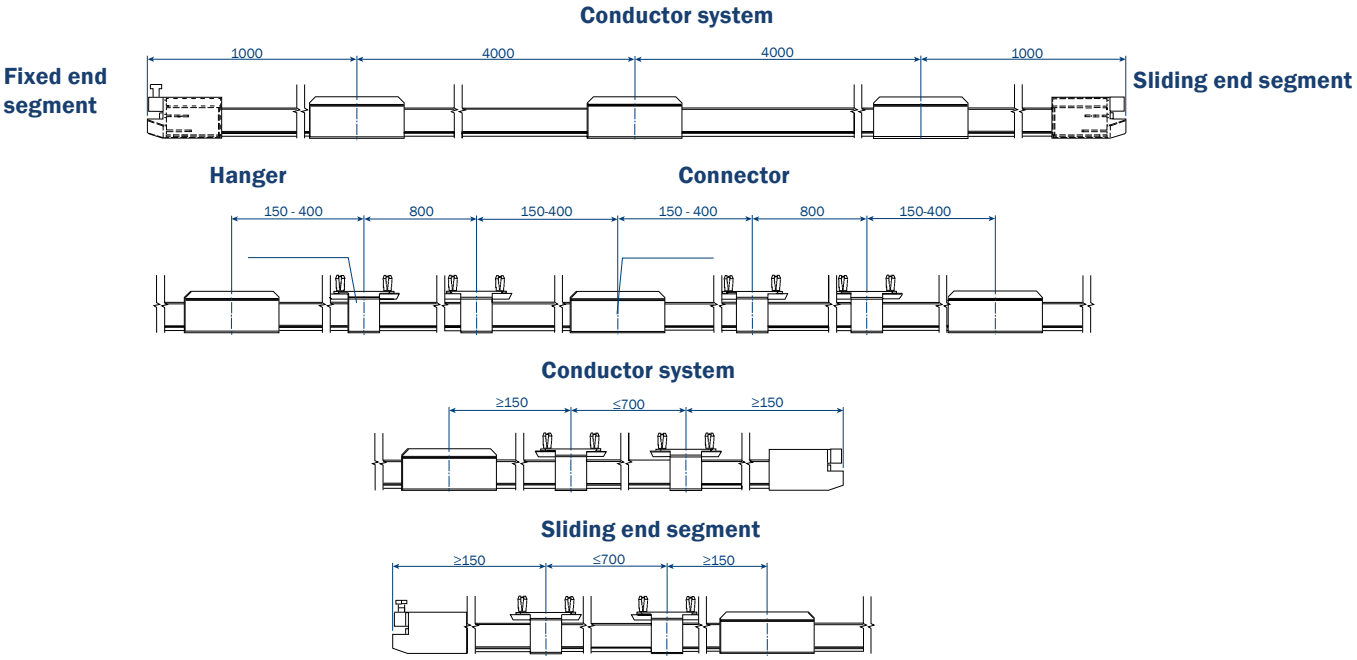
Type	Weight kg	Order no.
FLAT BLUNT FILE FSF 150 x 16 x 4	0.085	2 812 964

SCREW DRIVER PH1

Type	Weight kg	Order no.
Phillips screwdriver PH 1	0.014	2 812 963

STANDARD EXAMPLE FOR SHUTTLE APPLICATION

SPECIFICATIONS



Company: _____ Date: _____

Tel.: _____ Fax: _____

E-mail: _____ Internet: _____

1. Number of wiper line systems: _____
2. Type of crane or device to be fed: _____
3. Operating voltage: _____ volt Phases: _____ Frequency: _____Hz

   Three-phase voltage: ☐ AC voltage: ☐ DC voltage: ☐
4. Line length: _____
5. Number of phase rails: _____ N-rails: _____ Control rails: _____ Ground conductor: ___
6. Installation position of the wiper line:

   ☐ Hanging wiper line / current collector cable downwards

   ☐ Hanging wiper line / current collector cable lateral entry (1)

   ☐ Hanging distance _____ m (max. 2 m) ☐ Other: _____
7. Number of cranes or devices in a wiper line system: _____
8. Indoor system: ☐ Outdoor system: ☐
9. Special operating conditions (moisture, dust, chemical influences, etc) _____
10. Ambient temperature: _____ °C min. _____ °C max.
11. Position and number of feeds _____
12. Position and number of disconnecting points (e. g. for repair zones) (1): _____
13. Where is the wiper line to be positioned? (1): _____
14. Screw consoles to be supplied: yes ☐; no ☐ Distance middle of carrier – middle of wiper line _____

    Flange width of carrier: _____
15. Travel speed for longitudinal travel: _____ in bends: _____ at transfers: _____
16. Current consumption of the individual electricity consumers: _____
    (Please use the table below.)
17. Max. voltage drop from conductor rail feed to the current collectors and considering the start-up currents:

    3 % ☐ or _____ % in relation to nominal current.

Motor data	Crane/device 1							Crane/device 2						
	Power kW	Nominal current			Start-up current		Drive type (2)	Power kW	Nominal current			Start-up current		Drive type (2)
		A	cos ΦN	% ED	A	cos ΦA			A	cos ΦN	% ED	A	cos ΦA	
Lifting device														
Auxiliary lifting device														
Carriage														
Trolley traveling winch														

Mark motors that can be switched on at the same time with an *.

Mark motors that can start up at the same time with Δ.

Further information: _____

_____

_____

_____

Signature _____

(1) Outline drawing required for offer preparation

(2) Enter drive type: K for squirrel-cage rotor, S for slip ring rotor, F for frequency-controlled motor

VAHLE Inc.
1169 Brittmoore Rd.
Houston, TX 77043

Tel: 713-465-9796
Fax: 713-465-1851
E-mail: salesinbox@vahleinc.com
www.vahleinc.com

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