



REO current sensor

Product Information WK0-2C

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The advantages at a glance



- Solutions tailored to your specific requirements
- Use of modern core materials such as nanocrystalline and amorphous for optimal performance
- Use of UL-certified materials
- REO speaks your language: Our worldwide sales offices always keep us close to our clients - no matter what your language, time zone or currency. A REO location is near you, guaranteeing fast, efficient and cost-effective settling of your order.
- Reliability through testing
All our current transformers are checked for the following criteria:
 - phase shift between primary and secondary
 - response curve
 - saturation
 - core/winding relationship
 - overcurrents and overvoltages
 - dynamic behaviour of the whole current transformer

REO Double-Core Technology

REO - Double-Core Technology

In most applications, closed-loop current transducers deal with measurements in the range from DC to frequencies up to 120 kHz. For this application a standard single-core technology hall effect sensor mounted in the air gap is a good solution (see Figure 1).

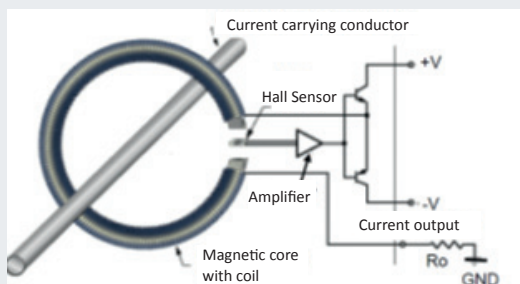


Figure 1: Closed loop compensated current transducer principle

In this design, the hall effect sensor located in the air gap is used with a bipolar power stage to create an equal and opposite magnetic field in the core. This means that the current output signal is directly proportional to the primary current travelling in the conductor.

This principle works well for lower frequencies, but as frequencies increase the core inductivity becomes a larger factor and the compensating electronics are not able to work adequately. At this point, the unit acts like a conventional current transformer with poor linearity. This effect is demonstrated in Figure 2. This effect and subsequent lack of measurement accuracy are those facts which make the REO WKO 2C with double-core technology so important.

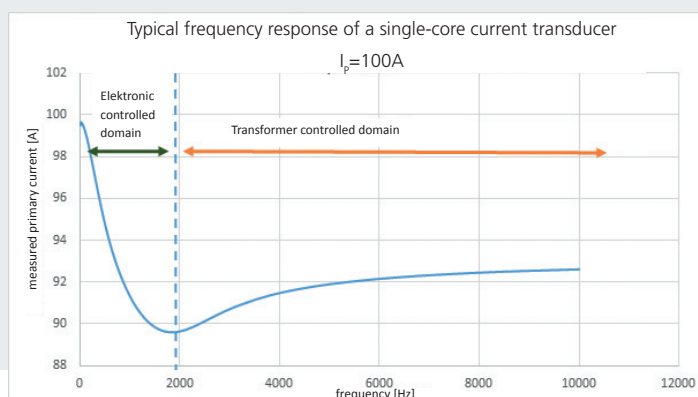


Figure 2: The performance of the electronic and transformer stages are not balanced.

REO Double-Core Technology

The REO design team developed a solution to achieve a smooth, high accuracy transition from electronics to transformer-controlled domain.

We took two identical cores and joined them together as shown in Figure 3. This patented solution significantly improves measurement accuracy.

- Due to the compensation effect, the current transducer is insensitive to external magnetic fields.
- Better frequency response

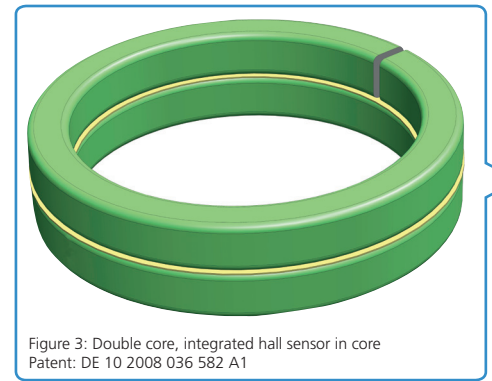


Figure 3: Double core, integrated hall sensor in core
Patent: DE 10 2008 036 582 A1

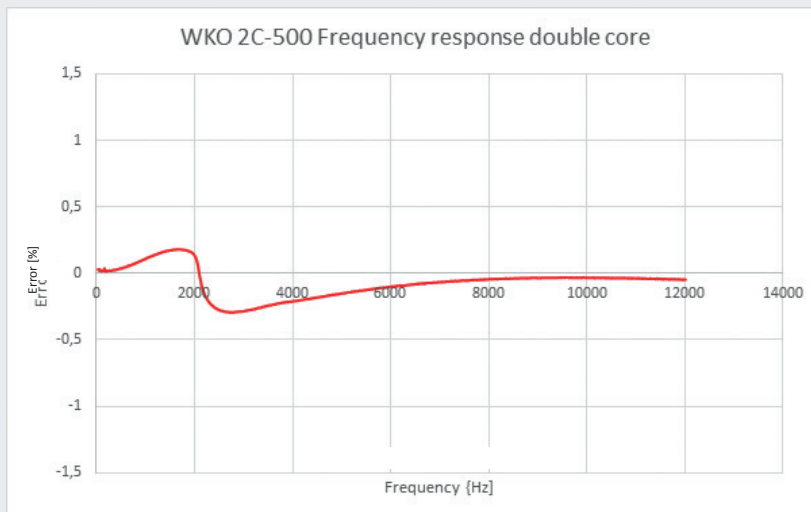


Figure 4: Double core frequency response

REO's double-core frequency response in Figure 4 shows the smooth transition between electronics and transformer domains.

We have tested other current transducer technologies and we can safely say that only a few of them have acceptable smooth frequency transition performance as shown in Figure 5 below.

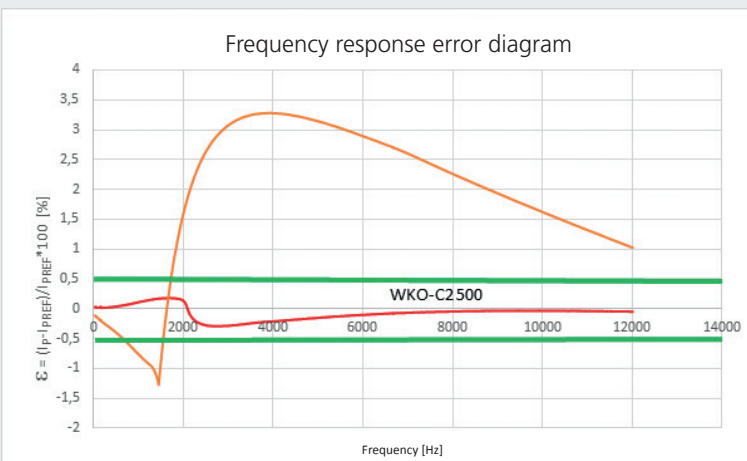


Figure 5: Comparison WKO-2C 500 and competitors products

Plug + Play

Benefits

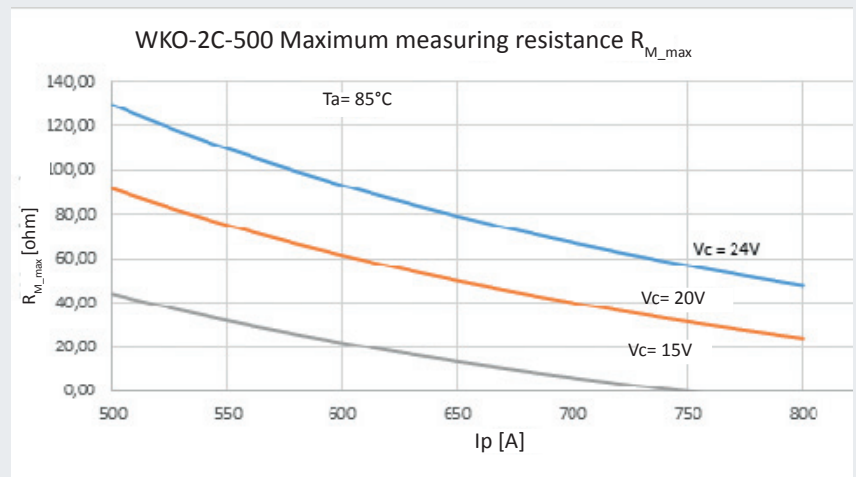
- High current measurement accuracy of 0.5%
- Modular designs providing universal mounting options
- Lower sensitivity to external magnetic fields
- Bidirectional and isolated current measurement
- Current output
- REO double-core technology
- All materials used are UL listed

- EN 50178:1997
- UL 94-V0

REO has developed a new generation of closed-loop (C/L) current transducers which guarantee increased current measurement accuracy better than 0.5% in the whole frequency range: DC to 120 kHz.

The new current transducer type WKO-2C is a completely new development utilizing REO's double-core technology magnetic design. The unit uses the latest hall effect elements with an extended frequency response up to 120 kHz and accurate phase response.

Completely redesigned electronics ensures that the new C/L current transducer has better drift compensation and an extended temperature range from -40°C to 85°C.



Typical applications

- Variable speed control of 3-phase AC motors and servo motor drives
- Industrial inverters
- Uninterruptable power supplies
- All types of switched-mode power supplies
- Power supplies for welding applications

Technical data

Type	Primary RMS Nominal current I_{PN} [A]	Measurement range I_p [A]	Feed-in U_c [V]	Measurement accuracy $X_G @ I_{PN}$ [-20...70°C] of I_{PN} [%]	Ratio K_N	Secondary RMS nominal current I_{SN} [mA]	Secondary winding Resistor $R_s @ 85^\circ\text{C}$ [Ω]	No-load current [mA]
WKO-2C-500	500	0 ... ± 1000	$\pm 15 \dots 24$	$< \pm 0,5$	5000	100	72	$36 + I_s$
WKO-2C-1000	1000	0 ... ± 1500	$\pm 15 \dots 24$	$< \pm 0,5$	5000	200	38	$24 + I_s$
WKO-2C-2000	2000	0 ... ± 3000	$\pm 15 \dots 24$	$< \pm 0,5$	5000	400	22	$78 + I_s$

Accuracy and dynamic data

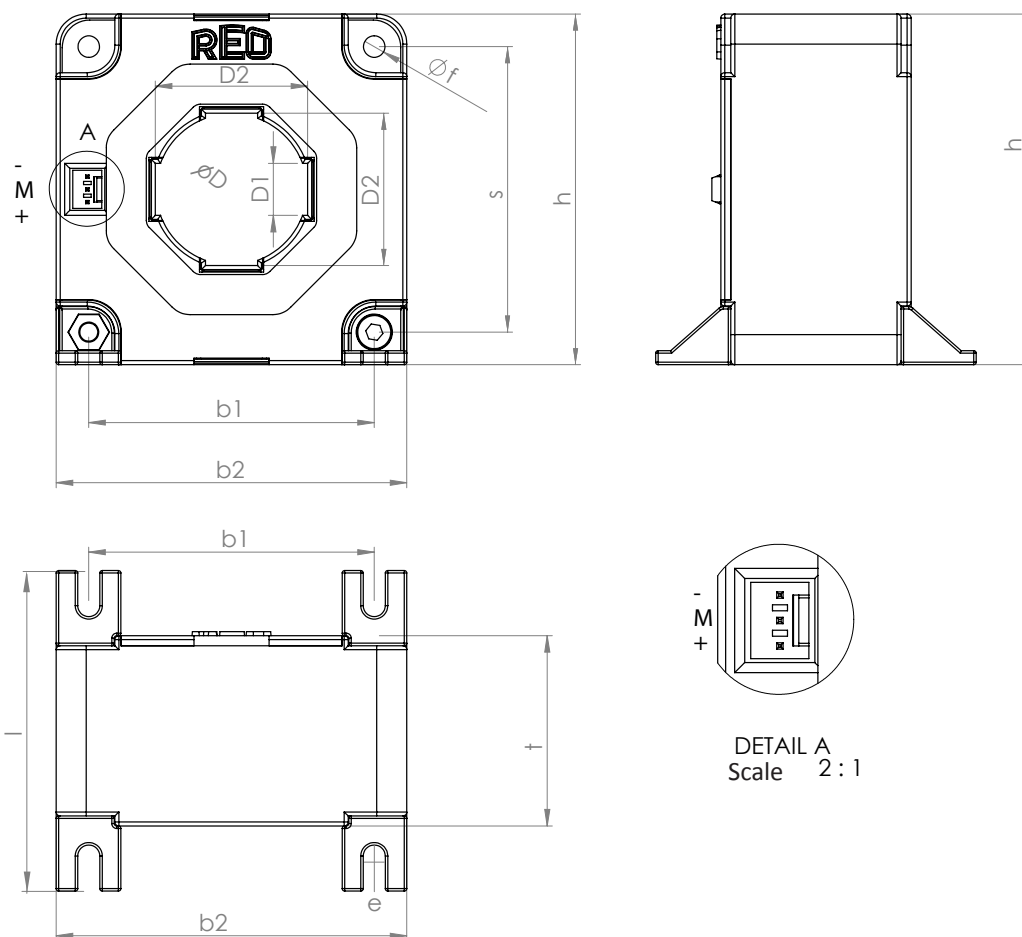
Type	Linearity mistake e [%]	Offset mistake @ 25° I_0 [mA]	Offset drift -25°C ... +70°C I_{OT} [mA]	Reaction time t_{ra} [μs]	Response time 10%-90% t_s [μs]	di/dt [A/ μs]	Stock width -1dB [kHz]
WKO-2C-500	$< \pm 0,1$	$< 0,2$	$< 0,5$	$< 0,5$	$< 0,5$	> 100	DC .. 120
WKO-2C-1000	$< \pm 0,1$	$< 0,3$	$< 0,5$	$< 0,5$	$< 0,5$	> 100	DC .. 120
WKO-2C-2000	$< \pm 0,1$	$< 0,5$	$< 0,5$	$< 0,5$	$< 0,5$	> 100	DC .. 120

Isolation data

Type	Creepage distance d_{Cp} [mm]	Clearance d_{Ci} [mm]	Creep resistance [CTI]	AC-Isolation test 50/60Hz 1min U_d [kV]	Impulse voltage test 1,2/50 μs U_i [kV]	di/dt [A/ μs]	Weight [kg]
WKO-2C-500	10	9	600	6	12,5	> 100	0,240
WKO-2C-1000	15	12	600	6	14,5	> 100	0,450
WKO-2C-2000	25	21	600	6	14,5	> 100	1,620

Mechanical Data

- Various mounting options with pluggable bases
- The multi-purpose mounting system means that the units can be used easily in new designs and in retro-fit applications.



Type	$b1$ [mm]	$b2$ [mm]	t [mm]	s [mm]	h [mm]	$D \varnothing$ [mm]	$D1/D2$ [mm]	$\varnothing f$ [mm]	$\varnothing e$ [mm]
WKO-2C-500	57	70	38	57	70	30,2	10,4/30,4	4,3	4,3
WKO-2C-1000	78	94	42	78	94	38,5	13,5/40,5	5,3	5,3
WKO-2C-2000	102	135	52	102	135	57,5	20,5/60,5	6,5	6,5

Mounting Options

REO current sensor WKO-2C series is provided in various designs: as basic version with Molex plugs, mounting feet frontal or lateral mounted at different positions, with front cover, etc. For connection we offer Molex plugs (basic model), 3-pole litz wires or 3- or 4-pole plugs.

All models are provided either fully assembled (article no. see below) or you choose a model and additionally buy mounting feet or covers – maximum flexibility guaranteed.

WKO-2C – Basic model with different mounting options



Type - Fig. 1	WKO-2C Basic model with Molex plug / Article No.
WKO-2C-500	30642 0 1 501 4 20 00
WKO-2C-1000	30642 0 1 102 4 20 00
WKO-2C-2000	30642 0 1 202 4 20 00

Type - Fig. 2	WKO-2C-F Basic model with Molex plug and mounting feet frontal / Article No.
WKO-2C-F-500	30642 0 1 501 4 21 00
WKO-2C-F-1000	30642 0 1 102 4 21 00
WKO-2C-F-2000	30642 0 1 202 4 21 00

Type - Fig. 3	WKO-2C-FG Basic model with Molex plug and mounting feet frontal, fitted on the left / Article No.
WKO-2C-FL-500	30642 0 1 501 4 23 00
WKO-2C-FL-1000	30642 0 1 102 4 23 00
WKO-2C-FL-2000	30642 0 1 202 4 23 00

Type - Fig. 4	WKO-2C-L Basic model with Molex plug and mounting feet lateral / Article No.
WKO-2C-L-500	30642 0 1 501 4 24 00
WKO-2C-L-1000	30642 0 1 102 4 24 00
WKO-2C-L-2000	30642 0 1 202 4 24 00

Type – without illustration	WKO-2C-FR Basic model with Molex plug and mounting feet frontal, fitted on the right / Article No.
WKO-2C-FR-500	30642 0 1 501 4 22 00
WKO-2C-FR-1000	30642 0 1 102 4 22 00
WKO-2C-FR-2000	30642 0 1 202 4 22 00

Modular construction

- various mounting options through pluggable mounting feet and mounting kit for busbars
- 3 different connection options: Molex plugs, litz wires or litz wires with plug
- Through standardized design REO current sensors WKO-2C are compatible with conventional models available on the market – no modifications necessary

= Plug+Play



WKO-2C-A series – Basic model with front cover and different mounting options

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WKO-2C-A

Basic model with front cover

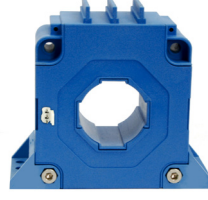
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WKO-2C-A-F

Basic model with front cover
and mounting feet frontal

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WKO-2C-A-L

Basic model with front cover
and mounting feet lateral

Type - Fig.5	WKO-2C-A Basic model with front cover / Article No.
WKO-2C-A-500	30642 0 1 501 1 00 00
WKO-2C-A-1000	30642 0 1 102 1 00 00
WKO-2C-A-2000	30642 0 1 202 1 00 00

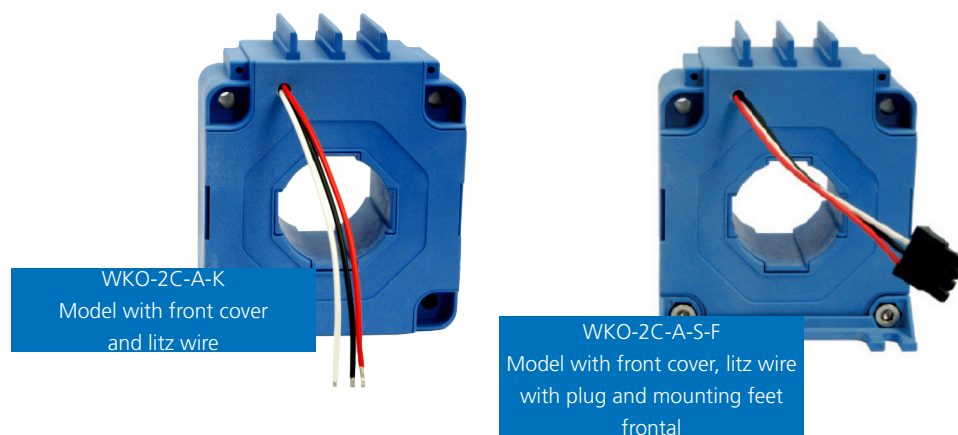
Type - Fig.6	WKO-2C-A-F Basic model with front cover and mounting feet frontal / Article No.
WKO-2C-A-F-500	30642 0 1 501 1 01 00
WKO-2C-A-F-1000	30642 0 1 102 1 01 00
WKO-2C-A-F-2000	30642 0 1 202 1 01 00

Type - Fig.7	WKO-2C-A-L Basic model with front cover and mounting feet lateral / Article No.
WKO-2C-A-L-500	30642 0 1 501 1 04 00
WKO-2C-A-L-1000	30642 0 1 102 1 04 00
WKO-2C-A-L-2000	30642 0 1 202 1 04 00

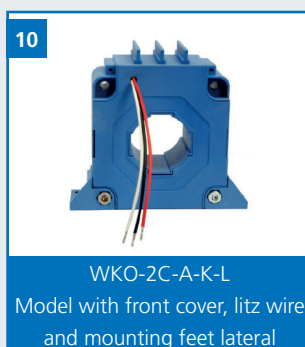
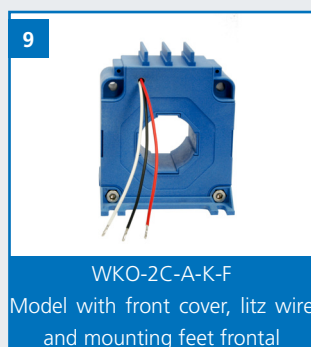
Type – without illustration	WKO-2C-A-FG Basic model with front cover and mounting feet frontal, fitted on the left / Article No.
WKO-2C-A-FL-500	30642 0 1 501 1 03 00
WKO-2C-A-FL-1000	30642 0 1 102 1 03 00
WKO-2C-A-FL-2000	30642 0 1 202 1 03 00

Type – without illustration	WKO-2C-A-FR Basic model with front cover and mounting feet frontal, fitted on the right / Article No.
WKO-2C-A-FR-500	30642 0 1 501 1 02 00
WKO-2C-A-FR-1000	30642 0 1 102 1 02 00
WKO-2C-A-FR-2000	30642 0 1 202 1 02 00

Further connections + options



WKO-2C-A-K series – Model with front cover and litz wire and different mounting options



Type - Fig.8	WKO-2C-A-K Model with front cover and litz wires / Article No.
WKO-2C-A-K-500	30642 0 1 501 8 00 00
WKO-2C-A-K-1000	30642 0 1 102 8 00 00
WKO-2C-A-K-2000	30642 0 1 202 8 00 00

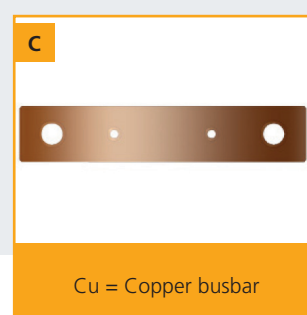
Type - Fig. 9	WKO-2C-A-K-F Model with front cover, litz wire and mounting feet frontal / Article No.
WKO-2C-A-K-F-500	30642 0 1 501 8 01 00
WKO-2C-A-K-F-1000	30642 0 1 102 8 01 00
WKO-2C-A-K-F-2000	30642 0 1 202 8 01 00

Type - Fig. 10	WKO-2C-A-K-L Model with front cover, litz wire and mounting feet lateral / Article No.
WKO-2C-A-K-L-500	30642 0 1 501 8 04 00
WKO-2C-A-K-L-1000	30642 0 1 102 8 04 00
WKO-2C-A-K-L-2000	30642 0 1 202 8 04 00

Type - Fig. 11	WKO-2C-A-K-FG Model with front cover, litz wire and mounting feet frontal fitted on the left/ Article No.
WKO-2C-A-K-FG-500	30642 0 1 501 8 03 00
WKO-2C-A-K-FG-1000	30642 0 1 102 8 03 00
WKO-2C-A-K-FG-2000	30642 0 1 202 8 03 00

Type – without illustration	WKO-2C-A-K-FR Model with front cover, litz wire and mounting feet frontal fitted on the right / Article No.
WKO-2C-A-K-FR-500	30642 0 1 501 8 02 00
WKO-2C-A-K-FR-1000	30642 0 1 102 8 02 00
WKO-2C-A-K-FR-2000	30642 0 1 202 8 02 00

Fastenings – optional



Also available for railway applications

- Fulfills the required railway engineering safety standards: EN 50175, EN 50155:2007 and IEC 61373:2010

- Specially for railway technology: shock and vibration tested according to IEC 61373:2010

= WKO-2C-B



WKO-2C-A-S series – Model with front cover and litz wire with plug and different mounting options

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WKO-2C-A-S-F

Model with front cover and litz wire with plug, with mounting feet frontal

Type - Fig. 12	WKO-2C-A-S-F Model with front cover and litz wire with plug, with mounting feet frontal
WKO-2C-A-S-F-500	30642 0 1 501 9 01 00
WKO-2C-A-S-F-1000	30642 0 1 102 9 01 00
WKO-2C-A-S-F-2000	30642 0 1 202 9 01 00

Type – without illustration	WKO-2C-A-S Model with front cover and litz wire with plug / Article No.
WKO-2C-A-S-500	30642 0 1 501 9 00 00
WKO-2C-A-S-1000	30642 0 1 102 9 00 00
WKO-2C-A-S-2000	30642 0 1 202 9 00 00

Type – without illustration	WKO-2C-A-S-L Model with front cover, litz wire with plug and mounting feet lateral / Article No.
WKO-2C-A-S-L-500	30642 0 1 501 9 04 00
WKO-2C-A-S-L-1000	30642 0 1 102 9 04 00
WKO-2C-A-S-L-2000	30642 0 1 202 9 04 00

Type – without illustration	WKO-2C-A-S-FG Model with front cover, litz wire with plug and mounting feet frontal fitted on the left / Article No.
WKO-2C-A-S-FG-500	30642 0 1 501 9 03 00
WKO-2C-A-S-FG-1000	30642 0 1 102 9 03 00
WKO-2C-A-S-FG-2000	30642 0 1 202 9 03 00

Type – without illustration	WKO-2C-A-S-FR Model with front cover, litz wire with plug and mounting feet frontal fitted on the right / Article No.
WKO-2C-A-S-FR-500	30642 0 1 501 9 02 00
WKO-2C-A-S-FR-1000	30642 0 1 102 9 02 00
WKO-2C-A-S-FR-2000	30642 0 1 202 9 02 00

Also available for mounting to the basic model

L



L = 1 set of mounting feet lateral (2 left, 2 right)

F



F = 1 set of mounting feet frontal (2 pcs)

A



A = Front cover

M



M = Mounting kit for busbar



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