KRUGER

ECOWATT®
DRIVE SERIES K320C



Simple Installation

Premium Warranty

Cost Saving





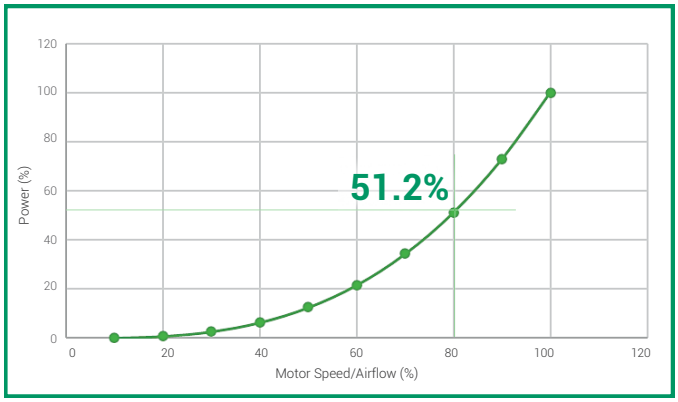
WHY KRUGER?

KRUGER has been a leading innovator and manufacturer of residential, commercial, and industrial ventilation solutions across Asia since 1985. Today, with a direct presence in over 18 regions throughout Asia, world-class R&D and manufacturing facilities, Kruger is able to offer its customers unparalleled service and support at a local level. Our customers trust Kruger to provide the best solutions for their needs.

Why use a KRUGER ECOWATT® Drive for Demand Controlled Ventilation (DCV)?

In joining the global effort to combat climate change, KRUGER, a world leader in ventilation, is presenting the Demand Controlled Ventilation (DCV) system. This system enables performance control of installations by adjusting them to the real needs of ventilation. We also adopt "ECOWATT® Drives K-Series", a new high-performance variable-frequency drive (VFD) specifically designed for fan applications. The VFD comes with the latest PID function to support the DCV system, which can regulate constant or variable pressure, airflow, temperature, and humidity. This helps optimize the output voltage of the VFD to the actual load of the fan motor, thus minimizing power consumption.

As depicted below, when using a **KRUGER VFD** to reduce the fan flowrate down to **80%** flow, there is a reduction in power consumption by **51.2%.**



The ability to reduce energy usage also cuts the CO2 **EMISSIONS**

A major of contributor to **CLIMATE CHANGE**

And the dramatic effects on **OUR ENVIRONMENT**

Highlights



Energy Saving

Security and Safety

Simple Installation

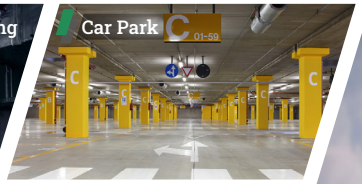
Friendly with Environment

Standard Models

Series	Input Voltage	Output Voltage	Ingress Protection
K320C	3PH 400V 50/60Hz	1.5 - 500kW	IP20

Applications









Energy Saving

Auto Energy Optimization Function for Real Time Loading

Accurate Motor Autotuning
To optimize the FAN performance and efficiency, Ecowatt® Drives will automatically measure the electrical motor parameters to use in controlling algorithms when commissioning.

Accurate Energy-Saving Run
In light-load state, the motor can adjust the output voltage automatically to achieve energy saving.

PID Function for Demand Controlled Ventilation

PID control is mainly used to adjust the VFD output frequency or output voltage through performing scaledivision, integral and differential operations on the difference between feedback signal of controlled variables and signal of the target. It is suitable for flow control, pressure control, temperature control, etc. by following Kruger Demand controlled Ventilation concept.



Simple Installation

Simple Power and Control Wiring by following the quick setting manual.

Simple Setting Via LED Keypad and PC Interface Program.

Ecowatt® Drives provide a LED keypad with Quick parameter setting function.
In case of needing fine tuning or copying VFD parameter, it also has the PC interface program for configuration.



Security and Safety

Safe Torque Off (STO) Function



Safe Torque Off

The STO function switches off the drive output by turning off the drive signals to prevent unexpected startups of the motor when the main power supply of the drive is not switched off.

In the even that any preventive maintenance which requires exposing the fan or any rotational parts to maintenance personal, it is best that the VFD is electrically disconnected by a cutoff switch to ensure the safety of the maintenance personal

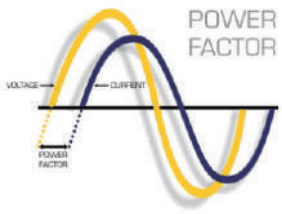
Reference Standards:
IEC 61508-1, IEC 61508-2, IEC 61508-3, IEC 61508-4, IEC 62061, ISO 13849-1 and IEC 61800-5-2

Complied with the EMC and Safety Standards

CE

The CE marking on the name plate of the VFD indicates that the VFD is CE-compliant, meeting the regulations of the European low-voltage directive (2014/35/EU) and EMC directive (2014/30/EU).

Friendly with Environment



Built-in EMC filter and a DC choke.
This design replaces the need for an electrical distribution cabinet and saves space for other devices, while providing the benefits of harmonic suppression and better power quality to the system.

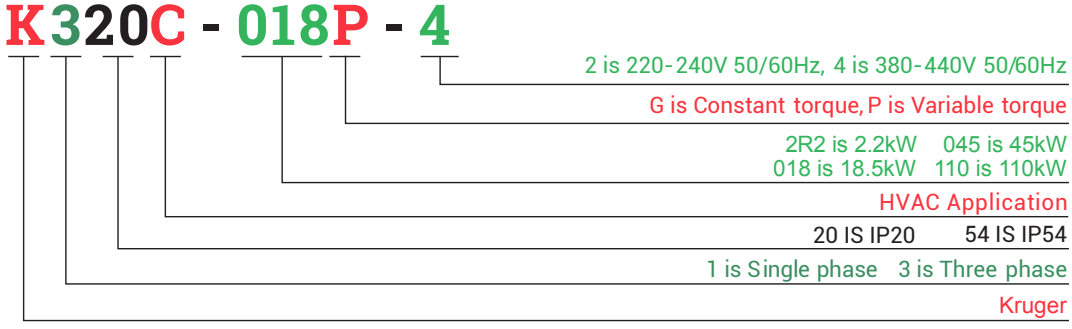


IP20 rating is touchproof and will be resistant to dust or objects that are over 12mm in size. However, it has no protection whatsoever against liquids and will be susceptible to damage if it comes into contact with sprays of water.

Model List

Model name	Output Power	Input Current	Output Current	Input Voltage	Output Voltage	Protection Degree	Frame type
K320C-1R5P-4	1.5	5	3.7	3PH 380V±15% 50/60Hz	3PH 0-Vinput 0-400Hz	IP20	A
K320C-2R2P-4	2.2	6	5				
K320C-004P-4	4	15	9.5				
K320C-5R5P-4	5.5	20	13				B
K320C-7R5P-4	7.5	27	17				
K320C-011P-4	11	35	25				C
K320C-015P-4	15	44	32				
K320C-018P-4	18	46	38				D
K320C-022P-4	22	54	45				
K320C-030P-4	30	75	60				E
K320C-037P-4	37	90	75				
K320C-045P-4	45	108	92				F
K320C-055P-4	55	142	115				G
K320C-075P-4	75	177	150				
K320C-090P-4	90	200	180				
K320C-110P-4	110	240	215				H
K320C-132P-4	132	278	250				
K320C-160P-4	160	310	305				I
K320C-185P-4	185	335	330				
K320C-200P-4	200	385	380				
K320C-220P-4	220	430	425				J
K320C-250P-4	250	465	460				
K320C-280P-4	280	540	530				K
K320C-315P-4	315	605	600				
K320C-355P-4	355	655	650				
K320C-400P-4	400	660	720				L
K320C-450P-4	450	754	820				
K320C-500P-4	500	800	860				

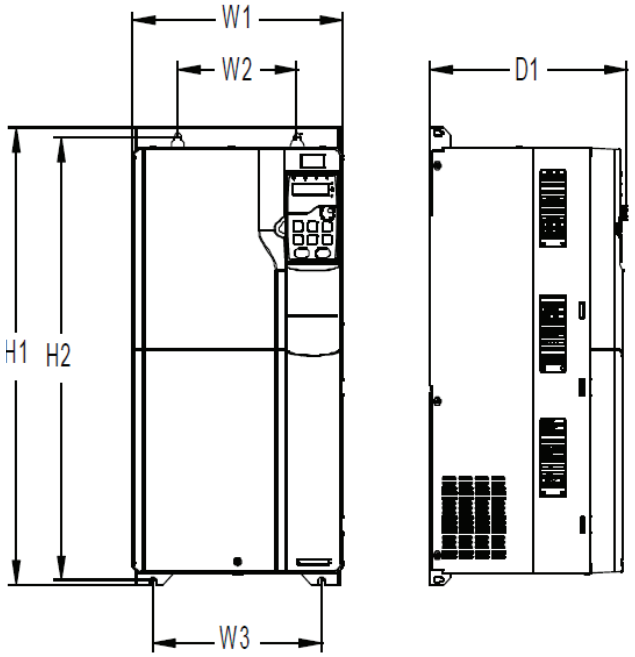
Nomenclature



Product Specifications

Description		Specifications
Power input	Input voltage (V)	AC 3PH 380–480V. Rated voltage: 380V
	Allowed voltage transient fluctuation	-15%–+10%
	Input current (A)	Refer to Rated Value
	Input frequency (Hz)	50Hz or 60Hz; Allowed range: 47–63Hz
Power Output	Output voltage (V)	0–Input voltage (V)
	Output current (A)	Refer to Rated Value
	Output power (kW)	Refer to Rated Value
	Output frequency (Hz)	0–400Hz
Technical control performance	Control mode	Space voltage vector control, and sensorless vector
	Motor type	Asynchronous motor (AM) and permanent magnetic synchronous motor (SM)"
	Speed ratio	For asynchronous motors (AMs): 1:200 (SVC); for synchronous motors (SMs): 1:20 (SVC)
	Speed control accuracy	± 0.2% (SVC)
	Speed fluctuation	± 0.3% (SVC)
	Torque response	< 20ms (SVC)
	Torque control accuracy	± 10% (SVC)
	Overload capacity	Able to run at 110% of rated current for 1min, and an overload allowed for every 5min.
Running control performance	Overload capacity	Able to run at 110% of rated current for 1min, and an overload allowed for every 5min.
	Frequency setting method	Settings can be implemented through digital, analog, pulse frequency, multi-step speed run, simple PLC, PID, and communication. Settings can be combined and the setting channels can be switched.
	Automatic voltage regulation	The output voltage can be kept constant although the grid voltage changes.
	Fault protection	Many protection functions available, such as protection against overcurrent, overvoltage, undervoltage, overtemperature, and phase loss
	Speed tracking restart	Used to implement impact-free smooth startup for rotating motors
Peripheral interface	Terminal analog input resolution	No more than 20mV

Dimensions



Output Power	Protection Degree	Model name	Frame type	Dimension	W1	W2	H1	H2	D1	Hole Diameter	Screw	Net weight	Gross weight
3 Phase 380V 50/60Hz	IP20	K320C-1R5P-4	A	89*231*193	89	70	231	221	193	ø 5	M4	2	2.5
		K320C-2R2P-4		89*231*193	89	70	231	221	193	ø 5	M4	2	2.5
		K320C-004P-4		89*231*193	89	70	231	221	193	ø 5	M4	2	2.5
		K320C-5R5P-4	B	89*259*212	89	70	259	248	212	ø 6	M5	2.4	3
		K320C-7R5P-4		89*259*212	89	70	259	248	212	ø 6	M5	2.4	3
		K320C-011P-4	C	145*280*207	145	130	280	268	207	ø 6	M5	4	4.8
		K320C-015P-4		145*280*207	145	130	280	268	207	ø 6	M5	4	4.8
		K320C-018P-4	D	169*320*214	169	154	320	308	214	ø 6	M5	5.2	5.7
		K320C-022P-4		169*320*214	169	154	320	308	214	ø 6	M5	5.2	5.7
		K320C-030P-4	E	200*341*214	200	185	341	328.5	214	ø 6	M5	8	10
		K320C-037P-4		200*341*214	200	185	341	328.5	214	ø 6	M5	8	10
		K320C-045P-4	F	250*400*228	250	230	400	380	228	ø 6	M5	14	16
		K320C-055P-4	G	282*560*264	282	160	560	542	264	ø 9	M8	18	21
		K320C-075P-4		282*560*264	282	160	560	542	264	ø 9	M8	18	21
		K320C-090P-4		282*560*264	282	160	560	542	264	ø 9	M8	18	21
		K320C-110P-4	H	338*554*338	338	200	554	534	338	ø 9.5	M8	34	40
		K320C-132P-4		338*554*338	338	200	554	534	338	ø 9.5	M8	34	40
		K320C-160P-4	I	338*825*398	338	260	825	800	398	ø 11	M10	53	64
		K320C-185P-4		338*825*398	338	260	825	800	398	ø 11	M10	53	64
		K320C-200P-4		338*825*398	338	260	825	800	398	ø 11	M10	53	64
		K320C-220P-4	J	303*1108*477	303	240	1108	980	477	ø 14	M12	78	99
		K320C-250P-4		303*1108*477	303	240	1108	980	477	ø 14	M12	78	99
		K320C-280P-4	K	330*1288*552	330	225	1288	1150	552	ø 13	M10	89	119
		K320C-315P-4		330*1288*552	330	225	1288	1150	552	ø 13	M10	89	119
		K320C-355P-4		330*1288*552	330	225	1288	1150	552	ø 13	M10	90	120
		K320C-400P-4	L	330*1398*552	330	240	1398	1280	552	ø 13	M10	173	205
		K320C-450P-4		330*1398*552	330	240	1398	1280	552	ø 13	M10	175	207
		K320C-500P-4		330*1398*552	330	240	1398	1280	552	ø 13	M10	175	207

Accessories

The following figure shows the external option wiring of the VFD.

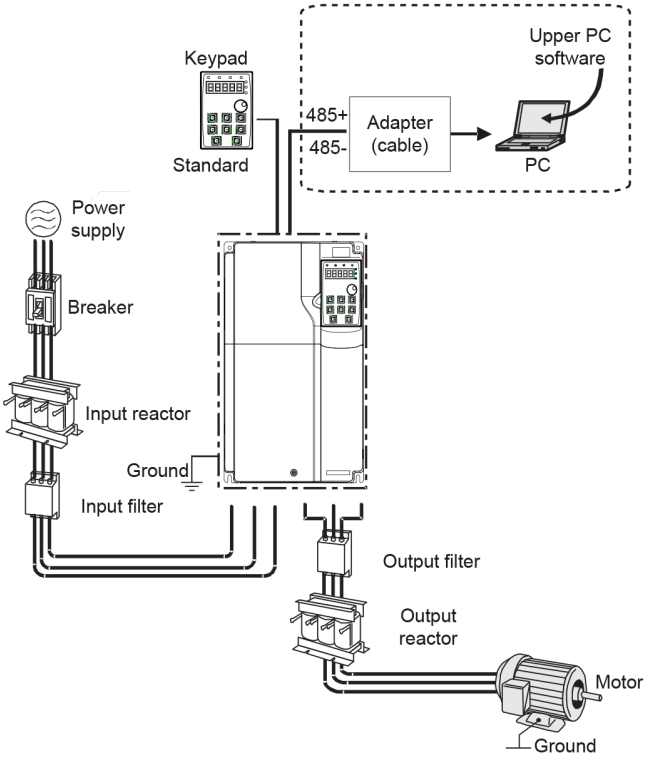
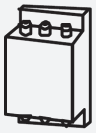
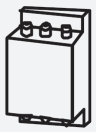


Image	Name	Description
	Input Reactor	Accessories used to improve the current adjustment coefficient on the input side of the VFD, and thus restrict high-order harmonic currents. The VFD models of 160P and higher can be directly connected to external DC reactors.
	DC Reactor	
	Input Filter	Accessory that restricts the electromagnetic interference generated by the VFD and transmitted to the public grid through the power cable. Try to install the input filter near the input terminal side of the VFD.
	Output Filter	Accessory used to restrict interference generated in the wiring area on the output side of the VFD. Try to install the output filter near the output terminal side of the VFD.
	Output Reactor	Accessory used to lengthen the valid transmission distance of the VFD, which effectively restricts the transient high voltage generated during the switch-on and switch-off of the IGBT module of the VFD.

List of Accessories

VFD model	Output Power	Input Current	Output Current	Input reactor	Output reactor	Input filter	Output filter
K320C-1R5P-4	1.5	5	3.7	ACL2-1R5-4	OCL2-1R5-4	FLT-P04006L-B	FLT-L04006L-B
K320C-003P-4	2.2	6	5	ACL2-2R2-4	OCL2-2R2-4		
K320C-004P-4	4	15	9.5	ACL2-004-4	OCL2-004-4	FLT-P04016L-B	FLT-L04016L-B
K320C-5R5P-4	5.5	20	13	ACL2-5R5-4	OCL2-5R5-4	FLT-P04032L-B	FLT-L04032L-B
K320C-7R5P-4	7.5	27	17	ACL2-011-4	OCL2-7R5-4		
K320C-011P-4	11	35	25	ACL2-015-4	OCL2-011-4	FLT-P04045L-B	FLT-L04045L-B
K320C-015P-4	15	44	32	ACL2-018-4	OCL2-015-4		
K320C-018P-4	18	46	38	ACL2-018-4	OCL2-018-4	FLT-P04065L-B	FLT-L04065L-B
K320C-022P-4	22	54	45	ACL2-022-4	OCL2-022-4		
K320C-030P-4	30	75	60	ACL2-037-4	OCL2-037-4	FLT-P04100L-B (FLT-P04065L-B)	
K320C-037P-4	37	90	75	ACL2-037-4	OCL2-037-4	FLT-P04100L-B	FLT-L04100L-B
K320C-045P-4	45	108	92	ACL2-045-4	OCL2-045-4		
K320C-055P-4	55	142	115	ACL2-055-4	OCL2-055-4	FLT-P04150L-B	FLT-L04150L-B
K320C-075P-4	75	177	150	ACL2-075-4	OCL2-075-4	FLT-P04240L-B (FLT-P04150L-B)	
K320C-090P-4	90	200	180	ACL2-075-4	OCL2-110-4	FLT-P04240L-B	FLT-L04240L-B
K320C-110P-4	110	240	215	ACL2-110-4	OCL2-110-4		
K320C-132P-4	132	278	250	ACL2-160-4	OCL2-132-4	FLT-P04400L-B	FLT-L04400L-B
K320C-160P-4	160	310	305	ACL2-160-4	OCL2-200-4		
K320C-185P-4	185	335	330	ACL2-200-4	OCL2-200-4		
K320C-200P-4	200	385	380	ACL2-200-4	OCL2-200-4		
K320C-220P-4	220	430	425	ACL2-280-4	/	FLT-P04600L-B	FLT-L04600L-B
K320C-250P-4	250	465	460	ACL2-280-4	/		
K320C-280P-4	280	540	530	ACL2-280-4	/		
K320C-315P-4	315	605	600	ACL2-350-4	/	FLT-P04800L-B	FLT-L04800L-B
K320C-355P-4	355	655	650	ACL2-350-4	/		
K320C-400P-4	400	660	720	ACL2-400-4	/		
K320C-450P-4	450	754	820	ACL2-500-4	/	FLT-P041000L-B	FLT-L041000L-B
K320C-500P-4	500	800	860	ACL2-500-4	/		

KRUGER Ventilation Group

THAILAND (Regional Head Quarter)
KRUGER VENTILATION INDUSTRIES ASIA CO., LTD.
30/159 Moo 1, Sinsakorn Industrial Estate Chetsadawithi Road,
Khok Kham, Mueang Samut Sakhon 74000, Thailand
Tel: +662 1054298 Fax: +662 0248256-9
website: www.krugertan.com

THAILAND
KRUGER VENTILATION IND. (THAILAND) CO., LTD.
30/105 Moo 1. Sinsakorn Industrial Estate Chetsadawithi Road,
Khok Kham, Mueang Samut Sakhon 74000, Thailand
Tel: +662 1050399 Fax: +662 1050370-2
Email: mktg@kruger.co.th

INDIA
KRUGER VENTILATION INDUSTRIES (INDIA) PVT. LTD.
Kruger Centre, Mumbai-Nashik Highway, Shahapur,
Thane 421601, Maharashtra, India
Tel: +91 99605 58899, +91 97663 23739
Email: sales@krugerindia.com

INDIA (NORTH)
KRUGER VENTILATION INDUSTRIES (INDIA) PVT. LTD.
Khasra No. 150/20/2/1, 21/1/2, 22/2, 151/16/2/2, Village Rohad,
Tehsil Bahadurgarh, Jhajjar-124507, Haryana, India
Tel: +91-9958991652 / 9958991660 / 8586966303
Fax: +91-1276-278096
Email: sales.kni@krugerindia.com, service@krugerindia.com

KOREA
NEOMATE CO., LTD.
2-1010, Ace High Tech City B/D, 775 Gyeongin-ro,
Yeongdeungpo-gu, Seoul, Korea, 07299
Tel: +82-2-2679-2052 Fax: +82-2-2679-2174
Email: y7890@neomate.co.kr

SINGAPORE
KRUGER ENGINEERING PTE. LTD.
2 Venture Drive, #20-23 Vision Exchange,
Singapore 608526
Tel: +65 68631191 Fax: +65 68631151
Email: mktg@krugerfan.com

AUSTRALIA
S&P KRUGER AUSTRALIA PTY. LTD.
2 Cunningham St, Moorebank, NSW 2170, Australia
Tel: +61 2-98227747
Fax: +61 2-98227757
Email: info@sandpkruger.com.au

INDONESIA
P.T. KRUGER VENTILATION INDONESIA.
JL. Teuku Umar No. 20, Karawaci, Tangerang 15115, Indonesia
Tel: +62 21-5512288 / 5513557
Fax: +62 21-5513502
Email: mktg@krugerindo.co.id

VIETNAM
KRUGER VENTILATION INDUSTRIES (VIETNAM) CO. LTD.
Lot A7.2-4, C2 Road, Thanh Thanh Cong Industrial Zone,
Trang Bang District, Tay Ninh Province, Vietnam
Tel: +84-276 3585200 / 01 / 02 / Fax: +84-276 3585199
Email: mktg@krugervn.com

CHINA (GUANGZHOU)
GUANGZHOU KRUGER VENTILATION CO. LTD.
No. 9 Huahui Road, Huashan Town, Huadu District,
Guangzhou, P.R. China 510880
Tel: +86 20-66356635 Fax: +86 20-86786001 / 86786500
Email: gzkruger@krugergz.com

CHINA (TIANJIN)
TIANJIN KRUGER VENTILATION CO. LTD.
No. 168, Anyuan Road, Chagugang Town,
Wuqing District, Tianjin, 301700, China
Tel: +86 22-22143480 / 3481 Fax: +86 22-22143482
Email: krugertj@krugertj.com

CHINA (SHANGHAI)
SHANGHAI KRUGER VENTILATION CO., LTD.
No. 500 Yuanguo Road, Anting, Jiading District,
Shanghai 201814, P.R. China
Tel: +86 21-69573266 Fax: +86 21-69573296
Email: shkruger@krugerchina.com

CHINA (WUHAN)
WUHAN KRUGER VENTILATION CO. LTD.
No. 805, Huian Ave, Dongxihu District, Wuhan,
Hubei, P.R. China 430040
Tel: +86 27-83248840 / 83060522 / 83097505
Fax: +86 27-83261886
Email: whkruger@krugerwh.com

HONG KONG
KRUGER VENTILATION (HONG KONG) LIMITED.
Flat C, 9/F, Yeung Yiu Chung (No. 8) Industrial Building,
20 Wang Hoi Road, Kowloon Bay, Kowloon, Hong Kong
Tel: +852 22469182 Fax: +852 22469187
Email: info@kruger.com.hk

TAIPEI
KRUGER VENTILATION (TAIWAN) CO. LTD.
No. 157, Ping'an Road, Hengfeng Village,
Dayuan Shiang District, Taoyuan City 337, Taiwan
Tel: +886 3-3859119 Fax: +886 3-3859118
Email: sales@krugertwn.com.tw

MALAYSIA
KRUVENT INDUSTRIES (M) SDN. BHD.
Lot 850, Jalan Subang 7, Taman Perindustrian Subang,
47500 Subang Jaya, Selangor Darul Ehsan, Malaysia
Tel: +603 80743399 Fax: +603 80743388
Email: mktg@kruger.com.my

PHILIPPINES
KRUGER M & E INDUSTRIES CORP.
B3 Welborne Industrial Park, Bancal, Carmona,
Cavite 4116, Philippines
Tel: +63-917 561 9088, +63-917 596 7288
+63-917 712 8438, +63-917 306 8288
Email: mktg@krugerph.net

Kruger Ventilation Industries Asia Co., Ltd

30/159 Moo 1, Sinsakorn Industrial Estate
Chetsadawithi Road, Khok Kham Mueng,
Samuthsakorn 74000, Thailand
Tel. +662 1054298 - Fax. +662 0248256-9
Website:www.krugerfan.com

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A member of

Soler&Palau Ventilation Group