USING THE QUICK GUIDE

- Serves for safe handling with the KEB drive controller.
- Provides information on handling, assembly and installation.
- Remains for later use at the drive controller.
- Does **not** replace the electronically provided instructions for use.

This manual is intended exclusively for persons who are familiar with the logistics and installation. The person must have the following qualifications:

- Knowledge and understanding of the safety instructions.
- Skills for installation and assembly.
- Understanding of the function in the used machine.
- Detection of hazards and risks of the electrical drive technology.
- Knowledge of IEC 60364-5-54.
- Knowledge of national safety regulations (e.g. DGUV Regulation 3).

SAFETY INSTRUCTIONS

▲ DANGER

Interventions by unauthorized personnel!

Danger to life by electric shock and malfunction!



▶ Modification or repair is only permitted by KEB authorised personnel.

Getting more documentation

Hazards and risks through ignorance.



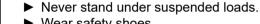
- ▶ Open the KEB homepage at www.keb.de.
- ▶ By entering the material number in the search field, you will get the corresponding parts of the instructions for use.
- ► Read the instructions for use carefully!
- ► Observe the safety and warning instructions!
- ▶ If you have any questions, please contact service@keb.de!

The transport must be carried out by instructed persons, observing the following instructions.

A CAUTION

Maximum design edges and high weight!

Contusions and bruises!



- ► Wear safety shoes.
- Secure drive controller accordingly when using lifting gear.

Behaviour in case of transport damage



- ▶ When receiving goods, check the device for transport damage such as deformations or loose parts.
- In case of damage, contact the carrier immediately. ▶ Do not operate the device in case of transport damage!

STORAGE

- Do not store drive controllers
- in the environment of aggressive and/or conductive liquids or gases.
- in locations exposed to direct sunlight.
- outside the specified environmental conditions.

UNPACKING AND CHECKING

- Make sure that no components are bent and/or isolation distances are changed.
- The device must not be put into operation in case of mechanical defects. There is no compliance with applicable safety standards any more.



The electrolytic capacitors of the DC link must be reformed if the drive controller was stored or out of operation for more than one year. See www.keb.de/nc/search with search term "electrolytic capacitors".

INSTALLATION



Drive controllers contain electrostatic sensitive components.



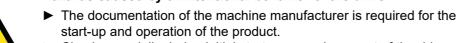
- Avoid contact.
- ► Wear ESD-protective clothing.
- Do not allow moisture or mist to penetrate the unit. Mount the drive controller according to the required degree of protection.
- Make sure that no small parts fall into the device during assembly and wiring (drilling chips, screws etc.). This also applies to mechanical components, which can lose small
- The device is intended for the use in a pollution degree 2 environment.
- Maximum ambient temperature 45°C
- UL/CSA: For push-through versions, the part of thends to "NEMA Type 1".
- UL/CSA: Use only 75°C copper cables for UL-compliant connections for all power
- CSA: For installations according to the Canadian National Standard C22.2 No. 274-13 overvoltage category III.

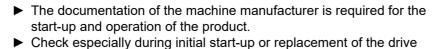
START-UP AND OPERATION

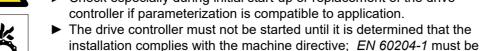
▲ WARNING

Function of the drive controller determines the machine manufacturer!

Hazards caused by unintentional behavior of the drive!



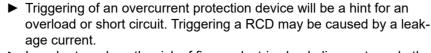




₩ WARNING Triggering of overcurrent protection devices

Risk of fire or electric shock!

observed.



- ▶ In order to reduce the risk of fire or electric shock, live parts and other components of the controller should be checked and replaced in case of damage.
- ▶ If the contacts of an overload relay are burned, the complete relay must be replaced.

A CAUTION

High sound pressure level during operation!



Wear hearing protection!

Hearing damage possible!

MAINTENANCE

⚠ DANGER Unauthorized exchange, repair and modifications!

Unpredictable malfunctions!



- ▶ The function of the drive controller is dependent on its parameterization. Never replace without knowledge of the application.
- ► Modification or repair is permitted only by KEB Automation KG author-
- Only use original manufacturer parts.

The following maintenance work has to be carried out when required, but at least once a year by authorised and trained personnel.

- ▶ Clean the drive controller from dirt and dust deposits. Pay attention especially to cooling fins and protective grid of the fans.
- ▶ Check the function of the fans of the drive controller. The fans must be replaced in case of audible vibrations or squeak.
- ▶ Make a visual test of the cooling circuit for leaks and corrosion at liquid-cooled drive controllers.
- ▶ In case of malfunction, unusual noises or smells inform a person in charge! ▶ In case of failure, please contact the machine manufacturer. Only the machine manufacturer knows the parameterisation of the used drive controller and can provide an appro-

priate replacement or induce the maintenance. **INSTALLATION / ELECTRICAL CONNECTION**

▲ DANGER

Voltage at the terminals and in the device!

Danger to life by electric shock!

- ▶ Never work under voltage on the open device or touch exposed parts.
- ► For any work on the unit switch off the supply voltage and secure it against switching on. ▶ Wait until the mechanical drive system has stopped in order that no



- regenerative energy can be generated. ▶ Wait until the DC link capacitors are discharged (5 minutes). Verify by measuring the DC voltage at the terminals.
- ▶ If personal protection is required, install suitable protective devices for drive controllers.



- ▶ Never bridge upstream protective devices (also not for test purposes). ► Connect the protective earth conductor properly to drive controller and motor.
- ▶ Leakage current higher than 3.5 mA: The minimum cross section of the protective earth conductor must comply with local safety regulations for protective earth conductors for equipment with high leakage

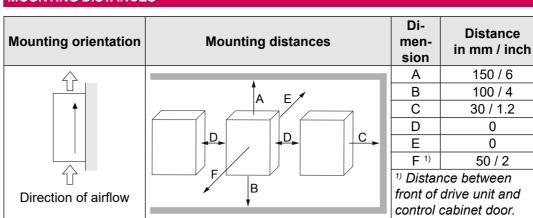


- ▶ Install all required covers and protective devices for operation.
- ▶ Residual current: This product can cause a DC current in the protective earth conductor. When a residual current device (RCD) or a residual current monitor (RCM) is used for the protection of direct or indirect contact, only a RCD or RCM of Type B is permitted for this product on the power supply side.

For a trouble-free and safe operation, please pay attention to the following instructions:

- ► Check for reliable fit of the device connections in order to minimize contact resistance and avoid sparking.
- ▶ Connection of the drive controller is only permissible on symmetrical networks with a maximum line voltage (L1, L2, L3) with respect to earth (N/PE) of maximum 300 V. USA UL: 480/277 V. An isolating transformer must be used for supply networks which exceed this value. In case of non-compliance the control circuits are no longer considered as "safe separate circuit".
- ▶ Within systems or machines the person installing electrical wiring must ensure that on existing or new wired safe ELV circuits the EN requirement for safe insulation is still met!
- ► For drive controllers that are not isolated from the supply circuit (in accordance with EN 61800-5-1) all control lines must include other protective measures (e.g. double insulation or shielded, earthed and insulated).

MOUNTING DISTANCES



PROTECTION

NOTICE

Important:

UL/CSA Branch Circuit Protection

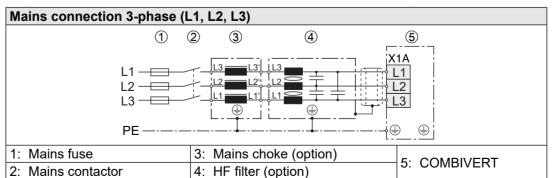
R	<u>D</u>	Input voltage		Max. fuse size					
COMBIVERT	Housing	IEC	UL		UL				
		AC	3ph	IEC	JDDZ/7 Class "J"	SCCR	JFHR2/8 ¹⁾	SCCR	
10F6				20A	25A		25A		
12F6		2201/	2401/	32A	40A		40A		
13F6		230 V	240 V	35A	50A		50A		
14F6				50A	70A		63/70A		
12F6	2			20A	15A		15/16A		
13F6			480 V	25A	20A		20A		
14F6		400 V		25A	25A		25A		
15F6				35A	35A		40A		
16F6				50A	50A		50A		
15F6				80A	80A		80A	30 kA	
16F6		230 V	240 V	80A	90A	5kA	90/100A		
17F6				100A	110A		125A		
17F6	3			63A	45A		50A		
18F6		400 V	480 V	80A	60A		50A		
19F6			400 V	80A	70A		70/80A		
20F6						100A	90A		90/100A
18F6		230 V	240 V	125A	110A		125A		
18F6		400 V	/ 480 V	80A	60A		50A		
19F6	4			80A	70A		80A		
20F6	7			100A	90A		100A		
21F6				125A	110A		125A		
22F6				160A	125A	10 kA	125A		
19F6		230 V	240 V	160A	.		<u> </u>	TBD	
20F6				200A	TBD	TBD	TBD		
21F6				250A					
21F6	6			125A	110A		125A		
22F6		400 V	480 V	160A	150A		160/175A	30 kA	
23F6		400 V	400 V	200A	175A	10 kA	180/200A	JUKA	
24F6				250A	200A		200A		
25F6				250A	250A		250A		
26F6	7	400 V	480 V	315A	300A		315A	100 kA	
27F6	,	400 V	400 V	355A	350A		350A	TOOKA	
28F6				400A	450A	18 kA	450A		
27F6		8 400 V		500A	400A		400A		
28F6	0		400V 480V	500A	500A	101.4	500A	100 kA	
29F6	0			630A	600A	18 kA	550/600A	TOUKA	
30F6				630A	600A		600/630A		
30F6				630A	601A		630A		
31F6	0	4001/	4001/	700A	700A	30 kA	700A	10014	
32F6	9	400 V	480 V	800A	800A		800A	100 kA	
33F6				900A	900A	42kA	900A		
1) Info	ormati	ons on the	manufactur	ers of UL a	pproved fus	ses are ava	ilable in the i	instructio	
£		f the eeus-	nandina ba						

for use of the corresponding housings.

BRAKING TRANSISTOR

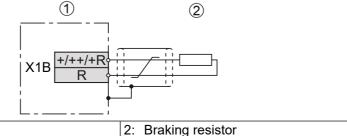
F6 Housing	Max. cycle time in t / s	Max. cyclic duration factor in % 1)		
2, 3, 4, 6, 7, 8	120	50		
9	120	25		

The cyclic duration factor is additionally limited by the used braking resistor.



Connection brake resistor

1: COMBIVERT



Motor connection with **Brake connection** temperature monitoring 2 3 (1) $U_{dc} = 24V$

24V supply control unit Connection of control unit The connection of the control depends on the programming of the machine manufac- $U_{dc} = 24V$ Control turer. See the documentation for the ma- I_{max} A/K Control = 4,5A A/P I_{max} P Control = 4,8A Overcurrent protection required! X2A X2B 27 7 Control board rating of relays is DC 30V/1A.

2: Motor 3-phase | 3: Temperature detection | 4: Brake

	No. from Table 2 Terminal block(s)						
Housing		X1	X1C	X2A-D	FAN	PE	
	L1, L2(N), L3	U, V, W	+, -, ++,, R, +R, PB	XIO .	all PINs	TAN	+
F6 2	2	2	2				6
F6 3	4	4	3 1) / 4			_	7
F6 4	5	5	5				8
F6 6	9	9	9	1	1		9
F6 7	10	10	10				10
F6 8	11	11	11			13	11
F6 9	12	12	12				12
Table 1: Assignment of terminals to terminal numbers							

The specification applies only to terminals R and +R.

2: 24V supply

No from		Permissible of	Tightening torque		
No. from Table 1	Mounting type	mm² with wire end ferrule	AWG without wire end ferrule	Nm	lb inch
1	Push-In terminal	0.141.5 1)	_	-	_
2	Screw terminal	2.510	266	1.5	13
3	Screw terminal	0.516	206	1.21.5	1113
4	Screw terminal	0.535	202	2.54.5	2340
5	Screw terminal	1.535	161	3.23.7	2832
6	M4 screw 2)	_	_	1.3	11
7	M5 bolt 2)	_	_	68	5370
8	M6 bolt 2)	_	_	6.112	54106
9	M8 bolt 2)	_	_	1015	88132
10	M10 bolt 2)	_	_	25	220
11	M12 bolt 2)	_	_	35	310
12	M16 bolt 2)	_	_	35	310
13 Screw terminal		0,24 1.5 max. with 2 conductors	2410 14 max. with 2 conductors	0.50.6	4.55.3
Table 2:	Assignment of	terminal number to cros	s section and tightening	g torque	

- Malfunctions caused by loose cable connections and too short wire end ferrules!
- ▶ Use wire end ferrules according to table 3 Wire end ferrules and stripping length.
- ▶ Strip cable according to table 3 Wire end ferrules and stripping length.
- ²⁾ For crimp connectors.

1: COMBIVERT

1: COMBIVERT

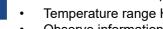
Cable cross-sections and fuses must be dimensioned according to the design of the machine manufacturer. Specified minimum / maximum values may not be fallen below /exceeded.

Cross section	Wire end ferrule	Metal sleeve length	Stripping length	
0.50 mm ²	with plantic college	10 mm	12 mm	
0.75 mm ²	with plastic collars (DIN 46228-4)	12 mm	14 mm	
1.00 mm ²	(DIN 40220-4)	12 mm	15 mm	
1.50 mm ²	without plastic collars (DIN 46228-1)	10 mm	10 mm	
0.141.5 mm ² single or finewire	without wire end ferrule	_	1015 mm	

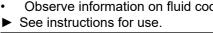
FLUID COOLER

F6	V	olume flo	w Q / I/min	Connection Ø			
Housing	Water	Oil	Water (High-Performance)	Water	Oil	Water (High-Performance	
3	315	_		10 mm	-	_	
4	515	1525	_	10 mm	G 1/2"	_	
6	515	1525	1525	10 mm	G 1/2"	G 1/2"	
7	620	_	2030	12 mm	-	18 mm	
8	1033	_	1530	15 mm	-	18 mm	
9	1033	_	2040	15 mm	_	18 mm	

- Maximum pressure for liquid-cooled drive controllers 10 bar (145 psi).
- The volume flow depends on the power dissipation.



Temperature range High-Performance fluid cooler may vary. Observe information on fluid coolers.



► See instructions for use

Table 3: Wire end ferrules and stripping length

Temperature range fluid cooler, water: 5...40°C, water H.-P.: 5...55°C, oil: 40...55°C.



MORE KEB PARTNERS WORLDWIDE:





COMBIVERT F6

QUICK START GUIDE

Translation of the original manual F6 Series Housing 2, 3, 4, 6, 7, 8, 9 Document 20162225 EN 11

HOUSING DIMENSIONS

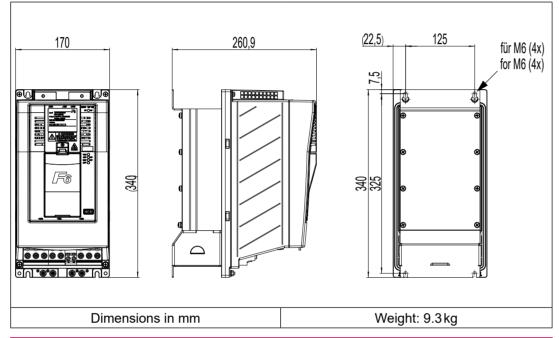
HOUSING 2 BUILT-IN VERSION

für M6 for M6

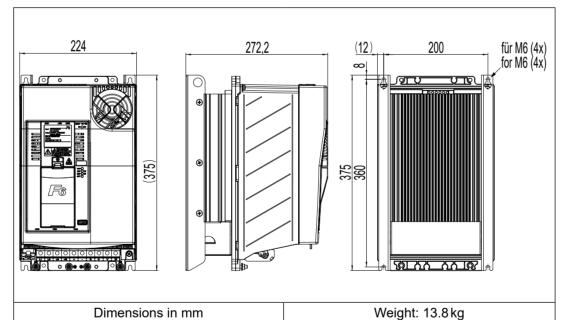
Weight: 5.0 kg

HOUSING 3 BUILT-IN VERSION

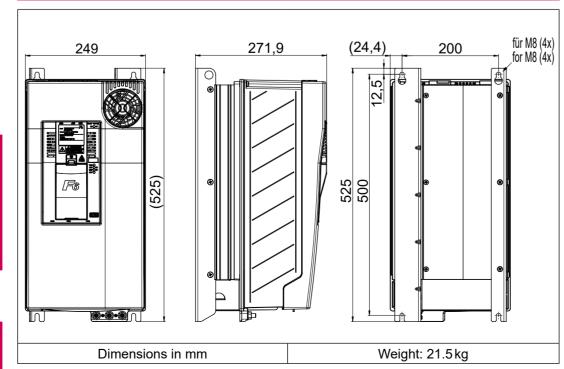
Dimensions in mm



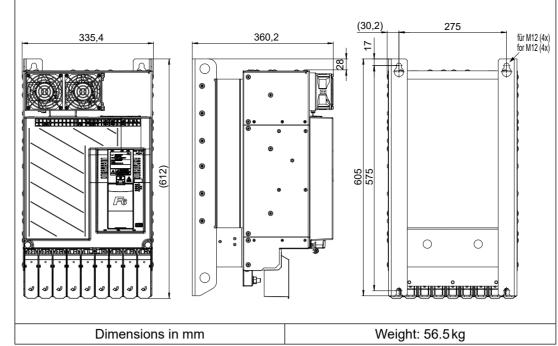
HOUSING 4 BUILT-IN VERSION



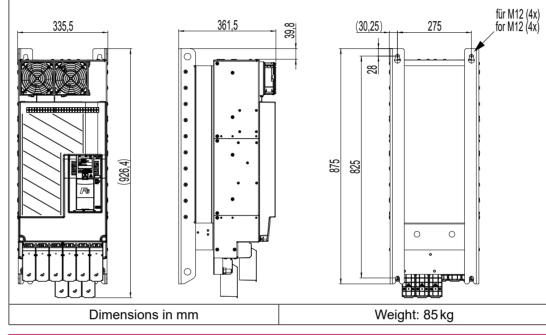
HOUSING 6 BUILT-IN VERSION



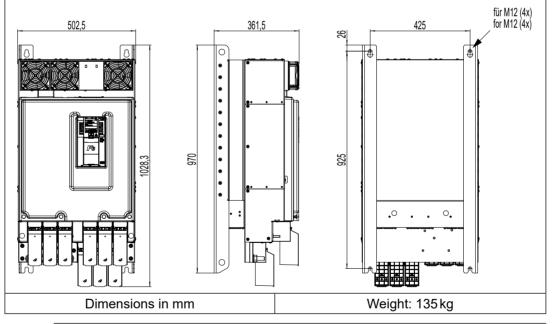
HOUSING 7 BUILT-IN VERSION



HOUSING 8 BUILT-IN VERSION



HOUSING 9 BUILT-IN VERSION



The housing dimensions of other model variants can be found in the instructions for use of the corresponding housings.

CERTIFICATION

CE certification

CE certification



KEB products meet the requirements of the valid European and national directives. The conformity has been proven. The corresponding declarations can be downloaded from our website by entering the material number in the search field.

FS certification



For devices with FS logo on the nameplate, the corresponding KEB safety manual must be observed!



During the UL evaluation, only electrical safety and risk of fire aspects were investigated. Functional safety aspects were not evaluated. Devices with safety function are limited to a service life of 20 years. Then the devices must be replaced.

See www.keb.de/nc/search with search term "safety manual".

UL certification

NOTICE UL certification

Only devices with UL logo on the name plate are certified.



For compliance with UL for use in the North American and Canadian Market, the following additional information must be observed (English original text):

BRANCH CIRCUIT PROTECTION

- ▶ Integral solid state short circuit protection does not provide branch circuit protection. ▶ Branch circuit protection must be provided in accordance with the Manufacturer Instruc-
- tions, National Electrical Code and any additional local codes".
- ► CSA: For Canada: Branch circuit protection must be provided in accordance with the Canadian Electrical Code, Part I.

A WARNING

► THE OPENING OF THE BRANCH-CIRCUIT PROTEC-TIVE DEVICE MAY BE AN INDICATION THAT A FAULT HAS BEEN INTERRUPTED. TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, CURRENT-CARRYING PARTS AND OTHER COMPONENTS OF THE CON-TROLLER SHOULD BE EXAMINED AND REPLACED IF DAMAGED. IF BURNOUT OF THE CURRENT ELEMENT OF AN OVERLOAD RELAY OCCURS, THE COMPLETE OVERLOAD RELAY MUST BE REPLACED.

AVERTISSEMENT

► LE DÉCLENCHEMENT DU DISPOSITIF DE PROTEC-TION DU CIRCUIT DE DÉRIVATION PEUT ÊTRE DÛ À UNE COUPURE QUI RÉSULTE D'UN COURANT DE DÉFAUT. POUR LIMITER LE RISQUE D'INCENDIE OU DE CHOC ÉLECTRIQUE, EXAMINER LES PIÈCES PORTEUSES DE COURANT ET LES AUTRES ÉLÉ-MENTS DU CONTRÔLEUR ET LES REMPLACER S'ILS SONT ENDOMMAGÉS. EN CAS DE GRILLAGE DE L'ÉLÉMENT TRAVERSÉ PAR LE COURANT DANS UN RELAIS DE SURCHARGE, LE RELAIS TOUT ENTIER DOIT ÊTRE REMPLACÉ.

GROUNDING SYSTEM

► All 480Vac / 3-ph Models:

"Only for use in non-corner grounded type WYE source not exceeding 277 V phase to ground" (or equivalent).

► All 200-240Vac / 3-ph Models:

"Only for use in non-corner grounded type WYE source not exceeding 139 V phase to ground" (or equivalent).

UK Conformity Assessed

UK Conformity Assessed



KEB products with the listed logo meet the requirements and guidelines

The corresponding information can be obtained on our website by entering the material number in the search field or from our authorised contact person below:

KEB(UK) Ltd.

5 Morris CI, Park Farm Industrial Estate, Wellingborough NN8 6XF, UK

► For professional disposal, follow the instructions in the instructions for use

INSTRUCTIONS FOR USE



► Open the KEB homepage at www.keb.de.

▶ By entering the material number in the search field, you will get the corresponding parts of the instructions for use.

► Read the instructions for use carefully! KR 다른 언어도 사용할 수 있습니다.

KEB Offille	WWW.NED.UE	IXIX	
BG	Други налични езици.	HR	Ostali dostupni jezici.
CN	其他语言可用。	HU	Más elérhető nyelvek.
CZ	Jiné jazyky k dispozici.	LV	Citas pieejamās valodas.
DK	Andre sprog til rådighed.	LT	Kitos kalbos.
DE	Weiteren Sprachen verfügbar.	MT	Lingwi oħra disponibbli.
EN	Other languages available.	NL	Andere talen beschikbaar.
EE	Muud keeled on saadaval.	PL	Inne dostępne języki.
ES	Otros idiomas disponibles.	PT	Outros idiomas disponíveis.
FI	Muut kielet saatavilla.	RO	Alte limbi disponibile.
FR	Autres langues disponibles.	RU	Доступны другие языки.
GR	Άλλες διαθέσιμες γλώσσες.	SE	Andra språk finns tillgängliga.
IE	Teangacha eile ar fáil.	SK	lné jazyky sú k dispozícii.
IT	Altre lingue disponibili.	SI	Drugi jeziki so na voljo.
JP	他の言語も利用できます。	TR	Mevcut diğer diller.
			

Mat.No. 00F6N1M-0005