COMBIVERT

GB INSTRUCTION MANUAL Portable Operator

Mat.No.	Rev.
PL58NEB-0000	1B

KEB

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1. Introduction

1.1 General information

Before working with the unit the user must become familiar with it. This includes especially the knowledge and observance of the safety and warning directions. The pictographs used in this instruction manual have following meaning:

	Danger	Indicates danger to life by electric current.

	Warning	Indicates possible danger to life or danger of injury.

	Note	Indicates tips and additional information.

1.2 Validity

This manual as well as the specified hardware and software are developments of the Karl E. Brinkmann GmbH. Errors and omissions excepted! The Karl E. Brinkmann GmbH have prepared the documentation, hardware and software to the best of their knowledge, however, no guarantee is given that the specifications will provide the efficiency aimed at by the user. The Karl E. Brinkmann GmbH reserves the right to change the specifications without prior notification or further obligation. All rights reserved.

The information contained in the technical documentation, as well as any user-specific advice in spoken and written and through tests, are made to best of our knowledge and information about the application. However, they are considered for information only without responsibility. This also applies to any violation of industrial property rights of a third-party.

Inspection of our units in view of their suitability for the intended use must be done generally by the user. Inspections are particularly necessary, if changes are executed, which serve for the further development or adaption of our products to the applications (hardware, software or download lists). Inspections must be repeated completely, even if only parts of hardware, software or download lists are modified.

	Inspection by the user	Application and use of our units in the target products is outside of our control and therefore exclusively in the area of responsibility of the user.

	Use under special conditions	The used semiconductors and components of KEB are developed and dimensioned for the use in industrial products. If the KEB COMBIVERT is used in machines, which work under exceptional conditions or if essential functions, life-supporting measures or an extraordinary safety step must be fulfilled, the necessary reliability and security must be ensured by the machine builder.

1.3 Qualification

All work from the transport, to installation and start-up as well as maintenance may only be done by qualified personnel (IEC 364 and/or CENELEC HD 384 or DIN VDE 0100 and note national safety regulations). According to this manual qualified staff means those who are able to recognise and judge the possible dangers based on their technical training and experience and those with knowledge of the relevant standards and who are familiar with the field of power transmisssion (VDE 0100, VDE 0160 (EN 50178), VDE 0113 (EN 60204) as well as those who note the valid local regulations).

	Danger by high voltage	KEB electronic components contain dangerous voltages, which can cause death or serious injury. Depending on the protective system they can have live parts, bright parts, if necessary also moving parts, as well as hot surfaces during operation. Care should be taken to ensure correct and safe operation to minimise risk to personnel and equipment.
	Fire risk	Unit contains Li-Ion accumulator. Accumulator may not be: • mechanically damaged • short circuited • thrown in the fire / water • loaded externally or at temperature above +45°C
		Accumulator/unit is withdrawn by KEB after the end of lifetime. Accumulator manufacturer in the sense of the German battery law: Fey Elektronik GmbH, D-21217 Seevetal

1.4 Order data

Portable Operator Set WIRELESS with USB, HSP5, RS485 cables	00.58.060-0010
Portable Operator Set BASIC without accumulator/radio module with RS485/USB combi cable (supplied via DIN66019 interface)	00.58.060-0110
Inverter radio module, connection HSP5 and DIN66019	00.58.060-0030
Transformer cable RJ45/RS485 DSUB9, 2.5 m for the connection to a F5-HSP5 interface inverter (included in the WIRELESS set)	00.F5.0C0-4025
Adapter cable RJ45/RS485 DSUB9, 2.5 m for the connection to a RS485 interface inverter/operator (included in the WIRELESS set)	00.F5.0C0-0021
Adapter HSP5 DSub/RJ45 for the connection to a HSP5 diagnostic interface F5 operator (included in the WIRELESS set)	00.F5.0C0-0020
USB cable connector A-B, connection to an USB slot (PC or power supply) (included in the WIRELESS and BASIC set)	00.F5.0C4-1010
Combi cable RS485 with USB (included in the BASIC set)	00.F5.0C0-0022

1.5 Product description

The Portable Operator has a display with a text indicator, which enables a clearly representation of comprehensive informations, for example a parameter name with its value. Several languages are available.
The four function keys are occupied variable. Internal and external possibility of saving enables the transmission and storage of parameter lists and thereby a faster programming of inverter.

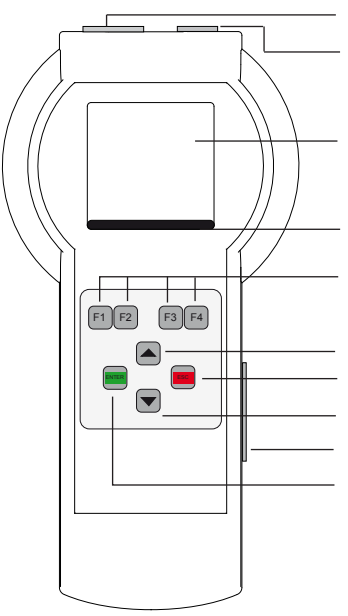
This transmission can be made wire-connected and wireless (WIRELESS version).

The BASIC version is supplied via the enclosed combi cable by the D-Sub9 connector. Alternatively it can also be supplied with a standard USB connection cable (type A -> B type) from a PC/Laptop.

This instruction manual describes the software status starting from 2010-07.

2. Hardware

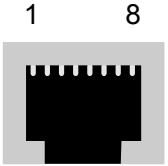
2.1 Description of the operator



(1) X6A (RJ45)
(2) X6B (USB-B)
(3) LCD display
160 x 160 pixel, 32 gray scale value
(4) Function bar
(5) Function keys F1 to F4
(6) Up
(7) ESC
(8) Down
(9) Card slot for SD/MMC
(10) ENTER

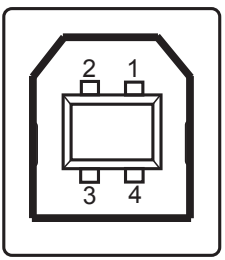
(1)	Communication interface RS485, see also chapter „Communication“	(5)	The function keys F1 to F4 are variable assigned. The assignment is displayed by the function bar.
(2)	USB-B (socket), voltage supply / file transfer	(6) (8)	With "Up" and "Down" it can be moved between the menu items or changing parameter values.
(3)	The LCD display offers a detailed representation of the information with a plain text display.	(7)	With ESC a jump to the next superior menu is done.
(4)	A flashing function bar indicates an inverter error.	(9)	Card slot for SD/MMC (not for BASIC version)
(10)	With ENTER it can be jumped into the selected menu item or a selection can be confirmed.		

X6A communication interface RS485



1	TxD+	Transmission signal (A)
2	TxD-	Transmission signal (B)
3	GND	Reference for signals
4	RxD+	Receive signal (A)
5	RxD-	Receive signal (B)
6	PGM	Connect with GND for operation
7	E_TxD+	Handshake signal (A)
8	E_TxD-	Handshake signal (B)

X6B voltage supply/file transfer USB-B 2.0, 5.0 V maximum, current input 0.5 A max.



1	+5 V In
2	USB-
3	USB+
4	GND

An installed card shaft at the right side serves for input of SD or MMC memory cards

2.2 Internal flash memory

Access to this memory is possible via device C:. System files, work and parameter lists are stored here. Observe the following particularities:

- Long file names up to 32 characters are possible.
- Data are not physically deleted. At first they are internal marked as deleted. Thus the available memory capacity decreases. The complete memory is formatted new with the command "format". All data are irrevocable deleted.
- With the command "clear" the deleted memory capacity can be made available again without reformatting.

If the Flash memory is formatted during a firmware update, so the files LANGUAGE.DAT and PARAS.BLB must be copied from the SD card.

2.3 External memory card (not at BASIC version)

A SD or MMC memory card of any capacity can be insert into the slot of the operating unit. Access to this memory is possible via device A:. Any files can be stored also here. Observe the following particularities:

- The file system is FAT16 or FAT 32 and thus compatibly to external readers and Windows operating systems.
- It can be accessed only to files in the main directory.
- Long file names (up to 32 characters) are possible.
- The write protection switch (at SD cards) is considered, writing on the card only possible after release.

2.4 System files

Necessary system files:

- LANGUAGE.DAT: Texts in all languages for the operation of the operator
- PARAS.BLB: Parameter functions and names for all inverter and operator parameters

2.5 Accumulator operation

Only for unit variant with WIRELESS:
The Portable Operator contains an integrated Li-Ion accumulator, which supplies the operator when the USB cable is removed. This enables real mobile operation at wireless communication.

Press the green ENTER key for 2 seconds to switch on the unit. The accumulator is charged via the USB port X6B. A load controller prevents overloading. The accumulator indicator in the main menu in the function strip left displays the capacity (voltage measurement) and charging (running bar) or low level (flashing). Charging can be done by PC, laptop or USB power supply. Max. 5 V are permissible here. The accumulator display is no longer visible after complete charging.

In order to prevent the accumulator, several functions are available in the menu „Settings“:
- The backlight can be switched off time controlled.
- The complete Portable Operator can be switched off time controlled.
- In either case the Portable Operator switches off after a short note at low accumulator load.

i	The optimum temperature for operation and storage of the Li-ion accumulator is +15°C. This enables the longest accumulator run-time.

The Portable Operator is permanently switched on during voltage supply via USB socket, otherwise the unit can be switched off in the main menu via function key F4, then F1.

In case of failure, especially at running custom-specific application, the unit can be switched off by software for more than 10 seconds by pressing F1 and F4 simultaneously.
If these software switch off failure then the main switch in the unit can be reached by opening the lower flap (remove the screw for this). Thereby the accumulator is completely disconnected, also the real-time clock loses its data.

2.6 Wireless operation

Only for unit variant with WIRELESS:
The integrated wireless module allows sending/receiving of DIN66019II telegrams. A wireless connection to one/several inverters can be done here by using one or more wireless inverter modules 0058060-0030. The operating mode is determined via menu "Communication". As soon as no "wireless"
operating mode is adjusted, the wireless module is completely switched off and there is no significant current supply.

2.7 Real-time clock

The Portable Operator contains a real-time clock which is supplied by the accumulator. At file generation date and time are used as time-stamp. Custom-specific applications have also access to this information e.g. for documentation. Leap years to 2099 are automatically considered.

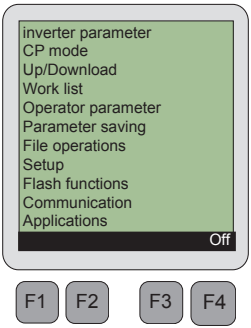
The version BASIC without accumulator loses the time data without external voltage supply!

2.8 Technical data

General	
Dimension (HxBxT)	230 x 120 x 50
Weight	0.4 kg
Protective system (EN 60529)	IP20
Operation temperature	-10°…45°C, charge accumulator: 0…45°C
Storage temperature	-25°…70°C, accumulator: -25…+50°C optimum: +15°C
Climatic category (EN60721-3-3)	3 K 3
Environment (IEC 664-1)	Pollution degree 2
Flash memory	4 / 8 MBytes
External memory	SD or MMC memory cards of any capacity
Wireless module	2.4 GHz ISM Band, worldwide usable in accordance with EN 300440, EN 301489, EN 60950, EN 50371 100m free field distance, 500 kHz bandwidth
Accumulator	Li-ion, 3.6 V, 2250 mAh, 8 Wh
Accumulator run-time	with backlight and wireless operation approx. 24 h with backlight without wireless operation approx. 40 h without backlight without wireless operation approx. 72 h
Accumulator recharge time	approx. 6 hours for empty accumulator (0.43A charging current)
Voltage supply (via X6B-USB)	Variant without accumulator (BASIC): 3.0…5.0 V, max. 100 mA Variant with accumulator (WIRELESS): 5.0 V, max. 500 mA

3. Software

3.1 Main menu



ENTER
→
←
F1

Jump into the submenu

Return to the main menu

The function keys F1 to F4 can be assigned as follows depending on the respective submenu.

3.2 Operation of the function keys

Display	Function
Flash/Card	Change between internal flash memory and external memory card
DecHex	Change between decimal and hexadecimal display
Num	Numeric input: manual input of numbers
Set	Changing the sets [I], [A] or [0-7]
Select	Selection of a configuration file
Last	Select the last used configuration file
Top/Bottom	Change between first and last list item
Formt [1)]	The complete memory including the system file is formatted again. → Data are irrevocable deleted
CinUp [1)]	Make deleted memory space without new formatting available again
Delete [1)]	Delete the selected file of memory card or flash memory
Upload	Load complete download list from current inverter

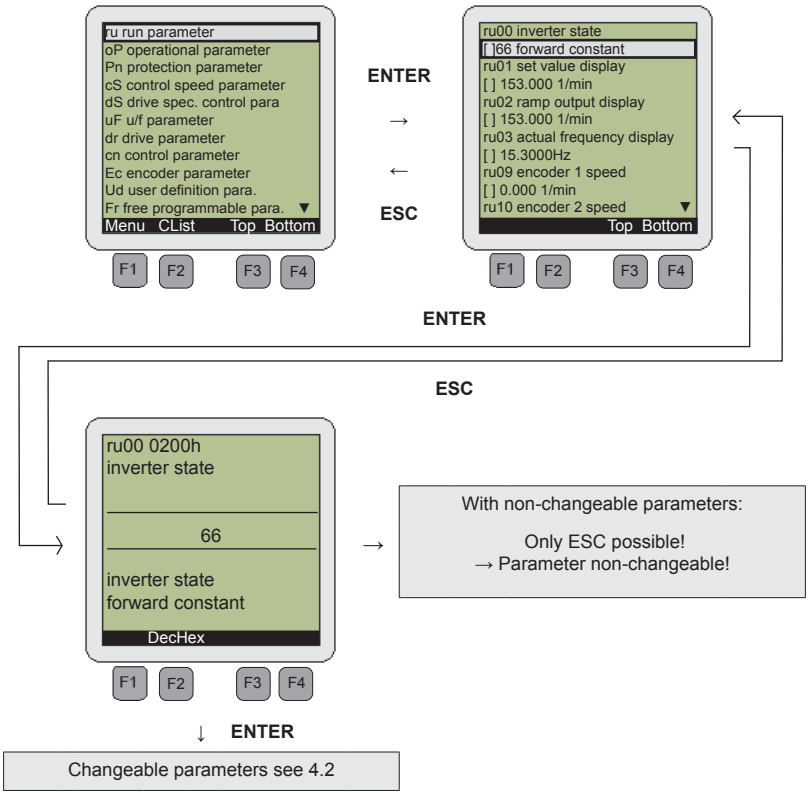
further on next side

Display	Function
Download	Store download list in the inverter
Copy	Copy of files between flash memory and memory card
← →	Move to the left and right (e.g. at numeric input or input of file names)
CList	A complete parameter list is generated
Menu	Return to the main menu
Yes	Process confirm
+-	The sign is changed
,	A point and a further digit are inserted.
1) File access is possible depending on the password level, reduced or switched off	

4 Inverter Parameter

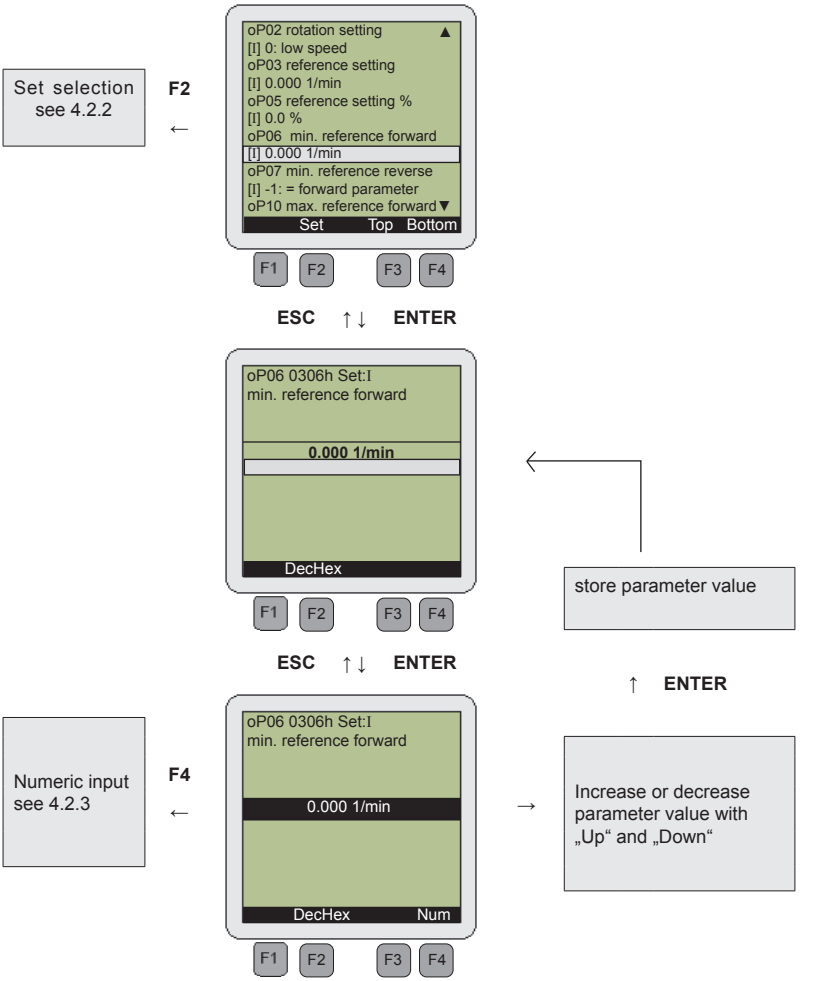
4.1 Non-changeable parameters

i	The parameter groups are depending on the inverter

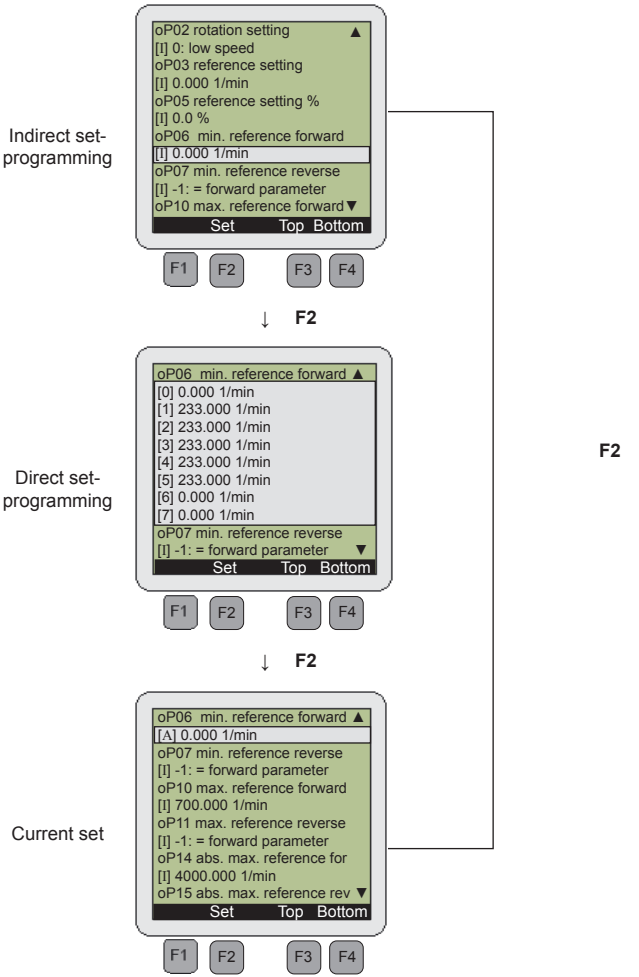


4.2 Changeable parameters

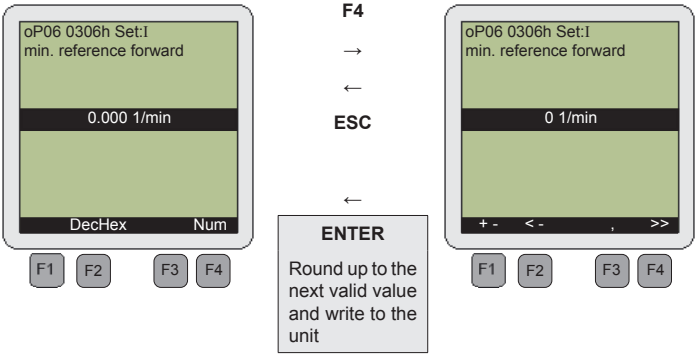
4.2.1 Changing with „Up“ and „Down“



4.2.2 Set selection

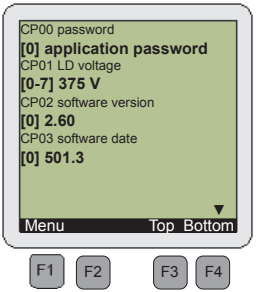


4.2.3 Numeric input



F1	F2	F3	F4
The sign is changed	A digit is removed	A point and a further digit are inserted. The digit can be changed with "UP" and „Down“. With several points only the first is considered!	The display is extended by a digit. The digit can be changed with "UP" and „Down“.

5. CP Mode

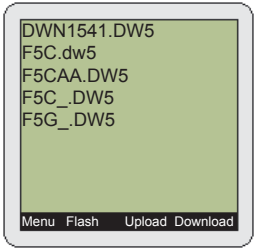


CP mode

The defined customer parameters in the inverter are displayed.
Operation takes place like the inverter parameters.

i	The representation size of the parameter values can be adjusted separately! → see “menu“ → “adjustments“ → “type size2“

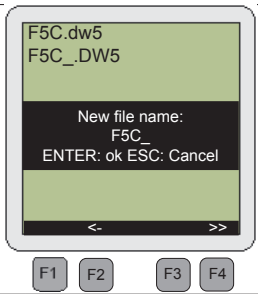
6. Up/Download



F1	F2
Back to the main menu	**Card** The file path is on memory card and changes to flash **Flash** The file path is on flash and changes to memory card

F3	Generate-correction is required	F4
A download list is loaded from the current inverter and stored under new name		A download list is stored in the inverter

↓ENTER	↓ ESC	↓ ENTER	↓ ESC
	Cancel	process confirmed	Cancel



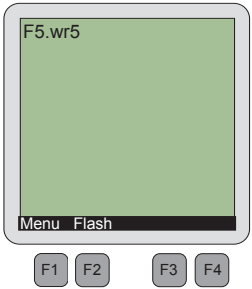
↓	↓
A digit is removed	A digit is added. The digit can be changed with "UP" and „Down“: 0-9; _ ; A-Z

↓ENTER	↓ESC
Procedure confirmed/if necessary "overwrite“ inquiry	Cancel

i	A complete parameter list can be generated with "CList" in the menu item "inverter parameter".

ENTER	Display of file name / size / date / time. Since there is no real-time clock integrated in the LCD operator, new created files have the date 01.01.2003.

7. Work List



ENTER

→

←

ESC

Displays of the work list F5.wr5

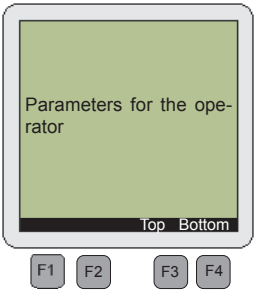
The selection of a work list of the memory card or the flash memory (function key F2) occurs in this menu item.

i	The compilation of the work list must be done with COMBIVIS.

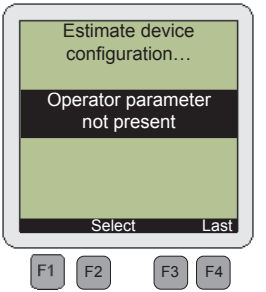
8. Operator Parameter

The LCD operator must be connected to the HSP5 diagnostic interface of the appropriate operator for representation of operator parameters.

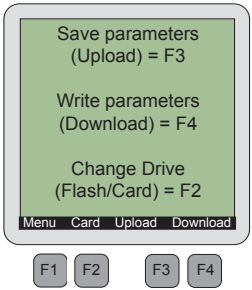
The operator can load the appropriate parameters if a valid configuration number is recognized. Operation takes place like the inverter parameters.



Either a configuration file can be selected via function key F2 or the last used configuration file can be taken via function key F4 if no configuration number is recognized.



9 Parameter Saving



F3	F4
All inverter and operator parameters (if an operator is available) are read out and saved in the flash memory or memory card. Every new upload process overwrites the pre-saved parameter lists.	A download is not possible without saved inverter parameters → error message! Operator parameters are only written if they are saved in the flash memory or memory card and if an operator is on the new inverter, which is to be written.

Fixed file names for saved parameter lists:

Inverter parameters: %%SAVEFU.DW5

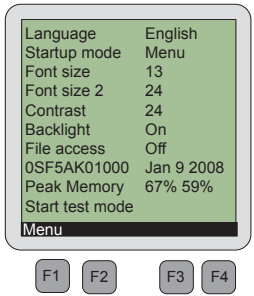
Operator parameters: %%SAVEOP.DW5

10. File Operations

F2	F3	F4	ENTER
Change between the files of the memory card and the files of the flash memory.	The selected file is copied between flash memory and memory card. The generate-correction is required. If the target file is already available, also the delete-authorization is necessary.	The selected file of the memory card or the flash memory is deleted. The delete-authorization is necessary.	Display of file name / size / date / time.

An automatic "clearing" is done if not enough memory is available during copying files to the flash memory (see chapt. 2.2).

11. Settings



To store changes non-volatile, a return to the main menu is required with the F1 key.

11.1 Language

A language is selected for the menu and the parameters.
If the selected language is not available the parameters are displayed in English.

11.2 Startup mode

The startup mode determines the menu item after initialization of the operator.

11.3 Font size

It can be selected between font sizes 8.10.13.16 and 24 in the display.
Exception: see „font size 2“

11.4 Font size 2

The font size for the display of parameter values is specified in the CP mode and in the work list.

11.5 Contrast

The contrast adjustments of the LCD display can be changed within the range of 0 to 50.

11.6 Backlight

If the backlight displays „on" it is generally switched on. If the backlight is adjusted to "out" it is generally switched off. If the backlight is adjusted to "auto", it is switched on during pressing a key and switched off again after 10 seconds if no key is pressed.

11.7 File access

The following possibilities are available to determine the file access:

Display	Function	Password
Off	Files cannot be generated or deleted	0
Create	Files can be generated	55
Create/Delete	Existing files can be generated, deleted or over-written	345

11.8 Switch off time

Adjusts the disconnecting time of the unit without pressing a key. This function can also be set to 0 (off). Then the unit is only switched off with empty accumulator. NO switching off takes place when connecting a voltage supply via USB port.

11.9 Date

Enables the display and input of the actual date. The keys Up/Down change first the day. Switching to month → year and return to day with function key F4.

11.10 Time

Enables the display and input of the actual time. The keys Up/Down change first the hour. Switching to minute →second and return to hour with function key F4.

11.11 Software information

The display indicates the material number and the output data of the operator software.

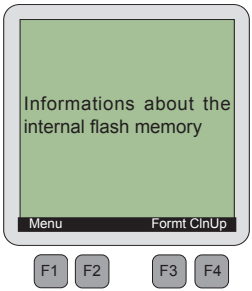
11.12 Peak memory

The peak load of the text memory is displayed first. The peak load value of the communication buffer is displayed behind (this display is only for information).

11.13 Start test mode

This mode tests the keyboard and the display. Follow the instructions of the display.

12. Flash Functions



F3	Generate-/delete-authorization is required	F4
⚠	The complete memory including the system files is formatted again. → Data are irrevocable deleted!	The deleted memory capacity can be made available again without reformatting.

13. Communication

The Portable Operator enables several connections and protocols for external communication. The interface X6A is protected up to 24 V against overload / destruction. If a wrong adapter cable is used remains without consequences for the Portable Operator. However, some transformer cables can be damaged in case of misapplication.

The HSP5 transformer cable 00F50C0-4025 may be used only with HSP5 interfaces!

The node address and one of the following connection types must be adjusted for use.

13.1 DIN66019II

Selects the wireline DIN66019II protocol. The node address selects the requested unit. It must be adjusted also in the target device. The connection is made via X6A and adapter cable 00F50C0-0021, which uses the RS485 interface of the KEB units.

Also networking up to 30 other units is possible. It is switched to other nodes by changing the node address. The baud rate is self-detected and adjusted in the range of 9600-55500 baud.

13.2 HSP5

Selects the wireline HSP5 protocol. The node address has no function with this protocol. The connection occurs via X6A and transformer cable X6A 00F50C0-4025 which uses the HSP5 interface of the KEB units. The connection to a HSP5 diagnostic interface of an F5 operator can also occur with adapter cable 00F50C0-0020. The baud rate is self-detected and adjusted in the range of 38400-250000 baud.

13.3 Wireless (not at BASIC version)

Selects the wireless DIN66019II protocol. The node address selects the requested unit. It must be adjusted also in the target device. The connection occurs via the integrated wireless module. Additionally one (or several) inverter wireless module 0058060-0030 must be installed within a radius of range.

The inverter wireless module can be plugged to a DIN66019II or HSP5 interface and detects protocol and baud rate independently. Also networking up to 30 other units is possible here. It is switched to other nodes by changing the node address. The baud rate is universally adjusted to 38400 baud.

13.4 USB

A virtual COM port appears when connecting the unit via USB interface X6B to a PC. Access to the file system of the Portable Operator can be done with the program "kebFtpApplication" after installation of the required driver (if necessary). Driver and programs can be downloaded at www.keb.de.

14. Applications

Loadable, user-specific applications can be selected here. This executable programs are created by the user in programming language "C" and loaded to the memory card or to the internal Flash. They are started via function key F4 and then they have access to all system functions, like graphic display, keyboard, communication, real-time clock and file system. The file extension for these applications is „.app“.

The separately available portable operator tool kit contains the up to 64kB code size free development environment HEW and example programs to develop own applications.

15. Password Protection of the KEB COMBIVERT

The KEB COMBIVERT is equipped with an extensive password protection.
This affects the portable operator as follows:

Password level	Meaning	Portable Operator
CP read	Reading is only possible in the final customer menu (CP-Parameter).	No inverter parameters No operator parameters
CP-read/ write	Reading and writing is possible in the final customer menu (CP-Parameter)	
Application mode	All parameter groups and parameters are visible	No restriction

The change between the password inputs:

Current password level	Password input in parameter
CP mode	CP.00
Application mode	Ud.01

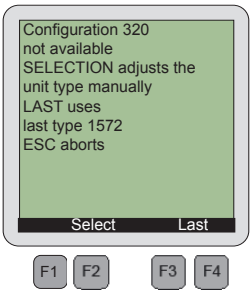
16. Error

- Error: Password setting insufficient

  Cause: Selection of parameters at low password level

  Solution: Adjust another password in the CP mode

- Error: The following message is displayed when switching on:



  Solution:
  - Select the last used parameter configuration with the function LAST
  - Select a new parameter configuration with the function SELECTION
  - Load the current system file "PARAS.BLB" from the internet to the memory card and download it to the operator flash memory in the menu item "file management"

- Error: The parameters are not displayed in the selected language

  Solution: Load the current system file „PARAS.BLB“ from the internet to the memory card and download it to the operator flash memory in the menu item "file management" → eventually not all parameters are available here in the desired language

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