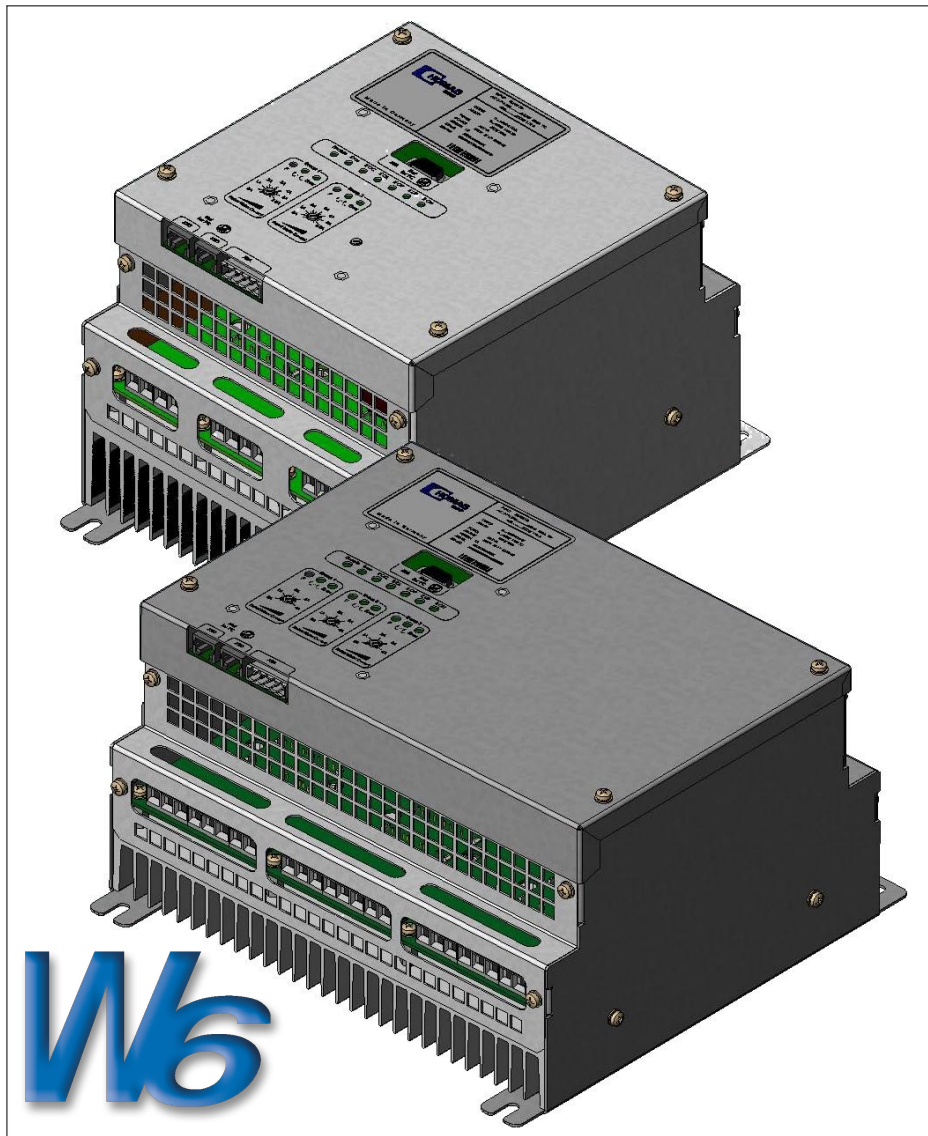


COMBIVERT



W6

GB Instruction Manual
Type W6

Multi Inverter
Size 02 / 04 / 06



This instruction manual describes the KEB COMBIVERT W6. Prior to performing any work on the unit the user must familiarize himself with the unit. This especially applies to the knowledge and observance of the following **safety and** warning indications. The pictographs used in this instruction manual have following meaning:

GB - 3 ... GB - 24



**Danger
Warning**



**Attention
Essential
Discharge Time**



**Information
Help**

Table of Contents

1. Introduction	4
1.1 Preface	4
1.2 Product Description	4
1.3 Specified Application	4
1.4 Unit Identification	5
2. Safety and Application Instructions	6
3. Technical Data	7
3.1 Operating conditions of the COMBIVERT W6	7
3.2 Power Data	8
3.2.1 Overload characteristic	8
3.3 Dimensions and Weights	9
3.4 Control cabinet installation	10
3.5 Installation Instructions	10
4. Connection and Control Elements	11
4.1 Summary	11
4.2 Power Unit	12
4.2.1 Terminals of the power circuit	12
4.2.2 Connection housing size A	13
4.2.3 Connection housing size B	13
4.3 Control terminal strip X2A	14
4.3.1 Assignment of the Terminal Strip X2A	14
4.4 QSI Bus Interface	14
4.4.1 Assignment of socket X6C (QSI-in)	14
4.4.2 Assignment of socket X6D (QSI-out)	14
4.5 Programming and Diagnostic Interface X6B (HSP5)	14
4.6 Control Elements	15
4.6.1 Status and error LED's	15
4.6.2 Adjustment and LED's of the module groups	15
5. Parameter description	16
5.1 Summary	16
5.2 Parameter Assignment	16
5.3 Functions	17
5.3.1 Operating data and system parameters	17
5.3.2 Diagnostics and manual parameter setting	19
5.3.3 QSI interface	19
5.3.4 Motor protection	21
5.3.5 Enable function	21
5.3.6 Relay output standstill	22
6. Certifications	23
6.1 CE-Marking	23
6.2 UL - Marking	23

1. Introduction

1.1 Preface

First we would like to welcome you as a customer of KEB and congratulate you to the acquisition of this product. You have chosen a product on the highest technical standard.

This enclosed documents as well as the specified hardware and software are developments of KEB. Errors expected. KEB has prepared the documentation, hard- and software to the best of their knowledge, however, no guarantee is given that the user will have the aimed advantage. KEB reserves the right to change specifications without prior notice or to inform third persons. The safety and warning instructions specified in this manual do not lay claim on completeness.

The used pictograms have following significance:



Danger
Warning
Caution



Attention
Essential
Discharge Time



Information
Help
Tip

1.2 Product Description

This instruction manual describes the multi inverter KEB COMBIVERT W6. The COMBIVERT W6 has the following characteristics.

- Reduction of the unit costs
- Reduction of the energy costs by internal DC interconnection
- Central supply
- Motor protection separately adjustable according to groups
- Lower dimensions compared to single units
- Lower cabling costs
- Bus access to the power modules occurs via change-over in the control
- Control via QSI-bus implemented
- QSI bus monitoring
- Extensive protection against overcurrent, over- and undervoltage, overtemperature and overload
- Conditional short-circuit proof and ground-fault proof
- HSP5 programming and diagnostic interface

1.3 Specified Application

COMBIVERT W6 serves exclusively for stepless speed control of three-phase asynchronous motors. The operation of other electric consumers is prohibited and can lead to the destruction of the unit.

1.4 Unit Identification

06.W6.Q2A-9900	Design	0: Heat sink (default)	
	reserved	0: reserved	
	Switching frequency; short time current limit; over current limit	4 kHz 9: 180 % 216 %	
	Voltage	9: 3-phase; 400 V; AC	
	Housing	A, B	
	Options	2: Filter	3: Filter and braking resistor
	Control type	Q: QSI control	
	Series	Multi inverter W6	
	Number of connectable motors	2, 4, 6	

2. Safety and Application Instructions



Safety and Operating Instructions for drive converters

(in accordance with: Low-Voltage Directive 73/23/EWG)

1. General

In operation, drive converters, depending on their degree of protection, may have live, uninsulated, and possibly also moving or rotating parts, as well as hot surfaces.

In case of inadmissible removal of the required covers, of improper use, wrong installation or maloperation, there is the danger of serious personal injury and damage to property.

For further information, see documentation.

All operations serving transport, installation and commissioning as well as maintenance are to be carried out by skilled technical personnel (Observe IEC 364 or CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN/VDE 0110 and national accident prevention rules!).

For the purposes of these basic safety instructions, „skilled technical personnel“ means persons who are familiar with the installation, mounting, commissioning and operation of the product and have the qualifications needed for the performance of their functions.

2. Intended use

Drive converters are components designed for inclusion in electrical installations or machinery.

In case of installation in machinery, commissioning of the drive converter (i.e. the starting of normal operation) is prohibited until the machinery has been proved to conform to the provisions of the directive 89/392/EEC (Machinery Safety Directive - MSD). Account is to be taken of EN 60204.

Commissioning (i.e. the starting of normal operation) is admissible only where conformity with the EMC directive (89/336/EEC) has been established.

The drive converters meet the requirements of the Low-Voltage directive 73/23/EEC. They are subject to the harmonized standards of the series DIN EN 50178/VDE 0160 in conjunction with EN 60439-1/ VDE 0660, part 500, and EN 60146/ VDE 0558.

The technical data as well as information concerning the supply conditions shall be taken from the rating plate and from the documentation and shall be strictly observed.

3. Transport, storage

The instructions for transport, storage and proper use shall be complied with.

The climatic conditions shall be in conformity with EN 50178.

4 Installation

The installation and cooling of the appliances shall be in accordance with the specifications in the pertinent documentation.

The drive converters shall be protected against excessive strains. In particular, no components must be bent or isolating distances altered in the course of transportation or handling. No contact shall be made with electronic components and contacts.

Drive converters contain electrostatic sensitive components which are liable to damage through improper use. Electric components must not be mechanically damaged or destroyed (potential health risks).

5. Electrical connection

When working on live drive converters, the applicable national accident prevention rules (e.g. VBG 4) must be complied with.

The electrical installation shall be carried out in accordance with the relevant requirements (e.g. cross-sectional areas of conductors, fusing, PE connection). For further information, see documentation.

Instructions for the installation in accordance with EMC requirements, like screening, earthing, location of filters and wiring, are contained in the drive converter documentation. They must always be complied with, also for drive converters bearing a CE marking. Observance of the limit values required by EMC law is the responsibility of the manufacturer of the installation or machine.

6. Operation

Installations which include drive converters shall be equipped with additional control and protective devices in accordance with the relevant applicable safety requirements, e.g. act respecting technical equipment, accident prevention rules etc.. Changes to the drive converters by means of the operating software are admissible.

After disconnection of the drive converter from the voltage supply, live appliance parts and power terminals must not be touched immediately because of possibly energized capacitors. In this respect, the corresponding signs and markings on the drive converter must be respected.

During operation, all covers and doors shall be kept closed.

7. Maintenance and servicing

The manufacturer's documentation shall be followed.

KEEP SAFETY INSTRUCTIONS IN A SAFE PLACE!

3. Technical Data

3.1 Operating conditions of the COMBIVERT W6

		Standard	Standard/ class	Instructions	
Definition acc.	Temperature	EN61800-2		Inverter product standard: rated specifications	
	Humidity	EN61800-5-1		Inverter product standard: General safety	
Site altitude				max. 2000 m above sea level (over 1000 m a derating of 1% per 100 m must be taken into consideration)	
Ambient conditions during operation					
Climate	Temperature	EN60721-3-3	3K3	extended to -10...45 °C	
	Humidity		3K3	5...85% (without moisture condensation)	
Mechanical	Vibration	EN60721-3-3	Path	max. oscillation amplitude 1 mm (5...13 Hz) max. acceleration amplitude 7 m/s ² (13...200 Hz) sinus	
			Germ. Lloyd		EN50155 Part 7-3
					3M1
Contamination	Gas		3C2		
	Solids		3S2		
Ambient conditions during transport					
Climate	Temperature	EN60721-3-2	2K3	(without moisture condensation)	
	Humidity		2K3		
Mechanical	Vibration	EN60721-3-2	Path	max. oscillation amplitude 3,5 mm (2...9 Hz) max. acceleration amplitude 15 m/s ² (9...200 Hz) sinus	
			Germ. Lloyd		EN50155 Part 7-3
					2M1
	Surge	EN60721-3-2	2M1	max. 100 m/s ² ; 11 ms	
Contamination	Gas		2C2		
	Solids		2S2		
Ambient conditions at storing					
Climate	Temperature	EN60721-3-1	1K4	(without moisture condensation)	
	Humidity		1K3		
Mechanical	Vibration	EN60721-3-1	Path	max. oscillation amplitude 1 mm (5...13 Hz) max. acceleration amplitude 7 m/s ² (13...200 Hz) sinus	
			Germ. Lloyd		EN50155 Part 7-3
					1M1
	Surge	EN60721-3-1	1M1	max. 100 m/s ² ; 11 ms	
Contamination	Gas		1C2		
	Solids		1S2		
Type of protection		EN60529	IP20		
Environment		IEC 664-1		Pollution degree 2	
Definition acc.		EN61800-3		Inverter product standard: EMC	
EMC emitted interference (see instruction manual)					
	Cable-fed disturbances	EN55011	C2	≙ Limit value B	
	Radiated disturbances	EN55011	C2	≙ Limit value B	
EMC interference immunity					
	ESD	EN61000-4-2	8 kV	AD (air outlet) and CD (contact outlet)	
	Burst - control lines + bus	EN61000-4-4	2 kV		
	Burst - mains supply	EN61000-4-4	4 kV		
	Surge - mains supply	EN61000-4-5	1 / 2 kV	Phase-phase / phase-ground	
	EMC	EN61000-4-3	10 V/m		
	Voltage fluctuations / -voltage drops	EN61000-2-1		+10%, -15%; 90%	
	Voltage symmetries / frequency changes	EN61000-2-4		3%; 2%	

Technical Data

3.2 Power Data

Inverter size		02	04	06
Housing size		B	A	A
Number of groups		2	2	3
Output data				
Output rated power	[kVA]	8,0	5,7	8,5
Output rated current acc. to the group	[A]	5,8	4,1	4,1
Overload current (E.OL)	[A]	8,7	6,15	6,15
OC-tripping current	[A]	12,5	8,8	8,8
Max. rated motor power acc. to the group	1) [kW]	2,2	1,5	1,5
Output voltage	[V]	3 x 0...mains voltage		
Max. motor line length acc. to the group	[m]	7	2 x 7	2 x 7
recommended motor cable cross-section	[mm ²]	1,5		
Input data				
Phases		3		
Rated voltage	[V]	400		
Mains voltage	[V]	305...528 ±0%		
Mains frequency	[Hz]	50 / 60 ±2		
Input rated current	[A]	17	12	18
Max. permissible main fuse	[A]	25	20	25
I ² t Main fuse type gR	[A ² s]	<1250		
recommended supply cable cross-section	[mm ²]	2,5		
Max. main fuse type RK5 (UL)		15A		
Motor protection circuit breaker (UL)		Moeller PKZM0 max. 16A (only for use in WYE 480/277V mains)		
Other data				
Rated switching frequency	[kHz]	4		
Max. switching frequency	[kHz]	4		
Power loss at nominal operating	[W]			
Max. heat sink temperature	[°C]	90		
Max. braking current	[A]	10	–	–
Min. braking resistor	2) [Ω]	82	–	–

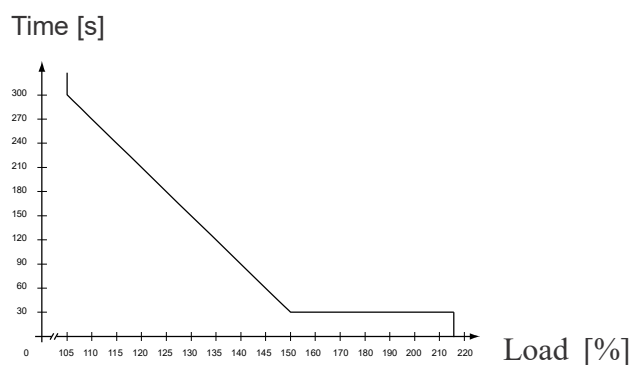
1) Continuous operation is limited by the cooling capacity for unit sizes 02 and 06.

Parallel switched motors within a group must have the same size for UL.

2) If no intrinsically safe resistance is used, it must be guaranteed that no dangerous conditions can occur in case of resistance or braking transistor defects.

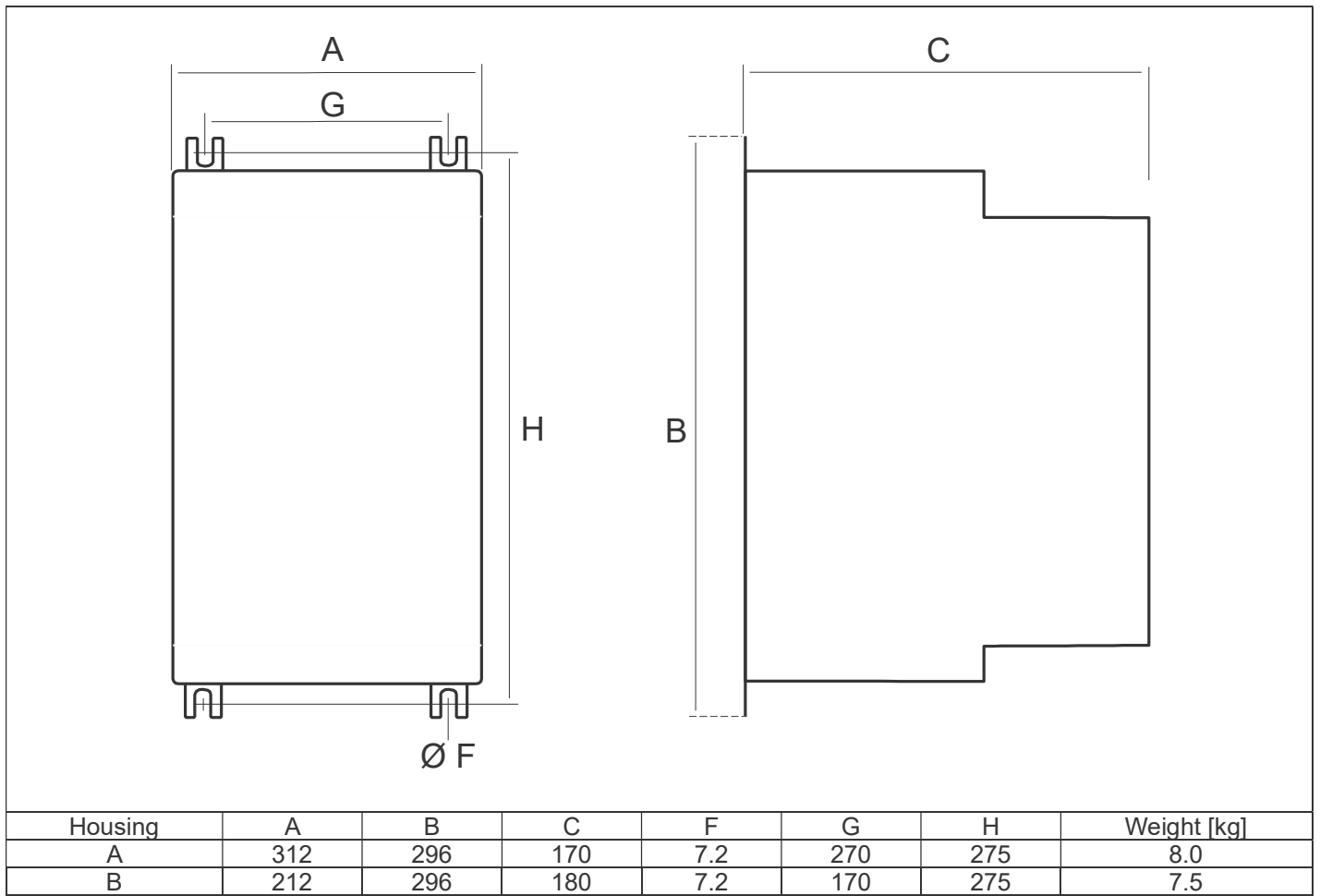
i Site altitude maximal 2000 m. With site altitudes over 1000 m a derating of 1 % per 100 m must be taken into consideration.

3.2.1 Overload characteristic

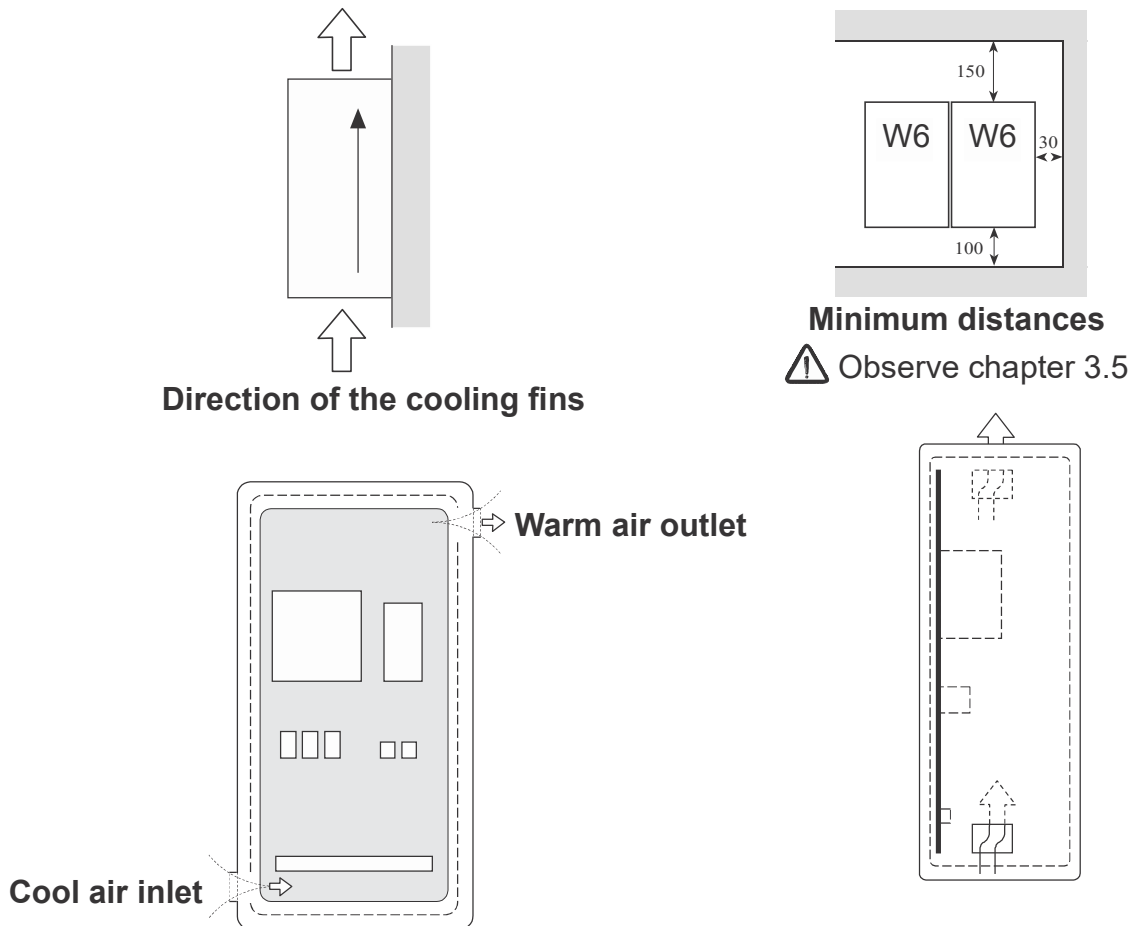


An overload integrator starts if the load exceeds 105%. It is counted down when the value falls below. Error E.OL is released if the integrator achieves the inverter corresponding overload characteristic.

3.3 Dimensions and Weights



3.4 Control cabinet installation



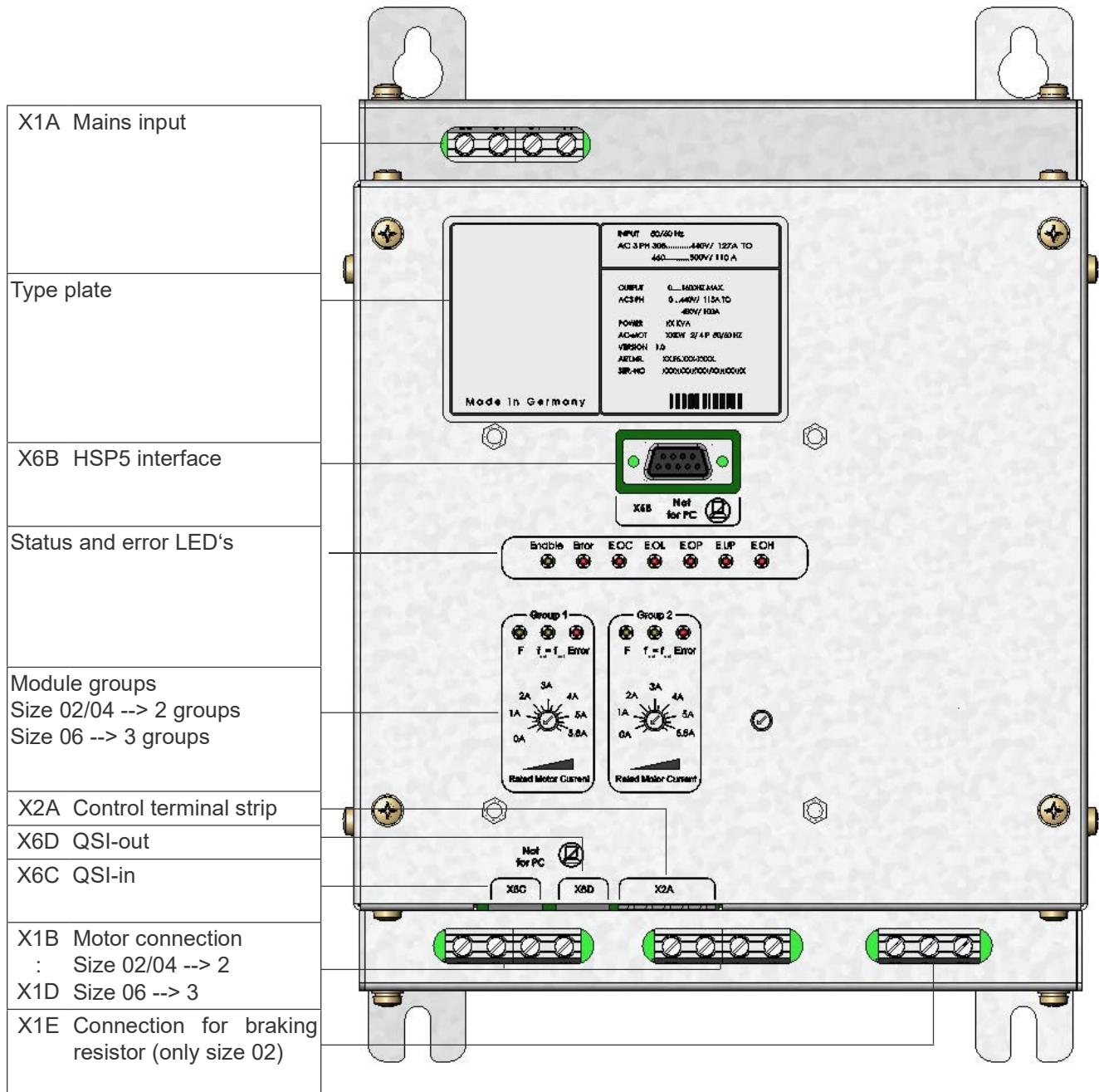
3.5 Installation Instructions



- Stationarily install and earth COMBIVERT.
- The device must not be permeated by mist or water.
- The indicated minimum distances are regarded as recommendation. The distances can vary dependent on load, air circulation and cabinet surface. The ambient temperature may not exceed the limit value of 45 °C (measured 30 mm upside the unit).
- Allow for sufficient heat dissipation if installed in a dust-proof housing.
- Install the COMBIVERT in an appropriate housing in accordance with the local regulations when operating it in explosive spaces.
- Protect the COMBIVERT against conductive and aggressive gases, liquids and materials.

4 Connection and Control Elements

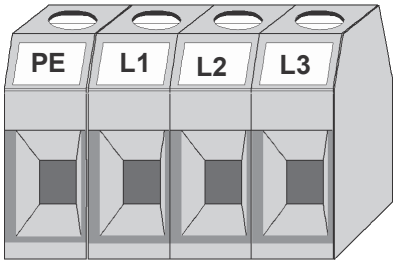
4.1 Summary

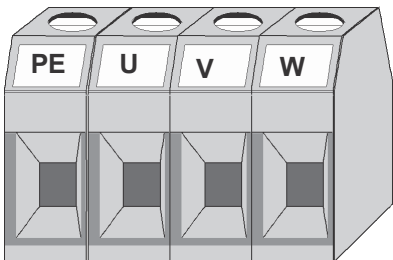


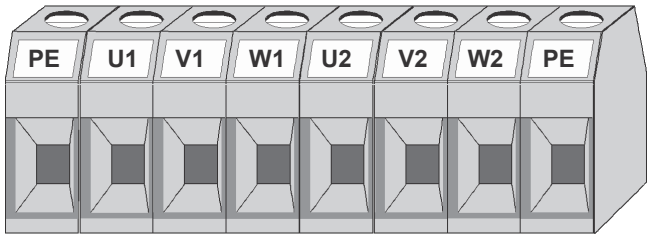
Terminals

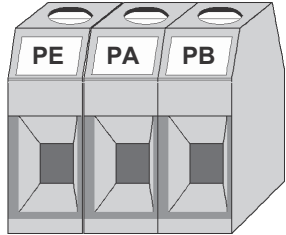
4.2 Power Unit

4.2.1 Terminals of the power circuit

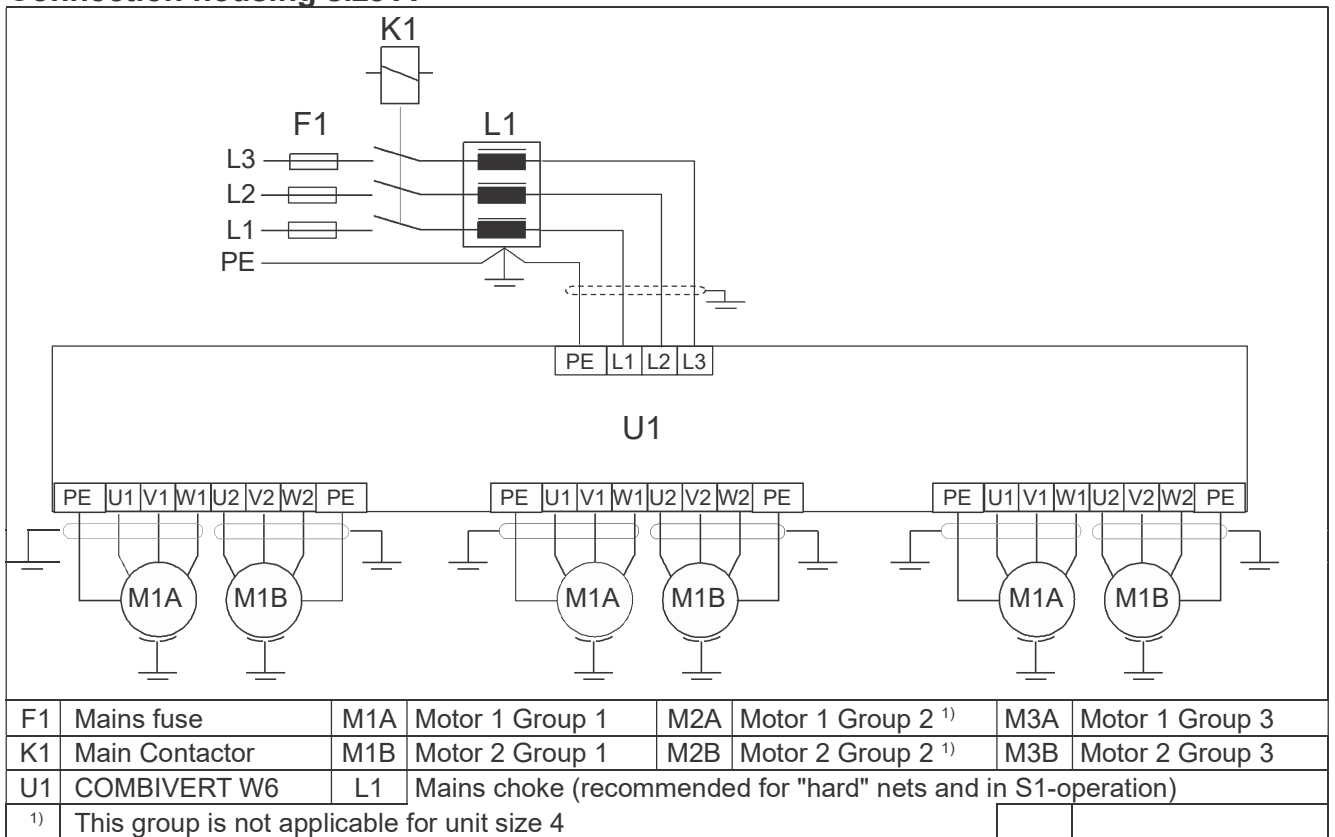
Terminal X1A mains input size A and B	Name	Tightening torque [Nm]		
		perm. core cross-section [mm ²]		
	L1 L2 L3	3-phase mains input	0,5 : 4	0,5
	PE, ⊕	Connection for earthing		
	Function			

Motor connection for housing size B	Name	Tightening torque [Nm]			
		perm. core cross-section [mm ²]			
Terminal X1B group 1		U V W	0,5 : 4	0,5	
Terminal X1C group 2		PE, ⊕			Connection for earthing
Function		Output motor Group X1B...X1C			

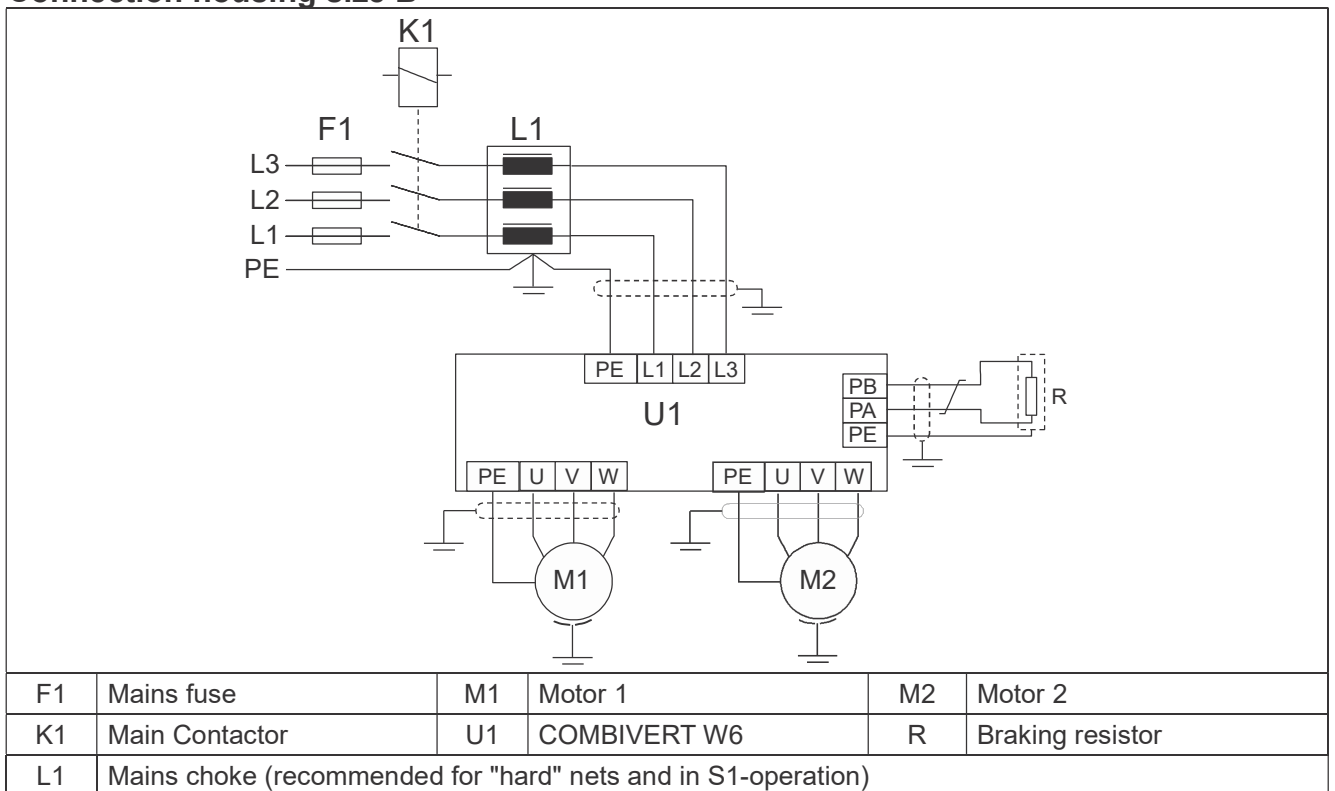
Motor connection for housing size A	Name	Tightening torque [Nm]			
		perm. core cross-section [mm ²]			
Terminal X1B group 1		U1 V1 W1	0,5 : 4	0,5	
Terminal X1C group 2		U2 V2 W2			Output motor 2 Group X1B...X1D
Terminal X1D group 3		PE, ⊕			Connection for earthing
Function		Output motor1 Group X1B...X1D			

X1E Connection for braking resistor	Name	Tightening torque [Nm]		
		perm. core cross-section [mm ²]		
	PA PB	Connection for braking resistor	0,5 : 4	0,5
	PE, ⊕	Connection for earthing		
	Function			

4.2.2 Connection housing size A



4.2.3 Connection housing size B



Control Circuit

4.3 Control terminal strip X2A

4.3.1 Assignment of the Terminal Strip X2A

X2A



Tightening torque of terminals 0,5Nm
perm. core cross-section 0,5...2,5 mm²

PIN	Function	Name	Description	Specifications
1	Input 24 V	Uin	External supply of the control board (feed line ≤ 5 m)	24 VDC±25 % max. 250 mA
2	Release	EN	Releases the control for the modulation of the power modules. The output frequency is decelerated to 0 Hz on release	Ri: 4 kΩ
3	Digital mass	0V	Reference potential for digital input and supply voltage	
4	Relay / NO contact	RLA	Relay output is closed, if <ul style="list-style-type: none"> all power modules have reached an output frequency of 0 Hz. no error is present QSI control bits 0, 2, 4 are not set and bit 6 is set. the QSI bus is correct connected. Attention! Observe connecting-up instructions in chapter 5.3.6.	max. 30 VDC/ 5 A
5	Relay / switching contact	RLB		

4.4 QSI Bus Interface

4.4.1 Assignment of socket X6C (QSI-in)

Input for QSI bus (RJ45 socket)	No.	Name	Function
	1	+Tx	Transmission signal
	2	-Tx	
	3	+Rx	Receive signal
	4	-Rx	
	5	+CLK	Clock signal (clock frequency 250 kHz)
	6	-CLK	
	7	+SEL	Select signal
	8	-SEL	

4.4.2 Assignment of socket X6D (QSI-out)

Output for QSI bus (RJ45 socket)	No.	Name	Function
	1	+Rx	Receive signal
	2	-Rx	
	3	+Tx	Transmission signal
	4	-Tx	
	5	+CLK	Clock signal (clock frequency 250 kHz)
	6	-CLK	
	7	+SEL	Select signal
	8	-SEL	

4.5 Programming and Diagnostic Interface X6B (HSP5)



The direct connection, PC to the inverter is only valid with a special cable (part number 00.F5.0C0-0001). Otherwise it would lead to the destruction of the PC-interface!

4.6 Control Elements

4.6.1 Status and error LED's

LED	Name	Description
Enable	Control release	Control release of the superior control
Error	Error Multi Inverter	General error in the multi inverter or error in a module.
E. OC	overcurrent	The output current has exceeded the permissible current for a short-term.
E. OL	overload	The load has exceeded the permissible overload limit for a long-term (> 30s).
E. OP	Overvoltage	The DC link voltage has increased the permissible limit.
E. UP	underpotential	The DC link voltage has decreased the permissible limit.
E. OH	overtemperature	The temperature of the heat sink of a DC power module has increased the permissible limit.

4.6.2 Adjustment and LED's of the module groups

	Name	Description
	Group 1...3	Designation of the respective power module. A change of the potentiometer of group 3 has no consequence for frequency inverter variants with only two power modules.
	F	Direction of rotation forward is set
	Fa=Fs	Actual frequency = setpoint frequency (standard 200Hz)
	Error	Error inside of the group
	Rated motor current	Potentiometer for the adjustment of the motor protection rated current

5. Parameter description

5.1 Summary

The following section describes the control board (Cb) parameters. The Cb parameters are stored in the Multi inverter control. The description of the inverter parameters can be taken from the application manual of the COMBIVERT F5-C. Parameter setting occurs via HSP5 interface.

Display	Parameter	Setting range	Resolution	Setting	r/w	Address
Cb.1	SACB master address	1	1	1	ro	2001h
Cb.2	SACB baud rate	0...7	1	4	ro	2002h
Cb.3	SACB time-out	1...16 ms	1 ms	10 ms	rw	2003h
Cb.4	SACB error counter	0...255	255	0	rw	2004h
Cb.6	HSP5 baud rate	3...10	1	5	rw	2006h
Cb.7	HSP5 supported baud rates	0...65535	1	175	ro	2007h
Cb.8	HSP5 error counter	0...255	1	0	rw	2008h
Cb.10	QSI control byte	0...255	1	–	ro	200Ah
Cb.11	QSI status byte	0...255	1	–	ro	200Bh
Cb.12	QSI bus state	0...1	1	–	ro	200Ch
Cb.13	QSI control byte manual	0...255	1	0	rw	200Dh
Cb.14	QSI control byte condition	0...1	1	0	rw	200Eh
Cb.16	Control board type	–	–	1	ro	2010h
Cb.17	Software version	000...999	1	–	ro	2011h
Cb.18	Software date	00000...99999	1	TTMMJ	ro	2012h
Cb.20	Power module selector	1...Cb.21	1	1	rw	2014h
Cb.21	Number of power modules	1...3	1	0	ro	2015h
Cb.23	Poti 1 display	0...100%	1%	–	ro	2017h
Cb.24	Poti 2 display	0...100%	1%	–	ro	2018h
Cb.25	Poti 3 display	0...100%	1%	–	ro	2019h
Cb.27	Input terminal state	0...1	1	–	ro	201Bh
Cb.28	Condition relay	0...2	1	2	rw	201Ch
Cb.29	Relay state	0...1	1	–	ro	201Dh
Cb.30	Relay feedback	0...1	1	–	ro	201Eh
Cb.31	LED state	0...65535	1	–	ro	201Fh

5.2 Parameter Assignment

The following table describes the functions of the parameter groups:

Operating data and system parameters	Cb.1...Cb.8; Cb.16...Cb.18; Cb.31
Diagnostics and manual parameter setting	Cb.20; Cb.21
QSI interface	Cb.10...Cb.14
motor protection	Cb.23...Cb.25
Enable function	Cb.27
Relay output standstill	Cb.28...Cb.30

5.3 Functions

5.3.1 Operating data and system parameters

Cb.1 SACB master address

Co-domain	Setting	Description
1	1	This parameter displays the internal SACB bus address of the master control board. The connection between master control board and power modules occurs via SACB bus.

Cb.2 SACB baud rate

Decimal value	Baud rate [kBaud]	Setting	Function
0	38,4		This parameter displays the transmission speed between master control board and power modules.
1	55,5		
2	57,6		
3	62,5		
4	100	x	
5	115,2		
6	125		
7	250		

Cb.3 SACB time-out

Co-domain	Setting	Description
1...16 ms	10ms	This parameter monitors the communication between master control board and power modules. An error is released, if no successful communication with a module is possible after timeout of the adjusted time. The parameter is set to the default value after power off of the control board.

Cb.4 SACB error counter

Co-domain	Setting	Description
0...255	0	The SACB error counter counts the transmission errors on the SACB bus. The parameter is set to the default value after power off of the control board.

Cb.6 HSP5 baud rate

Decimal value	Baud rate [kBaud]	Setting	Function
3	9,6		This parameter displays the transmission speed of the diagnostic interface.
4	19,2		
5	38,4	x	
6	55,5		
8	100		
10	125		

Operation of the Unit

Cb.7 HSP5 supported baud rates

Decimal value	Baud rate [kBaud]	Function
3	9,6	This parameter displays the supported baud rates of the diagnostic interface.
4	19,2	
5	38,4	
6	55,5	
8	100	
10	125	

Cb.8 HSP5 error counter

Co-domain	Setting	Description
0...255	0	The HSP5 error counter counts the transmission errors of the diagnostic interface. The parameter is set to the default value after power off of the control board.

Cb.16 Control board type

Decimal value	Control type	Description
1	W6 control board QSI	This parameter displays the type of the master monrol board.

Cb.17 Software version

Co-domain	Description
000...999	Display of the software version number. 1. and 2. digit : software version (e.g. 2.1) 3 digit : special version (0= standard)

Cb.18 Software date

Co-domain	Setting	Description
00000...99999	TTMMJ	Display of the inverter software date in the format „TT.MM.J“.

Cb.31 LED state

Decimal value	LED	Function
0	off	This parameter displays the state of the LEDs of the control borad.
1	E. OH	
2	E. OP	
4	E. OL	
8	E. OC	
16	E. UP	
32	F3	
64	F2	
128	F1	
256	Fa=Fs 1	
512	Error 1	
1024	Fa=Fs 2	
2048	Error 2	
4096	Fa=Fs 3	
8192	Error 3	
16384	Error Common	
32768	Enable	

5.3.2 Diagnostics and manual parameter setting

Access to all inverter parameters is possible with the PC software KEB COMBIVIS 5. They can be read and adjusted or parameterized by download.

The other parameter groups displays the parameters of the power module adjusted by parameter cb.20. Cb.20 must be adjusted, in order to adjust the power modules individually.



At operation with COMBIVIS the configuration file dependent to the unit is to be find in the "CFGs" file of the COMBIVIS program directory (e.g. "C:\programs\KEB\CFGs").

Generally only indirect set selection is possible. That means the master control board writes the parameter values in the set which is adjusted in Fr.09.

When using the COMBIVIS program "Scope", indirect set selection must be adjusted at the channel adjustment. Scope operates only in online mode.

Cb.20 Power module selector

Co-domain	Setting	Description
1...Cb.21	1	Selection of the power module, which parameter is actual displayed. Is set to default value with power off of the control board.

Cb.21 Number of power modules

Co-domain	Description
1...3	The number of power modules is determined during the initialization phase of the control. For this the power modules also must be supplied with voltage.

5.3.3 QSI interface

Cb.10 QSI control byte

The QSI control byte enables the control of the multi inverter via QSI bus, if Cb.14 is set to "0".

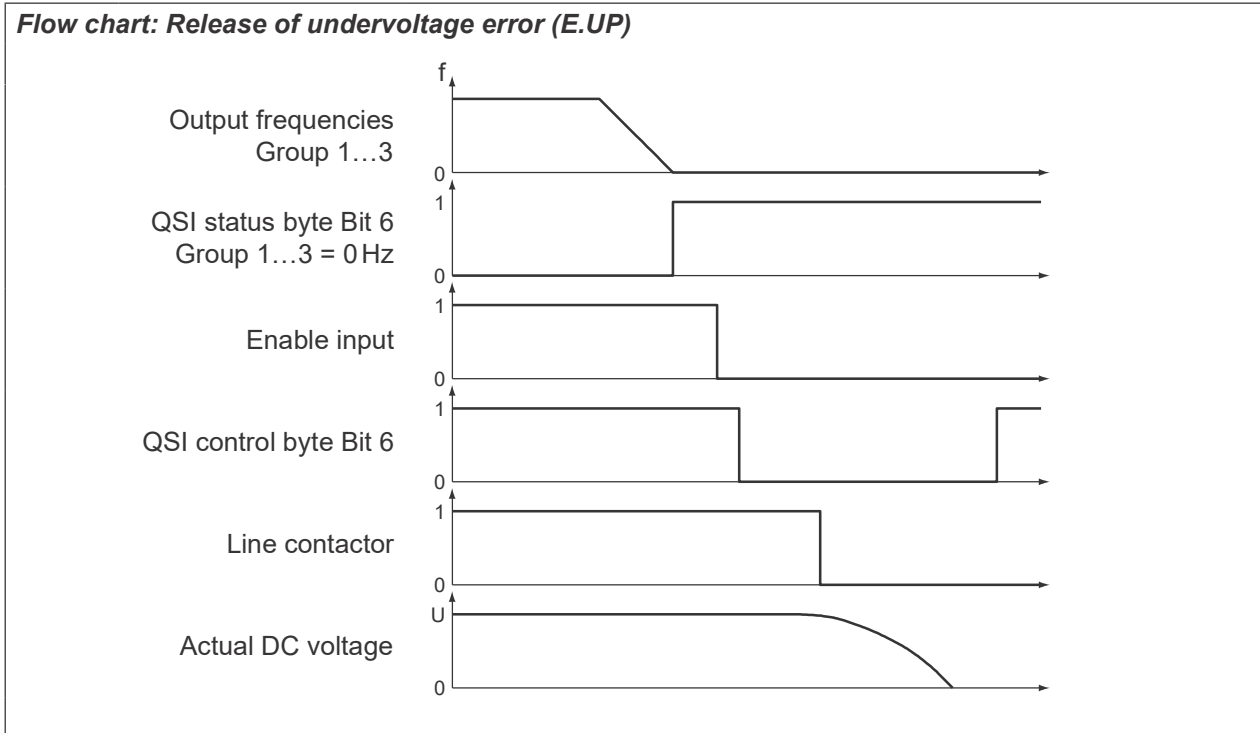
Parameter "digital setpoint setting" (oP.03) of the corresponding power module is set to 200 Hz, if bit 0, 2 and/or 4 = "1". If a bit is reset to "0", oP.03 is set to 0 Hz. Accelerating of the module output frequency is only possible if the enable input is set and no errors are present.

Error "undervoltage" (E.UP) is released at the inverter if bit 6 = "0". Thus the charging current limit becomes active. This bit should be set to „0“, if

- the output frequency of all modules is 0 Hz (Cb.11 Bit 6=„0“)
- the enable signal is removed

Bit	Description
0	Group 1 on, 200 Hz
1	reserved – must be set to „low“ from bus
2	Group 2 on, 200 Hz
3	reserved, must be set to „low“ from bus
4	Group 3 on, 200 Hz
5	reserved – must be set to „low“ from bus
6	Error "undervoltage" (E.UP) is released and the charging current limit is activated if bit 6 = "0".
7	reserved – must be set to „low“ from bus

Operation of the Unit



Cb.11 QSI status byte

The QSI status byte contains the status messages mentioned below of the multi frequency inverter and can be scanned from the QSI bus master.

Bit	Description
0	Actual frequency (ru.03) of group 1 = 200 Hz
1	Error at group 1
2	Actual group (ru.03) of group 2 = 200 Hz
3	Error at group 2
4	Actual frequency (ru.03) of group 3 = 200 Hz
5	Error at group 3 (if available)
6	Actual frequency (ru.03) of group 1...3 = 0 Hz
7	Error complete unit (e.g. relay error, communication between control board and power modules is incorrect) or error in one module

Cb.12 QSI bus state

This parameter displays whether the QSI bus operates correctly.

Co-domain	Description
0	Error at QSI bus at socket X6C (OSI-in). The setpoint setting of all groups is internally set to 0 Hz and bit 6 is set to "1" by QSI control byte Cb.10.
1	QSI bus correctly connected at socket X6C (OSI in)

Cb.13 QSI control byte manual

If Cb.14 is set to "1" the QSI control byte manual enables the adjustment of a desired QSI control byte via HSP5 interface.

Parameter "digital setpoint setting" (oP.03) of the corresponding power module is set to 200 Hz, if bit 0, 2 and/or 4 = "1". If a bit is reset to "0", oP.03 is set to 0 Hz. Accelerating of the module output frequency is only possible if the enable input is set and no errors are present.

Error "undervoltage" (E.UP) is released at the inverter if bit 6 = "0". Thus the charging current limit becomes active. This bit should be set to „0“, if

- the output frequency of all modules is 0 Hz (Cb.11 Bit 6=„0“)
- the enable signal is removed

Bit	Description
0	Group 1 on, 200 Hz
1	reserved – must be set to „low“ from bus
2	Group 2 on, 200 Hz
3	reserved, must be set to „low“ from bus
4	Group 3 on, 200 Hz
5	reserved – must be set to „low“ from bus
6	Error "undervoltage" (E.UP) is released and the charging current limit is activated if bit 6 = "0".
7	reserved – must be set to „low“ from bus

Cb.14 QSI control byte condition

This parameter determines the source of the QSI control byte.

Co-domain	Setting	Description
0	x	QSI control byte is set over the QSI bus.
1		QSI control byte is set over Cb.13.

5.3.4 motor protection

The motor protection/rated current (dr.12) of the corresponding power module is adjusted with the potentiometer of the module groups. If several motors are connected to one module, the adjusted current applies to each motor output.

Cb.23 Poti 1 display

Cb.24 Poti 2 display

Cb.25 Poti 3 display

Co-domain	Description
0...100 %	Parameters Cb.23... 25 display the respective adjusted motor protection /rated current (dr.12) in a range of 0...100 % referring to the inverter rated current (in.01).

5.3.5 Enable function

The output frequency of a power module is accelerated to 200 Hz, if the enable input (terminal X2A.2) and the corresponding bit are set in the QSI control byte (Cb.10).

Thereby the run/stop flags of parameters "control word low (Sy.50)" are set to "RUN" in the power modules. The enable function becomes only active after initial correct connection of the QSI bus, or after setting parameter cb.14 to "1".

Cb.27 Input terminal state

Decimal value	Input	Function
0	off	This parameter displays the state to the digital input terminal X2A.2.
1	on	

Operation of the Unit

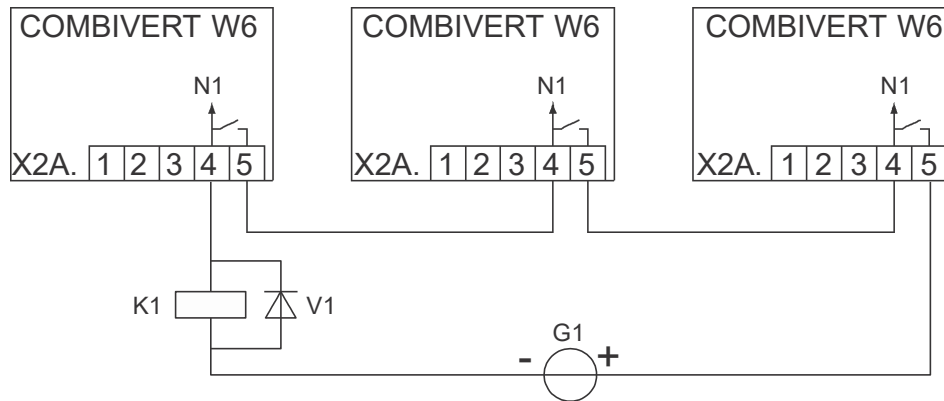
5.3.6 Relay output standstill

The relay terminal X2A.4 / X2A.5 is switched, if

- the output frequencies of all modules are 0 Hz.
- no error is present
- Bit 0, 2, 4 is not set and bit 6 is set in the QSI control byte (Cb.10).
- the QSI bus is correctly connected.

The relay in the current state is interlocked with 0 at the enable input. The switching state of the relay is monitored. In case of a welded relay contact the unit act as switching off of the "enable" signal (see chapter 5.3.5).

Connection of the relay output „standstill“



G1	Voltage supply 24 VDC ±10 %	N1	Internal monitoring of the relay
K1	Relay for cover locking	X2A	Control terminal strip
V1	Free-wheeling diode (in case of inductive load)		
	For a correct monitoring of the relay (described in the wiring diagram) it is important to connect the load to X2A.4 and the supply voltage to X2A.5. Observe polarity!		

Cb.28 Condition relay

Adjustment of the switching condition for the relay terminal X2A.4 and X2A.5.

Co-domain	Setting	Description
0		always off
1		always on
2	x	Switching condition „standstill display“ as described above

Cb.29 Relay state

Display of the desired switching state of the relay.

Co-domain	Description
0	off
1	on

Cb.30 Relay feedback

Monitoring of the relay contacts.

Co-domain	Description
0	An error occurs during switching the relay (probably relay contacts welded). The output frequency of the power module remains on 0 Hz.
1	Relay operates error-free

6. Certifications

6.1 CE-Marking

CE marked frequency inverter and servo drives were developed and manufactured to comply with the regulations of the Low-Voltage Directive 73/23/EEC.

The inverter or servo drive must not be started until it is determined that the installation complies with 89/392/EEC (machine directive) as well as the directive (89/336/EEC) (note EN 60204).

The frequency inverters and servo drives meet the requirements of the Low-Voltage Directive 73/231/EEC. The harmonized standards of the series EN 50178 in connection with EN 60439-1 and EN 60146 were used.

This is a product of limited availability in accordance with IEC 61800-3. This product may cause radio interference in residential areas. In this case the operator may need to take corresponding measures.

6.2 UL - Marking

To be conform according to UL for the use on the North American and Canadian Market the following instructions must be observed:

- Inverter is suitable for use on a circuit capable of delivering not more than 5 kArms (symmetrical) 480Y/277 V maximum.
- Use copper cables. Exception: control cables 60/70 °C.
- Maximum surrounding air temperature 45 °C (113 °F).
- For control cabinet mounting as „Open Type“.
- For use in a pollution degree 2 environment.
- Motor protection by adjustment of current parameters.
- Not incorporated with overspeed protection.
- Power terminal tightening torque (see chapter 4.2.1).
- Control terminal tightening torque (see chapter 4.3.1).
- Overload protection is internally adjusted at the unit in percent of the inverter output rated current. Adjustment instructions are find in the instruction manual.
- Refer to this installation instructions for proper wiring.
- The integrated short-circuit protection does not support the "Branch Circuit Protection" according to UL 489. Branch Circuit Protection must occur in accordance with the manufacturer's instructions, the national electric code as well as additional local or comparable regulations.



Karl E. Brinkmann GmbH

Försterweg 36-38 • D-32683 Barntrup
fon: +49 5263 401-0 • fax: +49 5263 401-116
net: www.keb.de • mail: info@keb.de

KEB Antriebstechnik GmbH & Co. KG

Wildbacher Str. 5 • D-08289 Schneeberg
fon: +49 3772 67-0 • fax: +49 3772 67-281
mail: info@keb-combidrive.de

KEB Antriebstechnik Austria GmbH

Ritzstraße 8 • A-4614 Marchtrenk
fon: +43 7243 53586-0 • fax: +43 7243 53586-21
net: www.keb.at • mail: info@keb.at

KEB Antriebstechnik Herenveld 2 • B-

9500 Geraadsbergen fon: +32 5443
7860 • fax: +32 5443 7898 mail:
vb.belgien@keb.de

KEB Power Transmission Technology (Shanghai) Co. Ltd.

Industry Development District No.
28 Dongbao Road Song Jiang
CHN-201613 Shanghai, PR. China
fon: +86 21 51 099 995 • fax: +86 21 67 742 701
net: www.keb.cn • mail: info@keb.cn

KEB Antriebstechnik Austria GmbH

Organizační složka
K. Weise 1675/5 • CZ-370 04 České Budějovice
fon: +420 387 699 111 • fax: +420 387 699 119
net: www.keb.cz • mail: info.keb@seznam.cz

KEB España

C/ Mitjter, Nave 8 - Pol. Ind. LA MASIA
E-08798 Sant Cugat Sesgarrigues (Barcelona)
fon: +34 93 897 0268 • fax: +34 93 899 2035
mail: vb.espana@keb.de

Société Française KEB

Z.I. de la Croix St. Nicolas • 14, rue Gustave Eiffel
F-94510 LA QUEUE EN BRIE
fon: +33 1 49620101 • fax: +33 1 45767495
net: www.keb.fr • mail: info@keb.fr

KEB (UK) Ltd.

6 Chieftain Buisness Park, Morris Close
Park Farm, Wellingborough GB-Northants, NN8 6 XF
fon: +44 1933 402220 • fax: +44 1933 400724
net: www.keb-uk.co.uk • mail: info@keb-uk.co.uk

KEB Italia S.r.l.

Via Newton, 2 • I-20019 Settimo Milanese (Milano)
fon: +39 02 33500782 • fax: +39 02 33500790 net:
www.keb.it • mail: kebitalia@keb.it

KEB - YAMAKYU Ltd.

15-16, 2-Chome, Takanaawa Minato-ku
J-Tokyo 108-0074
fon: +81 33 445-8515 • fax: +81 33 445-8215
mail: info@keb.jp

KEB Taiwan Ltd.

No.8, Lane 89, Sec.3; Taichung Kang Rd.
R.O.C.-Taichung City / Taiwan
fon: +886 4 23506488 • fax: +886 4 23501403
mail: info@keb.com.tw

KEB Korea Seoul

Room 1709, 415 Missy 2000
725 Su Seo Dong, Gang Nam Gu
ROK-135-757 Seoul/South Korea
fon: +82 2 6253 6771 • fax: +82 2 6253 6770
mail: vb.korea@keb.de

KEB Sverige

Box 265 (Bergavägen 19)
S-43093 Hälsö
fon: +46 31 961520 • fax: +46 31 961124
mail: vb.schweden@keb.de

KEB America, Inc.

5100 Valley Industrial Blvd. South
USA-Shakopee, MN 55379
fon: +1 952 224-1400 • fax: +1 952 224-1499
net: www.kebamerica.com • mail: info@kebamerica.com