AMKASYN
U/f double AC inverter KWF
Hardware description

Version: 2011/15
Part no.: 200302
Translation of the "Original Beschreibung"

About this documentation

Name: PDK_200302_KEKW_Hardware_KWF_en

Use: Description of the hardware and start-up of the module KWF

What has changed:

Version	Change	Subject	Letter symbol
2003/40			
2008/25		first Flare version	Bls
2011/15	tightening torques	tightening torques	LeS

Reservation: We reserve the right to modify the content of the documentation as well as to the delivery options for the product.

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For fast and reliable troubleshooting, you can help us by informing our Customer Service about the following:

- Type plate data for each unit
- Software version
- Device configuration and application
- Type of fault/problem and suspected cause
- Diagnostic messages (error messages)

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Content

1 Short description

The U/f-double ac inverter module KWF is used as frequency inverter of small power in the drive system KE/KW.

The KWF module has been conceptualized for operation of 2 three-phase standard motors (A and B) in the operating mode U/f voltage/frequency supply (motor without transmitter).

Two independent frequency inverters are installed in a casing (A and B).
Width (55 mm), height (330 mm) and depth (255 mm) of the casing correspond to the dimensions of the remaining KE/KW modules of small power.

Two versions are available:

KWF 1	Output 2 x 1 kVA
KWF 2	Output 2 x 2 kVA

The “Coldplate” technology for cooling (assembly of the KWF module on a liquid-cooled back plate) enables compact dimensions and a high power density coupled with highest reliability.

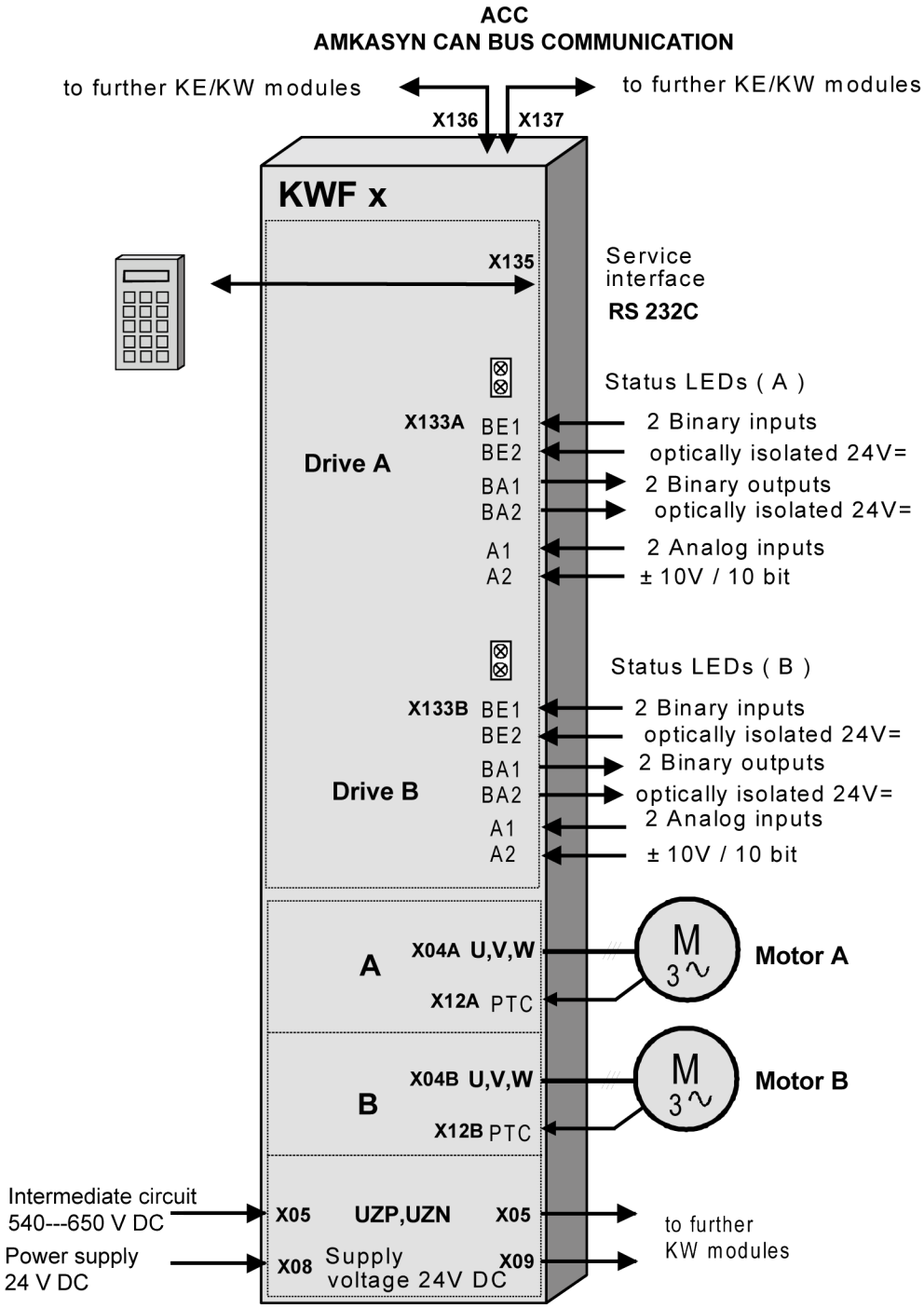
The KWF is operated with the supply voltage 24 DC and powered from the common direct current intermediate circuit (from KE module).

Logic and power pack are available separately for every frequency inverter.

2 Safety information

The safety information of the “Device description KE/KW” also applies in content to the U/f-double ac inverter module KWF.

3 Overview interfaces KWF



4 Power data KWF x

Type	KWF 1	KWF 2
Input voltage UZP, UZN(X05)	540 ... 650 V DC	
Supply voltage	24 V DC ±15 %, waviness max. 5 %	
Input power P(X08, X09)	8W	
Effectivity	approx. 98 %	
Cooling	Back plate for assembly on coldplate/cooler, max. perm. coldplate or ambient temperature 40 °C	
Input current 1) (X05)	3.8 A	7.6 A
	(KWF A and KWF B active)	
Output rated power 2) (X04)	2 x 1 kVA	2 x 2 kVA
Output voltage(X04)	0-400 VAC for sinus-shaped output current	
Output frequency(X04)	5-300 Hz	
Output rated current IN2)(X04)	2 x 1.65 A	2 x 3.3 A
Peak output current Imax4)	2x 3.3 A for 60 s	2x 6.6 A for 60 s
Protective/monitoring functions	Motor overcurrent/short circuit/earthing Excess temperature cooler Overcurrent monitoring after I2t	
Control procedure	PWM	
Switch frequency	8 kHz	
Recommended power cross-sections 3) [mm2/AWG] **X05 Intermediate circuit (UZP, UZN)** **X04 Motor connection (shielded)** **X12 Motor PTC resistor (RT1, RT2)** **X08, X09 24 VDC Power supply (24 V, 0 V)**	2x4/AWG10 4x1/AWG16 2x0.5/AWG20 0.75/AWG18	2x4/AWG10 4x1/AWG16 2x0.5/AWG20 0.75/AWG18
PE-connection [mm2/AWG]	10/AWG6	10/AWG6
Dimensions W x H x D [mm]	55 x 330 x 255	
Weight [kg]	2	2

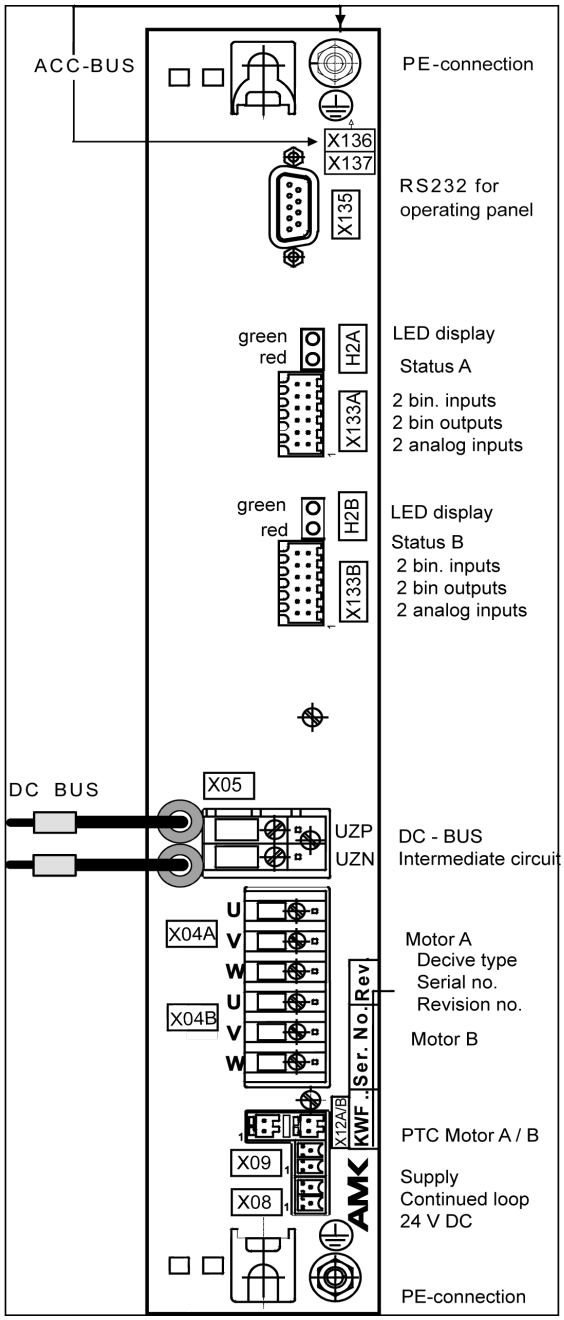
1) Specifications valid for input rated voltage 400 V 50/60 Hz.

2) Specifications valid for motor rated voltage 400 V AC

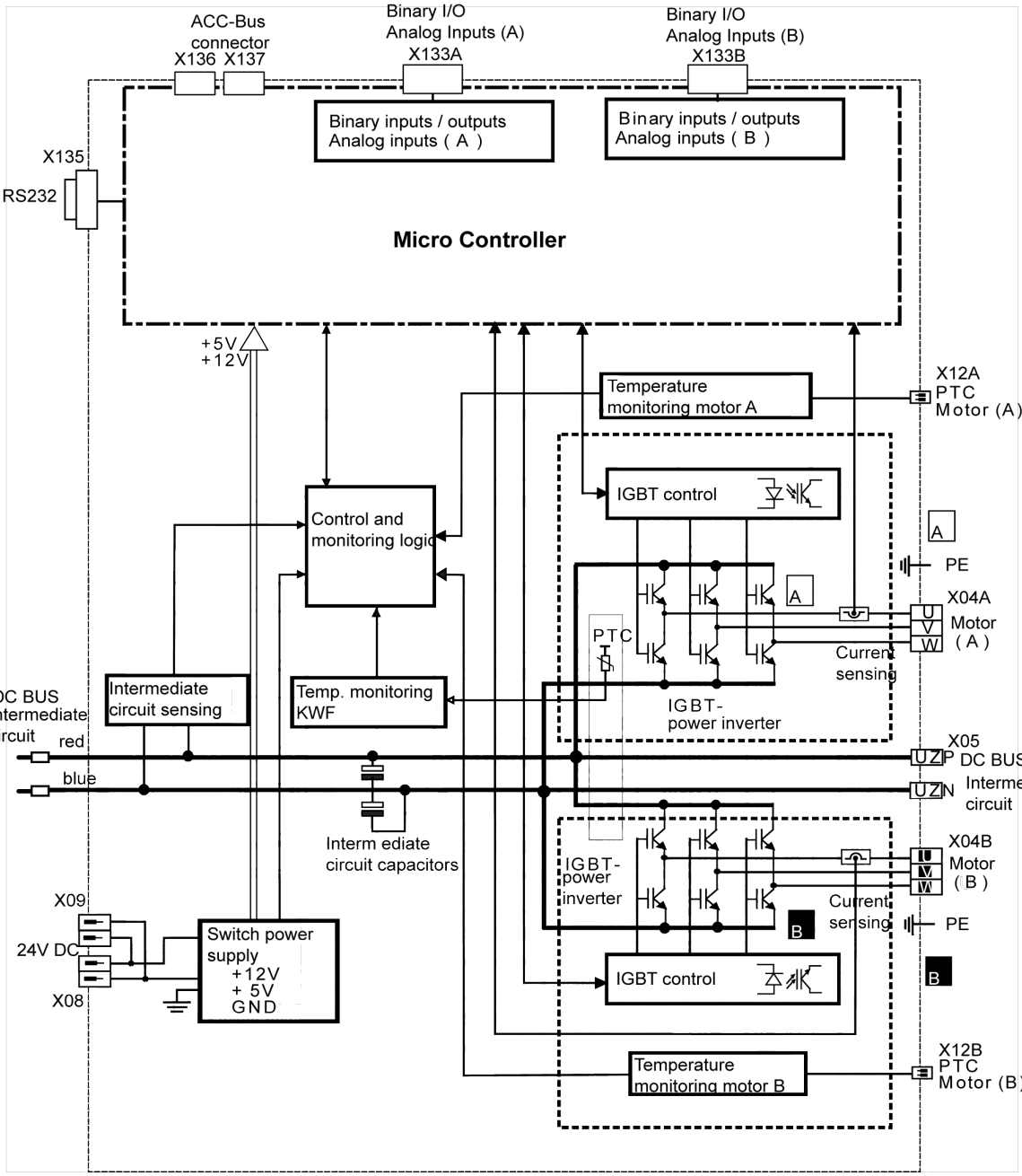
3) Cross-sections according to EN 60204-1: Installation type C or UL 508C: Tab. 39.2, Copper, 75 °C or CSA C22.2 Tab. 3, Col. 3 and Tab. 31

4) The operating time tx for overcurrent Ix in the range between IN and Imax is calculated with the formula: tx = 180 / ((Ix / IN)2 - 1) Result in (s).

5 Front view U/f-double ac inverter KWF



6 Principal circuit diagram U/f-double ac inverter KWF



7 Function description U/f-double ac inverter KWF

The U/f-double ac inverter module KWF contains the following function groups:

- KWF Switch power supply
  The switch power supply supplies the logic packs for both frequency inverters A and B.
- 2 ac inverters, equipped with IGBT-power semi-conductors
  Apart from the common voltage supply, the coverage of the intermediate circuit voltage and of the internal temperature is only present once in the KWF.
  The supply of the IGBT-control levels is carried out from a common DC/DC-converter. The end levels of the frequency inverters A and B are controlled according to a U/f-characteristic curve. The connected motor (A/B) can only be operated in the operating mode “Voltage/Frequency supply” (U/f).

In each end level (A and B), the output current is measured in 1 motor phase. The actual current value is evaluated for control purposes and for protection of the power semi-conductors.

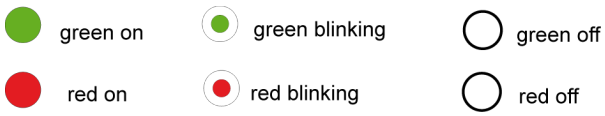
Operation with an output frequency < 5 Hz is not permitted. The PWM is internally restricted with a setpoint frequency < 5 Hz.

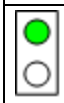
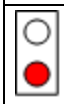
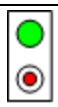
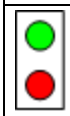
Information regarding behavior in case of a malfunction:

In case of a defect in the power pack of a frequency inverter, operation of the second frequency inverter is no longer possible. For safety reasons, both power packs are always restricted in case of a malfunction.

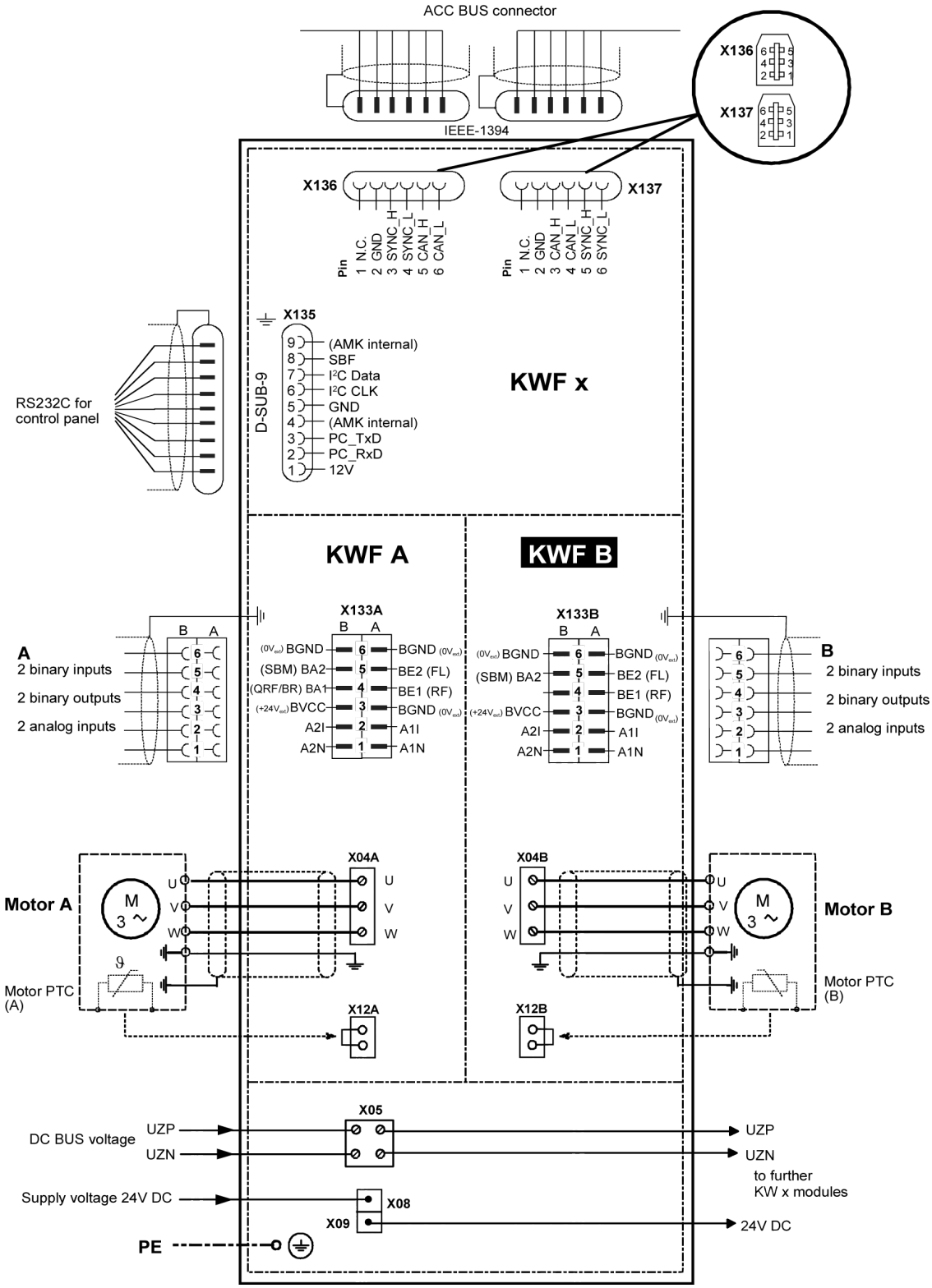
- 2 logic packs
  In logic part A and B, the general tasks are realized, such as
  drive initiation;
  system monitoring,
  parameter administration,
  U/f-operation,
  diagnostics,
  display, ...
- Protective functions
  Monitoringintermediate circuit (DC BUS) for excess or insufficient
  Monitoring of supply voltage 24 V DC
  ACC-BUS monitoring
  Monitoring for short-circuit output binders
  I2t monitoring per frequency inverter A/B with warning bit release
  I2t monitoring per motor A/B with warning bit release
  Temperature monitoring KWF
  Temperature monitoring motor A/B
- Status display via LED field H2A/H2B
  On the front plate, one green and one red LED are assigned for each frequency inverter (A and B) for status display.

The green LED indicates the system status (SBM, QRF).
The red LED indicates warnings and malfunctions.



LED Display	Explanation
	24 V supply missing, status during the system initiation
	KWF - System Ready Message (SBM = 1)
	Drive under voltage (QRF = 1)
	Error (Configuration, controller, hardware defect)
 resp. 	Warning (e.g. unauthorized access via CAN, temperature warning, ...)
	Special case: Interruption ACC-BUS.

8 Connections and interfaces KWF



9 Connections ac inverter module KWF (signal description)

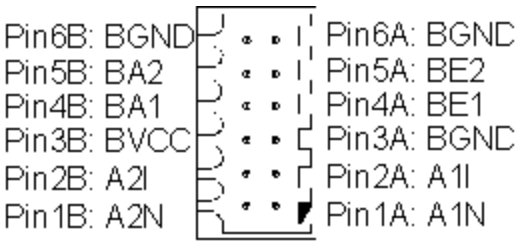
In the U/f-double ac inverter module KWF, the same connection names are used as in the KW module if plug assignment and function are identical.
The assignment to the two frequency inverters in the KWF is carried out through the addition A or B at the corresponding connection or signal name.
The print on the KW front plate for ac inverter B is inversed.

X04A/B	Motor connection Connection cross-section max. 2.5 mm2 / AWG 14
U:	Motor phase U
V:	Motor phase V
W:	Motor phase W
	Connection through a shielded cable. The cable shield is to be placed on the casing (PE) on both sides. Wrong phase order during motor connection results in wrong turning direction of the motor shaft!
X05	Intermediate circuit voltage (DC-BUS) Connection cross-section max. 4 mm2 / AWG 10
UZP:	Intermediate circuit voltage (+)
UZN:	Intermediate circuit voltage (-)
X08, X09	Supply voltage 24V DC Connection cross-section max. 1.5 mm2 / AWG 16
Pin 2:	+ 24V
Pin 1:	0V
	24V DC-feed from external (power supply with potential separation according to VDE 0160) for supply of the internal switch power supply in the KWF module. (Continued loop of the voltage over X08 or X09 for max. 4 further KWx modules permitted). The 0V potential of the external power supply has to be connected with PE
X12A/B	Motor PTC resistor Connection cross-section max. 0.5 mm2 / AWG 20
Pin 2: RT2	Connection 2 for the motor PTC resistor
Pin 1: RT1	Connection 1 for the motor PTC resistor. Connection through a shielded cable. Cable shield earthed on one side at the KWF casing. If the motor has no PTC resistor, pin 1 and 2 have to be bypassed.
H2A/B	LED-field One green and red LED each signal the current operating status in KWF A/B.

X133A/B

Analog inputs,
Binary inputs and outputs (pin strip, 6-pin, 2 rows)

Assignment:



Connection cross-section max. 1 mm2 / AWG 18

Signal for KWF A/B	Use
A1N	Analog channel 1 (non inverting))
A1I	Analog channel 1 (inverting)
A2N	Analog channel 2 (non inverting)
A2I	Analog channel 2(inverting)
BGND	External reference potential 0 V_{ext}
BVCC	External supply +24 V_{ext}
BE1	Binary input 1
BE2	Binary input 2
BA1	Binary output 1 (24V / 1A)
BA2	Binary output 2 (24V / 100mA)
PE	Shield support

Attention:
Plug assignment deviates from X133 for KW/KWD!
KWF: Pin 6A: BGND Pin 6B: BGND !!!
KW / KWD: Pin 6A: BE3 Pin 6B: BA3 !!!

a) Analog inputs A1, A2

The analog inputs are differential inputs.
Input voltage: Nominal 0...+10 V
Resolution: 10 bit for +10 V.
A maximum input voltage of +12 V is permitted!
The GND potential of the setpoint source may deviate in relation to the PE by a maximum of +10 V.
The request is made by the micro-processor cyclically every 0.5 ms.
A setpoint speed can be preset for the frequency inverter through analog input A1.
The setpoint frequency for the motor is internally formed from this speed.
Analog input A2 is not in use.
Connection through a shielded cable (paired). The cable shield has to be earthed through the KWF casing.

b) Binary inputs and outputs

Potential separated through optoelectronic coupler
Rated input voltage: +24 V
Rated output voltage: +24 V
Rated input current: 8 mA
Rated output current BA1: 1 A, protected against sustained short-circuit
Rated output current BA2: 0.1 A, protected against sustained short-circuit
Cycle time for binary I/O: 1 ms
Connection through a shielded cable. The cable shield has to be earthed through the KWF casing.

Pin A3 / Pin A6 Pin B6 BGND

Reference potential 0 Vext. of the external control voltage +24 Vext. for supply of binary inputs and outputs.

Pin A4:
Input BE1

(Default assignment RF “Inverter ON”, can also be configured) Flank-controlled, input voltage of +24 Vext. to RF releases the tact impulses in the ac inverter. The motor is magnetized and supplied with voltage.

Prerequisite:

Successful system start-up after 24 V DC On, acknowledged with SBM = 1 (KWF Ready). DC intermediate circuit voltage present. If one of these conditions is not fulfilled, the system signals a malfunction. The message SBM (KWF Ready) is reset and an error message is issued.
Taking away the Inverter On (RF = 0) during operation causes the setpoint frequency of the motor to go back to “0” after ID32782 “Run-down time for RF inactive”. With a setpoint frequency < 5 Hz, the frequency inverter restricts the tact impulses for the end levels, the motor is without momentum. QRF is only reset when the setpoint frequency “0” is reached at the end of the run-down ramp. .

In case of an Emergency-Off, the control RF has to be interrupted using the hardware by triggering a contact of the Emergency-Off circuit.

Pin A5:
Input BE2

(Default assignment FL “Delete errors”, can also be configured)
Prerequisites for deleting errors: Inverter On inactive (RF = 0).
In case of an error, the frequency inverter has to be started up using “Delete error” after the cause of the error has been removed. This can be accomplished through an impulse (≥ 100 ms) at the input “FL”. After a successful start-up, the System Ready Message is set again.
Deleting errors is also possible through the MASTER-KW and the ACC-BUS.

Pin B3: BVCC

Common feed-in of the external supply voltage +24 Vext. for the binary outputs.

Pin B4:
Output BA1

(Default assignment QRF “Acknowledgement Inverter On”, can also be configured)
The output QRF is set if after RF = 1 the drive is supplied with voltage. The drive system is now ready to process setpoint values.
Taking away the Inverter On (RF = 0) during operation causes the setpoint frequency of the motor to shut down after ID32782 “Run-down time for RF inactive”. With a setpoint frequency < 5 Hz, the frequency inverter restricts the tact impulses for the end levels, the motor is without momentum.
QRF is reset when the setpoint frequency “0” is reached at the end of the run-down ramp.

Pin B5:
Output BA2

(Default assignment SBM “System Ready KWF”, can also be configured)
Output SBM is set until no error condition is recognized in the KWF module. In case of an error, SBM is reset immediately and reacts depending on the type of error (refer to “AMKASYN diagnostic messages”): As long as the motor can still be controlled, the setpoint frequency is reset after ID32782 “Run-down time for RF inactive”, at < 5 Hz it is shut down.
An error, e.g. in the supply voltage or in the logic pack leads to removal of the internal Inverter On as well as to a restriction of the control impulses in the power part. The motor runs down.

RS232 Service interface (D-SUB 9-pin, socket)

This interface serves for communication with the KWF through RS232. The operating panel KU-BF1 (option) can be connected at X135 and can be used for entering the communication parameters and for diagnostics. (Internally at AMK, X135 is used for loading the KWF system software).

X135/PIN	CODE	Use
1	12V	+12 V supply (max. 100 mA)
2	PC_RxD	Receive Data (RS232)
3	PC_TxD	Transmit Data (RS232)
4	N.C.	AMK internal use
5	GND	Signal Ground
6	I2C_CLK	I2C-Bus CLK
7	I2C_Data	I2C-Bus Data
8	SBF	Hardware recognition bit
9	N.C.	AMK internal use
Casing	SSS	Shield placed over D-SUB plug casing

The connection cable to the PC may only contain lines RXD, TXD and GND! The use of a customary zero-modem link cable may cause damages on the PC input!

X136 / X137

ACC-Vernetzung

Through the ACC-Bus, all participants are connected with the ACC-MASTER and synchronized to the ACC-BUS master tact (in the KWF, synchronization is neither possible nor required). Using the ACC-BUS, the participants in the network can be addressed from the ACC-MASTER (e.g. for parameter settings and diagnostics).
The ACC cross linkage is carried out with FireWire cables (IEEE1493) through the plugs X136 and X137. The U/f-double ac inverter KWF contains two frequency inverters A and B, each with their own BUS address. However, it only has one ACC-BUS connection (X136/X137). In the KE/KW system, the KWF module is connected like a KW module as ACC-BUS participant (refer to “Device description KE/KW”, section 5.3 ACC cross linkage).

9.1 Tightening torques [Nm] for terminals

Terminal / fastening	for housing width 55mm
X05	2
X04	1
PE connection	4
Pressure bolts	-
Rear panel M6 mounting	8
D-SUB housing	0.8
Shield clamps SK 8	0.6
SK 14... 20	0.8
SK 35	1.8

10 Installation

In content, the installation information from the “Device description KE/KW” (refer to section 6) also applies to the KWF frequency inverters.

Additional information regarding “Motor cables”:

A long motor cable with a high cable capacity may trigger the error message “2334 overcurrent output binders” in the KWF module!

11 Start-up

In content, the start-up information from the “Device description KE/KW” also applies to the KWF frequency inverters.

Special information regarding the KWF module:

The KWF module in the drive system can only be started through the ACC-BUS-MASTER. To enable communication through the ACC-BUS, the communication parameters have to be entered in the operating panel as first step when starting up (see chapter 14 Operating panel KU-BF1):

ID34023 BUS participant address

The address has to be entered for frequency inverter A.
The system then assigns the next higher address (value A + 1) to frequency inverter B.
(Default setting: Frequency inverter A à Address “31” Frequency inverter B à Address “32”)

ID34024 BUS transmission rate (Default setting: “0” → 1000 kBd)

To accept the modified values, the supply voltage 24V DC has to be switched off and on again (system start-up).

Further parameter setting is now carried out from the ACC-MASTER through the ACC-BUS.

In the KWF frequency inverters, only a subset of the generally available parameters is used (refer to chapter 13 “Parameters (ID No.) for U/f-operation in the KWF”).

12 Speed control

12.1 Course of the motor voltage over the speed

The course of the motor voltage over the speed is determined either through

- fixed voltage/frequency assignment or through
- variable voltage/frequency assignment

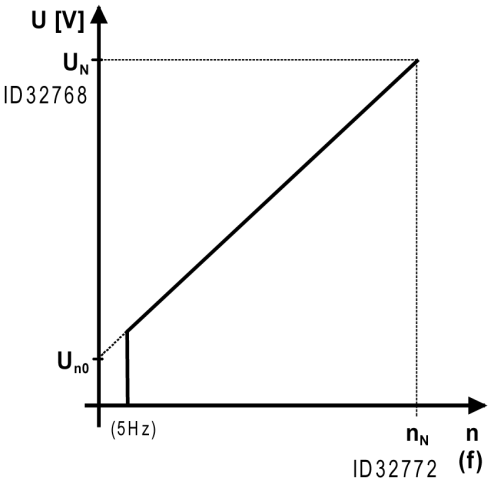
The fixed voltage/frequency (speed) assignment is defined through the parameters
ID32935 Standstill voltage
ID32768 Rated voltage motor
ID32772 Rated speed

For the variable voltage/frequency assignment, the voltage/frequency values can be found in a U/f-table. It contains a maximum of 5 support points, each with a voltage value and the corresponding frequency value.
These values have to be entered in the variables ID34010 to 34019 (variable 10 to 19) (voltage in [V], frequency in [Hz]).

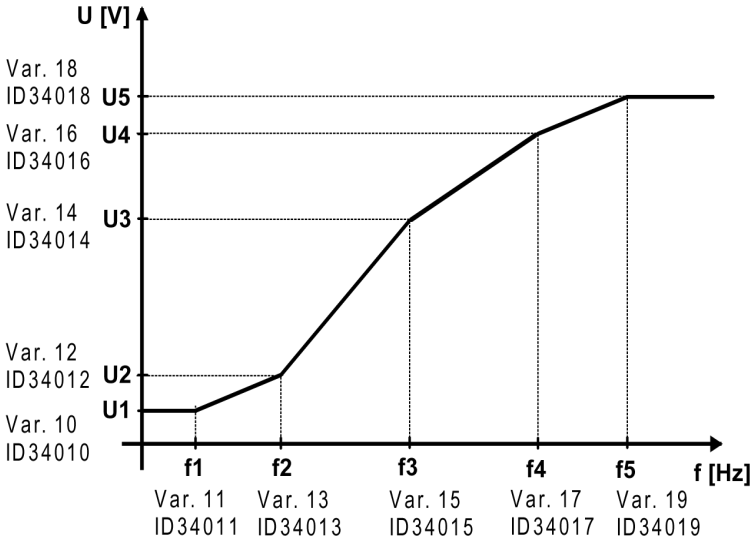
The frequency results out of the motor speed and the motor pole number according to the formula:

$$f[Hz] = \frac{n[\min^{-1}]}{60} * \frac{Polzahl}{2}$$

Fixed U/f-assignment:



Variable U/f-assignment:



U_N:Rated voltage
U_{n0}:Standstill voltage
n_N:Rated speed

For all frequencies underneath the 1. support point, its voltage value applies. The voltage is linearly interpolated between support points.
For all frequencies above the last support point, its voltage value applies.
If the variables of the first two support points have been assigned a zero, work is carried out without U/F-table.

Non used variables have to be assigned a zero!

13 Parameters (ID No.) for U/f-operation in the KWF

13.1 Communication parameters

ID No.	Name	Default Value	Unit	Explanation/Information
34024	BUS transmission rate	0.0	kBd	corresponds to 1000 kBaud
34023	BUS participant address	31/32		see below
34027	BUS failure characteristic	2		0 = No reaction 1 = Warning message 2 = Error message

The communication parameters (ID34023 and ID34024) can only be written through frequency inverter A; they can only be read in frequency inverter B.
For the BUS participant address ID34023, A automatically receives the entered value; this value +1 is internally entered as address for B.
The BUS transmission rate (ID34024) is always valid for both frequency inverters A and B.
Further parameter setting is now carried out from the ACC-MASTER through the ACC-BUS.
In the KWF frequency inverters, only a subset of the total parameters is used.
The BUS failure characteristic (ID34027) is always valid for both frequency inverters A and B.

13.2 Motor parameters

ID No.	Name	Default	Unit	Explanation/Information
109	Max. current motor	3.3	A	Barrier for current limit
111	Rated current motor	0.5	A	For I2t monitoring motor
113	Maximum speed	3000	1/min	For error message “n > n_{max}”
32768	Rated voltage motor	400.0	V	End point linear U/f characteristic curve
32772	Rated speed	1500	1/min	End point linear U/f characteristic curve
32775	Pin number motor	4		
32935	Standstill voltage	0.0	V	Starting point linear U/f characteristic curve (n = 0)

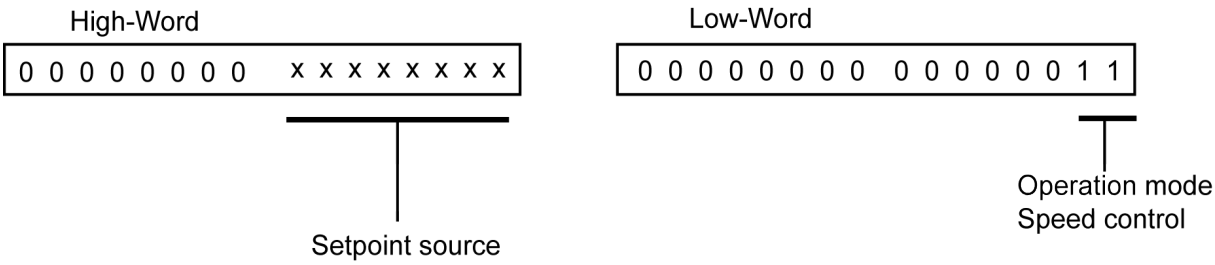
13.3 Variables for U/f-table

(for values equal zero, the following applies: Operating mode “Fixed voltage/Frequency assignment”)

ID No.	Name	Default Value	Unit	Explanation/Information
34010	Variable 0	0	V	Support point 1
34011	Variable 1	0	Hz	
34012	Variable 2	0	V	Support point 2
34013	Variable 3	0	Hz	
34014	Variable 4	0	V	Support point 3
34015	Variable 5	0	Hz	
34016	Variable 6	0	V	Support point 4
34017	Variable 7	0	Hz	
34018	Variable 8	0	V	Support point 5
34019	Variable 9	0	Hz	

13.4 Main operating mode ID32800

Default value: F0 0003h: → Speed control with digital speed setpoint value according to ID36 (default value ID36 = 100 min^{-1}) Internally, the voltage/frequency supply (U/f-operation) is automatically activated through this.



Permissible codes	Setpoint source speed
1 h	Analog input A1: Setpoint value for 10 V according to ID32778, offset correction according to ID34037
F0 h	Digital speed setpoint according to ID36 (can be modified temporarily through ID269)
F1 h	Speed setpoint through ACC-BUS (RECEIVE PDO)

13.5 Speed parameters

ID No.	Name	Default	Unit	Explanation/Information
36	Speed setpoint value	100.0	min^{-1}	
38	Limit speed positive	3000	min^{-1}	
39	Limit speed negative	-3000	min^{-1}	
32778	Speed for 10 V	1500	min^{-1}	Speed for 10 V at A1
32780	Start-up time TH	500	ms	Start-up time from speed 0 to nmax
32781	Run-down time TL	500	ms	Run-down time from nmax to speed 0
32782	Run-down time for RF inactive	500	ms	Run-down time from nmax to speed 0 with removal of the Inverter On RF
34037	Offset analoging. A1	0,00	V	Offset correction for analog input A1

13.6 Parameters for protective functions

ID No.	Name	Default	Unit	Explanation/Information
114	Overload barrier motor	50.0	%	Barrier for I2t warning message motor*)
32773	Service switch	0	Hex	Bit 14 = 0I2t monitoring motor inactive Bit 14 = 1I2t monitoring motor active*)
32837	UZ-monitoring (DC-BUS)	385.0	V	Barrier for error UZ “Undervoltage in intermediate circuit (DC-BUS)”
32920	Motor overload time	5.0	s	Influences I2t monitoring of the motor*)
32999	Overload barrier KWF	50.0	%	Barrier for I2t warning message KWF

*) I^2t monitoring motor only active, if bit 14 = 1 in ID32773 (service switch)

13.7 System parameters

ID No.	Name	Default	Unit	Explanation/Information
269 1)	Memory mode (for temp. parameter)	0	Hex	0 = Parameter change in serial EEPROM 1 = Parameter temporary in RAM
32796	Source RF	0		0 = Binary input (BE1) to KWF 9 = ACC-BUS (using ID32904)
Default codes for assignment to binary outputs BA1/BA2:				
32865	Port3 Bit0 (QRF)	33031		Function QRF for binary output BA1
32866	Port3 Bit1 (SBM)	33029		Function SBM for binary output BA2
Alternative codes for assignment to binary outputs BA1/BA2:				
	Warning overcurrent KWF	33016		I2t warning message KWF
	Warning excess temp. KWF	33017		
	Warning excess temp. mot.	33018		
	Warning overcurrent mot.	310		I2t warning message motor
	Collective message warning	33074		Status “General warning” in KWF
Default codes for assignment to binary outputs BE1/BE2:				
32978	Port3 Bit0 (RF)	32904		Function RF through binary input BE1
32979	Port3 Bit1 (FL)	32913		Function FL through binary input BE2
	RF/FL through ACC-MASTER:			
32904	Inverter On (from ACC-MASTER)			With ID32904 = 0:→ Reset RF With ID32904 = 1:→ Setting of RF (only for ID32796 = 9: RF through ACC-BUS)
32913	Delete error (from ACC-MASTER)	0		Delete error with ID32913 = 1

1)

For parameters which can be modified temporarily, it has to be set whether access to the parameters is to be carried out temporarily (in the RAM work memory) or in the serial EEPROM (SEEP):
ID269 = 0Modification in SEEP
ID269 = 1Modification in RAM, until ID269 is reset to “0”.
The parameters which can be modified temporarily, are listed under ID270.

13.8 Parameters for display values

ID No.	Name	Default	Unit	Explanation/Information
17	List of all IDs	-		
30	Software version	-		
40	Actual speed	-	min^{-1}	Setpoint speed value after ramp
110	Max. current	-	A	Max. current KWF
112	Rated current	-	A	Rated current KWF
182 2)	Manufacturer status	-	Hex	Status bits
270 1)	List temp. par.	-		List of parameters which can be modified temporarily (online)
390	Diagnosis number	-		Call-up of the error codes, up to 4 errors can be read out through a multiple call-up of ID390
32836	Intermediate circuit voltage	-	V	
33116	Internal temp.	-	°C	Temperature at IGBT (coldplate)

The data can be read off the ACC-MASTER after release of the corresponding ID No.
1) ID270 List of the parameters which can be modified temporarily for KWF

Element	Content (ID No.)	Description
0	22	List length (byte)
1	22	
2	36	Speed setpoint
3	38	
4	39	
7	32778	
8		Start-up time TH
9	32781	Run-down time TL
10	32935	Standstill voltage

2) In ID182 Manufacturer status, status bits or images of important control bits are defined.
This bit strip can only be read.
The status bits are internally cyclically updated.

MSB

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SBM	**ERR**	**WRN**	**QUE**	**UE**	**QRF**	**RF**	**res**	**res**	**res**	**res**	**res**	**res**	**res**	**res**	**res**

Bit 11 and Bit 9 are only images of control bits, they are not for process control!
The device status can also be transmitted to the ACC-MASTER through a TRANSMIT-PDO:

MSB

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
res	**res**	**res**	**res**	**res**	**res**	**res**	**QRF**	**res**	**res**	**ERR**	**WRN**	**res**	**res**	**QUE**	**SBM**

14 Operating panel KU-BF1

To enter the communication parameters as well as for KWF diagnostics, the operating panel KU-BF1 can be connected to plug X135.

The menu for the operating panel at the KWF is different from the menu of the operating panel at the KW:

After switching on or after connecting the operating panel to the KWF, the start-up menu appears. Bus addresses of the frequency inverters A and B as well as the software version are indicated:

BUS addresses
Software version

```
A D R : 3 1   /   3 2
K W F   1 0 1   0 3 3 1
```

(A / B)
Year / week

Press the button [F1] to access the first menu point. If there is an error in the device, it is now displayed:

Error memory
Error number

```
E R R O R   1   A D R : 3 1   A
      1 0 4 9         I:      0
```

BUS address inverter A
Additional information

Use the scroll button [F2] to display the next error number, if available.
Up to four errors can be saved and displayed through scrolling.
This menu point is hidden in case of no errors in the KWF and the menu for entering the BUS participant address appears immediately (ID34023):

ID
Current value

```
A D D R E S S   A D R : 3 1   A
          3 1             -
```

BUS address inverter A

Behind the current value, an address can be entered:

ID
Current value

```
A D D R E S S   A D R : 3 1   A
          3 1           2 5 _
```

BUS address inverter A
New value „25“

Use [Shift] + [⇧] to move the cursor to the left, e.g. to overwrite a wrong entry. Use the input button [SP CR] to save the new value in the EEPROM to the KWF. The new values only become active once the system has been started up again.

Use the button [F2] to change to the menu point for setting the BUS transmission rate (ID34024), input in kBd. (The default value = 0 corresponds to 1000 kBd):

ID
Current value

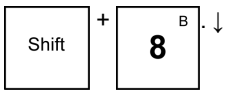
```
B I T R A T E   A D R : 3 1   A
      1 0 0 0             _
```

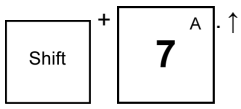
BUS address inverter A

Press the button [F2] again to return to the beginning of the operating panel menu.

Use key combinations [Shift] + [A 7] and [Shift] + [B 8] to switch between frequency inverter A and frequency inverter B:

ID Current value	A D D R E S S A D R : 3 1 A 3 1 -	BUS address inverter A





For frequency inverter B, BUS address and BUS transmission rate cannot be entered directly. This data is deduced from the corresponding specifications in frequency inverter A:
BUS address B:= Value address A + 1
BUS transmission rate B:Is always the same as in frequency inverter A

Table of the button functions

Buttons	Function
F1	After start-up, switch to first menu point
0 , 1 , 2 R	Input of new values (decimal, no commas)
Shift + ⇦	Move cursor to the left to overwrite faulty entry
SP CR	Input Input value is accepted
Shift + 7 A	Switch to frequency inverter A
Shift + 8 B	Switch to frequency inverter B
F2	Scroll to the next menu point (at the end, transfer to first menu point again)

15 Replacement information KWF

The KWF module may only be replaced after corresponding with the machine manufacturer!

1. MAIN SWITCH OFF, AWAIT UNLOAD TIME > 3 MINUTES!
2. If available: remove front covering
3. Remove strain relief/shield binder connections of the connection cables.
4. Remove all plugs including the ACC-BUS plug at the upper side.
5. Remove connections UZP/UZN.
6. Secure unique designation of the motor connections at X04A/X04B. Disconnect motors.
7. Unplug PE-connections at the PE-bolts.
8. Loosen the setting screws of the KWF module.
9. Slightly lift device and remove to front.
10. Clean assembly surface of the coldplate and of the new KWF module.
11. Insert the new KWF module, lower and tighten setting screws, tightening torque 5 Nm.
12. Tightly connect all PE-connections to the PE-bolts again.
13. Reconnect UZP/UZN connections.
14. Connect motor connections U, V, W (X04A/X04B).
    Follow phase order! Wrong phase order inverses the motor turning direction!
15. Plug in all plugs, ACC-BUS plug and close plug correctly.
16. Carefully establish all shield connections/strain reliefs using shield binder.
17. If available: Hang in KWF covering again.
18. Correctly address KWF module again, load correct parameter set to the KWF module
19. Switch the plant on again

Warning

16 Your Opinion is Important!

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