AMKASYN
Servoumrichter AN/AZ/AW
Hardware description AZ 05

Version: 2001/41
Teile-Nr.: 25320
Technische Änderungen vorbehalten.

AMK

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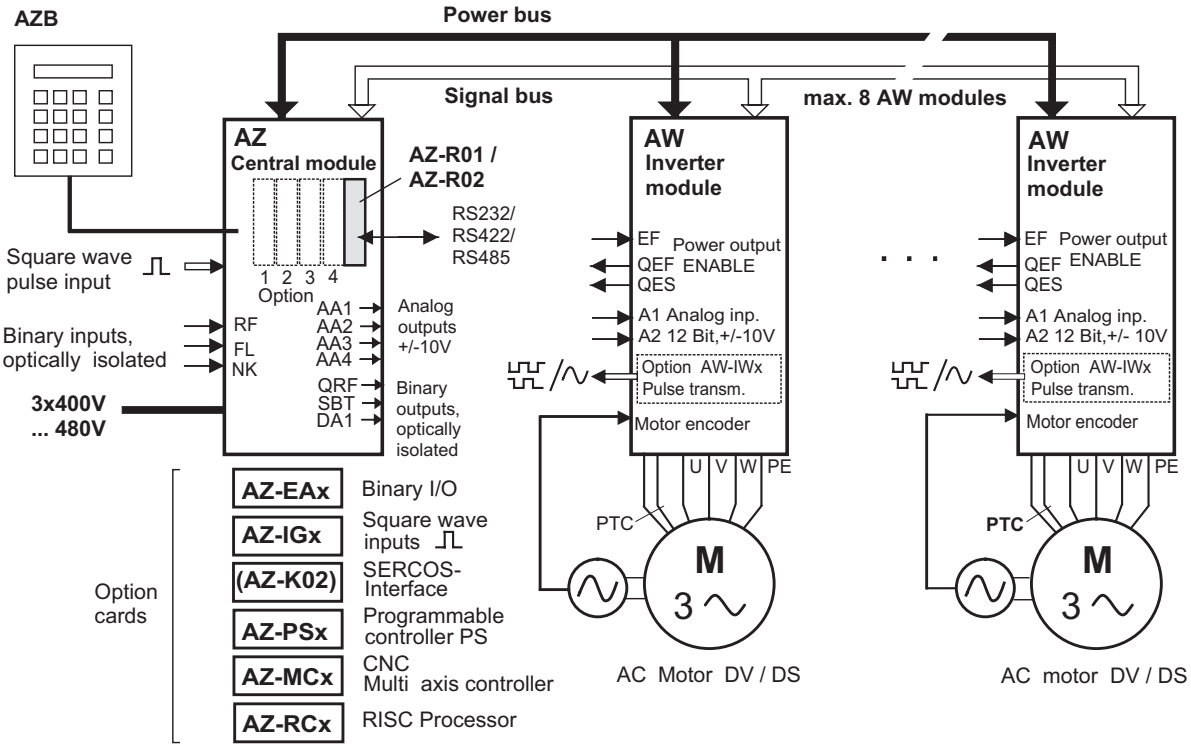
1 System overview



RF All INVERTERS ON
FL ERROR RESET
NK Reference limit switch

QRF INVERTERS ON handshake
SBT SYSTEM READY
DA1 Data output (configurable)

EF Power output ENABLE
QEF Power output ENABLED
QES Power output DISABLED

The AMKASYN series is a drive system of modular construction for feeding AMK AC motors. The digital inverters regulate the drives in 4 quadrant mode precisely and with high dynamic response. The feed is direct from a 400V three-phase power supply. The inverter modules are supplied from a common DC BUS. The latest power semiconductor technology in conjunction with high-grade integration guarantee high reliability. The units are protected against overcurrent.

2 Safety instructions

Please read and observe additionally the „Safety instructions for AMKASYN Inverters“.

Meaning of the used symbols:

Danger

Possible consequences: Dead or severest injuries!

Warning

Possible consequences: Severe injuries or death!

Warning

The operation of the drive system in a manner that does not conform to its purpose and intended use can be dangerous and can cause severe injury, up to loss of life, to the user/operator. Misuse can also cause damage to the machinery/equipment of the enduser.

In order to minimize the risk of accidents and damage it is necessary that installation, start-up, maintenance and repairs are performed diligently by trained and experienced specialists.

Drive system parameters may only be set or modified by the machine manufacturer!
Entry of non-conforming parameter values is effecting the drive behaviour and increasing the risk of accidents and damage!

Danger

Each time before working on the AMKASYN drive system: Interrupt power supply using the MASTER SWITCH!
Working under voltage is dangerous to life!
More than ONE LIVE CIRCUIT! See diagram! (2 line circuits on AZ module X01, X03).
After POWER OFF:
Because of capacitor charge don’t touch electrical connections immediately! DC voltage at terminals UZP and UZN is dangerous to life!
Before working on the modules wait for discharge time longer than 3 minutes after turning power off!

The option cards and all plug connectors must only be inserted or removed when the modules are voltage-free!

Never losen or tighten terminals under voltage!

3 Central module AZ 05 specifications

Typ	AZ05
Input voltage	3 x 400V ± 10 %, 47 ... 63 Hz
Extended line voltage range (from Ser.No.: 46029-...)	3 x 400V ... 480V ± 10%, 47 ... 63 Hz
DC BUS voltage	560V =
Efficiency	approx. 0,98
Power factor cos φ	> 0,9
Number of AW modules that can be connected	max. 8, note power values
Cooling	forced convection
Fan voltage	230 V | Internal fan: 12 V/3W
Input current	11 A
Nominal output power	5 kW
Overload factor for 60 s [1)]	2
Braking transistor	Integrated in the AZ module
Ext. brake resistor (option)	min. 45 Ohm
Recommended fuses [2)] **Supply voltage** **Fan voltage**	 16 A 2 A
Recommended cable cross-sections [mm²]	
X01 Power supply 3 x 400V	3 x 1,5 (AWG 14)
X03 Fan	2 x 0,75 (AWG 18)
X21 RB Brake resistor (shielded cable)	2 x 1 (AWG 16)
X24 RTB Ext. PTC resistor (shielded cable)	2 x 0,5 (AWG 20)
PE-connection [mm²]	10 (AWG 6)
Cross-section PE bar [mm²]	≥ 10 x 3

1) Cycle time > 240 s

2) Fuses for cable protection, „gL“ classification acc. to DIN / VDE 0636

On principle the inverter modules AW 1,3/2,6 , AW 2,5/5 , AW 4,5/9 also can be combined with the AW modules of the AMKASYN system with higher power. In this case a matched steel fixing bracket is available for installation of the small AW modules. Through this all modules can be connected in the same place.

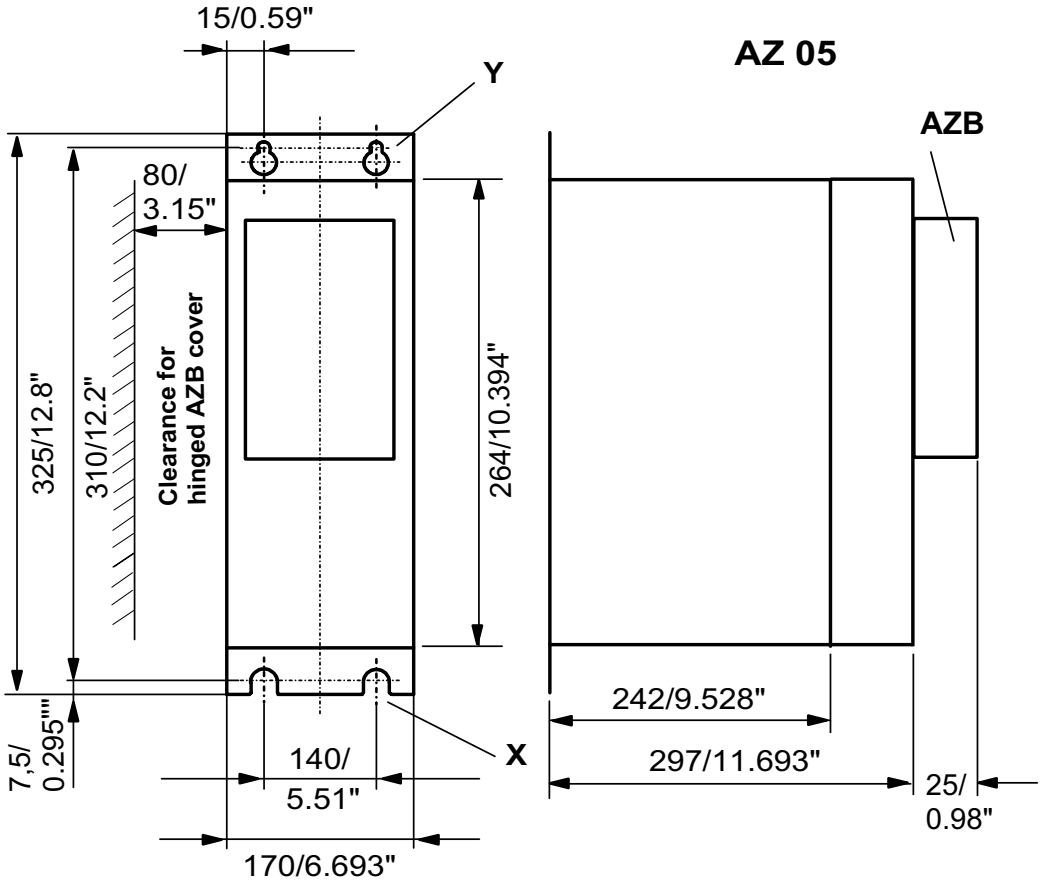
Simultaneity factor for AW modules

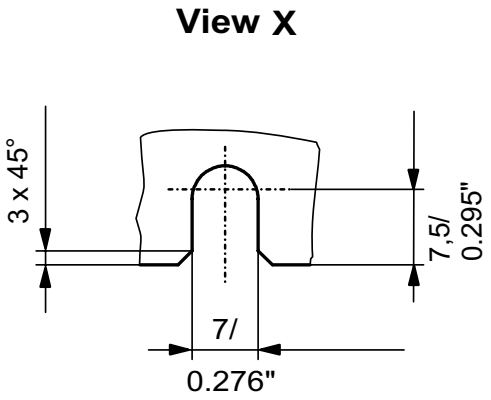
n: Number of AW modules which can be operated simultaneously with a permissible current of $I_{AW} = I_N$ x table value.

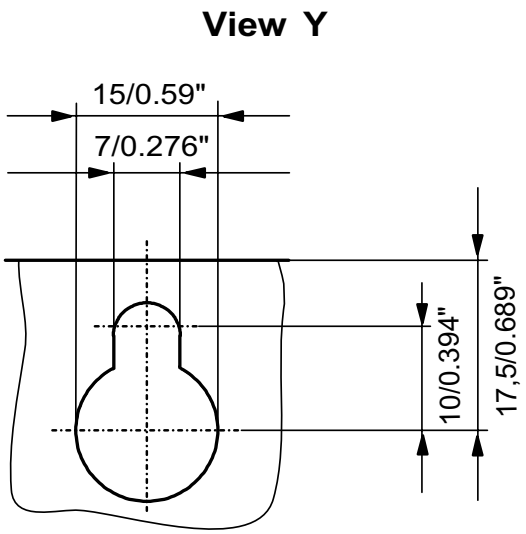
The total current is limited to max. 20 A (r.m.s.) by the cross section of the terminal leads UZP/UZN.

AW-Type	I_N [A]	n = 1	n = 2	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8
AW 1,3/2,6	2,15	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
AW 2,5/5	4,15	1,00	1,00	1,00	1,00	0,96	0,80	0,69	0,60
AW 4,5/9	7,5	1,00	1,00	0,88	0,66	0,53	0,44	0,38	0,33

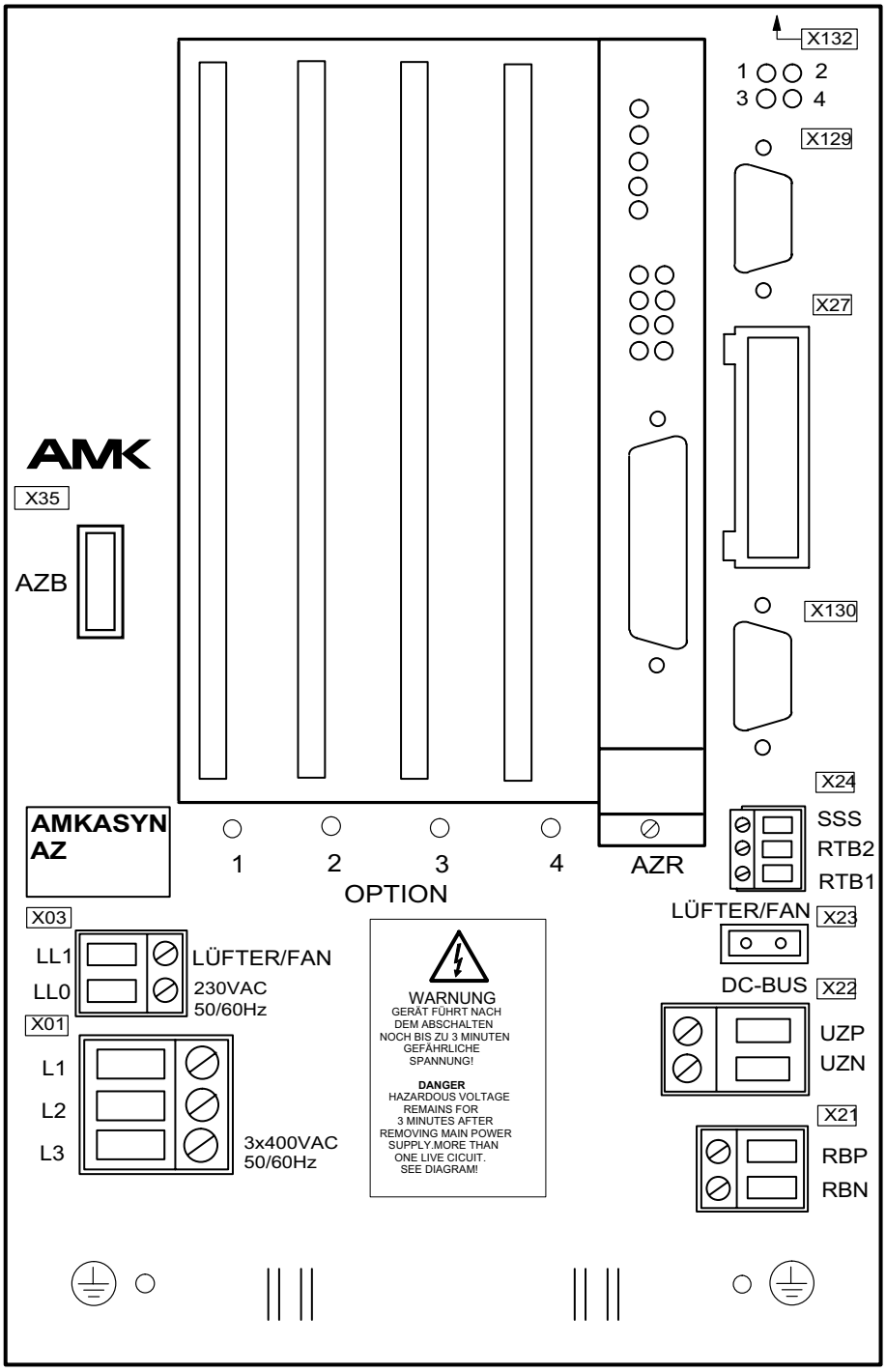
4 Dimensions Central module AZ 05



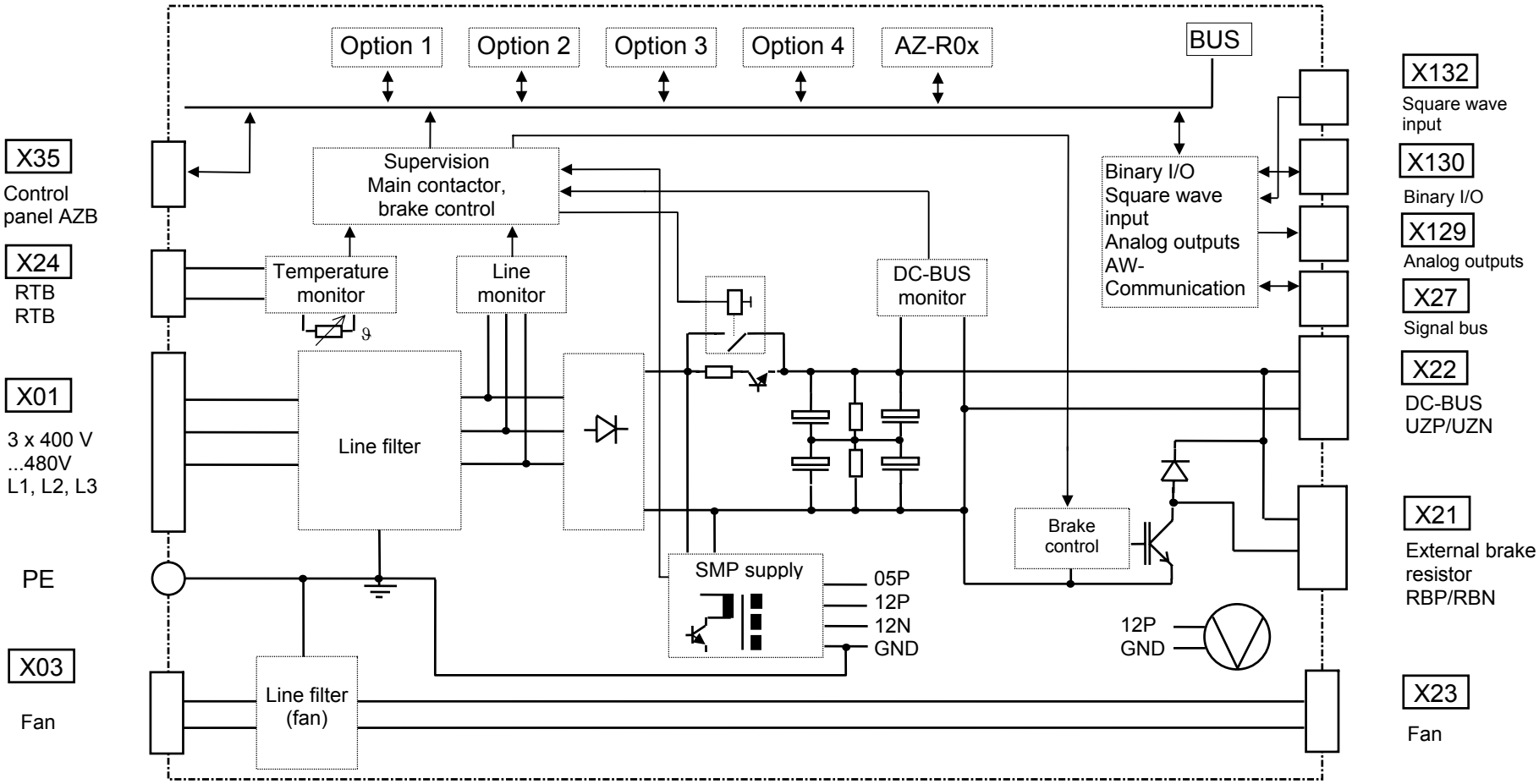




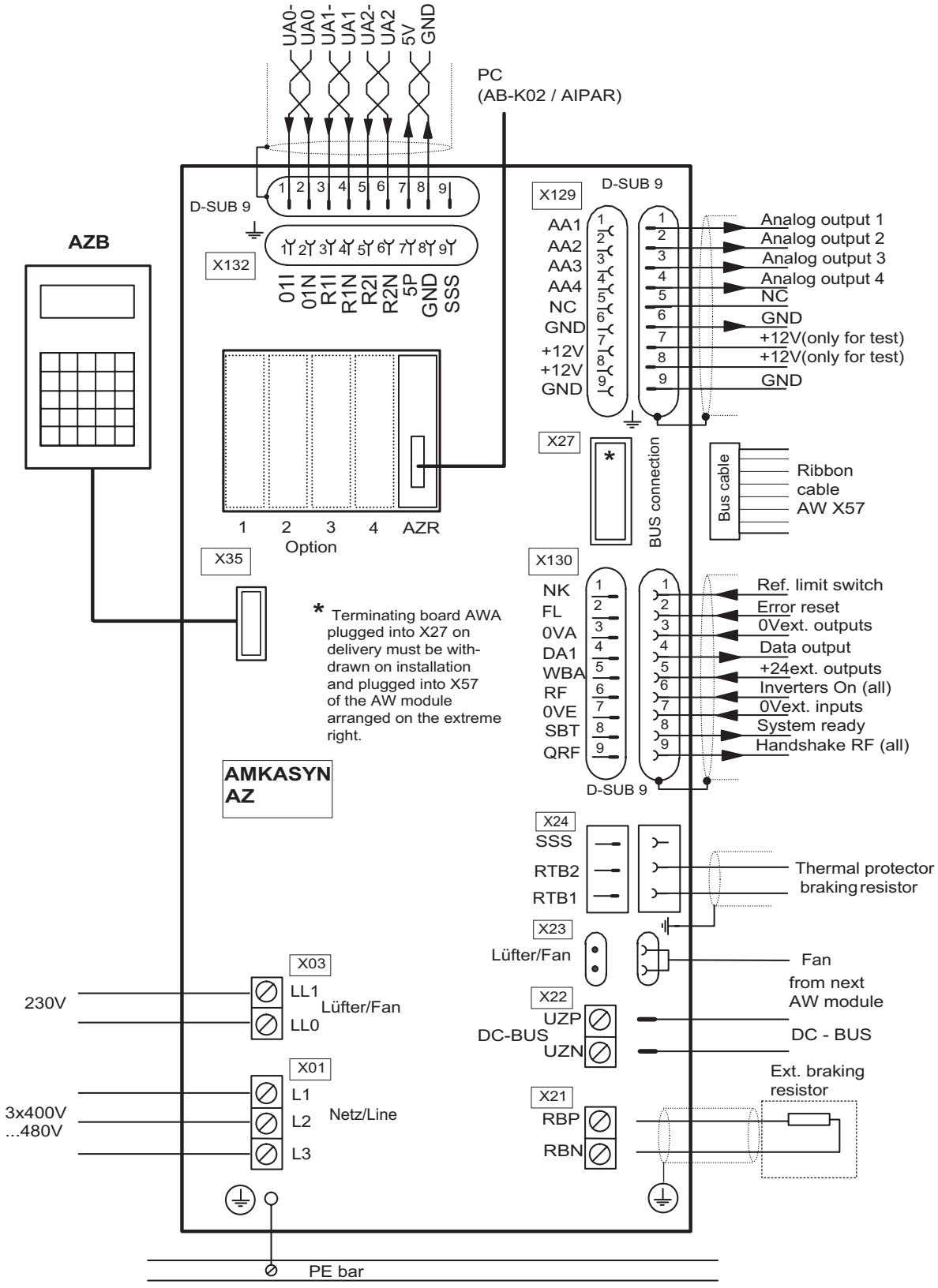
5 Front view, connections of central module AZ 05



6 Block diagram central module AZ 05

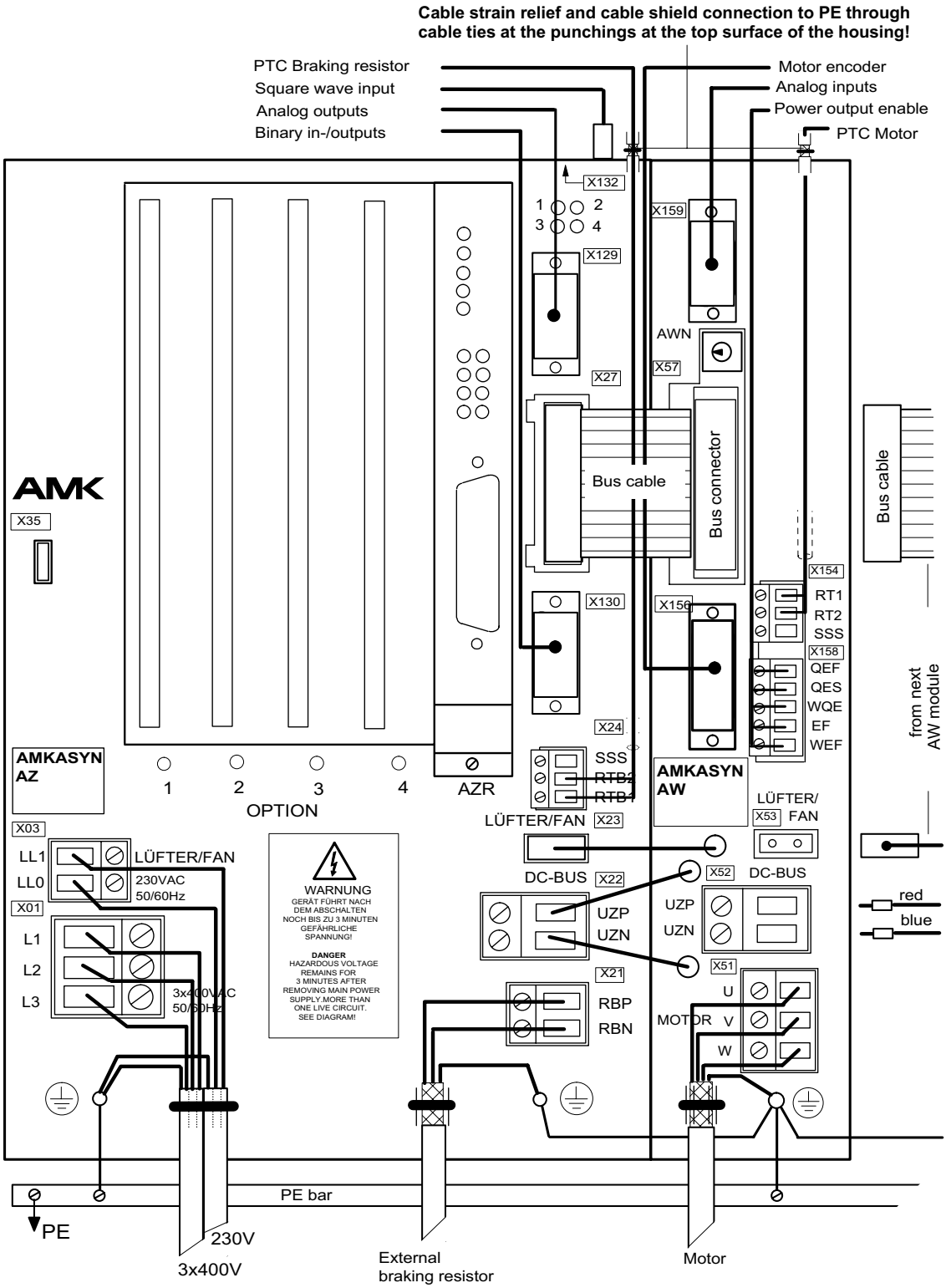


7 Connection drawing of central module AZ 05



For measurements on signals led through 9 pole D-SUB connectors an adapter is available.

8 Wiring AZ - AW



9 Functional description of central module AZ

The central module AZ contains the following functional groups:

- **Rectifiers**

  for generating the DC BUS voltage. All connected inverter modules for main and servo motors work from a common DC BUS. This facilitates energy balancing when braking/accelerating the different motors.

- **Charging device for the DC BUS**

- **Braking transistor**

  Braking energy from the motors is first fed into the DC BUS. If the DC BUS voltage exceeds its limit value of 730V, the braking transistor is activated and the surplus braking energy is converted into heat through the brake resistor.
  The braking transistor is integrated in the AZ module, the brake resistor AR 45 must be installed externally. The brake resistor is monitored by a bimetal thermal protector 130°. The evaluation takes place in the AZ module. Without protector AZ terminals RTB1-RTB2 must be jumpered.

Danger

After the power is shut down, the buffer capacitors for the DC BUS can still be charged and carry dangerous voltage. Wait at least 3 minutes for the capacitors to discharge before working on the modules.

- **Switched mode power supply**

  The primary clocked switched mode power supply generates the internal supply voltages +5V, +12V, -12V. These voltages are short circuit protected. The switched mode power supply is supplied from the DC BUS.

- **Monitoring/switch-on logic**

  Power supply, DC BUS and internal supply voltages are monitored for limit values. When the limits are exceeded, error messages are generated in the central computer.

  The switch-on logic is implemented in the central computer AZ-R0x by programming. With power on the DC BUS voltage is generated and the central processor is booted. After booting binary output „SBT System ready“ is set. Now binary input „RF Inverters on“ must be set. Binary output „QRF Handshake RF“ is signalling that all axes are under control.

  Error messages must be reset through binary input „FL Error reset“.

- **LED Indicators**

  The 4 green LEDs at the right top corner of the AZ front allow a rough system diagnosis.

  During trouble-free operation all 4 LEDs are shining.

  LED status meaning:

L1 ☼ ○ L2 L3 ○ ○ L4	System booting
L1 ☼ ☼ L2 L3 ○ ○ L4	Perfect system configuration
L1 ☼ ☼ L3 ☼ ○	AZ05 ready
L1 ☼ ☼ L3 ☼ ☼	AZ05 and all activated AW modules ready (normal operation status)

Central processor AZ-R0x plug-in card
(Software from AZ 0208)

The plug-in card AZ-R0x is located in the rack for the additional cards at the slot on the extreme right. It is secured by means of a screw in the front panel below the card grip against inadvertent loosening.

The central processor controls the entire inverter system. All data is available here and can be transferred through different interfaces internally and to the higher ranking control system. Setpoints and control data are transferred via the internal bus system to the controllers of the AW modules.

System parameters and configuration data are stored permanently in the EEPROM on the AZ-R0x. Access to this data is possible through a PC with associated start up and parameterization software through the RS232C interface on the AZ-R0x card. The menue-assistance offers high convenience and reduces the time required for commissioning. Complete parameter sets can be generated online or offline. They are stored on the hard disk of the PC. Already existing parameter sets are simply downloaded to the central processor card AZ-R0x on start-up.

Option control panel AZB
As an option the control panel AZB is implemented in the hinged cover of the AZ 05 module. It communicates with the central processor through the RS232C serial interface (X 35).
The entire drive system can be configured and parametrized using the AZB. Access to certain data groups is protected by passwords. Status and error messages can be called up and displayed in plain language and speed setpoints can be set for the individual axes.

Essentially the AZB control panel is provided for servicing. A PC with the start-up and parameterization software AIPAR is recommended for the initial commissioning.

10 Standard interfaces on the AZ module

Pulse encoder input (X132)
(9-pole D-SUB connector, located at the top surface of the AZ module)

The pulse encoder input is provided for connection of an external actual position encoder , e.g. for spindle positioning or for square setpoint pulses (e.g. stepping motor control, synchronous control). The pulse encoder input is assigned to the corresponding inverter module and the type of signal evaluation is determined by the configuration.

Analog outputs AA1 ... AA4 (X129)
4 configurable analog outputs ± 10V, at a resolution of 12 bits.
Maximum current per output: 10 mA.
The analog outputs are cyclic served every 1 ms by the AZ processor. Through parameter setting internal system variables (e.g. actual speed, actual torque, ...) can be assigned to analog outputs. The variables then are represented as analog voltage.

AZB control panel (X35)
Beside a PC, the entire drive system can be configured and parameterized using the optional AZB control panel. Access to certain data groups is protected by passwords. Status and error messages can be called up and displayed in plain language. Communication with the AZ processor through serial interface RS232C.

11 Signal description central module AZ 05

For measurements on signals led through 9 pole D-SUB connectors, an adapter is available. It is installed between AZ plug socket and cable connector.

11.1 Binary inputs/outputs X130, 9 pole D-SUB (pins)

Optically isolated inputs/outputs
Input nominal voltage: +24V $_{ext.}$
Input nominal current: 8 mA
Output nominal voltage: +24V $_{ext.}$
Output nominal current: 100 mA, short circuit protected
Binary I/O cycle time: 10 ms (1 ms)
Connection via a shielded cable. The cable shield must be connected to the metallized D-SUB housing.

Pin 6: RF **„Inverters on“,** edge-controlled
Input voltage of +24V $_{ext.}$ at RF enables the clock pulses of all configured inverter modules. The motors are energized, the control is active.

Prerequisite: “Power output enable“ EF of all involved axes are set, single „Inverter on“ inputs are not defined by system parameters. If one of these conditions is missing, the system goes to fault. The „System ready“ SBT report is reset and an error message is produced. After fulfilment of the prerequisites, the error message must be deleted by a pulse ≥ 100 ms at input FL. If no further error is present, SBT is set again.

Removal of “Inverters on“ (RF = 0) in operation causes the motors to be decelerated according to a braking ramp which is specified by parameter Ident No. 32782. At standstill the clock pulses for the power transistors are disabled, the motor is without torque.

In the case of emergency stop, RF must be interrupted by hardware through a contact of the emergency stop circuit.

If single “Inverter on“ inputs are specified in the system parameter, then input “Inverters on“ RF is ineffective. The single “Inverter on“ RFx are assigned to inputs of the option card AZ-EAx on configuration. This card must be inserted in slot 1. With the prerequisites SBT = 1 and EFx = 1, the activation of the corresponding RFx input causes that this drive controls. The internal bit “Handshake QRFx“ is set. For monitoring the QRFx bits can be assigned to
binary outputs.
Input E1 of AZ-EAx in slot 1 activates “Inverter on“ for AW1, E2 for AW2 and so on.

X130:

Pin 2: FL **„Error reset“**
Prerequisite: RF „Inverters on“ inactive

With RF „Inverters on“ inactive, a +24$V_{ext.}$ pulse (≥ 100 ms) at FL deletes the existing error messages, provided the cause of error has been eliminated. After an error message, a FL pulse must be output in order to set the „System ready report SBT“ again. Error reset also is possible via softkey on control panel (option), via the programmable controller AZ-PSx or through SERCOS interface.

Pin 1: NK **„Cam“**
Prepared for connection of a reference limit switch.

Pin 3: 0VA Reference potential of the external control voltage +24$V_{ext.}$ for supplying the binary outputs.

Pin 7: 0VE Reference potential of the external control voltage +24$V_{ext.}$ for supplying the binary inputs.

Pin 5: WBA Common feed of the external supply voltage +24$V_{ext.}$ for the binary outputs.

Pin 9: QRF **„RF handshake“**
The output QRF is set if after RF = 1 (Inverters on), all permitted drives are under control. The drive system is now ready to process setpoints.

After removal of RF (RF = 0), the drives are decelerated in speed control mode. QRF is reset only when all drives are at standstill.

In the case of **single „Inverter on“** inputs via option AZ-EAx „Inputs/outputs“, the output QRF is not set. In this case the single handshakes of „Inverter on“ (QRFx) must be assigned to binary outputs of the AZ-EAx. The higher ranking control system has to verify that all axes involved in the process report their readiness by their single „Inverter on“ handshakes QRFx.

Single handshakes QRFx can also be formed and placed on binary outputs (option AZ-EAx) without the need to define generally single „Inverter on“ RFx inputs by system parameters. Proceed in this way in the case of **motors with holding brakes**. The command to release the holding brake must be triggered by the PLC by evaluation of the binary output of the single handshake QRFx = 1.

Acknoledgement of the single „Inverter on“ inputs is indicated by green LEDs on the AZ-R0x front panel. They are marked with the numbers 1...8 for QRF1...QRF8.

If single „Inverter on“ inputs are defined, it is mandatory that a card AZ-EAx (option) is inserted in slot1. The binary inputs E1...E8 are reserved for single „Inverter on“ inputs RF1...RF8. With less than 8 AW modules, the remaining inputs can be allocated to other functions. The handshake signals QRF1...QRF8 have to be assigned to binary outputs.

Pin 8 : SBT **„System Ready“**
Output SBT is set as long as no error status is detected in the drive system. In the case of a fault SBT is reset and reacts depending upon the type of fault. Faults for instance in the power supply or in the computer lead directly to removal of all internal „Inverter on“ signals and thus to stopping all drives still capable of working. With standstill of all drives that can still be controlled, the system then resets output QRF (QRF = 0).

Overload or thermal errors generate a warning which directly resets output SBT and initiates a stop process as described above after 4 sec. It is possible for the higher ranking controller to initiate the wanted measures via the setpoint setting within this delay time.

Pin 4: DA1 **Data output DA1** (configurable)

11.2 Analog outputs AA1 ... AA4, X129, 9-pole D-Sub (female connector)

Connection via shielded cable. The cable shield must be connected to the metallized D-SUB housing.

Pin 1:	**AA1**	The analog outputs deliver in each case an output voltage of ± 10V at a resolution of
Pin 2:	**AA2**	12 bits, maximum current per output: 10 mA. The analog outputs are served cyclically
Pin 3:	**AA3**	every 1 ms by the AZ computer. The analog functions must be defined (by
Pin 4:	**AA4**	parameters) in the parameter set.

Pin 6:	**GND**	Reference potential (internal) for the analog voltage ± 10V
Pin 7, 8:	**+12V**	For internal test purposes only. No use of the +12V/GND
Pin 9:	**GND**	by the user

11.3 Square-wave pulse input X 132, 9-pole D-SUB (female connector)

Connector X132 is located at the top surface of the AZ module.

Connection via a twisted-pair shielded cable. The cable shield must be connected to the metallized D-SUB housing.

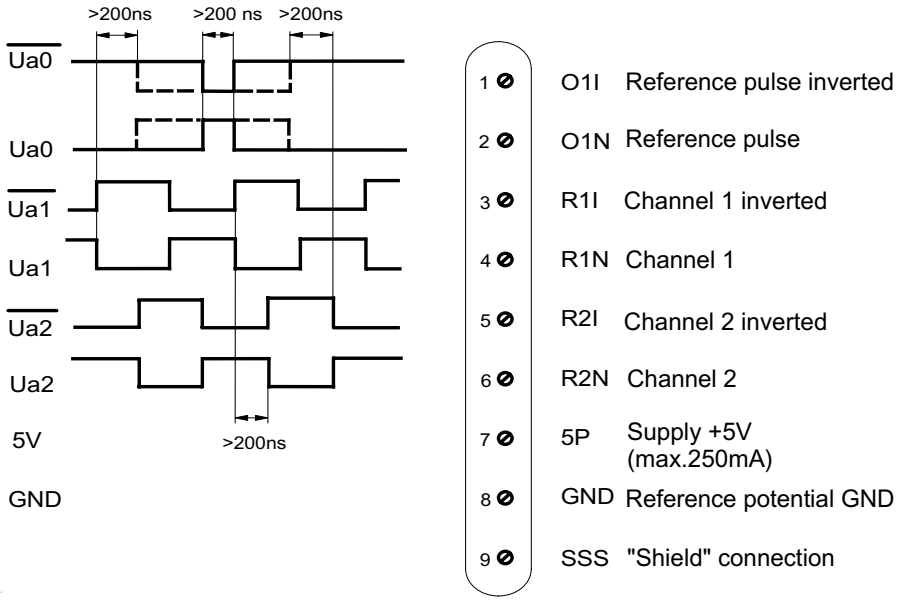
An actual position acquisition is possible through the differential inputs R1N, R1I, R2N, R2I by an external position measuring system with square-wave output. Also setpoint pulses e.g. for stepping motor control, synchronous control can be fed in through these inputs. Measuring system respectively source of setpoint pulses must be designed with differential outputs (line drivers acc. to RS422).

The inputs are direct galvanically coupled. Input impedance 180 Ohm (max. input current ≤ 20 mA).

On the AZ side a supply voltage (5V, max. 250 mA) for the external encoder is made available.

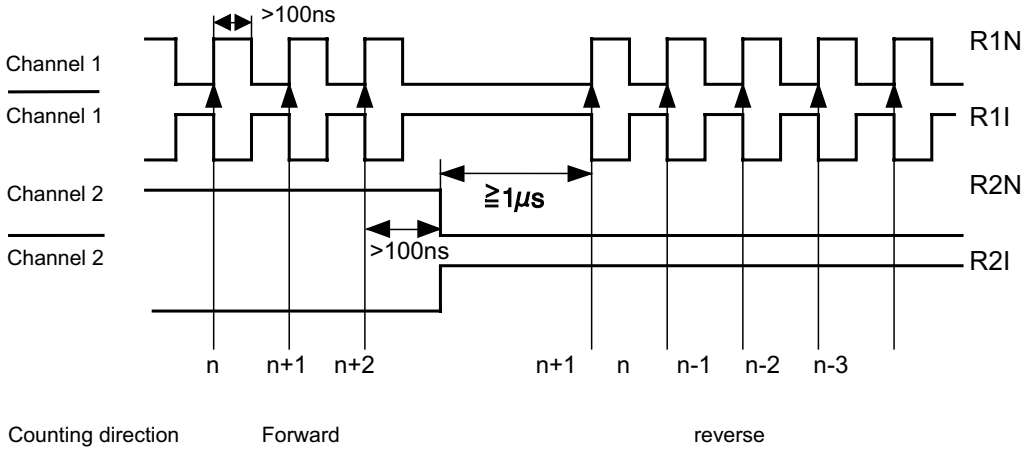
It is determined by system parameters in which form the signals are evaluated. The following signal forms can be processed:

2 square-wave pulses in quadrature (offset 90°)



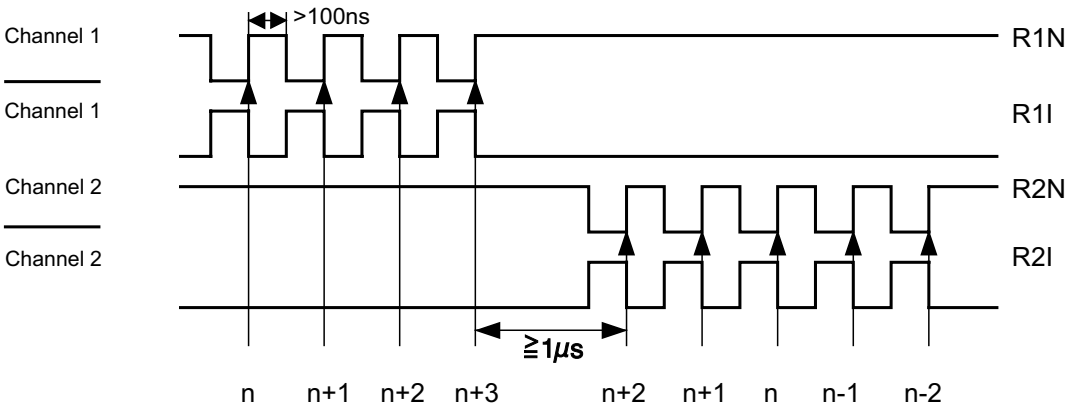
The maximum input frequency is 1 MHz (until end of 1999), **500kHz from 2000!**
The encoder signals are evaluated 4-fold by the AMKASYN system.

Counting pulses channel 1, direction signal channel 2



The maximum input frequency is 4 MHz (until end of 1999), **2 MHz from 2000!**
This type of setpoint pulses permits only single evaluation of the pulses.

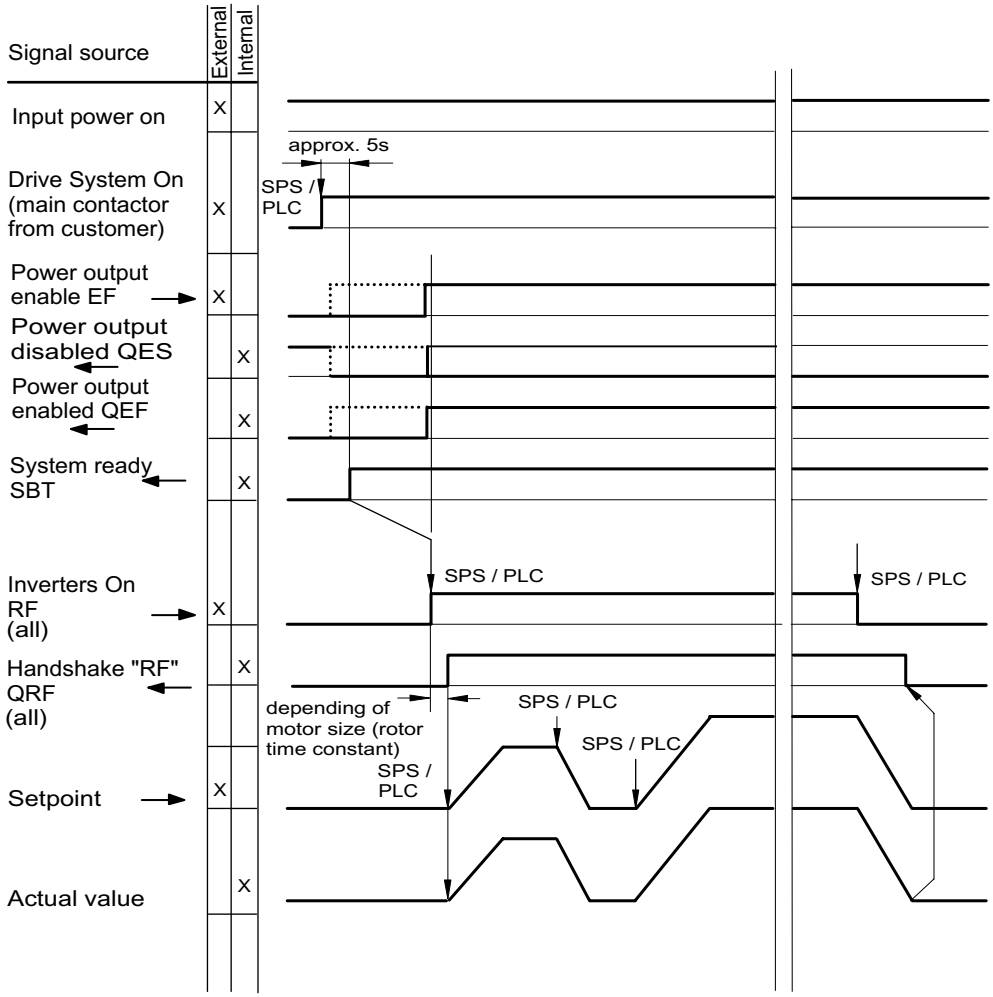
Forward pulses on channel 1
Reverse pulses on channel 2



The maximum input frequency is 4 MHz (until end of 1999), **2 MHz from 2000!**
This type of setpoint pulses permits only single evaluation of the pulses.

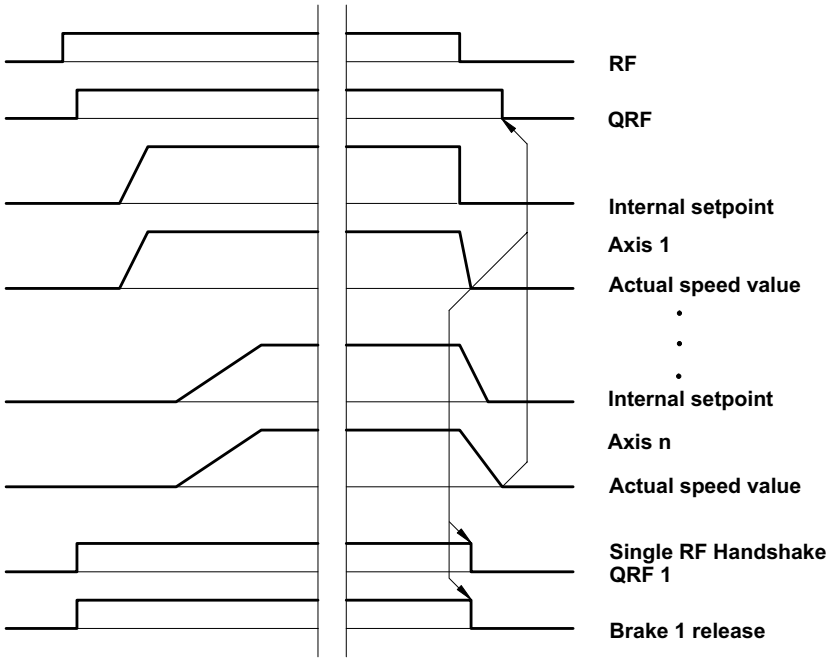
12 Pulse diagrams

12.1 Pulse diagram switching on/off

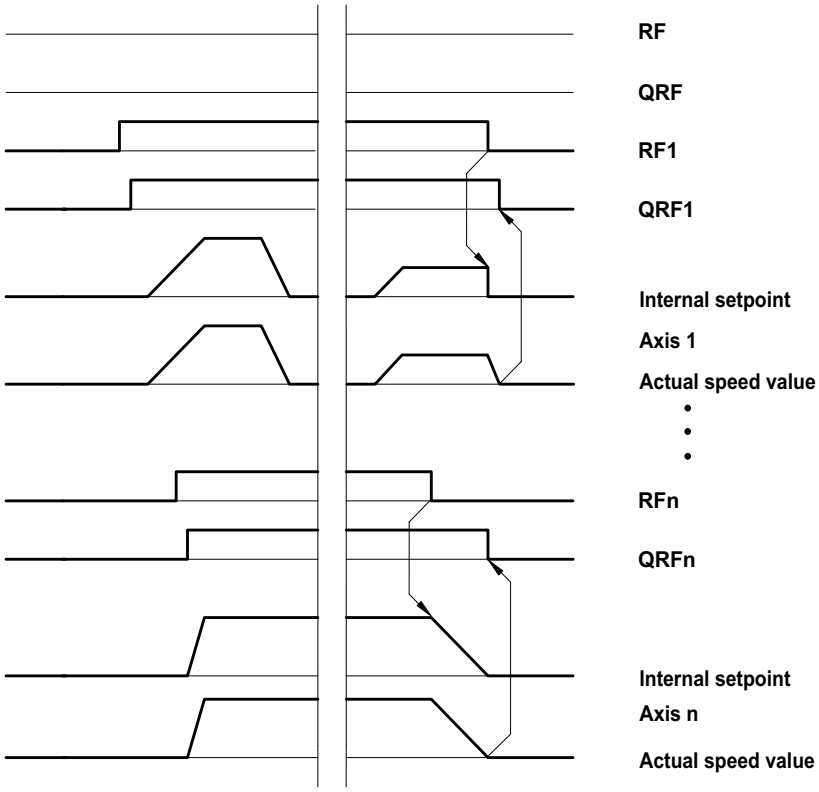


12.2 Pulse diagram Inverter ON

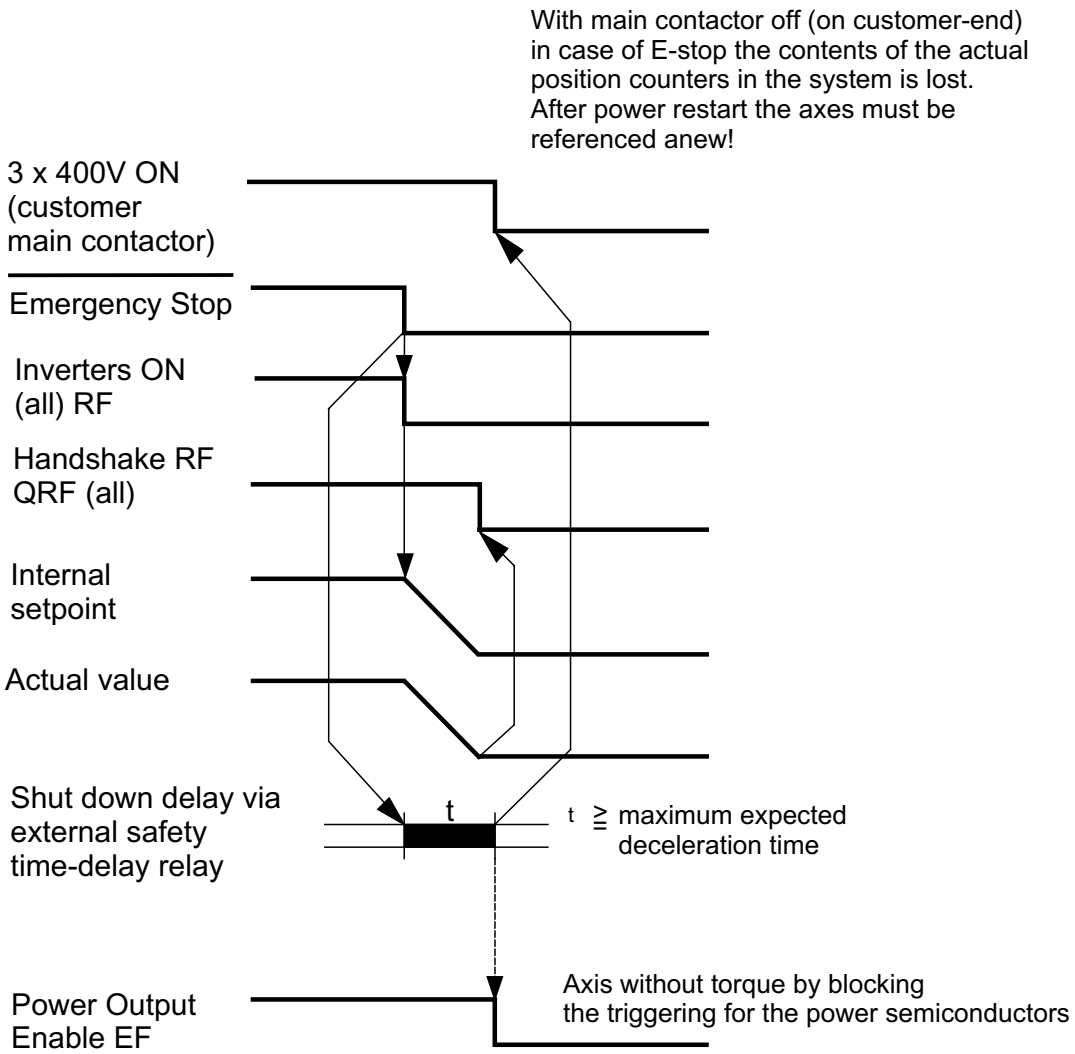
Inverters on (RF)



Single inverter ON

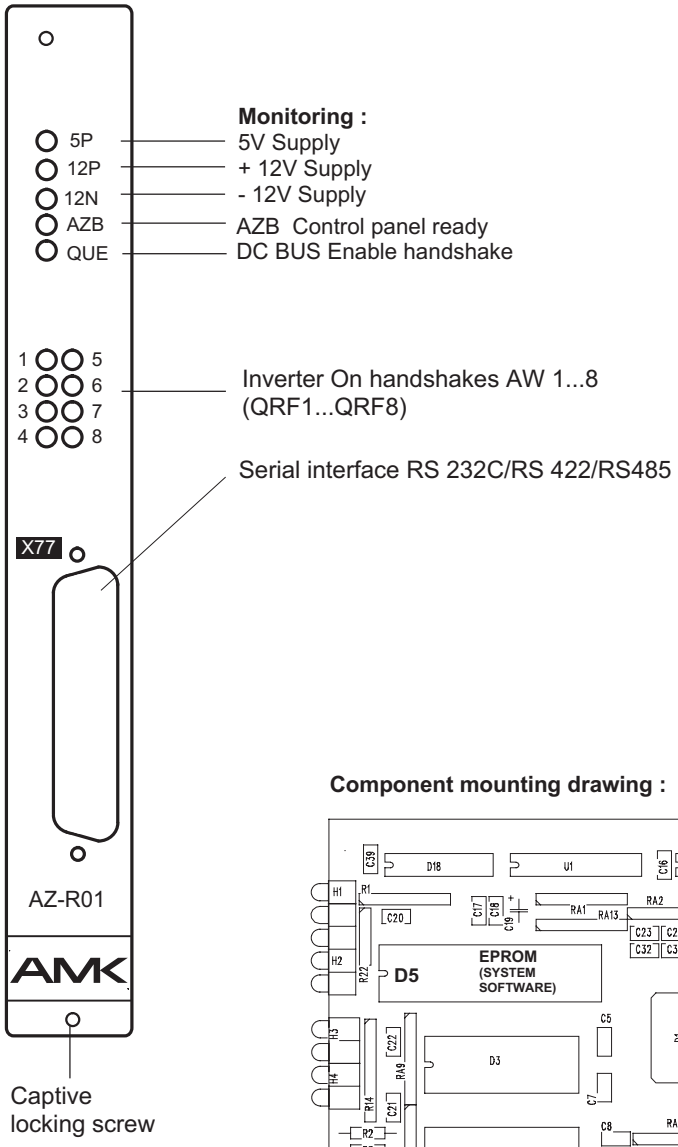


12.3 Pulse diagram Emergency Stop



13 Central processor cards AZ-R0x, hardware

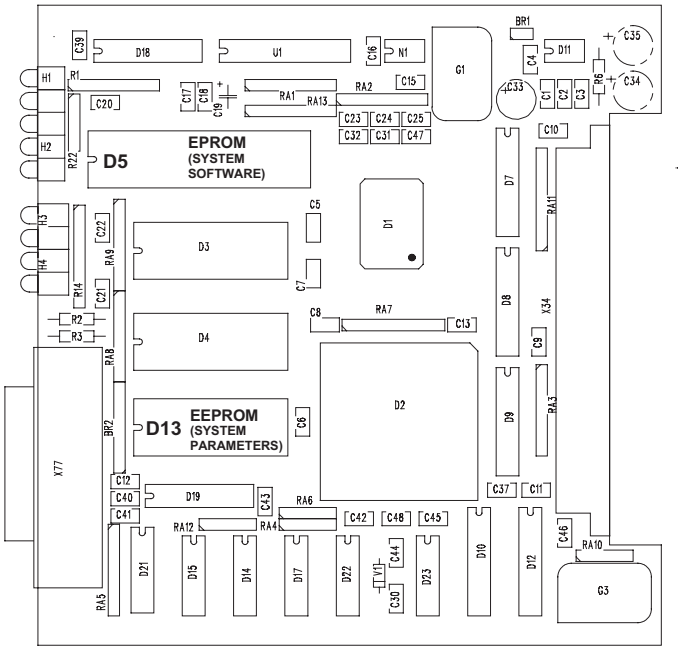
13.1 AZ-R01 Front view component mounting drawing



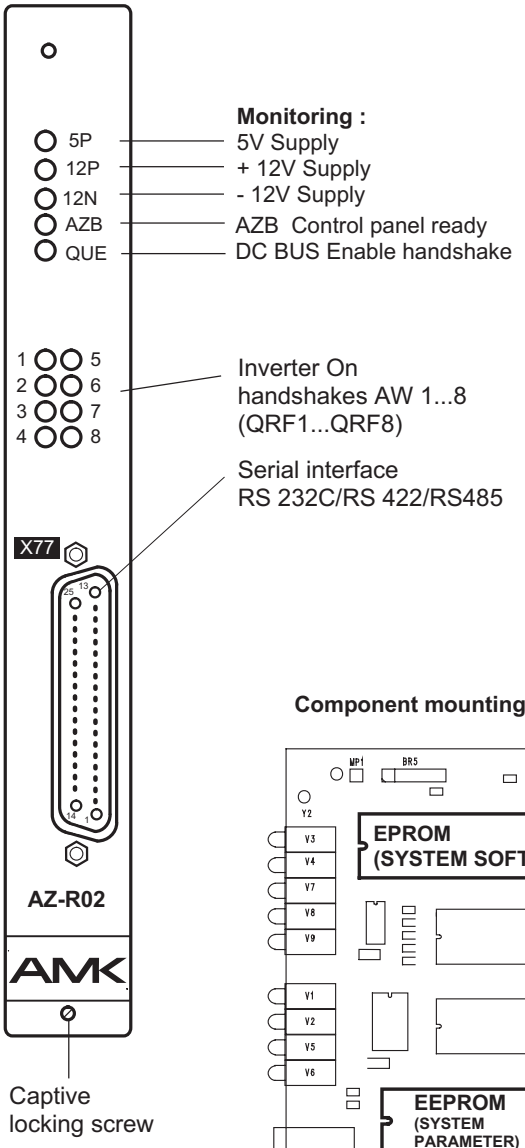
X 77 :

1	PE
2	TXD-
3	RXD-
4	RTS
5	CTS
6	n.c.
7	GND
8	n.c.
9	GND
10	5P
12	5P
13	n.c.
14	n.c.
15	n.c.
16	n.c.
17	n.c.
18	12P
19	n.c.
20	n.c.
21	n.c.
22	n.c.
23	n.c.
24	n.c.
25	12N

Component mounting drawing :



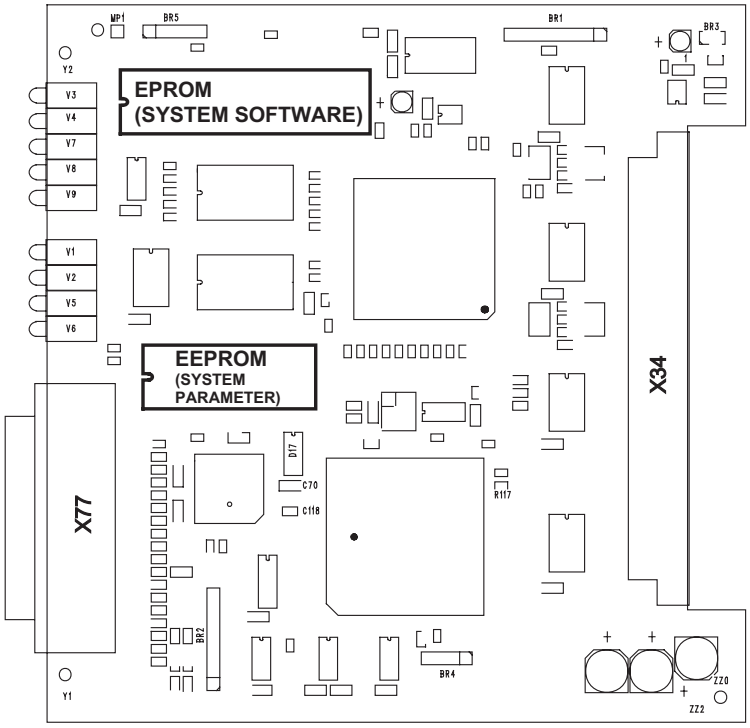
13.2 AZ-R02 Front view, component mounting drawing



X 77 :

1	PE
2	TXD-
3	RXD-
4	RTS
5	CTS
6	n.c.
7	GND
8	n.c.
9	GND
10	5P
12	5P
13	n.c.
14	n.c.
15	n.c.
16	n.c.
17	n.c.
18	12P
19	n.c.
20	n.c.
21	n.c.
22	n.c.
23	n.c.
24	n.c.
25	12N

Component mounting drawing :



14 Control panel AZB

14.1 General

The AZB control panel is integrated in the hinged front cover of the AZ module.

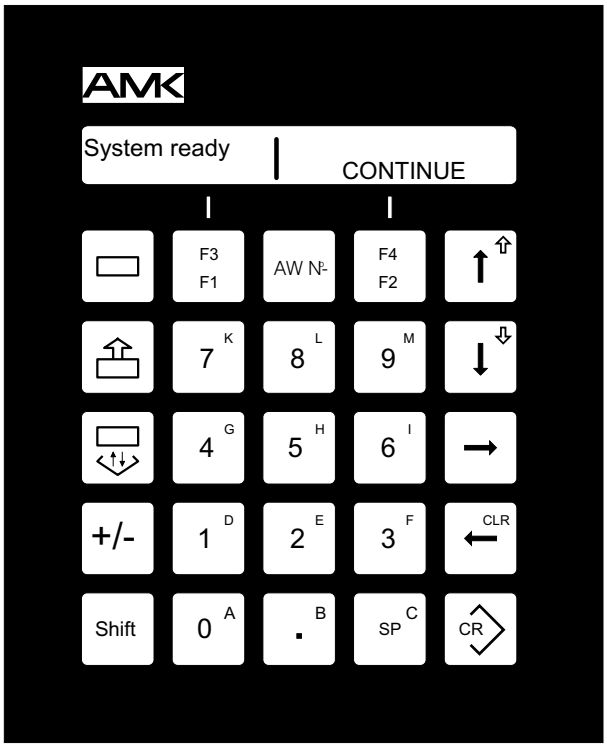
AZB functions

The AZB panel is controlled by a processor. It is designed as a service unit and a commissioning aid. For faster and more convenient start-up a PC with the AMK Software AIPAR for drive configuration and parameter setting is recommended.

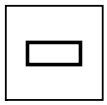
Through the AZB panel, the following items can be used:

- Drive configuration and parameter setting
- Status and error messages display
- Display of actual and setpoint values of the selected drive
- Speed setpoint entry for the selected drive
- Display of system data

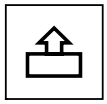
14.2 AZB keypad



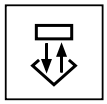
14.3 Legend of the key functions

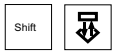


Return to main menu



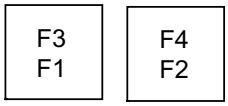
Jump to the next higher menu level



The current date is stored with 

, other menu items can now be selected. A direct return is possible by operating the key once again.

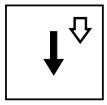
Selection of the second key allocation



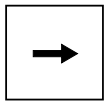
Softkeys for selection of individual functions of the main menu

AW number selection key, current AW is displayed in the display top right

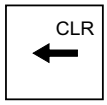
First allocation: Scrolling down
Second allocation: Scrolling down within SERCOS parameters



First allocation: Scrolling up
Second allocation: Scrolling up within SERCOS parameters

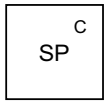


Clocking forward within appointed parameters



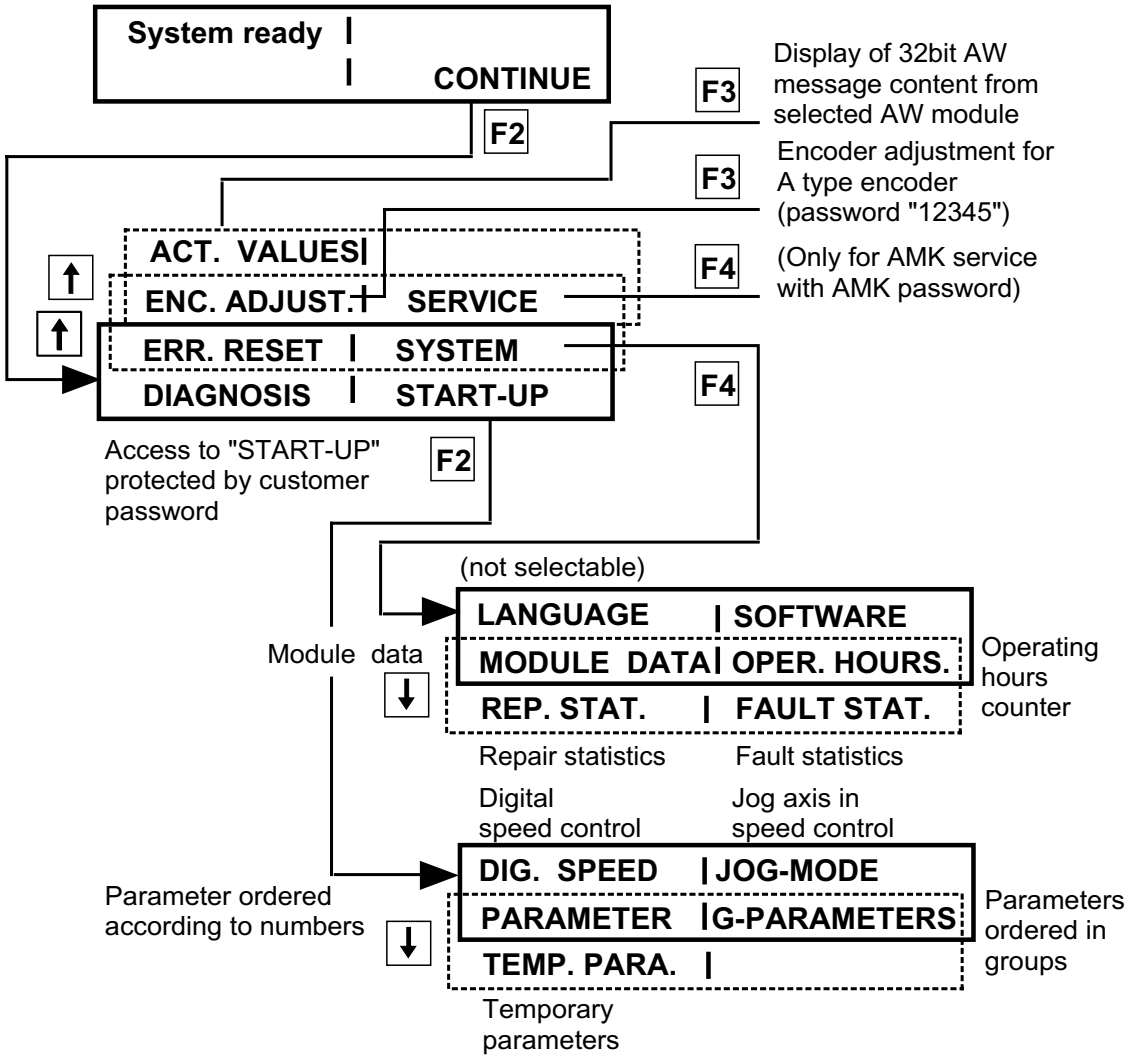
Delete key

Carriage Return (Enter)



Blank

14.4 AZB Menu overview



14.5 System booting

After Power ON the AZB display shows:

System initialization

The drive system is booted with initial checks.
After successful booting the display indicates:

System ready	
	CONTINUE

With function key F4 F2 „CONTINUE“ main menu is activated:

ERR.RESET	SYSTEM
DIAGNOSIS	START-UP

In case of a fault (e.g. configuration error) the display indicates:

Configuration	
DIAGNOSIS	CONTINUE

Function key F3 F1 „DIAGNOSIS“ activates the diagnosis function, the corresponding error message is displayed, e.g.:

1334	AW1	1
ID 38 > ID 113		

The error message must be cancelled after elimination of the error either with Shift + F3 F1 „ERR.RESET“ or through binary input „FL“. Error reset is only possible with UE and RF OFF.

▭ Main menu

ERR.RESET	SYSTEM
DIAGNOSIS	START-UP

Shift + F3 F1

Err.reset active

ERR.RESET	SYSTEM
DIAGNOSIS	START-UP

„Main menu“ is not automatically activated after error reset through „FL“!

The single menu item are selected via function keys F1...F4. F3 F1 „F1“ is assigned to left-hand menu item in the bottom line of the display, F4 F2 „F2“ is assigned to the right-hand menu item in the bottom line. Shift + F3 F1 „F3“ addresses left-hand menu item in the top line of the display, Shift + F4 F2 „F4“ right-hand menu item in the top line.

Menu lines can be changed with the scroll keys ↑ / ↓ and it is possible to move up and down within a menu item.

15 External brake resistor AR 45

Specification:

Continuous braking power:	45 W *
Peak braking power:	5 kW for 1s
Nominal resistance:	110 Ohm
Thermal protector:	130°C, evaluation via PTC input X24 on AZ
Connections:	Copper litz wire, 250 mm long, Cross section 1,5 mm² (AWG 14)

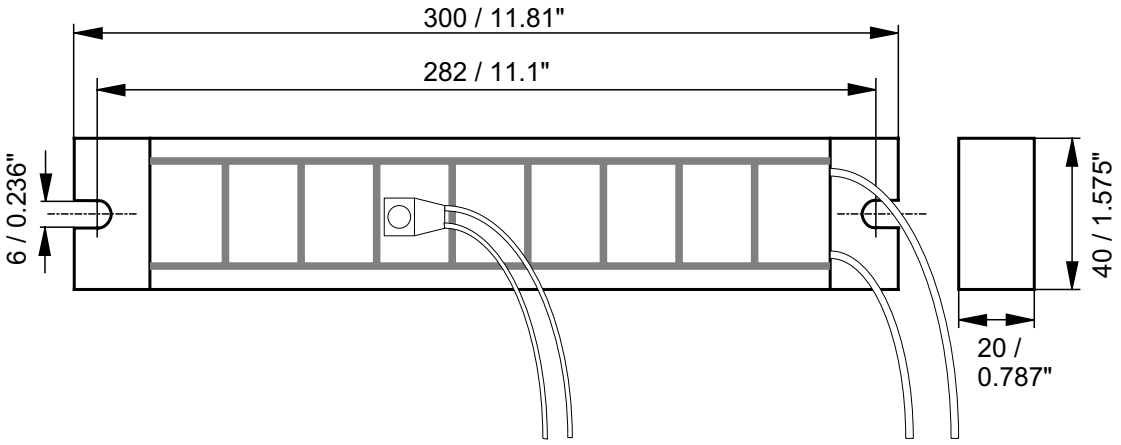
* By suitable ventilation respectively resistor installation on a heat sink continuous braking power can be increased to max. 400 W.

For increase of the peak braking power at most 2 brake resistors can be connected to the AZ module. The resistors (red leads) must be connected in parallel, the thermal protectors must be connected in series:

Resistor 1 / lead 1 and resistor 2 / lead 1 → X21/RBP
Resistor 1 / lead 2 and resistor 2 / lead 2 → X21/RBN
Thermal protector 1 / lead 1 → X24/RTB1
Thermal protector 1 / lead 2 → Thermal protector 2 / lead 1
Thermal protector 2 / lead 2 → X24 / RTB2

Don´t install the brake resistor in the cooling air intake area of electronic equipment.

WARNING !!!
Maximum surface temperature of 130°C at brake resistor or heat sink. Protect against accidental contact. Attach a warning label: Caution against contact.



Brake resistor
AR 45

White :
Thermal contact
to RTB1, RTB2

Red :
Brake resistor
to RBP,RBN

16 Parameters

Overview

K: Number of places behind decimal point for parameter entry through operator keyboard or PC software AIPAR.

Example: **ID-Nr. 00036, Velocity command value**
Editing of the velocity command value is only possible in [RPM] although the internal speed resolution is 0,0001 RPM.

ID-Nr. 32774, Rotor time constant TR
Editing of the rotor time constant is only possible in [ms] although an internal time resolution of 0,1 ms is used.

ID-No.	Designation	K		Minimum	Maximum	Unit
00001	NC cycle time	3		0.500	65.535	ms
00002	SERCOS cycle	3		0.500	65.535	ms
00017	List all op.data					
00036	Veloc. cmd.value	1		-100000.0000	100000.0000	rpm
00038	Pos. veloc.limit	0		0.0000	100000.0000	rpm
00039	Neg. veloc.limit	0		-100000.0000	0.0000	rpm
00041	Homing velocity	0		1.0000	100000.0000	rpm
00043	Veloc. polarity	0		0000h	0007h	
00049	Pos.posit. limit	0		-2147483648	2147483647	Incr.
00050	Neg.posit. limit	0		-2147483648	2147483647	Incr.
00055	Posit. polarity	0		0000h	0009h	
00057	In posit. window	0		0	65535	Incr.
00080	Torque cmd.value	1		-1000.0	1000.0	% MN
00082	Pos.torque limit	0		0.0	1000.0	% MN
00083	Neg.torque limit	0		-1000.0	0.0	% MN
00085	Torque polarity	0		0000h	0001h	
00096	Slave identifier	0		0000h	FEFEh	
00097	Mask st.class 2	0		0000h	FFFFh	
00098	Mask st.class 3	0		0000h	FFFFh	
00100	Veloc. gainKP	0		1	30000	
00101	Int.time veloc.	0		0.0	1000.0	ms/4
00103	Modulo value	0		1	4294967295	Incr.
00104	Position loop KV	0		20	30000	1/min
00110	Invert.peak curr	1		0.000	200.000	A
00111	Motor nom. curr.	1		0.000	200.000	A
00112	Invert.nom.curr.	1		0.000	200.000	A
00113	Max. motor speed	0		180.0000	100000.0000	rpm
00115	Posit.feedb.type	0		0000h	000Fh	
00116	Resol.mot.encod.	0		200	1280000	Incr.
00117	Resol.ext.encod.	0		0	4294967295	Incr.
00121	Gear input rev.	0		1	30000	Rev.
00122	Gear output rev.	0		1	30000	Rev.
00123	Feed constant	4		0.0000	429496.7295	mm/rev
00124	Zero veloc.wind.	0		0.0000	60000.0000	rpm

ID-No.	Designation	K		Minimum	Maximum	Unit
00125	Veloc. limit Nx	0		0.0000	100000.0000	rpm
00126	Torque limit Mdx	0		0.0	1000.0	% MN
00136	Positive accel.	0		1.000	60000.000	Rev/ss
00137	Negative accel.	0		-60000.000	-1.000	Rev/ss
00147	Homing par.	0		0000h	FFFFh	
00150	Reference offset	0		-2147483648	2147483647	Incr.
00153	Angle position	0		-2147483648	2147483647	Incr.
00154	Spindle pos.par.	0		0000h	FFFFh	
00157	Velocity window	0		1.0000	60000.0000	rpm
00158	Power limit Px	0		1	100000	VA
00159	Excess Error	0		0	32767	Incr.
00180	Spindle pos.rel.	0		-2147483648	2147483647	Incr.
00209	Low. adapt.limit	0		0.0000	100000.0000	rpm
00210	Upp. adapt.limit	0		0.0000	100000.0000	rpm
00211	Gain adaption	0		0.0	500.0	%
00212	Integr. adaption	0		0.0	500.0	%
00222	Spindl.pos.speed	0		1.0000	100000.0000	rpm
00225	Synchron par.	0		0000h	FFFFh	
00228	Angle syn.window	0		0	65535	Incr.
00230	Syn. pos. offset	0		-2147483648	2147483647	Incr.
00265	Language	0		0000h	0002h	
00268	Syn.angle posit.	0		-2147483648	2147483647	Incr.
00270	List temp. par.					
00278	Syn. add. posit.	0		-2147483648	2147483647	Incr.
32768	Nom.motor volt.	1		0.0	1000.0	V
32769	Magnet.curr. IM	1		0.000	200.000	A
32770	Magnet.curr. IM1	1		0.000	200.000	A
32771	Nom. torque	1		0.0	2000.0	Nm
32772	Nom. velocity	0		10.0000	100000.0000	rpm
32773	Service switch	0		00000000h	FFFFFFFFh	
32774	Rotor const. TR	3		0.0100	1.5000	s
32775	Pole number mot.	0		2	16	
32776	Motor enc.period	0		50	5000	
32777	Torque 10V [Va]	0		0.0	1000.0	% MN
32778	Speed 10V [Va]	0		0.0000	100000.0000	rpm
32779	Speed offs. [Va]	4		-100.0000	100.0000	rpm
32780	Accel. ramp	0		1.0	1200000.0	ms
32781	Decel. ramp	0		1.0	1200000.0	ms
32782	Ramp RF inactive	0		1.0	1200000.0	ms
32785	KU message 16	0		0	65535	
32786	KU message 32	0		0	65535	
32787	Source analog 1	0		0	4294967295	
32788	Final analog 1	0		-2147483648	2147483647	
32789	Source analog 2	0		0	4294967295	
32790	Final analog 2	0		-2147483648	2147483647	
32791	Source analog 3	0		0	4294967295	
32792	Final analog 3	0		-2147483648	2147483647	
32795	Source UE	0		0	65535	
32796	Source RF	0		0	65535	
32798	User list 1					
32799	Conf. peripherie	0		00000000h	FFFFFFFFh	

ID-No.	Designation	K		Minimum	Maximum	Unit
32800	AMK main op.mode	0		00000000h	FFFFFFFFh	
32801	AMK op. mode 1	0		00000000h	FFFFFFFFh	
32802	AMK op. mode 2	0		00000000h	FFFFFFFFh	
32803	AMK op. mode 3	0		00000000h	FFFFFFFFh	
32804	AMK op. mode 4	0		00000000h	FFFFFFFFh	
32805	AMK op. mode 5	0		00000000h	FFFFFFFFh	
32811	Ext.feedb.source	0		0	65535	
32813	Par.set 1	0		00000000h	FFFFFFFFh	
32821	Password	0		0	4294967295	
32846	Output port 1	0		0	65535	
32847	Port 1 bit 0	0		0	4294967295	
32848	Port 1 bit 1	0		0	4294967295	
32849	Port 1 bit 2	0		0	4294967295	
32850	Port 1 bit 3	0		0	4294967295	
32851	Port 1 bit 4	0		0	4294967295	
32852	Port 1 bit 5	0		0	4294967295	
32853	Port 1 bit 6	0		0	4294967295	
32854	Port 1 bit 7	0		0	4294967295	
32855	Output port 2	0		0	65535	
32856	Port 2 bit 0	0		0	4294967295	
32857	Port 2 bit 1	0		0	4294967295	
32858	Port 2 bit 2	0		0	4294967295	
32859	Port 2 bit 3	0		0	4294967295	
32860	Port 2 bit 4	0		0	4294967295	
32861	Port 2 bit 5	0		0	4294967295	
32862	Port 2 bit 6	0		0	4294967295	
32863	Port 2 bit 7	0		0	4294967295	
32864	Adr. Ausg.port 3	0		0	65535	
32865	Port 3 bit 0	0		0	4294967295	
32866	Port 3 bit 1	0		0	4294967295	
32867	Port 3 bit 2	0		0	4294967295	
32868	Port 3 bit 3	0		0	4294967295	
32873	Input port 1	0		0	65535	
32874	Port 1 bit 0	0		0	4294967295	
32875	Port 1 bit 1	0		0	4294967295	
32876	Port 1 bit 2	0		0	4294967295	
32877	Port 1 bit 3	0		0	4294967295	
32878	Port 1 bit 4	0		0	4294967295	
32879	Port 1 bit 5	0		0	4294967295	
32880	Port 1 bit 6	0		0	4294967295	
32881	Port 1 bit 7	0		0	4294967295	
32890	Puls multiplier	0		1	10	
32892	Pulse divider	0		65536	2147483647	
32893	Pulse multipl.	0		-2147483648	2147483647	
32922	Resid.dist.wind.	0		0	65535	Incr.
32925	AMK posit. par.	0		0000h	FFFFh	
32926	AMK homing par.	0		0000h	FFFFh	
32927	AMK syn. par.	0		0000h	FFFFh	
32928	Time filter 1	1		0.0	2000.0	ms
32929	Time filter 2	1		0.0	2000.0	ms
32935	Volt. standstill	1		0.0	1000.0	V

ID-No.	Designation	K		Minimum	Maximum	Unit
32940	High hom. veloc.	0		0.0000	100000.0000	rpm
32948	KU message 4x32	0		00000000h	FFFFFFFFh	
32952	Posit.syn.window	0		0	65535	Incr.
32953	Encoder type	0		0000h	FFFFh	
32954	Ramp down contr.	2		0.00	655.35	s
32955	Delay time	2		0.00	655.35	s
32956	Add. accel.value	0		4	255	
32959	Offset resolver	0		0	65535	Incr.
32960	Input M.enc.gear	0		1	65535	Rev.
32961	Outp. M.enc.gear	0		1	65535	Rev.
32968	Input port 2	0		0	65535	
32969	Port 2 bit 0	0		0	4294967295	
32970	Port 2 bit 1	0		0	4294967295	
32971	Port 2 bit 2	0		0	4294967295	
32972	Port 2 bit 3	0		0	4294967295	
32973	Port 2 bit 4	0		0	4294967295	
32974	Port 2 bit 5	0		0	4294967295	
32975	Port 2 bit 6	0		0	4294967295	
32976	Port 2 bit 7	0		0	4294967295	
32977	Input port 3	0		0	65535	
32978	Port 3 bit 0	0		0	4294967295	
32979	Port 3 bit 1	0		0	4294967295	
32980	Port 3 bit 2	0		0	4294967295	
32981	Port 3 bit 3	0		0	4294967295	
34000	Variable 0	0		-2147483648	2147483647	
34001	Variable 1	0		-2147483648	2147483647	
34002	Variable 2	0		-2147483648	2147483647	
34003	Variable 3	0		-2147483648	2147483647	
34004	Variable 4	0		-2147483648	2147483647	
34005	Variable 5	0		-2147483648	2147483647	
34006	Variable 6	0		-2147483648	2147483647	
34007	Variable 7	0		-2147483648	2147483647	
34008	Variable 8	0		-2147483648	2147483647	
34009	Variable 9	0		-2147483648	2147483647	
34010	Variable 10	0		-2147483648	2147483647	
34011	Variable 11	0		-2147483648	2147483647	
34012	Variable 12	0		-2147483648	2147483647	
34013	Variable 13	0		-2147483648	2147483647	
34014	Variable 14	0		-2147483648	2147483647	
34015	Variable 15	0		-2147483648	2147483647	
34016	Variable 16	0		-2147483648	2147483647	
34017	Variable 17	0		-2147483648	2147483647	
34018	Variable 18	0		-2147483648	2147483647	
34019	Variable 19	0		-2147483648	2147483647	
34020	List function					
34021	PID controller 1					
34022	Ramp 1					
34023	BUS addr. part.	0		0000h	FFFFh	
34024	BUS transm. rate	2		0.00	99000.00	
34025	BUS mode	0		0000h	FFFFh	
34026	BUS mode attrib.	0		0000h	FFFFh	

ID-No.	Designation	K		Minimum	Maximum	Unit
34027	BUS fail.charac.	0		0	65535	
34028	BUS output rate	0		0000h	03FFh	
34029	BUS status bits					
34030	ANP1 Cond. mod.					
34031	ANP2 Cond. mod					
34032	ANP3 Cond. mod					
34033	ANP4 Cond. mod					
34034	ANP5 Cond. mod					
34035	Ramp 2					

17 AZ 05 module exchange

Important information:

1. **MASTER SWITCH OFF. AWAIT DC BUS DISCHARGING TIME > 3 MINUTES !**
2. Swing open the AZ 05 module front cover with control panel AZB and disconnect X35.
3. Loosen strain relief for all AZ cables and disconnect all cables of possible option cards. Disconnect D-SUB connector X130 (and X129 and X132 at the top of the AZ 05 module, if used).
4. Loosen the ribbon cable connector X27 (BUS cable) by pressing the two locking clips to the left and unplug cable.
5. Disconnect fan connectors X23. For this loosen the latching at the narrow connector edge by pressing with your fingers.
6. Unscrew DC BUS connections UZP (red) and UZN (blue) at terminals X22.
7. Unscrew single wires for power input at terminals X01 (be aware of clear wire marking!).
8. If used: Disconnect external brake resistor (X21) and plug-in terminal block for associated PTC resistor (X24).
9. Unscrew PE connections at AZ module.
10. Loosen module fastening screws at the mounting panel.
11. Slightly lift the module and take it out towards you.
12. Insert the new AZ 05 module, lower it and securely tighten the fastening screws.
13. Draw out the option cards and the processor card AZ-R0x out of the just removed AZ module after loosening the fixing screws below the card grip. Insert the cards 1:1 into the slots of the new AZ module, securely tighten the fixing screws and connect the option card cables safely in the correct sockets.

Warning

Absolutely pay attention to:
Exchange of the processor card AZ-R0x is only permitted after consultation of the machine manufacturer and his release.

All system specific parameters are stored in the EEPROM on the processor card AZ-R0x. The machine manufacturer first has to load the actual and valid parameter set into the EEPROM of the new processor card before restart of the system. Also make sure, that the correct system software (EPROM) is used (equal or higher number of the software version). Non-observance of these instructions leads to functional problems, malfunction and machine damages!

14. Securely tighten PE connections at AZ module.
15. If used, securely connect brake resistor (X21) and insert plug-in terminal block X24.
16. Securely connect power input (X01) **according to the wire marking.**
17. Securely connect DC BUS UZP (red) and UZN (blue) at terminals X22.
18. Insert and latch fan connector X23.
19. Insert ribbon cable connector (BUS cable) from the following AW module in X27. For this raise the two locking clips slightly and then plug-in the connector carefully without force until the locking clips close.
20. Insert D-SUB connectors X130 and X131 (and also X129, X132 if used) into the respective sockets.

21. For strain relief fix all cables to the bases with cable ties. With shielded cables, carefully press screen onto the bare metal front plate, contact area as large as possible, through cable ties.
22. Connect AZB control panel through ribbon cable connector X35 and close AZ 05 front cover.
23. Main switch on. Restart.

18 Impressum

Title **PDK_025320_AZAW_Hardware_AZ05_en**

Objective **Hardware description central module AZ 05**

Part-Number **25320**

History

Date
2001/41

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To assure a fast and accurate response to solve customer problems we ask for your cooperation in providing us with the following information:

- Nameplate data
- Software version
- System configuration and application
- Description of problem and presumed cause of failure
- Diagnostic message (error code)

Publisher

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