S5
Handling Software

Operation and programming the AK30 via INTERBUS-S

Please keep for further use !

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Fonts

Italics and **bold** type are used for the title of a document or to emphasize text passages.

Passages written in `Courier` show text which is visible on the display as well as software menu selections.

"< >" refers to keys on your computer keyboard (e.g. <RETURN>).

Note

Text following the "NOTE" symbol describes important features of the respective product.

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Revision History

Note:
The cover of this document shows the current revision status and the corresponding date. Since each individual page has its own revision status and date in the footer, there may be different revision statuses within the document.

Document created: 02.07.1998

Revision	Date

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1 Introduction

This manual describes the handling software for programming axis parameters and reading position values of the AK30 for INTERBUS-S.
In the following the AK30 should be connected on the INTERBUS-S and the INTERBUS-S should be in operation correctly.
In the run up at first the INTERBUS-S is started and then AK30 handling software is called.
The elements of this handling are linked into OB20/21/22, OB1 and OB10/11/12/13 into the AG135U and the AG155U or the OB21/OB22, the OB1 and OB13 into the AG115U.
The elements are independent of the PLC-type because no system commands were employed.
For the handling exist two versions, one for the peripheral field (P-field) and one for the extended peripheral field (Q-field).
It is to be considered that no field overlap between P- and for Q-field is possible and that only the unit INTERBUS-DAB or DCB unit uses the addresses of this handling.

2 Scope of delivery

The handling software is delivered on a floppy disk of 3½" in DOS format.

3 Survey of the elements

The handling is delivered in two program files, one for the P-field, one for the Q-field and consists of the following elements:

for the P-field program file AK30P@ST.S5D

FB120 (AK.PROG)	Programming of the parameters for one axis
FB121 (AK.ISTW)	Read position value for one axis
FB122 (AK.PRST)	Programming of the Preset-value 1 or 2 for one axis
FB123 (AK.FEHL)	Error evaluation for all axes
FB124 (AK.INIT)	Start initialization
FB125 (AK.ZYK)	Cycle control
FB126 (AK.GBPR)	Programming

and for the Q-field program file AK30Q@ST.S5D

FB120 (AK.PROGQ)	Programming of the parameters for one axis
FB121 (AK.ISTWQ)	Read position value for one axis
FB122 (AK.PRSTQ)	Programming of the Preset-value 1 or 2 for one axis
FB123 (AK.FEHLQ)	Error evaluation for all axes
FB124 (AK.INITQ)	Start initialization
FB125 (AK.ZYKQ)	Cycle control
FB126 (AK.GBPRQ)	Programming

4 Start

With the start, the data interface in the data block DB120 (GBDB) must be initialized. For this purpose, in all start-OB´s you must call the FB124 (AK.INIT). During the restart it is possible to program one or several axes of the AK30. That facilitates an encoder exchange. The programming of the encoder occurs during the restart.

5 OB 1- cycle (cyclical program)

The programming of the encoder parameters occurs when the FB126 in the OB1 is called. Since the INTERBUS-S unit sends no output signals on the INTERBUS in the start routine, no programming is possible at the start. This must happen in the cycle. For programming the axes, the corresponding releasing marks and the operating mode mark (FB120.7) must be set. While programming the registration of the position value is blocked.
After programming, the FB125 resets the operating mode mark and unlocks the position value registration. If an error occurs while programming, the FB120 sets its error output (M123.0 - M123.3). If all axes are programmed, the error outputs are tested. If an output is set, error reading is carried out and the error messages are saved in the data block DB120 (GBDB). The error output is only reset by correct programming.

While programming it is recommended that all application programs are blocked. The alarms are blocked by the FB125 while programming.

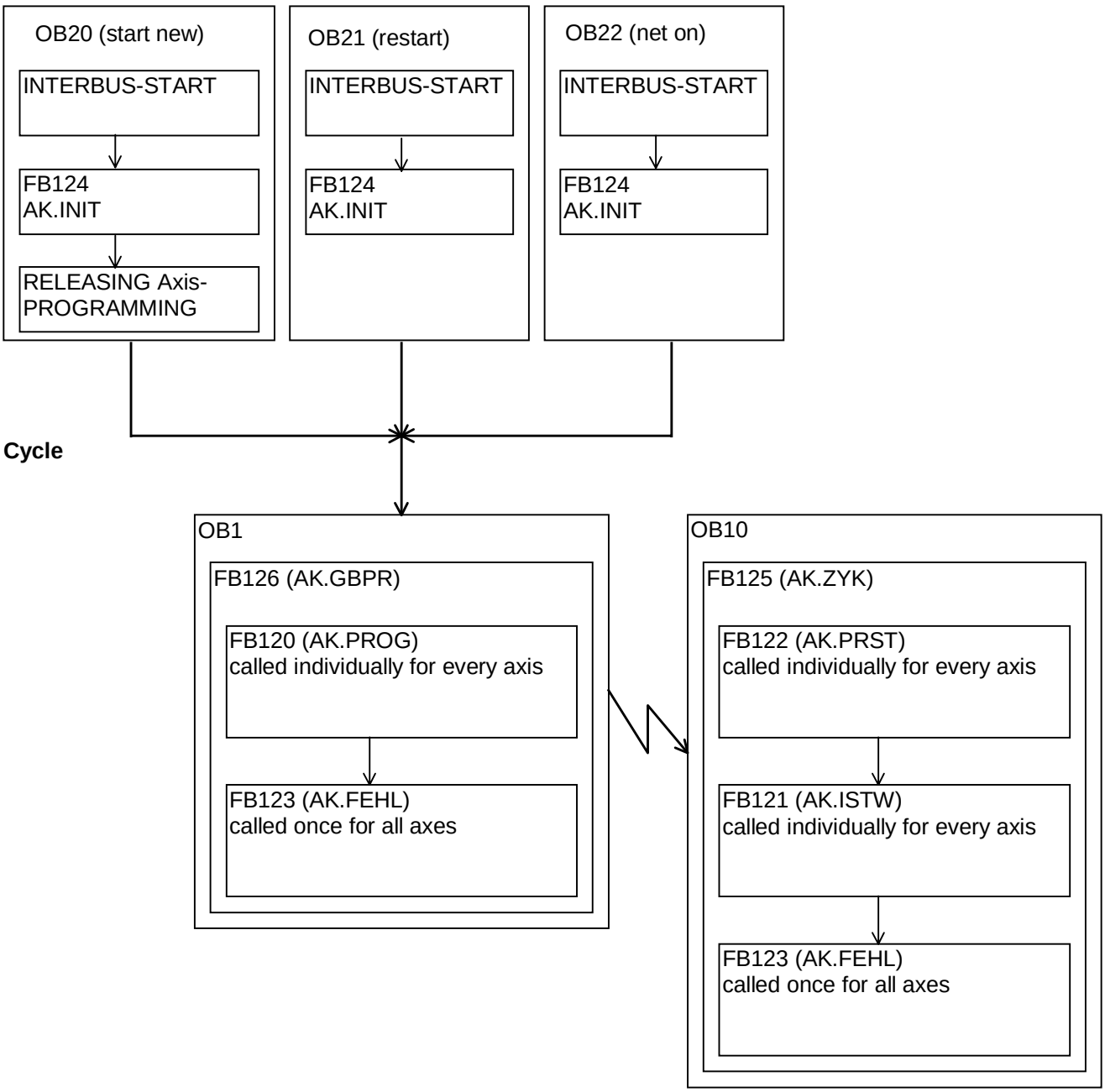
6 OB 10- cycle (time-controlled program)

The output of the preset values of the AK30 and the position value registration are executed in the time-OB. Therefore in the time-OB the FB125 is called. If an error occurs during the position value registration (error report of the AK30), the FB121 (AK.ISTW) sets his error output for the corresponding axis. If all position values are read, the error outputs are tested. If an output is set, error reading is carried out.

In the case of an error the application program must immediately stop the axis!

7 Functional overview

Start



Mark control

Handling still requires further marks except for some scrawling marks. These must not be employed by the PLC-program in any way:

M120.7 1=Programming mode and closing the position value registration and preset programming
0=Normal mode and closing programming

Programming mode

M120.0 Programming releasing axis 1
M120.1 Programming releasing axis 2
M120.2 Programming releasing axis 3
M120.3 Programming releasing axis 4

M123.0 Programming error axis 1
M123.1 Programming error axis 2
M123.2 Programming error axis 3
M123.3 Programming error axis 4

If one of the marks is set in the MB123, error reading is carried out for all axes.

Normal operation

M121.0 Error axis 1
M121.1 Error axis 2
M121.2 Error axis 3
M121.3 Error axis 4
M121.4 not used
M121.5 Collecting errors = releasing error reading (shows itself from OR-connection of the individual error marks)
M121.6 Status indicator "Error reading ready"
M121.7 Status indicator "Occurred error while error reading"

M122.0 Releasing preset transfer axis 1
M122.1 Releasing preset transfer axis 2
M122.2 Releasing preset transfer axis 3
M122.3 Releasing preset transfer axis 4

Individual encoders can be removed by handing over a different bit pattern on the formal operand MASK to the start element FB124 (AK.INIT). Changing the mask during the cycle can only be done by changing DW14 in data block DB120 (GBDB).

8 Reaction of the PLC application programm to error reports

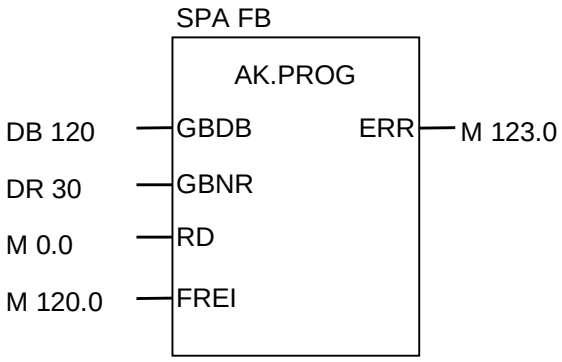
1. **Stop axis.**
2. Wait until status indicator "ready reading error " is set. In this case, all error messages from the AK are read-out once. If the cause is not yet repaired, error messages are registered again into the error buffers of the AK.
   With the first read-out of the error messages, the error bit and therefore the error mark of the axis is reset.
3. Display error number(s) from the data block GBDB.
4. Repair error.
5. To acknowledge the errors, the "ready for error reading " status mark is reset from the application program. As a result, a further error reading is activated. If the error cause was repaired, the entire sense byte must become zero and the application program can drive on with this axis again. If the error is not repaired, the AK30 will set again the error bit and the error read procedure begins new.

   If an error occurs while error reading, the AK30 ran into timeout or the INTERBUS is not in operating mode.

9 Formal operands

FB120 (AK.PROG)

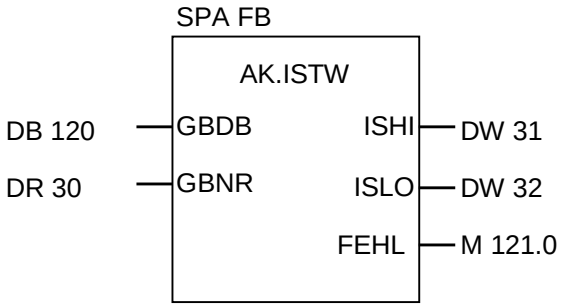
Programming the parameters of an axis.
The element transmits all axes particular parameter of an axis from the S5 into the AK30 or from the AK30 into the S5.



GBDB: Data block which contains the user interface
GBNR: Data byte with the encoder number (DR x in the data block GBDB)
RD: Direction mark for programming
0 = transfer of the parameters S5 → AK30
1 = transfer of the parameters AK30 → S5
FREI: Releasing mark for programming the axis
0 = programming locked
1 = programming unlocked
ERR: Error indication
0 = transfer successful
1 = timeout while programming

FB121 (AK.ISTW)

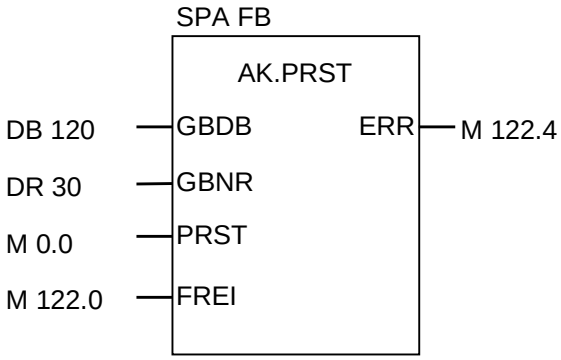
Reading the position value of an axis.
The element reads the position value of an axis from the peripheral or Q-field into a data block.



GBDB: Data block which contains the user interface
GBNR: Data byte with the encoder number (DR x in the data block GBDB)
ISHI: Data word, which contains the HI-Word of the position value
ISLO: Data word, which contains the LO-Word of the position value
FEHL: Error indication, if the AK has the error bit set

FB122 (AK.PRST)

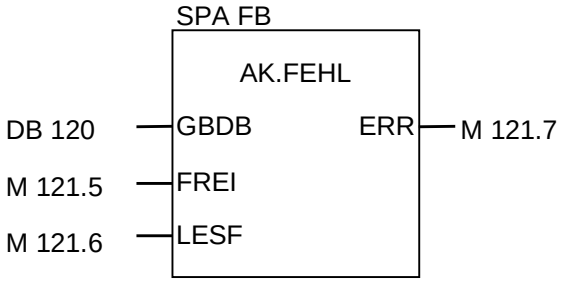
Programming the 1st or 2nd preset value of an axis



GBDB: Data block which contains the user interface
GBNR: Data byte with the encoder number (DR x in the data block GBDB)
PRST: Direction mark for programming
0 = transfer of the parameters S5 → AK30
1 = transfer of the parameters AK30 → S5
FREI: Releasing mark for programming the axis
0 = programming locked
1 = programming unlocked
ERR: Error indication
0 = transfer successful
1 = timeout while programming

FB123 (AK.FEHL)

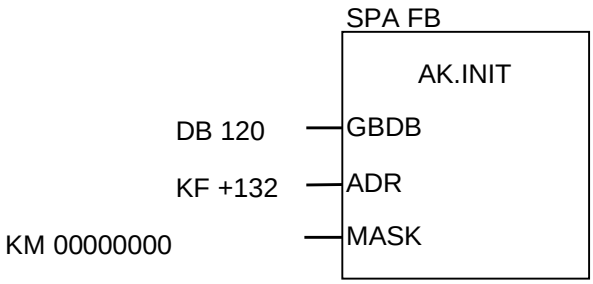
Error evaluation for all axes.
The element reads all pending error messages of all axes and all special errors from the AK and copies them into the error buffers in the data block GBDB.



GBDB: Data block which contains the user interface
FREI: Releasing mark
0 = error reading locked
1 = error reading unlocked
LESF: Signalling mark
0 = no error reading active or error reading not ready
1 = error reading finished, error messages are valid
ERR: Error indication
0 = transfer successful
1 = timeout while error reading

FB124 (AK.INIT)

Start initialization
The element deletes all old error messages, calculates the peripheral addresses of the individual axes and enters the addresses into the data block GBDB together with the encoder mask.

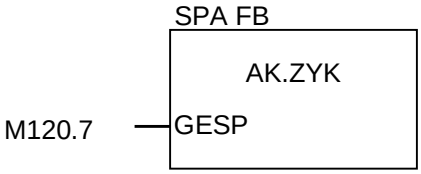


GBDB: Data block which contains the user interface
ADR: Base address of the first axis in the peripheral or Q-field
MASK: Encoder mask

FB125 (AK.ZYK)

Cycle control

It serves the position value registration and the preset programming as a platform.

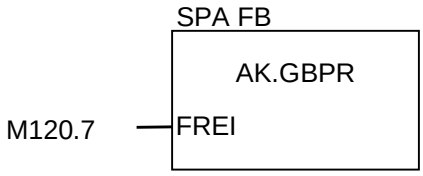


GESP: closure mark
0 = element is unlocked
1 = element is locked
While programming, the element is to be blocked. The employed closure mark must be the same as the releasing mark of the FB126 (AK.GBPR)

FB126 (AK.GBPR)

Programming

It serves for programming as a platform.



GESP: Releasing mark
0 = element is locked
1 = element is unlocked
During the position value registration, the element is to be blocked. The employed releasing mark must be the same as the closure mark of the FB125 (AK.ZYK)