

### **Festo\_Positioning\_Basic library – Messagesystem / Errorhandling**

Commissioning of a selected system with the Festo\_Positioning\_Basic library is explained step by step, so that it's successfully integrated into the user program.

FPosB

Title .....Festo\_Positioning\_Basic library – Messagesystem / Errorhandling  
Version ..... 1.30  
Document no. .... 100102  
Original .....en  
Author .....Festo

Last saved ..... 11.06.2021

## Copyright Notice

This documentation is the intellectual property of Festo SE & Co. KG, which also has the exclusive copyright. Any modification of the content, duplication or reprinting of this documentation as well as distribution to third parties can only be made with the express consent of Festo SE & Co. KG.

Festo SE & Co KG reserves the right to make modifications to this document in whole or in part. All brand and product names are trademarks or registered trademarks of their respective owners.

## Legal Notice

Hardware, software, operating systems and drivers may only be used for the applications described and only in conjunction with components recommended by Festo SE & Co. KG.

Festo SE & Co. KG does not accept any liability for damages arising from the use of any incorrect or incomplete information contained in this documentation or any information missing therefrom.

Defects resulting from the improper handling of devices and modules are excluded from the warranty.

The data and information specified in this document should not be used for the implementation of safety functions relating to the protection of personnel and machinery.

No liability is accepted for claims for damages arising from a failure or functional defect. In other respects, the regulations with regard to liability from the terms and conditions of delivery, payment and use of software of Festo SE & Co. KG, which can be found at [www.festo.com](http://www.festo.com) and can be supplied on request, shall apply.

All data contained in this document do not represent guaranteed specifications, particularly with regard to functionality, condition or quality, in the legal sense.

The information in this document serves only as basic information for the implementation of a specific, hypothetical application and is in no way intended as a substitute for the operating instructions of the respective manufacturers and the design and testing of the respective application by the user.

The operating instructions for Festo products can be found at [www.festo.com/sp](http://www.festo.com/sp).

Users of this document (application note) must verify that all functions described here also work correctly in the application. By reading this document and adhering to the specifications contained therein, users are also solely responsible for their own application.

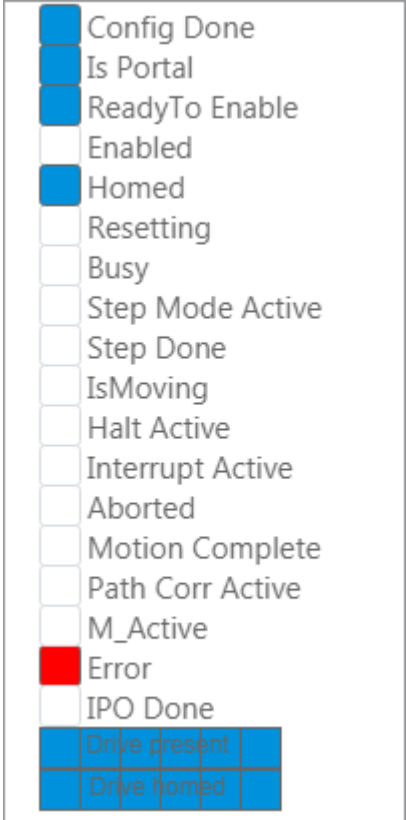
# Table of contents

- 1    **Message system / error handling ..... 5**
- 1.1    Diagnosis..... 6
- 1.2    Error Code Description ..... 8
- 1.3    Error Reaction..... 8
- 1.4    SMC\_Error ..... 8
- 1.5    CANOPEN\_KERNEL\_ERROR ..... 8
- 1.6    SDO\_ERROR ..... 9
- 1.7    Get Drive Error..... 9



# 1 Message system / error handling

The error bit is set in the event of an error.

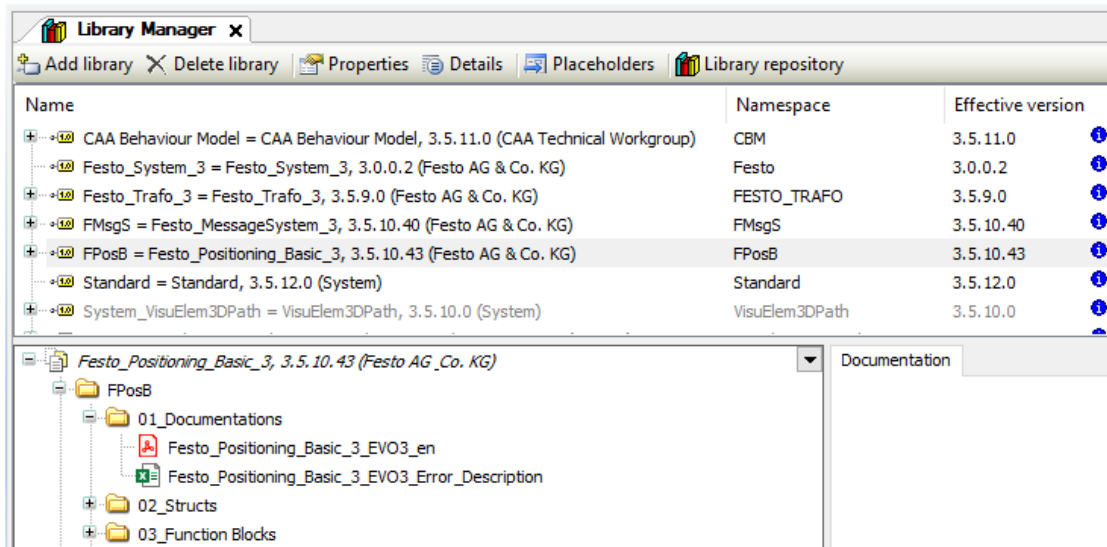
| Visualisation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Codesys                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
|  <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Config Done</li> <li><input checked="" type="checkbox"/> Is Portal</li> <li><input checked="" type="checkbox"/> ReadyTo Enable</li> <li><input type="checkbox"/> Enabled</li> <li><input checked="" type="checkbox"/> Homed</li> <li><input type="checkbox"/> Resetting</li> <li><input type="checkbox"/> Busy</li> <li><input type="checkbox"/> Step Mode Active</li> <li><input type="checkbox"/> Step Done</li> <li><input type="checkbox"/> IsMoving</li> <li><input type="checkbox"/> Halt Active</li> <li><input type="checkbox"/> Interrupt Active</li> <li><input type="checkbox"/> Aborted</li> <li><input type="checkbox"/> Motion Complete</li> <li><input type="checkbox"/> Path Corr Active</li> <li><input type="checkbox"/> M_Active</li> <li><input checked="" type="checkbox"/> Error</li> <li><input type="checkbox"/> IPO Done</li> <li><input checked="" type="checkbox"/> Drive present</li> <li><input checked="" type="checkbox"/> Drive homed</li> </ul> | <pre>g_stOut.xError = TRUE;</pre> |

In addition to setting the error bit, further information is made available in the diagnosis tab.

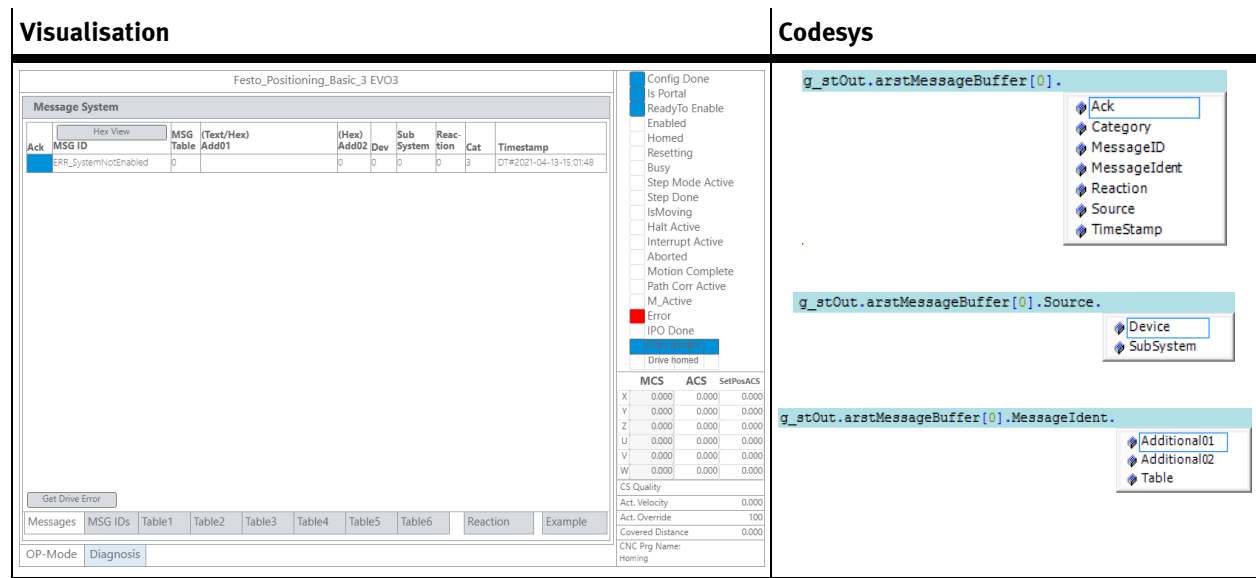
It appears in the visualisation, as well as in a buffer at the Codesys level to a given extent.

Reference is made to corresponding tables in Codesys, which are already implemented in the visualisation. It's the responsibility of the user to determine how this information will be further processed by his PLC.

The tables with the descriptions of the error codes can be found in an Excel file in the library:



## 1.1 Diagnosis



All of the information which helps to determine the cause of error can be found in the diagnosis tab. These data are also available at the Codesys level.

| Designation | Significance                                                                                                                                                                                                                         |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACK         | If this value is active (1), the respective message must be acknowledged by the user.                                                                                                                                                |
| MSG ID      | Represents the error code which is explained in the error code description.                                                                                                                                                          |
| MSG table   | Display with additional table including more detailed information (1-> SMC_ERROR; 2-> CANOPEN_KERNEL_ERROR; 3-> SDO_ERROR)                                                                                                           |
| Add01       | Error code for error table 1-3 in accordance with the MSG table                                                                                                                                                                      |
| Dev         | Number of the participant which has caused the error                                                                                                                                                                                 |
| Subsystem   | A number can be assigned to the kinematics here, so that the master controller receives information indicating which subsystem has caused the error (advisable when several kinematic systems are connected to a single controller). |
| Reaction    | Code in the error reaction table                                                                                                                                                                                                     |
| Cat         | Message category                                                                                                                                                                                                                     |

| <b>Designation</b> | <b>Significance</b>       |
|--------------------|---------------------------|
| Timestamp          | Timestamp for the message |

Table 1.1: Labelling

## 1.2 Error Code Description

| Diagnose        |          | Error Code Des... | Error Re: |   |
|-----------------|----------|-------------------|-----------|---|
| Device_Diagnose |          |                   |           |   |
| Ack             | MSG ID   | MSG Table         | Add01     | A |
| 1               | f0040040 | 0                 | 3         | 0 |

The MSG ID is reflected in the error code description. The value is displayed there for the user in clear text.  
In this case:

F0040040 = ERR\_CNCOutOfRange

This means that the CNC could not be started because the positions are outside of the kinematic system's working range.

## 1.3 Error Reaction

| Error Reaction | SMC_Error | SDO_ERROR |            |          |
|----------------|-----------|-----------|------------|----------|
|                |           |           |            |          |
| 01             | Add02     | Dev       | Sub System | Reaction |
|                | 0         | 0         | 0          | 160      |

The user is informed what should be checked in order to eliminate the error in the error reaction table.  
In this case:

160 = Check\_CNC\_Path

The path of the selected CNC is the cause of the error in this case. The user has to examine further details himself.

## 1.4 SMC\_Error

The error code from the Add01 column in the diagnosis tab appears in the SMC\_Error table. It represents the error in the soft motion modules.

## 1.5 CANOPEN\_KERNEL\_ERROR

The error code from the Add02 column in the diagnosis tab appears in the CANOPEN\_KERNEL\_ERROR table. It represents the CAN bus error.

## 1.6 SDO\_ERROR

The error code from the Add03 column in the diagnosis tab appears in the SDO\_ERROR table. It represents the SDO communication error.

## 1.7 Get Drive Error

It's possible now to get information about the specific error of each drive.  
Here we have an additional input called "Get Drive Error" (= xReadDriveError).

Festo\_Positioning\_Basic\_3

Message System

Hex View

| Ack | MSG ID               | MSG Table | (Text/Hex) Add01         | (Hex) Add02 | Dev | Sub System | Reaction | Cat | Timestamp              |
|-----|----------------------|-----------|--------------------------|-------------|-----|------------|----------|-----|------------------------|
|     | ERR_SwLimitExceeded  | 0         |                          | 0           | 2   | 0          | 180      | 3   | DT#2017-08-30-11:04:08 |
|     | ERR_PositioningError | 1         | SMC_MS_AXIS_IN_ERRORSTOP | 0           | 1   | 0          | 1000     | 3   | DT#2017-08-30-11:04:08 |
|     | ERR_DriveError       | 1         | SMC_DI_HWLIMITS_EXCEEDED | 0           | 1   | 0          | 210      | 3   | DT#2017-08-30-11:04:08 |

Get Drive Error

Messages MSG IDs Table1 Table2 Table3 Table4 Table5 Reaction Example

OP-Mode Diagnosis

Config Done  
Is Portal  
ReadyTo Enable  
Enabled  
Homed  
Resetting  
Busy  
Step Mode Active  
Step Done  
IsMoving  
Halt Active  
Interrupt Active  
Aborted  
Motion Complete  
Path Corr Active  
M\_Active  
**Error**  
IPO Done  
Drive Present  
Drive Homed

|   | MCS    | UCS    | WPCS    |
|---|--------|--------|---------|
| X | 15.397 | 15.397 | 7.842   |
| Y | -4.306 | -4.306 | -13.932 |
| Z | 2.839  | 2.839  | 2.839   |

CS Quality 1.000 1.000  
Act. Override 100  
CNC Prg Name:  
PTP

GVL\_Motion\_INOUT x

CPX\_CEC.Application.GVL\_Motion\_INOUT

| Expression            | Type                                  | Value    |
|-----------------------|---------------------------------------|----------|
| vOrigin1              | SMC_VECTOR3D                          |          |
| vPointOnX1            | SMC_Vector3D                          |          |
| vPointOnY1            | SMC_Vector3D                          |          |
| vOrigin2              | SMC_VECTOR3D                          |          |
| vPointOnX2            | SMC_Vector3D                          |          |
| vPointOnY2            | SMC_Vector3D                          |          |
| garSingleVar          | ARRAY [0..3] OF SMC_CNC.SMC_SingleVar |          |
| g_stIn                | FPosB.FPB_INPUT_DATA                  |          |
| eMOP                  | OP_MODE                               | ePTPMode |
| stCW                  | CONTROL_WORD                          |          |
| xEnable               | BOOL                                  | TRUE     |
| xReset                | BOOL                                  | FALSE    |
| xMovePositive         | BOOL                                  | FALSE    |
| xMoveNegative         | BOOL                                  | FALSE    |
| xStart                | BOOL                                  | TRUE     |
| xHalt                 | BOOL                                  | FALSE    |
| xQuickStop            | BOOL                                  | FALSE    |
| xAabort               | BOOL                                  | FALSE    |
| xEnablePathCorrection | BOOL                                  | FALSE    |
| xAckM                 | BOOL                                  | FALSE    |
| xAckAllM              | BOOL                                  | FALSE    |
| xEnableStepMode       | BOOL                                  | FALSE    |
| xNextStep             | BOOL                                  | FALSE    |
| xAckError             | BOOL                                  | FALSE    |
| xSetOpMode            | BOOL                                  | FALSE    |
| xAvoidAbortByError    | BOOL                                  | FALSE    |
| xReadDriveError       | BOOL                                  | FALSE    |

These errors are set to the top of the error list. In this example, we have a following error of our first device.

| Festo_Positioning_Basic_3 |                      |           |                            |             |     |            |          |     |                        |
|---------------------------|----------------------|-----------|----------------------------|-------------|-----|------------|----------|-----|------------------------|
| Message System            |                      |           |                            |             |     |            |          |     |                        |
| Hex View                  |                      |           |                            |             |     |            |          |     |                        |
| Ack                       | MSG ID               | MSG Table | (Text/Hex) Add01           | (Hex) Add02 | Dev | Sub System | Reaction | Cat | Timestamp              |
|                           | ERR_Motor_Controller | 4         | Following error monitoring | 8611        | 1   | 0          | 0        | 3   | DT#2017-08-30-11:04:29 |
|                           | ERR_SwLimitExceeded  | 0         |                            | 0           | 2   | 0          | 180      | 3   | DT#2017-08-30-11:04:08 |
|                           | ERR_PositioningError | 1         | SMC_MS_AXIS_IN_ERRORSTOP   | 0           | 1   | 0          | 1000     | 3   | DT#2017-08-30-11:04:08 |
|                           | ERR_DriveError       | 1         | SMC_DI_HWLIMITS_EXCEEDED   | 0           | 1   | 0          | 210      | 3   | DT#2017-08-30-11:04:08 |

It is also possible to change the view to HEX in the WebVisu.

| Festo_Positioning_Basic_3 |          |           |                  |             |     |            |          |     |                        |
|---------------------------|----------|-----------|------------------|-------------|-----|------------|----------|-----|------------------------|
| Message System            |          |           |                  |             |     |            |          |     |                        |
| Hex View                  |          |           |                  |             |     |            |          |     |                        |
| Ack                       | MSG ID   | MSG Table | (Text/Hex) Add01 | (Hex) Add02 | Dev | Sub System | Reaction | Cat | Timestamp              |
|                           | f0000030 | 4         | 8611             | 8611        | 1   | 0          | 0        | 3   | DT#2017-08-30-11:04:29 |
|                           | f0020060 | 0         | 0                | 0           | 2   | 0          | 180      | 3   | DT#2017-08-30-11:04:08 |
|                           | f0040060 | 1         | b7               | 0           | 1   | 0          | 1000     | 3   | DT#2017-08-30-11:04:08 |
|                           | f0010040 | 1         | b                | 0           | 1   | 0          | 210      | 3   | DT#2017-08-30-11:04:08 |

This message can be found in the stOut structure.

| GVL_Motion_INOUT x                   |                               |                      |
|--------------------------------------|-------------------------------|----------------------|
| CPX_CEC.Application.GVL_Motion_INOUT |                               |                      |
| Expression                           | Type                          | Value                |
| g_stOut                              | FPosB.FPB_OUTPUT_DATA         |                      |
| stSW                                 | STATUS_WORD                   |                      |
| uiActualOverride                     | UINT                          | 16#0064              |
| lrActualPathVelocity                 | LREAL                         | 10                   |
| arstSWLimitSwitch                    | ARRAY [1..6] OF LIMIT_SWITCH  |                      |
| arstActualDynamicACS                 | ARRAY [1..6] OF DYNAMIC       |                      |
| stActualPositionACS                  | CART_POS                      |                      |
| stActualPositionMCS                  | CART_POS                      |                      |
| stActualPositionJCS                  | CART_POS                      |                      |
| stActualPositionWPCS                 | CART_POS                      |                      |
| xIPOWorking                          | BOOL                          | FALSE                |
| iIPOStatus                           | SMC_INT_STATUS                | IPO_CONSTANT         |
| stIPOActSetPos                       | SM3_CNC.SMC_POSINFO           |                      |
| stActualTangent                      | SMC_VECTOR3D                  |                      |
| sActSelectedPrpName                  | STRING                        | 'PTP'                |
| eMoPDisplay                          | OP_MODE                       | ePTPMode             |
| eActiveKinematicType                 | KINEMATIC_TYPE                | eH_Gantry            |
| eActiveCS                            | COORDINATE_SYSTEM             | eMCS                 |
| stActiveCSData                       | CS_NEW                        |                      |
| lrQualityOfUCS                       | LREAL                         | 1                    |
| lrQualityOfWPCS                      | LREAL                         | 1                    |
| eSelectedAxis                        | AXIS                          | eX                   |
| stCncFunctions                       | CNC_FUNCTIONS                 |                      |
| stCncList                            | CNC_LIST                      |                      |
| stMostSignificantErrorMessage        | FMgs.MESSEGE                  |                      |
| arstMessageBuffer                    | ARRAY [1..16] OF FMgs.MESSEGE |                      |
| arstMessageBuffer[1]                 | FMgs.MESSEGE                  |                      |
| Timestamp                            | DATE_AND_TIME                 | DT#2017-8-30-11:4:29 |
| Category                             | CATEGORY                      | ERROR                |
| Ack                                  | BOOL                          | FALSE                |
| Reaction                             | UINT                          | 16#0000              |
| Source                               | SOURCE                        |                      |
| MessageID                            | DWORD                         | 16#F0000030          |

At least the Add02 message shows us, which error our device has.  
In this case it is 0x8611.

| Festo_Positioning_Basic_3 |          |           |                  |             |     |            |          |     |                        |
|---------------------------|----------|-----------|------------------|-------------|-----|------------|----------|-----|------------------------|
| Message System            |          |           |                  |             |     |            |          |     |                        |
| Hex View                  |          |           |                  |             |     |            |          |     |                        |
| Ack                       | MSG ID   | MSG Table | (Text/Hex) Add01 | (Hex) Add02 | Dev | Sub System | Reaction | Cat | Timestamp              |
|                           | f0000030 | 4         | 8611             | 8611        | 1   | 0          | 0        | 3   | DT#2017-08-30-11:04:29 |
|                           | f0020060 | 0         | 0                | 0           | 2   | 0          | 180      | 3   | DT#2017-08-30-11:04:08 |
|                           | f0040060 | 1         | b7               | 0           | 1   | 0          | 1000     | 3   | DT#2017-08-30-11:04:08 |
|                           | f0010040 | 1         | b                | 0           | 1   | 0          | 210      | 3   | DT#2017-08-30-11:04:08 |

|                      |                                |                        |
|----------------------|--------------------------------|------------------------|
| arstMessageBuffer    | ARRAY [1..16] OF FMsgS.MESSAGE |                        |
| arstMessageBuffer[1] | FMsgS.MESSAGE                  |                        |
| TimeStamp            | DATE_AND_TIME                  | DT#2017-8-30-11:4:29   |
| Category             | CATEGORY                       | ERROR                  |
| Ack                  | BOOL                           | FALSE                  |
| Reaction             | UINT                           | 16#0000                |
| Source               | SOURCE                         |                        |
| MessageID            | DWORD                          | 16#F0000030            |
| MessageIdent         | MESSAGE_IDENT                  |                        |
| Table                | MESSAGE_TABLE                  | 16#0004                |
| Additional01         | DWORD                          | 16#00008611            |
| Additional02         | DWORD                          | 16#00008611            |
| MessageText          | STRING(35)                     | 'ERR_MOTOR_CONTROLLER' |

The corresponding message to the displayed error on the display of the controller can be found in the description of each drive.

| Error group 17 |       | Following error monitoring |                                                                                                                                                                                                                |
|----------------|-------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| no.            | Code  | Message                    | Reaction                                                                                                                                                                                                       |
| 17-0           | 8611h | Following error monitoring | configurable                                                                                                                                                                                                   |
|                |       | Cause                      | Comparison threshold for the limit value of the following error exceeded.                                                                                                                                      |
|                |       | Action                     | <ul style="list-style-type: none"> <li>Enlarge error window.</li> <li>Parameterise acceleration to be less.</li> <li>Motor overloaded (current limiter from the I<sup>2</sup>t monitoring active?).</li> </ul> |