



Programmable Safety Systems PSS-Range

Press Upgrade Package
PSS SB EXZ
Item No. 20 214



The spirit of safety.

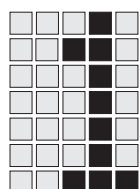
All rights to this manual are reserved by the publishers. Copies may be made for internal purposes.

While every effort has been made to ensure that the information in this manual is accurate, no responsibility can be accepted for errors or omissions contained within it.

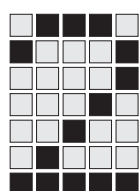
We reserve the right to amend specifications without prior notice. We are grateful for any feedback on the contents of this manual.

The names of products, goods and technologies used in this manual are trademarks of the respective companies.

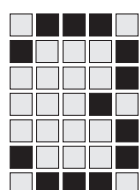
Contents



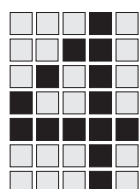
Introduction	1-1
Overview of manual	1-2
Terminology	1-3
Definition of symbols	1-4



Overview	2-1
Software Package	2-1
Range	2-2

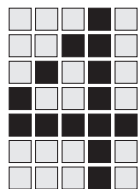


Safety	3-1
Intended use	3-1
Application areas	3-1
Standard function blocks and program blocks	3-1
Structure and program design	3-1
Approval procedure	3-2
Safety guidelines	3-2
Use of qualified personnel	3-3
Warranty and liability	3-3

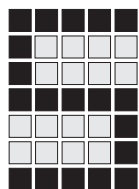


Basics	4-1
Set-up speed	4-1
Foot switch	4-1
Cam evaluation	4-2
Mechanical cam evaluation	4-2
Electronic cam evaluation	4-2
Cam types	4-3
Run-up cam (HL)	4-3
Overrun cam (NL)	4-3
Dynamic cam	4-4
Stop cam	4-4

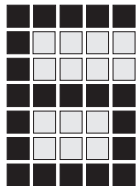
Contents



Cam layout	4-5
Press safety valve	4-6
Dynamically monitored press safety valves	4-6
Statically monitored press safety valves	4-6
Test pulses	4-7
Input devices	4-7
Monitoring for broken shearpins	4-8

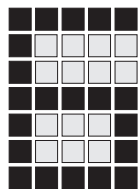


Function Description	5-1
Control concept	5-1
Function range	5-2
Safety devices	5-3
Operating modes	5-4
“Press OFF” mode	5-4
“Set-up without motor” mode	5-4
“Set-up” mode	5-5
“Single-stroke two-hand” mode	5-6
“Single-stroke foot” mode	5-7
“Automatic operation two-hand/foot” mode (continuous stroke)	5-8
“Single break with light curtain” mode	5-9
“Double break with light curtain” mode	5-10
Program structure	5-11
Program structure in OB 120	5-11
Standard function block SB 070	5-11
Function block FB 008	5-11
Program structure in OB 101	5-12
Function blocks	5-13
Program block PB 101	5-13
Administration data block DB 015	5-13
Fault diagnostics using display systems	5-14
Error evaluation blocks	5-14
Message text files	5-14

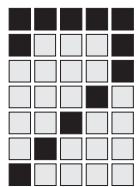


Standard Function Blocks	6-1
Reserved areas within the software package	6-1
FB 001: Press operating modes	6-2
Block header	6-2
Function	6-2
Input parameters	6-2
FB 002: Two-hand control device/foot switch	6-3
Block header	6-3
Function	6-3
Input parameters	6-3
FB 003: E-STOP/guard functions	6-4
Block header	6-4
Function	6-4
Input parameters	6-4
FB 004: General functions	6-6
Block header	6-6
Function	6-6
Input parameters	6-6
Output parameters	6-6
FB 005: Monitoring camshafts and shearpins	6-7
Block header	6-7
Function	6-7
Input parameters	6-7
FB 006: Press safety valve sequence	6-8
Block header	6-8
Function	6-8
Input parameters	6-8
Output parameters	6-8
FB 007: ESPE/AOPD	6-9
Block header	6-9
Function	6-9
Input parameters	6-9
Output parameters	6-9

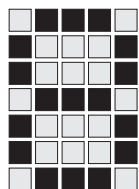
Contents



FB 008: Selecting press options	6-10
Block header	6-10
Function	6-10
Input parameters	6-10
FB 009: Electronic cam evaluation	6-15
Block header	6-15
Function	6-15
Input parameters	6-15

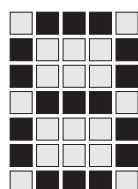


Parameters and Program Structure	7-1
Organisation block OB 101	7-1
Organisation block OB 120	7-1
PSS 3056-2 assignment list	7-2
Input assignment	7-2
Output assignment	7-3
Test pulse assignment	7-3
Parameters and structure of organisation block OB 101	7-4
Parameters and structure of organisation block OB 120	7-8
Example 1: Setting parameters on FB 008	7-8
Example 2: Setting parameters on FB 008	7-10

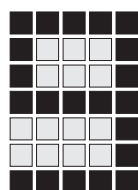


Assembly and Installation	8-1
PSS 3056-2 programmable safety system	8-1
Control elements on the eccentric press	8-1
Inputs/outputs on the PSS 3056-2	8-1
PSS input assignment	8-2
Operating mode selector switch	8-3
Foot switch	8-3
E-STOP button	8-3
Guard function	8-5
General guarding	8-5
Safety gate (movable safety device)	8-5

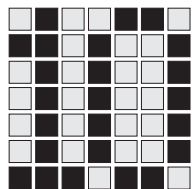
Contents



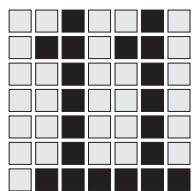
Mechanical camshaft	8-5
Electronic camshaft	8-6
Pulse detection monitoring for broken shearpins	8-8
ESPE/AOPD	8-8
Monitoring the feedback loop on the PSV	8-8
Dynamically monitored press safety valve	8-8
Statically monitored press safety valve	8-8
Speed monitoring on the drive motor	8-9
Side guarding	8-9
PSS output assignment	8-10
ESPE/AOPD	8-11
LEDs	8-11
Press safety valve	8-11
Controlling the drive motors	8-11



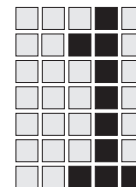
Commissioning	9-1
Start conditions	9-1
Commissioning the individual operating modes	9-3
Press OFF mode	9-3
Set-up press without motor mode	9-3
Set-up without motor with two-hand control device	9-3
Set-up without motor using 3-position foot switch	9-4
Press set-up mode	9-5
Set-up via two-hand control device	9-5
Set-up using 3-position foot switch	9-6
Single-stroke two-hand mode	9-7
Single-stroke foot mode	9-8
Automatic 2-hand mode (continuous stroke)	9-9
Automatic foot mode (continuous stroke)	9-10
Single break mode	9-11
Double break mode	9-12



Fault Diagnostics	10-1
Operating system faults	10-1
PSS reaction	10-1
Diagnosing operating system faults	10-1
Diagnostics via CPU display	10-1
Diagnostics via programming device	10-1
Additional diagnostic tools	10-2
Error messages on standard function blocks	10-2
PSS reaction	10-2
Diagnosing error messages on standard function blocks	10-2
Diagnostics via programming device	10-2
Additional diagnostic tools	10-4



Appendix	11-1
Current block versions	11-1
Standard function blocks in the MBS Eccentric Press package	11-1
Blocks in the press upgrade package	11-2
Organisation blocks	11-2
Function blocks	11-2
Program blocks	11-2
Data blocks	11-3
Approval certificate for press upgrade package	11-4



Introduction

This operating manual describes the software package used to upgrade eccentric presses in accordance with EC directive RL95/63/EG. The software package is designed to be used with the compact programmable safety system PSS 3056-2. The functionality and assignment of PSS inputs/outputs are pre-assigned in the press upgrade package.

Separate manuals are available for the compact programmable safety system PSS 3056-2: the "PSS 3056 Shortform" and the "Installation Manual" for the PSS 3056 series.

To fully understand this manual you will need to be conversant with the information found in the general documentation for the PSS-range (System Manual, Installation Manual for the compact PSS and Programming Manual).

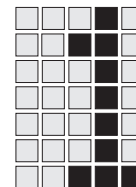
This manual is intended for instruction and should be retained for future reference.

Introduction

Overview of manual

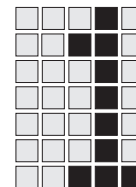
This manual is divided into the following chapters:

- 1 Introduction**
The introduction is designed to familiarise you with the contents, structure and specific order of this manual.
- 2 Overview**
This chapter provides information on the most important features of the software package and provides a brief overview of the application range.
- 3 Intended Use**
This chapter **must be read** as it contains important information on safety and intended use.
- 4 Basics**
This chapter explains the basic functions, configurations and safety requirements on an eccentric press.
- 5 Function Description**
The function description contains detailed information on how the software package operates.
- 6 Function Blocks**
This chapter explains the function of the input/output parameters on the function blocks.
- 7 Parameters**
This chapter documents the assignment of input/output parameters to pre-assigned I/Os on the PSS 3056-2.
- 8 Assembly and Installation**
Circuit diagrams are used to document how I/Os on the PSS 3056-2 are connected to periphery devices.
- 9 Commissioning**
This chapter provides a step-by-step account of the commissioning process.
- 10 Fault Diagnostics**
This chapter illustrates the various options for fault diagnostics.
- 11 Appendix**
The appendix contains various additional information.



Terminology

- In this manual, the term “active optoelectronic protection device” is frequently abbreviated to “AOPD”.
- In this manual, the term “electrosensitive protective equipment” is frequently abbreviated to “ESPE”.
- In this manual, the term “press safety valve” is frequently abbreviated to “PSV”.
- In this manual, the term “top dead centre” is frequently abbreviated to “TDC”. This term comes from the standard EN 692, 08/96.
- In this manual, the term “bottom dead centre” is frequently abbreviated to “BDC”. This term comes from the standard EN 692, 08/96.
- In this manual, the Pilz system software “PSS SW PG” is referred to as “programming device” or “PG”.



Introduction

Definition of symbols

Information in this manual that is of particular importance can be identified as follows:



DANGER!

This warning must be heeded! It warns of a **hazardous situation that poses an immediate threat of serious injury and death**, and indicates preventive measures that can be taken.



WARNING!

This warning must be heeded! It warns of a **hazardous situation that could lead to serious injury and death** and indicates preventive measures that can be taken.



CAUTION!

This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures that can be taken.



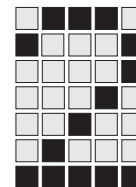
NOTICE

This describes a situation in which the unit(s) could be damaged and also provides information on preventive measures that can be taken.



INFORMATION

This gives advice on applications and provides information on special features, as well as highlighting areas within the text that are of particular importance.



Overview

Software Package

The software package “PSS SB EXZ” is used to upgrade eccentric presses with friction clutches to the safety requirements stated under EU directive RL95/63/EG.

It is used to:

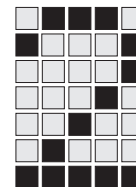
- Control the eccentric press
- Set the operating mode
- Evaluate the set operating mode
- Evaluate the different safety functions and protection devices
- Diagnose faults

The software package has enabled the requirements of the control and safety concept to be standardised to such an extent that, in the majority of applications, it can be used without any additional programming or changes.

The software package contains approved function blocks and program blocks. These organise the control and evaluation functions in the user program.

These blocks have partial access internally to approved standard function blocks which monitor safety functions.

Safety-related blocks in the software package are exclusively for use in the failsafe section of a programmable safety system in the PSS-range. Blocks for fault diagnostics are not safety-related and are used in the standard section of the PSS.



Overview

Range

The software package consists of:

- One CD
- One operating manual: Press Upgrade Package PSS SB EXZ

The CD contains:

Blocks:

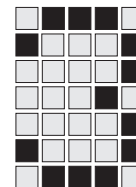
- Various approved standard function blocks (SBs from the MBS Eccentric Press package)
- Various approved function blocks (FBs from the Press Upgrade package)
- Various approved program blocks (PBs from the Press Upgrade package)
- Pre-prepared data block DB 015 (administration DB from the MBS Eccentric Press package)
- Pre-prepared organisation block OB 101 with default parameters on the FBs
- Pre-prepared organisation block OB 120 with default parameters on SB 070 and FB 008
- Standard function blocks from the “Error Evaluation” software package, including driver blocks for a text display

Message text files for fault diagnostics using a text display:

- Message text file for PX 30
- Message text file for PX 120

Documents (PDF files):

- Approval certificate
- Sample documentation for an approved press upgrade
- Operating manual: “Press Upgrade Package PSS SB EXZ”
- Operating manual “MBS Eccentric Presses”
- Operating manual “Error Evaluation”



Safety

Intended use

Application areas

The software package is designed for upgrading eccentric presses to the safety requirements stated under the EU machinery directive 98/37/EG (see approval certificate in the Appendix).



INFORMATION

This software package is exclusively for use on eccentric presses with friction clutches.

The software package is designed for use with the compact programmable safety system PSS 3056-2 from the PSS-range. The I/O allocation on the PSS 3056-2 is pre-assigned. Any allocation differing from the one given in this manual will be deemed as improper use. Any type of modification (e.g. adapting the software package to a programmable safety system from the PSS 3000 series) requires agreement from Pilz.



INFORMATION

This software package is suitable for use in safety-related applications. It must be used in the failsafe section of the PSS.

Use of the software package outside the specifications described here will be deemed as improper use.

Standard function blocks and program blocks

Several program blocks (PB) and standard function blocks (SB) in the software package are only accessed internally. For this reason, all SBs and PBs supplied with the package must be downloaded to the PSS 3056-2 with the project (PG).

Structure and program design

The functionality of the control concept has been tested and approved by a notified body (see approval certificate in the Appendix). This is why the structure and program design in OB 101 and OB 120 are pre-assigned. Changing the pre-assigned structure and program design will be deemed as improper use.

Safety

Approval procedure

The press upgrade package consists of the following components:

- Approved, encrypted function blocks and standard function blocks belonging to the software package
- Certified programmable safety system PSS 3056-2 (type approved)
- Approved control concept (declaration of conformity)

If the upgraded eccentric press requires complete approval in accordance with EU machinery directive 98/37/EG, pre-approved components will not require additional testing.

Safety guidelines

These safety guidelines are an important part of this operating manual. Failure to keep to these guidelines will render all warranty and liability claims invalid.

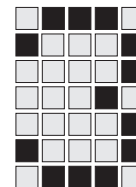
All rules and regulations for accident prevention relating to the specific area of application must be met. In particular, VDE and all local regulations regarding safety measures should also be taken into account. Please make sure you also read the information in the “Installation Manual” for the compact PSS.

You should also be familiar with the details provided in the PSS “Safety Manual” in the “System Manual” for the modular/compact PSS.



WARNING!

Please note: To achieve the corresponding category or requirement class (EN 954-1, 03/97 or DIN V 19250, 05/94), the whole system including all safety-related components (parts, devices, user program etc.) must be taken into account in the assessment. For this reason, Pilz cannot accept liability for the correct classification into a category or requirement class.



Use of qualified personnel

The package may only be assembled, installed, commissioned, operated, maintained and decommissioned by qualified personnel who, because they are

- Qualified electrical engineers
- Have received training from qualified electrical engineers

are suitably experienced to operate devices, systems, plant and machinery in accordance with the general standards and guidelines for safety technology.

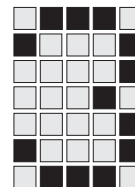
It is the company's responsibility only to employ personnel who:

- Are familiar with the basic regulations concerning health and safety / accident prevention
- Have read and understood the safety guidelines given in the manual
- Have read and understood the description of the functions given in this manual
- Are familiar with the requirements stated in the "Safety Manual" in the "System Manual" for the modular/compact PSS.

Warranty and liability

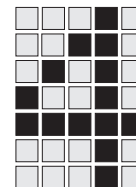
All claims to warranty and liability will be rendered invalid if:

- Function blocks are used contrary to the purpose for which they were intended
- Damage can be attributed to not having followed the guidelines in the manual
- Operating personnel are not suitably qualified.



Safety

Notes



Basics

Set-up speed

Specific safety measures are required for setting up the eccentric press. One of these safety measures is reduced speed in set-up mode. Safety requirements depend on the drive type. The following options are possible using the press upgrade package.

- Control via a separate drive motor or a separate winding on the drive motor
The reduced speed required for safety is achieved using the separate drive. The control relays (K1 and K2) must each be monitored via a feedback loop. Corresponding inputs on the PSS 3056-2 are reserved for this purpose.
- Control via a frequency converter
The reduced speed must also be evaluated for safety. This can be achieved using a safe speed monitor (e.g. a Pilz PDZ). A separate input on the PSS 3056-2 is reserved for this purpose.

Foot switch

It is also possible to use a foot switch to set up the eccentric press and to perform single strokes. In this case, special requirements must be met in the design and wiring of the foot switch.

- The foot switch **must** have three switch settings.
- The foot switch **must** be wired in such a way that:
 - **only** the middle setting triggers an enable
 - all other settings trigger a safety-related stopping of the press.

Basics

Cam evaluation

Normally the can signal on an eccentric press can be evaluated in two ways:

- Mechanical cam evaluation
- Electronic cam evaluation

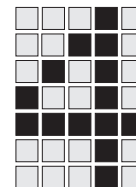
The type of cam evaluation to use must be established when the parameters are set. In addition, different inputs on the PSS 3056-2 are reserved for cam signals, depending on the type of cam evaluation used.

Mechanical cam evaluation

With mechanical cam evaluation, cams are evaluated via switches and contacts. In the following text, a camshaft with mechanical cam evaluation will be called a “mechanical camshaft” for short.

Electronic cam evaluation

With electronic cam evaluation, cams are evaluated via proximity switches. These proximity switches detect the mechanical cam and form the relevant signal. In this manual, a camshaft with electronic cam evaluation will be called an “electronic camshaft” for short.



Cam types

Mechanical and electronic camshafts can include the following cam types:

- Run-up cam
- Overrun cam
- Dynamic cam
- Stop cam



INFORMATION

The safe evaluation of a camshaft is performed with the run-up cam and overrun cam. Both these cams must be safety-related in design and their evaluation must also be safety-related.

Run-up cam (HL)

With mechanical camshafts, the wiring is monitored using test pulses.

With electronic camshafts, the evaluation must be dual-channel. The PSS 3056-2 monitors whether the two signals reach the same status within the preset synchronisation time. If the PSS 3056-2 detects different signals once the synchronisation time has elapsed, the press will be halted.

Overrun cam (NL)

With mechanical camshafts, the wiring is monitored using test pulses.

With electronic camshafts, the evaluation must be dual-channel. The PSS 3056-2 monitors whether the two signals reach the same status within the preset synchronisation time. If the PSS 3056-2 detects different signals once the synchronisation time has elapsed, the press will be halted.

Basics

Dynamic cam

A separate dynamic cam within the camshaft (electronic or mechanical) is only required on presses which have a variable number of strokes per minute and are driven via a frequency converter. The dynamic cam helps to ensure the eccentric press switches off correctly at TDC. The signal evaluation is not a safety-related function.

With mechanical camshafts, the wiring is monitored using test pulses. With electronic camshafts, single-channel evaluation is sufficient (test pulses are not required).

Stop cam

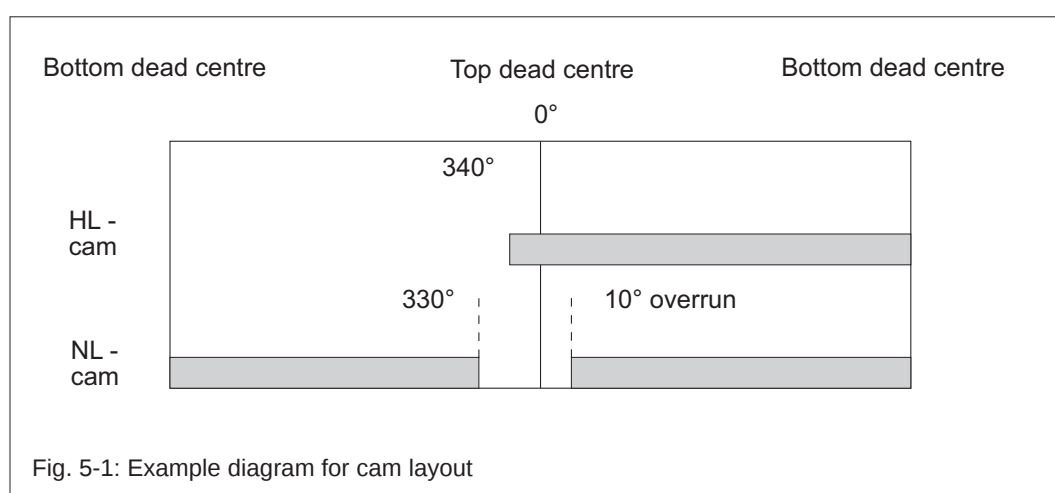
It is not absolutely necessary to have a stop cam in a camshaft (electronic or mechanical). In conjunction with the run-up cam, the stop cam generates the 3 stop pulses for “set-up” mode (see chapter entitled “Function Description”). If no separate stop cam is present, the overrun cam can be evaluated as the stop cam. The evaluation of the stop cam is not a safety-related function.

With mechanical camshafts, the wiring is monitored using test pulses. With electronic camshafts, single-channel evaluation is sufficient (test pulses are not required).



Cam layout

The layout of the cams for mechanical and electronic camshafts is identical. The run-up cam and overrun cam are required as a minimum for safety-related press operation.



Additional example diagrams for setting and evaluating camshafts can be found in the description of SB 074 in the operating manual for “MBS Eccentric Presses”.

Basics

Press safety valve

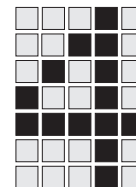
The press upgrade package requires the use of a dual valve, as similar switching characteristics can be assumed. The monitoring of a press safety valve will depend on its design. There are press safety valves for dynamic or static monitoring.

Dynamically monitored press safety valves

Press safety valves for dynamic monitoring have one feedback contact per valve coil. Using these feedback loops, the press safety valve is monitored during each operation, to ensure it is in the correct position. A separate input on the PSS 3056-2 is reserved for evaluating both feedback loops.

Statically monitored press safety valves

Due to their internal design, press safety valves for static monitoring can ensure that both valves always switch simultaneously. Any fault is signalled via an error output on the press safety valve. A separate input on the PSS 3056-2 is reserved for evaluating the error output.



Test pulses

In the case of signal inputs with infrequent operation, the function of these input devices can only be monitored under certain conditions. Faults that arise could remain undetected and therefore lead to an accumulation of errors. To avoid this, signal input devices with infrequent operation must be tested from category 2 onwards in accordance with EN 954-1. On the press upgrade package this is achieved using test pulses.

The PSS 3056-2 has available a number of test pulses at outputs T0 ... T3 and T8 ... T11. These are short pulses switching from “1” to “0” at a pre- defined point in each cycle. These test pulses are connected via inputs on the PSS 3056-2 and are evaluated by the operating system.



INFORMATION

The wiring and assignment of test pulses T0 ... T3 are pre-assigned in the press upgrade package. The wiring and assignment of test pulses T0 ... T3 **must** be carried out as documented in the chapter entitled “Assembly and Installation”.

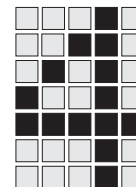
Input devices

From the technical safety standpoint, input devices for safety-related applications must either have normally closed contacts (E-STOP buttons, safety gate switches, feedback contacts etc.) or must be dual-channel and diverse (two-hand control device, foot switch etc.).



INFORMATION

The design of the input device is pre-set in the press upgrade package. It **must** correspond to the design documented (see chapter entitled “Assembly and Installation”).

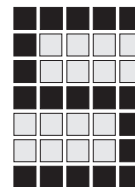


Basics

Monitoring for broken shearpins

A camshaft can be driven directly or indirectly. On camshafts that are driven indirectly a proximity switch **must** be used to monitor for broken shearpins.

A separate input on the PSS 3056-2 is reserved for monitoring the broken shearpin signal.



Function Description

Control concept

The control concept of the press upgrade package is built on a number of components. These components include:

- The PSS 3056-2 programmable safety system with fixed I/O assignment and wiring
- A number of standard function blocks from the “MBS Eccentric Press” package, to monitor safety devices
- A number of function blocks and program blocks to:
 - control the eccentric press
 - select and evaluate press functions
 - select and evaluate safety devices.
- A number of standard function blocks and drivers for fault diagnostics using a text display (option)

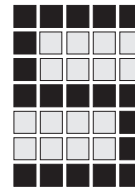
The program structure and cycle is also pre-determined, helping to make the software package universal and easy to use. This means there is no need for extensive user programs in the PSS. To a great extent the user program can be restricted to setting parameters for the function blocks.

Function Description

Function range

As eccentric presses vary both in function and in the type/range of safety devices they employ, a number of corresponding options are available within the software package. The actual function range required and available safety devices can be determined by setting parameters on the relevant function block. The software package has the following function range:

- Evaluation of operating modes via an operating mode selector switch
The following operating modes are available:
 - “press OFF” mode
 - two different set up modes
 - “single-stroke” mode
 - “continuous-stroke” mode (automatic)
 - two different cycle modes
- Evaluation of operating options
(either two-hand button or foot switch)
- Evaluation of safety devices on the eccentric press
(light curtain, safety gate etc.)
- Evaluation of camshaft
(either dynamic or electronic cam evaluation)
- Control of the drive
(either via a frequency converter, two drive motors or two separate windings on the drive motor)
- Control and evaluation of press safety valves
(either dynamic or static monitoring of valves)
- Fault diagnostics



Safety devices

The software package provides the evaluation of a number of safety devices as pre-defined functions. The pre-set assignment and wiring of the relevant PSS 3056-2 inputs are documented in the chapter entitled “Assembly and Installation”.

The following safety devices are available:

- E-STOP button
- Guard function (e.g. start-up disabler)
- General guard function (e.g. air pressure monitor)
- Side guard (e.g. safety gate)
- ESPE/AOPD (e.g. light curtain)
- Feedback loops
 - press safety valve
 - “motor ON”
 - speed monitoring
 - “reduced speed”



INFORMATION

Please note that the evaluation of the following safety devices is **always** activated in **all** operating modes, even if some safety devices have been intentionally deactivated in some operating modes.

- E-STOP
- “Guard function”
- “General guard function”

Function Description

Operating modes

The software package provides a number of pre-defined operating modes. Differing requirements on the function range of eccentric presses may mean that the use of some operating modes is optional.

“Press OFF” mode

The eccentric press is in rest condition. In this operating condition, it is impossible to either start the motor or switch the press safety valves. The functionality of the E-STOP button is tested.

“Set-up without motor” mode

In this operating mode the eccentric press drive **cannot** be switched on.

“Set-up without motor” mode can be used with two types of operating device:

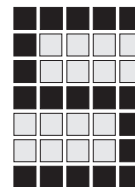
- Two-hand control device or
 - Foot switch
- The foot switch **must** have three switch settings.

The operating device must be selected via parameters (FB 008).

The press safety valve can be switched by pressing the operating device (two-hand control or foot switch). As long as the press safety valve is switched on, it will be possible to move the press using a manual drive on the press slide.

In this operating mode, the following active safety devices are evaluated:

- E-STOP
- “Guard function”
- “General guarding”



“Set-up” mode

In this operating mode, the eccentric press is operated at reduced speed (see chapter entitled “Basics”, section on “Set-up speed”).

In this operating mode, the following active safety devices are evaluated:

- E-STOP
- “Guard function”
- “General guarding”

“Set-up” mode uses “3-stop mode” as an additional safety measure. “3-stop mode” prevents the eccentric press from performing a complete stroke. “Set-up” mode can be used with two types of operating device:

- Two-hand control device or
 - Foot switch
- The foot switch **must** have three switch settings.

The operating device must be selected via parameters (FB 008). The cycle in “3-stop mode” is as follows:

- Operating device is pressed (two-hand control or foot switch)
- Press starts downward movement
- 1st stop pulse is generated shortly after leaving TDC and downward movement is halted
- Press movement only restarted by releasing and re-pressing the operating device
- Downward movement continues to BDC and then upward movement begins
- 2nd stop pulse is generated shortly before reaching TDC and upward movement is halted
- Press movement only restarted by releasing and re-pressing the operating device
- 3rd stop pulse is generated when TDC is reached and upward movement is halted

Function Description

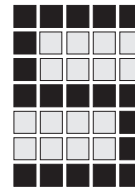
“Single-stroke two-hand” mode

In this operating mode the press is operated at press speed. A single press stroke is performed (TDC→BDC→TDC). A two-hand control unit is used as the operating device. “Single-stroke two-hand” mode operates as follows:

- Operating device is pressed, thereby switching the press safety valve
- Downward movement of eccentric press
The operating device can be used to interrupt the downward movement.
- When BDC is reached, the press automatically travels back to TDC. The operating device cannot be used to interrupt the upward movement.
- Automatic stop when TDC is reached
The press will also be stopped if the operating device is constantly pressed.
- A new press stroke is triggered by releasing and re-pressing the operating device

In this operating mode, the following active safety devices are evaluated:

- E-STOP
- “Guard function”
- “General guarding”
- “Side guarding”



“Single-stroke foot” mode

In this operating mode the press is operated at press speed. A single press stroke is performed (TDC→BDC→TDC). A foot switch is used as the operating device. “Single-stroke foot” mode operates as follows:

- Operating device is pressed, thereby switching the press safety valve
- Downward movement of eccentric press
The operating device can be used to interrupt the downward movement.
- When BDC is reached, the press automatically travels back to TDC. The operating device cannot be used to interrupt the upward movement.
- Automatic stop when TDC is reached
The press will also be stopped if the operating device is constantly pressed.
- A new press stroke is triggered by releasing and re-pressing the operating device.



INFORMATION

A light curtain must be used as safety device if you are using “Single-stroke foot” mode. The light curtain **must** undergo a function test before the first press stroke is performed.

In this operating mode, the following active safety devices are evaluated:

- E-STOP
- “Guard function”
- “General guarding”
- “Side guarding”
- Light curtain
- Safety gate

Function Description

“Automatic operation two-hand/foot” mode (continuous stroke)

In this operating mode the press is operated at press speed. Once the press start signal has been given, press strokes will continue until a press stop signal is triggered.

Either a two-hand control or a foot switch can be used as the operating device to start the process. An input (E2.05) on the PSS 3056-2 is reserved for making the selection. The selection can only be enabled via an FS PSS cold start (FS section switching from STOP to RUN). This selection cannot be modified while the press is operating.

There are two options for switching off the continuous stroke of the press:

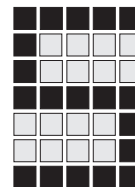
- “Stop continuous stroke” command via the operating device
An input on the PSS 3056-2 is reserved for connecting the “Stop at end of cycle” button as the operating device. When you switch off the press using this operating device, the press stroke will continue to TDC and then the press will stop (stop at end of cycle).
- “Stop continuous stroke” command via a safety device
When the press is switched off because a safety device has energised, the press will stop immediately.

One of the following pieces of safety equipment is required with automatic mode:

- Non-safe tool with appropriate safety devices
- Safe tool

In this operating mode, the following active safety devices are evaluated:

- E-STOP
- “Guard function”
- “General guarding”
- “Side guarding”
- Light curtain
- Safety gate



“Single break with light curtain” mode

In this operating mode the press is operated at press speed. A single press stroke is performed (TDC→BDC→TDC). “Single break with light curtain” mode operates as follows:

- Start light curtain in “single break mode”
 - if the light curtain is already active:
reset
 - if the light curtain is **not** active:
function test and then reset
- Reset:
Press the reset button
Function test:
Break the protected field - Clear protected field - Reset
- The press stroke is started by a single break of the light curtain. The protected field is active until the press stroke is complete. If the light curtain is broken, the press will stop immediately.
 - A single press stroke is performed
 - Switch to a different mode
The switch to “single mode foot” must be followed by a reset.



INFORMATION

An output on the PSS 3056-2 is reserved for displaying single break mode. The LED on the output will light as soon as the light curtain is in “single break mode” and the PSS 3056-2 is ready for the single break.

In this operating mode, the following active safety devices are evaluated:

- E-STOP
- “Guard function”
- “General guarding”
- “Side guarding”
- Light curtain
- Safety gate

Function Description

“Double break with light curtain” mode

In this operating mode the press is operated at press speed. A single press stroke is performed (TDC→BDC→TDC). “Double break with light curtain” mode operates as follows:

- Start light curtain in “double break mode”
 - if the light curtain is already active:
reset
 - if the light curtain is **not** active:
function test and then reset
- Reset:
Press the reset button
Function test
Break the protected field→Clear protected field→Reset
- The press stroke is started by a double break of the light curtain. The protected field is active until the press stroke is complete. If the light curtain is broken, the press will stop immediately.
- A single press stroke is performed
- Switch to a different mode
The switch to “single mode foot” must be followed by a reset.

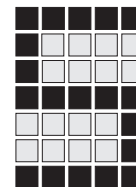


INFORMATION

An output on the PSS 3056-2 is reserved for displaying double break mode. The LED on the output will light as soon as the light curtain is in “double break mode” and the PSS 3056-2 is ready for the first break.

In this operating mode, the following active safety devices are evaluated:

- E-STOP
- “Guard function”
- “General guarding”
- “Side guarding”
- Light curtain
- Safety gate

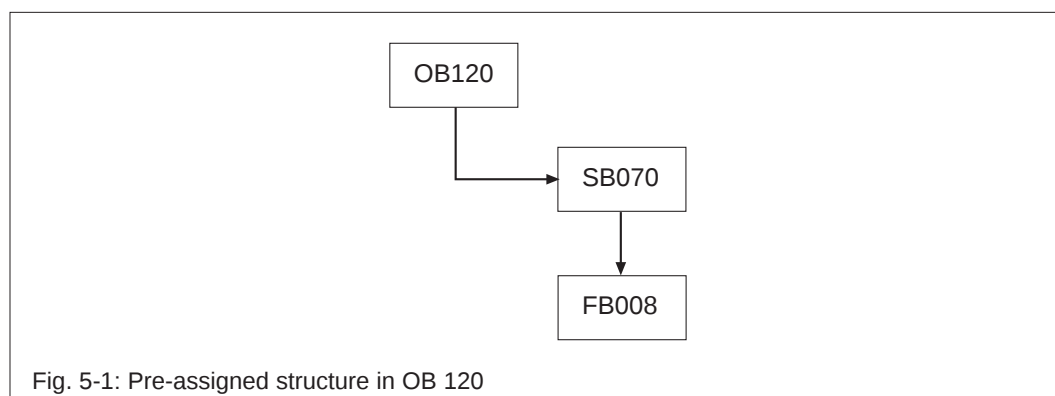


Program structure

The software package includes pre-prepared organisation blocks for OB 120 and OB 101. The documented structures and program cycles are fixed and may not be modified.

Program structure in OB 120

OB 120 is run once when the FS section of the PSS is cold and warm started. This means that the settings made through the parameters are transferred once only.



Standard function block SB 070

SB 070 is included in the software package. The input parameters on SB 070 establish the values of a number of global parameters, which are required to initialise the standard function blocks supplied with the package. SB 070 is pre-assigned default values. It is not normally necessary to change the pre-assigned values. A detailed description of SB 070 can be found in the operating manual for “MBS Eccentric Presses”.

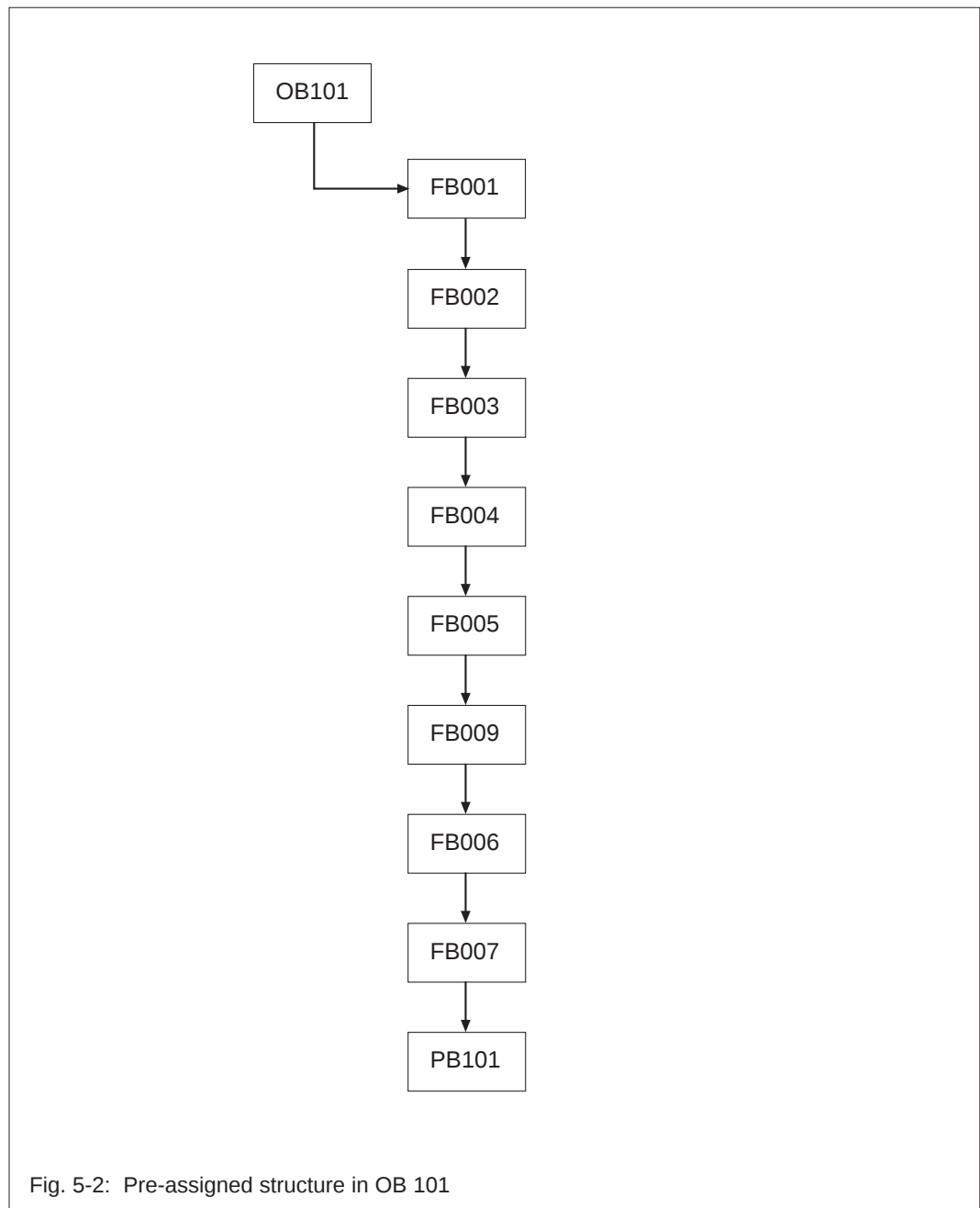
Function block FB 008

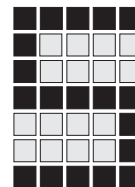
The actual function range of the eccentric press is established by the parameters set on FB 008.

Function Description

Program structure in OB 101

OB 101 is run in each program cycle. This means that the settings made through the parameters will be processed in each program cycle.





Function blocks

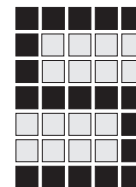
Function blocks in OB 101 are pre-assigned I/O addresses on the PSS 3056-2. They access a number of standard function blocks internally.

Program block PB 101

PB 101 organises the program cycle of the press controller. The cycle is established from the evaluation of enable links from the standard function blocks.

Administration data block DB 015

Administration block DB 015 is a permanently specified component when using standard function blocks in the modular block system (MBS). Standard function blocks use DB 015 to store error messages. The operating manual “MBS Eccentric Presses” contains a detailed description of the structure and contents of administration block DB 015.



Function Description

Fault diagnostics using display systems

A text display or operator terminal can be connected to the user interface on the PSS 3056-2 for enhanced fault diagnostics.

Error evaluation blocks

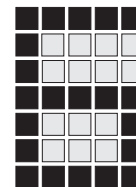
The enclosed software package contains a number of driver blocks as well as blocks from the “Error Evaluation” package. These are required in order to:

- Control the PSS cycle (standard section)
- Initialise the user interface
- Drive the text display (message texts)

Further information can be found in the “Error Evaluation” manual supplied with the software package.

Message text files

Message text files are available for certain Pilz display systems (e.g. PX 30, PX 120). These message text files correspond to the messages in the error stack and the standard function blocks for “MBS Eccentric Presses”. They are included within the package.



Function Blocks

Standard function blocks

Several of the package's function blocks and program blocks access standard function blocks from the "MBS Eccentric Press" package internally. The software package contains all the standard function blocks you will require. For further information on the standard function blocks please refer to the "MBS Eccentric Press" manual which is included with the package.



INFORMATION

The "MBS Eccentric Press" manual will also contain descriptions of standard function blocks that are not included in this software package. These standard function blocks have no relevance for the functionality of this package.

Reserved areas within the software package

Function blocks and standard function blocks in this software package use a number of different flags, counters and timers internally. These flags, counters and timers can therefore be regarded as reserved areas. This refers to the following:

Flag range:	M 64.00 ... M 85.31
Counter range:	Z 64 ... Z 70
Timers:	on an electronic camshaft: T 70, T 71, T 72, T 73, T 80



CAUTION!

Do not use any of these areas for your own applications. The use of timers, flags and counters from these reserved areas may lead to malfunctions.

Function Blocks

FB 001: Press operating modes

Block header

FB 001 BA Press	
X	BaS1
X	BaS2
X	BaS3
X	BaS4
X	BaS5
X	BaS6
X	BaS7
X	BaS8
W	Time

Function

FB 001 transmits signals from the operating mode selector switch to standard function block SB 051 for evaluation. A description of SB 051 can be found in the “MBS Eccentric Press” manual. The input parameters are pre-assigned.

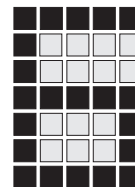
Input parameters

- *BaS1 ... BaS8*: Switch levels from operating mode selector switch
On each position of the selector switch, a 1-signal must be present at one switch contact only.

Input coding of selector switch (mode 1 from 8):

Position	<i>BaS8</i>	<i>BaS7</i>	<i>BaS6</i>	<i>BaS5</i>	<i>BaS4</i>	<i>BaS3</i>	<i>BaS2</i>	<i>BaS1</i>	Dec.Value
1	0	0	0	0	0	0	0	1	1
2	0	0	0	0	0	0	1	0	2
3	0	0	0	0	0	1	0	0	4
4	0	0	0	0	1	0	0	0	8
5	0	0	0	1	0	0	0	0	16
6	0	0	1	0	0	0	0	0	32
7	0	1	0	0	0	0	0	0	64
8	1	0	0	0	0	0	0	0	128

- Time: Maximum permitted contact switchover time between two correct switch settings (default parameter: 1023 ms)
Permitted time range: 1 ... 1023 ms



FB 002: Two-hand control device/foot switch

Block header

FB 002 Hand/Fuß	
X -	Ha1O
X -	Ha1S
X -	Ha2O
X -	Ha2S
X -	FußO
X -	FußS
X -	2H/F

Function

FB 002 transmits signals from the operating devices to standard function block SB 059 for evaluation. A description of SB 059 can be found in the “MBS Eccentric Press” manual. The input parameters are pre-assigned.

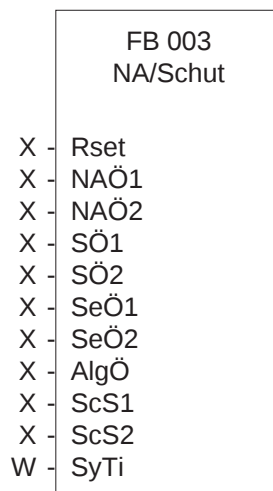
Input parameters

- *Ha1Ö*: Input parameter for N/C contact two-hand button left
- *Ha1S*: Input parameter for N/O contact two-hand button left
- *Ha2Ö*: Input parameter for N/C contact two-hand button right
- *Ha2S*: Input parameter for N/O contact two-hand button right
- *FußÖ*: Input parameter for N/C contact foot switch
- *FußS*: Input parameter for N/O contact foot switch
- *2H/F*: Selection of operating device in automatic mode (two-hand control device or foot switch)
The selection is made via the wiring at input E 2.05 and is only enabled when the FS section of the PSS is cold or warm started.
2H/F = unwired: foot switch selected
2H/F = 24 V signal from test pulse output: two-hand control device selected

Function Blocks

FB 003: E-STOP/guard functions

Block header



Function

FB 003 transmits signal from a number of different safety devices to the respective standard function blocks.

E-STOP button: SB 061

“Guard function”: SB 061

“General guarding”: SB 061

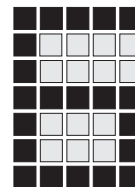
“Side guarding”: SB 061

Safety gate: SB 066

A description of SB 061 and SB 066 can be found in the “MBS Eccentric Press” manual. The input parameters are pre-assigned.

Input parameters

- *Rset*: Input parameter for reset button
- *NAÖ1*: Input parameter for E-STOP button N/C contact 1
- *NAÖ2*: Input parameter for E-STOP button N/C contact 2
- *SÖ1*: Input parameter for guarding N/C contact 1
- *SÖ2*: Input parameter for guarding N/C contact 2
- *SeÖ1*: Input parameter for side guarding N/C contact 1
- *SeÖ2*: Input parameter for side guarding N/C contact 2

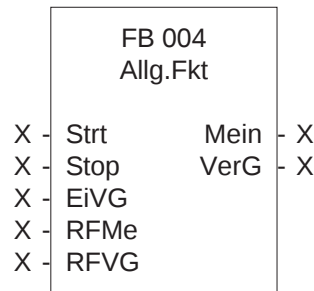


-
- *AlgÖ*: Input parameter for general guarding N/C contact
 - *ScS1*: Input parameter for safety gate switch 1 (contact 1)
 - *ScS2*: Input parameter for safety gate switch 2 (contact 2)
 - *SyTi*: Permitted switch or contact synchronisation time between the two signals at *ScS1* and *ScS2*.
Permitted time parameters:
SyTi = 0: unlimited time
(for default parameters, see chapter entitled
"Parameters and Program Structure")
SyTi = 1 ... 30000: time in ms

Function Blocks

FB 004: General functions

Block header



Function

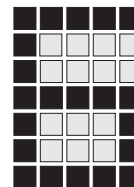
FB 004 transmits signals from the input and output parameters to the relevant places in the user program. It organises the program cycle for motor start/stop, operating speed/reduced speed in set-up mode, monitoring reduced set-up speed and feedback loop monitoring on the drive motor relays. The input and output parameters are pre-assigned.

Input parameters

- *Strt*: Input parameters for start button, motor
- *Stop*: Input parameter for stop button, motor
- *EiVG*: Input parameter for monitoring reduced speed in set-up mode
- *RFMe*: Input parameter for N/C contact, feedback loop "motor on"
- *RFVG*: Input parameter for N/C contact, feedback loop "reduced speed"

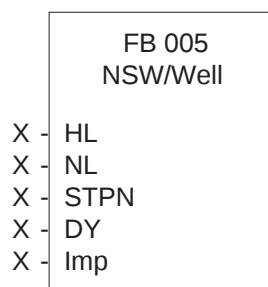
Output parameters

- *Mein*: Output parameter for "motor on"
- *VerG*: Output parameter for "reduced speed" in set-up mode



FB 005: Monitoring camshafts and shearpins

Block header



Function

FB 005 transmits signals for monitoring the camshaft and monitoring for broken shearpins to the relevant standard function blocks.

Camshaft: SB 074

Monitoring for broken shearpins: SB 077

A description of SB 074 and SB 077 can be found in the “MBS Eccentric Press” manual. The input parameters are pre-assigned.

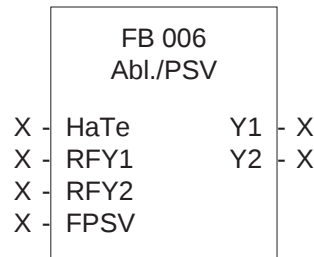
Input parameters

- *HL*: Input parameter for signal from run-up cam
- *NL*: Input parameter for signal from overrun cam
- *STPN*: Input parameter for signal from stop cam
- *DY*: Input parameter for signal from dynamic cam
- *Imp*: Input parameter for signal from broken shearpin initiator

Function Blocks

FB 006: Press safety valve sequence

Block header



Function

FB 006 transmits the signals necessary to drive the press safety valve. It transfers the corresponding signals to standard function blocks SB 056 and SB 080.

Stop at end of cycle: SB 056

Feedback loops: SB 080

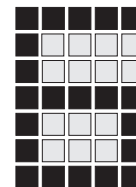
A description of SB 056 and SB 080 can be found in the “MBS Eccentric Press” manual. The input and output parameters are pre-assigned.

Input parameters

- *HaTe*: Input parameter for “stop at end of cycle”
- *RFY1*: Input parameter for feedback loop PSV Y1
- *RFY2*: Input parameter for feedback loop PSV Y2
- *FPSV*: Input parameter for the error contact on a statically monitored press safety valve

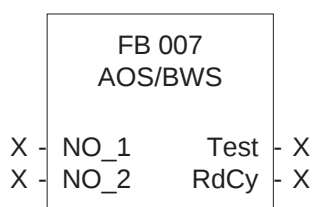
Output parameters

- *Y1*: Output parameter for PSV valve 1
- *Y2*: Output parameter for PSV valve 2
The output switches one PSS cycle later than *Y1*. This means that short circuits from *Y1* to *Y2* can be detected.



FB 007: ESPE/AOPD

Block header



Function

FB 007 transmits output signals from the ESPE/AOPD to standard function block SB 068 for evaluation. A description of SB 068 can be found in the “MBS Eccentric Press” manual. The input and output parameters are pre-assigned.

Input parameters

- *NO_1*: Input parameter for N/O contact 1 of ESPE/AOPD
NO_1 = 0: Protected field broken
NO_1 = 1: Protected field clear
- *NO_2*: Input parameter for N/O contact 2 of ESPE/AOPD
NO_2 = 0: Protected field broken
NO_2 = 1: Protected field clear

Output parameters

- *Test*: Output parameter for testing the ESPE/AOPD
Test = 0: Simulated break; automatic function test of ESPE/AOPD by switching off the ESPE/AOPD emitter
Test = 1: ESPE/AOPD emitter in operation
- *RdCy*: Output parameter for “ESPE/AOPD ready for cycle mode”
RdCy = 0: Cycle mode not selected or cycle mode selected but ESPE/AOPD not ready for break
RdCy = 1: Cycle mode selected and ESPE/AOPD ready for break

Function Blocks

FB 008: Selecting press options

Block header

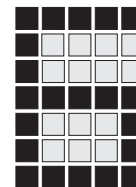
FB008 Optionen	
X	Er2H
X	ErFu
X	2M
X	FU
X	DY?
X	E/M
W	E_HL
W	E_NL
X	Wel?
W	TanI
W	Timp
X	RFK?
W	TonY
W	TofY
X	AOS?
B	TAOS

Function

This function block is used to select the various options relating to the operation and control of the eccentric press. FB 008 can be found in OB 120 and its default settings are pre-assigned. The input parameters may need adjusting.

Input parameters

- *Er2H*: Select set-up mode using two-hand control device
The parameters are set via flags M 110.00 (RLO 0) and M 110.01 (RLO 1).
Er2H = 0 (M 110.00): Operating device de-selected
Er2H = 1 (M 110.01): Operating device selected (default)
- *ErFu*: Select set-up mode via foot switch (3 positions).
The parameters are set via flags M 110.00 (RLO 0) and M 110.01 (RLO 1).
ErFu = 0 (M 110.00): Operating device de-selected (default)
ErFu = 1 (M 110.01): Operating device selected



INFORMATION

The two input parameters *Er2H* and *ErFu* must be assigned different signals. The function block performs a feasibility check on the parameters set for both input parameters. An error message will be triggered if the signals are the same. The FS section of the PSS will switch to a STOP condition and the CPU display will show the message E00E.

- *2M*: Press is driven via 2 separate drive motors or 2 separate windings on the drive motor.
The parameters are set via flags M 110.00 (RLO 0) and M 110.01 (RLO 1).
2M = 0 (M 110.00): Drive mode de-selected
2M = 1 (M 110.01): Drive mode selected (default)
- *FU*: Press is driven via frequency converters.
The parameters are set via flags M 110.00 (RLO 0) and M 110.01 (RLO 1).
FU = 0 (M110.00): Drive mode de-selected (default)
FU = 1 (M110.01): Drive mode selected



INFORMATION

The two input parameters *2M* and *FU* must be assigned different signals. The function block performs a feasibility check on the parameters set for both input parameters. An error message will be triggered if the signals are the same. The FS section of the PSS will switch to a STOP condition and the CPU display will show the message E00E.

- *DY?*: Separate dynamic cam
The parameters are set via flags M 110.00 (RLO 0) and M 110.01 (RLO 1).
DY? = 0 (M110.00): No dynamic cam available
The signal for the dynamic cam is formed in the PSS (default)
DY? = 1 (M110.01): Dynamic cam available



INFORMATION

Please note the information given under “Cam types” in the chapter entitled “Basics”.

Function Blocks

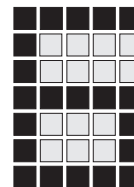
- *E/M*: Camshaft selection
The parameters are set via flags M 110.00 (RLO 0) and M 110.01 (RLO 1).
E/M = 0 (M 110.00): Mechanical camshaft (default)
E/M = 1 (M 110.01): Electronic camshaft
- *E_HL*: Value for monitoring the synchronisation time on both signals from the run-up cam (only on an electronic camshaft)
Time base: 50 ms
Permitted entries:
 - KF 00001 (50 ms)
 - KF 00002 (100 ms, default)
 - KF 00003 (150 ms, maximum value)
- *E_NL*: Value for monitoring the synchronisation time on both signals from the overrun cam (only on an electronic camshaft)
Time base: 50 ms
Permitted entries:
 - KF 00001 (50 ms)
 - KF 00002 (100 ms, default)
 - KF 00003 (150 ms, maximum value)



INFORMATION

Parameters for monitoring synchronisation time are only required on electronic camshafts. The maximum permitted synchronisation monitoring time of 150 ms (KF 00003) must not be exceeded. If the value is exceeded (entry > KF 00003), the maximum value will automatically be read in and the value set in the parameters will be ignored.

- *Wel?*: Input parameter for selecting monitoring for broken shearpins on camshafts that are driven indirectly.
The parameters are set via flags M 110.00 (RLO 0) and M 110.01 (RLO 1).
Wel? = 0 (M 110.00): Monitoring for broken shearpins active
Wel? = 1 (M 110.01): No monitoring for broken shearpins (default)
- *TAnl*: Input parameter for the start-up time for monitoring for broken shearpins (see SB 077 description in the “MBS Eccentric Press” manual).
Permitted value range: 1 ... 1023 ms
Format: Constant fixed point number (KF)
e.g.: KF 00300 corresponds to 300 ms
Default: KF 00000 (not used)



- *TImp*: Input parameter for the reaction time for monitoring for broken shearpins (see SB 077 description in the “MBS Eccentric Press” manual).
Permitted value range: 1 ... 1023 ms
Format: Constant fixed point number (KF)
e.g.: KF 00300 corresponds to 300 ms
Default: KF 00000 (not used)



INFORMATION

Monitoring for broken shearpins is only a requirement on camshafts that are driven indirectly. If there is no monitoring for broken shearpins, both input parameters *TAnI* and *TImp* must be assigned KF 00000. Input E 0.29 for the device generating the pulse to monitor for broken shearpins must remain unconnected (see chapter entitled “Assembly and Installation”).

- *RFK?*: Select press safety valve with feedback loop
The parameters are set via flags M 110.00 (RLO 0) and M 110.01 (RLO 1).
RFK? = 0 (M 110.00): No PSV feedback loop (default)
RFK? = 1 (M 110.01): PSV feedback loop active
- *TOnY*: Monitoring the reaction time on the press safety valve feedback on switch-on
Permitted value range: 1 ... 511 ms
Format: Constant fixed point number (KF)
Default: KF 00500 (500 ms)
- *TOfY*: Monitoring the reaction time on the press safety valve feedback on switch-off
Permitted value range: 1 ... 1023 ms
Format: Constant fixed point number (KF)
Default: KF 00800 (800 ms)

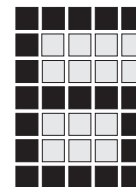


INFORMATION

It is important to monitor the reaction time of the press safety valve (input parameters *TOnY* and *TOfY*), as reaction times have considerable influence on the stopping time of a press in the case of an emergency stop. The stopping time directly determines the safety distance to the tool. For this reason you should set the reaction time to be as short as possible. **Please note** however, that the reaction time must not adversely affect the availability of the press. You should also take into account how pressure and temperature fluctuations will change the reaction time.

Function Blocks

- **AOS?**: Selecting an ESPE/AOPD as safety device.
The parameters are set via flags M 110.00 (RLO 0) and M 110.01 (RLO 1).
AOS? = 0 (M 110.00): ESPE/AOPD active
AOS? = 1 (M 110.01): ESPE/AOPD inactive (default)
- **TAOS**: Monitoring the test time on the ESPE/AOPD.
The monitoring time depends on the PSS scan time. The test on the ESPE/AOPD should be complete after the stated number of PSS cycles.
Permitted value range: 1 ... 20
Format: Constant byte (KB)
Default: KB 007 (7 PSS cycles)
Accept default setting even when *AOS?* = 1
If the maximum permitted value is exceeded (20 PSS cycles), the maximum value (KB 020) will automatically be read in and the value set in the parameters will be ignored.



FB 009: Electronic cam evaluation

Block header

	FB 009
	NSW Elek
X -	HL_1
X -	HL_2
X -	NL_1
X -	NL_2
X -	DYN.
X -	STOP

Function

FB 009 transmits the signals from the electronic camshaft. It transfers the relevant signals to SB 074 for evaluation. A description of SB 074 can be found in the “MBS Eccentric Press” manual. The input parameters are pre-assigned.

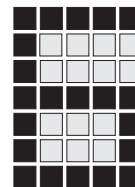


INFORMATION

Please note the information given under “Cam types” in the chapter entitled “Basics”.

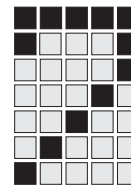
Input parameters

- *HL1*: Input parameter for initiator 1, run-up cam
- *HL2*: Input parameter for initiator 2, run-up cam
- *NL1*: Input parameter for initiator 1, overrun cam
- *NL2*: Input parameter for initiator 2, overrun cam
- *DYN.*: Input parameter for signal, dynamic cam
- *STOP*: Input parameter for signal, stop cam



Function Blocks

Notes



Parameters and Program Structure

Organisation block OB 101

The software package contains organisation block OB 101 with pre-assigned program structure. The input and output parameters of the function blocks are specifically designed for use with a PSS 3056-2 and are pre-assigned to the PSS inputs and outputs.

The section in this chapter entitled “PSS 3056-2 assignment list” documents the allocation of inputs and outputs and their respective function. Additional information can be found in the circuit diagrams contained in the chapter entitled “Assembly and Installation”.

No parameters need to be set for the function blocks in OB 101, although you may need to adjust the monitoring times of FB 001 and FB 003. The required function range is selected through the wiring of the PSS inputs and outputs. Wiring specifications of the PSS inputs and outputs are documented in the chapter entitled “Assembly and Installation”.



WARNING!

Modifications to the pre-assigned structure, program cycle or parameter assignment in OB 101 can prevent the press control program from operating correctly. This can lead to **hazardous situations**, which could result in **serious injury and death**.

Organisation block OB 120

OB 120 contains FB 008. FB 008 is used to establish the function range of the software package. Parameters for FB 008 must be set to correspond to the required function range, according to the information provided in the chapter entitled “Function Description”.



WARNING!

Modifications to the pre-assigned structure or program cycle in OB 120 can prevent the press control program from operating correctly. This can lead to **hazardous situations**, which could result in **serious injury and death**.

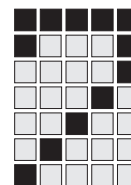
Parameters and Program Structure

PSS 3056-2 assignment list

Input assignment

Inputs	Function	Description
E 0.00	Press OFF	Op. mode selector switch “press OFF”
E 0.01	Set-up without motor	Op. mode selector switch “set-up without motor”
E 0.02	Set-up	Op. mode selector switch “set-up”
E 0.03	Single stroke 2-hand	Op. mode selector switch “single-stroke 2-hand”
E 0.04	Single stroke foot	Op. mode selector switch “single stroke foot”
E 0.05	Automatic hand/foot	Op. mode selector switch “automatic 2-hand/foot”
E 0.06	ESPE/AOPD 1-break	Op. mode selector switch “ESPE/AOPD 1-break”
E 0.07	ESPE/AOPD 1-break	Op. mode selector switch “ESPE/AOPD 2-break”
E 0.08	N/C 2-Hand left	2-hand N/C contact, left button
E 0.09	N/C 2-Hand right	2-hand N/C contact, right button
E 0.10	N/O 2-Hand left	2-hand N/O contact, left button
E 0.11	N/O 2-Hand right	2-hand N/O contact, right button
E 0.12	N/C foot switch	Foot switch, N/C contact
E 0.13	E-STOP N/C 1	E-STOP button, N/C contact 1
E 0.14	E-STOP N/C 2	E-STOP button, N/C contact 2
E 0.15	N/O foot switch	Foot switch, N/O contact
E 0.16	Reset	Reset button
E 0.17	Guard N/C 1	Guard function N/C contact 1
E 0.18	Guard N/C 2	Guard function N/C contact 2
E 0.19	General guard N/C	General guard function, N/C contact
E 0.20	Safety gate 1	Safety gate contact 1
E 0.21	Safety gate 2	Safety gate contact 2
E 0.22	Start motor	Button for “Start Motor”
E 0.23	Stop motor	Button for “Stop Motor”
E 0.24		
E 0.25	Run-up signal	Signal from the run-up cam (mechanical cam)
E 0.26	Overrun signal	Signal from the overrun cam (mechanical cam)
E 0.27	Dynamic signal	Signal from the dynamic cam (mechanical cam)
E 0.28	Stop signal	Signal from the stop cam (mechanical cam)
E 0.29	Pulse detection, pin	Signal from broken shearpin monitoring
E 0.30	Electr. cam, dyn. cam	Signal from dynamic cam (electronic cam)
E 0.31	Electr. cam, STPN cam	Signal from stop cam (electronic cam)
E 2.00	Stop at end of cycle	Stop button for press at TDC in automatic mode
E 2.01	ESPE/AOPD contact 1	ESPE/AOPD contact 1
E 2.02	ESPE/AOPD contact 2	ESPE/AOPD contact 2

(Continued overleaf)



(Continued)

Inputs	Function	Description
E 2.03	Feedback loop PSV Y1	Feedback contact press safety valve Y1
E 2.04	Feedback loop PSV Y2	Feedback contact press safety valve Y2
E 2.05	Select 2-hand/foot	Select: automatic mode with 2-hand/foot switch
E 2.06	Set-up speed	Speed monitoring for set-up speed
E 2.07	Error PSV static	Error output PSV statically monitored
E 2.08	FL motor	Feedback contact "Motor ON"
E 2.09	FL reduced speed	Feedback contact "reduced speed"
E 2.10	Side guard N/C 1	Side guard N/C 1
E 2.11	Side guard N/C 2	Side guard N/C 2
E 2.12	Electr. cam HL1	Signal 1 from run-up cam (electronic cam)
E 2.13	Electr. cam HL2	Signal 2 from run-up cam (electronic cam)
E 2.14	Electr. cam NL1	Signal 1 from run-up cam (electronic cam)
E 2.15	Electr. cam NL2	Signal 2 from run-up cam (electronic cam)

Output assignment

Outputs	Function	Description
A 1.00 A 1.01 A 1.02 A 1.03	Monitoring the input devices on used test pulse outputs	
A 1.08	Test ESPE/AOPD	Test output for ESPE/AOPD
A 1.09	Ready to cycle mode	Indicates readiness for cycle mode ESPE/AOPD
A 1.10		
A 1.11		
A 1.16	PSV Y1	Dual-pole output: press safety valve Y1
A 1.17	PSV Y2	Dual-pole output: press safety valve Y2
A 1.18	Motor on	Dual-pole output: motor relay ON
A 1.19	Reduced speed	Dual-pole output: motor relay reduced speed

Test pulse assignment

Outputs	Function	Description
A 1.00	Pulse 0	E 0.12, E 0.15, E 0.17, E 0.20, E 0.25, E 2.00, E 2.03, E 2.08
A 1.01	Pulse 1	E 0.18, E 0.21, E 0.26, E 0.28, E 2.04, E 2.09
A 1.02	Pulse 2	E 0.08, E 0.10, E 0.13, E 0.19, E 0.27, E 2.05, E 2.07, E 2.10
A 1.03	Pulse 3	E 0.09, E 0.11, E 0.14, E 2.06, E 2.11

Parameters and Program Structure

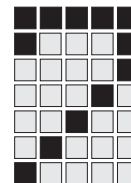
Parameters and structure of organisation block OB 101

Press op. mode : Segment 00
:CAL FB 001

			FB 001 BA Press 03.08.99 08:15
E0.00	.BaS1	- X -	BaS1
E0.01	.BaS2	- X -	BaS2
E0.02	.BaS3	- X -	BaS3
E0.03	.BaS4	- X -	BaS4
E0.04	.BaS5	- X -	BaS5
E0.05	.BaS6	- X -	BaS6
E0.06	.BaS7	- X -	BaS7
E0.07	.BaS8	- X -	BaS8
KF 001023		- W -	Time

2-hand / foot : Segment 01
:CAL FB 002

			FB 002 Hand/Fuß 18.08.99 14:31
E0.08	.2Hand L N/C	- X -	Ha1O
E0.10	.2Hand L N/O	- X -	Ha1S
E0.09	.2Hand R N/C	- X -	Ha2O
E0.11	.2Hand R N/O	- X -	Ha2S
E0.12	.Foot N/C	- X -	FußO
E0.15	.Foot N/O	- X -	FußS
E2.05	.Sel. 2H / Foot	- X -	2H/F



E-Stop/guard: Segment 02
:CAL FB 003

				FB 003	
				NA/Schut	
				05.08.99	
				15:50	
E0.16	.Reset	- X	Rset		
E0.13	.E-STOP N/C1	- X	NAÖ1		
E0.14	.E-STOP N/C2	- X	NAÖ2		
E0.17	.Guard N/C1	- X	SÖ1		
E0.18	.Guard N/C2	- X	SÖ2		
E2.10	.Side guard N/C1-	X	SeÖ1		
E2.11	.Side guard N/C2-	X	SeÖ2		
E0.19	.General guard	- X	AlgÖ		
E0.20	.Safety gate co.1-	X	ScS1		
E0.21	.Safety gate co.2-	X	ScS2		
KF 000000		- W	SyTi		

General Fct : Segment 03
:CAL FB 004

				FB 004	
				Allg.Fkt	
				06.08.99	
				10:25	
E0.22	.Start button	- X	Strt	Mein	- X - A1.18 .Motor Press
E0.23	.Stop button	- X	Stop	VerG	- X - A1.19 .Red. speed
E2.06	.Red. speed	- X	EiVG		
E2.08	.FL Motor ON	- X	RFMe		
E2.09	.FL Red. speed	- X	RFVG		

Camshaft / Pin: Segment 04
:CAL FB 005

				FB 005	
				NSW/Well	
				03.08.99	
				08:31	
E0.25	.HL cam	- X	HL		
E0.26	.NL cam	- X	NL		
E0.28	.Stop cam	- X	STPN		
E0.27	.Dynam. cam	- X	DY		
E0.29	.Pulse pin br.	- X	Imp		

Parameters and Program Structure

Electr. cam: Segment 05
:CAL FB 009

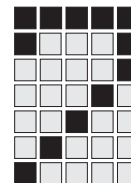
				FB 009	
				NSW Elek	
				19.08.99	
				11:29	
E2.12	.Elec. HL 1	- X	HL_1		
E2.13	.Elec. HL 2	- X	HL_2		
E2.14	.Elec. NL 1	- X	NL_1		
E2.15	.Elec. NL 2	- X	NL_2		
E0.30	.Elec. Dyn.	- X	DYN.		
E0.31	.Elec. STPN	- X	STOP		

PSV cycle : Segment 06
:CAL FB 006

				FB 006	
				Abl./PSV	
				10.09.99	
				15:57	
E2.00	.Stop pr. stroke	- X	HaTe	Y1	- X - A1.16 .Valve 1 PSV
E2.03	.FL PSV Y1	- X	RFY1	Y2	- X - A1.17 .Valve 2 PSV
E2.04	.FL PSV Y2	- X	RFY2		
E2.07	.Error PSV	- X	FPSV		

AOPD / ESPE : Segment 07
:CAL FB 007

				FB 007	
				AOS/BWS	
				03.08.99	
				08:35	
E2.01	.AOPD S1	- X	NO_1	Test	- X - A1.08 .Test o/p AOPD
E2.02	.AOPD S2	- X	NO_2	RdCy	- X - A1.09 .Cycle mode



Cycle Progr. : Segment 08
:CAL PB 101

PB 101
Abl.Pre.
7.09.99
15:32

Incr. DW 1015 : Segment 09
:A DB 015
:I DW 1015
End : Segment 10
:BE

Parameters and Program Structure

Parameters and structure of organisation block OB 120

The parameters set for FB 008 in OB 120 will depend on the function range required on the eccentric press. The following examples are intended to explain the parameters on FB 008.

Example 1: Setting parameters on FB 008

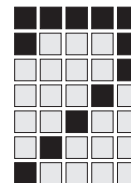
Settings (as per the default settings in SB 070 and FB 008):

- Select set-up mode via a two-hand control device
- Control in set-up mode via a separate drive motor or separate winding on the drive motor
- Mechanical camshaft
- Statically monitored press safety valve (no feedback)
- No light curtain (ESPE/AOPD)

Init.MBS : Segment 00
:CAL SB 070

KB050	.Sync. contacts - B -	KoSy
KB100	.TimeMon FL - B -	RRFK
KB100	.TimeMon button- B -	KU_S
KB050	.TimeMon relay - B -	KU_R
KF30000	.TimeMon ESPE - W -	MaZy
KB150	.Rct.Mon ESPE - B -	RBWS
KF30000	.TimeMon. valve - W -	RVen

SB 070
INIT_MBS
22.08.96
08:48



Option Press : Segment 01
:CAL FB 008

				FB008 Optionen 10.09.99 19:50
M110.01	.2Hand BaEr	- X -	Er2H	
M110.00	.not used	- X -	ErFu	
M110.01	.sep. drive	- X -	2M	
M110.00	.not used	- X -	FU	
M110.00	.not used	- X -	DY?	
M110.00	.mech. cam	- X -	E/M	
KF00002	.not used	- W -	E_HL	
KF00002	.not used	- W -	E_NL	
M110.01	.not used	- X -	Wel?	
KF00000	.not used	- W -	TAnl	
KF00000	.not used	- W -	TImp	
M110.00	.not used	- X -	RFK?	
KF00500	.not used	- W -	TonY	
KF00800	.not used	- W -	TofY	
M110.01	.not used	- X -	AOS?	
KB007	.not used	- B -	TAOS	

End : Segment 02
:BE

Parameters and Program Structure

Example 2: Setting parameters on FB 008

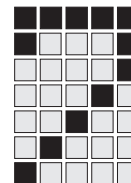
Settings:

- Select set-up mode via a two-hand control device
- Control in set-up mode via a frequency converter
- Electronic camshaft
- Dynamically monitored press safety valve (feedback loop)
- Light curtain (ESPE/AOPD)

Init.MBS : Segment 00
:CAL SB 070

KB050	.Sync. contacts	- B -	KoSy
KB100	.TimeMon FL	- B -	RRFK
KB100	.TimeMon button-	B -	KU_S
KB050	.TimeMon relay	- B -	KU_R
KF30000	.TimeMon ESPE	- W -	MaZy
KB150	.Rct.Mon ESPE	- B -	RBWS
KF30000	.TimeMon valve	- W -	RVen

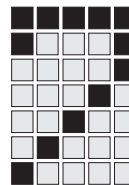
SB 070
INIT_MBS
22.08.96
08:48



Option Press : Segment 01
:CAL FB 008

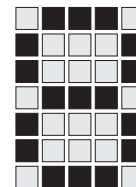
				FB008 Optionen 10.09.99 19:50
M110.01	.2Hand BaEr	- X	-	Er2H
M110.00	.not used	- X	-	ErFu
M110.00	.not used	- X	-	2M
M110.01	.Frequency-conv	- X	-	FU
M110.01	.Dyn. cam	- X	-	DY?
M110.01	.el. cam	- X	-	E/M
KF00002	.Sync. HL-cam	- W	-	E_HL
KF00002	.Sync. NL-cam	- W	-	E_NL
M110.01	.not used	- X	-	Wel?
KF00000	.not used	- W	-	TAnl
KF00000	.not used	- W	-	TImp
M110.01	.FL PSV active	- X	-	RFK?
KF00300	.React. PSVon	- W	-	TonY
KF00300	.React. PSVoff	- W	-	TofY
M110.00	.ESPE active	- X	-	AOS?
KB020	.Test time ESPE	- B	-	TAOS

End : Segment 02
:BE



Parameters and Program Structure

Notes



Assembly and Installation

PSS 3056-2 programmable safety system



INFORMATION

Please make sure you also read the information in the “Installation Manual” for the PSS 3056 series.

The installation manual is supplied with the PSS 3056-2.

Control elements on the eccentric press



INFORMATION

Please note that all control elements (relays for drive motors, solenoid valve coils etc.) **must** be suitable for connecting to 24 VDC.

Inputs/outputs on the PSS 3056-2



WARNING!

Modifications to the documented I/O-assignment can prevent the press control program from operating correctly. This can lead to **hazardous situations**, which could result in **serious injury and death**.



INFORMATION

Please note that the parameters set for FB 008 must match the relevant I/O-assignment on the PSS.

Assembly and Installation

PSS input assignment

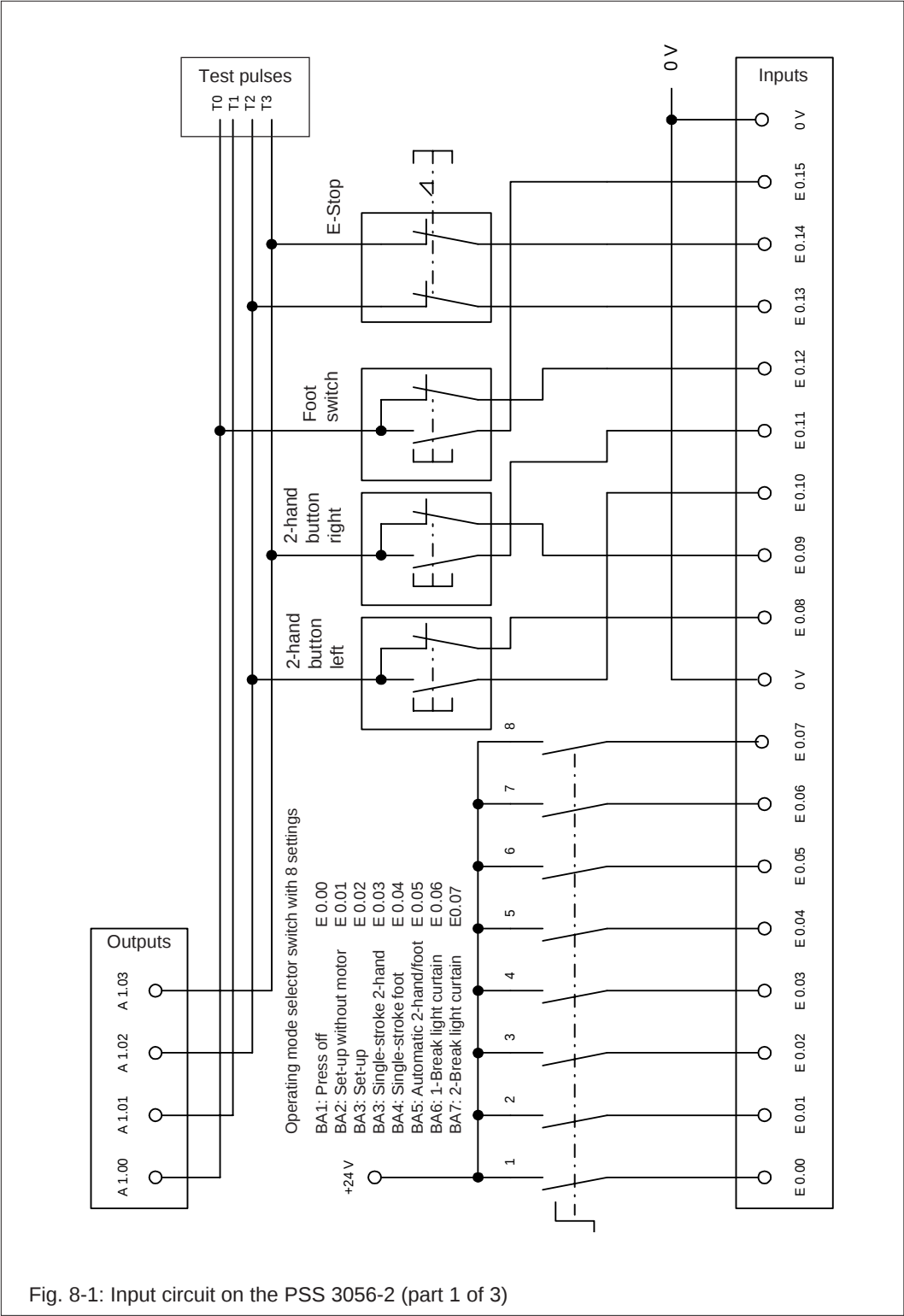
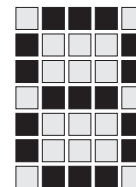


Fig. 8-1: Input circuit on the PSS 3056-2 (part 1 of 3)



Operating mode selector switch

A selector switch with a maximum of 8 positions can be used as operating mode selector switch (selection mode 1 from 8). Inputs E 0.00 ... E 0.07 on the PSS 3056-2 are reserved for the switch setting contacts (see Fig. 8-1). Inputs belonging to operating modes that are not being used remain unwired.

Special feature on “automatic two-hand/foot” mode

In this mode, continuous stroke can be started either via a two-hand control device or via a foot switch. Input E 2.05 is provided to enable you to select the operating device. The control program on the PSS 3056-2 evaluates the selection at input E 2.05 once, when the PSS is cold or warm started (failsafe section).

E 2.05 = “0”- Signal: Select “continuous stroke” via foot switch

E 2.05 = “1”- Signal: Select “continuous stroke” via two-hand control device

Foot switch

A foot switch is used in “single-stroke foot” mode and can be used in the following operating modes: “set-up without motor”, “set-up” and “automatic 2-hand/foot”.

If you are using a foot switch, specific requirements must be met regarding its design and wiring:

- The foot switch **must** have three switch settings.
- The foot switch **must** be wired in such a way that:
 - **only** the middle setting triggers an enable
 - operating modes for set-up: start enable
 - “Single-stroke foot” mode: single stroke is activated if the centre position is maintained
 - all other settings trigger a safety-related stopping of the press.

E-STOP button

If the eccentric press has more than one E-STOP button, all the emergency stop buttons **must** be connected **in series**. Connect both wires to inputs E 0.13 and E 0.14 on the PSS 3056-2, as shown in Fig. 8-1.

Assembly and Installation

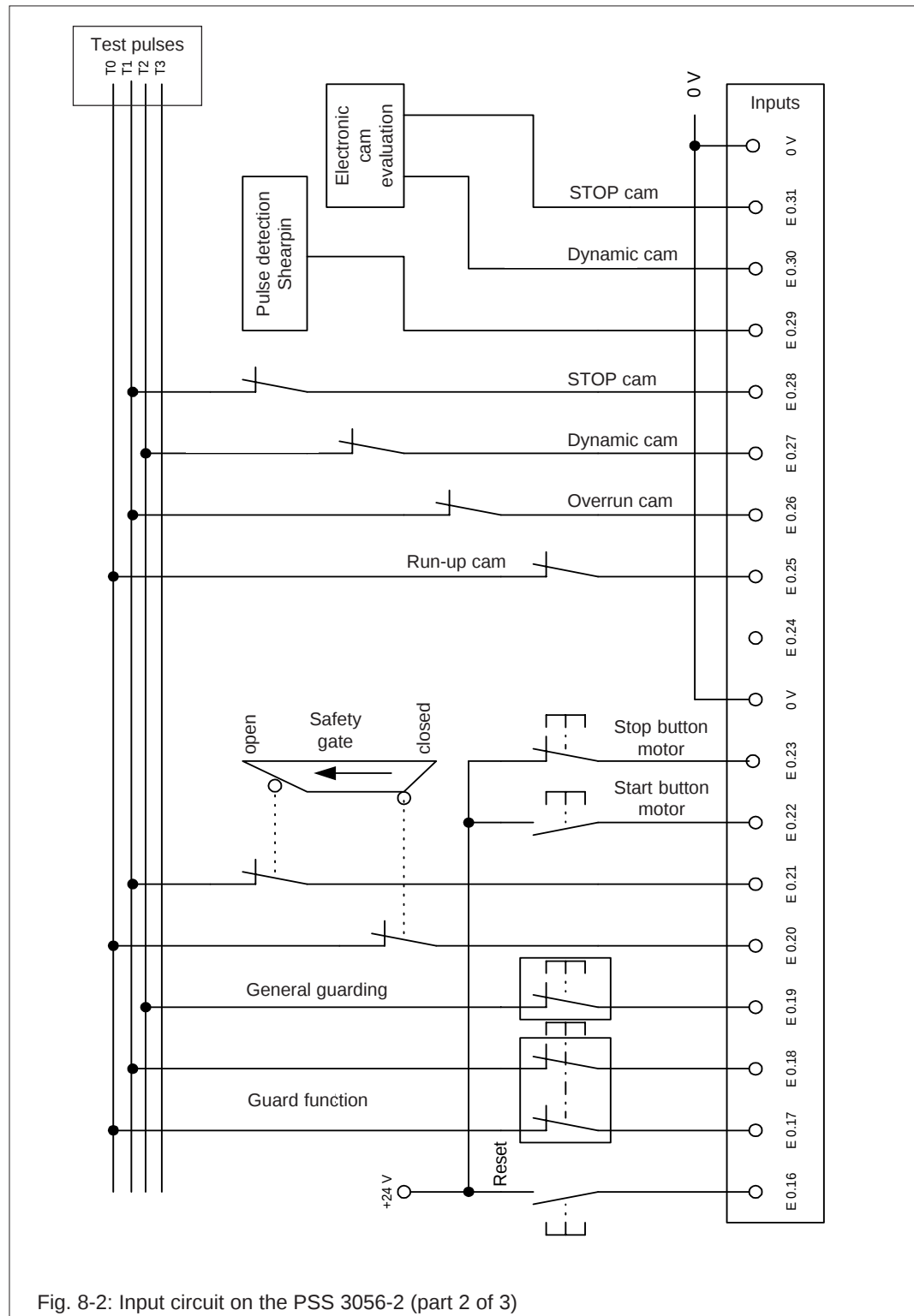
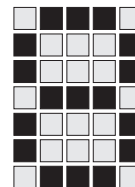


Fig. 8-2: Input circuit on the PSS 3056-2 (part 2 of 3)



Guard function

It is possible to connect an additional dual-channel guard function to inputs E 0.17 and E 0.18. The guard function could involve a start-up disabler, for example.

If no additional guard function of this type is being used, connect both inputs directly to the stated test pulses (see Fig. 8-2).

General guarding

It is possible to connect an additional single-channel guard function to input E 0.19. The guard function could involve an air or oil pressure monitor, for example.

If no additional guard function of this type is being used, connect the input directly to the stated test pulses (see Fig. 8-2).

Safety gate (movable safety device)

If the eccentric press does not have a safety gate, connect both inputs E 0.20 and E 0.21 directly to the stated test pulses (see Fig. 8-2).

Mechanical camshaft

If you are using a mechanical camshaft, inputs E 0.25 ... E 0.28 should be connected.

There are three different scenarios:

- The camshaft has all cams at its disposal.
Connect the PSS 3056-2 inputs to the relevant cam signal (see Fig. 8-2).
- The camshaft does not have a separate stop cam.
On the PSS 3056-2, connect input E 0.28 (stop cam) to input E 0.26 (overrun cam).
- The camshaft does not have a separate dynamic cam. Leave input E 0.27 (dynamic cam) unconnected.

Assembly and Installation



INFORMATION

If an electronic camshaft is used, any inputs that are reserved for a mechanical cam must remain unconnected, otherwise the failsafe section of the PSS will switch to a STOP condition and the CPU-display will show the message E00D.

Electronic camshaft

If an electronic camshaft is used, connect inputs E 2.12 ... E 2.15 plus inputs E 0.30 and E 0.31.

There are three different scenarios:

- The camshaft has all cams at its disposal.
Connect the PSS 3056-2 inputs to the relevant cam signal (see Fig. 8-2 and Fig. 8-3).



INFORMATION

Please note that the evaluation of the signal from the run-up cam (E 2.12/E 2.13) and overrun cam (E 2.14/E 2.15) **must** be dual-channel.

- The camshaft does not have a separate stop cam.
On the PSS 3056-2, connect one of the two inputs E 2.14 or E 2.15 (overrun cam, dual-channel) to input E 0.31 (stop cam).
- The camshaft does not have a separate dynamic cam. Leave input E 0.30 (dynamic cam) unconnected.



INFORMATION

If a mechanical camshaft is used, any inputs that are reserved for an electronic camshaft must remain unconnected, otherwise the failsafe section of the PSS will switch to a STOP condition and the CPU-display will show the message E00D.

If an error occurs during electronic cam evaluation, it will not be possible to reset this error condition. The PSS will need to be cold or warm started in order to restart the eccentric press.

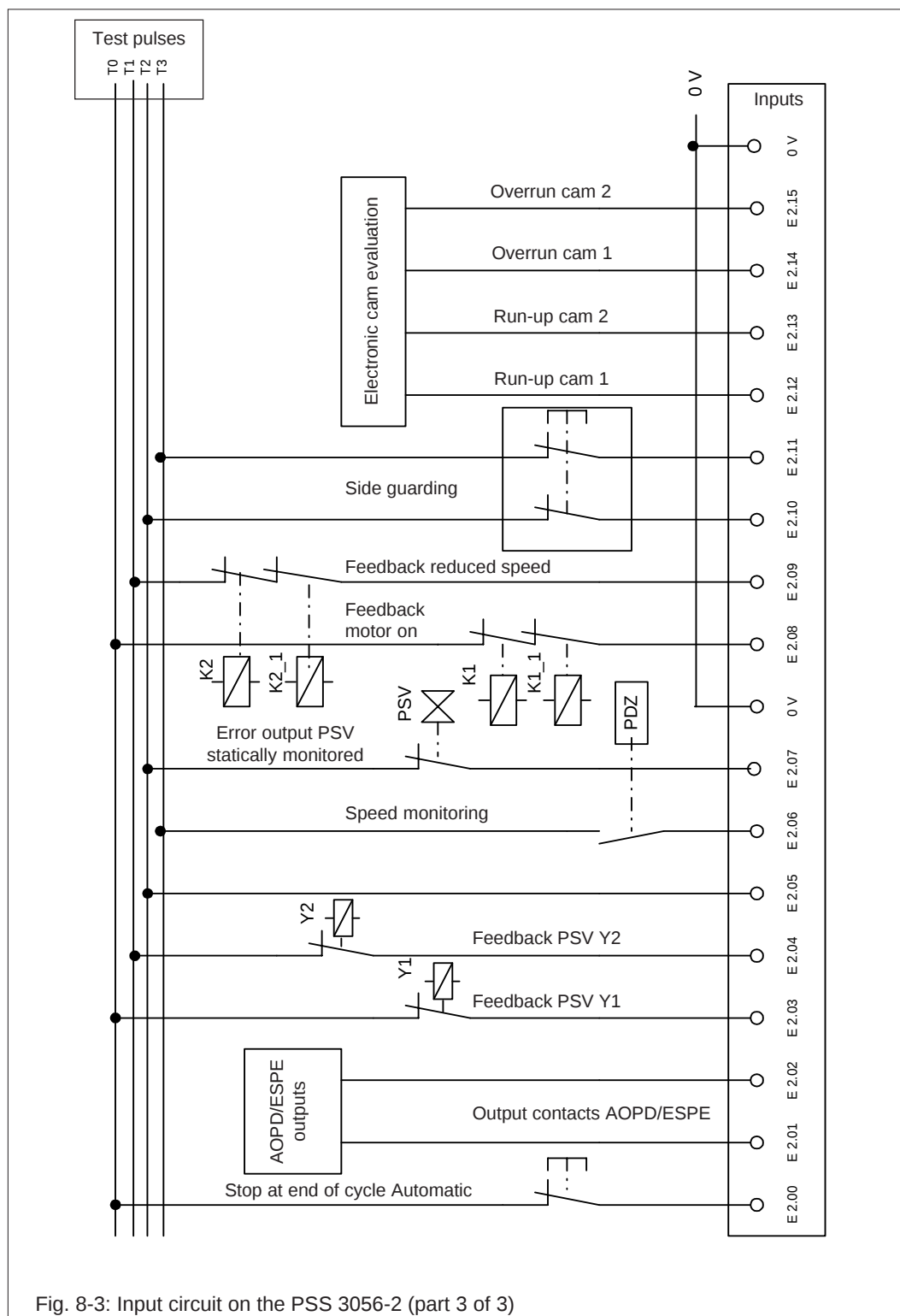
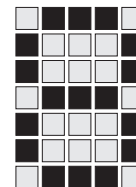


Fig. 8-3: Input circuit on the PSS 3056-2 (part 3 of 3)

Assembly and Installation

Pulse detection monitoring for broken shearpins

Monitoring for broken shearpins is **absolutely essential** on camshafts that are driven indirectly. Connect the initiator to input E 0.29. On camshafts that are driven directly, leave input E 0.29 unconnected.

ESPE/AOPD

If an ESPE/AOPD is used as a safety device, connect the enable outputs on the ESPE/AOPD to inputs E 2.01 and E 2.02. If the eccentric press does not have any such safety device, leave both inputs unconnected.

Monitoring the feedback loop on the PSV

Dynamically monitored press safety valve

PSVs that are monitored dynamically have a feedback loop for each valve coil. Connect the feedback contacts (Y1 and Y2) on the PSV to inputs E 2.03 and E 2.04.



INFORMATION

If a statically monitored PSV is used, any inputs that are reserved for dynamic monitoring must remain unconnected, otherwise the failsafe section of the PSS will switch to a STOP condition and the CPU-display will show the message E00D.

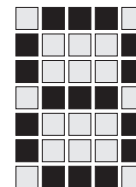
Statically monitored press safety valve

PSVs that are monitored statically have a monitoring output. Connect the monitoring switch to input E 2.07.



INFORMATION

If a dynamically monitored PSV is used, input E 2.07 must remain unconnected, otherwise the failsafe section of the PSS will switch to a STOP condition and the CPU-display will show the message E00D.



Speed monitoring on the drive motor

On an eccentric press, if the reduced speed in set-up mode is achieved via a frequency converter, the speed must be monitored using a safety-related speed monitor (e.g. Pilz PDZ). If this is the case, connect the speed monitor to E 2.06.

If control is via two separate motors or two separate windings on the drive motor, leave input E 2.06 unconnected.

Side guarding

It is possible to connect an additional dual-channel guard function to inputs E 2.10 and E 2.11. The guard function could involve a safety gate, for example.

If no additional guard function of this type is being used, connect both inputs directly to the stated test pulses (see Fig. 8-3).

Assembly and Installation

PSS output assignment

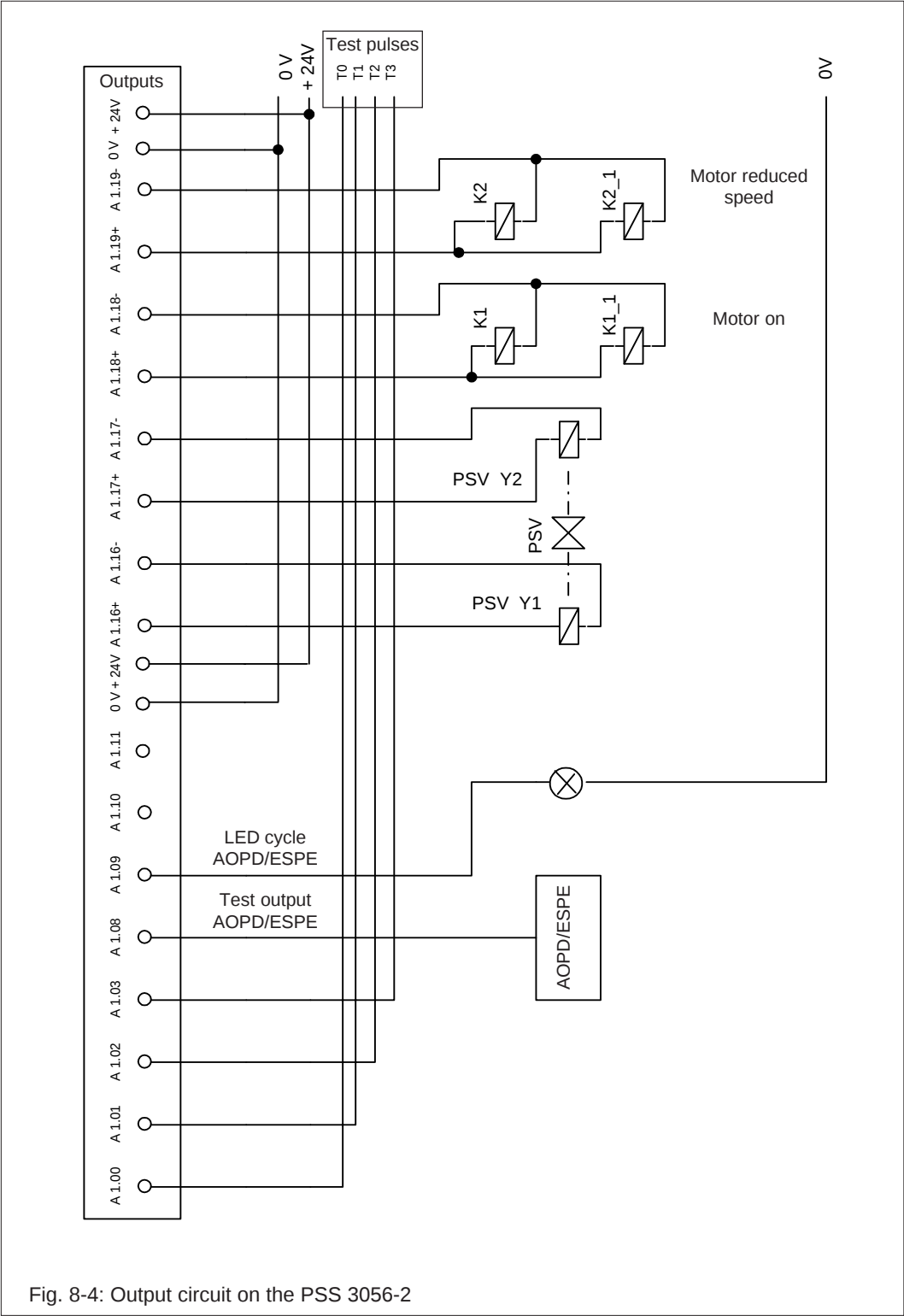
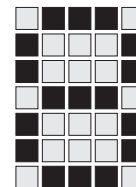


Fig. 8-4: Output circuit on the PSS 3056-2



ESPE/AOPD

Connect the ESPE/AOPD test input to output A 1.08 on the PSS 3056-2 (see Fig. 8-4).

LEDs

LEDs are used to display single and double break mode in operating modes “light curtain single break” and “light curtain double break”. This output is only active in these two operating modes. Connect the LED to output A 1.09 on the PSS 3056-2 (see Fig. 8-4).

Press safety valve

Each valve coil on the PSV is driven via a dual-pole output on the PSS 3056-2 (see Fig. 8-4).

- PSV Y1: A 1.16 +/A 1.16 -
- PSV Y2: A 1.17 +/A 1.17 -

Controlling the drive motors

The drive motors are controlled via two relays (see Fig. 8-4). The relays must be suitable for 24 VDC and must also have feedback contacts. Use the dual-pole output A 1.18 +/A 1.18 – for “motor on” and dual-pole output A 1.19 +/A 1.19 – for “reduced speed in set-up mode”.

There are two different scenarios:

- Control via two separate drive motors or two separate windings on the drive motor (see Fig. 8-5 for connection diagram):
Connect the feedback contacts on the relay to inputs E 2.08 and E 2.09.
- Control via a frequency converter (see Fig. 8-5 for connection diagram):
Connect the feedback contact for “motor on” to input E 2.08. Leave the feedback contact for “reduced speed in set-up mode” unconnected (E 2.09).

Assembly and Installation

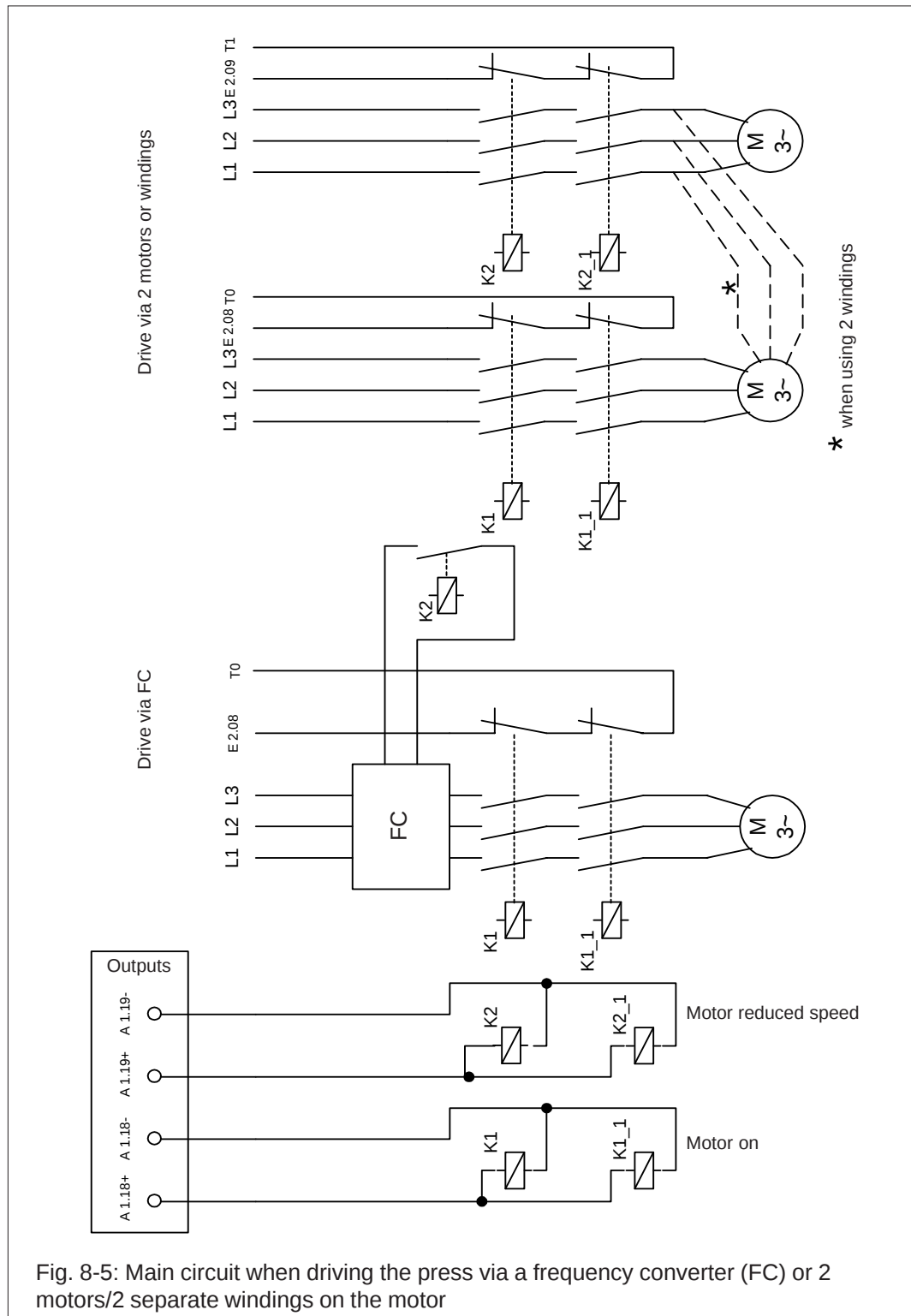
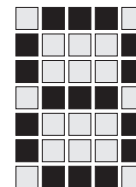


Fig. 8-5: Main circuit when driving the press via a frequency converter (FC) or 2 motors/2 separate windings on the motor



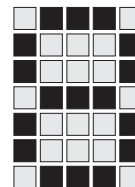
Test pulses on the PSS 3056-2



INFORMATION

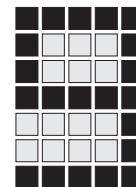
Please note the following:

The connection and use of test pulses T0 ... T3 is documented in circuit diagrams Fig. 8-1 ... Fig. 8-5. Do not deviate from this wiring.



Assembly and Installation

Notes



Commissioning

Start conditions

Before you start commissioning, please check the following points:

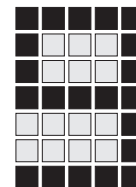
- The PSS 3056-2 must be assembled correctly (“see “Installation Manual” for the compact PSS)
- The periphery devices must be installed correctly (see chapter entitled “Assembly and Installation”)
- The PSS inputs and outputs must be wired correctly with regard to the existing requirements and the function range of the eccentric press (see chapter entitled “Assembly and Installation”, Figs. 8-1 to 8-5)
- Parameters of FB 008 must be set correctly with regard to the existing requirements and the function range of the eccentric press (see chapter entitled “Standard Function Blocks”)
In particular you should make sure that the parameters in FB 008 match the wiring of the inputs and outputs on the PSS 3056-2
- All the function blocks, standard function blocks, program blocks and organisation blocks supplied with the package must be available within the project (programming device)
- DB 015 must be available with the correct set-up properties (READ/ WRITE, 1024 data words)
- The documented structure in organisation blocks OB 101 and OB 120 must be maintained.

Commissioning

Commissioning the PSS 3056-2

- Transfer the failsafe project (linked program) from the programming device to the PSS 3056-2 (failsafe section).
- If you are using a display system:
Transfer the standard project (all blocks) from the programming device to the PSS 3056-2 (standard section).
- Carry out the following steps:

Instruction	Result
Restart PSS 3056-2 (switch off/on)	
Set FS and ST section to RUN (FS – RUN, ST – Auto PG)	FS RUN LED and ST RUN LED light up
Is the PSS CPU showing a fault?	Fault diagnostics via CPU display or graphics device (if available)
Rectify error, then: Restart FS (STOP-RUN)	
Error message on CPU display?	E00E: Press options, Parameter error in FB 008 E00D: Press options, Wiring error at PSS inputs
Rectify error, then: Restart FS (STOP-RUN)	
No error message on CPU display	Display: 0000 PSS 3056-2 is connected correctly
To proceed:	See section entitled: “Commissioning the individual operating modes”



Commissioning the individual operating modes

To make the commissioning process easier, this section contains check lists for all the operating modes. Work through the tables step by step. This will complete the commissioning process.

Press OFF mode

Instruction	Result	LED		Test OK
Operating mode selector switch: Press OFF		E 0.00		
Press E-STOP	E-STOP inputs on PSS are no longer available	E 0.13 E 0.14		
Release E-STOP reset	E-STOP inputs on PSS available again	E 0.13 E 0.14		
Start button, motor	Drive does not switch on		A 1.18	
Two-hand button operated	PSVs are not switching		A 1.16 A 1.17	
Foot switch operated	PSVs are not switching		A 1.16 A 1.17	

Set-up press without motor mode

Active safety devices in this operating mode:

- E-STOP
- Guard function
- General guarding

All other safety devices are inactive.

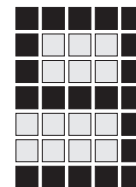
Set-up without motor with two-hand control device

Instruction	Result	LED		Test OK
Operating mode selector switch: Set-up press without motor		E 0.01		
Start button, motor	Drive does not switch on		A 1.18	
Two-hand button operated	PSV is switching		A 1.16 A 1.17	
Foot switch operated	PSV is not switching		A 1.16 A 1.17	

Commissioning

Set-up without motor using 3-position foot switch

Instruction	Result	LED		Test OK
Operating mode selector switch: Set-up press without motor		E 0.01		
Start button, motor	Drive does not switch on		A 1.18	
3-position foot switch operated in middle setting	PSV is switching		A 1.16 A 1.17	
Two-hand button operated	PSV is not switching		A 1.16 A 1.17	
Operate 3-position foot switch in middle setting, then press right down	PSV switches, once pedal is pressed down PSV switches off	A 1.17	A 1.16	
Release 3-position foot switch then operate again	PSV does not switch reset missing		A 1.16 A 1.17	



Press set-up mode

Active safety devices in this operating mode:

- E-STOP
- Guard function
- General guarding
- Control via frequency converter: reduced set-up speed required

All other safety devices are inactive.

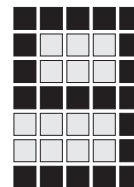
Set-up via two-hand control device

Instruction	Result	LED		Test OK
Operating mode selector switch: Press set-up		E 0.02		
Start button, motor	Drive switches on, reduced speed active with frequency converter (f/c)		A 1.18 A 1.19	
	Drive switches on, reduced speed active with 2 motors (2M)		A 1.19	
Press E-STOP	Motor switches off with f/c motor on mode		A 1.18	
	Motor switches off with 2 motor mode		A 1.19	
Release E-STOP	Motor does not switch on automatically with f/c		A 1.18	
	Motor does not switch on automatically with 2M		A 1.19	
Start button, motor	Drive does not switch on with f/c		A 1.18	
	Drive does not switch on with 2M		A 1.19	
Reset E-STOP	Drive does not switch on Start button missing			
Start button, motor	Drive switches on, reduced speed active with f/c		A 1.18 A 1.19	
	Drive switches on, reduced speed active with 2M		A 1.19	
Two-hand button operated	PSV switches, press in 3-stop mode		A 1.16 A 1.17	
Foot switch operated	PSV does not switch		A 1.16 A 1.17	

Commissioning

Set-up using 3-position foot switch

Instruction	Result	LED		Test OK
Operating mode selector switch: Press set-up		E 0.02		
Start button, motor	Drive switches on, reduced speed active with f/c		A 1.18 A 1.19	
	Drive switches on, reduced speed active with 2M		A 1.19	
Press E-STOP button	Motor switches off with f/c motor on mode		A 1.18	
	Motor switches off with 2M mode		A 1.19	
Release E-STOP button	Motor does not switch on automatically with f/c		A 1.18	
	Motor does not switch on automatically with 2M		A 1.19	
Start button, motor	Drive does not switch on with f/c Drive does not switch on with 2M		A 1.18 A 1.19	
Reset E-STOP	Drive does not switch on Start button missing			
Start button, motor	Drive switches on reduced speed active with f/c		A 1.18 A 1.19	
	Drive switches on, reduced speed active with 2M		A 1.19	
3-position foot switch operated	PSV switches, press in 3-stop mode		A 1.16 A 1.17	
Two-hand button operated	PSV does not switch		A 1.16 A 1.17	



Single-stroke two-hand mode

Active safety devices in this operating mode:

- E-STOP
- Guard function
- General guarding
- Side guarding

All other safety devices are inactive.

Instruction	Result	LED		Test OK
Stop button, motor	Drive switches off, reduced speed active with f/c		A 1.18	
	Drive switches off, reduced speed active with 2M		A 1.19	
Operating mode selector switch: Press single-stroke 2-hand		E 0.03		
Start button, motor	Drive switches on		A 1.18	
Two-hand button operated	PSV switches		A 1.16 A 1.17	
Foot switch operated	PSV does not switch		A 1.16 A 1.17	

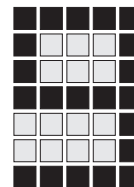
Commissioning

Single-stroke foot mode

Active safety devices in this operating mode:

- E-STOP
- Guard function
- General guarding
- Light curtain
- Safety gate

Instruction	Result	LED		Test OK
Operating mode selector switch: Press single-stroke foot		E 0.04		
Light curtain active for 1st time, function test, break protected field	Light curtain inputs on PSS no longer active	E2.01 E2.02		
Protected field cleared, press reset	Function test on light curtain complete	E2.01 E2.02		
Foot switch operated	PSV switches		A 1.16 A 1.17	
Two-hand button operated	PSV does not switch		A 1.16 A 1.17	



Automatic 2-hand mode (continuous stroke)

Active safety devices in this operating mode:

- E-STOP
- Guard function
- General guarding
- Light curtain
- Safety gate

Instruction	Result	LED		Test OK
Operating mode selector switch: Press automatic 2-hand		E 0.05		
Selected input E 2.05 connected when FS section starts up		E 2.05		
Two-hand button operated	PSV switches		A 1.16 A 1.17	
Stop continuous stroke, stop at end of cycle	PSV switches off at TDC		A 1.16 A 1.17	
Foot switch operated	PSV does not switch		A 1.16 A 1.17	

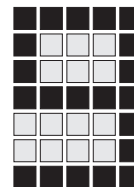
Commissioning

Automatic foot mode (continuous stroke)

Active safety devices in this operating mode:

- E-STOP
- Guard function
- General guarding
- Light curtain
- Safety gate

Instruction	Result	LED		Test OK
Operating mode selector switch: Press automatic foot		E 0.05		
Selected input E 2.05 not connected when FS section starts up		E 2.05		
Foot switch operated	PSV switches		A 1.16 A 1.17	
Stop continuous stroke, stop at end of cycle	PSV switches off at TDC		A 1.16 A 1.17	
Two-hand button operated	PSV does not switch		A 1.16 A 1.17	

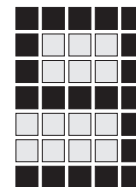


Single break mode

Active safety devices in this operating mode:

- E-STOP
- Guard function
- General guarding
- Light curtain
- Safety gate

Instruction	Result	LED		Test OK
Operating mode selector switch: Press single break		E 0.06		
Cycle lock on selection of single break active for the first time, press reset	Light curtain ready for single break mode		A 1.09	
Break light curtain once and then clear	PSV switches		A 1.16 A 1.17	
Two-hand button operated	PSV does not switch		A 1.16 A 1.17	
Foot switch operated	PSV does not switch		A 1.16 A 1.17	



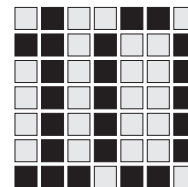
Commissioning

Double break mode

Active safety devices in this operating mode:

- E-STOP
- Guard function
- General guarding
- Light curtain
- Safety gate

Instruction	Result	LED		Test OK
Operating mode selector switch: Press double break		E 0.07		
Cycle lock on selection of double break active for the first time, press reset	Light curtain ready for double break mode		A 1.09	
Break light curtain twice and then clear	PSV switches		A 1.16 A 1.17	
Two-hand button operated	PSV does not switch		A 1.16 A 1.17	
Foot switch operated	PSV does not switch		A 1.16 A 1.17	



Fault diagnostics

Operating system faults

PSS reaction

If the operating system of the PSS failsafe section detects an operating system fault, the PSS failsafe section will switch to a STOP condition. All the PSS outputs will be switched off safely. Operating system faults are logged in an error stack (see “FS System Description” in the System Manual for the modular/compact PSS”).

Diagnosing operating system faults

Operating system faults can be read in a number of different ways:

- CPU display
- Programming device (“Online” menu)
- Additional diagnostic tool
(display system with pre-assigned text memory).

Diagnostics via CPU display

Faults logged on the error stack can be scanned using the CPU display (“F-Stack” button)
The exact procedure for this is described in the “FS System Description”, in the chapter entitled “Error Diagnostics and Correction”). The key to the error codes is given in the “Error List”.
Both these descriptions can be found in the System Manual for the modular/compact PSS.

Diagnostics via programming device

For this type of diagnostics the programming device must be connected to the PSS. The error stack is read using “Display PSS error stack” in the “On-line” menu (see “Programming Device” manual for the modular/compact PSS).

Fault diagnostics

Additional diagnostic tools

Error entries can also be viewed using an additional diagnostic tool. You will need a text display (e.g. Pilz PX 30) with pre-assigned text memory. The text display is driven using standard function blocks from the “Error Evaluation” package and various driver blocks, enabling faults to be displayed as message texts.

Error messages on standard function blocks

PSS reaction

Faults are detected by the relevant standard function block. This will trigger the error reaction configured in the user program. There is **no** general shutdown of the PSS outputs. The PSS remains in a RUN condition.

Diagnosing error messages on standard function blocks

Error messages on standard function blocks can be read in a number of different ways:

- Programming device (“Online” menu)
- Additional diagnostic tool
(text display with pre-assigned text memory).

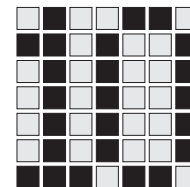
Diagnostics via programming device

For this type of diagnostics the programming device must be connected to the PSS. Error messages from the standard function blocks are stored in DB 015 (see “MBS Eccentric Press” manual).

The error messages are read using “Display variables” in the “On-line” menu (see “Programming Device” manual for the modular/compact PSS).

Follow the steps below to display the error messages:

- Select the “On-line” menu
- Select “Display variables”



- Select DB 015
- Select the relevant data word
- Confirm by pressing F4 to activate the status display

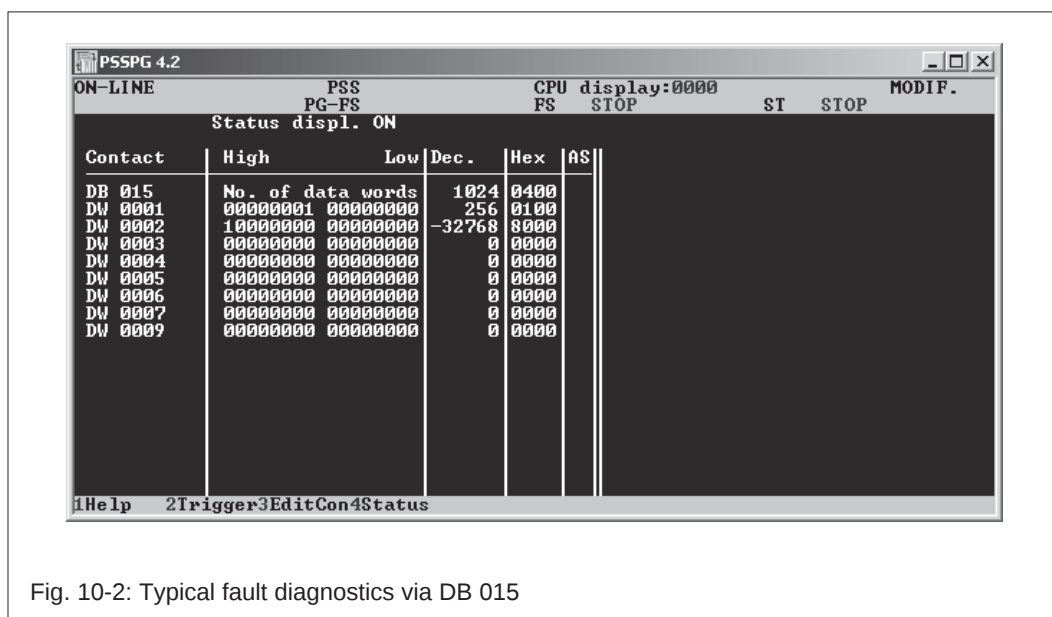
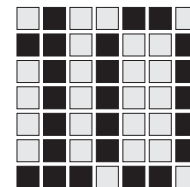


Fig. 10-2: Typical fault diagnostics via DB 015

Fig. 10-2 shows typical entries in DB 015. Set bits in a data word indicate errors. A key to the error entries is provided in the "MBS Eccentric Press" manual, under the relevant standard function block.

A data word from DB 015 is allocated to a standard function block using the SB's safety subroutine number (SSNR). In the enclosed software package, the allocation of data words to an SB is pre-assigned (see table overleaf).



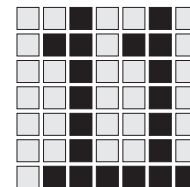
Fault diagnostics

Table of safety subroutine numbers (SSNR)

SSNR of SB	Data word in DB 015	Function	Standard function block
1	DW 001	Select operating mode	SB 051
2	DW 002	Two-hand control device	SB 059
3	DW 003	3-position foot switch	SB 092
4	DW 004	Foot switch	SB 059
5	DW 005	E-STOP	SB 061
6	DW 006	“Guard function”	SB 061
7	DW 007	“General guarding”	SB 061
8	DW 008	Camshaft	SB 074
9	DW 009	Safety gate	SB 066
10	DW 010	Monitoring for broken shearpins	SB 077
11	DW 011	ESPE/AOPD (light curtain)	SB 068
12	DW 012	Press sequence	SB 056
13	DW 013	PSV	SB 080
14	DW 014	Feedback loop for motor	SB 067
15	DW 015	Feedback loop for reduced speed	SB 067
16	DW 016	“Side guarding”	SB 061
17	DW 017	Static monitoring PSV	SB 061

Additional diagnostic tools

Error entries can also be viewed using an additional diagnostic tool. You will need a text display (e.g. Pilz PX 30) with pre-assigned text memory. The text display is driven using standard function blocks from the “Error Evaluation” package, enabling faults to be displayed as message texts.



Appendix

Current block versions

All approved blocks are supplied in an encrypted format. Users can set parameters for them but not amend them. The version status of an approved block can be recognised by the date and check sum (CRC) in the block header.

On blocks that are not approved, the version status can only be recognised by the date in the block header.



INFORMATION

This operating manual is intended exclusively for use with the standard function block versions listed below. **Always** use the current version of the relevant blocks.

Standard function blocks in the MBS Eccentric Press package

The version status of the standard function blocks in the MBS Eccentric Press package is documented in the respective operating manual, which is included on the CD as a PDF file.

Appendix

Blocks in the press upgrade package

Organisation blocks

Number	Name	Date	CRC	Version
OB 101	Zyklus	29.05.00	---	---
OB 120	Init MBS	26.05.00	---	---

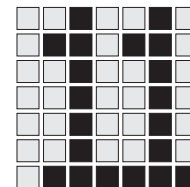
Function blocks

Number	Name	Date	CRC	Version
FB 001	BA Press	03.08.99	BFFD	1.0
FB 002	Hand/Fuß	18.08.99	6BCE	1.0
FB 003	NA/Schut	05.08.99	0541	1.0
FB 004	Allg.Fkt	06.08.99	F3F5	1.0
FB 005	NSW/Well	03.08.99	5780	1.0
FB 006	Abl./PSV	10.09.99	15FE	1.0
FB 007	AOS/BWS	03.08.99	F2CD	1.0
FB 008	Optionen	10.09.99	3FBD	1.0
FB 009	NSW Elek	19.08.99	F74C	1.0

Program blocks

Number	Name	Date	CRC	Version
PB 001	BA-Press	02.08.99	75B6	1.0
PB 002	2-Hand	18.08.99	250D	1.0
PB 003	FußTaste	02.09.99	2221	1.0
PB 004	Not-Aus	03.08.99	E95E	1.0
PB 005	Schutz	03.08.99	3F7E	1.0
PB 006	Algm.Sch	03.08.99	866E	1.0
PB 007	MotorVor	18.08.99	35F6	1.0
PB 008	Seitl.S.	05.08.99	CADB	1.0
PB 009	Elek_NSW	10.09.99	610E	1.0
PB 010	Verm.Ge.	10.09.99	5473	1.0

(Continued overleaf)

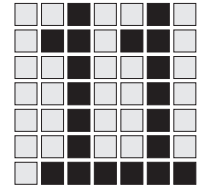


(Continued)

Number	Name	Date	CRC	Version
PB 011	3_St.Fus	10.09.99	1E7E	1.0
PB 012	NockSch.	19.08.99	C498	1.0
PB 013	SchutzTü	03.08.99	ED55	1.0
PB 014	Überw. E	10.09.99	1038	1.0
PB 017	WellBru.	10.09.99	F577	1.0
PB 018	AOS/BWS	10.09.99	134A	1.0
PB 020	AblaufP.	10.09.99	B8C9	1.0
PB 021	PSV	04.08.99	0356	1.0
PB 022	Fehl_PSV	07.09.99	8546	1.0
PB 101	Abl.Pre.	07.09.99	6D73	1.0

Data blocks

Number	Name	Date	CRC	Version
DB 002	SYS-DB2	20.08.99	---	---
DB 015	MBS-Fehl	18.08.99	---	---



Approval certificate for press upgrade package



Maschinen-, Hebe- und Fördertechnik
Fachbereich Maschinen- und Gerätesicherheit
Akkreditierte Prüf-, Überwachungs- und Zertifizierungsstelle
Notified Body 0408



GUTACHTEN

über die Konformitätsuntersuchung

TÜV-A/MHF/MG-99/05522

Auftraggeber: PILZ Ges.m.b.H.
A-1030 WIEN, Modecenterstraße 14

Hersteller: PILZ Ges.m.b.H.
A-1030 WIEN, Modecenterstraße 14

Prüfgegenstand: Sicherheitskonzept der fehlersicheren Steuerung
für Exzenterpressen

Prüfgrundlagen: EG- Richtlinie Maschinen 98/37/EG in der geltenden Fassung und somit Maschinen-
Sicherheitsverordnung (MSV); BGBl. Nr. 306/1994 idgF;
EN 292, EN 418, EN 574, EN 692, EN 954-1, EN 60204-1

Prüfungen/Untersuchungen:

- Prüfung der technischen Unterlagen
- Prüfung der sicherheitsgerichteten Programmierung
- praktische Funktionsprüfungen an einer Testpresse
- praktische Fehlerunterstellungen und -simulationen

Ergebnis: Die Prüfungen/Untersuchungen des o. a. Steuerungskonzeptes ergeben -
Übereinstimmung mit den grundlegenden Anforderungen der Maschinen-
Sicherheitsverordnung (MSV).

Bemerkung: Dieses Gutachten bezieht sich ausschließlich auf die sicherheitsgerichteten Teile der
Steuerung und stellt keine Konformitätsuntersuchung der gesamten Maschine dar.

Jede auszugsweise Vervielfältigung oder Wiedergabe bedarf der schriftlichen Zustimmung des TÜV Österreich

Für den Einsatz des Sicherheitskonzeptes (Serienfertigung) stehen seitens des Sachverständigen im Sinne der o.
a. Richtlinie keine Bedenken entgegen, sofern herstellerinterne Maßnahmen zur Gewährleistung der
Übereinstimmung getroffen sind.

Ausstellungsdatum:

Wien, am 22.09.1999



Prüfstelle:

Maschinen-, Hebe- und Fördertechnik
Maschinen- und Gerätesicherheit



Sachverständiger:
Dipl.-Ing. SCHLOSSER Christian

A	Pilz Ges.m.b.H. Modecenterstraße 14 1030 Wien Österreich Telefon (01) 7 98 62 63-0 Telefax (01) 7 98 62 64 E-Mail: pilz@eunet.at	E	Pilz Industrieelektronik S.L. Edificio Tilma Avda. Sant Julià 1 08400 Granollers Spanien Telefon (93) 8 49 74 33 Telefax (93) 8 49 75 44 E-Mail: central@pilzspain.com	MEX	Pilz de Mexico S. de R.L. de C.V. Av. San Ignacio 1079 Col. Jardines de San Ignacio C.P. 45000 Guadalajara, Jalisco Mexiko Telefon (013) 1 22 16 81 Telefax (013) 6 47 81 85 E-Mail: pilz_msolis@infosel.net.mx
AUS	Pilz Australia Industrial Automation LLP. 9/475 Blackburn Road Mt. Waverley, Melbourne VIC 3149 Australien Telefon (03) 95 44 63 00 Telefax (03) 95 44 63 11 E-Mail: safety@pilz.com.au	F	Pilz France Electronic 1, rue Jacob Mayer BP 12 67037 Strasbourg Cedex Frankreich Telefon 03 88 10 40 00 Telefax 03 88 10 80 00 E-Mail: siege@pilz-france.fr	NL	Pilz Nederland Postbus 186 4130 ED Vianen Niederlande Telefon (03 47) 32 04 77 Telefax (03 47) 32 04 85 E-Mail: info@pilz.nl
B	Pilz Belgium BC Building Industriezone III Industrielaan 4 9320 Erembodegem Belgien Telefon (053) 83 66 70 Telefax (053) 83 89 58 E-Mail: info@pilz.be	FIN	Pilz Skandinavien KS Pakilantie 61 00660 Helsinki Finnland Telefon (09) 27 09 37 00 Telefax (09) 27 09 37 09 E-Mail: pilz.sk@kolumbus.fi	P	Pilz Industrieelektronik S.L. Apartado 2028 2706-909 Colares Portugal Telefon (21) 9 28 91 09 Telefax (21) 9 28 91 13 E-Mail: pilz@esoterica.pt
L		GB	Pilz Automation Technology Willow House, Medicott Close Oakley Hay Business Park Corby Northants NN18 9NF Großbritannien Telefon (015 36) 46 07 66 Telefax (015 36) 46 08 66 E-Mail: sales@pilz.co.uk	PRC	Pilz China Representative Office Flat F9/F Huijing Building 134 Siyou Xin Malu Dongshan District Guangzhou 510600 China Telefon (020) 87 37 16 18 Telefax (020) 87 37 35 55 E-Mail: pilzchn@public.guangzhou.gd.cn
BR	Pilz do Brasil Sistemas Eletrônicos Industriais Ltda. Rua Ártico, 123 - Jd. do Mar 09726-300 São Bernardo do Campo - SP Brasilien Telefon (11) 43 37-12 41 Telefax (11) 43 37-12 42 E-Mail: pilz@pilzbr.com.br	I	Pilz Italia srl Via Meda 2/A 22060 Novedrate (CO) Italien Telefon (031) 78 95 11 Telefax (031) 78 95 55 E-Mail: pilzitalia@pilz.it	S	Pilz Skandinavien KS Energigatan 10 B 43437 Kungsbacka Schweden Telefon (03 00) 1 39 90 Telefax (03 00) 3 07 40 E-Mail: pilz@tripnet.se
CH	Pilz Industrieelektronik GmbH Gewerbepark Hintermättli Postfach 6 5506 Mägenwil Schweiz Telefon (062) 8 89 79 30 Telefax (062) 8 89 79 40 E-Mail: pilz@bluewin.ch	IRL	Pilz Ireland Industrial Automation Cork Business and Technology Park Model Farm Road Cork Irland Telefon (021) 4 34 65 35 Telefax (021) 4 80 49 94 E-Mail: sales@pilz.ie	SGP	Pilz Industrial Automation Pte Ltd. 61, Kaki Bukit Ave 1, #05-01 Shun Li Industrial Park Singapore 417943 Singapur Telefon 8 44 44 40 Telefax 8 44 44 41 E-Mail: sales@pilz.com.sg
D	Stammhaus: Pilz GmbH & Co. Felix-Wankel-Straße 2 73760 Ostfildern Deutschland Telefon (07 11) 34 09-0 Telefax (07 11) 34 09-1 33 E-Mail: pilz.gmbh@pilz.de	J	Pilz Japan Co., Ltd. Three One Building 701 3-20-5 Shin-Yokohama Kohoku-ku Yokohama 222-0033 Japan Telefon (045) 4 71-22 81 Telefax (045) 4 71-22 83 E-Mail: pilz@pilz.co.jp	USA	Pilz LP 24850 Drake Road Farmington Hills Michigan 48335 USA Telefon (2 48) 4 73-11 33 Telefax (2 48) 4 73-39 97 E-Mail: info@pilzusa.com
DK	Pilz Skandinavien KS Ellegaardvej 25 L 6400 Sønderborg Dänemark Telefon 74 43 63 32 Telefax 74 43 63 42 E-Mail: pilz@pilz.dk	...	In vielen Ländern sind wir durch Handelspartner vertreten. Nähere Informationen entnehmen Sie bitte unserer Homepage oder nehmen Kontakt mit unserem Stammhaus auf.		
		www	www.pilz.com		