



PITmode flex visu

PILZ
THE SPIRIT OF SAFETY

- ▶ Control and signal devices

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SD means Secure Digital

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1 Introduction

1.1 Definition of symbols

Information that is particularly important is 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 product or devices could be damaged and also provides information on preventive measures that can be taken. It also highlights areas within the text that are of particular importance.



INFORMATION

This gives advice on applications and provides information on special features.

2 Overview of systems for safety-related operating mode selection

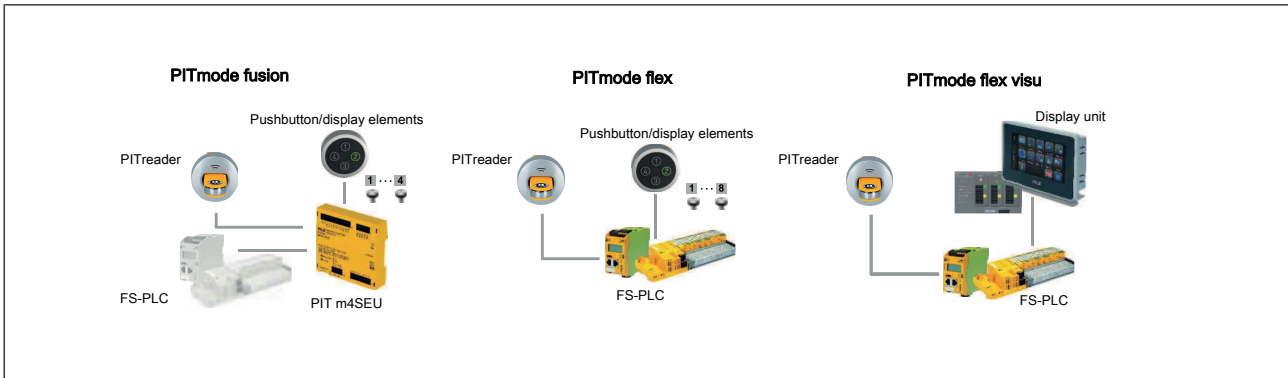


Fig.: Overview of systems for safety-related operating mode selection

PITmode fusion, PITmode flex and PITmode flex visu are systems for the safety-related selection of modes of safe operation (MSO). For example these include operating modes such as automatic, setting, test run, process monitoring and service. In all systems, access restrictions are guaranteed by the authentication system PITreader. Various devices are used to select and evaluate operating modes.

► PITmode fusion

comprises:

- Authentication system PITreader (PITreader Key or PITreader Card)
- Safe evaluation unit PIT m4SEU
- Pushbutton for selecting the operating mode (e.g. PIT oe 4S)
- Display elements for displaying the selected operating mode (as integrated in PIT oe 4S)
- Safety controller to evaluate and activate the selected operating mode

► PITmode flex

comprises:

- Authentication system PITreader (PITreader Key, PITreader Card or PIT gb with PITreader)
- Pushbutton for selecting the operating mode (e.g. PIT oe 4S)
- Display elements for displaying the selected operating mode (as integrated in PIT oe 4S)
- Safety controller to evaluate and activate the selected operating mode e.g. PNOZmulti or the safety controller from the automation system PSS 4000
- Elements/components from Pilz

► PITmode flex visu

comprises:

- Authentication system PITreader (PITreader Key, PITreader Card or PIT gb with PITreader)
- Display unit for selecting and displaying the operating mode
A PASvisu project with the "MSO flex visu" tile is used on the display unit.

- Safety controller to evaluate and activate the selected operating mode e.g. PNOZmulti or the safety controller from the automation system PSS 4000
- Elements/components from Pilz

The chapters that follow describe the system PITmode flex visu. There are separate documents for the other systems.

3 Safety

3.1 Intended use

PITmode flex visu is a system for the safety-related selection of modes of safe operation (MSO). For example these include operating modes such as automatic, setting, test run, process monitoring and service. Up to 8 modes of safe operation can be selected on PIT-mode flex visu.

With this safety-related selection system, an operating mode is selected safely using a selection device in conjunction with an access device. The access device itself does not fulfil any safety functions.

Only the following display units from Pilz may be used for safety-related operating mode selection:

- ▶ PMI v704e, order number 266704
- ▶ PMI v707e, order number 266707
- ▶ PMI v807, order number 266807
- ▶ PMI v812, order number 266812
- ▶ PMI v815, order number 266815

The system can be used for applications in accordance with

- ▶ EN ISO 13849-1:2015 up to Cat 3, PL d
- ▶ IEC/EN 61508-3:2010 up to SIL 2
- ▶ IEC/EN 62061:2005 + A1:2012 + A2:2015 up to SIL CL 2

3.2 Safety regulations

3.2.1 Additional documents that apply

Read and observe the following documents for the system PITmode flex visu with PNOZmulti:

- ▶ Operating manual PITreader, operating manual PIT gb RLLE y ETH
- ▶ Operating manual PMI v704e/707e, operating manual PMI v807/v812/v815
- ▶ Operating manuals for the PNOZmulti devices that are used
- ▶ Online Help PNOZmulti Configurator
- ▶ Online Help PASvisu Builder

Read and observe the following documents for the system PITmode flex with PSS 4000:

- ▶ Operating manual PITreader, operating manual PIT gb RLLE y ETH
- ▶ Operating manual PMI v704e/707e, operating manual PMI v807/v812/v815
- ▶ Operating manuals for the applied PSSu modules
- ▶ PAS4000 Online Help
- ▶ Online Help PASvisu Builder

3.2.2 Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, maintained and decommissioned by persons who are competent to do so.

A competent person is a qualified and knowledgeable person who, because of their training, experience and current professional activity, has the specialist knowledge required. To be able to inspect, assess and operate devices, systems and machines, the person has to be informed of the state of the art and the applicable national, European and international laws, directives and standards.

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 information provided in the section entitled Safety
- ▶ Have a good knowledge of the generic and specialist standards applicable to the specific application.

3.2.3 Warranty and liability

All claims to warranty and liability will be rendered invalid if

- ▶ The product was used contrary to the purpose for which it is intended,
- ▶ Damage can be attributed to not having followed the guidelines in the manual,
- ▶ Operating personnel are not suitably qualified,
- ▶ Any type of modification has been made (e.g. exchanging components on the PCB boards, soldering work etc.).

3.2.4 Disposal

- ▶ When decommissioning, please comply with local regulations regarding the disposal of electronic devices (e.g. Electrical and Electronic Equipment Act).

3.3 Application conditions

**WARNING!****Hazardous state due to defective safety function**

A failure of the safety function or a defective safety function may mean that the operating mode switches unexpectedly or fails to switch despite a new operating mode being selected.

**NOTICE**

With safety-related operating mode selection, only the Pilz display units listed in the section entitled [Intended use](#) [📖 8] may be used for visualisation.

**NOTICE**

Note the provisions of the type C standards (machinery safety standards) for the respective application with regard to operating mode selection, such as section 5.2.4 of EN ISO 16090-1 for example.

**NOTICE**

Design your system so that MSO1 is the safest mode of operation.

**NOTICE**

The plant should undergo a complete function test after installation and each time the configuration is changed. This inspection may only be carried out by qualified personnel.

**NOTICE****Note:**

- The active operating mode must always be visible to the operator.
- The operator must always ensure that the required operating mode is the one that is actually selected.
If the operating mode selected is not the one that is required, the system must be shut down immediately.
- You must check that the required operating mode is selected each time before starting the machine.



NOTICE

Check the following:

- The operator must have sufficient training for the selected operating mode.
- The operating mode displayed after the selection is made must match the operating mode that the operator selected.



NOTICE

The system does not check any interdependencies between the individual working areas.

If you are using more than one working area, check the interdependencies between the working areas and consider these in your customer application before activating the selected MSOs.



CAUTION!

It is essential to note:

- The operating mode may only ever be selected from outside the danger zone
- The selected operating mode itself must not cause the machine to start.
- After an operating mode has been selected, the safety functions must not be switched while the machine is running.

Please note also:

- ▶ The PASvisu Server must be on the display unit and not on an external device.
- ▶ The working area must be unique within a Modbus/TCP network and may not be assigned twice.
- ▶ If you need more than 10 working areas, the connected Modbus/TCP network must be segmented (e.g. using firewalls).

For the system PITmode flex visu with PNOZmulti please note:

- ▶ A separate MSO flex visu element must be configured in the PNOZmulti project for each working area. Just one "MSO flex visu" tile must be available for this element in the PASvisu project. The PASvisu project may be run on just one display unit. The PASvisu project may contain tiles for several working areas. However, all working areas must be visible from the display unit.
- ▶ You will need to ensure that the PASvisu visualisation project corresponds to that of the PNOZmulti project. Changes must be made on both sides.

For the system PITmode flex visu with PSS 4000 please note:

- ▶ A separate instance of the block FS_MSO_PITreader_Visu must be used and configured in the PSS 4000 project for each working area. Just one "MSO flex visu" tile must be available for this instance of the block in the PASvisu project. The PASvisu project may be run on just one display unit. The PASvisu project may contain tiles for several working areas. However, all working areas must be visible from the display unit.
- ▶ You must ensure that the PASvisu visualisation project corresponds to that of the PSS 4000 project. Changes must be made on both sides.

4 Security

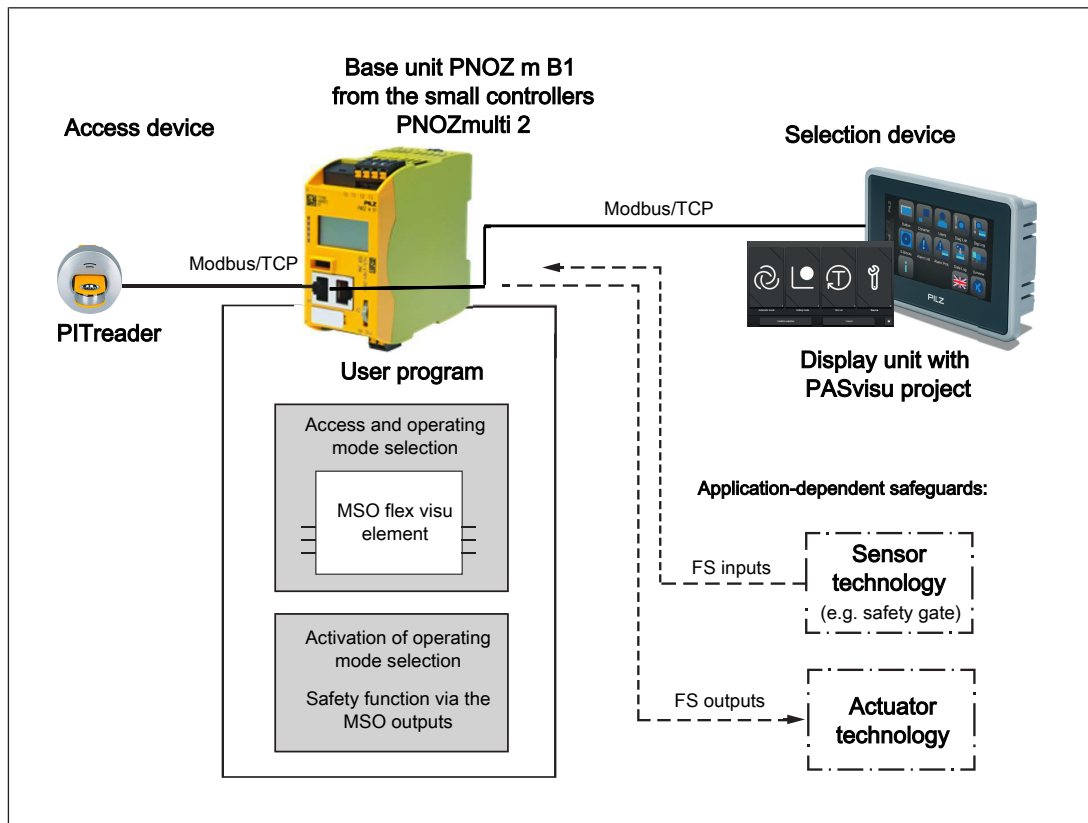
4.1 Required security measures

- ▶ Modbus/TCP has no security mechanisms. Use a firewall to protect the product from unauthorised access.
- ▶ The products' communication interfaces should be protected against physical manipulation.
- ▶ Protect the 24 V inputs and outputs on the safety controller against physical manipulation through protected wiring, e.g. by installing the safety controller in a lockable control cabinet.
- ▶ Protect the configuration and log data from unauthorised changes. Configure the display device so as to prevent unauthorised access to the file system.

5 PITmode flex visu with PNOZmulti

5.1 Description

5.1.1 System overview



PITmode flex visu is a system for the safety-related selection of modes of safe operation (MSO). For example these include operating modes such as automatic, setting, test run, process monitoring and service. Up to 8 modes of safe operation can be selected on PITmode flex visu.

With this safety-related selection system, an operating mode is selected safely using a selection device in conjunction with an access device. The access device itself does not fulfil any safety functions.

Hardware and software components for the overall system:

► Access device

The access device consists of the authentication system PITreader with transponder for restricting access. A user can authenticate himself on the PNOZmulti by positioning a transponder on the PITreader and is thereby authorised for certain actions. The permission on the transponder must be greater than or equal to the selection on the operating mode selector switch (MSO number).

Several PITreader units can be connected to a base unit PNOZ m B1 (see [System expansion](#) [18]).

► Selection device

Operating modes are selected using a display unit (Visu panel).

Only the display units stated in the section entitled Intended use may be used for safety-related operating mode selection.

A project from the visualisation system PASvisu is operated on the display unit. The "MSO flex visu" tile is used in the process.

A tile must be created for each working area (e.g. infeed, machining, outfeed). The operating mode is selected on the tile; the status of the operating mode selection is also displayed.

The selection device must be evaluated on the safety controller.

Several display units can be connected to a base unit PNOZ m B1 (see [System expansion](#) [18]).

► Base unit PNOZ m B1 from the system PNOZmulti 2

The PNOZmulti is used to evaluate and monitor the access and selection device; it is also used for safety-related control of the system's overall safety function, which is application-dependent. A user program must be created in the PNOZmulti Configurator for this purpose.

The plant can be divided into working areas, e.g. infeed, machining, outfeed. A maximum of 8 working areas can be created for one base unit. One MSO flex visu element is created for each working area.

The MSO flex visu function element performs the following tasks:

- Reads the checked permission from the PITreader
- Evaluates the selection made from the display unit and acknowledgement
- Outputs display information via the diagnostic bits
- Generates and outputs diagnostic messages
- Outputs the mode of safe operation (MSO)

For the actual activation, the safety functions required for the selected operating mode are subsequently activated, depending on the application and the selected operating mode (e.g. light curtains or safety gates).

5.1.2 Safety features

- If no data or invalid data is received from the PITreader, the behaviour is the same as if no transponder is present or the transponder has been removed.
- The operating mode can only be selected under the following conditions:
 - Besides the pushbuttons, a PITreader is connected, a transponder is positioned and the transponder contains the relevant permission.
 or
 - The system is configured to automatically switch to the operating mode MSO1 when the transponder is removed.

The lock input must not be activated while an operating mode selection button is operated, otherwise the buttons will be deactivated.

- An operating mode can only be selected with the required permission from the assigned PITreader. The permission on the transponder must be greater than or equal to the selection on the operating mode selection button (MSO number).

- ▶ Operating mode selection will only be carried out if the relevant button is operated for a certain time and several buttons are not operated simultaneously.
- ▶ The user must also check the selection that is reported back and confirm it via a separate button. Confirmation is only valid if the button is operated for a certain time and several buttons are not operated simultaneously.
- ▶ It is ensured that only one safe operating mode is selected at any time.
- ▶ Operating mode 1 is always selected after a restart.

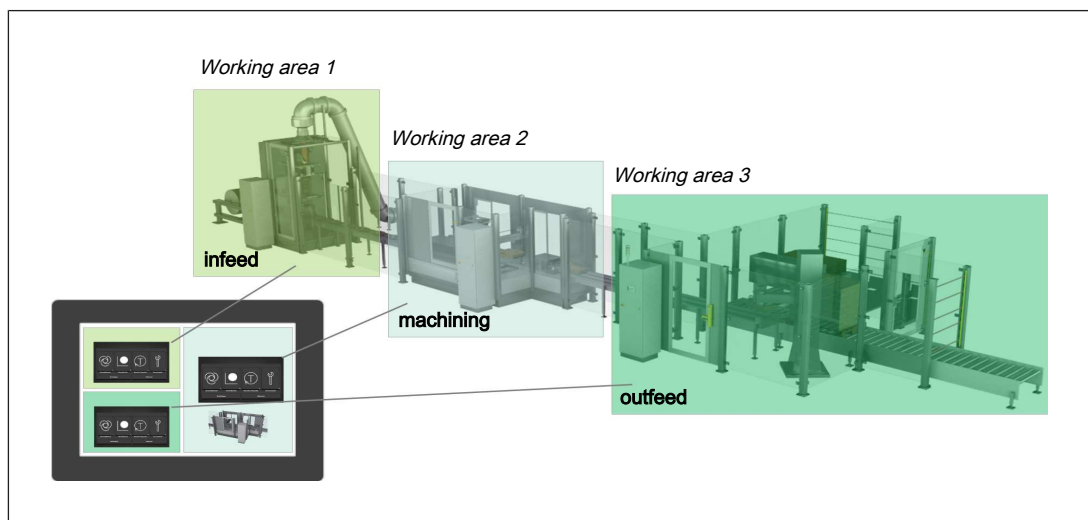
5.1.3 Working areas

A plant can be divided into different working areas. Working areas may be "infeed", "machining" and "outfeed" for example.

Separate operating modes may be assigned to each working area.

In the PNOZmulti Configurator, one working area is assigned to each MSO flex visu element. A working area may only be assigned once. Up to 8 working areas can be created for one base unit PNOZ m B1.

In the PASvisu Builder, one "MSO flex visu" tile is used for each working area.



5.1.4 Behaviour when the transponder is removed

In the PNOZmulti Configurator there are various options to configure the reaction that should occur when the transponder has been removed:

- ▶ Hold mode
The operating mode currently selected is retained.
- ▶ Fall back to mode 1
After the fall back delay (configurable) has elapsed, operating mode 1 will be selected instead of the operating mode currently selected.
- ▶ Fall back to mode 1 on service mode
After the fall back delay (configurable) has elapsed, operating mode 1 will only be selected if a service mode is currently selected. Otherwise, the currently selected operating mode is retained.

The fall back delay time is started when the transponder is removed. If a transponder with appropriate permission is positioned before the fall back delay time elapses, then fall back is prevented.

If **Acknowledge** is configured, the operating mode must also be acknowledged during fall back.

Fall back is prevented while the lock input (configurable) is active.

5.1.5 Acknowledge

As an option, an input on the controller can be used to acknowledge the operating mode selection.

After the selection is confirmed in the display unit, the selected operating mode is not adopted until there is also acknowledgement via the acknowledgement input on the controller.

5.1.6 Lock input

As an option, an input on the controller can be used to lock the operating mode selection.

While there is a high signal at the input configured for the lock input, the lock input is active and the operating mode cannot be changed.

5.1.7 Service mode

A maximum of 7 of the 8 operating modes can be configured as service mode. The number of the first service mode is stated; all subsequent operating modes are then automatically service modes.

Operating modes 5 to 8 are configured as service modes in the default setting.

If service modes are configured, the option **Fall back to mode 1 on service mode** should also be selected.

5.1.8 Audit trail

The "MSO flex visu" tile logs the following events:

- ▶ A user changing the operating mode
- ▶ The controller acknowledging an operating mode
- ▶ Reverting to operating mode MSO1

In the tile properties it is possible to configure whether the log should contain personal data (currently only the SID of the transponder). Personal data is used to identify the person who performed the action.

5.2 System expansion

Maximum system expansion for a base unit PNOZ m B1:

- ▶ 8 working areas can be configured
- ▶ 8 MSO flex visu elements can be configured.
- ▶ 4 PITreaders can be connected
- ▶ 4 units can be connected (however, the tile for a working area may only be displayed on one display unit)
- ▶ Maximum 10 working areas for one display unit.

5.3 Installation

5.3.1 Connect PITreader

The PITreader is connected to the base unit PNOZ m B1 via an Ethernet cable (for the number of PITreaders that can be connected see [System expansion \[18\]](#)). Please refer to the information and requirements in the operating manual for the PITreader.

5.3.2 Connect display unit

The display unit is connected to the base unit PNOZ m B1 via an Ethernet cable (for details of the display units that can be connected see [Intended use \[8\]](#), for the number of display units see [System expansion \[18\]](#)).

5.4 Configuration

5.4.1 Configure display unit

The display on the display unit is configured using the software tool PASvisu Builder.

A PASvisu project is created and an "MSO flex visu" tile is added for each working area. The tile contains the buttons for selecting operating modes.

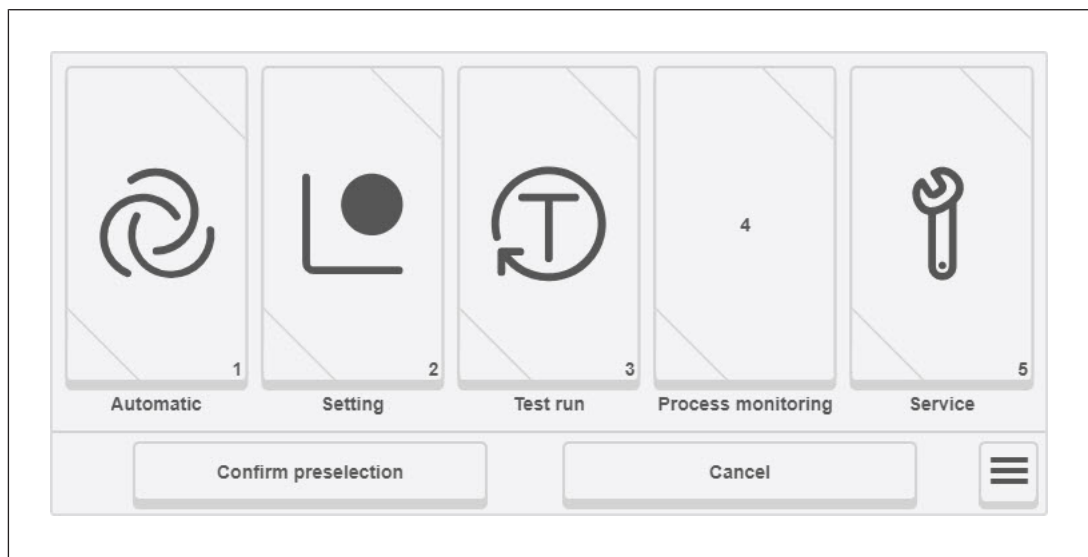


Fig.: Example for an "MSO flex visu" tile

A tile contains a maximum of 8 buttons. In the default configuration the buttons have the following labels:

MSO1 = Automatic mode

MSO2 = Setting mode

MSO3 = Manual intervention

MSO4 = Process monitoring

MSO5 = Service

MSO6 = Service 2

MSO7 = Service 3

MSO8 = Service 4

The labels on the buttons and icons can be changed. You can configure which buttons you use.

The buttons for the service modes are only visible on the display unit if a transponder with permission for the service modes is positioned and the selection lock is not activated. The button with the active operating mode is always visible.

Procedure

1. Create PASvisu project

Create a project in the PASvisu Builder.

2. Select data source

The operating mode selection configured on the connected PNOZmulti base unit and in the PASvisu project must match. This is guaranteed if the PNOZmulti project is used as the data source.

Select the PNOZmulti project as data source.

3. Insert tiles

Insert an "MSO flex visu" tile in the PASvisu project for each working area.

4. Configure tiles

Configure the tiles. For details of the configuration please refer to the Online Help for the PASvisu Builder.

5. Perform download

Download the PASvisu project to the display unit.

Notes

- ▶ Positioning of tiles

Ensure that an "MSO flex visu" tile is not covered by any other tiles. The operator must be able to see the whole tile.

- ▶ Consistent configuration of operating mode selection

The operating mode selection configured in the controller and PASvisu project must match. This is checked at the PASvisu project's runtime. If the configurations do not match, the tile is marked as faulty and no operating mode can be selected.

The best method for guaranteeing that the configurations in the controller and PASvisu project match is as follows: in the tile properties in the PASvisu project, select the corresponding element from the PNOZmulti project. That way the configuration will be copied from the PNOZmulti project and cannot be edited.

- ▶ One tile per working area

It is the user's responsibility to ensure that there is no more than one "MSO flex visu" tile per working area and that this tile is displayed on just one display unit.

Note: If the following error message is displayed: "Button was not pressed for long enough", even though the button was pressed for a sufficient amount of time, this may indicate that more than one tile is present for the working area.

- ▶ Labels for the buttons and icons

Adapt the label on the buttons and icons to suit your own application. Clear labelling and good icons help the operator to select the required button.

5.4.2 Configure PITreader

The PITreader is configured using a web application, see PITreader operating manual.

5.4.3 Configure PNOZmulti

All the configurations are performed and the user program created in the PNOZmulti Configurator.

5.4.3.1 Configure hardware

Add the following devices to the hardware configuration:

- ▶ Base unit PNOZ m B1
- ▶ Input and output modules
- ▶ Connected device PITreader
- ▶ Connected device display unit

5.4.3.2 Configure connection to the PITreader

- ▶ The connection to the PITreader is established via Modbus/TCP.

The Modbus/TCP Client connection between PNOZmulti and PITreader must be configured in the PNOZmulti Configurator.

Prerequisite

- ▶ PITreader and base unit PNOZ m B1 are connected via an Ethernet cable.
- ▶ A connected PITreader device has been added to the hardware configuration.

Procedure

- ▶ Configure the following network settings for the connection.

To do this, go to the hardware configuration and double-click on the PITreader you wish to configure under **Configured hardware**.

- **IP address:** Enter the PITreader's IP address. The factory default setting is 192.168.0.12.
- **Port:** 502

5.4.3.3 Configure connection to the display unit

The connection to the display unit is established via Modbus/TCP.

The connection is established automatically and does not need to be configured.

5.4.3.4 **Configure MSO flex visu element**

This element is used to evaluate the information from the access device and to evaluate, monitor and acknowledge the operating mode selection.

Add the MSO flex visu element to the user program and configure:

- ▶ Operating mode 1 ... 8
- ▶ Acknowledge input (optional)
- ▶ Lock input (optional)
- ▶ Service modes
- ▶ Behaviour once the transponder is removed (potentially with fall back delay).

5.4.3.5 **Configure safety function**

The actual activation of the safety functions required for the selected operating mode may depend on the application (e.g. light curtain or safety gates).

Assign the safety functions required for the various modes of safe operation using outputs *MSO1 ... MSO8*.

5.5 Operation

5.5.1 Select safe mode of operation MSO1 ... MSO8

Operating modes are selected via a display unit (Visu panel), on which a project from the visualisation system PASvisu is operated. The "MSO flex visu" tile is used in the process. The tile contains the buttons for selecting operating modes.

The buttons for the service modes are only visible on the display unit if a transponder with permission for the service modes is positioned and the selection lock is not activated. The button with the active operating mode is always visible.

Prerequisites

- ▶ A transponder with the corresponding permission must be positioned on the PITreader.
- ▶ The PITreader must recognise the transponder as valid.
- ▶ The transponder must be positioned on the PITreader for the whole time a button is operated.
- ▶ The display unit must be connected.
- ▶ Several pushbuttons may **not** be operated simultaneously when selecting an operating mode.

Procedure

1. Select mode of safe operation

Select the required operating mode by pressing the relevant button on the tile. The button must be pressed for between 500 ms and 5000 ms.

The button lights up yellow. 

2. Confirm operating mode selection


Press the "Confirm preselection" button on the tile.

The button flashes green. 

The preselection is now confirmed, but as yet unacknowledged by the PNOZmulti.

If "Acknowledge" is configured, the mode of safe operation will not be adopted until the selection is acknowledged (1-signal at "Acknowledge" input).

Note: A selected but as yet unacknowledged mode of safe operation will be reset to the current mode of safe operation if a 1-signal occurs at the "Lock input" before acknowledgement is received.

The mode of safe operation has been selected correctly when the button is continuously lit green. 






INFORMATION

You can switch at will between the individual operating modes MSO1 ... MSO8; i.e. it is possible to switch from MSO1 to MSO3 or from MSO4 to MSO2, for example.

5.5.2 Button status indicators

A tile in PASvisu contains a maximum of 8 buttons for selecting operating modes. Each button has triangles on the bottom left and top right to indicate the status.

Status indicator	Description
<p data-bbox="363 450 751 479">Top right triangle lights up green</p> 	<p data-bbox="906 450 1235 479">Operating mode is selected</p>
<p data-bbox="363 855 778 884">Bottom left triangle lights up yellow</p> 	<p data-bbox="906 855 1410 972">Operating mode is preselected, but the preselection must still be confirmed by pressing the “Confirm preselection” button on the tile.</p>
<p data-bbox="363 1252 735 1281">Top right triangle flashes green</p> 	<p data-bbox="906 1252 1417 1312">Operating mode is preselected. It must still be acknowledged by the controller.</p>

5.5.3 Status and error messages through the PNOZmulti

The status of the operating modes can be displayed using a logic link to the MSO outputs or via the diagnostic words.

2 diagnostic words are available for the MSO flex visu element. These can be displayed via a display unit. For more information refer to the section on "Diagnostic configuration PVIS" in the Online Help for the PNOZmulti Configurator.


Diagnostic word 1

Bit No.	Description	Cause and remedy
0 ... 7	Outputs operating mode 1 ... 8	For information only, no remedy required.
8	Cannot select operating mode because the controller has received invalid data from the visualisation.	Possible causes: <ul style="list-style-type: none"> ▶ Different configuration in PNOZmulti and PASvisu ▶ Corresponding Modbus registers are overwritten by another controller. Remedy: <ul style="list-style-type: none"> ▶ Check Modbus configuration
9	Error in the test pulse wiring	Possible causes: <ul style="list-style-type: none"> ▶ Short between contacts in the input wiring to 24 V or other signal cables Remedy: <ul style="list-style-type: none"> ▶ Ensure that there are no shorts between contacts in the test pulse wiring. ▶ Ensure that the input is wired in accordance with the configuration and circuit diagram. ▶ Contact Pilz.
10	The transponder does not have the required permission	Possible causes: <ul style="list-style-type: none"> ▶ The permission is not greater than or equal to the mode of safe operation that is being selected. Remedy: <p>For information only, no remedy required.</p> <p>Note: The diagnostic message is output for as long as the error is present and for 2 seconds after the error condition has ended.</p>

Bit No.	Description	Cause and remedy
11	Incorrect user entry	<p>Possible causes:</p> <ul style="list-style-type: none"> ▶ Lock input is active ▶ More than one pushbutton was operated simultaneously <p>Note: Prior to a new selection and to reset the diagnostic message, no button may be operated.</p> <ul style="list-style-type: none"> ▶ One of the buttons was operated for longer than 5 s. <p>Remedy:</p> <p>For information only, no remedy required.</p> <p>Note: The diagnostic message is output for as long as the error is present and for 2 seconds after the error condition has ended. The current operating mode is maintained.</p>
12	There is no transponder present.	<p>Possible causes:</p> <ul style="list-style-type: none"> ▶ No transponder positioned on the PITreader ▶ PITreader cannot read the transponder <p>Remedy:</p> <ul style="list-style-type: none"> ▶ Change transponder.
13	The transponder does not have permission (permission = 0)	<p>Possible causes:</p> <ul style="list-style-type: none"> ▶ The transponder does not contain any valid data ▶ The transponder was not assigned any permission for this working area <p>Remedy:</p> <p>For information only, no remedy required.</p>
14	Cannot authenticate because the data from the PITreader is invalid.	<p>Possible causes:</p> <ul style="list-style-type: none"> ▶ Connection to the PITreader is configured incorrectly ▶ Modbus registers are overwritten by another controller <p>Remedy:</p> <p>For information only, no remedy required.</p>

Bit No.	Description	Cause and remedy
15	Communication with the PITreader is interrupted	<p>Possible causes:</p> <ul style="list-style-type: none"> ▶ Cable connection broken between PNOZmulti and PITreader ▶ IP address is configured incorrectly <p>Remedy:</p> <ul style="list-style-type: none"> ▶ Check the connection between the PITreader and the PNOZmulti.

Diagnostic word 2

Bit No.	Description	Cause and remedy
0 ... 7	The controller has not yet acknowledged the selected operating mode 1 ... 8.	<p>Possible causes:</p> <ul style="list-style-type: none"> ▶ The operating mode was changed, but the selection has not yet been acknowledged. <p>Remedy:</p> <p>The diagnostic message is for information purposes only.</p>
10	The controller has not yet acknowledged the selected operating mode.	<p>Possible causes:</p> <ul style="list-style-type: none"> ▶ The operating mode was changed, but the selection has not yet been acknowledged. <p>Remedy:</p> <p>For information only, no remedy required.</p>
11	Operating mode selection is locked	<p>Possible causes:</p> <ul style="list-style-type: none"> ▶ Lock input is active <p>Remedy:</p> <p>For information only, no remedy required.</p>
12	Delay time is running for fall back to mode 1.	<p>For information only, no remedy required.</p> <p>Please also refer to the information under Behaviour when the transponder is removed [ 16]</p>

5.6 Version query for the "MSO flex visu" tile

In a PASvisu project (PASvisu Builder), an "MSO flex visu" tile must be added and configured for each working area. The "MSO flex visu" tile on the PASvisu Builder is versioned. However, the version of the "MSO flex visu" tile is independent of the version of the PASvisu Builder that is used.

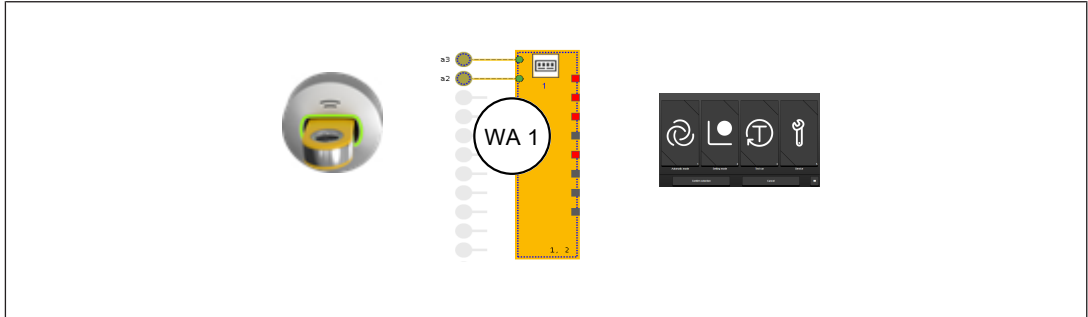
You can have the tile version displayed on the display unit:

- ▶ Click on the  button on the "MSO flex visu" tile (working area) and select **Display version**.

5.7 Examples for PITmode flex visu with PNOZ m B1

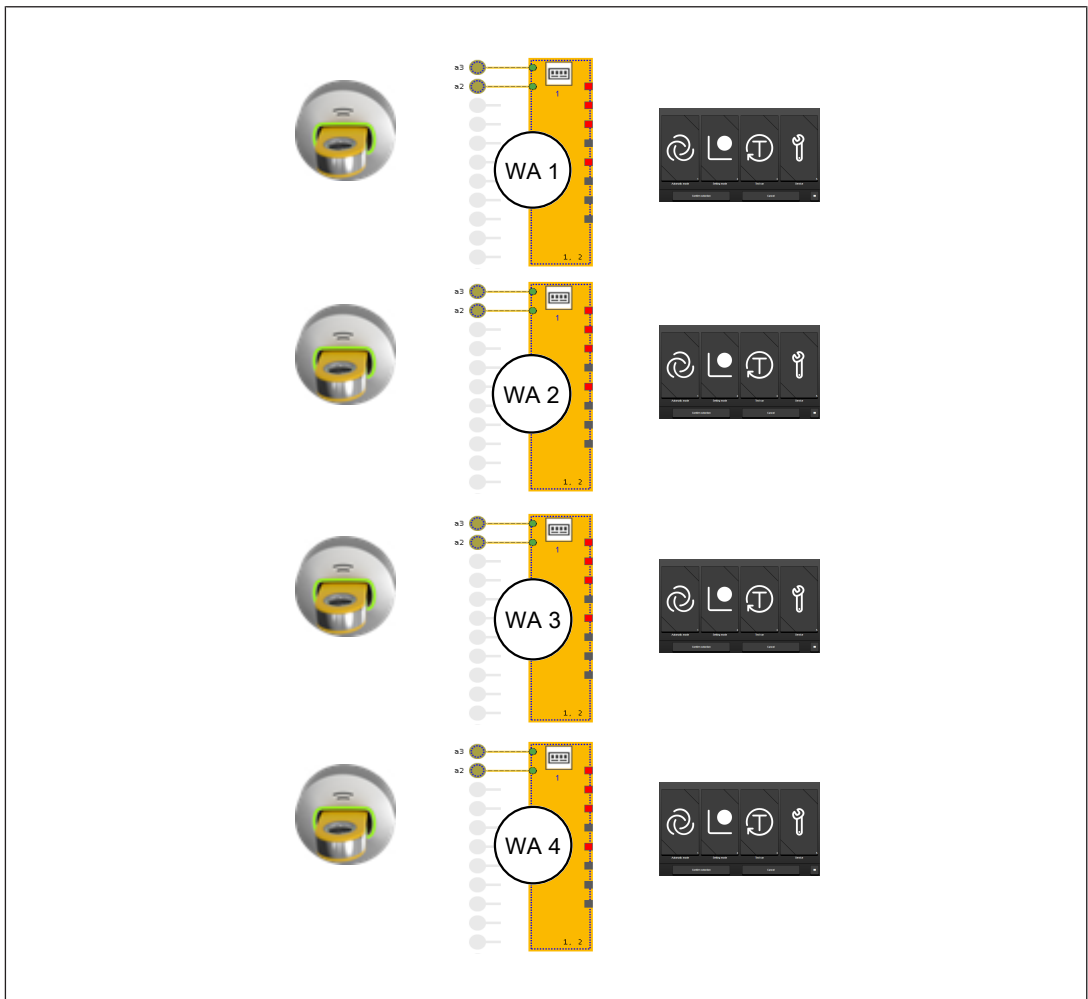
5.7.1 Example 1

1 PITreader for 1 working area (WA) and display on a display unit.



5.7.2 Example 2

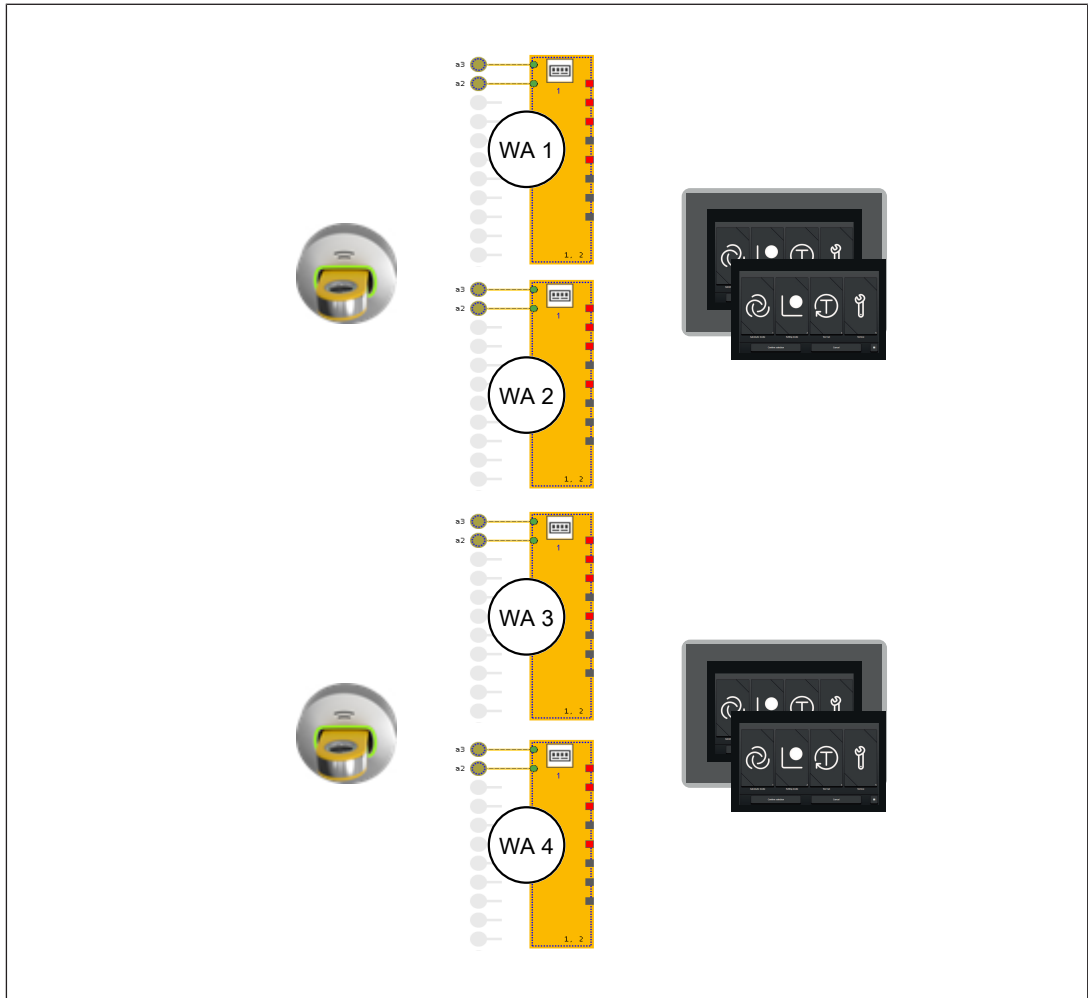
4 PITreaders, 1 for each working area (WA). Separate display on a display unit per working area.



5.7.3

Example 3

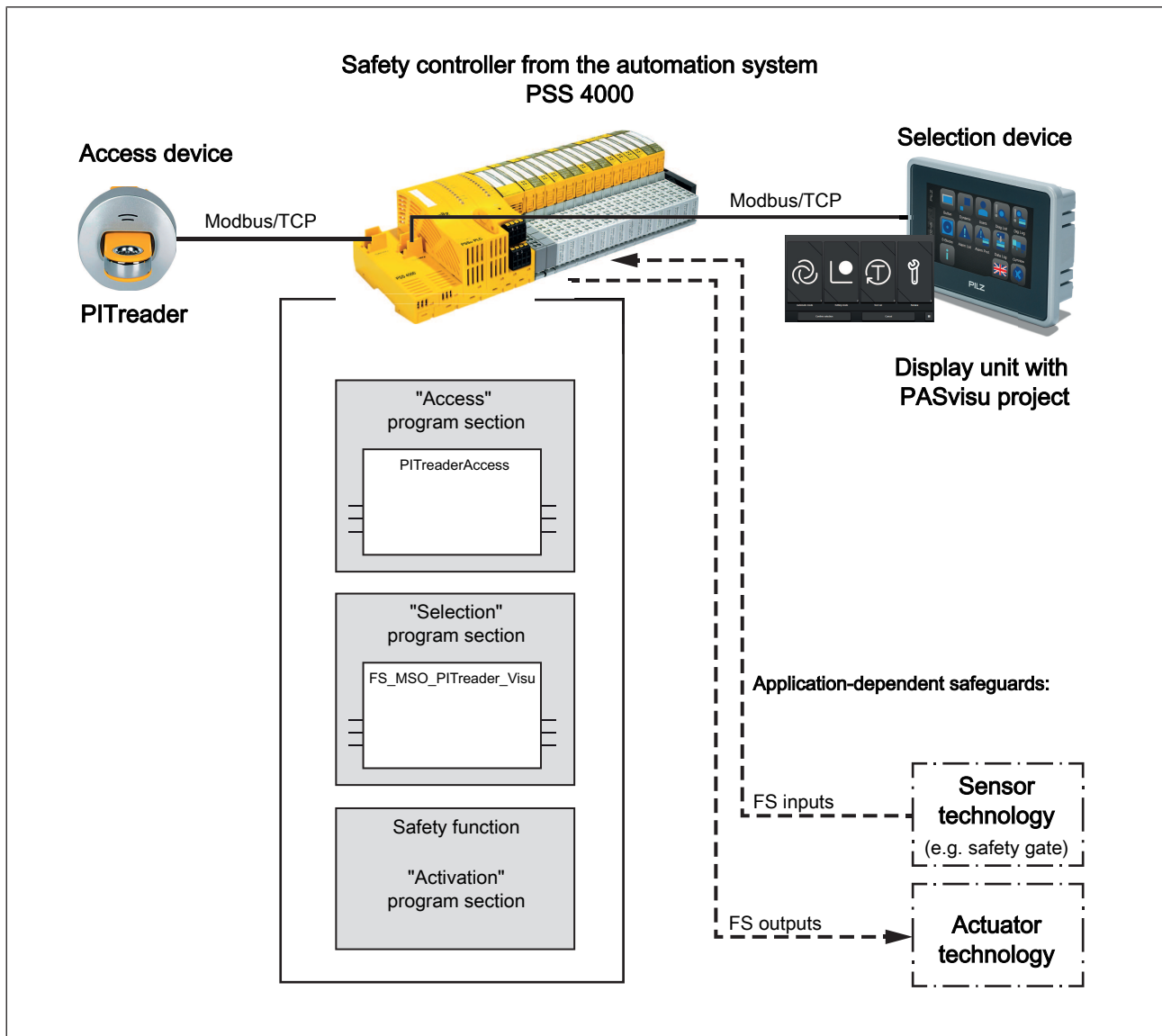
2 PITreaders, each covering 2 working areas (WA). 2 working areas covered by one display on a display unit.



6 PITmode flex visu with PSS 4000

6.1 Description

6.1.1 System overview




PITmode flex visu is a system for the safety-related selection of modes of safe operation (MSO). For example these include operating modes such as automatic, setting, test run, process monitoring and service. Up to 8 modes of safe operation can be selected on PIT-mode flex visu.

With this safety-related selection system, an operating mode is selected safely using a selection device in conjunction with an access device. The access device itself does not fulfil any safety functions.

Hardware and software components for the overall system:

► **Access device**

The access device consists of the authentication system PITreader with transponder for restricting access. A user can authenticate himself on the safety controller by positioning a transponder on the PITreader and is thereby authorised for certain actions. The permission on the transponder must be greater than or equal to the selection on the operating mode selector switch (MSO number).

Several PITreader units can be connected to a safety controller (see [System expansion](#) [ 34]).

► **Selection device**

Operating modes are selected using a display unit (Visu panel).


Only the display units stated in the section entitled Intended use may be used for safety-related operating mode selection.

A project from the visualisation system PASvisu is operated on the display unit.

The "MSO flex visu" tile is used in the process.


A tile must be created for each working area (e.g. infeed, machining, outfeed). The operating mode is selected on the tile; the status of the operating mode selection is also displayed.

The selection device must be evaluated on the safety controller.

Several display units can be connected to a safety controller from the automation system PSS 4000 (see [System expansion](#) [ 34]).

► **Safety controller from the automation system PSS 4000**

The safety controller is used to evaluate and monitor the access device and selection device, and also for safety-related control of the application-dependent safety function of the overall system. To do this, an application-dependent user program must be created in the safety controller.

The plant can be divided into working areas, e.g. infeed, machining, outfeed (see [Working areas](#) [ 32]).

The user program generally consists of the following program sections:

– "Access" program section

The information from the access device is evaluated in the "Access" program section. The PITreaderAccess block is required to do this. The current access permission is available as an evaluation result.

– "Selection" program section

In the "Selection" program section, the result from the "Access" program section is evaluated and the operating mode selected via the selection device is evaluated and monitored. The block FS_MSOPITreader_Visu is required to do this. If there is sufficient access permission and the selection is correct, the selected operating mode is available as an evaluation result.

– "Activation" program section

The result from the "Selection" program section is evaluated in the "Activation" program section. The safety functions required for the selected operating mode (e.g. light guards or safety gates) are activated in this program section, depending on the application, the selected working area and the selected operating mode.

6.1.2 Safety features

- ▶ If no data or invalid data is received from the PITreader, the behaviour is the same as if no transponder is present or the transponder has been removed.
- ▶ The operating mode can only be selected under the following conditions:
 - Besides the pushbuttons, a PITreader is connected, a transponder is positioned and the transponder contains the relevant permission.
- or
 - The system is configured to automatically switch to the operating mode MSO1 when the transponder is removed.

The lock input must not be activated while an operating mode selection button is operated, otherwise the buttons will be deactivated.

- ▶ An operating mode can only be selected with the required permission from the assigned PITreader. The permission on the transponder must be greater than or equal to the selection on the operating mode selection button (MSO number).
- ▶ Operating mode selection will only be carried out if the relevant button is operated for a certain time and several buttons are not operated simultaneously.
- ▶ The user must also check the selection that is reported back and confirm it via a separate button. Confirmation is only valid if the button is operated for a certain time and several buttons are not operated simultaneously.
- ▶ It is ensured that only one safe operating mode is selected at any time.
- ▶ When restarting, the block will either output the mode of safe operation 1 (MSO1) or the most recently selected mode of safe operation, depending on the configuration.

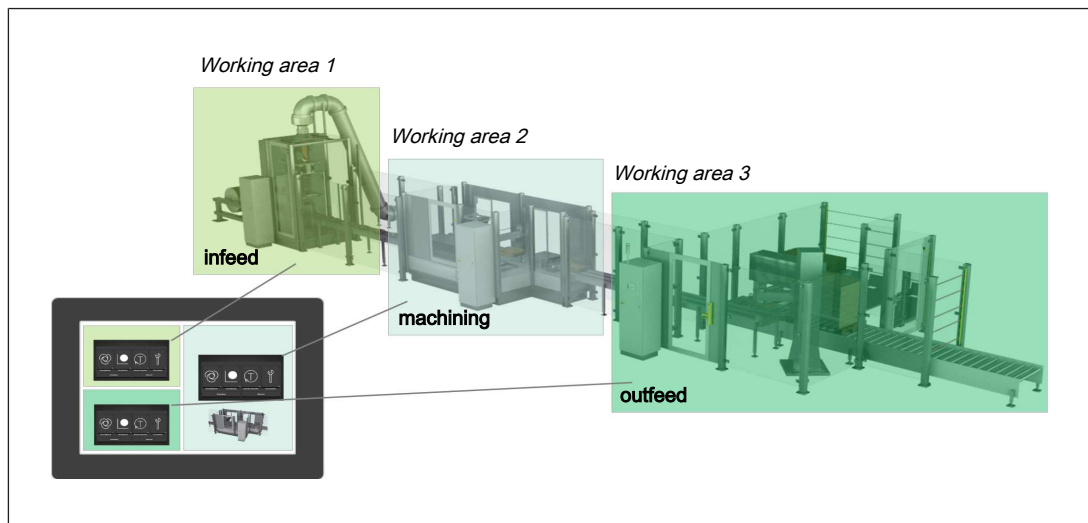
6.1.3 Working areas

A plant can be divided into different working areas. Working areas may be "infeed", "machining" and "outfeed" for example.

Separate operating modes may be assigned to each working area.

If there are several working areas, an instance of the block FS_MSOPITreader_Visu is assigned to each working area in the PSS 4000 project. A working area may only be assigned once. Up to 10 working areas can be created for a safety controller.

In the PASvisu Builder, one "MSO flex visu" tile is used for each working area.



6.1.4 Behaviour when the transponder is removed

The behaviour when the transponder is removed is configurable. The following options are available:

- ▶ Hold mode
The operating mode currently selected is retained.
- ▶ Fall back to mode 1
After the fall back delay (configurable) has elapsed, operating mode 1 will be selected.
- ▶ Fall back to mode 1 on service mode
After the fall back delay (configurable) has elapsed, operating mode 1 is selected if service mode is currently selected. If not, the currently selected operating mode is retained.

The fall back delay time is started when the transponder is removed. If a transponder with appropriate permission is positioned before the fall back delay time elapses, then fall back is prevented.

If "Acknowledge" is configured, the operating mode must also be acknowledged during fall back.

Fall back is prevented while the lock input (configurable) is active.

6.1.5 Acknowledge

As an option, an input on the controller can be used to acknowledge the operating mode selection.

After the selection is confirmed in the display unit, the selected operating mode is not adopted until there is also acknowledgement via the acknowledgement input on the controller.

6.1.6 Lock input

As an option, an input on the controller can be used to lock the operating mode selection.

While there is a high signal at the input configured for the lock input, the lock input is active and the operating mode cannot be changed.

6.1.7 Service mode

A maximum of 7 of the 8 operating modes can be configured as service mode. The number of the first service mode is stated; all subsequent operating modes are then automatically service modes.

If service modes are configured, the block FS_MSO_PITreader_Visu should be configured in such a way that a fall back to operating mode 1 occurs when the transponder is removed.

6.1.8 Audit trail

The "MSO flex visu" tile logs the following events:

- ▶ A user changing the operating mode
- ▶ The controller acknowledging an operating mode
- ▶ Reverting to operating mode MSO1

In the tile properties it is possible to configure whether the log should contain personal data (currently only the SID of the transponder). Personal data is used to identify the person who performed the action.


6.2 System expansion

Maximum system expansion for a safety controller from the PSS 4000 automation system:



- ▶ The maximum number of PITreaders that can be connected to a safety controller depends on the maximum number of IP connections that a safety controller can manage. Please also refer to the information on IP connections in the PAS4000's online help.
- ▶ 10 "MSO flex visu" tiles can be configured
- ▶ 10 display units can be connected (however, the tile for a working area may only be displayed on one display unit)
- ▶ Maximum 10 working areas for one display unit

6.3 Installation

6.3.1 Connect PITreader

The PITreader is connected to the safety controller from the automation system PSS 4000 via an Ethernet cable (for the number of PITreaders that can be connected see [System expansion](#)  34). Please refer to the information and requirements in the operating manual for the PITreader.

6.3.2 Connect display unit

The display unit is connected to the safety controller via an Ethernet cable (for display units that can be connected see [Intended use](#)  8], for the number of display units see [System expansion](#)  34)

6.4 Configuration and programming

6.4.1 Configure display unit

The display on the display unit is configured using the software tool PASvisu Builder.

A PASvisu project is created and an "MSO flex visu" tile is added for each working area. The tile contains the buttons for selecting operating modes.

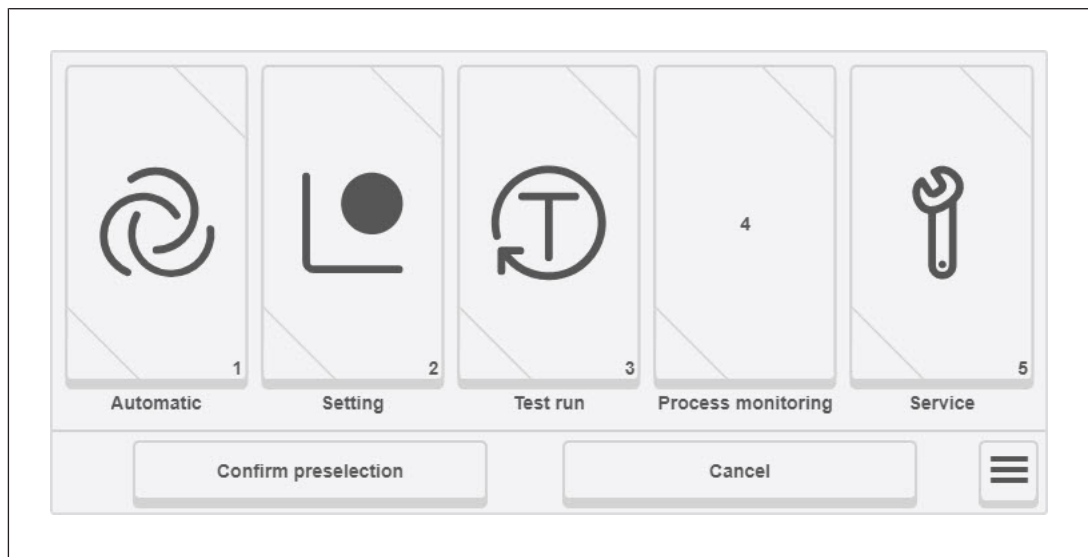


Fig.: Example for an "MSO flex visu" tile

A tile contains a maximum of 8 buttons. In the default configuration the buttons have the following labels:

MSO1 = Automatic mode

MSO2 = Setting mode

MSO3 = Manual intervention

MSO4 = Process monitoring

MSO5 = Service

MSO6 = Service 2

MSO7 = Service 3

MSO8 = Service 4

The labels on the buttons and icons can be changed. You can configure which buttons you use.

The buttons for the service modes are only visible on the display unit if a transponder with permission for the service modes is positioned and the selection lock is not activated. The button with the active operating mode is always visible.

Procedure

1. Create PASvisu project

Create a project in the PASvisu Builder.

2. Insert tiles

Insert an "MSO flex visu" tile in the PASvisu project for each working area.

3. Configure tiles

Configure the tiles. For details of the configuration please refer to the Online Help for the PASvisu Builder.

The operating mode selection configured on the connected safety controller and in the PASvisu project must match.

4. Perform download

Download the PASvisu project to the display unit.

Notes

▶ Positioning of tiles

Ensure that an "MSO flex visu" tile is not covered by any other tiles. The operator must be able to see the whole tile.

▶ Consistent configuration of operating mode selection

The operating mode selection configured in the safety controller and PASvisu project must match. This is checked at the PASvisu project's runtime. If the configurations do not match, the tile is marked as faulty and no operating mode can be selected.

▶ One tile per working area

It is the user's responsibility to ensure that there is no more than one "MSO flex visu" tile per working area and that this tile is displayed on just one display unit.

Note: If the following error message is displayed: "Button was not pressed for long enough", even though the button was pressed for a sufficient amount of time, this may indicate that more than one tile is present for the working area.

▶ Labels for the buttons and icons

Adapt the label on the buttons and icons to suit your own application. Clear labelling and good icons help the operator to select the required button.

6.4.2 Configure PITreader

The PITreader is configured using a web application, see PITreader operating manual.

6.4.3 Configure and program safety controller

All the configurations and the user program creation are made in PAS4000.

6.4.3.1 Configure hardware

In the PAS4000 Project Manager, add the following devices under **Hardware configuration**:

- ▶ PSS 4000 device (e.g. PSSu) of the PSS 4000 performance class PLC.
- ▶ Input and output modules

6.4.3.2 Configure connection to the PITreader

The connection to the PITreader is established via Modbus/TCP.

In PAS4000, a Modbus/TCP Client connection between the safety controller and PITreader must be configured in a PSS 4000 project.

Prerequisite

- ▶ PITreader and safety controller are connected via an Ethernet cable.

Procedure

1. Open the IP Connections Editor in PAS4000.
2. Create a new Modbus/TCP Client connection.
3. Configure the following network settings for the connection:
 - **Remote IP address**: Enter the PITreader's IP address. The factory default setting is 192.168.0.12.
 - **Local port number**: 0
 - **Remote port number**: 502
 - **Unit ID**: 255
 - **Keep alive settings**: Deselect checkbox "Enable keep alive"
 - **Connection timeout**: Select "Enable connection timeout" checkbox
 - **Connection cycles**: 10
 - **Connection cycle time**: Enable "Calculate automatically" checkbox
4. Configure the following data settings for the connection:
 - **Function code**: Read Input Register 3x
 - Start address and data length for receive:
 - **Start address**: 24
 - **Data length**: 14

6.4.3.3 Configure connection to the display unit

The connection to the display unit is established via Modbus/TCP.

In PAS4000, a Modbus/TCP Server connection between the safety controller and display unit must be configured in the PSS 4000 project for each "MSO flex visu" tile.

Prerequisites

- ▶ Display unit and safety controller are connected via an Ethernet cable.

Procedure

1. Open the IP Connections Editor in PAS4000.
2. Create a new Modbus/TCP Server connection for each "MSO flex visu" tile.
3. Change the default values for the network settings of each connection:
 - **Remote IP address:** 0.0.0.0
 - **Local port number:** 502
 - **Remote port number:** 0
 - **Keep alive settings:** Select "Enable keep alive" checkbox
 - **Keep alive time [ms]:** 1000
 - **Keep alive interval [ms]:** 1000
 - **Connection timeout:** Deselect "Enable connection timeout" checkbox
 - **Data update cycle time:** Enable "Calculate automatically" checkbox
4. Configure the server allocation table:

Data area	Start address	Data length
3xRead	1	12
4xWrite	1	22

Notes:

- ▶ The lower limit for the start address is 1.
- ▶ The table contains example values for 1 working area. If you are using several working areas (i.e. "MSO flex visu" tiles), the server allocation table must be expanded accordingly. For each working area, configure 12 words in the data area 3xRead for send data to the display unit and 22 words in the data area 4xWrite for receive data from the display unit. Example: With 3 working areas, a data length of at least 36 must be entered in the data area 3xRead and a data length of at least 66 must be entered in the data area 4xWrite.

6.4.3.4 Create user program

Please note the following when creating the user program:

- ▶ Resource assignment of the user program
Assign the user program to a task on the FS resource.
- ▶ Reaction times
The general statements on the reaction times in the PSS 4000 system description or in the PAS4000 online help apply.

- ▶ Create and call up the "Access" program section

In the "Access" program section, the access device (PITreader) must be evaluated using the PITreaderAccess block.

 - Create an instance of the PITreaderAccess block for the access device.

Note: If you are using more than one PITreader, then you can create several instances of the PITreaderAccess block.
 - Call up the block instance of PITreaderAccess before the instances of the selection block FS_MSO_PITreader_Visu; i.e. call up the "Access" program section before the "Selection" program section.

- ▶ Create and call up "Selection" program section

In the "Selection" program section, the operating mode selection must be evaluated and monitored using the block FS_MSO_PITreader_Visu, depending on the application.

 - Create an instance of the block FS_MSO_PITreader_Visu for operating mode selection.

Note: If various working areas are to be available in your customer application and the modes of safe operation in the working areas can be selected independently from each other, an "MSO flex visu" tile must be configured in the selection device for each working area and an instance of the block FS_MSO_PITreader_Visu must be created for each working area in the "Selection" program section. It is essential to refer to the information under ["Selection" program section with several working areas](#) [📖 40].
 - Depending on the application, configure the I-variables *EnableSelectionMSO*<2 ... 8>, *StoredMSO_AtStartup*, *MSO_AtKeyRemoval*, *FallbackDelayTime*, *EnableServiceMSO*, *FirstServiceMSO*. Further information on the I-variables can be found in the block description in the section "Input interface" (see online help of PAS4000).

- ▶ I-variables *SecurityID*, *Permission* and *PITreaderAccessError*

Assign the I-variables of the block instances of the FS_MSO_PITreader_Visu to the corresponding O-variables of the block instance of the PITreaderAccess

 - *SecurityID*: <Instance name of the PITreaderAccess>.SecurityID
 - *Permission*: <Instance name of the PITreaderAccess>.Permission
 - *PITreaderAccessError*: <Instance name of the PITreaderAccess>.DiagSystemError

- ▶ I-variables *Acknowledge* and *Lock*

The assignment of the I-variables *Acknowledge* and *Lock* is optional.

 - You can lock the selection completely using *Lock*.
 - You can use *Acknowledge* to ensure that any new selection that is made only becomes valid once any process that is still active has been completed. If you do not need this function, assign the I-variable *Acknowledge* with a high signal.

- ▶ Transfer of the selected operating mode to the "Activation" program section

The safety functions required for the selected operating mode (e.g. light guards or safety gates) must actually be activated in the "Activation" program section, depending on the application.

 - After the "Selection" program section, call up the "Activation" program section.

- In the "Activation" program section, assign the safety functions required for the various modes of safe operation with the O-variables *MSO1 ... MSO8*. The O-variables must form the enable for the actuators together with the safety functions.
- ▶ In the PAS4000 I/O Mapping Editor, map the receive data (block's I-PI variables) to the corresponding addresses on the server mapping table (Modbus/TCP):

I-PI variables	I/O mapping to:	Addresses in the data area 4xWrite
<i>ReceiveDataFromVisu_00</i>	->	4x00001
...
<i>ReceiveDataFromVisu_21</i>	->	4x00022

Note: The stated I/O mapping is an example for 1 working area. The I/O mapping for receive data must be performed for each instance of the block *FS_MS0_PITreader_Visu* and depends on the configured server mapping table (see [Configure connection to the display unit](#) [38]).

- ▶ In the PAS4000 I/O Mapping Editor, map the send data (block's O-PI variables) to the corresponding addresses on the server mapping table (Modbus/TCP):

O-PI variables	I/O mapping to:	Addresses in the data area 3xRead
<i>SendDataToVisu_00</i>	->	3x00001
...
<i>SendDataToVisu_11</i>	->	3x00012

Note: The stated I/O mapping is an example for 1 working area. The I/O mapping for send data must be performed for each instance of the block *FS_MS0_PITreader_Visu* and depends on the configured server mapping table (see [Configure connection to the display unit](#) [38]).

- ▶ In the PAS4000 I/O Mapping Editor, map the I-PI variables of the *PITreaderAccess* block to the corresponding addresses of the client connection (Modbus/TCP):

I-PI variables	I/O mapping to:	Addresses in the data area 3xRead
<i>PITreaderAccessData[0]</i>	->	3x00024
...
<i>PITreaderAccessData[13]</i>	->	3x00037

6.4.3.5 "Selection" program section with several working areas

If various working areas are to be available for a machine in your customer application and the modes of safe operation in the working areas can be selected independently from each other, an "MSO flex visu" tile must be configured in the selection device for each working area and an instance of the block *FS_MS0_PITreader_Visu* must be created for each working area in the "Selection" program section.

The I-variable *WorkingArea* of each block instance must be assigned a different value (value range 1 ... 10). Executing several block instances with the same value at the I-variable *WorkingArea* is deemed improper use.



WARNING!

Hazardous state due to incorrect configuration of the working areas

If there are several working areas where the modes of safe operation are selected independently, the I-variable *WorkingArea* must be assigned a different value on each instance of the block FS_MSO_PITreader_Visu. Failure to comply with this requirement is deemed improper use and can cause the operating mode to switch unexpectedly or to fail to change despite selecting a new mode.

Ensure that the I-variable *WorkingArea* is assigned a different value on each block instance of the block FS_MSO_PITreader_Visu.

Configure each instance of the block FS_MSO_PITreader_Visu via the I-variables *EnableSelectionMSO*<2 ...8>, *StoredMSO_AtStartup*, *MSO_AtKeyRemoval*, *FallbackDelayTime*, *EnableServiceMSO*, *FirstServiceMSO* in accordance with the requirements of the respective working area in your customer application.

6.5 Operation

6.5.1 Select safe mode of operation MSO1 ... MSO8

Operating modes are selected via a display unit (Visu panel), on which a project from the visualisation system PASvisu is operated. The "MSO flex visu" tile is used in the process. The tile contains the buttons for selecting operating modes.

The buttons for the service modes are only visible on the display unit if a transponder with permission for the service modes is positioned and the selection lock is not activated. The button with the active operating mode is always visible.

Prerequisites

- ▶ A transponder with the corresponding permission must be positioned on the PITreader.
- ▶ The PITreader must recognise the transponder as valid.
- ▶ The transponder must be positioned on the PITreader for the whole time a button is operated.
- ▶ The display unit must be connected.
- ▶ Several pushbuttons may **not** be operated simultaneously when selecting an operating mode.

Procedure

1. Select mode of safe operation

Select the required operating mode by pressing the relevant button on the tile. The button must be pressed for between 500 ms and 5000 ms.

The button lights up yellow.



2. Confirm operating mode selection

Press the "Confirm preselection" button on the tile.

The button flashes green.



The preselection is now confirmed, but as yet unacknowledged by the safety controller. If "Acknowledge" is configured, the mode of safe operation will not be adopted until the selection is acknowledged (I-variable Acknowledge = TRUE).

Note: If the lock input (I-variable *Lock*) is configured, then the selected but as yet unacknowledged mode of safe operation is reset to the current mode of safe operation if the I-variable *Lock* = TRUE prior to acknowledgement.

The mode of safe operation has been selected correctly when the button is continuously lit green.






INFORMATION

You can switch at will between the individual operating modes MSO1 ... MSO8; i.e. it is possible to switch from MSO1 to MSO3 or from MSO4 to MSO2, for example.

6.5.2 Button status indicators

A tile in PASvisu contains a maximum of 8 buttons for selecting operating modes. Each button has triangles on the bottom left and top right to indicate the status.

Status indicator	Description
<p>Top right triangle lights up green</p> 	<p>Operating mode is selected</p>
<p>Bottom left triangle lights up yellow</p> 	<p>Operating mode is preselected, but the preselection must still be confirmed by pressing the “Confirm preselection” button on the tile.</p>
<p>Top right triangle flashes green</p> 	<p>Operating mode is preselected. It must still be acknowledged by the controller.</p>

Special features

The FS resource of a safety controller can switch to various operating states in the event of an error. In these operating states, substitute values are used for a variety of data due to the error. The data (O-PI variables) that is transmitted to the display unit via a Modbus/TCP Server connection is also impacted; i.e. as the data is no longer updated and the substitute value is used instead, the last valid value is shown on the display unit.

In this case, the status indicator for a button may show the status "Operating mode is selected", even though there is an error present and the output is switched off or is in a safe state.

These operating states include, for example:

- ▶ FS resource in RUN state with error: Task in TERMINATED state
- ▶ FS resource in RUN state with error: Task in STOP state
- ▶ Major FS error

Further information on the substitute values and operating states is available in the System Description PSS 4000.

6.5.3 Diagnostics

The block FS_MSO_PITreader_Visu sends various user errors, system information and system errors to the display unit (Visu panel). This information is shown on the display unit, directly on the relevant tile.

The block FS_MSO_PITreader_Visu signals a variety of diagnostic information to the O-variables *Diag<...>*. These O-variables can be used to continue processing diagnostic information in the user program. A description of the diagnostic information can be found in the block description (online help for PAS4000). Under the default setting, all diagnostic information also appears in the safety controller's diagnostic list and diagnostic log. If individual or all diagnostic messages are unwanted, then the corresponding basic diagnostic items in PAS4000's Diagnostic Editor can be disabled (disable "Enable" checkbox). Parameter errors are not shown on the corresponding tile of the display unit and so should not be disabled.

Detailed information on system diagnostics and process diagnostics can be found in the online help for PAS4000.

6.6 Version query for the "MSO flex visu" tile

In a PASvisu project (PASvisu Builder), an "MSO flex visu" tile must be added and configured for each working area. The "MSO flex visu" tile on the PASvisu Builder is versioned. However, the version of the "MSO flex visu" tile is independent of the version of the PASvisu Builder that is used.

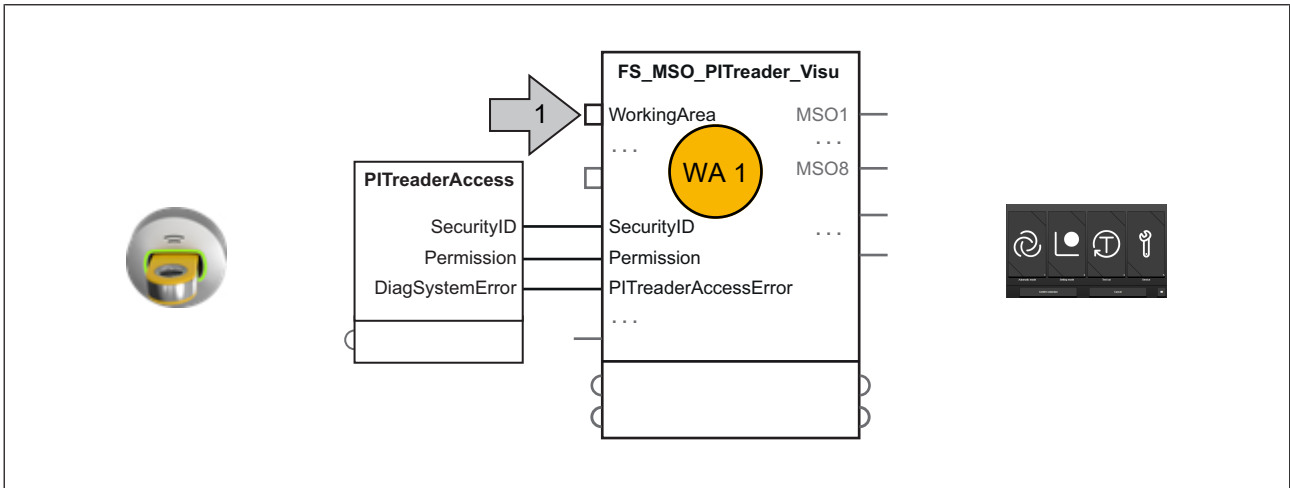
You can have the tile version displayed on the display unit:

- ▶ Click on the  button on the "MSO flex visu" tile (working area) and select **Display version**.

6.7 Examples for PITmode flex visu with PSS 4000

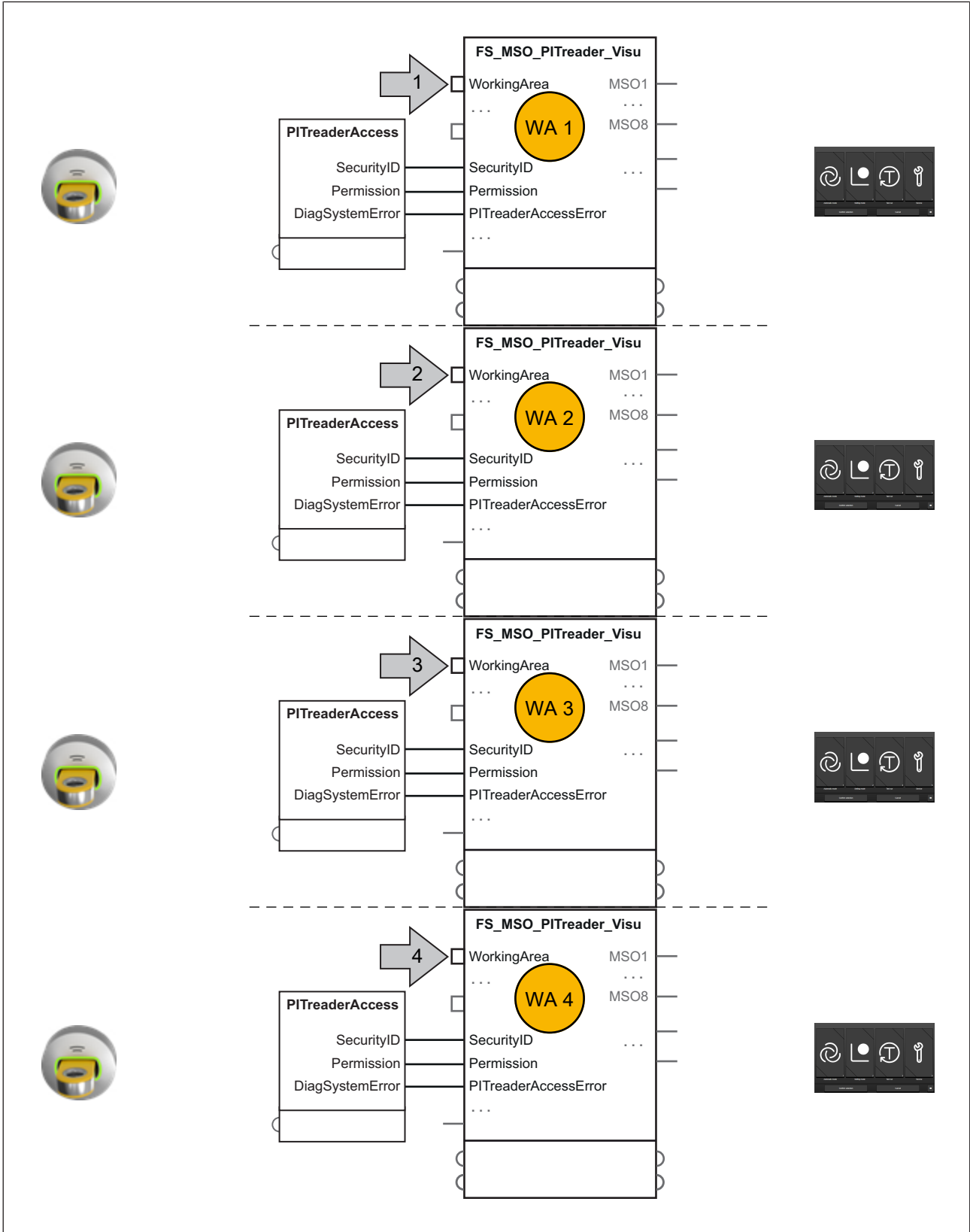
6.7.1 Example 1

1 PITreader for 1 working area (WA) and display on a display unit.



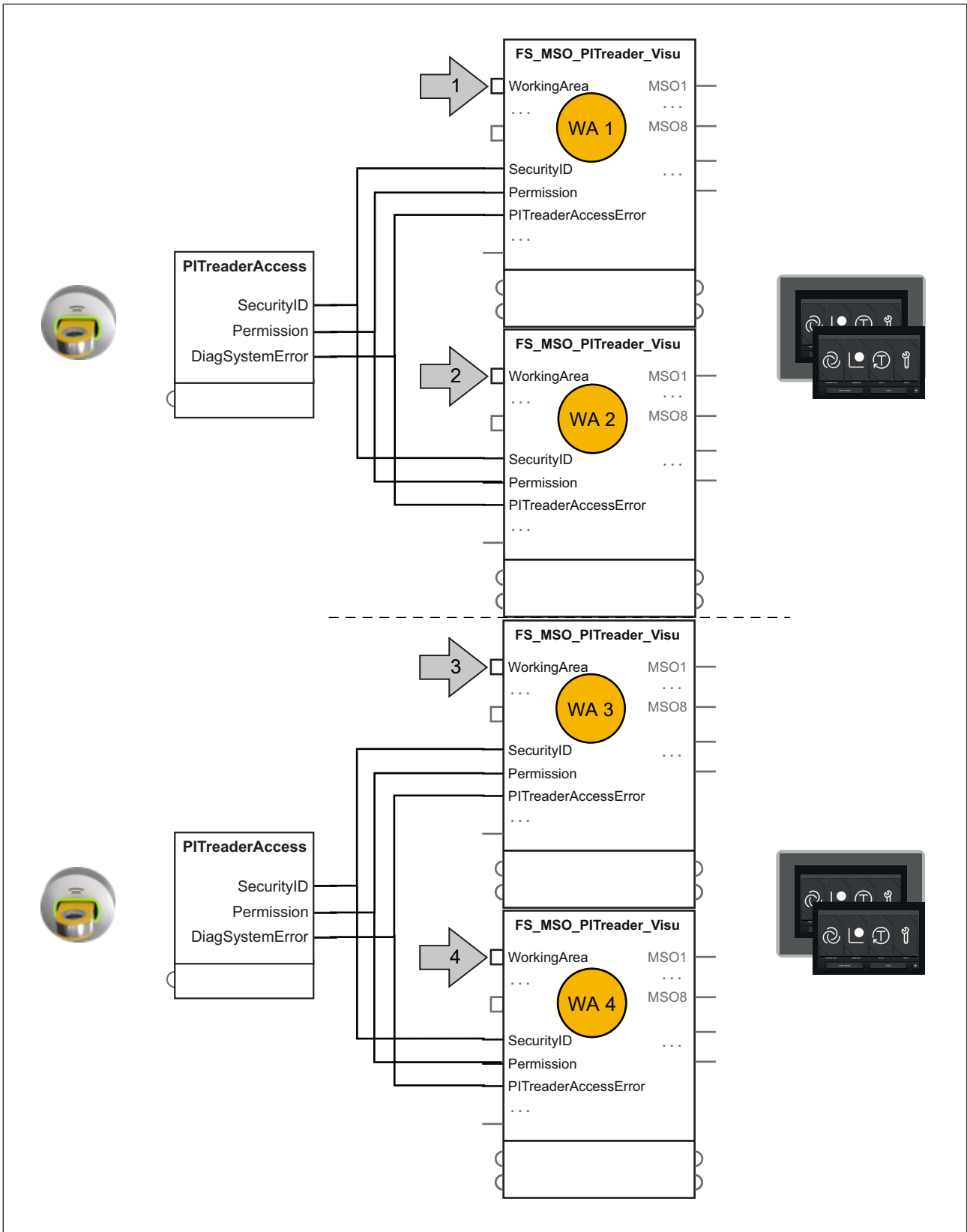
6.7.2 Example 2

4 PITreaders, 1 for each working area (WA). Separate display on a display unit per working area.



6.7.3 Example 3

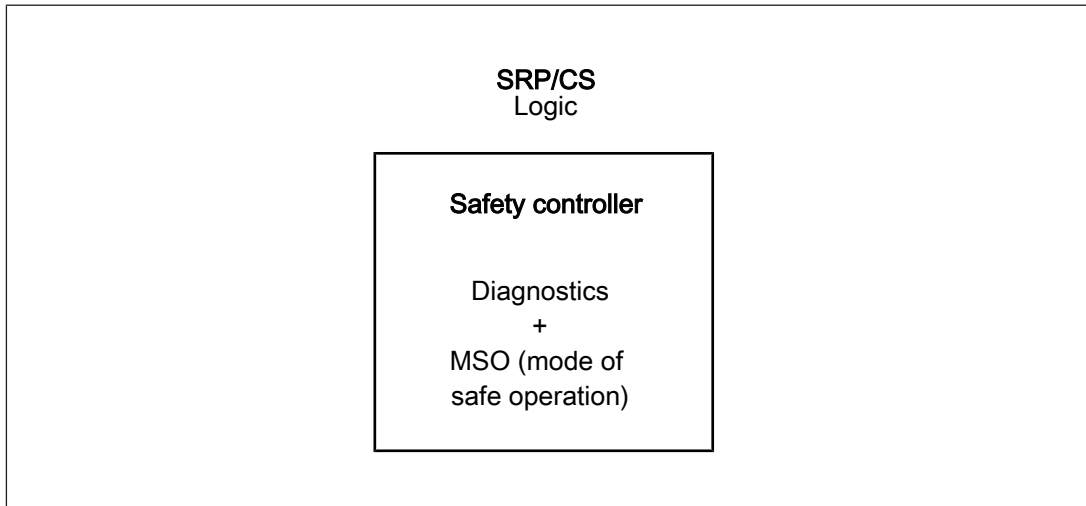
2 PITreaders, each covering 2 working areas (WA). 2 working areas covered by one display unit



7 Calculating the safety-related characteristic data

All the units used within a safety function must be considered when calculating the safety characteristic data.

Safety-related architecture, "Access and operating mode selection" subsystem



INFORMATION

As the residual error rate Λ of the communication system (Modbus/TCP) contributes to no more than 1 % of the safety function's total probability of failure, it can be ignored when calculating the safety characteristic data for the "operating mode selection" safety function and does not need to be added to the SRP/CS.



INFORMATION

The probability of failure of the access device and the visual selection device does not need to be included in the calculation of the safety function's probability of failure.



INFORMATION

A safety function's SIL/PL values are **not** identical to the SIL/PL values of the units that are used and may be different. We recommend that you use the PAscal software tool to calculate the safety function's SIL/PL values.

► Support

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