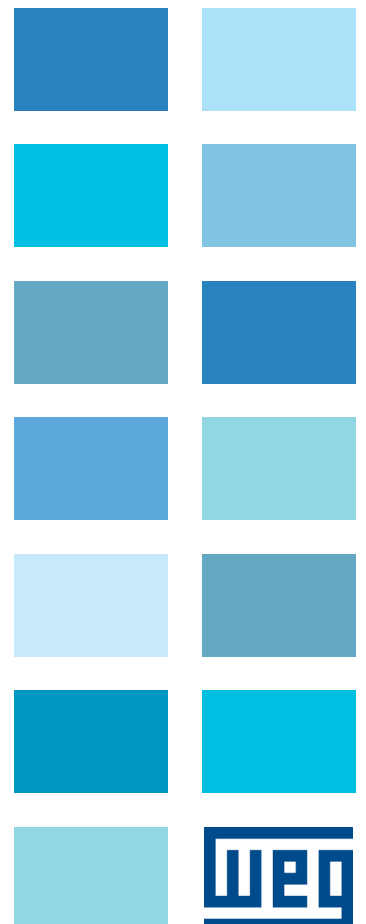
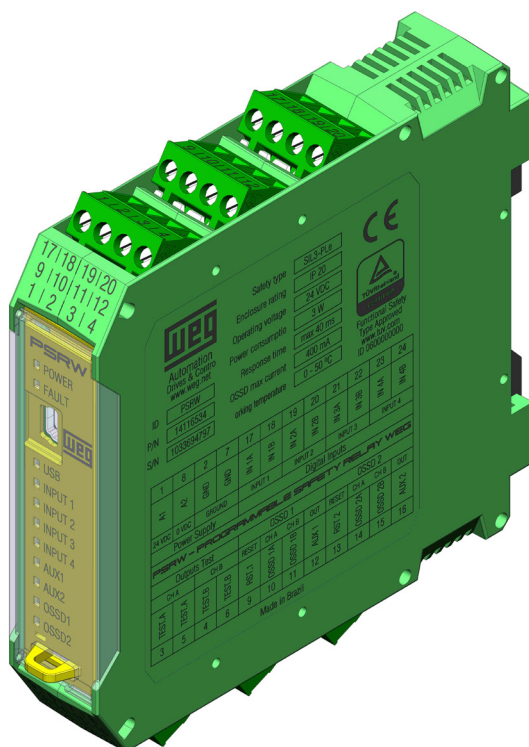


# PSRW

## Programmable Safety Relay WEG

### User's Manual







# **User's Manual**

Series: PSRW

Language: English

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# Summary of Reviews

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The information below describes the revisions made to this manual.

| Version | Review | Description   |
|---------|--------|---------------|
| -       | R00    | First edition |
| -       | R01    | New review    |

|                                                                          |            |
|--------------------------------------------------------------------------|------------|
| <b>1 INTRODUCTION .....</b>                                              | <b>1-1</b> |
| 1.1 WARNINGS .....                                                       | 1-1        |
| 1.2 ABBREVIATIONS .....                                                  | 1-2        |
| 1.3 APPLICABLE STANDARDS .....                                           | 1-2        |
| <b>2 DESCRIPTION.....</b>                                                | <b>2-1</b> |
| <b>3 MOUNTING .....</b>                                                  | <b>3-1</b> |
| 3.1 MECHANICAL FIXING.....                                               | 3-1        |
| 3.2 OVERVIEW .....                                                       | 3-1        |
| 3.3 CALCULATION OF SAFETY DISTANCE OF AN ESPE CONNECTED TO<br>PSRW ..... | 3-2        |
| 3.4 ELECTRICAL CONNECTIONS.....                                          | 3-2        |
| 3.5 INSTRUCTION TO CABLE AND TERMINALS .....                             | 3-3        |
| 3.6 USB INPUT.....                                                       | 3-3        |
| 3.7 CONNECTION EXAMPLE OF PSRW TO MACHINE CONTROL SYSTEM.....            | 3-4        |
| 3.8 CHECK LIST AFTER INSTALLATION .....                                  | 3-4        |
| <b>4 OPERATION DIAGRAM .....</b>                                         | <b>4-1</b> |
| <b>5 SIGNALS.....</b>                                                    | <b>5-1</b> |
| 5.1 DIGITAL INPUTS.....                                                  | 5-1        |
| 5.1.1 Contact Filter and Reset.....                                      | 5-1        |
| 5.1.2 Input Type: Electrical/Mechanical Contact Input .....              | 5-1        |
| 5.1.3 Input Type: PNP Input .....                                        | 5-1        |
| 5.1.4 Input Type: Simultaneity Control.....                              | 5-2        |
| 5.2 RESET INPUTS.....                                                    | 5-2        |
| 5.3 RESET .....                                                          | 5-3        |
| 5.4 AUXILIARY OUTPUT .....                                               | 5-3        |
| 5.5 TEST OUTPUTS.....                                                    | 5-4        |
| 5.6 OSSD OUTPUTS.....                                                    | 5-4        |
| <b>6 TECHNICAL SPECIFICATION .....</b>                                   | <b>6-1</b> |
| 6.1 SAFETY LEVEL .....                                                   | 6-1        |
| 6.2 TECHNICAL SPECIFICATIONS .....                                       | 6-1        |
| 6.3 ENCLOSURE.....                                                       | 6-1        |
| 6.4 MECHANICAL DIMENSIONS .....                                          | 6-2        |
| <b>7 DIAGNOSIS .....</b>                                                 | <b>7-1</b> |
| <b>8 CONNECTION EXAMPLES .....</b>                                       | <b>8-1</b> |
| 8.1 EMERGENCY STOP CONNECTION EXAMPLE .....                              | 8-1        |
| 8.2 TWO HANDS CONTROL CONNECTION EXAMPLE .....                           | 8-1        |
| 8.3 SAFETY SENSOR CONNECTION EXAMPLE .....                               | 8-2        |
| 8.4 LIGHT CURTAIN CONNECTION EXAMPLE .....                               | 8-2        |
| 8.5 RESET INPUTS.....                                                    | 8-3        |
| 8.6 AUXILIARY OUTPUT CONNECTION .....                                    | 8-4        |
| 8.7 OSSD OUTPUT CONNECTION .....                                         | 8-5        |

|                                                            |                 |
|------------------------------------------------------------|-----------------|
| <b>9 PROGRAMMING WITH WPS.....</b>                         | <b>9-1</b>      |
| 9.1 WPS INSTALLATION .....                                 | 9-1             |
| 9.2 APPLICATION SET UP .....                               | 9-2             |
| 9.2.1 Menu .....                                           | 9-2             |
| 9.2.2 Creating a Project .....                             | 9-3             |
| 9.3 SETTING UP COMMUNICATION .....                         | 9-7             |
| 9.4 WIZARDS .....                                          | 9-10            |
| 9.4.1 Wizard configurator .....                            | 9-10            |
| 9.4.2 Wizard Monitor .....                                 | 9-11            |
| 9.5 DESIGNING A CONFIGURATION .....                        | 9-11            |
| 9.5.1 Configuring the Inputs .....                         | 9-12            |
| 9.5.2 Logic and delay timer configuration .....            | 9-13            |
| 9.5.3 OSSD output and auxiliary output configuration ..... | 9-14            |
| 9.6 TRANSFERRING CONFIGURATIONS .....                      | 9-15            |
| 9.7 RETRIEVING CONFIGURATIONS FROM PSRW .....              | 9-19            |
| 9.7.1 Saving configurations on PC.....                     | 9-20            |
| <br><b>10 PRODUCT USE WITH SAFETY .....</b>                | <br><b>10-1</b> |
| <br><b>11 MODIFICATIONS.....</b>                           | <br><b>11-1</b> |
| <br><b>12 DECLARATION OF CONFORMITY .....</b>              | <br><b>12-1</b> |

# 1 INTRODUCTION

This manual contains the instructions for the correct use of the PSRW device and safety information.

- System description.
- Method of Installation.
- Connections.
- Inputs / outputs.
- Troubleshoot.
- Use of the configurator tool.

## 1.1 WARNINGS

The following safety warnings are used in this manual:



### ATTENTION!

This alert symbol indicates necessary attention to potential hazard or risk. If not follow the recommendation may cause dangerous situations to user or process.



### ATTENTION!

**The PSRW is built according following safety levels:**

|                     |                    |
|---------------------|--------------------|
| <b>SIL3</b>         | <b>IEC 61508</b>   |
| <b>SILCL 3</b>      | <b>IEC 62061</b>   |
| <b>PL e / Cat 4</b> | <b>ISO 13489-1</b> |

However, the definitive SIL and PL of the application will depend on the number of safety components, their parameters and the connections that are made, as per the risk analysis.



### ATTENTION!

Perform a risk analysis to determine the appropriate safety level for your specific application, using all the applicable standards.



### ATTENTION!

The configuration of the PSRW is the responsibility of the installer or user.



### ATTENTION!

The device must be installed/configured in accordance with the application specific, risk analysis and all the applicable standards.



### ATTENTION!

Reference should be made to the handbooks and the relative product and/or application standards to ensure correct use of devices connected to the PSRW within the specific application.



### ATTENTION!

The ambient temperature in the place where the system is installed must be compatible with the operating temperature parameters stated on the product label and in the specifications.



### ATTENTION!

For all matters concerning safety, if necessary, contact your country's competent safety authorities or the competent trade association.

### 1.2 ABBREVIATIONS

**PSRW:** Programmable Safety Relay WEG.

**OSSD:** output signal switching device: solid state safety output.

1

**PFH(1/h):** probability of a dangerous failure per hour.

**SFF:** safe failure fraction.

**MTTFd:** mean time to dangerous failure.

**PFDavg:** probability failure average dangerous.

**SIL:** safety integrity level.

**SIL CL:** safety integrity level claim limit.

**PL:** performance level.

**CAT:** category.

**ESPE:** electrosensitive safety protection device.

**EDM:** external device monitoring.

**WPS:** WEG Programming Suite.

### 1.3 APPLICABLE STANDARDS

PSRW complies with the following European Directives:

- 2006/42/UE "Machinery Directive".
- 2004/108/UE "Electromagnetic Compatibility Directive".
- 2006/95/UE "Low Voltage Directive".
- 2011/95/UE "RoHS Directive".

And according to following standards:

|                           |                                                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EN ISO 13849</b>       | Safety of machinery – Safety-related parts of control systems – Part 1 and 2                                                                                                                                 |
| <b>IEC 61508 Part 1-7</b> | Functional Safety of Electrical/Electronic/Programmable electronic safety-related systems                                                                                                                    |
| <b>IEC 62061</b>          | Safety of Machinery – Functional Safety of safety-related electrical, electronic and programmable electronic control systems                                                                                 |
| <b>IEC61000-6-7</b>       | Electromagnetic compatibility (EMC) – Part 6-7: Generic standards – Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations |
| <b>IEC 61131-2</b>        | Programmable controllers – Part 2: Equipment requirements and tests                                                                                                                                          |



## 2 DESCRIPTION

The PSRW is a configurable safety relay that can be programmed via WPS graphical interface. It has 4 (four) dual-channel safety inputs and 2 (two) OSSDs (dual-channel safety outputs) with configurable (manual/automatic) individual reset.

PSRW is capable of monitoring the following safety sensors and components:

- Safety Light curtain.
- Two hands control.
- Emergency stops.
- Magnetic sensors.
- Mechanical switches.
- Safety sensors.



## 3 MOUNTING

### 3.1 MECHANICAL FIXING

The PSRW adopt a 35mm DIN rail.

To proceed the fixation use the follow sequence:

- 1° step, fitting on rail.
- 2° step, spring action.
- 3° step, lock.

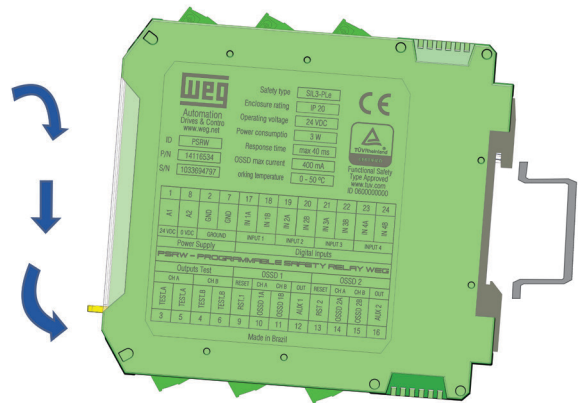


Figure 3.1: DIN rail 35 mm mounting

### 3.2 OVERVIEW

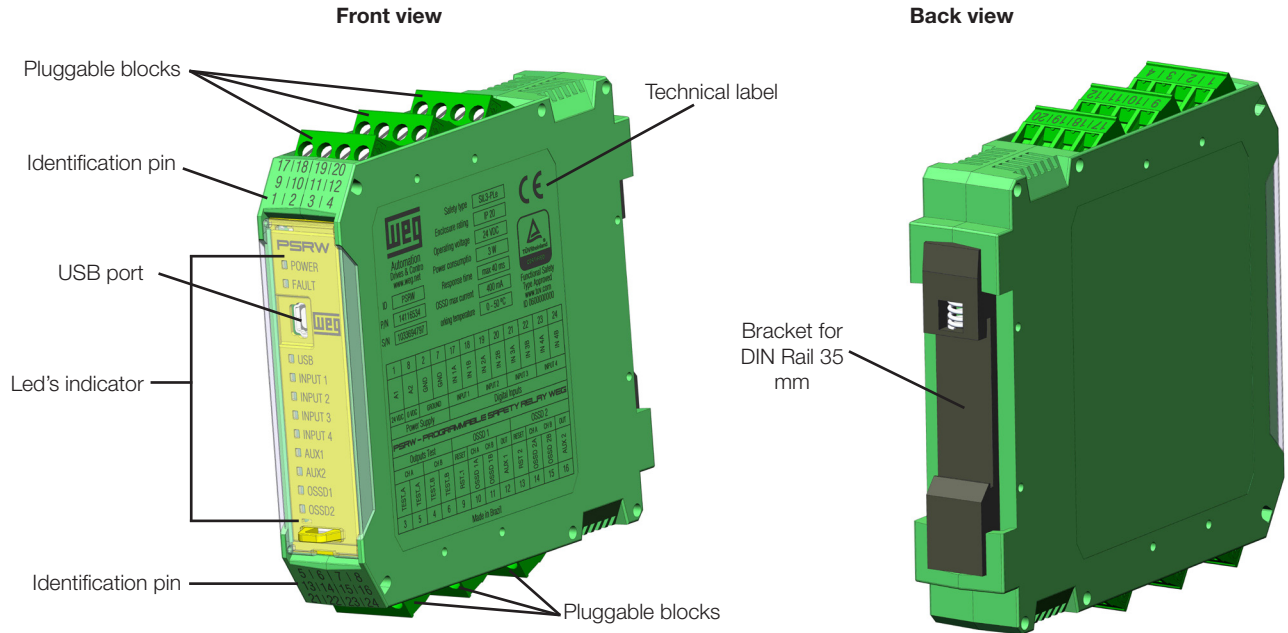


Figure 3.2: Main components of the PSRW

### 3.3 CALCULATION OF SAFETY DISTANCE OF AN ESPE CONNECTED TO PSRW

Any Electro-sensitive Protective Equipment device connected to PSRW, must be positioned at a distance equal to or greater than the minimum safety distance “**S**” so that the dangerous point can be reached only after stopping the dangerous movement of the machine.


**ATTENTION!**

The standard ISO 13855 provides the information to calculate the proper safety distance.

3


**ATTENTION!**

Carefully read the installation manual of each device for specific information on the positioning distance.


**ATTENTION!**

Remember that the total response time depends on:  
PSRW response time + ESPE response time + response time of the machine.

### 3.4 ELECTRICAL CONNECTIONS

The PSRW is provided with removable of terminal blocks for the electrical connections and has 6 terminal blocks with 4 pins each one:

*Table 3.1: Terminals of PSRW*

| Pin | Label   | Type   | Description                 | Operation                   |
|-----|---------|--------|-----------------------------|-----------------------------|
| 1   | A1      | Supply | 24 Vdc                      |                             |
| 2   | GND     | PE     | Ground                      |                             |
| 3   | TEST_A  | Output | Output to detect faults     | PNP (active at high level)  |
| 4   | TEST_B  | Output | Output to detect faults     | PNP (active at high level)  |
| 5   | TEST_A  | Output | Output to detect faults     | PNP (active at high level)  |
| 6   | TEST_B  | Output | Output to detect faults     | PNP (active at high level)  |
| 7   | GND     | PE     | Ground                      |                             |
| 8   | A2      | Supply | 0 Vdc                       |                             |
| 9   | RST_1   | Input  | Reset 1                     | Digital input (IEC 61131-2) |
| 10  | OSSD_1A | Output | Solid state 1 channel A     | PNP (active at high level)  |
| 11  | OSSD_1B | Output | Solid state 1 channel B     | PNP (active at high level)  |
| 12  | AUX_1   | Output | Auxiliary output / status 1 | PNP (active at high level)  |
| 13  | RST_2   | Input  | Reset 2                     | Digital input (IEC 61131-2) |
| 14  | OSSD_2A | Output | Solid state 2 channel A     | PNP (active at high level)  |
| 15  | OSSD_2B | Output | Solid state 2 channel B     | PNP (active at high level)  |
| 16  | AUX_2   | Output | Auxiliary output / status 2 | PNP (active at high level)  |
| 17  | IN_1A   | Input  | Channel A input 1           | Digital input (IEC 61131-2) |
| 18  | IN_1B   | Input  | Channel B input 1           | Digital input (IEC 61131-2) |
| 19  | IN_2A   | Input  | Channel A input 2           | Digital input (IEC 61131-2) |
| 20  | IN_2B   | Input  | Channel B input 2           | Digital input (IEC 61131-2) |
| 21  | IN_3A   | Input  | Channel A input 3           | Digital input (IEC 61131-2) |
| 22  | IN_3B   | Input  | Channel B input 3           | Digital input (IEC 61131-2) |
| 23  | IN_4A   | Input  | Channel A input 4           | Digital input (IEC 61131-2) |
| 24  | IN_4B   | Input  | Channel B input 4           | Digital input (IEC 61131-2) |

### 3.5 INSTRUCTION TO CABLE AND TERMINALS

- Terminal tightening torque: 5 ÷ 7 lb-in (0.6 ÷ 0.7 Nm).
- Wire size range: AWG 12 ÷ 30, (solid/stranded).
- Use 60/75 °C (140/167 °F) copper (Cu) conductor only.
- We recommend the use of separate power supplies for the PSRW to other electrical power equipment (electric motors, inverters, frequency converters) or other sources of disturbance.
- Cables used for connections of longer than 50 m must have a cross-section of at least 1 mm<sup>2</sup> (AWG16).

**ATTENTION!**

Install the PSRW in an enclosure with a protection class of at least IP54.

**ATTENTION!**

Turn off the PSRW before connect the inputs/outputs.

**ATTENTION!**

The supply voltage to the units must be 24 Vdc ± 20 % (PELV, in compliance with the standard EN 60204-1 ([Chapter 6 TECHNICAL SPECIFICATION on page 6-1](#))).

**ATTENTION!**

Do not use the PSRW like supply to external devices.

**ATTENTION!**

The same voltage reference (0 Vdc) must be used for all system components.

### 3.6 USB INPUT

The PSRW includes a USB 2.0 connector for connection to a personal computer and access the configurator tool WPS manual available for download on the website: **[www.weg.net](http://www.weg.net)**.

### 3.7 CONNECTION EXAMPLE OF PSRW TO MACHINE CONTROL SYSTEM

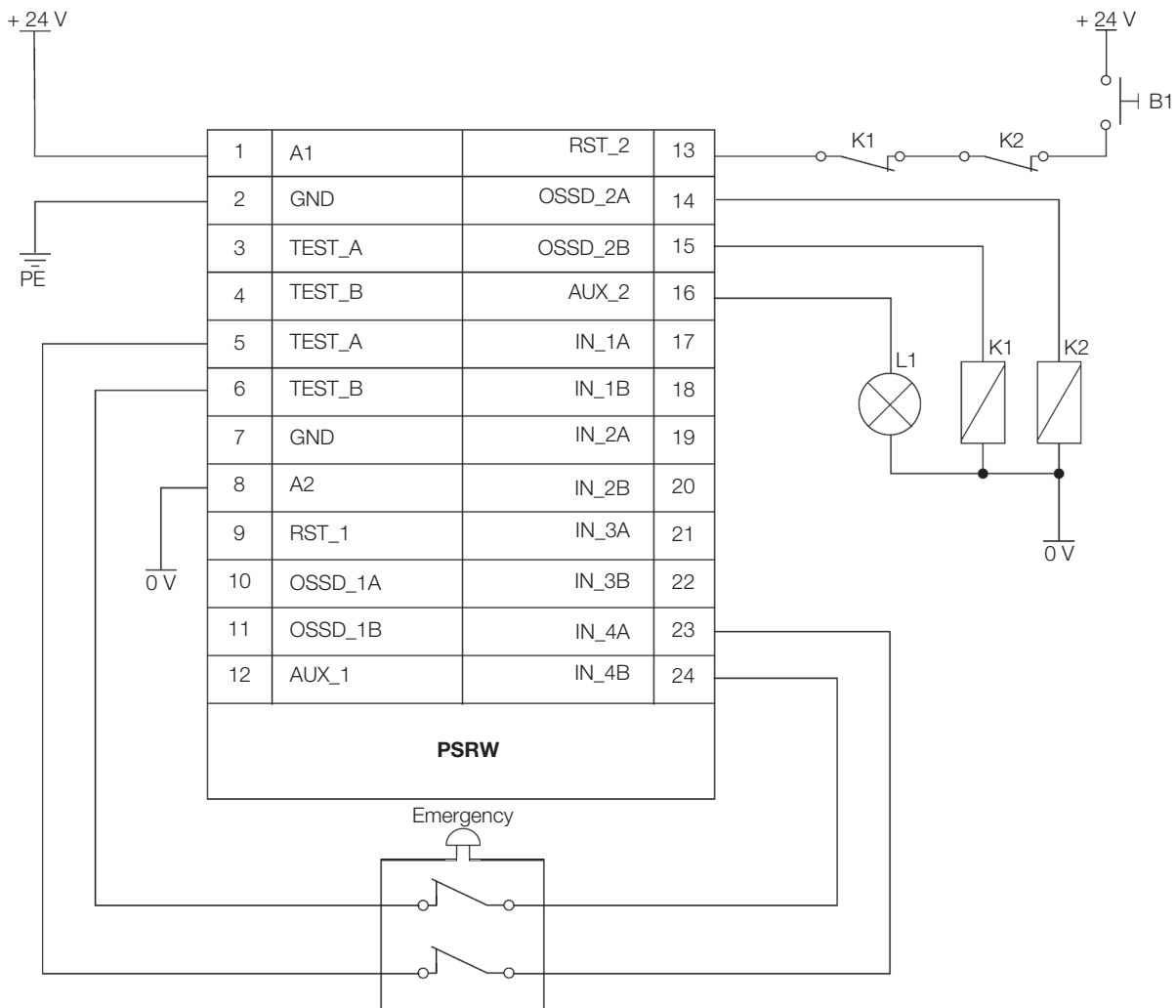


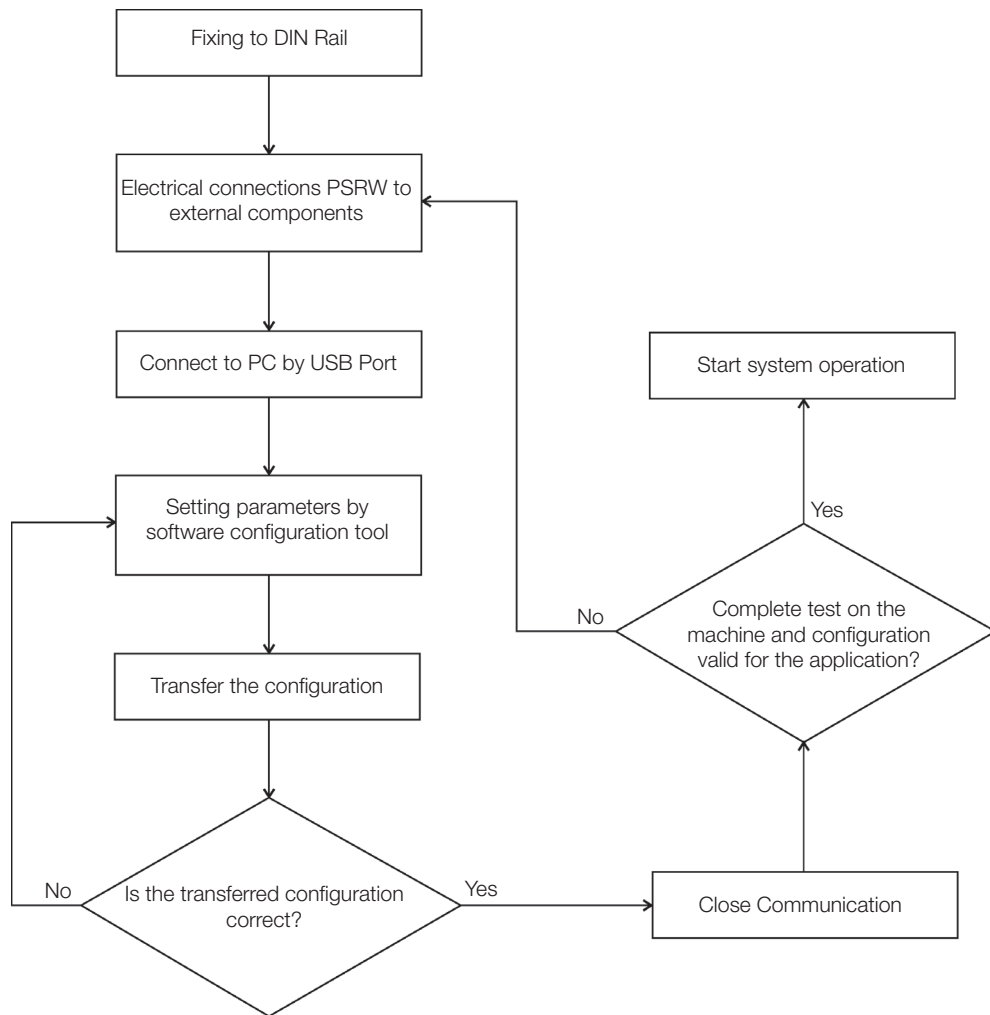
Figure 3.3: Connection example

### 3.8 CHECK LIST AFTER INSTALLATION

The PSRW is able to detect the internal faults. Anyway to assure the correct operation, the user must perform the following checks at start up and at least every one year:

- Perform a complete system test.
- Verify that all the cables are correctly inserted and the terminal blocks well screwed to PSRW.
- Verify that all LEDs light on correctly.
- Verify the right position of all sensors connected to PSRW.
- Verify the right fixing of PSRW to DIN rail.
- Verify that all the external indicators (lamps) work properly.

## 4 OPERATION DIAGRAM



**Figure 4.1:** Operation Diagram



## 5 SIGNALS

### 5.1 DIGITAL INPUTS

The PSRW has four (4) dual-channel safety inputs that can take up to three (3) different configurations, being possible to individually configure contact filter and reset options. The inputs are identified by the name INx\_y, where 'x' is the input number (1 to 4) and 'y' is the channel (A or B). See [Table 3.1 on page 3-2](#).

#### 5.1.1 Contact Filter and Reset

The contact filter is used to prevent noise in the contact line from jeopardizing the input operation. There are only two contact filter options: 4 milliseconds or 16 milliseconds. The users should choose the best option for their application.



#### **ATTENTION!**

The filter time influences the response time of the PSRW and must be considered in the calculation of the total response time:

PSRW response time = input filter + processing. See [Section 6.2 TECHNICAL SPECIFICATIONS on page 6-1](#).

It is possible to set the reset type for each input. When the option “reset dependent” is selected, it indicates to the logic that the input depends on a manual reset.

When not selected, it indicates automatic reset.

When all inputs have the option “reset dependent” selected, the logic reset will be manual.

When all inputs do not have the option “reset dependent” selected, the logic reset will be automatic.

When the inputs have different selections for the option “reset dependent”, the logic reset will be mixed.

For further information, see [Item 5.2 RESET INPUTS on page 5-2](#) and [Item 5.3 Reset on page 5-3](#).

#### 5.1.2 Input Type: Electrical/Mechanical Contact Input

This input type is used for safety devices with mechanical or electrical contact that do not provide energy; they only close the circuit. Those devices can be pushbuttons, safety relay contacts, safety contactors, safety sensors with isolated output, etc.

For this type of input, it is mandatory to use the test outputs in order to detect anomalies and short circuits.

For further information, see [Chapter 8 CONNECTION EXAMPLES on page 8-1](#).

#### 5.1.3 Input Type: PNP Input

This input type is used for safety devices that supply energy when activated (PNP Output). Safety devices with PNP output generate pulses on the output channels for internal diagnostics. The PSRW recognizes such devices through these pulses, and their absence will result in an input fault. Those devices can be light screens, safety controllers, safety PLCs, safety sensors, etc.

To differentiate the test pulses from an actual event, the PSRW uses the following reference:

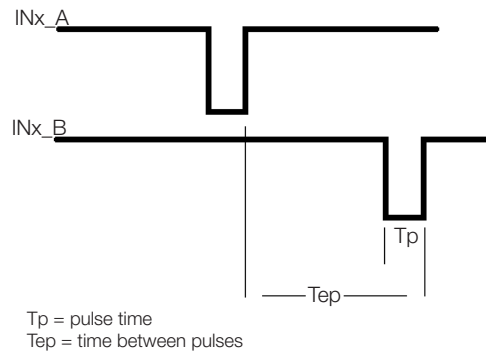


Figure 5.1: Example of test pulses

For the PSRW to identify the pulses as test pulses, 'Tp' cannot be longer than 1 millisecond, and 'Tep' cannot be longer than 50 milliseconds.

For further information, see [Chapter 8 CONNECTION EXAMPLES on page 8-1](#).

### 5.1.4 Input Type: Simultaneity Control

This type of input is used to control the simultaneity between two actuators. The two actuators must have electromechanical contacts and be connected to the test output circuit.

The maximum simultaneity time is 0.3 seconds according to ISO13851.

Since two actuators are used, two PSRW inputs will be used, allowing only two simultaneity controls per PSRW.

The simultaneity control can only match: Input 1 and 2 or Input 3 and 4.

The actuators must contain NO and NC contacts and be connected to the PSRW so that the test output channels are reversed. At the first input (1 or 3), the NO contact must be connected to channel A and the NC contact to channel B. At the second input (2 or 4), the NC contact must be connected to channel A and the NO contact to channel B.

For further information, see [Chapter 8 CONNECTION EXAMPLES on page 8-1](#).

## 5.2 RESET INPUTS

The PSRW has two reset inputs: RST\_1 and RST\_2.

They are used to validate the state of the digital inputs IN\_1, IN\_2, IN\_3 and IN\_4. Each reset input is exclusively related to its respective safety output.

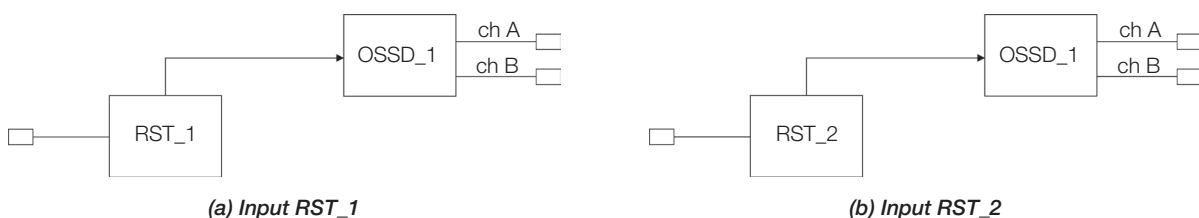


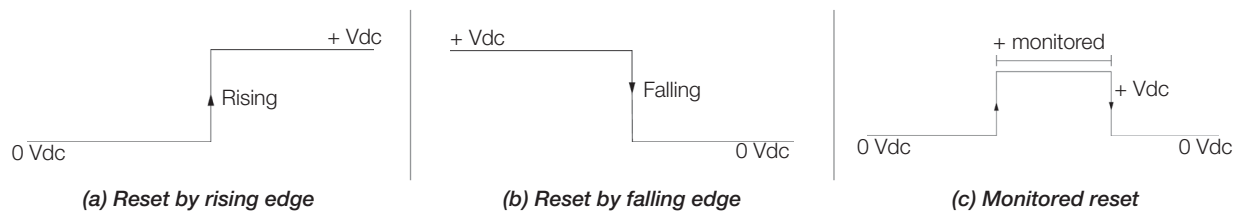
Figure 5.2: (a) and (b) Reset inputs

To increase the safety level of the application, it is recommended to use an EDM connected in series with the reset inputs, regardless of the configured operating mode.

The reset inputs are configurable by the user and can operate in automatic, manual or mixed (manual and automatic simultaneously) mode according to the application requirements.

For the automatic mode, the reset validation takes place immediately after each transition of the digital inputs, provided that the reset input is at high level (+ Vdc).

The manual mode, however, requires a transition edge (either rising, falling or both), where the time between the rise and fall is monitored.



**Figure 5.3:** (a) to (c) Reset modes

In the mixed mode, a reset input is used to validate manual and automatic inputs. The validation of the manual inputs only happens when there is a transition rising edge. For automatic inputs, the + Vdc level must be maintained.

## 5.3 RESET

The RST\_1 and RST\_2 allows the PSRW to verify an EDM (External Device Monitoring) feedback signal (series of contacts) from the external contactors, and to monitor Manual/Automatic operation.



### ATTENTION!

The Reset command must be installed outside the danger area in a position where the danger area and the entire work area concerned are clearly visible.



### ATTENTION!

It must not be possible to reach the Reset command button from inside the danger area.

**Table 5.1:** Reset operation mode

| Mode      | Type        | Reset Connection |
|-----------|-------------|------------------|
| Automatic | With EDM    |                  |
|           | Without EDM |                  |
| Manual    | Without EDM |                  |
|           | Without EDM |                  |

## 5.4 AUXILIARY OUTPUT

The auxiliary output is a programmable signal output exclusively related to its respective safety output. Normally is connected a signaller, used to indicate visually of the status of:

- Digital inputs.
- Reset inputs.

- Safety outputs (equal or reversed).



**ATTENTION!**  
Auxiliary output is only to no safety functions.

5.5 TEST OUTPUTS

To monitor the digital inputs configured as contact, it is necessary to use the test outputs (TEST\_A and TEST\_B) generated by the PSRW. The PSRW has two test output channels that must be connected to their respective input channel (channel A to channel A/channel B to channel B) for the correct operation of the input.

The OUT TEST TEST\_A and TEST\_B signals must be used to monitor the presence of short-circuits or overloads on the inputs see [Figure 5.4 on page 5-4](#).

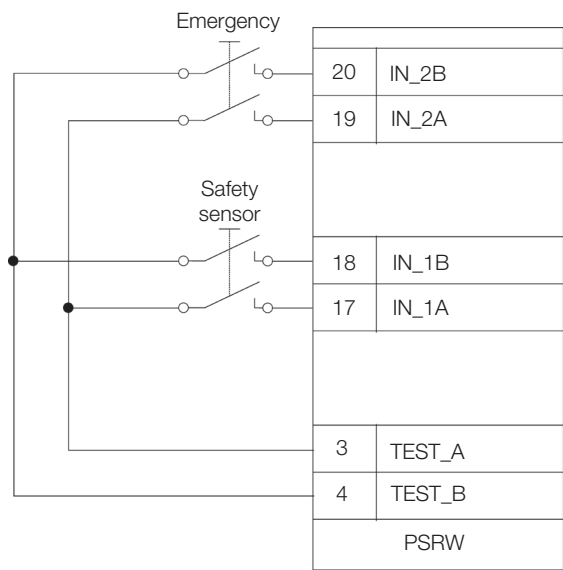


Figure 5.4: Example of TEST\_A and TEST\_B connection



**ATTENTION!**  
The maximum allowed length for test outputs connections is 30 meters.



**ATTENTION!**  
Is not allowed connect the test outputs to supply an external component.

5.6 OSSD OUTPUTS

The OSSD are short circuit protected, cross circuit monitored and supply:

- In the ON condition: **U<sub>v</sub> - 1 V** (where U<sub>v</sub> is 24 V ± 20 %).
- In the OFF condition: **0 V / 2 V<sub>rms</sub>**.
- The maximum load of **2A@24V** corresponds to a minimum resistive load of **12 Ω**.<sup>1</sup> Each OSSD channel can supply up to two (2) Amps. However, the sum of the currents of the four channels cannot exceed 2 (two) Amps.
- The maximum capacitive load is **1 uF**.
- The maximum inductive load is **30 mH**.

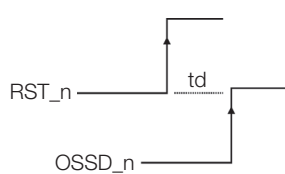
<sup>1</sup> See [Section 6.2 TECHNICAL SPECIFICATIONS on page 6-1](#) for maximum current.


**ATTENTION!**

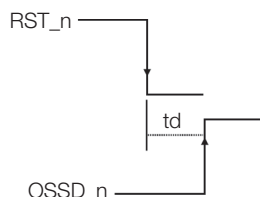
Is not allowed connect the OSSD like power supply.

Each OSSD is an independent double channel output and can be configurable individually. Each OSSD perform a logic 'AND' between the inputs when a reset command is occurs. At this time the CPU execute the logic according to its inputs configuration. The following reset configuration can be performed:

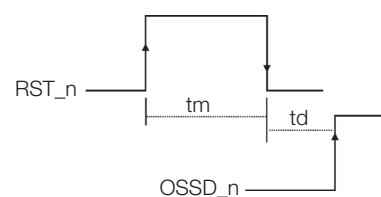
| Mode                 | Function                                                             | Description                                                                                                                                                                                                                                           |
|----------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Automatic            | Inputs related to automatic reset                                    | The system read the inputs and perform the "AND" logic. To turn on the OSSD the respective RESET must be connected to 24 V                                                                                                                            |
| Manual               | Inputs related to manual reset. Falling edge or rising edge          | The system reads the inputs and executes the "AND" logic. To connect the OSSD, it is necessary a transition from "0" to "1" or "1" to "0" at the reset terminal according to the edge selected                                                        |
| Manual Monitored     | Inputs related to monitored manual reset                             | The system read the inputs and perform the "AND" logic. To turn on the OSSD is necessary a transition "0" - "1" - "0" at reset terminal. The pulse mustn't be more than 3 seconds                                                                     |
| Manual and Automatic | Inputs related to automatic reset and manual reset, rising edge only | The system reads the inputs and executes the "AND" logic. To turn on the OSSD, it is necessary a transition from "0" to "1" to validate the manual inputs. Then the + Vdc signal must be maintained at the reset pin to validate the automatic inputs |



**(a) Manual Rising Edge**



**(b) Manual Falling Edge**



**(c) Time Pulse**

td = Time to switch on (5 ms maximum)  
tm = Time to monitored reset 50 ms < tm < 3 s

**Figure 5.5:** (a) to (c) OSSD operation



## 6 TECHNICAL SPECIFICATION

### 6.1 SAFETY LEVEL

| Parameter           | Value     | Standard         |
|---------------------|-----------|------------------|
| PL                  | e         | ISO 13849-1:2006 |
| CAT                 | 4         | ISO 13849-1:2006 |
| SIL                 | 3         | IEC 61508:2010   |
| SIL CL              | 3         | IEC 62061:2005   |
| PFH(1/h)            | 7.85 E-09 | IEC 61508:2010   |
| PFDavg              | 3.91 E-05 | IEC 61508:2010   |
| SFF                 | 99.50 %   | IEC 61508:2010   |
| MTTFd (years)       | 416.65    | IEC 61508:2010   |
| Proof test interval | 10 years  | IEC 61508:2010   |

### 6.2 TECHNICAL SPECIFICATIONS

|                                 |                                                                |
|---------------------------------|----------------------------------------------------------------|
| Digital inputs                  | 8 (4 double channel)                                           |
| Reset inputs                    | 2 (configurable manual/automatic), see Figure A3               |
| Logic of the inputs             | PNP active high – (IEC 61131-2)                                |
| Safety outputs                  | 4 (2 double channel)                                           |
| Logic of the safety outputs     | PNP active high – $[1 \div 4] 2 A \sum 2 A \text{ max}$        |
| Auxiliary outputs               | 2 (configurable)                                               |
| Logic of the auxiliary outputs  | PNP active high – (isolated) 100 mA to 24 Vdc max              |
| Supply                          | 24 Vdc ( $\pm 20 \%$ )                                         |
| Consumption                     | 3 W max                                                        |
| Response time                   | 5 ms + input debounce (4 or 16 ms) + delay time (configurable) |
| Connection cable cross section  | 0.5 to 2.5 mm <sup>2</sup> / AWG 12 to 30 (solid/stranded)     |
| Max length of connections       | 30 meters                                                      |
| Operating temperature           | 0 to 50 °C (32 to 122 °F)                                      |
| Max surrounding air temperature | 50 °C (122 °F)                                                 |
| Storage temperature             | -20 to 85 °C (-4 to 185 °F)                                    |
| Relative humidity               | 10 to 95 %                                                     |
| Connection to PC                | USB 2.0 – Max length of cable: 3 m                             |

### 6.3 ENCLOSURE

|                       |                                                                                               |
|-----------------------|-----------------------------------------------------------------------------------------------|
| Description           | Housing with 6 pluggable blocks of 4 terminals each and locking latch mounting in cover front |
| Material              | Polyamide                                                                                     |
| Class protection      | IP20                                                                                          |
| Dimension (H x L x D) | 108 x 22.5 x 114.5 (mm)                                                                       |

## 6.4 MECHANICAL DIMENSIONS

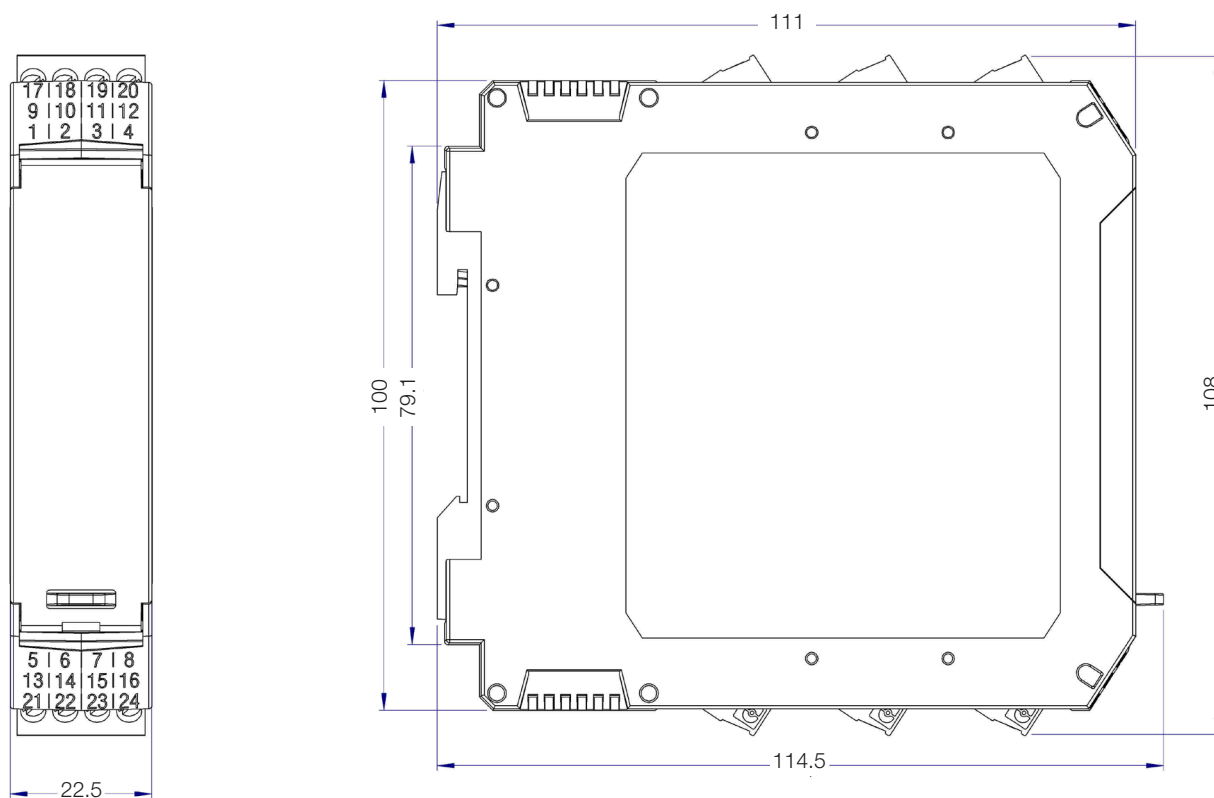


Figure 6.1: Mechanical dimensions

## 7 DIAGNOSIS

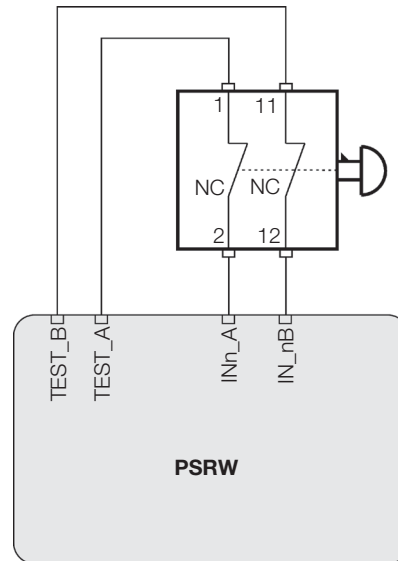
*Table 7.1: Diagnosis*

| Front End | Label       | Color      | Light On            | Light Off            | Blinking                                                        |
|-----------|-------------|------------|---------------------|----------------------|-----------------------------------------------------------------|
|           | POWER       | Green<br>  | PSRW on             | PSRW off             | Power Supply in fault                                           |
|           | FAULT       | Red<br>    | Fault               | No fault             | Internal fault detected<br>Over current<br>Output short circuit |
|           | USB         | Blue<br>   | Connected to PC     | No connected to PC   | -                                                               |
|           | INPUT [1,4] | Yellow<br> | Active input        | No active input      | Wrong connection<br>Over current<br>Input short circuit         |
|           | AUX [1,2]   | Yellow<br> | Auxiliary output on | Auxiliary output off | -                                                               |
|           | OSSD [1,2]  | Green<br>  | OSSD output on      | OSSD output off      | Under voltage<br>Over current<br>Output short circuit           |



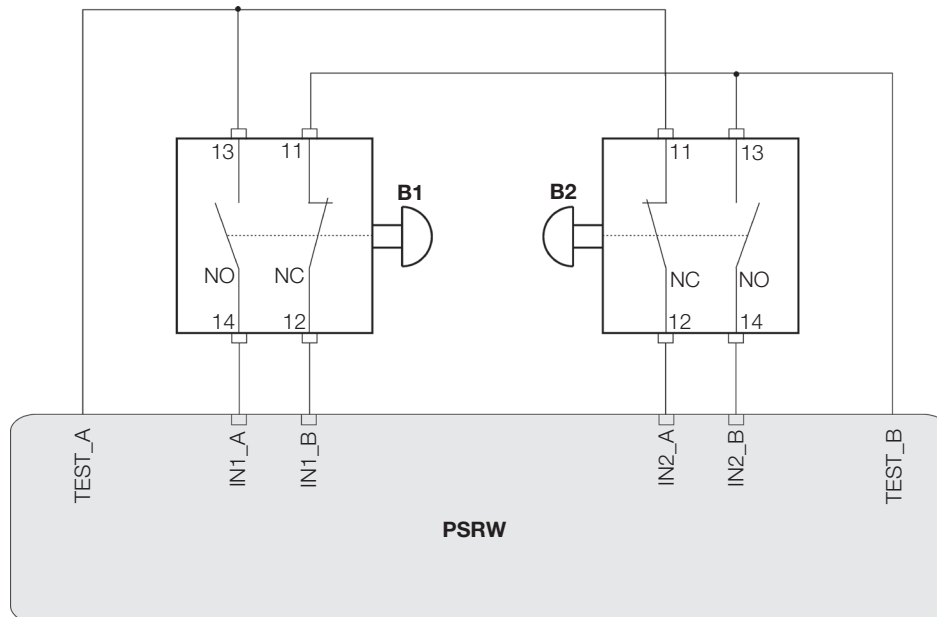
## 8 CONNECTION EXAMPLES

### 8.1 EMERGENCY STOP CONNECTION EXAMPLE

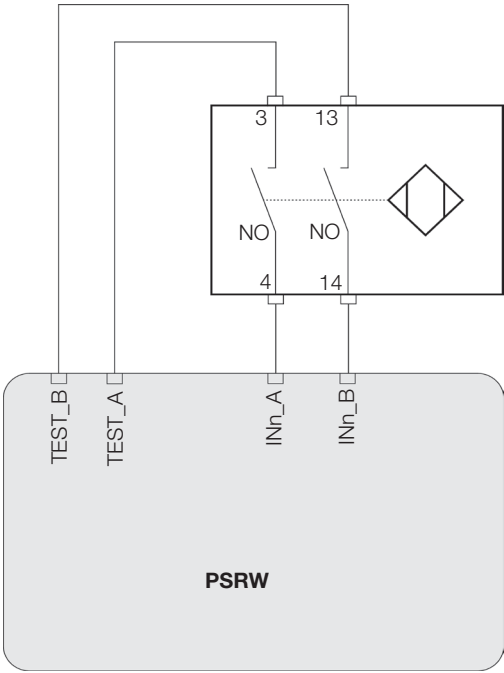


### 8.2 TWO HANDS CONTROL CONNECTION EXAMPLE

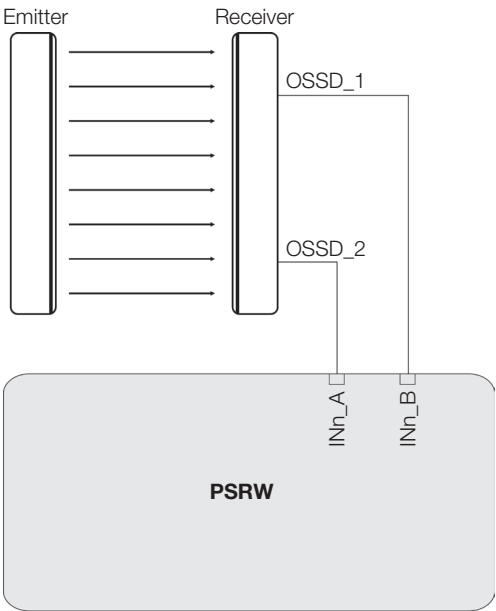
To connect a two hands control is necessary use two double channel inputs and it can be IN1-IN2 or IN3-IN4 and connect according to examples below.



8.3 SAFETY SENSOR CONNECTION EXAMPLE



8.4 LIGHT CURTAIN CONNECTION EXAMPLE

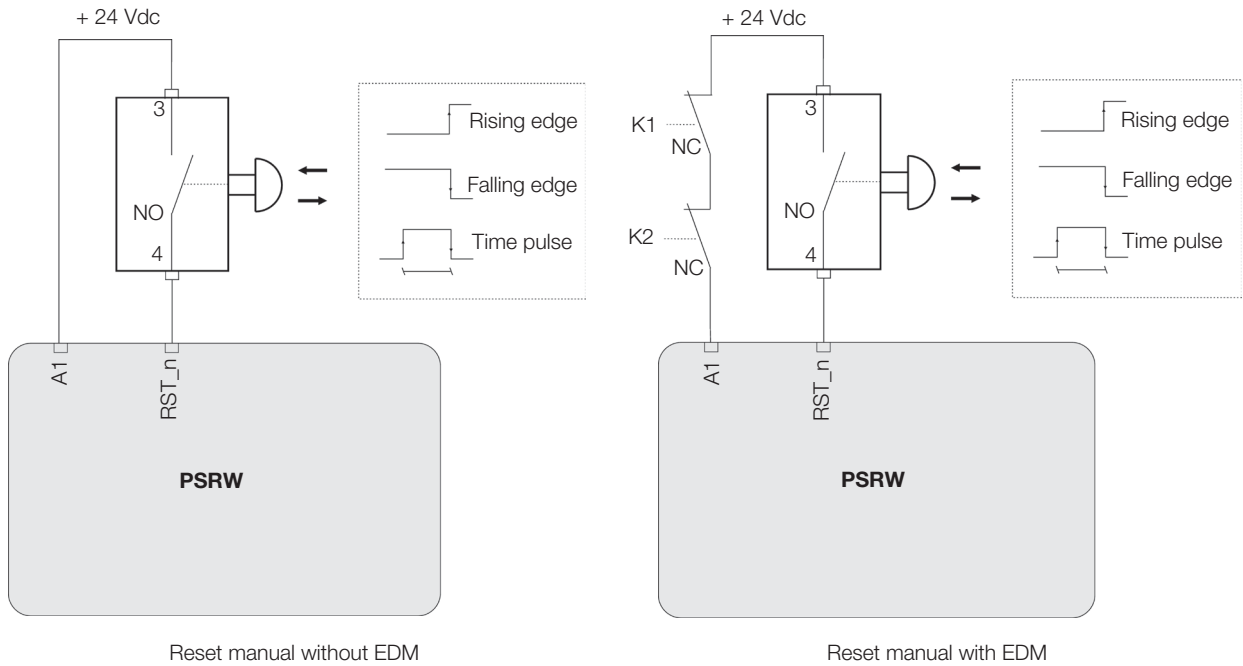


## 8.5 RESET INPUTS

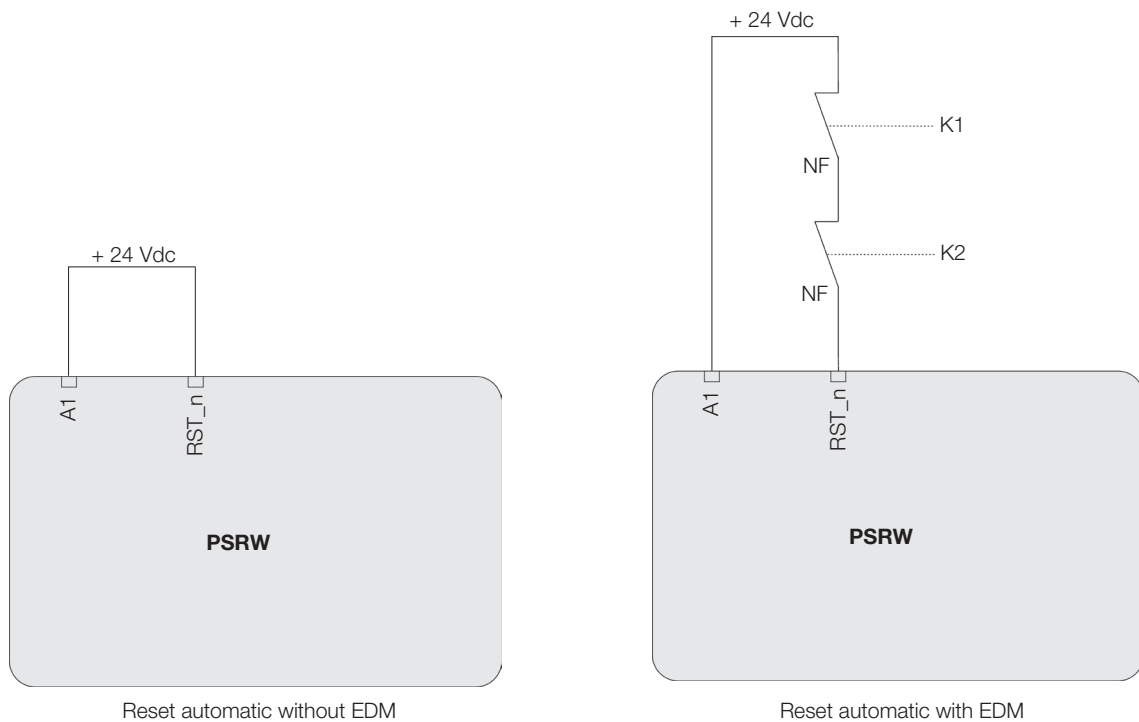
There are three different operating modes for the reset:

- Reset Manual
- Reset Automatic
- Reset Manual/Automatic

The manual mode is able to operate using falling edge, rising edge or time pulse, see figure below:

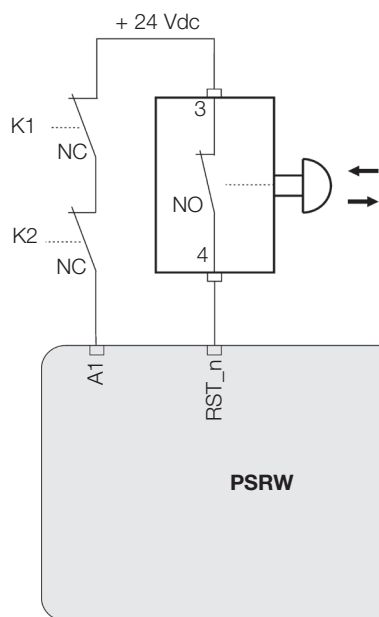


To operate in reset automatic the input must be connected to 24 Vdc.

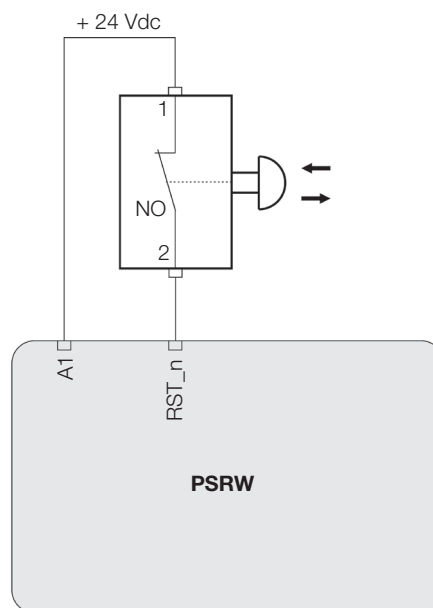


## Connection Examples

To operate in reset manual/automatic a NC button must be connected to input.

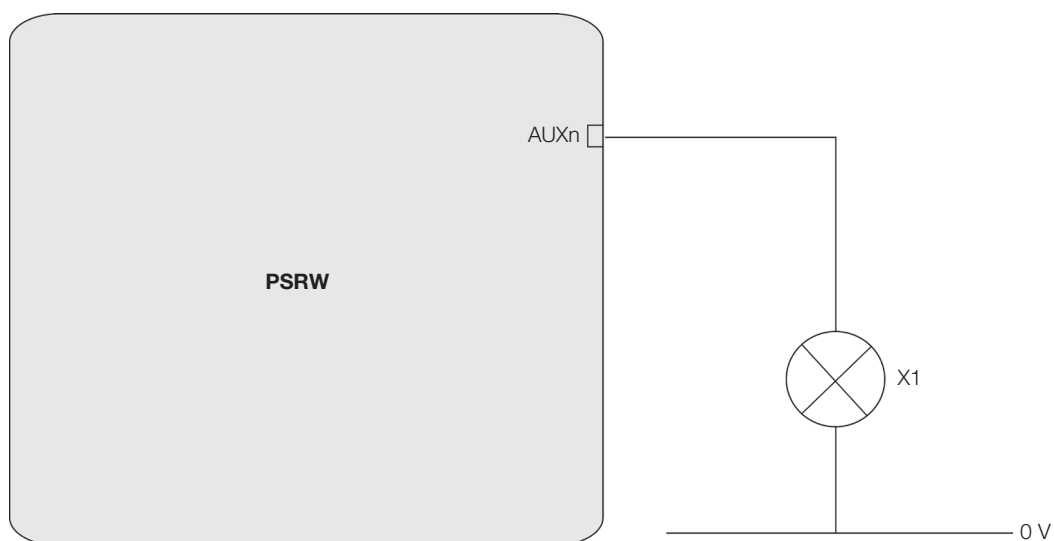


Reset manual/automatic with EDM



Reset manual/automatic without EDM

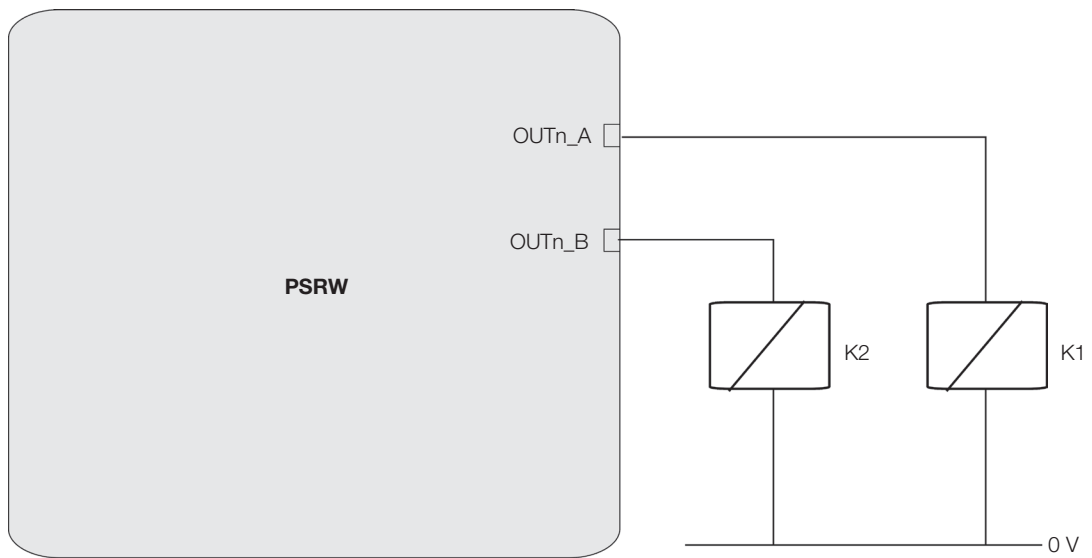
## 8.6 AUXILIARY OUTPUT CONNECTION



### ATTENTION!

Check if the current consumption from load not exceed the maximum allowed (100 mA).

## 8.7 OSSD OUTPUT CONNECTION



### ATTENTION!

Check if the sum of all loads of OSSD will not exceed the maximum allowed (2 A).



## 9 PROGRAMMING WITH WPS

The PSRW is configured using software WPS (WEG Programming Suite). This software is already used to configure other products from WEG. This software available for download on the website: **[www.weg.net](http://www.weg.net)**.

The WPS uses a versatile graphic interface to establish the connections between the various components, as described below.

### 9.1 WPS INSTALLATION

- Minimum hardware and software required:
- Platform: Windows 7 or greater.
- Minimum Processor: Core i3.
- Recommended processor: Core i5.
- Minimum RAM memory: 1 GB.
- Recommended RAM memory: 4 GB.
- Screen resolution: 1024 x 768 or greater.
- Disk space: 500 MB.
- Communication: USB.
- Browser: IE7+ or Firefox 46+.

## 9.2 APPLICATION SET UP

### 9.2.1 Menu

When WPS is launched, a welcome screen will be displayed. There are four options on it:

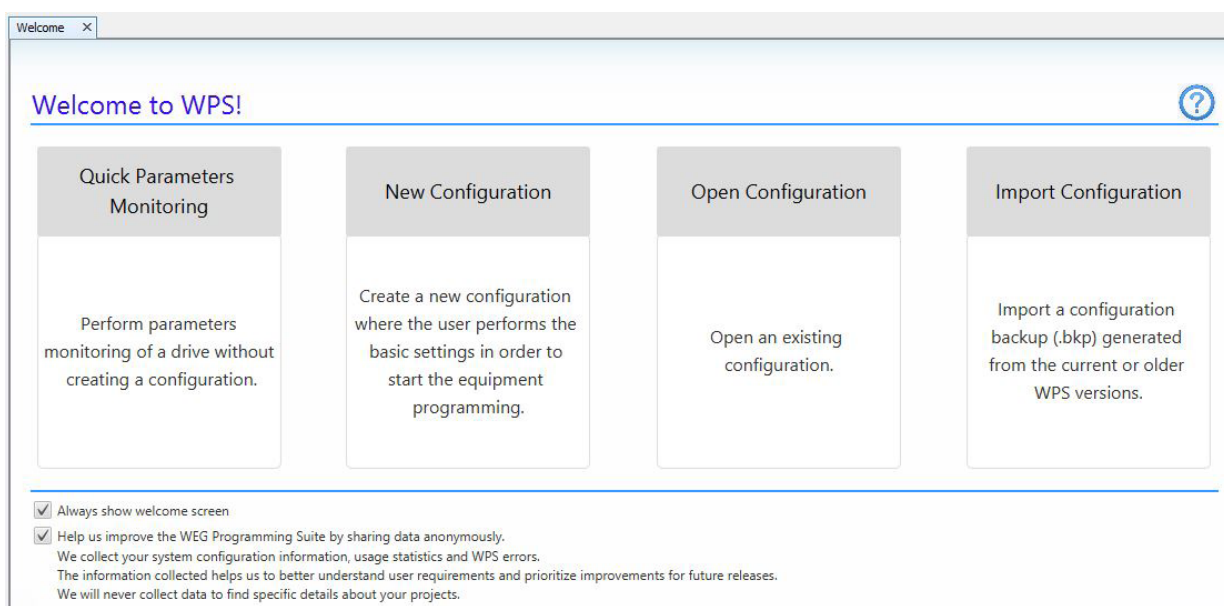
**New configuration:** Used to create a new configuration for PSRW.

**Open Configuration:** Used to open an existing configuration save on the computer.

**Quick Parameters Monitoring:** Not used for PSRW relay.

**Import configuration:** Not used for PSRW relay.

All this shortcuts are available on menu bar.



## 9.2.2 Creating a Project

When selecting the option new configuration, a popup window will be displayed asking for a configuration name (also called project name), file path and a resource name. Type these data and click on “Next”.

**New Configuration**

**Steps**

- 1. Name**
2. Communication configuration
3. Device selection

**Name**

Configuration name:

Configuration path:  ...

Resource name:

< Back **Next >** Finish Cancel Help

The next step is to setup the communication. In the combo-box “Preset” on Device” area, choose PSRW among other devices.

**New Configuration**

**Steps**

1. Name
2. Communication configuration
- 3. Device selection**
4. Import from WLP

**Device selection**

Type:

Version:

Voltage:

**Picture**

**Features**

PSRW is a configurable safety relay which can be configured using the WPS graphic interface, it has 4 (four) double channel safety inputs and 2 (two) OSSDs (Safety double channel safety outputs).

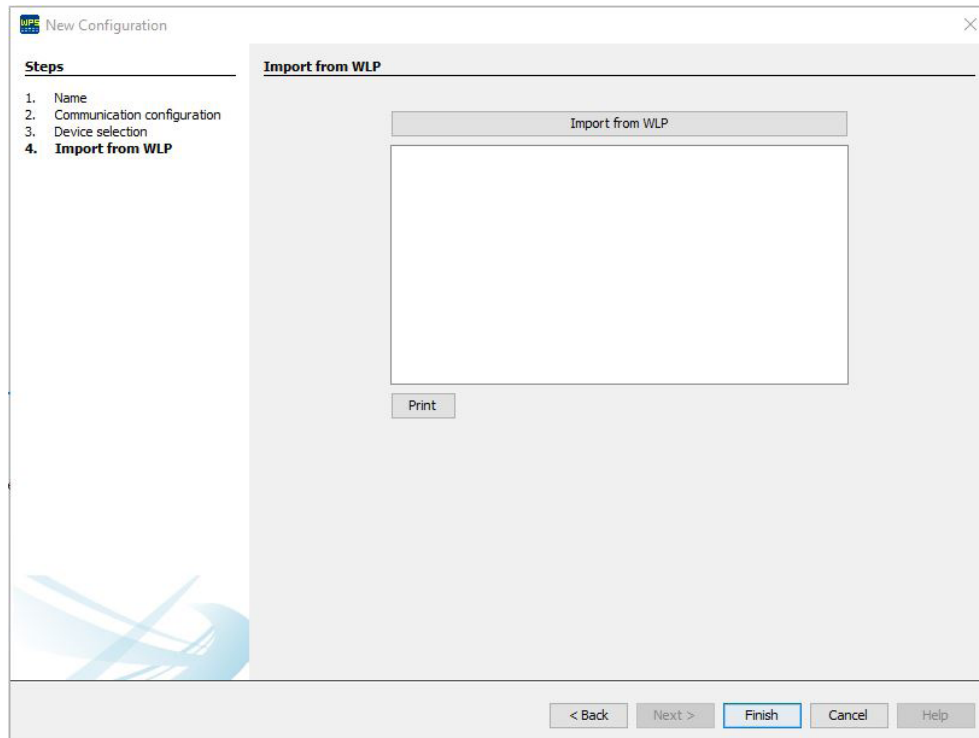
PSRW is capable of monitoring the following safety sensors and components:

- Safety Light curtain;
- Two hands control;
- Emergency stops;
- Magnetic sensors;

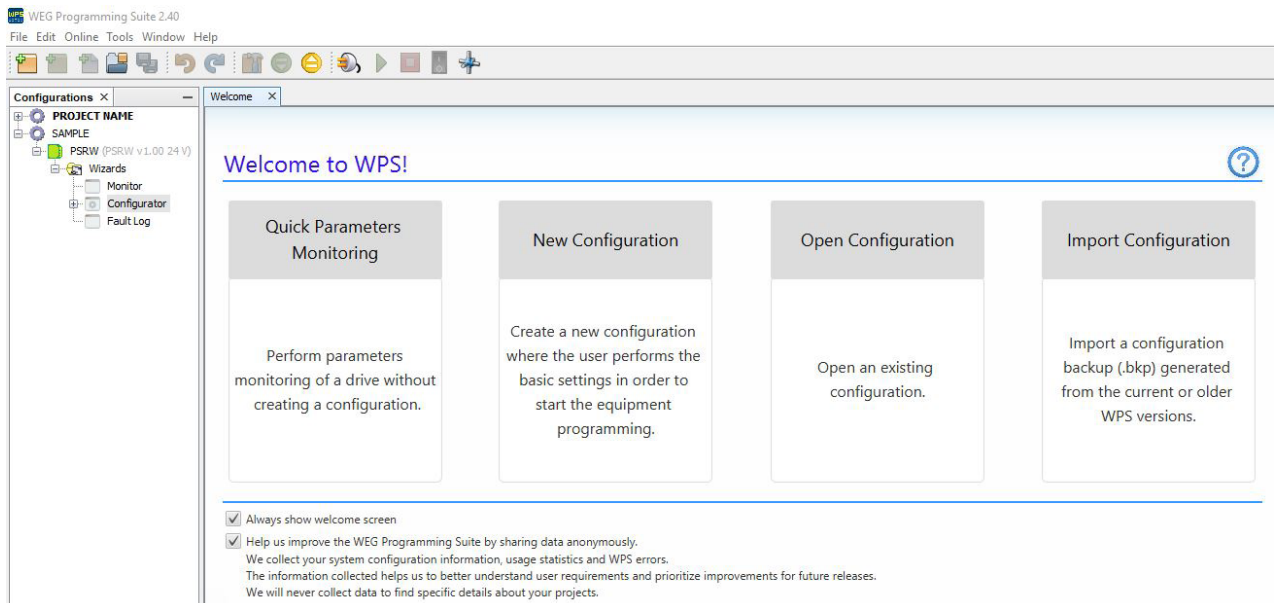
The communication parameters are loaded automatically, by this way, no further setup are needed except the COM port if PSRW was connected to the PC (see [Section 9.3 SETTING UP COMMUNICATION on page 9-7](#)). After that, click on “Next”.

On the following screen, check the device data and then click on “Next”.

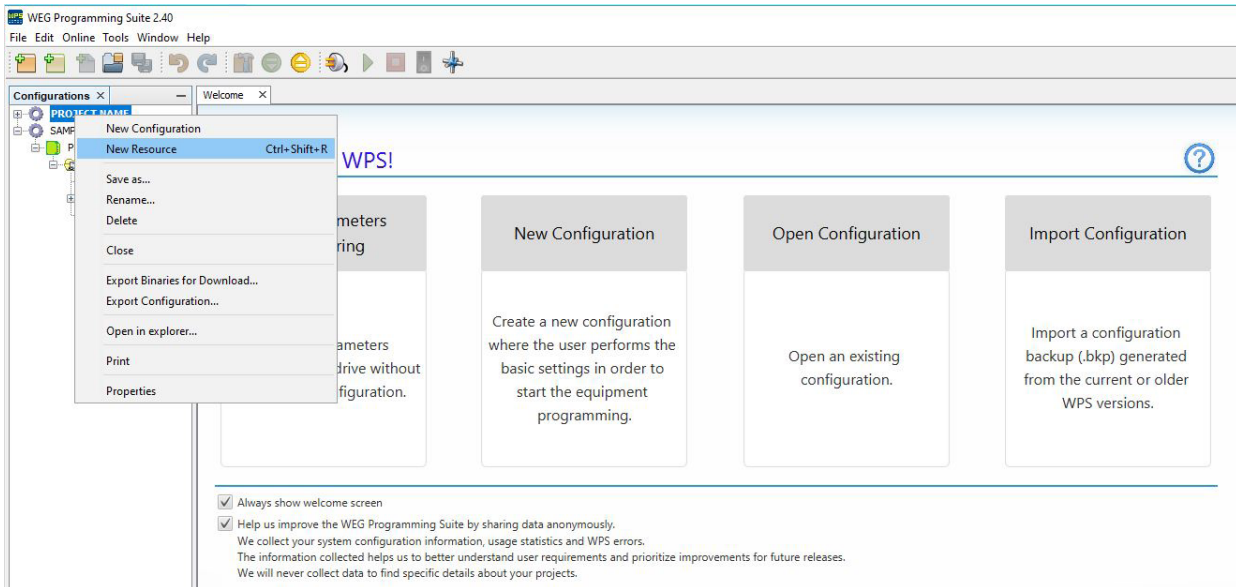
After that, click on “Finish”.



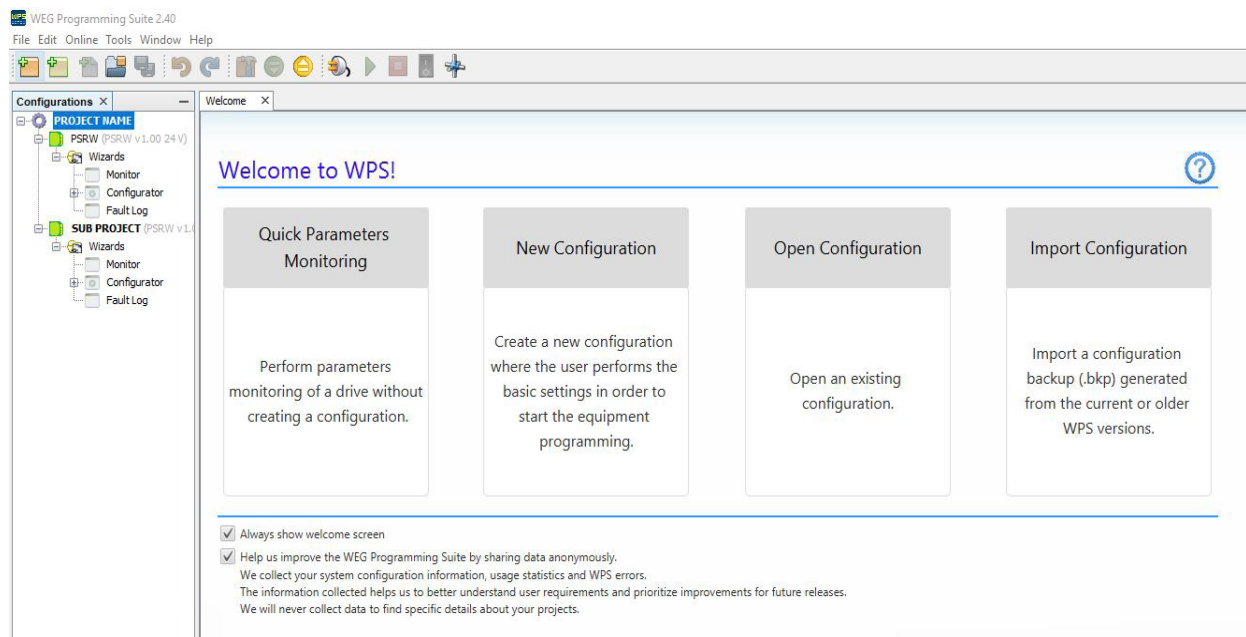
On this moment, the created Project with the PSRW Resource appears in the configuration tab.



On WPS, a Project could contain various resources. For instance, assuming that for a machine safety monitoring is demanded two PSRWs, it can add a new Resource on the Project tree by right clicking on the Project and then clicking on “New Resource”.



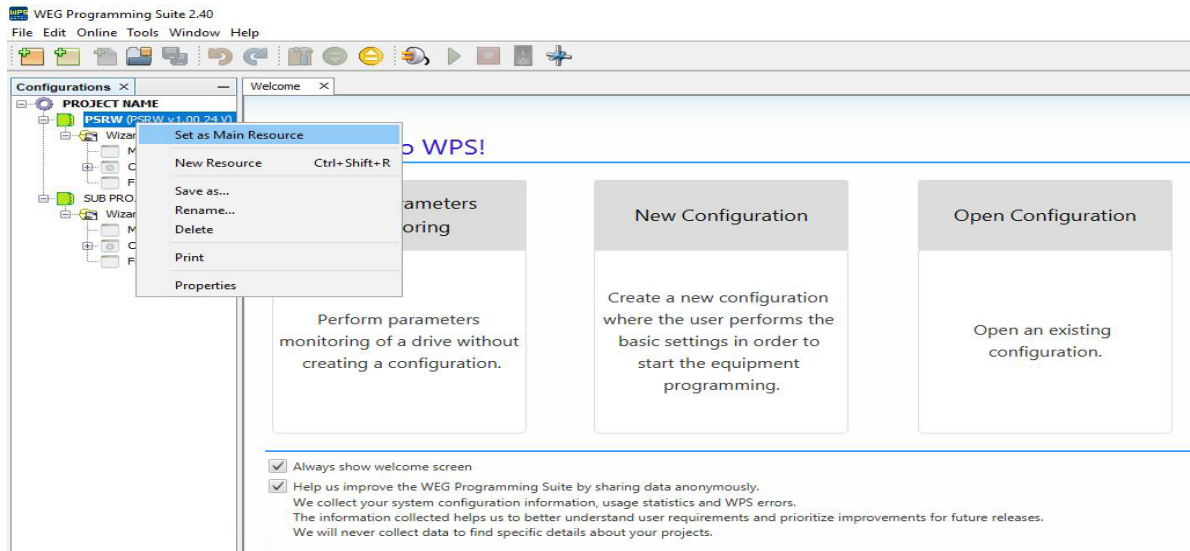
If you do that and follow the previous steps to create a Resource, it will be possible to observe the Resource under the Project tree:



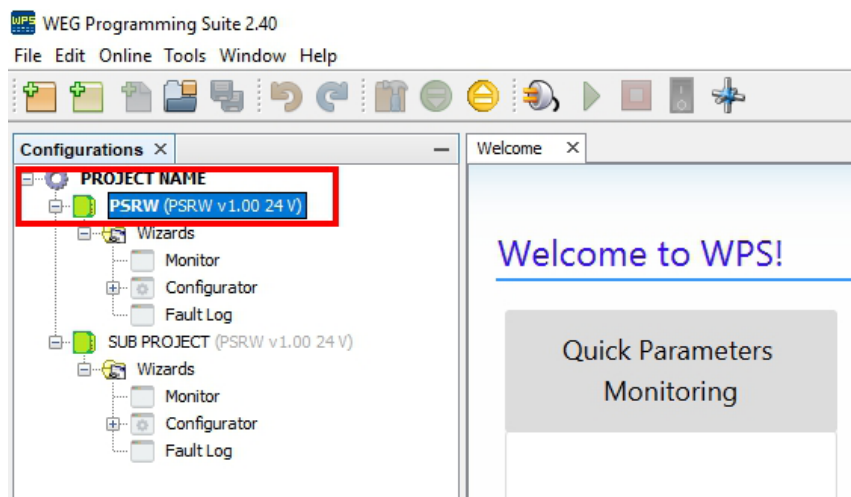
### 9.3 SETTING UP COMMUNICATION

To be possible to read and configure PSRW, it is necessary to setup its communication with the PC. To do so, connect PSRW to the PC and follow the steps below:

- a. Check if the resource elected to communicate with PSRW is the main resource.
  - Right click on the resource and click on “Set as Main Resource”.

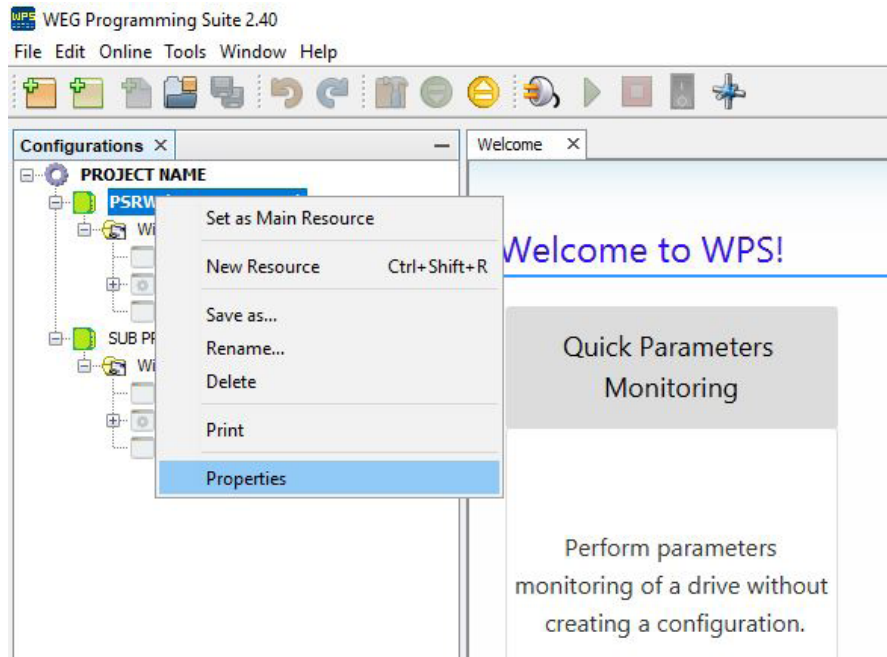


- Observe that the resource title became bold:

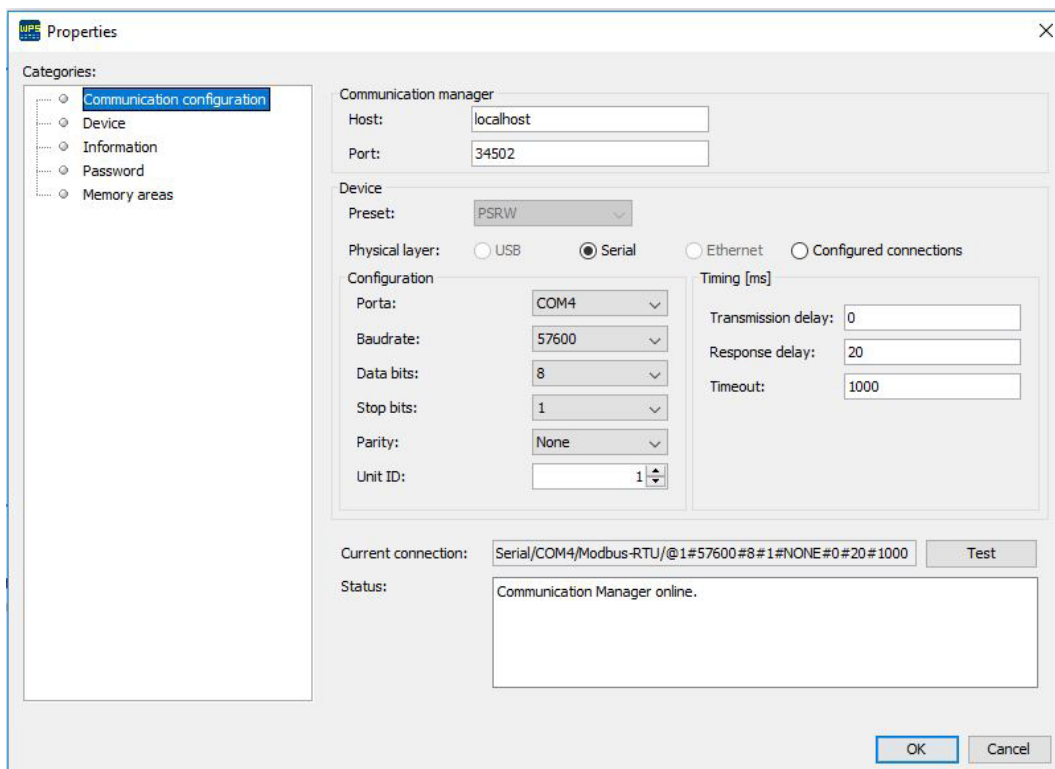


## b. Test the communication.

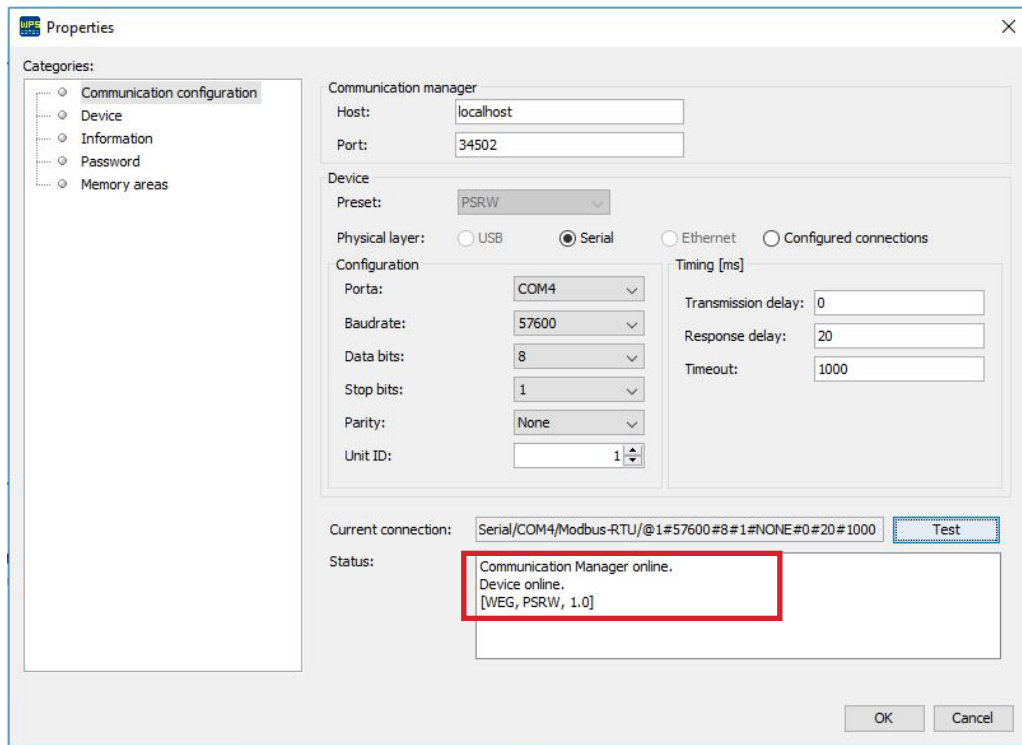
- Right click on Resource and click on “Properties”.



- Choose the COM port in the list on combo-box “Porta”. It is likely the port number will be the higher number.



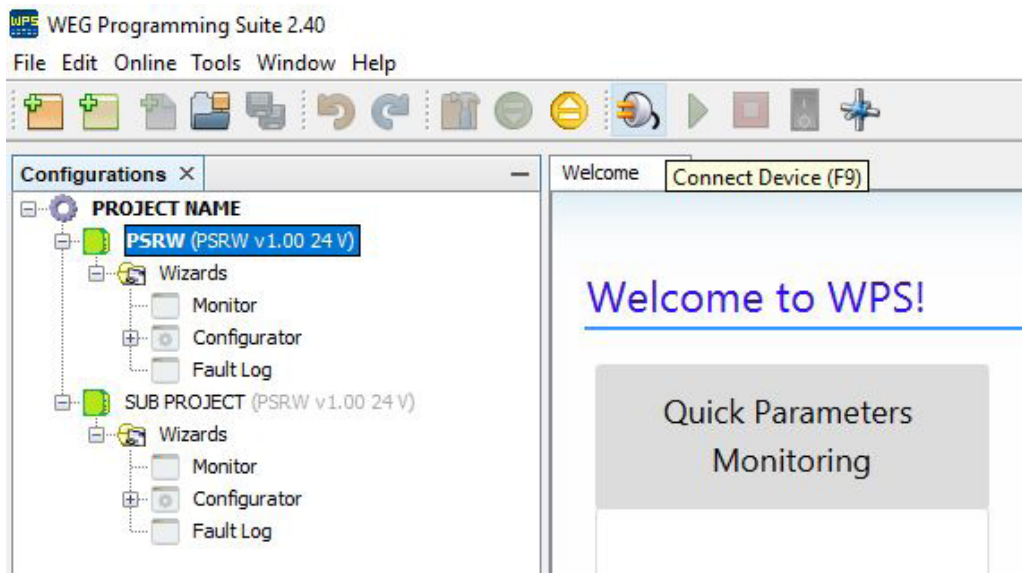
- Click on “Test” button. If the test was successful, the text area “Status” will contain the text “Device online”. If not, check the physical connections and the COM port number and try again.



- Click on “OK”.

**c.** Click on “Connect Device”

- Click on “Connect Device” toggle-button. Observe that it become selected and the status bar now contains a communication address. This means that WPS is recognizing PSRW



## 9.4 WIZARDS

PSRW is configured through Wizards wizard Configurator and Wizard Monitor. In the first one, it is possible to:

- Design a configuration through component blocks.
- Print and transfer a configuration.
- Read configurations from PSRW.

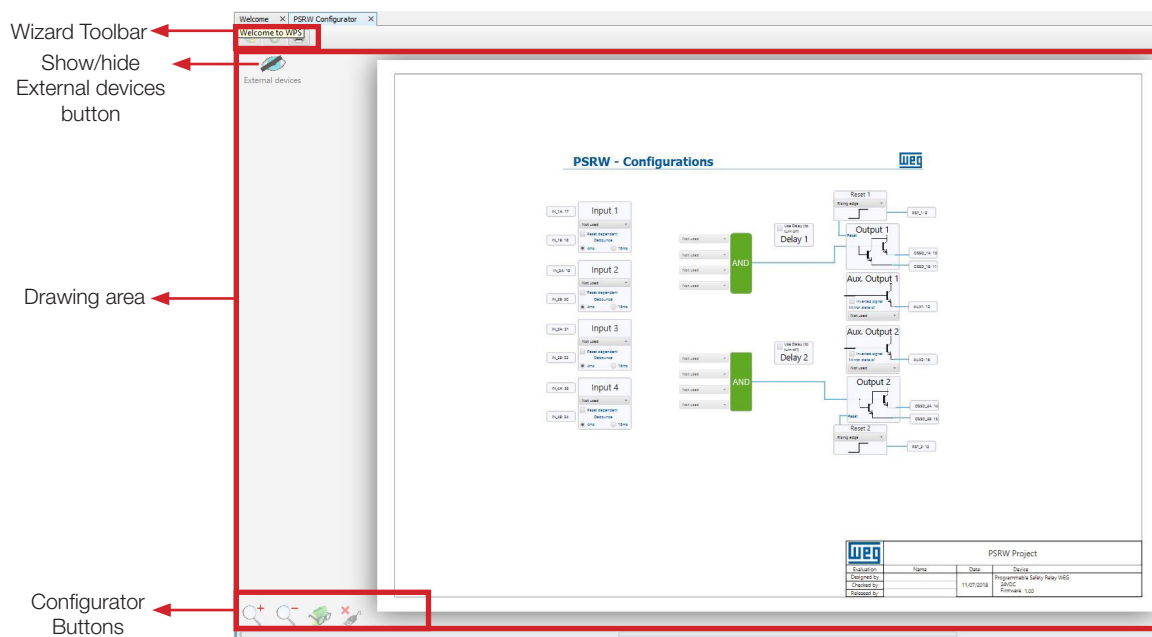
In the PSRW monitor is possible to:

- Read configurations from PSRW.
- Print a configuration.
- Validate a configuration.

The Validation command is sent only through Wizard Monitor. Without the Validation, PSRW discard the changes and return to the previous configuration stored when it disconnect from PC.

### 9.4.1 Wizard configurator

The following figure shows the user interface of the wizard Configurator.



**Wizard Toolbar:** displays the commands for monitoring , transfer  and printing  values from drawing area.

**Show/hide external devices button** : expose or hide the external devices on the drawing sheet. These devices are examples of how to connect the most common input and output devices on PSRW.

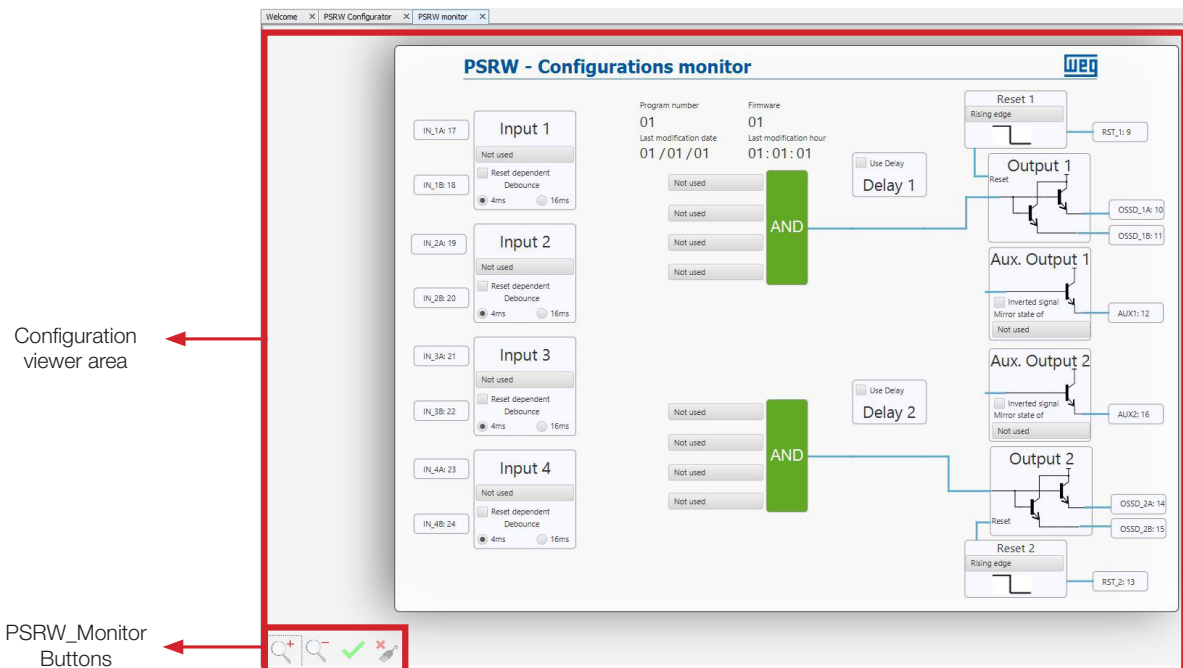
**Drawing area:** area where is possible to set configurations of PSRW. A more detailed explanation will be given in the following sections.

**Configurator Buttons:** displays commands for zoom in/out , retrieve configurations from physical PSRW , and exit from Prog-mode .

The buttons Exit from Prog-mode , monitoring  and transfer  are used to transfer configurations to PSRW and they will be explained in the following sections.

## 9.4.2 Wizard Monitor

The following figure shows the user interface of the Monitor.



**Configuration viewer area:** area where is possible to view configurations from PSRW. A more detailed explanation will be given in the following sections.

**Wizard Monitor Buttons:** displays commands for zoom in/out , validate configurations on physical PSRW , enter in Prog-mode  and exit from Prog-mode .

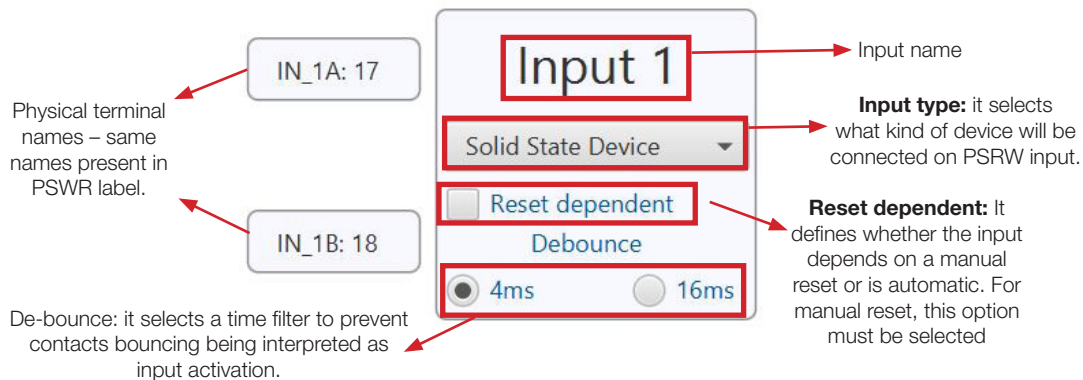
The buttons Exit from Prog-mode  and Validate configurations on physical PSRW , are used to transfer configurations to PSRW and they will be explained in the following sections.

## 9.5 DESIGNING A CONFIGURATION

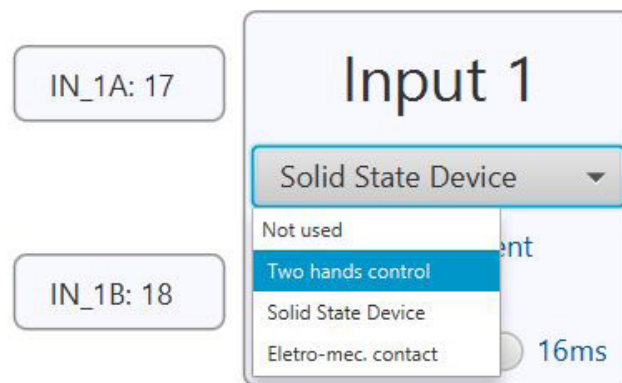
To design a configuration, it is necessary to open the wizard Configurator and configure the component blocks described in the following sections.

## 9.5.1 Configuring the Inputs

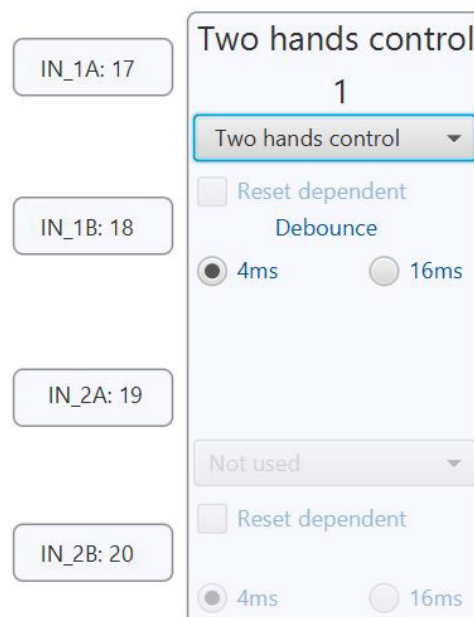
The component block used to configure the inputs is described below.



The options for Input type combo-box are:



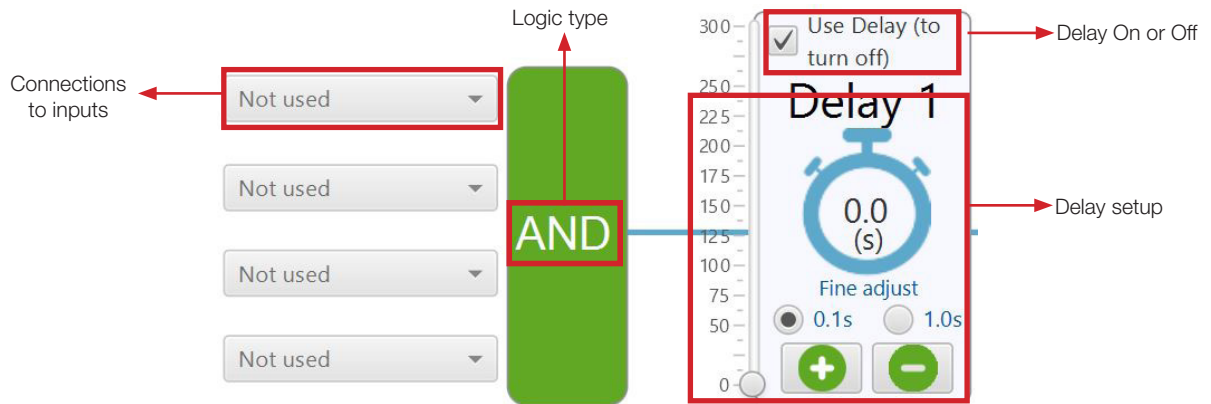
If the input type is “Two hands control”, the block changes to a big one containing the next block, as the figure bellow shows.



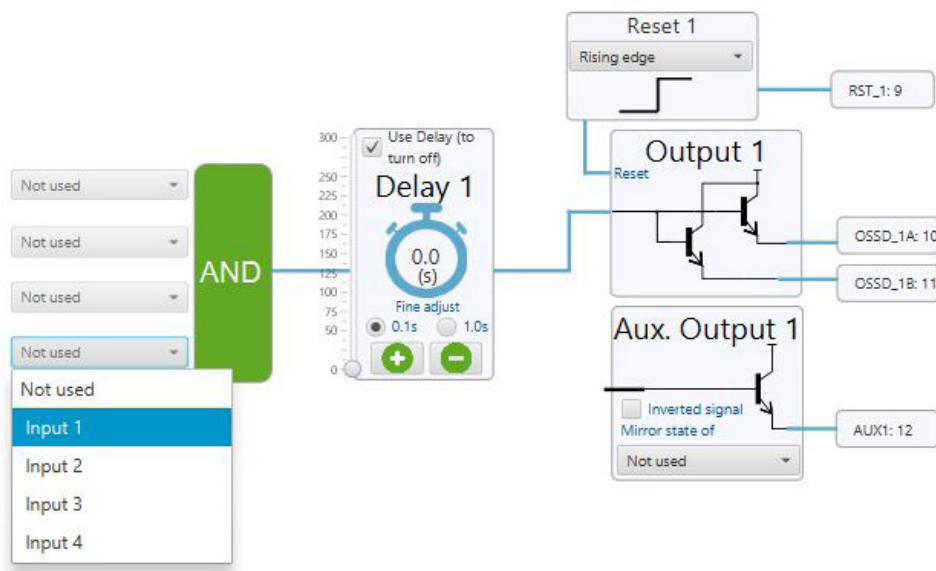
The two hands control type is only allowed between inputs 1 and 2 or between inputs 3 and 4. For this option, the reset option remains disabled for automatic reset of the two-hand control.

## 9.5.2 Logic and delay timer configuration

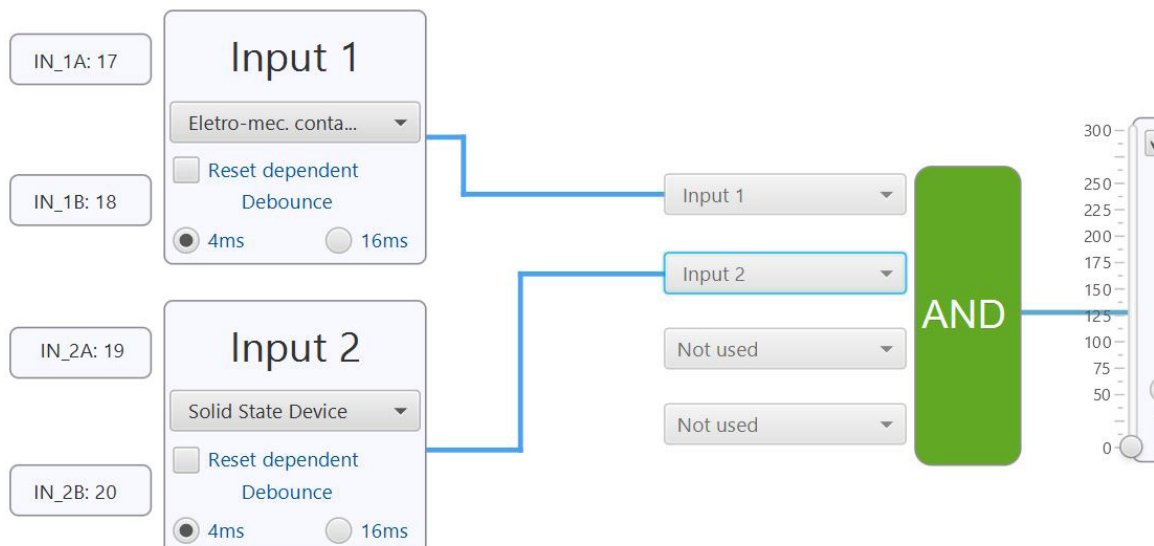
The WPS has two logic blocks to be configured “Logic 1” and “Logic 2”. Each block will active its respect OSSD output.



The logic block has 4 combo-box with option “Input 1”, “Input 2”, “Input 3”, “Input 4”and “Not used”.

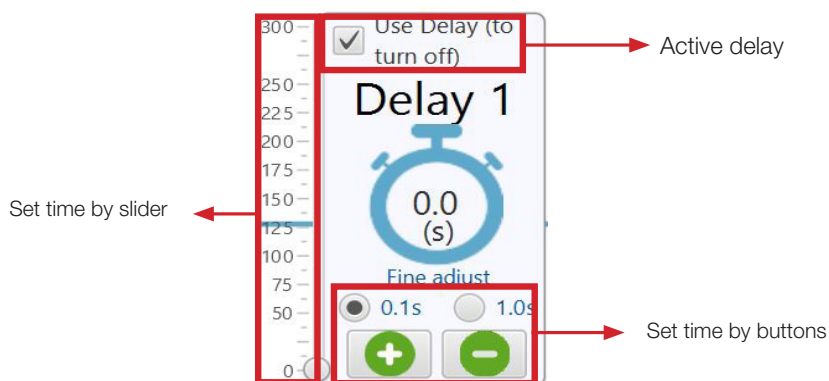


When an Input “n” is selected, the WPS will connect the input to logic block.



If two or more inputs are connected, the logic block will perform a “AND” logic between them to switch the OSSD.

The logic block has a delay option it can be active setting the flag “Use Delay”. When active will show a slider and buttons “+ Inc” and “- Inc” to set the delay.



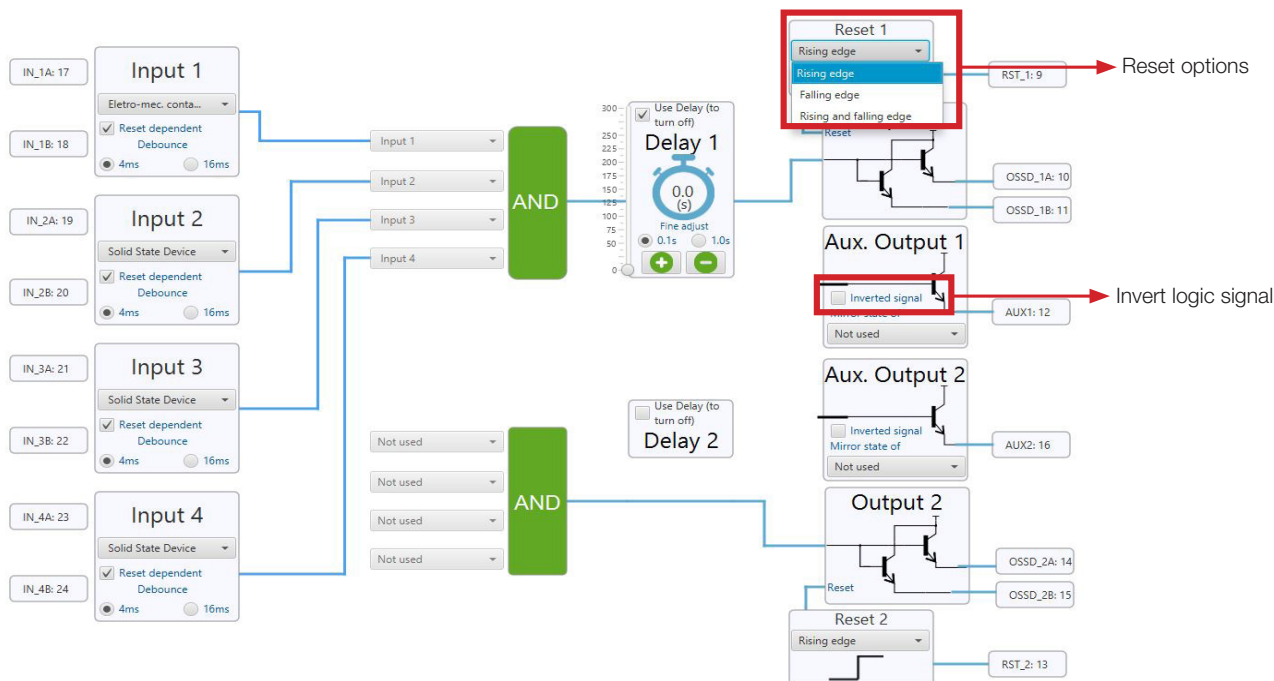
When active and set a delay, the OSSD output will keep active according to time selected.

## 9.5.3 OSSD output and auxiliary output configuration

The OSSD output will be active according to the logic configuration.

The auxiliary output can be set according to combo-box option “not used”, “Input n”, “Output n” or “Reset n” that’s meaning when its signal is active the auxiliary output will switch.

There is an option flag to invert the logic setting “Inverted signal”.



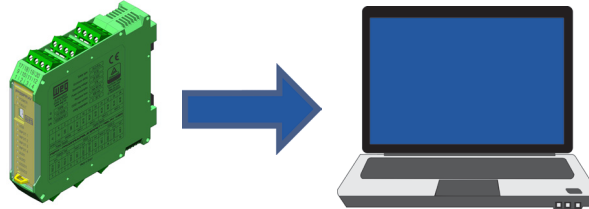
After set the inputs, logic block and delay time, the reset must be set according the options “Automatic”, “Rising Edge”, “Falling Edge” or “Rising and Falling Edge” (Time Pulse).

To active the manual reset options in necessary set the flag “reset dependent” at input block.

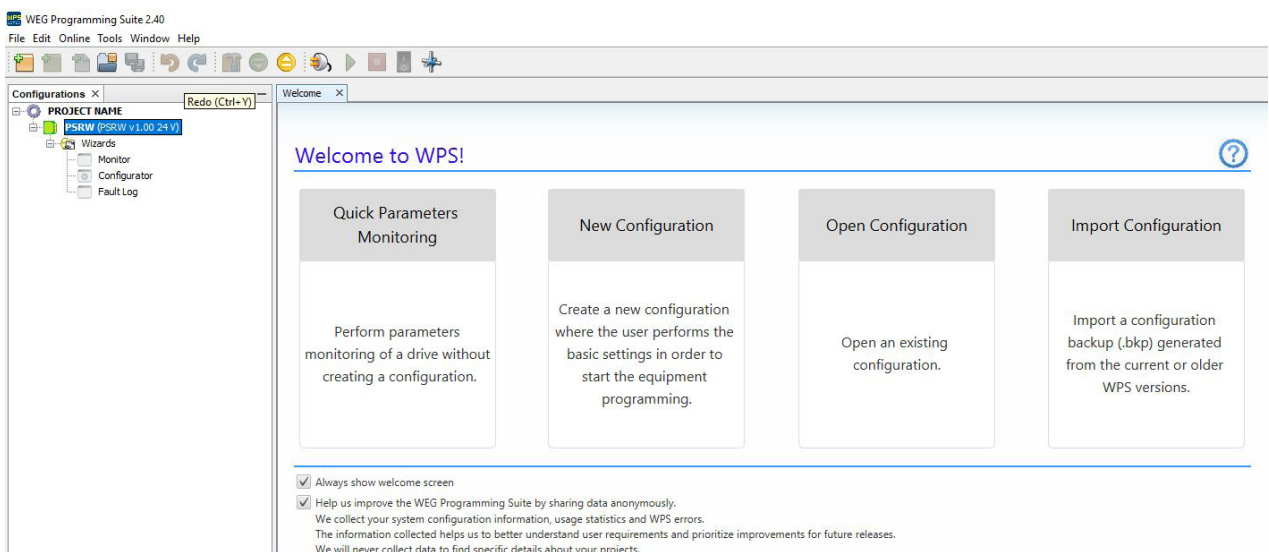
## 9.6 TRANSFERRING CONFIGURATIONS

The process of transfer a configuration to PSRW is:

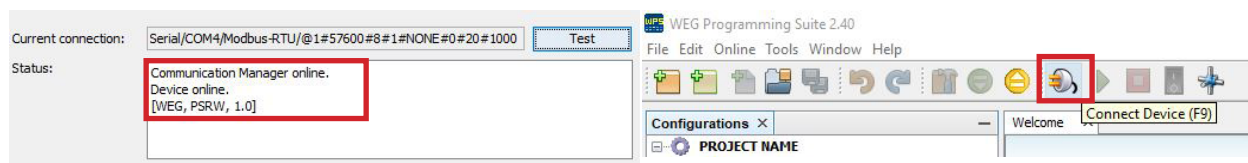
- Connect physically PSRW to the PC.



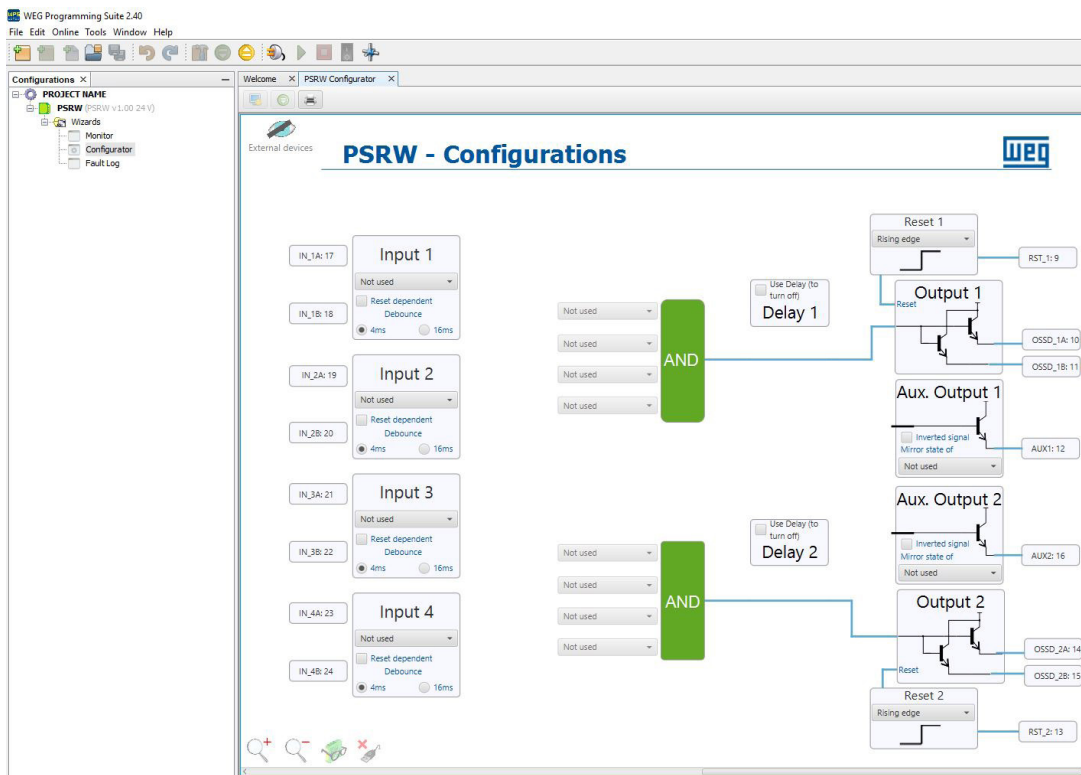
- Open WPS and Open/Create a PSRW Resource (see [Item 9.2.2 Creating a project on page 9-3](#)).



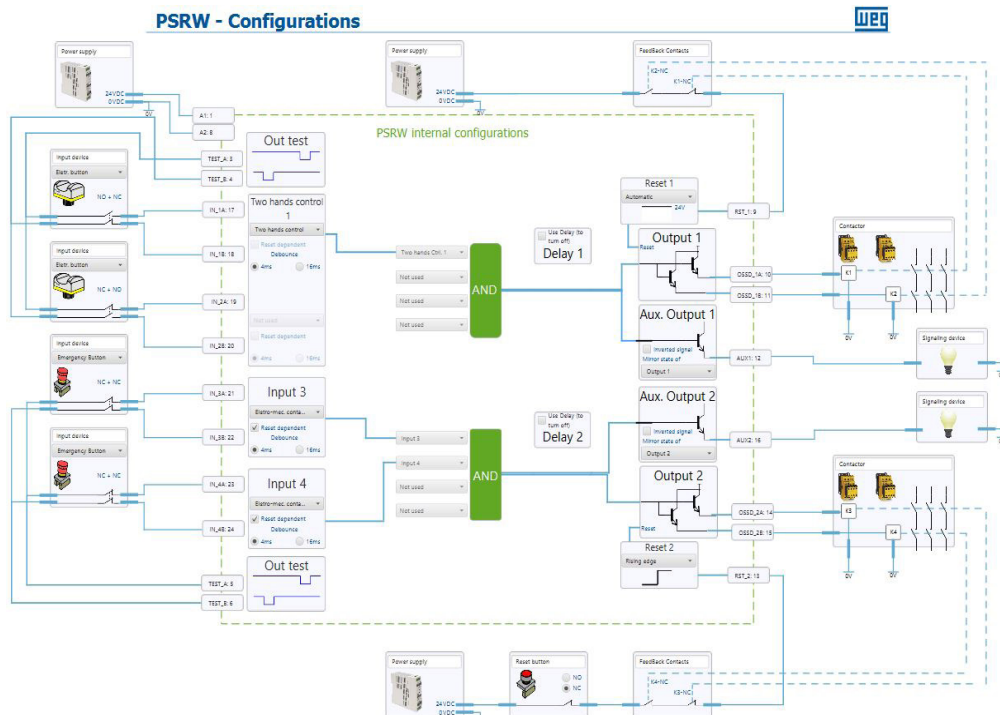
- Setup the communication (see [Section 9.3 SETTING UP COMMUNICATION on page 9-7](#)).



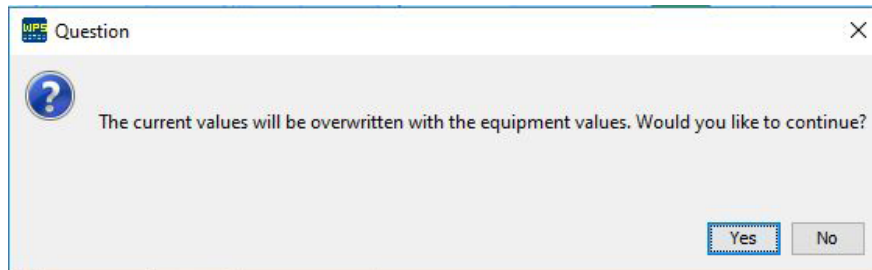
- Open wizard Configurator.



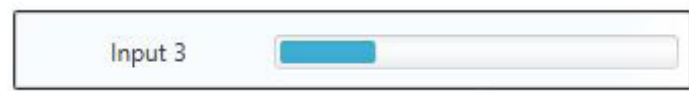
- Design a configuration.
- Click on External Devices button  to check the suggestions for external devices and fulfill the labels on the sheet.



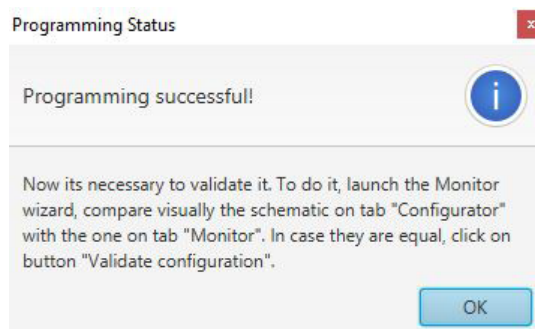
- Check if the device is connected. If it is, the icon “plug”  will be activated: .
- Check if the button “Monitor and read from equipment” is activated: . If not, click on it to activate. On this moment the message bellow will be displayed, but actually nothing will change on the configurations made. By this way, just ignore the message and click on “Yes”.



- Transfer the configuration by clicking on .
- On this moment, a Progress Bar will be displayed to inform the status of the transferring process.



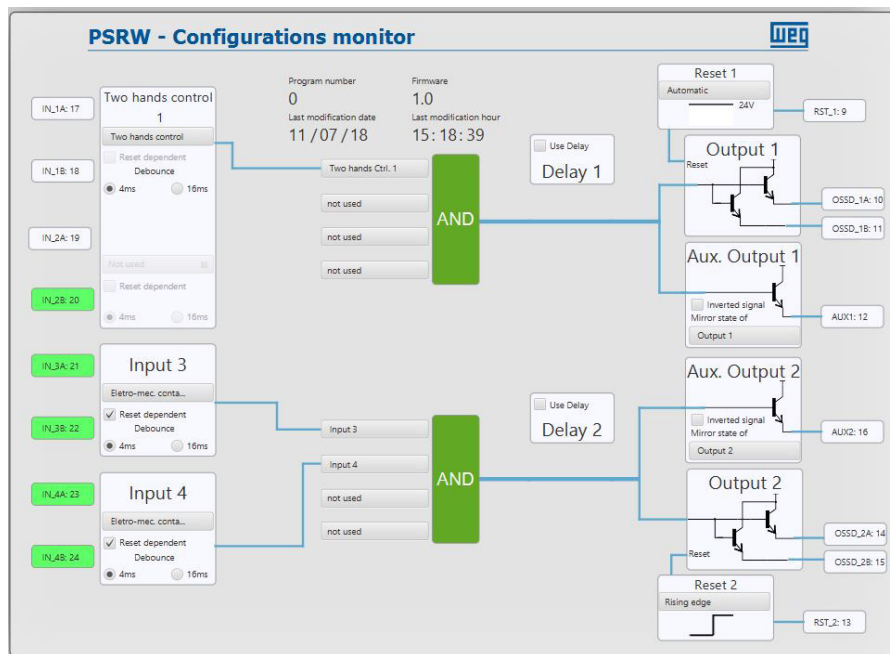
- If no error occur the Progress Bar will hide, and a popup will be displayed informing that now is necessary to validate the configurations.



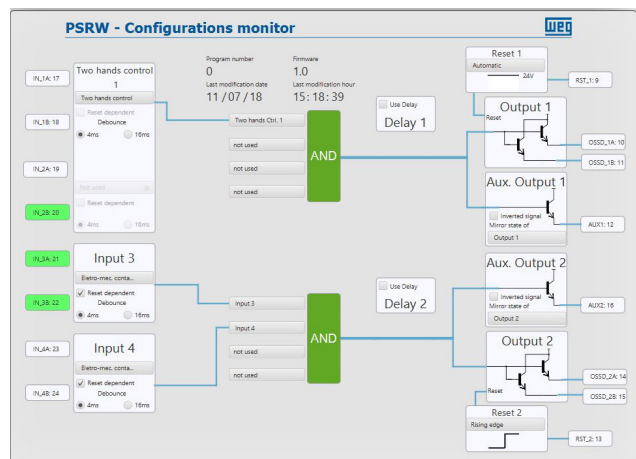
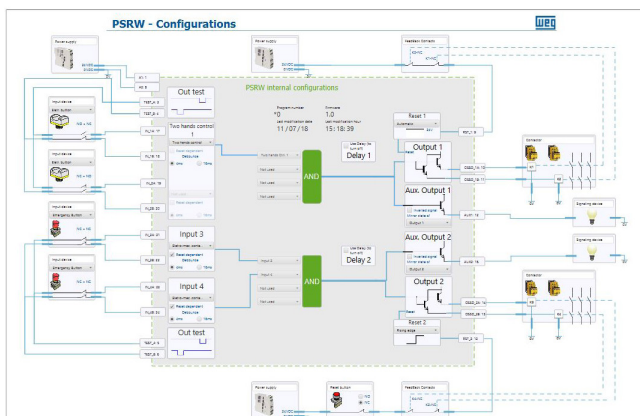
- Also, a text “Validation pending” will be displayed where the Progress Bar was. When the configurations were validated on wizard Monitor, this text changes to “Validation OK”.

Validation pending

- Next step: open wizard Monitor.

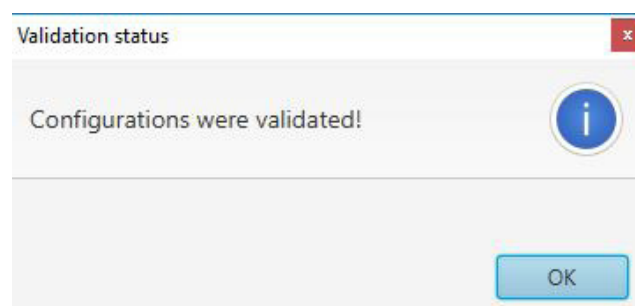


- Compare if the drawings on wizard Configurator and on Wizard Monitor are the same.



9

- If the drawings are equal, click on Validate Button
- A popup window will be displayed informing that configurations were validated.

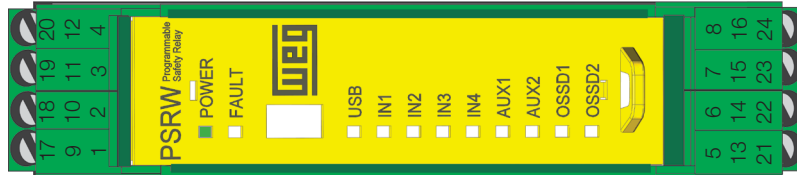


- If there are no further modifications exit from Prog-mode. Note that the Monitoring wizard also displays the present state of the internal blocks by changing their colors. Thus, it is possible to connect the physical devices to the PSRW and put them into operation to check that the created configuration is suitable for the actual application in which the PSRW will be used.

Monitoring toggle-button selected

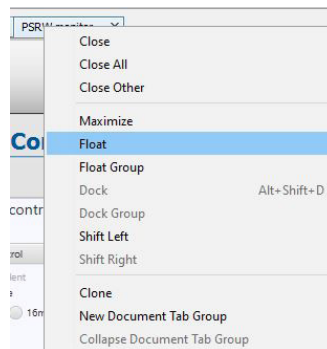


Buttons "Retrieve" and "Exit from Prog-mode" disabled

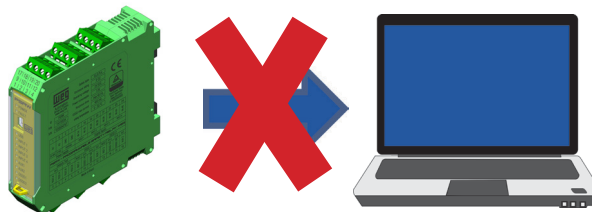


Blue led on physical PSRW de-activated

To ease this operation, you can do a right click on the title of any wizard tab and then click on "Float".



- De-select the toggle-button Connect Device
- Remove the USB cable.



- Test if the new configuration on PSRW attends the needs of the safety monitoring application were it will be used.

## 9.7 RETRIEVING CONFIGURATIONS FROM PSRW

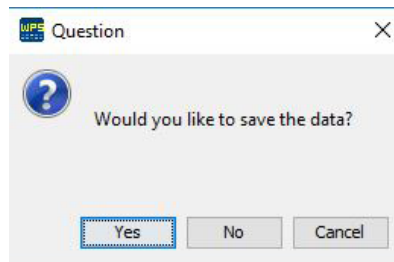
There are two ways to retrieve configurations from PSRW, one is through wizard Configurator Wizard and other is through Wizard Monitor Wizard.

To do that, the connection has to be already setup (see [Section 9.3 SETTING UP COMMUNICATION](#) on page 9-7) and the buttons Connect Device  and Monitor Device  have to be activated.

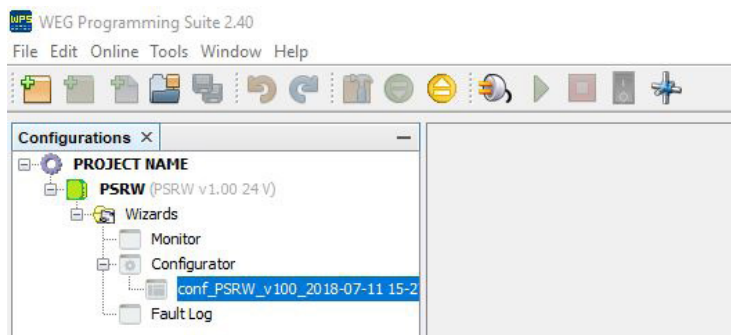
Under those conditions, though wizard Configurator is necessary to click on Retrieve button . The configurations will be loaded on the screen. Through Wizard Monitor, if the button Connect Device  was selected, the configurations from PSRW will be loaded automatically on the screen and they will change every time that new configurations were transferred to PSRW.

## 9.7.1 Saving configurations on PC

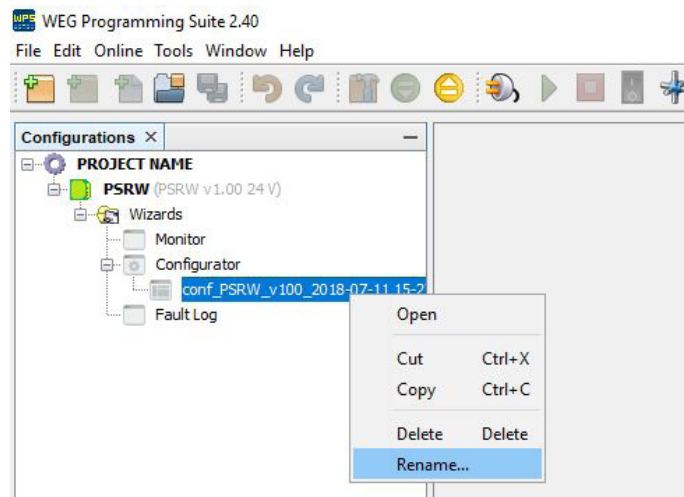
Every time that a tab containing a wizard was closed, a popup window will be displayed asking if you want to save the data.



If you click on “Yes” button, the configurations are saved. They are stored in the project tree under the wizard, with a generic name.



This name can be changed by right clicking on it and selecting the option “Rename”.



## **10 PRODUCT USE WITH SAFETY**

The control of machine should consider the safety level of PSRW to perform the correct connection between them.

It must be taken into account all possible failures and scams and that in any case are possible to eliminate or modify the installation of the equipment. Any failure endangering safety must be detected immediately, providing the stop machine immediate, being only possible to reactivate the operation if normal operating conditions have been restored and the dangerous zone is not invaded.

The use of PSRW is recommended in the following situations:

- The machine control can be actuated electrically.
- The dangerous machine motion can be stopped immediately.
- The local ambient temperature where the PSRW will be installed is compatible with the specifications of this manual.



## **11 MODIFICATIONS**

WEG reserves the right to change part or all technical and mechanical characteristics of the PSRW, as well as the contents of this manual at any time without notice, which is characterized as technological evolution, so, under any circumstances, WEG will be forced to make modifications, changes or updates to already manufactured and supplied equipment.



# 12 DECLARATION OF CONFORMITY

## EU Declaration of Conformity



We, **WEG Drives & Controls – Automação Ltda**  
Av. Prefeito Waldemar Grubba, 3000  
89256-900 - Jaraguá do Sul - SC – Brazil  
[www.weg.net](http://www.weg.net)

**WEG GERMANY GmbH**  
Industriegebiet Tümnich 3, Geigerstraße 7, 50169  
Kerpen Tümnich - North Rhine-Westphalia - Germany  
Contact person: Wilmar Henning  
Authorized Representative in the European Union

declare, under sole responsibility, that the products

Type: **Programmable Safety Relay**

Models: **PSRW**

Description of safety component: Monitoring safety circuits

when installed, maintained and used on the applications they were designed for, and in compliance with the relevant installation standards and manufacturer's instructions, comply with the relevant European Union harmonisation legislation where applicable:

Directives:

**Low Voltage Directive 2014/35/EU**  
**EMC Directive 2014/30/EU**  
**Machinery Directive 2006/42/EC**  
**RoHS Directive 2011/68/EU**

Standards:

**EN ISO 13849-1:2015**  
**EN 62061:2005 + A1:2013 + A2:2015 / IEC 62061:2005 + A1:2012 + A2:2015**  
**EN / IEC 61508 Parts 1-7:2010**  
**EN61000-6-7:2015 / IEC61000-6-7:2014**  
**EN 50581:2012**

**Notified Body**, which approved the full quality assurance system (Annex X): TÜV Rheinland Industrie Service GmbH, Alboinstraße 56 – Köln–Deutschland. Number of certification office NB0035 – 12103 Berlin, Germany.

CE marking in: 2018

Signed for and on behalf of the manufacturer

Jaraguá do Sul, June 15<sup>th</sup>, 2018



Adalberto José Rossa  
Drives Development  
Department Manager



Ronny Costa  
Test & Certification Lab  
Department Manager