

# Saitel DR

## M572AB000y / AB\_DIDO

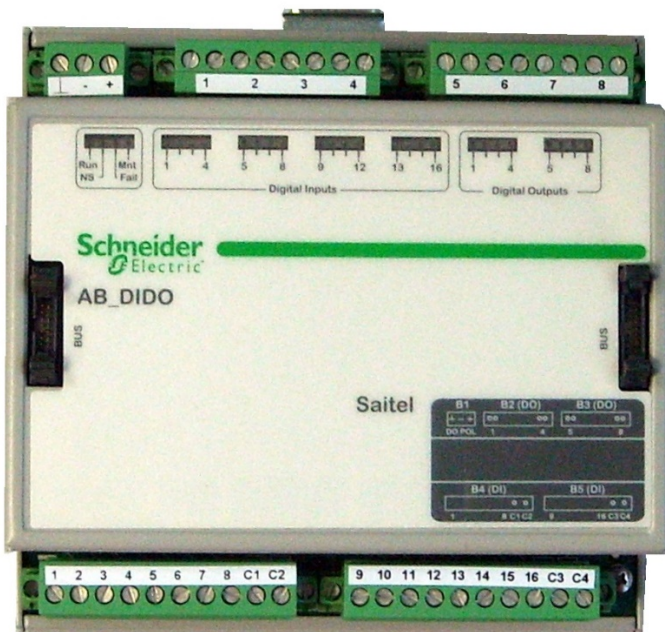
### User Manual

This manual provides information for the assembly, wiring, configuration and maintenance of the AB\_DIDO module.

SE-M572-USR

Publication Date (03/2020)

Read carefully the information contained in this manual before assembly, installation and use of the equipment.



## Change Control

Rev	Date	Description
01	24-03-2020	Initial edition.

## General Information

The Saitel platform and all its components have been developed in accordance to the requirements for a quality management system, complying with the ISO 9001:2015 Norm.

Document n°:	SE-M572-USR
Revision/Date:	01 / 24-03-2020
File:	AB_DIDO – User Manual_EN_01.pdf
Retention period:	Permanent throughout its validation period + 3 years after its cancellation.

## Reference Documents

User Manual	Document Code
Easergy Builder User Manual	FTE-MSS-S856
HU120 User Manual	SE-M590-USR
HUe User Manual	SE-M588-USR
HU_A User Manual	SE-M551-USR
HU_B User Manual	SE-M552-USR
HU_AF User Manual	SE-M503-USR
Easergy Builder User Manual	FTE-MSS-S856
webAPP User Manual	FTE-WPP-S856
webTool user manual	FTE-MSW-S856
EOL Instructions	FTE-EOLI-M555

## Software Version in this Manual

The information in this manual is valid for the software versions listed below. This information is also valid for later versions, although some parameters may change slightly:

Module	RTU Software	
	Module	Version
Baseline	HUe	11.06.08_7061
Baseline	HU_A/HU_AF	11.04.18_6825
Baseline	HU_B	02.03.01
Easergy Builder Tool	Core	1.5.9.1
AB_DIDO software	AB_DIDO.bin	01.01.07

# Content

<b><u>1</u></b>	<b><u>SAFETY &amp; HEALTH.....</u></b>	<b><u>4</u></b>
<b><u>2</u></b>	<b><u>GENERAL DESCRIPTION OF AB AO .....</u></b>	<b><u>14</u></b>
<b><u>3</u></b>	<b><u>PHYSICAL MOUNTING &amp; INSTALLING .....</u></b>	<b><u>20</u></b>
<b><u>4</u></b>	<b><u>CONFIGURATION &amp; MAINTENANCE.....</u></b>	<b><u>28</u></b>
<b><u>5</u></b>	<b><u>TECHNICAL SPECIFICATIONS TABLE .....</u></b>	<b><u>50</u></b>

# 1 Safety & Health

# Content

<b>1</b>	<b><u>SAFETY &amp; HEALTH</u></b> .....	<b>4</b>
<b>1.1</b>	<b>INTRODUCTION</b> .....	<b>6</b>
1.1.1	INFORMATION OF SAFETY .....	6
1.1.2	PRESENTATION .....	6
<b>1.2</b>	<b>INTRODUCTION TO SAFETY</b> .....	<b>7</b>
<b>1.3</b>	<b>SYMBOLS AND LABELS ON THE EQUIPMENT</b> .....	<b>7</b>
<b>1.4</b>	<b>INSTALLATION, SETUP AND OPERATION</b> .....	<b>8</b>
<b>1.5</b>	<b>EARTHING</b> .....	<b>10</b>
1.5.1	ELECTRICAL SAFETY .....	10
1.5.2	FUNCTIONAL EARTH (EMC).....	11
<b>1.6</b>	<b>HANDLING ELECTRONIC COMPONENTS</b> .....	<b>11</b>
<b>1.7</b>	<b>TECHNICAL SPECIFICATIONS FOR SAFETY</b> .....	<b>12</b>
1.7.1	PROTECTIVE ELEMENTS .....	12
1.7.2	ENVIRONMENTAL CONDITIONS .....	12
1.7.3	STORAGE CONDITIONS .....	12
<b>1.8</b>	<b>TECHNICAL LABEL</b> .....	<b>13</b>
<b>1.9</b>	<b>PACKING AND UNPACKING</b> .....	<b>13</b>
<b>1.10</b>	<b>DECOMMISSIONING AND DISPOSAL</b> .....	<b>13</b>

## 1.1 Introduction

### 1.1.1 Information of Safety

#### Important information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. In this manual you can find different types of messages associated with situations that have different level of risk for people and / or for the equipment.



This symbol indicates "DANGER" or "WARNING". This symbol informs of an electrical risk that will cause personal injuries if the instructions are not followed.



This symbol is associated to a safety alert. It is used to warn of possible personal injury hazards. The user must follow all instructions or messages associated to this symbol to avoid possible injuries.

#### DANGER

**DANGER** indicates a hazardous situation which, if not avoided, **will result** in death or serious injury.

#### WARNING

**WARNING** indicates a hazardous situation which, if not avoided, **could result** in death or serious injury.

#### NOTICE

**NOTICE** is used to address practices not related to physical injury. The safety alert symbol shall not be used with this signal word.

## To Keep in Mind

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is who fulfill with requirements in paragraph 1.2

### 1.1.2 Presentation

This manual provides information for a safe handling, commissioning and testing. This Safety chapter also includes descriptions of the labels on the equipment.

Documentation for equipment ordered from Schneider Electric is dispatched separately from manufactured goods and may not be received at the same time. Therefore, this guide is provided in order to do that printed information which may be present on the equipment is fully understood by the recipient.

The technical data in this safety guide is typical only, see the technical data section of the user manual for specific details of a particular equipment.




Before carrying out any work on the equipment the user should be familiar with the contents of this Safety chapter and the ratings on the equipment’s rating label.

**THE SAFETY SECTION MUST BE READ BEFORE STARTING ANY WORK ON THE EQUIPMENT.**

## 1.2 Introduction to Safety

The information in this section is intended to get that equipment is properly installed and handled in order to maintain it in safety conditions. It is assumed that everyone who will be associated with the equipment will be familiar with the contents of that Safety section.

When electrical equipment is in operation, dangerous voltages will be present in certain parts of the equipment. Failure to observe warning notices, an incorrect or improper use may endanger personnel and equipment and also cause personal injury or physical damage.

 <b>WARNING</b>
Before working with the terminal of connection, the device must be turned off and disconnected of the feeding.

Proper and safe operation of the equipment depends on appropriate shipping and handling, proper storage, installation and commissioning, and on careful operation, maintenance and servicing. For this reason, only qualified personnel may work on or operate the equipment.

Qualified personnel are individuals who:

- Are familiar with the installation, commissioning, and operation of the equipment and of the system to which it is being connected.
- Are able to safely perform switching operations in accordance with accepted safety engineering practices and are authorized to energize and de-energize equipment and to isolate, ground, and label it.
- Are trained in the care and use of safety apparatus in accordance with safety engineering practices.
- Are trained in emergency procedures (first aid).



It is necessary to consider that the documentation of the device collects the instructions for its installation, set up and operation. However, the manuals could not cover all the possible circumstances neither include specific information on all the details.








In case of questions or specific problems, contact with his office of sales Schneider Electric or with the center of attention to the customer and request the necessary information.

## 1.3 Symbols and Labels on the Equipment

Before the equipment is installed or commissioned, the user must understand the following symbols, which may be used on the equipment or referred to in the user documentation:

Table 1 - Symbols


Symbol	Associated Text	Description
	<b>Possibility of electric chock</b>	IEC symbol associated to a <b>DANGER</b> or <b>WARNING</b> message indicating that there is an electrical risk. Failure to follow these instructions could cause damage to people or death.
	<b>Caution, read the manual.</b>	Symbol associated with a risk alert. The user must read the manual before handling the equipment.

Symbol	Associated Text	Description
	<b>Possibility of electric chock</b>	ANSY symbol associated to a <b>DANGER</b> or <b>WARNING</b> message indicating that there is an electrical risk. Failure to follow these instructions could cause damage to people or death.
	<b>Protective earth connection</b>	Associated symbol to the protective ground connection. See paragraph 1.5.1 in this manual.
	<b>CE Mark</b>	This symbol indicates that the equipment has been developed in compliance with all applicable European Directives.
	<b>Electronic device. Special instructions must be follow for discard it.</b>	This symbol indicates that, at the end of its life, this module must be discarded according to the WEEE Directive (Waste Electrical and Electronic Equipment).
	<b>Compliant with RoHS.</b>	The equipment has been designed and manufactured according to RoHS Directive (Restriction of Hazardous Substances).
	<b>Direct Voltage</b>	Symbol of direct voltage ( $V_{DC}$ ).
	<b>Alternate Voltage</b>	Symbol of alternate voltage ( $V_{AC}$ ).

## 1.4 Installation, Setup and Operation

There are several acquisition blocks in Saitel DR that use high voltages (> 50 V). The user is responsible to check that the characteristics of each device are adapted and convenient for his installation. The user should read the instructions of installation before proceeding to the use or maintenance of the devices.

Not following these instructions can be dangerous for the people and the devices.

 <b>DANGER</b>
Devices that handle dangerous tensions are marked with a sticker on the front label (size: 12,5 mm). This label must be visible all the time while the module is installed on the DIN rail.

The following products handle dangerous tensions:

- **HU\_AF**: Advanced head unit with acquisition (P/N M503xx3x0x and P/N M503xx4x0x). For other part numbers, depending on the voltage handled by the equipment connected to the digital outputs (voltage > 50 V), this module must be marked with an electric risk label. It will not be marked on factory.
- **HU120**: High-performance CPU with acquisition (P/N M590xx000x).
- **AB\_DI**: Digital inputs module (P/N: M55520000x, M55530000x and M55540000x).
- **AB\_DIDO**: Input and output digital module (P/N M5722x000x, M5723x000x and M5724x000x). For other part numbers, depending on the voltage handled by the equipment connected to the digital outputs (voltage > 50 V), this module must be marked with an electric risk label. It will not be marked on factory.
- **AB\_AC**: Direct measurements module (P/N M562x0000x).
- **AB\_DO**: This module does not handle high voltages, it will not be marked at the factory. This module must be marked to inform about the risk when some equipment that manage voltage higher than 50 V are connected to digital outputs.

It is recommended to install the RTU inside a cabinet with a key. This cabinet only should be opened by a qualified person.

### **WARNING**

If this type of cabinet isn't available, a barrier must be installed in order to avoid an accidental contact with these dangerous elements. This barrier only should be removed using a special tool.

If the barrier has to be removed in order to access to equipment, personnel responsible for the task must be sure that the barrier is installed again when the task is finished.

While the RTU is accessible for a user, all people must follow all instructions to prevent electrical risk or discharges.

**Not following these instructions can give like result that the device do not work properly or even can damage to the people or devices.**



An electrical risk symbol with enough size must be included on the cabinet's door or on the barrier.

The following image shows an example:

Figure 1 – Barrier of protection for elements with dangerous voltages.



### **NOTICE**

Terminals will not be accessible to the user directly once it has made the installation of the device. The cabinet will have to remain closed with key or the screen of installed protection.

The cabinet or installation must have a general switch placed just in the cable entry of the installation (see paragraph 1.7.1 )

For the cleaning of the device it is only necessary using a dry cloth by the surface when it detects excessive presence of dust or any element deposited on the surface.

### **WARNING**

You mustn't use a liquid product of cleanliness due to the presence of active parts.

Because of the variety of uses of the product, the managers of the application and use of this device of control will have to take the measures to ensure the fulfillment of all the requests of security and provision of each application. The requests do reference to the applicable laws, regulations, codes and standard.

## 1.5 Earthing

### WARNING

Before energizing the device, it has to be placed to earth properly such as it indicates in sections 1.5.1 and 1.5.2 .

When installing the device, ground is the first thing that should be connected and the last one that should be disconnected.

Saitel can need put to earth for two distinct needs:

- For purposes of electrical safety (Protective Earth, PE).
- Improve the behavior in EMC and derive perturbations to earth (functional Earth).

### 1.5.1 Electrical Safety

Only qualified personnel, with knowledge about hazards associate with electrical equipment is allowed to install Saitel DR. In general, the installation will be following IEC 61010-1 recommendations in order to be compliant with this norm.



The DIN rail must be installed on a metallic surface. This metallic surface must have available an M4 screw marked with this symbol. The ground of the cabinet or installation must be connected to this screw, according to the norm IEC 61010-1.

Saitel DR modules have a metallic enclosure offering protection for isolation faults. Earthing is done by the metal rail fixing clip.

### WARNING

All devices with high voltage must be disconnected before dismount a module from the DIN rail.

A dedicated connection with green/yellow wire should be used to assure electric continuity to the installation protective earth. Section of these wires must be enough in order to support 25 A (ground bonding test).

Figure 2 – Yellow and Green cable for earthing.



The design and installation of the cabinet is responsible for compliance with all the existing international and national electrical codes concerning protective grounding of any device.

### WARNING

According to Electrical Safety:

- The screw for ground must be exclusive for this use.
- The power voltage must be supplied by a power supply that offers double or reinforced insulation against dangerous voltages.

## 1.5.2 Functional Earth (EMC)

In this case the main rule is that the connection has to do with wires of the lower possible length to the screen or connection of put to earth nearer. In this case the section of the driver is not notable, is more, it advises that the use of flat wires or flexible conductive bands for a good behavior EMC.

### NOTICE

The DIN rail must have terminals of earthing (of yellow and green color) necessary to connect the terminals of PE (if it is present).

Figure 3 – Terminal for functional earth (EMC).



All Saitel DR modules with power or polarization connector have an exclusive terminal for earthing EMC. These modules are HU120, HUe, HU\_B, HU\_A, HU\_AF, XU, AB\_DO, AB\_DIDO and AB\_SER with external polarization.

Figure 4 – Example of earthing for EMC.



## 1.6 Handling Electronic Components

Like any electronic device, Saitel is susceptible to receive electrostatic discharges during the handling. It is necessary to take the usual measures to minimize this risk, since serious damage to the equipment can be caused, which may not be detected immediately but which may affect the reliability of the product.

### ⚠ WARNING

The enclosure **ONLY** should be removed when is **strictly necessary**, because this action has a risk for the equipment:

- Before removing the enclosure, the operator must be equipotential with the equipment.
- Avoid touching the electronic. The board must be always manipulated for the edges.
- If the equipment has to be passed between two persons, both must be equipotential.
- Put the module always on an antistatic surface or on a surface equipotential with you.
- During the storage and transport, the module will remain in the packaging.

**Not following these instructions can give like result that the device do not work properly or even can damage to the people or devices.**


## 1.7 Technical Specifications for Safety

### 1.7.1 Protective Elements

The cabinet's engineering and installation must include a general automatic switch next to the cables' input in the cabinet; once the door is opened, high voltages must be interrupted inside. This switch must be located at a place which is not accessible by a third person while the operator is using the boards in the cabinet.

Moreover, the installation will incorporate a circuit breaker of 5A next to the cabinet protecting it from possible overcurrent in the power supply.

Both switches will be labeled with the symbol O as "Off" and I as "On".

 <b>WARNING</b>
The connection / disconnection switch must be installed in a fixed element (for example the wall of the cabinet) and it mustn't break any earthing wire.

### 1.7.2 Environmental Conditions

The protection degree of the device is IP20. It is designed only for his use in interiors. If it is necessary for his use in some external surroundings, it has to mount in a cabinet or specific accommodation that contributes a degree of protection IP54, protected against the dust and water.

The electronic cards of the modules will be able to be tropicalized or no according to the option of setting chosen. The tropicalized used is the AVR80, of the company ABchimie. It can consult all the technical information of this type of finishing in <http://www.abchimie.com/>.

Other data to take into account about the environmental are:

- Usage: Indoor use (installed in an electrical cabinet).
- Altitude until 2000 m.
- Operation temperature range: Between -40 °C and 70 °C. (IEC 60068-2-1 and IEC 60068-2-2).
- Maximum relative humidity of 95%. (IEC 60068-2-30)
- Degree of pollution II. (IEC 61010-1)
- Overvoltage transitory until levels of Category II. (IEC 61010-1)

### 1.7.3 Storage Conditions

The continuous exhibition to some high levels of humidity during the storage can cause damages to the electronic components and reduce the useful life of the device.

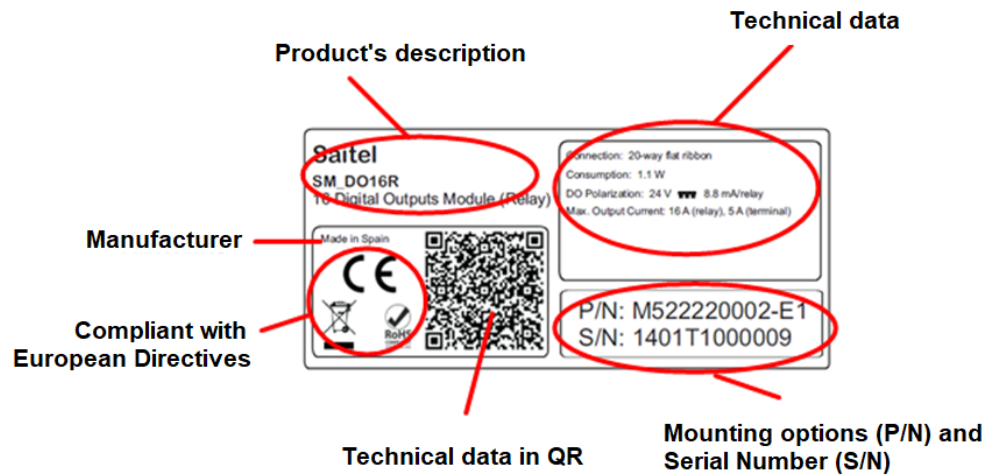
We recommend that, in the enclosure of storage, the relative humidity do not exceed 50%.

Once that the Saitel devices have been unpacked, recommend that they are energized inside the three following months. When it installs an electrical device, it has to leave sufficient time for the acclimatization to the temperature acclimatize of the environment, before the activation. Once the equipment has been unpacked, it is recommended that it be energized within the following three months.

## 1.8 Technical Label

Each Saitel product includes a technical label with the following information:

Figure 5 – Technical label.



### NOTICE

On the “Technical data” zone, you can see relevant information about the input and output voltage in the module. Any voltage greater than 50 V must be consider as a high voltage.

## 1.9 Packing and Unpacking

All Saitel modules are packaged separately in their own carton box and shipped inside outer packaging. Use special care when unpacking the device. Don't use force.

The design revision and manufacturing options can be determined using the P/N included in the packaging label on packaging.

After unpacking the device, inspect it visually to be sure it is in proper mechanical condition.

If the product needs to be shipped, the original packaging must be used, including foams and the carton box. If the original packaging is no longer available, make sure that the packaging used is according to ISO 2248 specifications for a drop height 1 m.

## 1.10 Decommissioning and Disposal



When the product is marked with this symbol, it means that, at the end of its life cycle, you mustn't dispose the product together with habitual residues. To avoid the possible damage to the environment or to the human health that represents the uncontrolled elimination of residues, please, separate the battery (if there is one) of the other elements, and each one must be recycled according to the local regulation.

## 2 General Description of AB\_DIDO

# Content

<b><u>2</u></b>	<b><u>GENERAL DESCRIPTION OF AB_DIDO.....</u></b>	<b><u>14</u></b>
2.1	SAITEL DR PLATFORM.....	16
2.2	AB_DIDO FEATURES.....	17
2.3	INTERFACES.....	18
2.4	HARDWARE ARCHITECTURE.....	18

## 2.1 Saitel DR Platform

Saitel DR is a hardware platform by Schneider Electric. It consists of a set of equipment which have been specifically designed for real-time control and automation applications. Saitel DR is a high-technology platform which serves Schneider Electric's business areas.

On this hardware platform, the Baseline Software Platform is installed. This software is used in Saitel families (Saitel DP and Saitel DR) and other Schneider Electric products.

Other features identifying Saitel DR are:

- A DIN rail is used for the mechanical installation.
- The communication between the controls units integrated in a distributed system is mainly established by Ethernet.
- The terminal blocks for field-connection are completely built into acquisition blocks.

Figure 6 – Saitel DR.



Saitel DR's design has been optimized to meet the most demanding requirements of multiple sectors:

- Safety and reliability requirements for power, gas and water supply, as well as sewage treatment plants, etc.
- Compliance with electric safety, electromagnetic compatibility, and environmental standards.
- Centralized monitoring and control of geographically-distributed systems which support hierarchical data acquisition and sharing networks.
- Local monitoring and control with data sharing capabilities of plant-distributed equipments.
- Quick troubleshooting, including the possibility of using programmable automation execution.

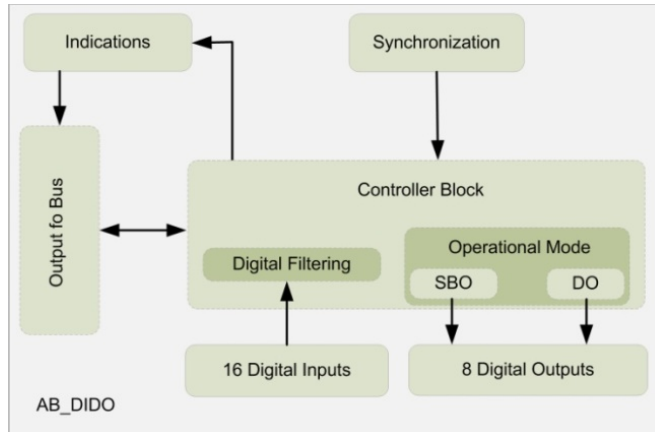
### WARNING

Please note Saitel DR **does not** support hot-swapping, that is, module replacements during operation.

## 2.2 AB\_DIDO Features

The diagram below illustrates the functional blocks integrated in the AB\_DIDO:

Figure 7 – AB\_DIDO - Functional block diagram.



### Digital Inputs

The AB\_DIDO has two blocks of 8 digital inputs plus a common block. Each input can be configured as:

- Simple digital input.
- Double digital input.
- Slow counter.

### Digital Outputs

The AB\_DIDO module contains two terminal blocks for 4 digital outputs each. The main features of these outputs include:

- The outputs can be: SBO (Select Before Operate) or DO (Direct Operate).
- Outputs can be simple or double.
- Each output can be pulsing or latching.
- They have a permanent output test.
- Each output is independent.
- External polarization.
- Number of operations (resistive charge)  $> 30 \cdot 10^6$ .
- Number of operations (L/R=80 ms, 24 V/1.25 A)  $> 2 \cdot 10^5$ .
- Automatic polarization test.
- Galvanic isolation.
- Input protection against electromagnetic disturbances.

### Controller Block

This block basically performs the management of both digital inputs and outputs in the AB.

In relation to outputs, and alike the AB\_DO module, the AB\_DIDO can operate in two modes: **Select Before Operate** (SBO) or **Direct Operate** (DO).

This block performs a pre-filtering before transmitting the information to the HU through the bus. As the AB\_DI module, it applies a debounce filter to each input and an anti-chattering filter.

When the input changes, it is transmitted to the HU as an event, which includes the value change and the timestamp. The CPU performs the rest of the processing on digital inputs.

## 2.3 Interfaces

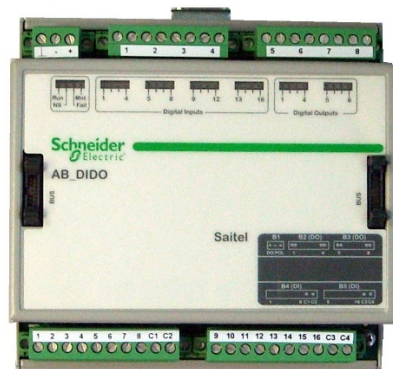
The AB\_DIDO module offers 16 high-precision (1 ms) configurable digital inputs and a digital filter for each of them. It also integrates 8 digital relay outputs with a high level of security.

Following interfaces are available in this module:

- 1 terminal block to connect the outputs polarization.
- 2 terminal blocks to connect 8 digital outputs.
- 2 terminal blocks to connect 16 digital inputs.
- 28 LED indicators.

The following figure shows AB\_DIDO module's front panel:

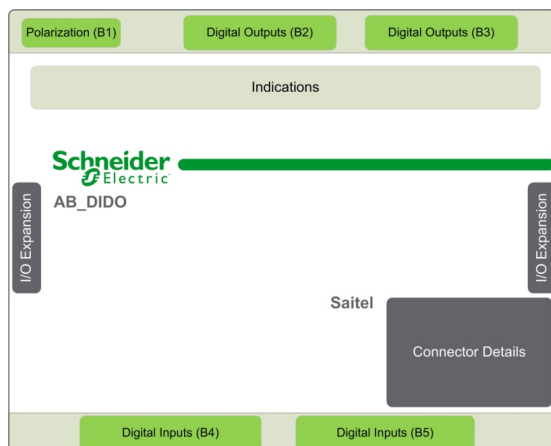
Figure 8 – AB\_DIDO Module.



## 2.4 Hardware Architecture

The figure below illustrates the block diagram which describes the AB\_DIDO hardware:

Figure 9 – AB\_DIDO - Hardware schematic view.



## Indications

There are 28 LED indicators on the module's front panel which provide information about the module and the input/output signals.

## Polarization (B1)

The AB\_DIDO digital outputs need an external polarization. The module has a dedicated 24/48 V<sub>DC</sub> polarization input terminal.

### NOTICE

The 48 V<sub>DC</sub> version is available for revision C0 and later.

## Digital Outputs (B2 and B3)

There are two terminal blocks labeled as B2 and B3 for field outputs which allow 8 digital outputs to be connected using screw terminals. Both terminal blocks support 4 outputs each. The signals DO 1 to DO 4 are connected to B2 and the signals DO 5 to DO 8 are connected to B3.

## Digital Inputs (B4 and B5)

### DANGER

#### HAZARD OF ELECTRIC SHOCK, ELECTRIC ARC OR BURNS

- Only qualified personnel should install this equipment. Such work should be performed only after reading this entire set of instructions and checking the technical characteristics of the device.
- NEVER work alone.
- Turn off all power supplying this equipment before working on or inside it. Consider all sources of power, including the possibility of back feeding.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Start by connecting the device to the protective earth and to the functional earth.
- Screw tight all terminals, even those not in use.

**Failure to follow these instructions will result in death or serious injury.**

There are various versions of the AB\_DIDO module depending on the polarization for the digital inputs. These versions are included in the module's technical specifications table.

The module has two terminal blocks labeled as B4 and B5 which allow the 16 digital inputs to be connected through screw terminals. Both terminal blocks support 8 inputs each. The signals DI 1 to DI 8 are connected to B4 and the signals DI 9 to DI 16 are connected to B5.


## 3 Physical Mounting & Installing

# Content

- 3    PHYSICAL MOUNTING & INSTALLING ..... 20**
  - 3.1   ITB INSTALLATION..... 22**
    - 3.1.1   HANDLING ..... 22
    - 3.1.2   LOCATION IN THE ITB ..... 22
    - 3.1.3   POWER SUPPLY REQUIREMENTS ..... 22
    - 3.1.4   MOUNTING PROCEDURE ..... 23
  - 3.2   WIRING AB\_DIDO..... 24**
    - 3.2.1   WIRING RECOMMENDATIONS ..... 24
    - 3.2.2   DIGITAL OUTPUTS AND POLARIZATION ..... 24
    - 3.2.3   DIGITAL INPUTS ..... 25
  - 3.3   LED INDICATORS..... 26**


## 3.1 ITB Installation

### 3.1.1 Handling

 <b>DANGER</b>
<p><b>Depending on the devices connected to the module AB_DIDO, could exist hazard of electric chock, electric arc or burns. For any of these cases, follow these instructions:</b></p> <ul style="list-style-type: none"> <li>• Only qualified operator should install this equipment. Such work should be performed only after reading this entire set of instructions and checking the technical characteristics of the device.</li> <li>• NEVER work alone.</li> <li>• Turn off all power supplying this equipment before working on or inside it. Consider all sources of power, including the possibility of back feeding.</li> <li>• Always use a properly rated voltage sensing device to confirm that all power is off.</li> <li>• Start by connecting the device to the protective ground and to the functional ground.</li> <li>• Screw tight all terminals, even those not in use.</li> </ul> <p><b>Failure to follow these instructions will result in death or serious injury.</b></p>

To avoid electrostatic damage, the following precautions must be strictly followed:

- Do not touch the bus connector pins.
- If unused, keep the modules in the antistatic bag.

 <b>WARNING</b>
Electrostatic discharges may damage semi-conductive devices within the module.

### 3.1.2 Location in the ITB

Sitel DR modules cannot be placed at any position in the ITB. Some of them, such as the head unit, the termination (TU or BT), the expansion (XU) and the communications module (AB\_SER) must be installed in a specific position in the ITB.

All AB\_DIDO modules will always be placed between two termination blocks. The type of termination block will depend on the row position within the ITB (HU, TU, XU or BT).

### 3.1.3 Power Supply Requirements

The main power is supplied by the HU through the bus. A polarization source is required for digital inputs, and the voltage depends on the ordering option.

The maximum power requirement for each AB\_DI module is:

- **Main power supply:** *Basic consumption*<sup>1</sup>
- **Polarization supply:**  $16 * \text{Polarization voltage per signal}^2 * \text{Maximum current per signal}^1$ .

<sup>1</sup> *Basic consumption* and *Maximum current per signal* values are indicated in the technical specifications table at the end of this manual.

<sup>2</sup> *Polarization voltage per signal* value depends on the manufacturing option of each module.

### 3.1.4 Mounting Procedure

#### WARNING

It is important to assure that handling is always done while the ITB elements are unpowered.

All Saitel DR modules have a DIN-rail bracket at the rear side that allows mounting on a DIN rail.

Figure 10 – Mount bracket on DIN rail.



The mounting procedure is described below:

- Switch off the power supply.
- Attach the module's rear bracket on the upper DIN rail.
- Press the lower front panel gently until a click confirms that the bracket is fit on the rail.
- Verifying the module is anchored firmly to the rail, although lateral movement is possible.

Figure 11 – Saitel DR module on a DIN rail.



The module is dismantled from the DIN rail as follows:

- Switch off the power supply.
- If necessary, disconnect the bridge(s) connecting the module to the system bus.
- Holding the module by the front panel, push the upper metal tab downward. The user can also pull the tab down using for example a screwdriver as shown:

Figure 12 – Remove module.



- Pressing the tab, remove the module from the lower DIN rail.
- Once detached, the module can be removed easily.

## 3.2 Wiring AB\_DIDO

This module has five terminal blocks labeled from B1 to B5 to connect polarization, digital inputs and digital outputs through screw terminals.

Depending on the voltage for digital inputs and devices connected to digital outputs, please pay attention on the following safety message:

**⚠ DANGER**

**Depending on the devices connected to the module AB\_DO, could exist hazard of electric chock, electric arc or burns. For any of these cases, follow these instructions:**

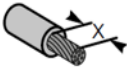


- Only qualified operator should install this equipment. Such work should be performed only after reading this entire set of instructions and checking the technical characteristics of the device.
- NEVER work alone.
- Turn off all power supplying this equipment before working on or inside it. Consider all sources of power, including the possibility of back feeding.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Start by connecting the device to the protective ground and to the functional ground.
- Screw tight all terminals, even those not in use.

**Failure to follow these instructions will result in death or serious injury.**

The wiring of each terminal block is described in detail below.

### 3.2.1 Wiring Recommendations

The following table shows several wiring recommendations for signals and polarization:

				Type of wire
Analog Ouputs	7 mm	2.5 mm <sup>2</sup> 13 AWG	0.5 Nm	Copper
Polarization	7 mm	2.5 mm <sup>2</sup> 13 AWG	0.5 Nm	Copper
Digital Outputs	7 mm	2.5 mm <sup>2</sup> 13 AWG	0.5 Nm	Copper

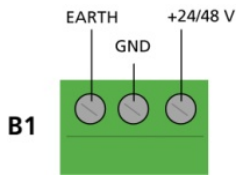
### 3.2.2 Digital Outputs and Polarization

The figure below shows how to connect the external polarization source to the B1 terminal block:

Figure 13 – AB\_DIDO - Polarization input wiring.

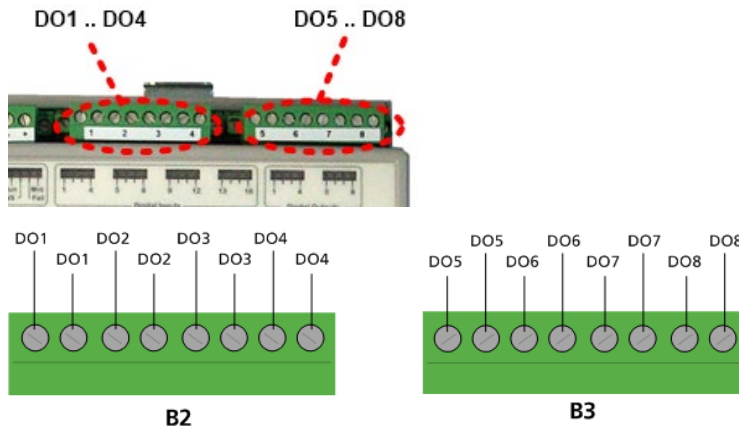
Polarization



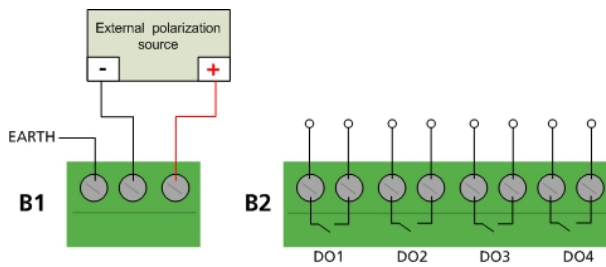


In the B2 and B3 terminal blocks, the field outputs are voltage-free NO (Normally open) contacts.

Figure 14 – B2 and B3 terminal blocks wiring



The field connection diagram is included below:

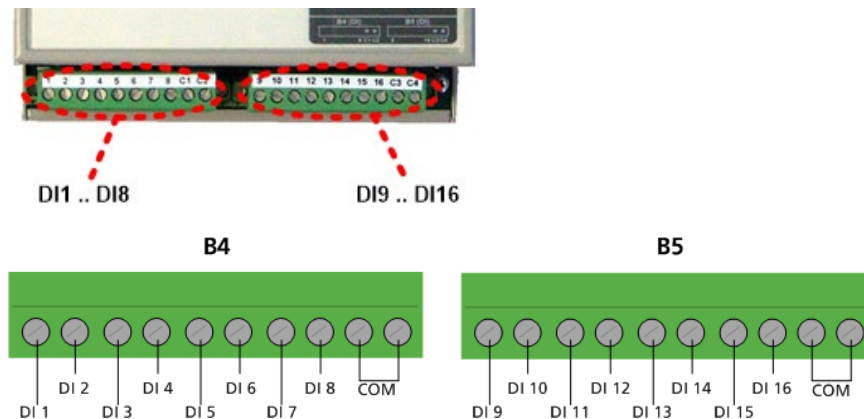


The B3 terminal block can be wired following the same connection diagram as B2.

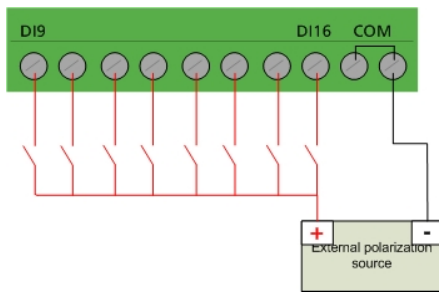
### 3.2.3 Digital Inputs

Both B4 and B5 terminal blocks support 10 pines, from which the first 8 inputs (from left to right) are related to signals and the last two are related to the common input (COM). DI 1 to DI 8 signals are connected to B4 and DI 9 to DI 16 signals are connected to B5.

Figure 15 – B4 and B5 terminal blocks wiring.



The field connection diagram is included below:



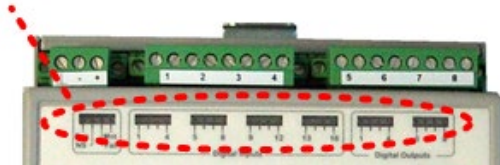
The B4 terminal block can be wired following the same diagram.

### 3.3 LED Indicators

The AB\_DIDO module has the following indicators on the front panel:

Figure 16 –Led Indicators.

LED Indicators



The information by the LED indicators includes:







- Acquisition and configuration status (**Run** and **Fail**)
- Synchronization status (**NS**)
- Module in maintenance (**Mnt**)
- Status for each digital input (**Digital Input x**).
- Status for each digital output (**Digital Output x**).

AB\_DIDO's LED provide the following information to the operator:

● / ● → On      ✱ / ✱ → Blink      ○ → Off

Table 2 - Led indicators meaning

LED	Status	Description	Recommended action
Run	✱	Module working properly.	
	○	Module not in acquisition mode.	The module was not included into the configuration, the module doesn't have an address or according to the loaded configuration, the type of the module is wrong.
NS	●	Synchronization message not received for over 10s.	Check the synchronization source.
	○	Synchronization message is being received.	
Fail	●	Module not configured or in abnormal state.	Check the configuration loaded in the HU. The module must be addressed and with the correct type (AB_DIDO).
	○	No fault has been detected in configuration or hardware.	
	✱	Failure in EEPROM.	

LED	Status	Description	Recommended action
<b>Mnt</b>		The module is in maintenance (Flashing, addressing, ...)	
		The module is in operation.	
<b>1..16</b>		The corresponding input is active (the contact is closed).	
		The corresponding input is inactive or not connected (the contact is open).	
<b>1 .. 8</b>		The corresponding output is active.	
		The corresponding output is inactive.	

## 4 Configuration & Maintenance

# Content

- 4    CONFIGURATION & MAINTENANCE..... 28**
  - 4.1 ITB CONFIGURATION ..... 30**
  - 4.2 AB\_DIDO CONFIGURATION ..... 32**
    - 4.2.1 INFORMATION OF LOCAL ACQUISITION..... 33
    - 4.2.2 AB\_DIDO SIGNALS ..... 33
    - 4.2.3 LOCAL ACQUISITION COORDINATES ..... 35
    - 4.2.4 INFORMATION IN THE TABLE STATUS ..... 35
    - 4.2.5 INFORMATION IN THE TABLE COMMAND ..... 37
  - 4.3 MAINTENANCE OF MODULE VIA WEB ..... 38**
    - 4.3.1 WEBAPP VS WEBTOOL ..... 38
    - 4.3.2 USING WEBAPP ..... 38
    - 4.3.3 USING WEBTOOL ..... 43
  - 4.4 FIRMWARE UPDATE ..... 47**

## 4.1 ITB Configuration

INFORMACIÓN
To perform the operations described in this chapter, the user must be familiar with the configuration tool. Otherwise, please consult the user manual of Easergy Builder.


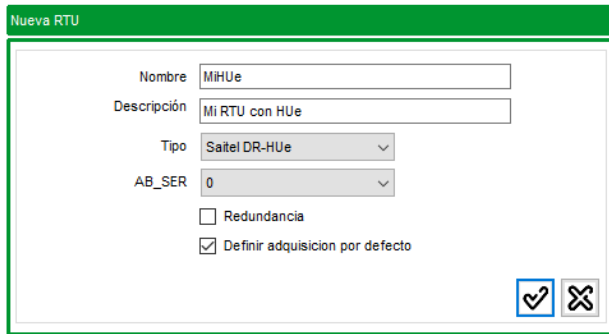
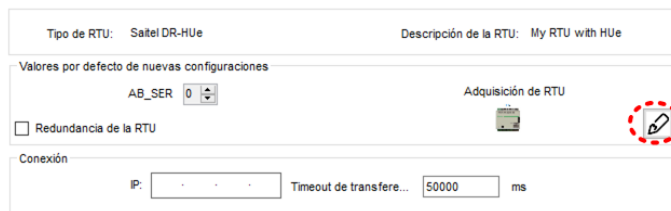
In the Workspace of Easergy Builder, create a new RTU using  button or pressing right button of the mouse in an empty area of the RTUs tree:

Figure 17 –Add RTU.



Pressing button next to the graphical ITB, you can add, remove or change the I/O modules included on the default configuration.

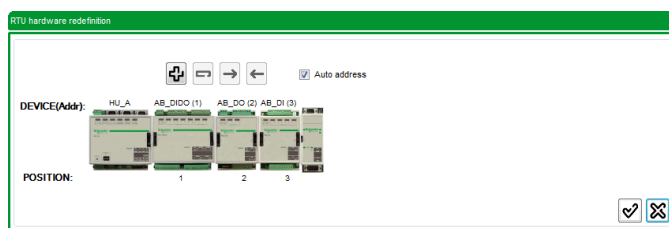
Figure 18 –Modify acquisition.





The user needs understand some basic concepts about Saitel DR before configuring the acquisition:

- An **ITB** is a set of acquisition blocks connected to a CPU (HU).
- An **Acquisition Block** or **AB** is a Saitel DR input/output module.
- Each acquisition block is allocated to a unique address in the ITB, the Node Number; this number identifies both the module and its type.
- The procedure **AAP (Automatic Addressing Procedure)** is performed by the operator every time an AB module is added, deleted, replaced or moved inside the ITB. It can be launched manually or automatically depending on the configuration switches of the HU (consult user manual of the HU).

Figure 19 – Acquisition modules in a default configuration.

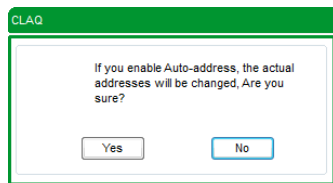


The number under each module corresponds with its address. You can select any AB and use buttons   to change its physical position.

When “**Auto Address**” box is checked (by default), if you reorder, add or delete an AB, all addresses are automatically recalculated matching their physical position in the rail. Address number 1 is assigned to the AB closest to the HU module (for HU\_AF or HU\_BI, address number 1 will be attached to the HU itself).

If “**Auto Address**” box is unchecked, modules will retain the allocated address, ignoring any changes made. If rechecked, the following message will appear:

Figure 20 – Confirmation for automatic addressing.





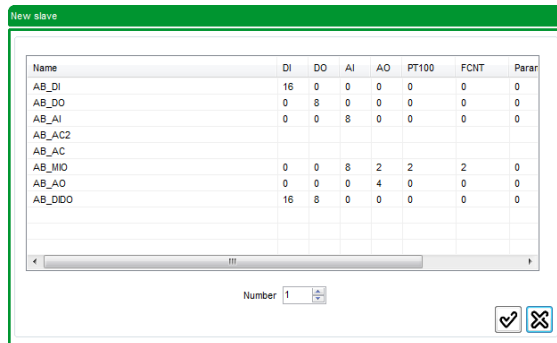
Select an AB (click on the AB image) and use button  to remove it. Use button  to add a new AB and select the type of module to include:

Figure 21 – Adding one (or several) AB.



If “**Auto Address**” is checked, you can add several AB at one time. This window allows selecting the quantity of modules to be added. If “**Auto Address**” is unchecked, you only can add one AB each time and you have to select the address to be assigned.


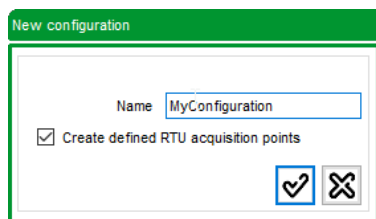
To create a new configuration, select RTU in the tree and pulse right button of the mouse or use  button.

Figure 22 – Adding configuration.



If the field "**Create acquisition points defined in the RTU**" is marked, all points of the local acquisition of the acquisition blocks included in the default acquisition configuration associated with the RTU will be included in coreDb.

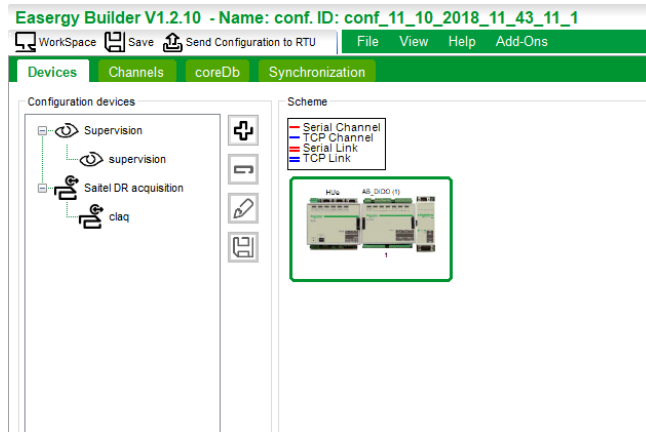
For example, if a HUE has an ITB with a AB\_DIDO module, if "**Create acquisition points defined in the RTU**", following points are generated:

- 16 digital inputs in Status table.
- 8 digital outputs in Command table

Finally, the new configuration will appear in the RTUs tree.

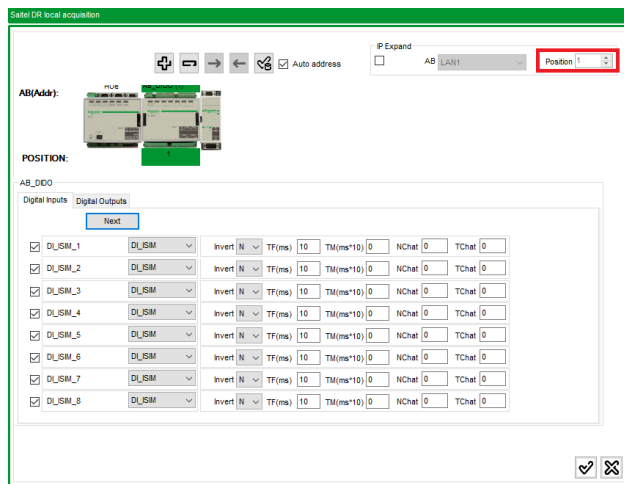
Access to the configuration edition clicking on the configuration name in the tree:

Figure 23– Easergy Builder configuration.



Double click on the claq Device open the window to configure/modify the ITB.

Figure 24 – Easergy Builder address.



## 4.2 AB\_DIDO Configuration

The local acquisition Device for Saitel DR is named “Local Acquisition Device Controller” (claq). The main functionality of claq is supporting the communication between field signals of each AB and its linked coreDb points.

The first step to configure the acquisition settings is to assure that the ITB in the graphical interface is according to the system. Each module must be addressed according its position in the ITB.

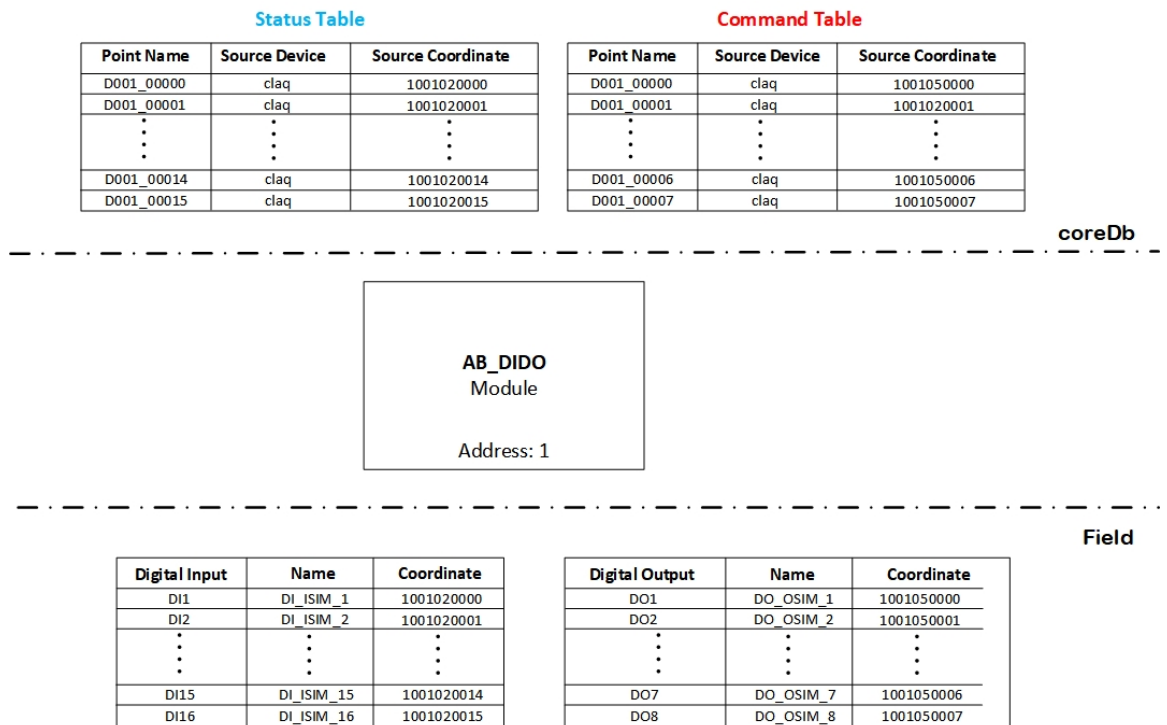
### NOTICE

The graphical interface does not take into account if the ITB is assembled in one or multiple rows. The modules should always be added in the adequate order, regardless the number of TU-XU modules that we have installed.

## 4.2.1 Information of Local Acquisition

The following figure shows the relationship between the field information received by the AB\_DIDO module and the related points in coreDb:

Figure 25 – Field signals and points in coreDb.

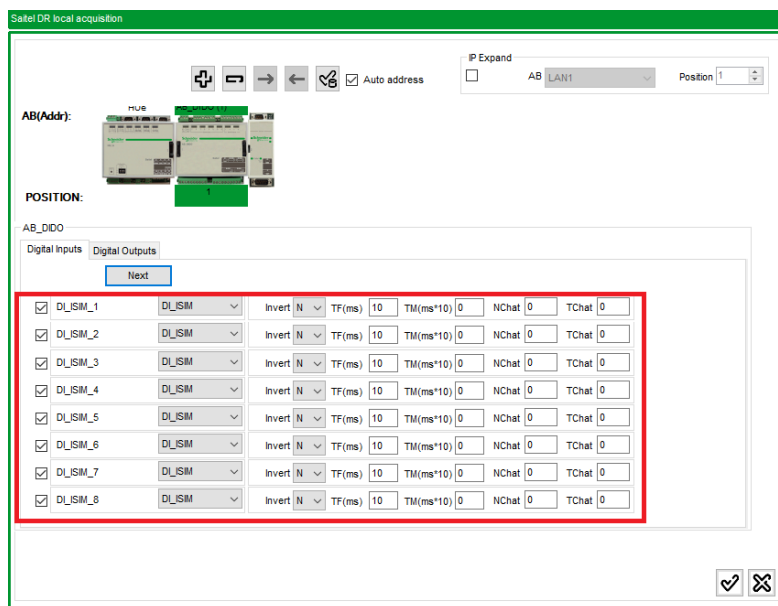


All signals in this picture are simple. If a signal is configured as double or counter its default name will be different.

## 4.2.2 AB\_DIDO signals

The following figure shows the configuration panel when the ITB is composed by an HUE and one AB\_DIDO module with address 1:

Figure 26 – AB\_DIDO digital input signals.



Select the module in the ITB and all its field signals are shown (marked in red).

The first position of each row corresponds with the signal's description (DI\_ISIM\_1 .. DI\_ISIM\_16). In coreDb, each signal will be identified using its coordinate. (see paragraph 4.2.3)

For each signal, the following parameters can be changed:

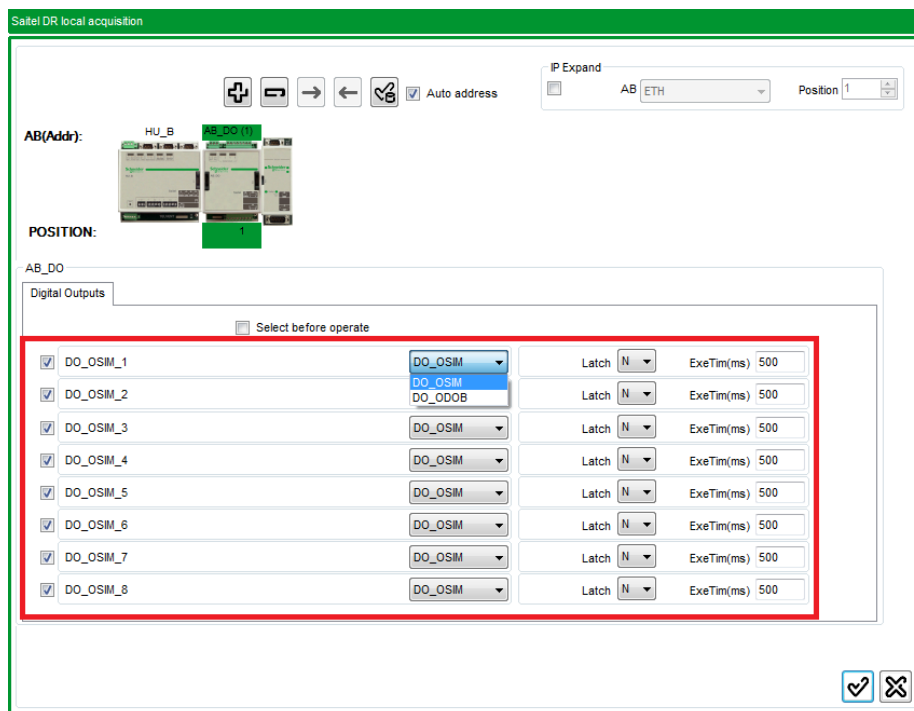
- **Type of signal:** The signal is configured as: Simple digital (DI\_ISIM), double digital (DI\_IDOB) or slow counter (DI\_ICNT32).

The following parameters will be available or not depending on the type of signal:

- **Invert:** Inversion flag. The signal is inverted (Y) or not inverted (N).
- **TF (ms):** Filtering time. All changes that take less than this time are rejected.
- **TM (ms\*10):** It applies to the signals set to "event". After an event, the signal's value is retained for this time before another event occurs. It must assure the correct detection by the logic.
- **TS (ms\*100):** It applies only for double signals. The stand-by time intends to create a time frame in which the deactivation of the active input is not detected until the other input is activated.
- **NChat and TChat:** These parameters are associated to the anti-chattering function and it applies to the signals set to "event". If a number of changes (NChat) are made in a specific timeframe (TChat), these all changes are rejected.

The following figure shows the configuration panel for digital output signals:

Figure 27 – AB\_DIDO digital output signals.



Each signal has the following associated information:

- **Select before operating:** Enable the SBO working mode.
- **Digital Output Checkbox:** Disable the digital output. It will not be used and cannot be mapped on coreDb.
- **DO\_OSIM/DO\_ODOB:**
  - **DO\_OSIM:** The digital output is configured as simple.
  - **DO\_ODOB:** The digital output is configured as double.

- **Latch:**
  - **No:** The digital output is not configured as latch.
  - **Yes:** The digital output is configured as latch.
- **ExeTim(ms):** In case latch option is not used ExeTim can be configured. It means the pulse time duration when the digital output is activated.

### 4.2.3 Local Acquisition Coordinates

Each digital input is identified in coreDb by a name (it is stored in the field Description), but this name is only used for information purpose. coreDb uses the signal’s coordinate to identify a field signal.

A claq coordinate is a numerical identifier of 10 digits with the following structure:

1XXXYYZZZZ

Where:

- **1:** First digit of the coordinate. In local acquisition signals, it must always be 1.
- **XXX:** Number that identifies the acquisition block. For the HUE signals, it will always be 000. For the rest of the ABs, this number will correspond with the address of the module.
- **YY:** Type of signal. For digital input could be:
  - 02: Simple digital input.
  - 03: Count.
  - 05: Simple digital output.
  - 07: Double digital input.
  - 15: Double digital output.
- **ZZZZ:** Position of the signal in the module.

### 4.2.4 Information in the Table Status

Each digital input signal is associated to a coreDb register in the status table using its claq coordinate as source:

Figure 28 – Digital input signals in coreDb.

	Name	Description	Source1 Device	Source1 Coordinates	Source1 Vmask	Destination1 Device	Destination1 Coordinates	Init value	Blocked	Non volatile	Shared Publish	Shared Subscribe
0	D001_HW_DI...	HW_DIAG	claq	1001000001					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	D001_COMM...	COMM_DIAG	claq	1001000000					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	D001_00015	DI_SIM_16	claq	1001020015					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	D001_00014	DI_SIM_15	claq	1001020014					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	D001_00013	DI_SIM_14	claq	1001020013					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	D001_00012	DI_SIM_13	claq	1001020012					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	D001_00011	DI_SIM_12	claq	1001020011					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	D001_00010	DI_SIM_11	claq	1001020010					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	D001_00009	DI_SIM_10	claq	1001020009					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	D001_00008	DI_SIM_9	claq	1001020008					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	D001_00007	DI_SIM_8	claq	1001020007					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	D001_00006	DI_SIM_7	claq	1001020006					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	D001_00005	DI_SIM_6	claq	1001020005					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	D001_00004	DI_SIM_5	claq	1001020004					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	D001_00003	DI_SIM_4	claq	1001020003					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	D001_00002	DI_SIM_3	claq	1001020002					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	D001_00001	DI_SIM_2	claq	1001020001					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	D001_00000	DI_SIM_1	claq	1001020000					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

These points can be created automatically when the module is included in the ITB, but they can be created manually using the claq's wizard.

In order to include a point manually, please create a new point, select claq as Destination Device, click right-button on the field Destination Coordinates and select **Launch Point wizard**:

Figure 29 – Launch Point Wizard.

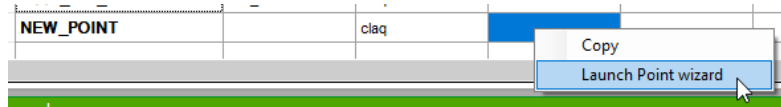
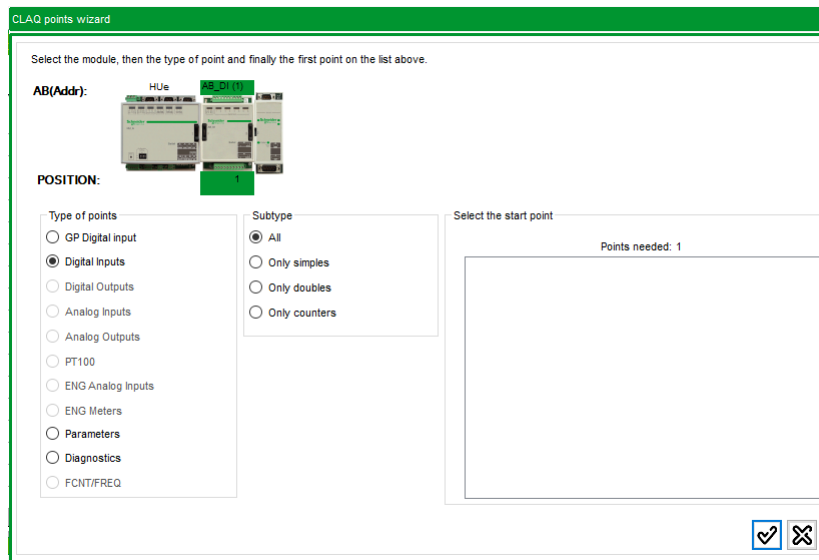


Figure 30 - Digital inputs local acquisition.



Select the module in which it wants to create these points and then select type.

Only not created point will be shown in the list.

The following point can be added for an AB\_DIDO module:

- 16 points for information from field. A coreDb point will be included in the Status table for each field signal. The default name is: D00x\_00000 .. D00x\_00015, where 00x is the module's address.
- Two diagnostic points associated to the module:
  - **COMM\_DIAG**: Status of the communication with the HU. 0 → “Communication FAIL”, 1 → “Communication OK”.
  - **HW\_DIAG**: Hardware diagnostic. 0 → No problem detected, 1 → Problem detected in the hardware.

## 4.2.5 Information in the Table Command

Each digital output signal is associated to a coreDb register in the command table using its claq coordinate as source:

Figure 31 – Digital output signals in coreDb.

Devices Channels coreDb Synchronization									
Status Command Analog Setpoint dbNET									
Name	Source	AND	Destination						
Name	Description	Source1 Device	Source1 Coordinates	Destination1 Device	Destination1 Coordinates	Destination2 Device	Destination2 Coordinates	Non volatile	
0	D001_00000	DO_OSIM_1		claq	1001050000			<input type="checkbox"/>	
1	D001_00001	DO_OSIM_2		claq	1001050001			<input type="checkbox"/>	
2	D001_00002	DO_OSIM_3		claq	1001050002			<input type="checkbox"/>	
3	D001_00003	DO_OSIM_4		claq	1001050003			<input type="checkbox"/>	
4	D001_00004	DO_OSIM_5		claq	1001050004			<input type="checkbox"/>	
5	D001_00005	DO_OSIM_6		claq	1001050005			<input type="checkbox"/>	
6	D001_00006	DO_OSIM_7		claq	1001050006			<input type="checkbox"/>	
7	D001_00007	DO_OSIM_8		claq	1001050007			<input type="checkbox"/>	

These points can be created automatically when the module is included in the ITB, but they can be created manually using the claq’s wizard.

In order to include a point manually, please create a new point, select claq as Source Device, click right-button on the field Source Device and select **Launch Point wizard** as explained above.

Figure 32 – Launch Point Wizard

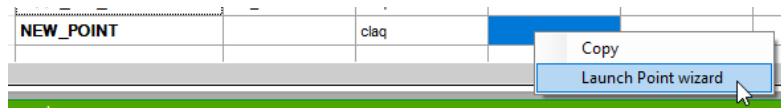
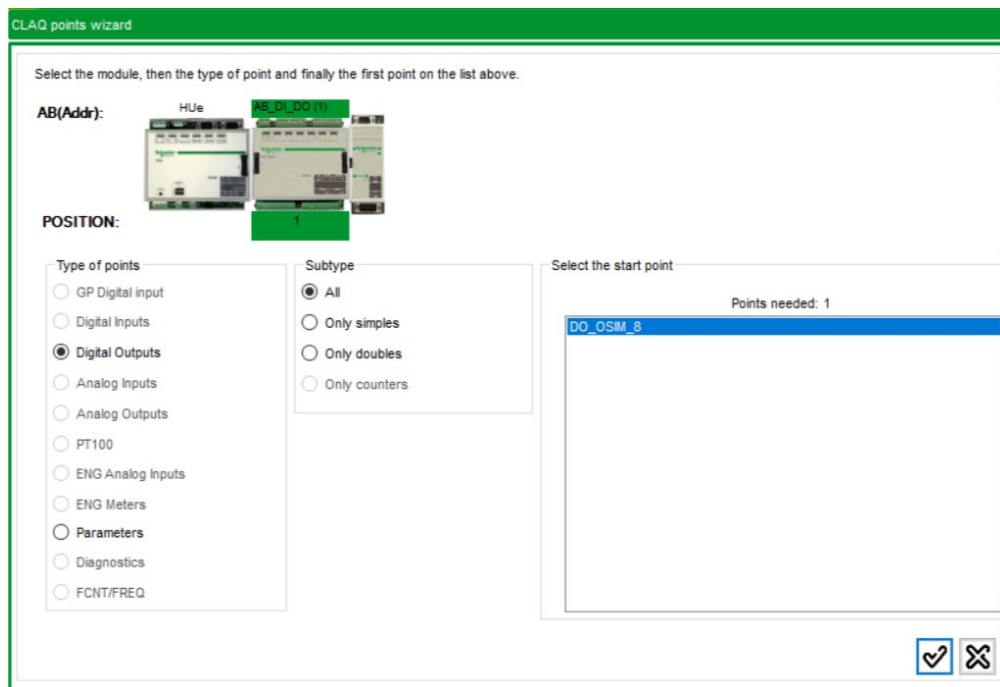


Figure 33 - Digital outputs local acquisition.



Select the module in which it wants to create these points and then select type.

Only not created point will be shown in the list.

The following point can be added for an AB\_DIDO module:

- 8 points for information from field. A coreDb point will be included in the Command table for each field signal. The default name is: D00x\_00000 .. D00x\_0007, where 00x is the module’s address.

## 4.3 Maintenance of Module via WEB

### 4.3.1 webApp Vs WebTool

WebApp and Webtool are remote user interfaces for consulting, monitoring and maintenance tasks. Once the username and password have been entered, you can access to the main window and, depending on the web tool, several sections are available.

<b>NOTICE</b>
WebApp has been designed to work only with cybersecurity brick. At now, it can be used only with HUe. HU_A and HU_AF use Webtool, while HU_B doesn't allow a remote connection using a webserver.

When use WebApp, the following message is shown previously to access the tool:

Figure 34 - Disclaimer information

Please, read this information and take it into account.

In this manual, only the information about AB\_DIDO is shown. For more information about these tools, please, consult the user manual for each one.

### 4.3.2 Using webApp

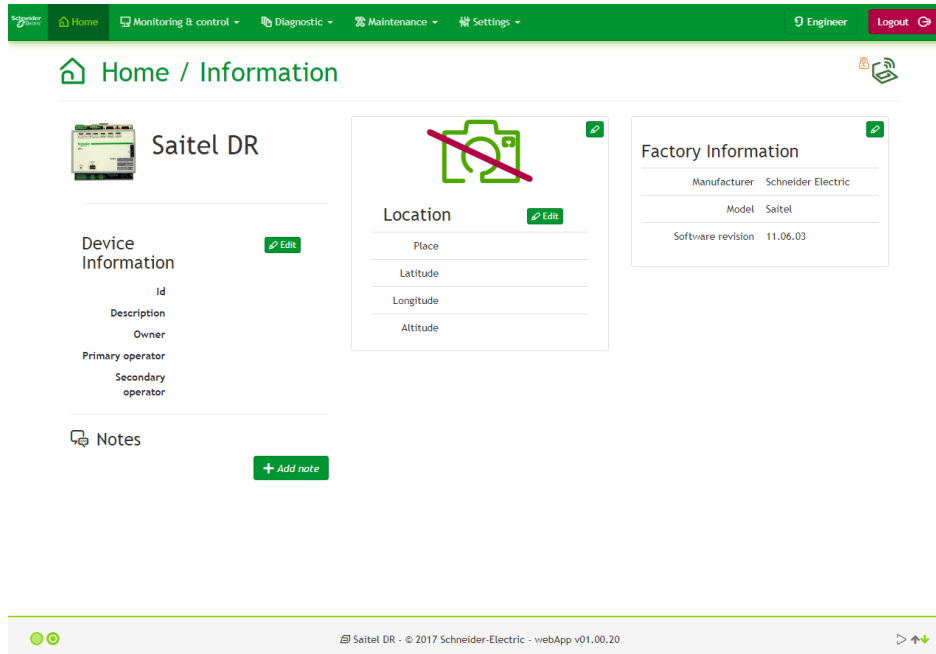
Saitel WebApp has an access control that allows differentiating the users who are able to connect. To get the window access, please write `https://< CPU IP address>` in the navigation address bar.

Figure 35 – Access screen





## Home tab

Select Home in the main toolbar and the following information is shown.

Figure 36 - Home view



Some of this information can be filled in by the user.

- **Device Information.** It is possible to add the names of the operators who have used or configured the equipment or a specific custom note that can be viewed each time a connection is established to this RTU. This information can be changed using button “Edit”, next to “Device information”.
- **Location.** The GPS coordinates for the RTU location (place, latitude, longitude, and altitude) should be entered here by the installer. Location is not set automatically. The image must be included manually by clicking button  on the map.
- Image associated to the RTU. It could be useful to include a location map corresponding to the GPS coordinates. Use button  on the graphic zone to do it.
- **Notes.** This zone allows the user to include notes that are shown to other users. Use button  to add new notes.
- **Factory information:** This zone shows the manufacturer, model and the version of the software loaded on the HU module. Using button  next to the text “Factory Information”, it is also possible to include an image of the particular RTU or CPU for identification purposes.

This screen contains other menus:

- Monitoring & Control
- Diagnostic
- Maintenance
- Settings

This manual only includes relevant information for AB\_DIDO. For more information about webApp, please, consult the webApp user manual.

## Monitoring and Control

This menu is used to monitor and control the information regarding to system status and coreDb points.

Select “Monitoring & control → System information” and the following information the system is displayed or not depending on whether the corresponding monitoring point was included or not in coreDb. In the following image, for each data, the supervision point that must be included in coreDb is indicated in a blue square.

Figure 37 - Monitoring and Control view - System information

The screenshot shows the Schneider Electric Monitoring & Control interface. The top navigation bar is green and contains 'Home', 'Monitoring & control', 'Diagnostic', 'Maintenance', and 'Settings'. The user is logged in as 'Engineer' and can click 'Logout'. The main heading is 'Monitoring System information'. Below this, there is a breadcrumb trail: 'Home / Monitoring / System information'. The main content area is titled 'System' and contains several panels:

- Configuration:** Shows 'RTU: OK' (green), 'PLC information not available' (orange warning), 'Configuration OK' (green), and 'OK' (green).
- Redundancy:** Shows 'Mode: No redundancy' and 'State: Online'.
- Local / Remote:** Shows 'Remote: [icon]'.
- Synchronization:** Shows 'Source 1 FAIL' (red) and 'Source 2 FAIL' (red).
- CPU usage:** A gauge showing 'N/A'.
- RAM usage:** A gauge showing 'N/A'.
- Temperature:** A thermometer icon showing 'N/A'.

Please take into account that the correspondent supervision points must be installed, otherwise, you will see a warning like the one in the example above (PLC information not available).

In this section, all the mapped points in Easergy Builder can be seen. There are 4 pages for viewing status and measurement data or for sending commands.

- Status page: For viewing the status of the digital data
- Command page: For sending change of state commands based on the digital data.
- Analog page: For viewing measurement values.
- Setpoint page: For forcing parameter values.

For an AB\_DIDO module, the showed points are the followings:

Figure 38 - Monitoring and Control - Status

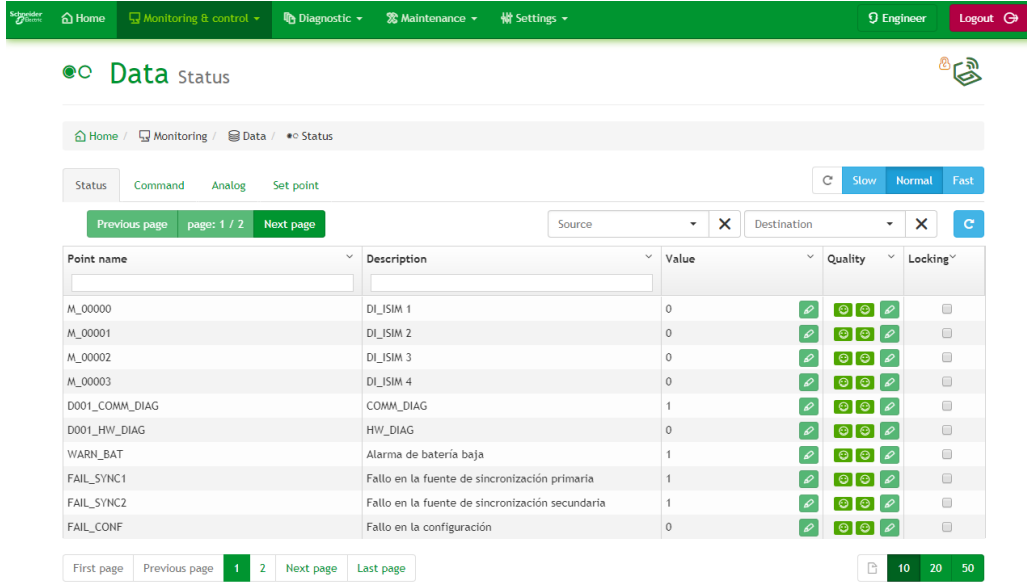
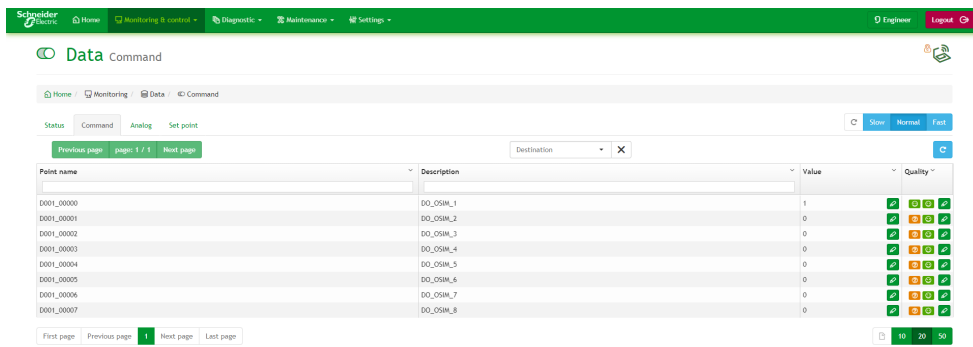


Figure 39 - Monitoring and Control – Command




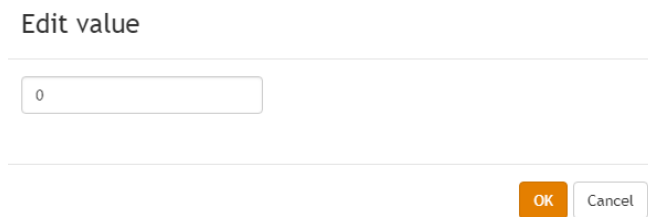
For all types of points, each page has the same format. If the user locks the signal and click in  in the “value” column, the value of the correspondent signal can be changed.

Figure 40 – Edit value




If the user locks the signal and click in  in the “quality” column, the value of the correspondent signal can be changed.

Figure 41 – Different values of signals

## Edit M\_00000 quality

Source : Local Good\_quality 0x00001010

Overflow	Rollover	Counter adjustment	Chatter	Locked	Manual
<input checked="" type="checkbox"/> Not topical	Invalid data	Critical alarm	High level alarm		
Low level alarm	Signal alarm	Invalid time			

Source : Remote Good\_quality

Overflow	Rollover	Counter adjustment	Chatter	Locked	
Substituted data	<input checked="" type="checkbox"/> Not topical	Invalid data	Invalid time		

Each code of quality bit has a different meaning. See next tables to know the description of each one.

Table 3 - Local quality bits

Values (Hexadecimal)	Description
0x00000000	OK
0x00000001	There has been an overflow
0x00000002	There has been a carry on a counter or a roll-over.
0x00000004	There has been a counter adjustment.
0x00000008	Excessive changes in a digital input.
0x00000010	Locked Point (blocked)
0x00000020	Point manually replaced (manual)
0x00000040	The point has not yet been written into the database (No refresh)
0x00000080	Invalid value (Error)
0x00000100	The value of the item has exceeded Highest Limit Alarm.
0x00000200	The value of the item has exceeded High Limit Alarm.
0x00000400	The value of the point has fallen down of Low Limit Alarm.
0x00000800	The value of the point has fallen down of Lowest Limit Alarm.
0x00001000	Invalid time.

Table 4 - Quality bits from the Device

Values (Hexadecimal)	Description
0x00000000	OK
0x00010000	There has been an overflow.
0x00020000	There has been a carry on a counter or a roll-over.
0x00040000	There has been a counter adjustment.
0x00080000	Excessive changes in a digital input.
0x00100000	Locked Point.
0x00200000	Point manually replaced.
0x00400000	The point has not yet been written into the database.
0x00800000	Invalid value.
0x10000000	Invalid time.

**NOTICE**

If more than one error is detected for a signal, the hexadecimal value monitored for quality bits will result from the sum of all. For example:  
**0x00000001** indicates that an overflow has occurred and **0x00000002** indicates that there has been a carry on a counter or a roll-over. The value **0x00000003** would appear monitored.

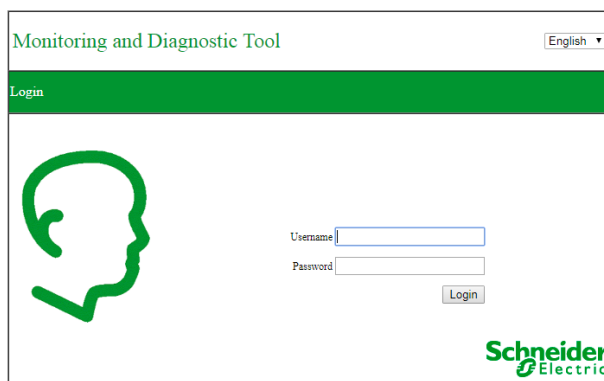
### 4.3.3 Using WebTool

Saitel Webtool is the tool used for maintenance and monitoring of Saitel RTUs which is supplied with the baseline software platform. The values of all the coreDb signals in real-time can be monitored through the Saitel Webtool as well as the quality data related to these values.

Saitel Webtool has an access control that allows differentiating the users who are able to connect. To get the window access, please write <https://< CPU IP address >> in the navigation address bar.

If the browser has been correctly configured, and the remote equipment is connected to the PC, the login window will prompt:

Figure 42 - Login window of Saitel Webtool



Once the username and the password are introduced in the login window, the main workspace is displayed:

Figure 43 - Initial screen of Saitel Webtool



## Saitel Webtool Monitoring and Diagnostic Tool

This window shows:

- Information about the user who opened the session (Login: admin).
- Button “Exit” in order to close the current session.
- It is possible to select the language through the field “Language”.
- The main menu is located on the left side of the screen. Each button gives access to all the information of the RTU:
  - Information: General information about the CPU configuration.
  - Monitoring: Gives access to the coreDb tables and the values for each register and field.
  - Bins: Gives access to the devices that have been configured in the RTU.
  - Network configuration: Gives information about the physical devices and routers.

### Information

Clicking Information on the main menu, you can see general information about the system.

The following real-time information can be monitored on this menu:

- System’s Configuration
- Hardware Status
- Synchronization Status
- Software Versions

Figure 44 - Information section

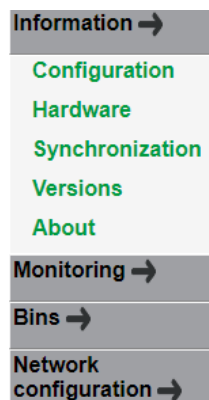
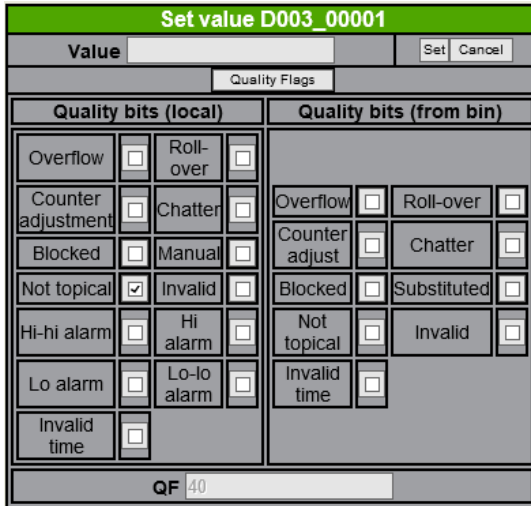




Figure 47 - Set Value screen



Each code of quality bit has a different meaning. See next tables to know the description of each one.

Table 5 - Local quality bits

Values (Hexadecimal)	Description
0x00000000	OK
0x00000001	There has been an overflow
0x00000002	There has been a carry on a counter or a roll-over.
0x00000004	There has been a counter adjustment.
0x00000008	Excessive changes in a digital input.
0x00000010	Locked Point (blocked)
0x00000020	Point manually replaced (manual)
0x00000040	The point has not yet been written into the database (No refresh)
0x00000080	Invalid value (Error)
0x00000100	The value of the item has exceeded Highest Limit Alarm.
0x00000200	The value of the item has exceeded High Limit Alarm.
0x00000400	The value of the point has fallen down of Low Limit Alarm.
0x00000800	The value of the point has fallen down of Lowest Limit Alarm.
0x00001000	Invalid time.

Table 6 - Quality bits from the Device

Values (Hexadecimal)	Description
0x00000000	OK
0x00010000	There has been an overflow.
0x00020000	There has been a carry on a counter or a roll-over.
0x00040000	There has been a counter adjustment.
0x00080000	Excessive changes in a digital input.
0x00100000	Locked Point.
0x00200000	Point manually replaced.
0x00400000	The point has not yet been written into the database.
0x00800000	Invalid value.
0x10000000	Invalid time.

#### NOTICE

If more than one error is detected for a signal, the hexadecimal value monitored for quality bits will result from the sum of all. For example:  
**0x00000001** indicates that an overflow has occurred and **0x00000002** indicates that there has been a carry on a counter or a roll-over. The value **0x00000003** would appear monitored.

## 4.4 Firmware Update

Once the ITB is configured, the HU module (HU\_A or HU\_B) already knows the type of acquisition blocks that are been installed and their corresponding addresses.

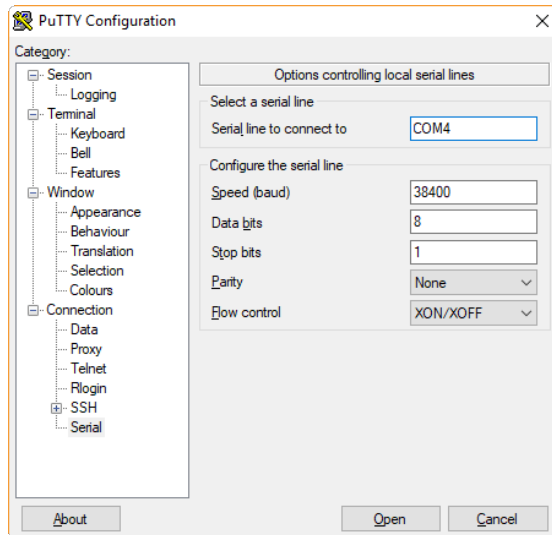
To update the software of the AB\_DIDO module, you need:

- A console connection with the HU.
- AB\_DIDO module must be correctly addressed and working fine in the ITB (LED Run must be blinking).
- AB\_DIDO.bin file with the new version. This file must be available in the flash folder of the HU. If not, you can contact Schneider Electric in order to ask for it. Use an SFTP client and transfer this binary file into the HU flash folder.

The console tool can be executed using any commercial tool for serial or SSH connection. In this manual, PuTTY software is used.

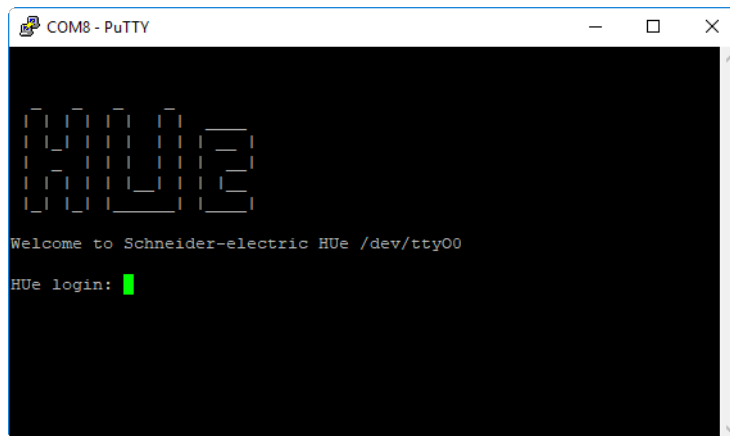
Open a serial connection as follow:

Figure 48 – Putty configuration



SSH connection via Ethernet can be used too. More information about the console use in the HU user manual. In the following picture, HUE is used as CPU:

Figure 49 – SSH Connection.



**NOTICE**

If the baseline includes the cybersecurity brick, you need to login in the console with **Installer**. No other user has permissions to execute this operation. Please, consult the HU user manual for more information.

If the file AB\_DIDO.bin is available in the flash folder, use one of the following commands to upgrade the software of AB\_DIDO modules:

Table 7 - Upgrading AB\_DIDO's software.

Module	File	Command	Description
All modules	*.bin	claqUpgrade "all"	It updates all the acquisition AB addressed in the ITB. You need to use the adequate file for each block.
By position	AB_DIDO.bin	claqUpgrade "<position>"	It updates the module AB_DIDO with the <position> address.
AB_DIDO	AB_DIDO.bin	claqUpgrade "all AB_DIDO"	It updates all the AB_DIDO modules installed in the ITB.

**NOTICE**


Console commands are case-sensitive, and quotation marks must be included.

After running the command, the console will show some messages indicating the process status. Finally, if no problem is found, we will have updated the firmware of the modules.

## 5 Technical Specifications table

Hardware Specifications		
Consumption	Typical	0.9 W
	Per relay	0.4 W
Mechanical	Weight	720 g
	Dimensions	134 mm x 129 mm x 60 mm
	Coating	AVR80 (Depending on P/N)
Digital inputs	Number of DI	16
	Input current per signal	< 5.5 mA at nominal PV
	Input per common	4
	Connectivity	2 10-pole terminal blocks / 2.5 mm <sup>2</sup> / 13 AWG
	Logic voltage levels	High level "1": From 80% (PV) Low level "0": Up to 30% (PV)
Digital outputs	Number of DO:	8
	Max. output current	5 A
	Connectivity (polarization)	3-pole terminal block / 2.5 mm <sup>2</sup> / 13 AWG
	Connectivity (signals)	2-8 pole terminal blocks / 2.5 mm <sup>2</sup> / 13 AWG
	Output switching capacity	<b>L/R = 20 ms:</b> 220 V <sub>DC</sub> / 300 mA, 110 V <sub>DC</sub> / 400 mA, 48 V <sub>DC</sub> / 500 mA, 24 V <sub>DC</sub> / 2 A, 12 V <sub>DC</sub> / 5 A <b>L/R = 40 ms:</b> 48 V <sub>DC</sub> / 400 mA, 24 V <sub>DC</sub> / 1.2 A, 12 V <sub>DC</sub> / 5 A

Software		
Digital inputs	Type	Simple / Double / Slow counter
	Processing	Status indication (simple and double)
		Memorized indication
		32-bit pulse counters, 45 Hz (single or double edge)
		Digital Filtering / Settling time / Change memory / Antichattering / Inversion
Timestamp for events	1 ms	
Parameters of DI:	Filtering time	0 – 255 ms
	Settling time	0 – 25500 ms
	Change memory	0 – 2550 ms
	Anti-chattering window	0 – 255 s
	Events for chattering	1 – 255 changes
Digital Outputs	Type	Simple / Double
	Processing	Pulsing (fixed time) / Latching
	Security mechanism	SBO (Select-Before-Operate) and Feedback on the output coil's relay
Parameters of DO	Output actuation timing	1-65535 ms
	Polarization test	Automatic

<b>⚠ WARNING</b>	
	According to the standard 60950-1, all electrical safety tests have been done in an environmental temperature range of -40 °C to 60 °C. For higher temperature (> 60 °C), the module must be handled with care, since the metal surface could reach a dangerous temperature for the user.

CE Mark		
Standards, Directives and harmonized norms.	<b>LVD</b> – Low Voltage Directive	Directive 2006/95/CE
	<b>EMC</b> – Electromagnetic Compatibility	Directive 2004/108/CE
	<b>RoHS 2</b> – Restriction of Hazardous Substances	Directive 2011/65/EU, according to royal legislative decree (RD) 219/2013
	<b>WEEE</b> – Waste Electrical and Electronic Equipment	Directive 2012/19/UE according to RD 110/2015
EMC tests according to	Immunity for equipment used in power station and substation environment IEC 61000-6-5:2001	
	Emission standard for industrial environments IEC 61000-6-4:2007	
Emission EMC tests	Radiated emissions EN 55022:2006 + A1:2007	From 30 to 1000 MHz (Class A)
	Conducted emissions EN 55022:2006 + A1:2007	From 0.15 to 30 MHz (Class A)
Immunity EMC tests	Electrostatic discharges (ESD) EN 61000-4-2:2009	By contact ±6 kV (Level 3)
	Radiated, RF, EMC field EN 61000-4-3:2006 + A2:2010	Between 80 and 2700 MHz (Level 3)
	Electrical fast transient/burst EN61000-4-4:2012	Power supply: ±2 kV, communication: ±1 kV (Level 3)
	Surge EN 61000-4-5:2006	Power supply: ±2 kV symmetric and asymmetric (Level 3)
	Conducted disturbances, RF fields EN 61000-4-6:1996 + A1:2001	(Level 3)
	Magnetic field EN 61000-4-8:2010.	30 A/m at 50 Hz (Level 4)
Electrical Safety	General requirements IEC 60950-1	Meets all the requirements indicated in the normative
	Insulation and dielectric rigidity IEC 60255-5	Isolation >100 MΩ, 2 kV <sub>AC</sub>
Environmental tests	Cold EN 60068-2-1:2007	-40°C during 16h (Cold start)
	Dry heat EN 60068-2-2:2007	+70°C during 16h
	Bump test (1 vertical axis) EN 60068-2-29	Acceleration: 250 m/s <sup>2</sup> ; Duration of pulse: 6 ms; Number of shocks: 100 shocks/axis/polarity
	Random vibration test (3 axes) UNE-EN 60068-2-64	Range: From 10 Hz to 500 Hz Test duration: 30 minutes

Ordering Options	
<p><b>AB_DIDO M572 x x 0 0 0 y zz</b></p>	
<p><b>DI Pol (Ax):</b> 2: 12 – 24 V<sub>DC</sub> 3: 48 V<sub>DC</sub> 4: 125 V<sub>DC</sub></p>	<p><b>DO Pol (Bx):</b> 2: 24 V<sub>DC</sub> 3: 48 V<sub>DC</sub></p>
<p><b>Coating:</b> 0: Without coating 2: AVR80 coating (by ABchimie)</p>	<p><b>Revision:</b> (Revision code)</p>

## Index of Figures

Figure 1 – Barrier of protection for elements with dangerous voltages.....	9
Figure 2 – Yellow and Green cable for earthing.....	10
Figure 3 – Terminal for functional earth (EMC).....	11
Figure 4 – Example of earthing for EMC.....	11
Figure 5 – Technical label.....	13
Figure 6 – Saitel DR.....	16
Figure 7 – AB_DIDO - Functional block diagram.....	17
Figure 8 – AB_DIDO Module.....	18
Figure 9 – AB_DIDO - Hardware schematic view.....	18
Figure 10 – Mount bracket on DIN rail.....	23
Figure 11 – Saitel DR module on a DIN rail.....	23
Figure 12 – Remove module.....	23
Figure 13 – AB_DIDO - Polarization input wiring.....	24
Figure 14 – B2 and B3 terminal blocks wiring.....	25
Figure 15 – B4 and B5 terminal blocks wiring.....	25
Figure 16 –Led Indicators.....	26
Figure 17 –Add RTU.....	30
Figure 18 –Modify acquisition.....	30
Figure 19 – Acquisition modules in a default configuration.....	30
Figure 20 – Confirmation for automatic addressing.....	31
Figure 21 – Adding one (or several) AB.....	31
Figure 22 – Adding configuration.....	31
Figure 23– Easergy Builder configuration.....	32
Figure 24 – Easergy Builder address.....	32
Figure 25 – Field signals and points in coreDb.....	33
Figure 26 – AB_DIDO digital input signals.....	33
Figure 27 – AB_DIDO digital output signals.....	34
Figure 28 – Digital input signals in coreDb.....	35
Figure 29 – Launch Point Wizard.....	36
Figure 30 - Digital inputs local acquisition.....	36
Figure 31 – Digital output signals in coreDb.....	37
Figure 32 – Launch Point Wizard.....	37
Figure 33 - Digital outputs local acquisition.....	37
Figure 34 - Disclaimer information.....	38
Figure 35 – Access screen.....	38
Figure 36 - Home view.....	39
Figure 37 - Monitoring and Control view - System information.....	40
Figure 38 - Monitoring and Control - Status.....	41

---

Figure 39 - Monitoring and Control – Command .....	41
Figure 40 – Edit value .....	41
Figure 41 – Different values of signals .....	42
Figure 42 - Login window of Saitel Webtool .....	43
Figure 43 - Initial screen of Saitel Webtool .....	44
Figure 44 - Information section .....	44
Figure 45 - Status monitoring screen .....	45
Figure 46 - Command monitoring screen .....	45
Figure 47 - Set Value screen .....	46
Figure 48 – Putty configuration.....	48
Figure 49 – SSH Connection. ....	48

# Index of Tables

Table 1 - Symbols .....	7
Table 2 - Led indicators meaning .....	26
Table 3 - Local quality bits .....	42
Table 4 - Quality bits from the Device .....	43
Table 5 - Local quality bits .....	46
Table 6 - Quality bits from the Device .....	47
Table 7 - Upgrading AB_DIDO's software .....	48

# Glossary

## A

**Amperio:** Amperio. Unidad de intensidad de la corriente eléctrica.

**AAP:** Automatic Addressing Procedure. Procedimiento para direccionamiento automático de los módulos del ITB.

**AB:** Acquisition Block. Bloque de adquisición de Saitel DR.

**AB\_AC:** Bloque de adquisición para entradas directas de tensión y/o corriente (modelo europeo).

**AB\_AI:** Módulo de E/S con entradas analógicas.

**AB\_AO:** Módulo de E/S con salidas analógicas.

**AB\_DI:** Módulo de E/S con entradas digitales.

**AB\_DIDO:** Módulo de E/S con entradas y salidas digitales.

**AB\_DO:** Módulo de E/S con salidas digitales.

**AB\_MIO:** Módulo de E/S con múltiples entradas y salidas.

**AB\_SER:** Módulo para expansión de comunicaciones serie.

**AC:** Alternate Current (Corriente alterna).

**AI:** Analog Input (Entrada analógica).

**AO:** Analog Output (Salida analógica).

**AWG:** American Wire Gauge. Calibre de cable estadounidense. Es una referencia de clasificación de diámetros.

## B

**BDTR:** Base de Datos en Tiempo Real.

**Bps:** Bits por segundo. En una transmisión de datos, es el número de impulsos elementales (1 o 0) transmitidos en cada segundo.

## C

**°C:** Grados Celsius o Centígrados.

**CEM:** Compatibilidad ElectroMagnética.

**COM:** Puerto de comunicaciones.

**CPU:** Central Processing Unit (Unidad Central de Proceso).

**CTS:** Clear to Send.

## D

**DC:** Direct Current (Corriente continua).

**DI:** Digital Input (Entrada digital).

**DIN:** Deutsches Institut für Normung. Instituto alemán de normalización.

**DO:** Digital Output (Salida digital).

**DRAM:** Dynamic Random Access Memory (Memoria electrónica volátil de acceso aleatorio).

## E

**EPROM:** Erasable Programmable Read Only Memory (Memoria ROM no volátil, programable y borrrable)

**E/S:** Entrada / Salida.

**Ethernet:** Tecnología para implementar redes que puede usar varios medios físicos, incluyendo par trenzado y cable coaxial. El TCP/IP es el protocolo que se utiliza normalmente con este tipo de redes.

## F

**Firmware:** Programa embebido en una ROM o flash memory.

**Flash Memory:** Tipo de almacenamiento no volátil similar a la EPROM.

**FTP:** File Transfer Protocol. Protocolo TCP/IP utilizado para la transferencia de ficheros de un sistema a otro.

## G

**G:** Gramo.

**GPS:** Global Positioning System (Sistema para posicionamiento global a través de satélite).

## H

**HU:** Módulo CPU de Saitel DR (Head Unit).

**HU\_A:** CPU avanzada de Saitel DR.

**HU\_AF:** CPU avanzada con adquisición de Saitel DR.

**HU\_B:** CPU básica de Saitel DR.

**HUe:** CPU de alto rendimiento de Saitel DR.

**Hz:** Hercios. Frecuencia en ciclos por segundo.

## I

**IED:** Dispositivo electrónico inteligente (Intelligent Electronic Device).

**IRIG:** Inter Range Instrumentation Group.

**IRIG-B:** Modo B del estándar IRIG.

**ISO 9001:** Norma internacional que especifica los requisitos que debe cumplir un sistema de gestión de calidad.

**ITB:** Intelligent Terminal Block. Unidad funcional de Saitel DR compuesto por una cabeza, más un conjunto de bloques de adquisición, junto con los elementos constructivos necesarios (módulo terminador, módulo expansor, bus interno...).

## K

**KB:** Kilobytes.

**kHz:** Kilohercios.

## L

**LAN:** Local Area Network. Red de área local.

**LED:** Light Emitting Diode. Indicador luminoso.

## M

**mA:** Miliamperio.

**MHz:** Megahercio.

**MB:** Megabyte.

**Mbaudio:** Megabaudio.

**Mbps:** Megabits por segundo.

**m:** Metro.

**mm:** Milímetro.

**ms:** Milisegundo.

## N

**N/A:** No aplica.

## P

**PC:** Personal Computer. Ordenador personal.

**PPS:** Pulsos por Segundo.

**PS:** Power Supply. Fuente de alimentación.

**PWR:** Power.

## R

**RAM:** Random Access Memory. Memoria volátil de acceso aleatorio.

**RS-232:** Estándar recomendado 232.

**RS-485:** Sistema de bus diferencial multipunto.

**RTS:** Request To Send. Tipo de mensaje enviado por un emisor en espera de una respuesta (CTS).

**RTU:** Remote Terminal Unit. Remota.

**Rx:** Recepción

## S

**s:** Segundo.

**SCADA:** Supervisory Control And Data Acquisition. Sistema automático para la supervisión, control y adquisición de datos.

**SNTP:** Simple Network Time Protocol.

**SRAM:** Static Random Access Memory. Memoria estática de acceso aleatorio.

## T

**TCP/IP:** Transmission Control Protocol/Internet Protocol. Protocolo para transmisión de datos.

**TFTP:** Trivial File Transfer Protocol. Protocolo para transferencia de ficheros que se asemeja a una versión básica del FTP.

**TU:** Terminal Unit. Módulo terminador.

**Tx:** Transmisión.

**V**

**VAC:** Voltios de corriente alterna.

**VDC:** Voltios de corriente continua.

**W**

**W:** Watio.

**X**

**XU:** Expansion Unit. Módulo de expansión.



Printed in:

Monday, April 13, 2020

## Schneider Electric

C/ Charles Darwin s/n  
Parque Científico y Tecnológico de la Cartuja  
Seville, Spain

©2020 All rights reserved. The information contained in this document is confidential and is owned by Schneider Electric. It cannot be copied or distributed in any way, unless there is express written authorization by Schneider Electric. Although this information was verified at the time of publication, may be subject to change without notice.

SE-M572-USR-01 03/2020