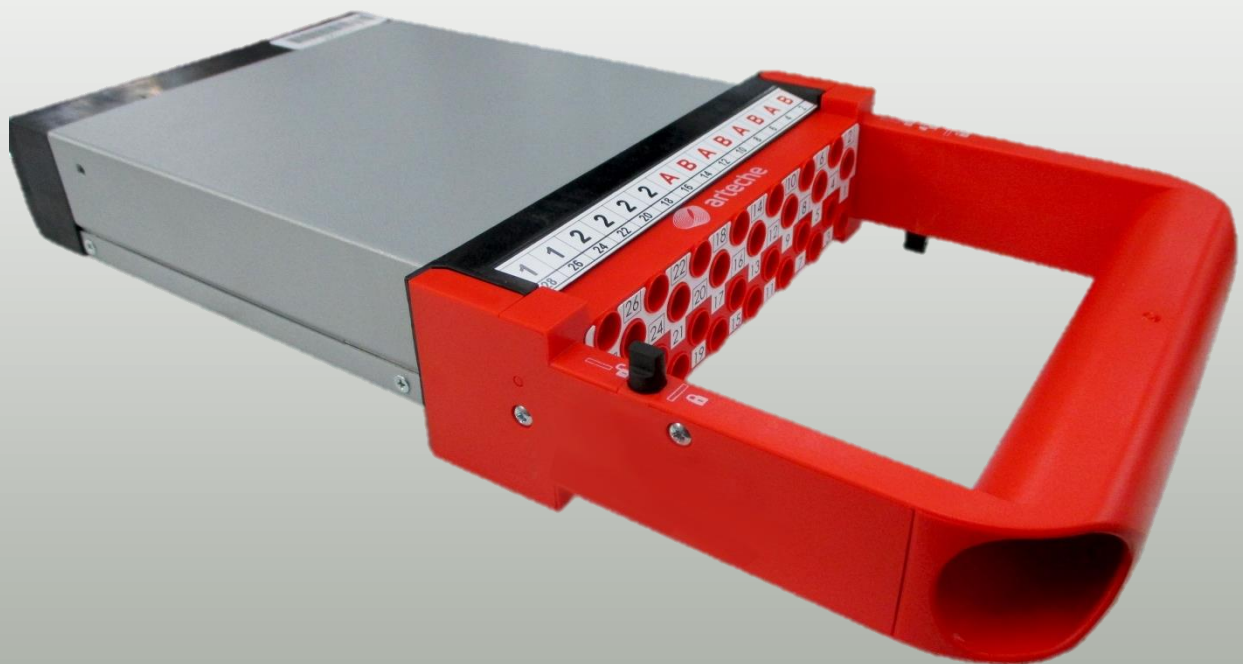


arteche

saTECH TSB-14-H/V

saTECH TSB-14-P-H/V





The test block manual contains instructions for installation, commissioning and operation. However, the manual cannot cover all conceivable circumstances or include detailed information on all topics.

In case of questions or specific problems do not take any action without proper authorization.

Please contact the technical sales of Arteche and request the necessary information.

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Chapter 1. Overview

→ saTECH TSB 14-H/V (TEST BLOCK)



TSB-14-H



TSB-14-V

→ saTECH TSB-14-P-H/V (TEST PLUG)



TSB-14-P-H



TSB-14-P-V

These test blocks facilitate secondary testing load of any power system, allowing rapid monitoring, insulation and testing of the field elements.

The box contains saTECH TSB-14:

- Set of cabinet fixing screw
- Set of rear block connection screw and earth connections.
- Requested Model saTECH TSB-14
- TSB-14 front cover

The box contains saTECH TSB-14-P:

- saTECH TSB-14-P
- TSB-P Protector for transport

Safety symbols:

The following symbols are located on different parts of the equipment and this manual:



Paragraphs marked with this symbol contain information which, if not properly followed, may cause damage to equipment and / or installation.



Paragraphs marked with this symbol contain information which, if not properly followed, may cause personal injury or even death.

General Safety instructions:



The installation and operation of the products described in this manual can be made only by trained personnel who have expertise in substation protection, automation and control.

Do not disassemble the test block or test plug. Correct installation of internal parts is critical to warrant the insulation and avoid internal arcs.

The ARTECHE guarantee ceases when, without express authorization of ARTECHE SMART GRID S.L, external personnel to ARTECHE SMART GRID S.L. makes any changes or reparation in the product. There are not included the failures by normal use out of the guarantee period, neither by inappropriate use, carelessness or negligence of the user.

Chapter 2. Cautions

1^o-. It's absolutely necessary to connect the equipment to earth according with the information defined on chapter 5.



It's absolutely necessary to connect the equipment to earth according with the information defined on chapter 5.

2^o-. To guarantee the correct operation of the test plug and extend his useful life it is recommended to clean the fingers periodically for possible metal deposition in the plastic zone of disruption, which may bring on to a reduction of electrical rigidity and insulation.

3^o-. In the case that the customer wanted to make a new dielectric verification , these were carried out according to point 10.6.4.3.7 of the IEC60255-27 standard (2014), 75% of the value of dielectric strength established.

4^o-. The test blocks are electrical equipment. Therefore, wrong installation or wrong connection can lead to malfunction or permanent equipment failure, therefore it is recommended to follow the instructions listed below:



The assembly of the test block should be done with wires which are not energized.

The test block must be connected rigidly to the ground.

Check that the secondary windings of the current transformers are grounded through one of its terminals.

Check that the connections are correctly tightened and that the contact surfaces are clean.

Check the correct polarity of the connections.

Check the correct external wiring. The secondary of the current transformers must be wired to intensity terminals: A and B.

ATTENTION. All secondary of a current transformer that is not loaded should be short-circuited; otherwise, the voltage between open circuit and secondary terminals can reach dangerous levels, even to destroy the equipment.

Chapter 3. Main features

The ARTECHE saTECH test block allows testing the protection relay, safely and easily, completely insulating the protection relay from the field elements and eliminating any risk to the user.

The main features are the following:

- **14 circuits** with different configuration (trigger, currents and voltages). This configuration should be defined prior to the order, because afterwards this configuration can't be modified.
- **Safe for the user**, the user will never have access to live parts during insertion or extraction of the test plug.
- **Safe insertion sequence, (make before break)**. The trip circuits are opened in the first place, avoiding undesired operation and later on, the voltage and current circuits are opened, ensuring that transformer circuits are shorted before opening the current circuits.
- **Safe extraction sequence**, the defined extraction sequence assures to have enough time to stabilizing the system. The first step connects the voltage and the current circuits, later on, the user must act specifically on the test plug before being able to extract it completely.
- **Unique test plug for different** test block configuration for the same number of circuits (14).
- **Installation Orientation**, there are two options: vertical and horizontal, the user is able to choose the installation orientation.

Chapter 4. Aplicación

saTECH TSB

The test block saTECH includes 14 circuits, which can be accessed by removing the front cover. The front cover guarantees an IP50 and its removal allows access to the internal circuitry to enable testing operations.



All of these circuits include a contact that is normally closed when the protection relay is in service.

The circuits can be classified into: trigger, voltage or current.



On the back side of the test block the circuits are identified by numbers and the numbers surrounded by a circle corresponding to field.

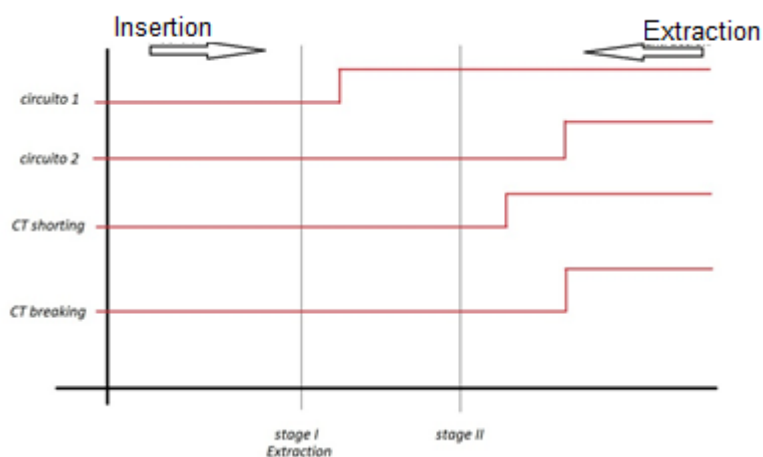
The circuits include a mechanism for ensuring the short current transformers before proceeding to open the corresponding contact test block. Arteche offers the possibility to select from various types of shorted, depending on the application. On the front side of the block, you can see which of those circuits are shorted, apart from identification shown on labels frame. This identification is visible even when the test plug is inserted.



The user will define what kind of circuit (trigger, voltage or current) wants in each position at the moment of ordering the test block saTECH TSB-14-H/V. The user should specify also the type of short circuit required according to the selection table on page 10 models.

During the insertion of the test plug the circuits are ready to be able to test the protection relay, according to the following sequence:

1. Opening of the trip circuits and signal.
2. Shorting the circuits of the current transformers.
3. Open the circuit of voltage and current.



Once the test plug is inserted, the protection relay is ready for testing; it will not affect the rest of the system, because it has been insulated.

The field elements are automatically insulated through shorting circuits and opening the voltage circuits and tripping.

saTECH TSB-14-P-H/V



The test plug TSP-14-P-H/V includes a guides and a poka-yoke system, to make easier the insertion into the test block in the proper position and ensuring the opening of all contacts, of the same type simultaneously. Once the test plug is inserted, it can be locked to prevent involuntary extractions, turning the black buttons of the test block.

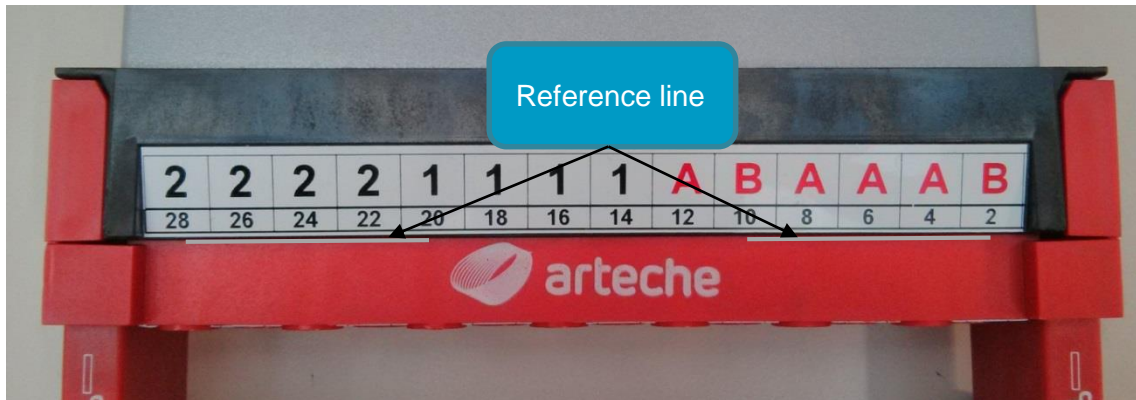


There are 28 banana plugs in the test plug, which allow the use of safety banana plugs: 14 banana plugs of 4mm are used for the test injection of the relay protection, and the other 14 to provide access to field elements.

All the banana plugs of the test plug are identified by a number that corresponds to the same number in the test block.

When the test plug is inserted into the test block, the user should push it until there is no gap between the test block and the test plug, in order to guarantee that the retention system is working during the safety extraction operation. To verify this, two lines have been arranged in

the plug. Once they are aligned with the framework of the block, they will help us to check visually whether the plug is properly inserted or not.



Example test plug correctly inserted



Example test plug incorrectly inserted



The retention system force to do the extraction of the test plug, with the following sequence:

First phase:

1. Connect the current and voltage circuits
2. Opening of the short circuit current transformers

Second phase:

3. Connecting the trigger circuitry.

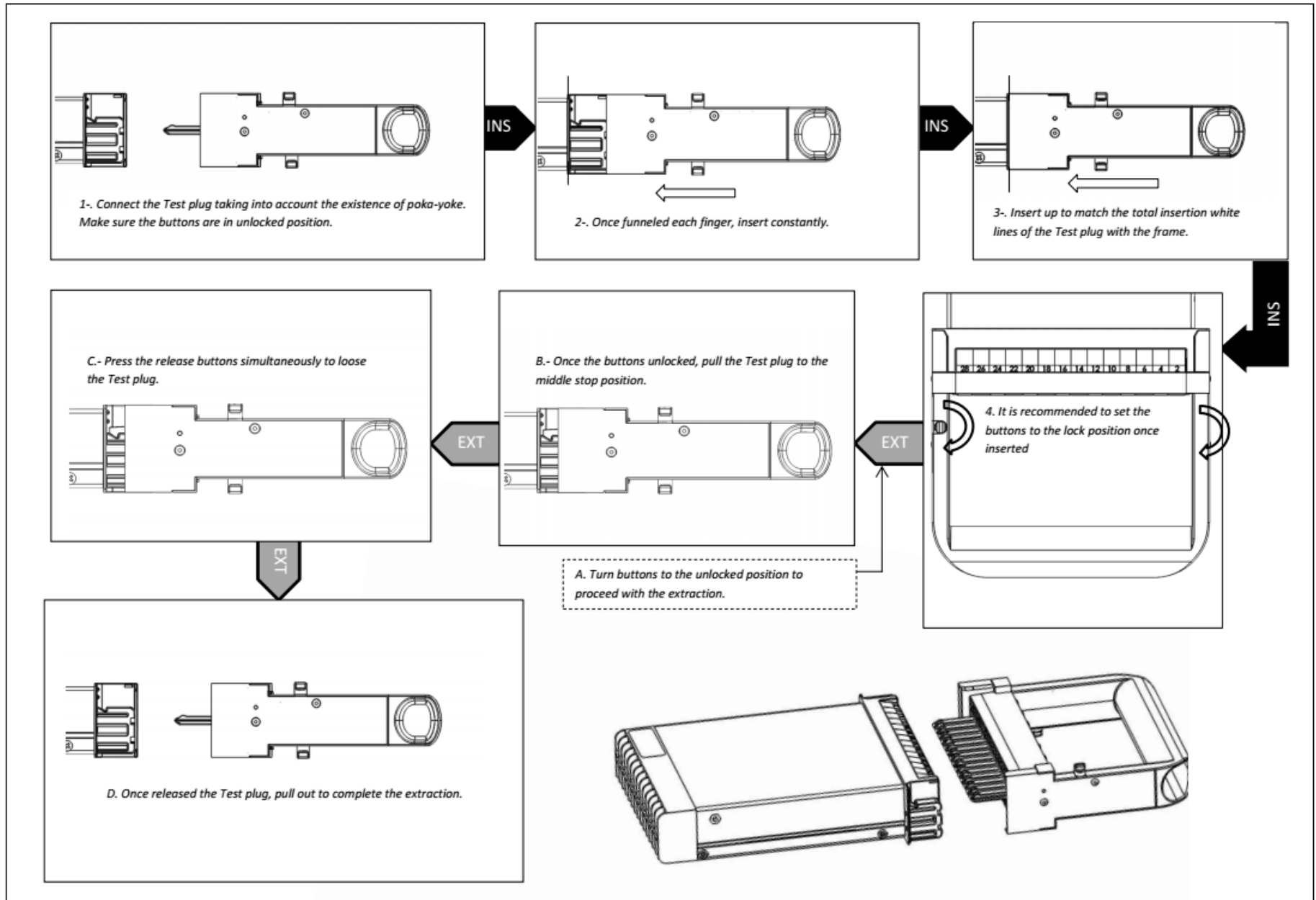
If the test plug has been previously blocked, it will be necessary to act in the retention system of the test plug, before move to the second phase. The retention system works turning the black buttons of the test plug: to the right side to lock it, and to the left side to unlock it.



This operation will allow voltage and current values to stabilize after transients during the connection, and will avoid unwanted tripping during the trigger circuit connection.

During the insertion and the extraction of the test plug don't occur bounces that could harm the current transformers.

INSTRUCTIONS



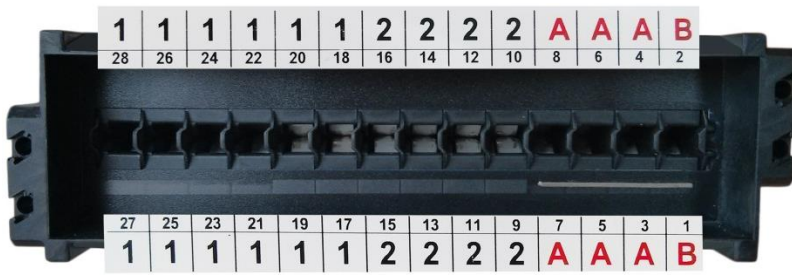
TECHNICAL SPECIFICATIONS

Technical data		
Dielectric strength IEC 60255-27	saTECH TSB & TSB-P IEC 60255-5	2kV between input and output contacts
		2kV open contacts, test plug inserted
		5 kV rms for 1 minute between all terminals connected together and the ground terminal
		2 kV rms for 1 minute between any pair of contacts, including contacts adjacent
Step current	saTECH TSB saTECH TSB-P IEC 60947-7-1	All circuits 20A allow continuously or 400A for 1s All circuits 10A allow continuously or 250A for 1s.
Maximum operating voltage	saTECH TSB & TSB-P	300 volts ac or dc continuously IEC 60255
Environmental conditions	Temperature	Storage -25 ° C to + 70 ° C operation -25°C a +55°C
		IEC 60068-2-1 Cold
	Humidity	IEC 60068-2-2 Dry heat
		IEC 60068-2-78 56 days a 93% Relative Humidity and +40°C
Enclosure protection	IEC 60529-1:	<ul style="list-style-type: none"> • TSB with front cover IP50 • TSB without front cover IP20 • TSB-P connected IP20
mechanical characteristics	Vibration	60255-21-1 IEC Class II 60255-21-2 IEC Class II



saTECH TSB-14 Back view

MODEL SELECTION



1-. Horizontal position (Reading from right to left)

Bloque de pruebas

Selección de Modelo: saTECH TSB-14-

Opciones

- 1: Circuito que abre en la primera fase (disparos y señalizaciones, alimentación de la protección)
- 2: Circuito que abre en la segunda fase (tensiones)
- A*: Circuito de corriente con cortocircuitado automático
- B*: Circuito de corriente con cortocircuitado automático, que indica el final de un grupo de cortocircuito

Tipos de Montaje: Horizontal (H), Vertical (V)

Peine

saTECH TSB-14-P -

Tipo de Montaje: H/V

Diagrama de Conexiones:

- Contacto 27-28
- Contacto 25-26
- Contacto 23-24
- Contacto 21-22
- Contacto 19-20
- Contacto 17-18
- Contacto 15-16
- Contacto 13-14
- Contacto 11-12
- Contacto 9-10
- Contacto 7-8
- Contacto 5-6
- Contacto 3-4
- Contacto 1-2

2-. Vertical position (Reading from top to bottom)

* The shorting circuits must be placed in a row, e.g.:

Bloque de pruebas

Selección de Modelo: saTECH TSB-14- 2 2 2 2 1 1 1 1 A A A B H/V

Opciones

- 1: Circuito que abre en la primera fase (disparos y señalizaciones, alimentación de la protección)
- 2: Circuito que abre en la segunda fase (tensiones)
- A*: Circuito de corriente con cortocircuitado automático
- B*: Circuito de corriente con cortocircuitado automático, que indica el final de un grupo de cortocircuito

Tipos de Montaje: Horizontal (H), Vertical (V)

Peine

saTECH TSB-14-P -

Tipo de Montaje: H/V

Bloque de pruebas

Selección de Modelo: saTECH TSB-14- A A A B A B 2 2 A B A A A B H/V

Opciones

- 1: Circuito que abre en la primera fase (disparos y señalizaciones, alimentación de la protección)
- 2: Circuito que abre en la segunda fase (tensiones)
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- B*: Circuito de corriente con cortocircuitado automático, que indica el final de un grupo de cortocircuito

Tipos de Montaje: Horizontal (H), Vertical (V)

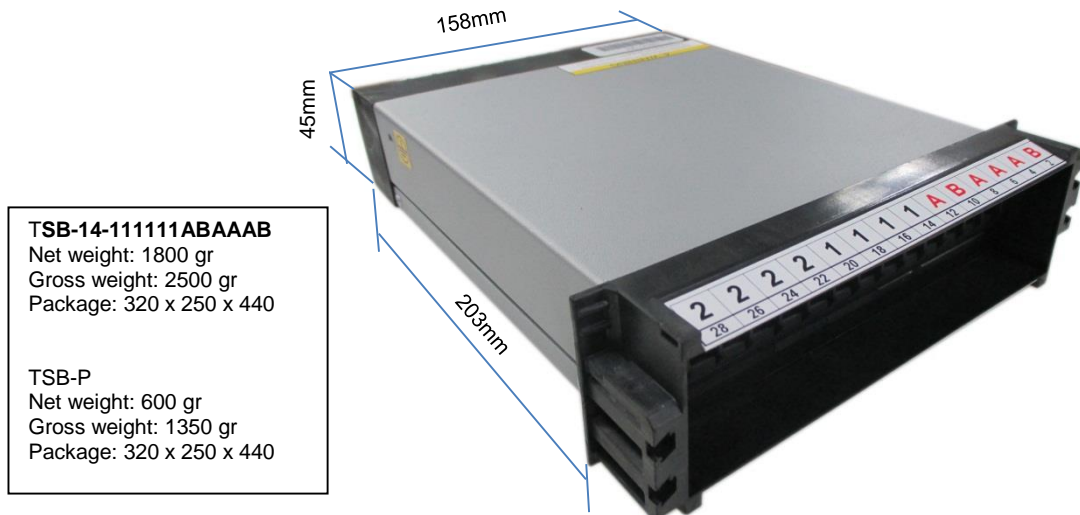
Peine

saTECH TSB-14-P -

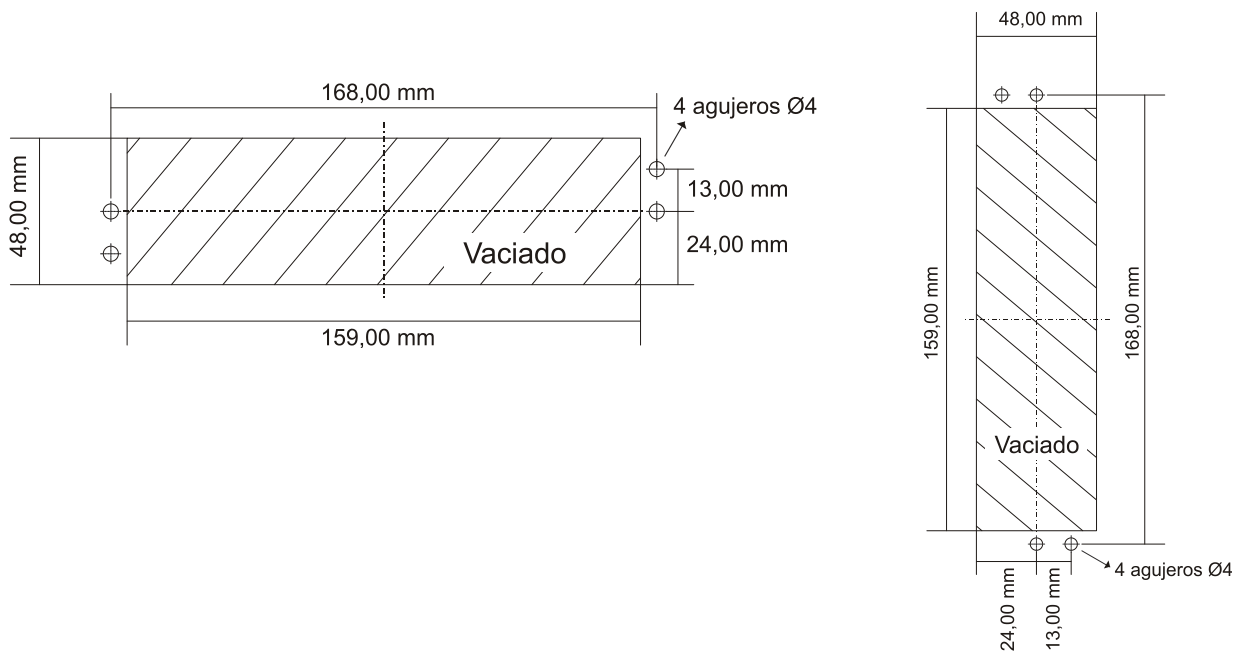
Tipo de Montaje: H/V

Chapter 5. Dimensions, installation and connections

DIMENSIONS



CUT OUT



ASSEMBLY AND INSTALLATION

There are two options for the installation of the Test Block: horizontally and vertically. The installation of equipment will be made according to the following indications:



Vertical option



Horizontal option

In the vertical option, the odd circuits (field) must be located in the right side and the numbers disposition will be top down.

In the horizontal option, the odd circuits (field) must be at the bottom and the pairs at the top.

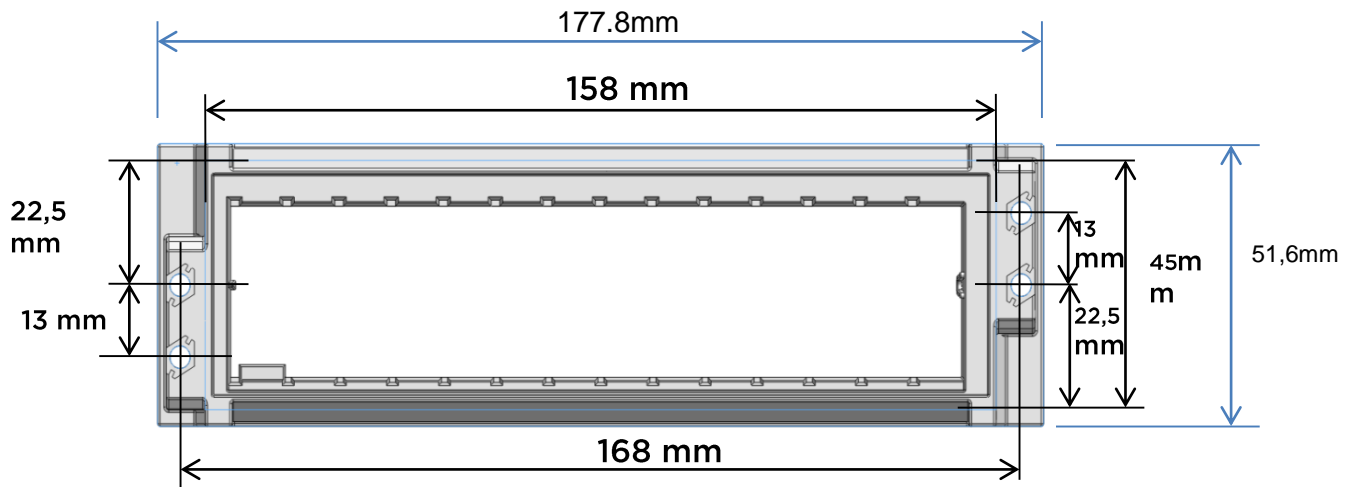
The connection of the Test Plug is conditioned by the installation of the Test Block, because it has a poka-yoke for the correct insertion. The connection of the Test Plug would be made in the following way:



Vertical option



Horizontal option

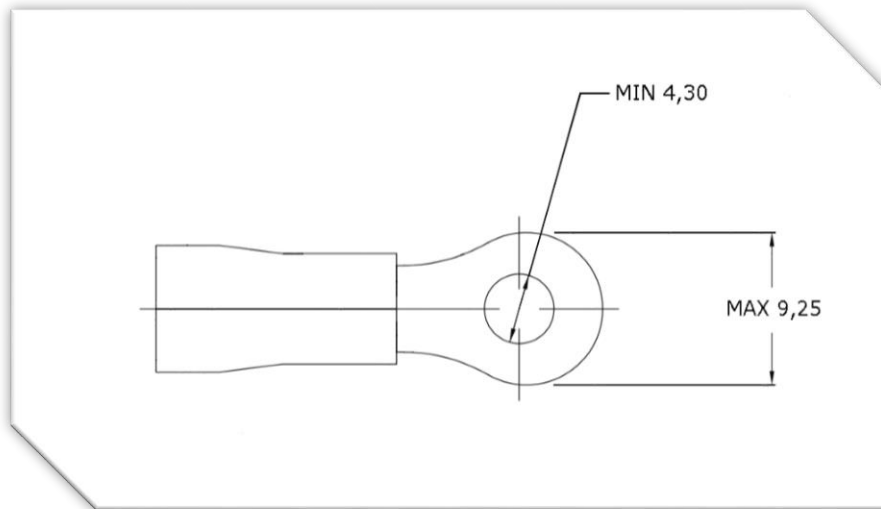


- Screw and washers: The wiring operation will be performed with the screws supplied with each equipment.
- Tools needed: 6mm hex wrench tube.
- Rear connection:
 1. Maximum number of ring terminals that can be connected: 2.
 2. Cable up to 4mm² or 12 AWG.
 3. Maximum outer diameter of annular connector: 9mm.
 4. With block-type tests are supplied Phillips head M4 screws.
 5. The maximum torque for the screws is 2.5N.
- Earth connection.
- After the test block is placed in the cabinet, the earth connection must be made. The saTECH TSB. Has two earth connections, one of them has to be done. In order to guarantee the IP protection, both grounding screws should be fixed. The wiring and earth connection screw set are included with the test block.

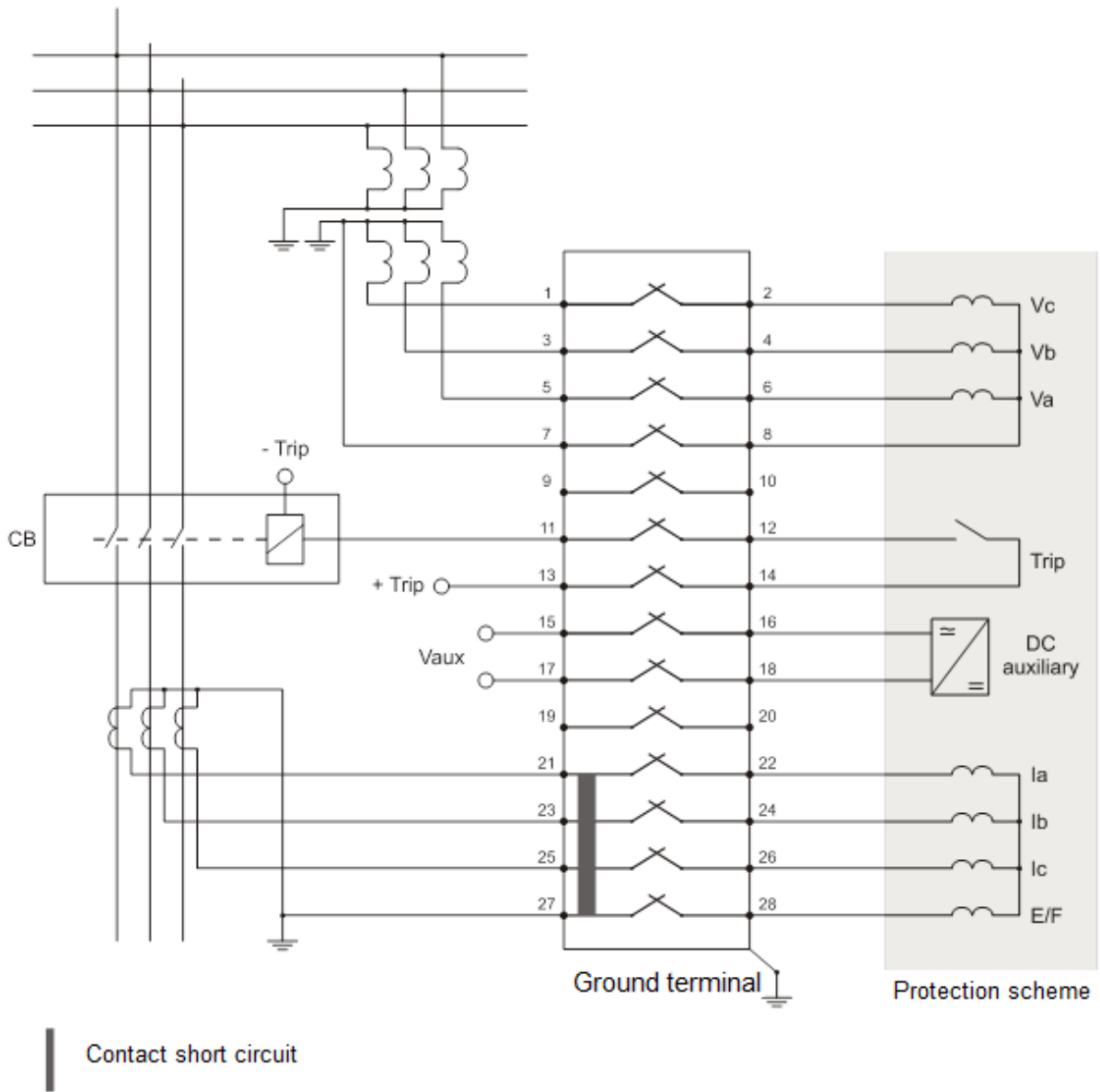


CONNECTIONS

The maximum and minimum dimensions of annular connectors recommend to be used in the back of the test block are:



APPLICATION EXAMPLE



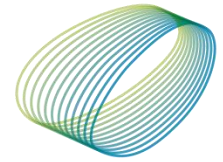
Chapter 6. Maintenance

As it is indicated in paragraph 2 of Chapter 2, it is advisable to make periodic cleaning by the operator, due to the deposition of metal particles in the interruption plastic zone of the circuits.

The following picture shows fingers which have not been cleaned and serviced, and where the deposition of material can be appreciated.



On the other hand, the number of operations supported by the test plug can limit the functionality of the test blocks, the test plug operation (insertions – extractions), life has been determined in 4000 operations.



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Moving together