# IA500 SF6 FULL INSULATED RMU AND SWITCHBOARDS

6

iberapa

people on power solutions

# SF6 full insulation IA500 Switchboards

## Overview

The IA500 range of switchboards from Iberica de Aparellajes are SF6 full insulated compact design and small dimensions units. All active parts are placed in a sealed stainless steel module filled with SF6 and sealed for life, requiring no maintenance of these active elements.
Each switchboard type IA500 integrates up to 5-line functions and / or protection in a single metal enclosure completely filled with SF6. All these IA500 compact switchboards comprising:


- Stainless steel waterproof metal enclosure, sealed for lifetime in SF6, where all the active parts are located.
- Fuses compartment.
- Controls compartment.
- Low voltage compartment.
- Cable connection compartment.

## Main Applications

IA500 switchboards have all medium-voltage functions that allow the operation of medium voltage networks up to 24kV in a compact unit; as well as the power connections and protection of the MV / LV transformers.

Its fields of application are:

- Each IA500 switchboard can be used as switching and protection equipment on the power companies MV / LV transformer stations.
- Inside a private / industrial transformer station, they allow disconnection from the power company to the property and maintains the power company ring network (incoming/outgoing)
- Each IA500 switchboard can be main switching and protection equipment in a MV / BT transformer station for industrial sector.
- There are specific IA500 switchboards for specific applications such as wind power generation.

## Key Benefits

- Insensitivity to environmental conditions, being insensitive to temporary flooding (tested at 3 meters under water for 24 hours at 1.1 times rated voltage, insulation test with power frequency).
- High security of operation by having the internal arc test.
- Protection against false operations by means of mechanical interlocking system.
- No maintenance of the active parts is needed as being the insulation in SF6, resulting in minimal maintenance costs.
- Simple operation and use.
- Small dimensions.
- High service availability.
- Gas pressure gauge.

## Standards

The IA500 switchboards series meet or exceed the following international standards:

MV Switchboard: IEC 60298 UNE-EN 6029
EXARC sf6 Switch: IEC 60265 UNE-EN 60265
Earthing Switch: IEC 60129 UNE-EN 60129
MV General: IEC 60694 UNE-EN 60694
Fuses: IEC 60282

iberica de aparellajes

# SF6 full insulation IA500 Switchboards

## Functions

IA500 switchboards are formed by combining mainly two types of functions:

**Line functions (L):** for operating incoming or outgoing of the transformer station, equipped with a switch-disconnector with earthing and voltage indicators.

**Protection functions (P):** For protection of transformers, equipped with fused switch-disconnector combined with earthing and voltage indicators.

**Switching functions (S):** For private industrial transformer stations with integrated power company incoming / outgoing functions, equipped with a switch-disconnector with earthing and voltage indicators.

**Busbars rising (0L):** On models equipped with it, this function incorporates voltage indicators.

## ELECTRICAL CHARACTERISTICS

| **Switchboard General<br>Standard IEC 60298 UNE –EN 60298** | **24 Kv** | **17,5 Kv** | **12 Kv.** |
|---|---|---|---|
| Rated Voltage | 24 Kv | 17,5 KV | 12 KV |
| Rated withstand voltage 50 Hz 1 min. | 50 KV | 38 KV | 28 KV |
| Rated withstand voltage 50 Hz 1 min. Across isolating distance | 60 KV | 45 KV | 32 KV |
| Rated impulse withstand voltage | 125 kV | 95 kV | 75 kV |
| Rated impulse withstand voltage across isolating distance. | 145 kV | 110 kV | 85 kV |
| Rated current of main circuits | 400/630 A | | |
| Rated current of transformer feeders | 200 A | | |
| Rated short-time withstand current for main and earthing circuits | 1s. 12,5 / 16 / 20 KA<br>3s. 12,5 / 16 KA | | |
| Rated peak withstand current for main circuits | 31,5 /40/50 kA | | |
| Rated relative filled pressure at 20 ºC and 1013 mbar | 0,4 bar | | |
| Permissible ambient temperature | -10ºC / + 50ºC | | |
| Degree of protection against ingress of solid bodies | IP 3XC | | |
| Degree of Steel tank protection against ingress of water | IP 67 | | |
| Protection against mechanical damage | IK 08 | | |
| **SWITCH DISCONNECTOR TYPE EXARC class m1E3 according standard IEC 60265** | **24 Kv** | **17,5 Kv** | **12 Kv.** |
| Rated Voltage | 24 Kv | 17,5 KV | 12 KV |
| Rated withstand voltage 50 Hz 1 min. | 50 KV | 38 KV | 28 KV |
| Rated withstand voltage 50 Hz 1 min. Across isolating distance | 60 KV | 45 KV | 32 KV |
| Rated impulse withstand voltage | 125 kV | 95 kV | 75 kV |
| Rated impulse withstand voltage across isolating distance. | 145 kV | 110 kV | 85 kV |
| Rated short circuit withstand current of main circuits | 1s. 12,5 / 16 / 20 KA<br>3s. 12,5 / 16 KA | | |
| Rated peak withstand current for main circuits | 31,5 /40/50 kA | | |
| Rated mainly active load breaking current | 400/630 A | | |
| Rated closed-loop breaking current | 400/630 A | | |
| Rated cable-charging breaking current | 16 A | | |
| Rated line-charging breaking current | 1,5 A | | |
| Earth fault breaking capacity | 50 A | | |
| Rated cable and line charging breaking current under earth fault conditions | 16 A | | |
| Short circuit making current | 31,5 / 40 kA | | |
| **EARTCHING SWITCH DISCONNECTOR TYPE EXARC Standard IEC 60129** | **24 Kv** | **17,5 Kv** | **12 Kv.** |
| Short circuit making current | 31,5 / 40 kA | | |
| Rated short circuit withstand current of main circuits | 1s. 12,5 / 16 / 20 KA<br>3s. 12,5 / 16 KA | | |
| Rated short circuit withstand current of main circuits | 31,5 /40/50 kA | | |

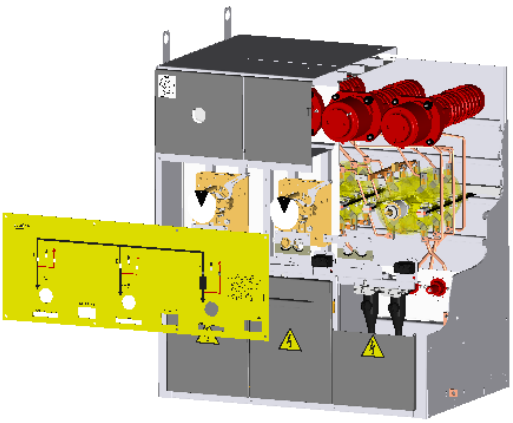
**IMPORTANT NOTE:**

Due to technological improvements, all data referenced in this catalog is subject to variations, being this right reserve by Iberica de aparellajes.

# SF6 full insulation IA500 Switchboards

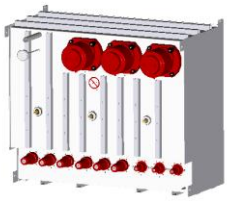
## Components

1. Stainless steel sealed sf6 gas tank
2. EXARC rotary switches
3. Electrolytic copper busbars
4. Fuse chambers for Iberica fuses
5. Operation mechanism compartments
6. Electrical diagram and operating devices
7. Low voltage compartment
8. Connection compartment
9. Plugin type connectors
10. Security flap



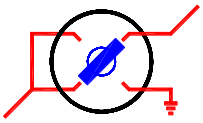
### 1. Stainless steel sealed sf6 gas tank

The sealed for life stainless steel enclosure, contains all the active parts of the switchboard.
It is completely sealed, being filled with SF6 gas to a pressure of 0.4 bar.
Is made of sheet steel 2 mm thick, with a strength test to internal arc of 16kA, according to IEC 60298.



### 2. EXARC rotary switches

Exarch switches are three position switches, open, closed and earthed, which preclude the possibility of wrong operations. By design, it is impossible for the main circuit and the earthing that they can be closed simultaneously.



The opening, closing and grounding manoeuvres are done using a lever, with independency of the operator's speed. On the protection function (P), the loading of the spring is completed when performing the closing operation, leaving the circuit ready for an opening through trip coil or the striker pin of the fuse. In this way if there is a defect when closing causing a fuse blown, the operation mechanism will perform an automatic opening of the switch instantly. After an external trigger of the switch it is necessary to move the lever in the direction of opening, even if the switch is already open, loading shunt springs and leaving it ready for the next closing.
The ground or earthing position is interlocked both to the access to line connectors compartments, as to the access to the fuse compartment in the case of a protection function.

### 3. Copper Busbars

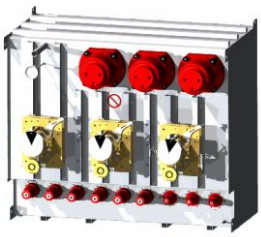
It is manufactured in electrolytic copper.

### 4. Fuse Chambers

Each protection function has a fuse compartment with three independent plugin fuse bases. The fuse holders are sealed, thus allowing the switchboard to be insensitive to temporary flooding.
The opening door of the fuse compartment is interlocked with the Exarc earthing switch, also there is a second interlock provided by lever.

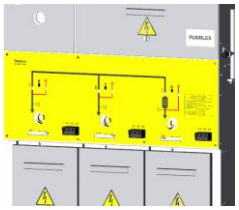
### 5. Operation mechanism compartments

In this compartment are located controls that transmit commands to Exarc switches and earthing switches. Mechanisms that made different switchboard interlocks are also located here.
Exarc switch operation mechanism can be manual by lever or can be motorized. On the protection functions (P), when closing the switch it is achieved the storage of energy for the opening, allowing us to do it by tripping coil, or through the striker pin of the fuse when it blows. The operation mechanism of earthing switch will always be manual, by means of a lever.



# SF6 full insulation IA500 Switchboards

## 6. Electrical diagram and operating devices



In this area we find the slots that will allow us through the operating lever operate the Exarc switch or earthing switch. It is provided with a synoptic that allows us to visualize the positions of the switches and the electrical diagram of the connection.
In this same area is also located the voltage indicators.

## 7. Low voltage compartment

The area where the outlet electrical connections outside of the equipment will take place (auxiliary contacts, coils, etc…).

## 8. Connection compartment

Here are located the three bushings to connect the line terminals by plug in type connectors. These compartments are independent for each of the functions of the cell. Access to each of these compartments is interlocked with the earthing switch of the same function.

## 9. Plugin type connectors

It is always plug-in type T-connectors or angled to allow the cable outlet downwards.

## 10. Security Flap

This rupture disc device ensures the safety of people against a possible internal arc, according to the IEC-60298 (internal arc type test). Located at the bottom of the stainless steel gas tank, this device would actuate in the unlikely event of an internal arc, due to increased pressure that would arise, channeling gas from the rear of the cell, away from the area the operator.

## 11. Fuses

Fuses according to DIN standard, low power dissipation as type IA37/21 shall be used. Whenever there is a blowing of a fuse it is recommended to replace the three fuses according to standard CEI60282-1. This is because when removing a defect by one fuse blowing, others, which are apparently intact, may have suffered by the action of the short circuit, which may lead to further melting at high risk for weak overcurrent value. This can generate us a new service unavailability that is not required. Attached table to choose the type of IA37/21 fuse of Iberica de Aparellajes, depending on the rated voltage and power of the transformer to protect.

## TRANSFORMERS PROTECTION TABLE (CEI 60787/IEC60787)

| **Transformer rated voltage** (kV) | | | 3 | 5 | 6 | 10 | 13,2 | 15 | 20 | 25 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Nominal rated fuse voltage** (kV) | | | 12 | 12 | 12 | 12 | 24 | 24 | 24 | 36 | 36 |
| **Rated power of the transformer** (kVA) | **Short circuit voltage** | **Short circuit limit time** | **Most adequate fuse nominal current** (A) | | | | | | | | |
| **50** | 4% | 2 sec. | 25 | 16 | 10 | 10 | 6,3 | 6,3 | 6,3 | 6,3 | |
| **75** | | | 32 | 20 | 16 | 10 | 10 | 10 | 6,3 | 6,3 | 6,3 |
| **100** | | | 40 | 25 | 25 | 16 | 10 | 10 | 10 | 6,3 | 6,3 |
| **125** | | | 50 | 32 | 25 | 16 | 16 | 16 | 10 | 10 | 6,3 |
| **160** | | | 63 | 40 | 32 | 20 | 16 | 16 | 16 | 10 | 10 |
| **200** | | | 80 | 50 | 40 | 25 | 20 | 20 | 16 | 16 | 10 |
| **250** | | | 100 | 63 | 50 | 32 | 25 | 25 | 20 | 16 | 16 |
| **315** | | | 125 | 80 | 63 | 40 | 32 | 32 | 20 | 16 | 16 |
| **400** | | | | 100 | 80 | 50 | 40 | 40 | 25 | 20 | 20 |
| **500** | | | | | 100 | 63 | 50 | 40 | 32 | 25 | 25 |
| **630** | | | | | 125 | 80 | 63 | 50 | 40 | 32 | 32 |
| **800** | 5% | 3 sec. | | | | 100 | 80 | 63 | 50 | 40 | 40 |
| **1000** | | | | | | 125 | 100 | 80 | 63 | 50 | 40 |
| **1250** | | | | | | | 125 | 100 | 80 | 63 | 50 |
| **1600** | 6,25% | 4 sec. | | | | | | 125 | 100 | 80 | 63 |
| **2000** | | | | | | | | | 125 | 100 | 80 |

# SF6 full insulation IA500 Switchboards

## OPTIONAL ELEMENTS

### Motorization
It can be done the motorization for (L) functions switches. It will never do the motorization for the earthing switch. Any of the functions that can be considered appropriate to be motorized can be performed. This motorization can be performed in most common voltages, 24 Vdc, 48Vdc, 110Vdc, or 220 Vac.

### Auxiliary Contacts
Auxiliary contacts can be placed for the status display, both the Exarc switch, and the earthing switch. These contacts may be either normally open and normally closed ... The number of contacts are defined according to customer needs. These contacts are always needed whenever you want to perform electrical interlocks.

### Tripping coil opening
The protection functions (P) are equipped with an emission opening coil with voltage at 230 Vac. For any further tension should be consulted.

### Manometer
IA500 compact switchboards can be equipped with pressure gauge.

### Bottom frame
The switchboards of the IA500 range can be equipped with a frame base of 400 mm height. With it you can avoid having to make the execution of pits for the cables connection.

### Mechanical interlocking by key lock
On request mechanical interlocking can be made associated to the main switch or the earthing switch. For the (P) function of transformer protection, it is convenient to associate an interlock between the door of the transformer and the earthing switch. This lock can also be associated with the low voltage switch of the transformer.

### Accessories
### Indirect protections relays
Indirect protections type IA50, can be added on request. They are connected through three toroid current transformers and associated with the fuse protection switch they have functions against overload (51), versus small earth faults (51N) or against large earth faults (50N). Instant actuation in constant time or inverse time. The 50 function is covered by the action of the fuses. More information on indirect protection relays catalog.

### Earth fault indicators
It is an instrument which can be known by means of three led lights the values of the current that has been the defect to earth.

### Short circuit indicators
After an earth fault, the display continues to tell us on what phase has occurred, until the indicator resets.

**Other options:** consult your particular case.

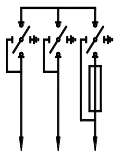
## RANGE: TYPES, DIMENSIONS AND WEIGHTS

| RMU | TYPE | IA500 | | | |
|---|---|---|---|---|---|
| | | Width (mm) | Length (mm) | Height (mm) | Weight (Kg) |
| IA510 | 2L+1P | 1139 | 788 | 1285 | 268 |
| IA515 | 3L+1P | 1549 | 788 | 1285 | 540 |
| IA520 | 2L+2P | 1549 | 788 | 1285 | 540 |
| IA525 | 3L+2P | 1899 | 788 | 1285 | 600 |
| IA535 | 4L+1P | 1899 | 788 | 1285 | 600 |
| IA530 44/2 | 2L+S extensible with Sf100 series | 831 | 803 | 1755 | 368 |
| **Wind Power Unit** | **TYPE** | **IA500E** | | | |
| | | Width (mm) | Lenght (mm) | Height (mm) | Weight (Kg) |
| IA500E | 0l+1P | 1139 | 788 | 1435 | 330 |
| IA505E | 0L+1L+1P | 1139 | 788 | 1435 | 350 |
| IA510E | 0L+2L+1P | 1139 | 788 | 1435 | 368 |
| All wind power RMU's has the outlet cable connection on the top of protection function | | | | | |

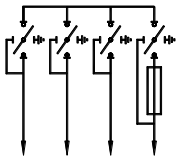
# SF6 full insulation IA500 Switchboards

## ELECTRICAL DIAGRAMS

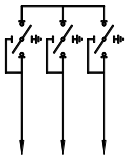
**Distribution Utility type Ring Main Units and Switchboards.** Other configurations under request



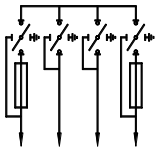
IA510



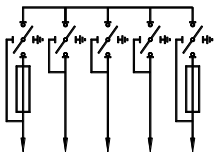
IA515



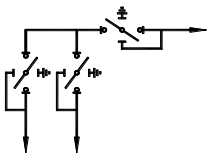
IA530



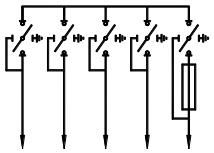
IA520



IA525

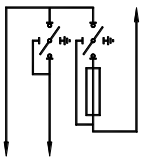


IA530/44/2 (extensible)

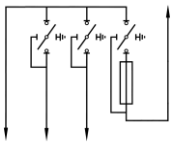


IA535

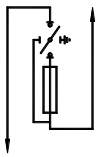
**Wind Power Types**. Other configurations under request



IA505E



IA510E



IA500E

## HOW TO ORDER

I A 5 x x ☐ ☐ ☐ ☐ / ☐ ☐ / ☐ ☐ ☐ ☐ ☐ ☐ / ☐ ☐ ☐ ☐

**Motorization**
_: Manual
M: Motor 220 ac
N: Motor 24 Vcc
O: Motor 48 Vcc
P: Motor 110 Vcc

**Transformer bushings connection**
_: Bottom
S: Top
E: Top outlet and busbar rising

I A 5 x x ☐ ☐ ☐ ☐

**Reference** (see types manufactured)

___: Standard
I : for CTCI
D : for CTCE
F : for CTCUF

**Pressure gauge:**
_: With
1: Without

**Voltage**
12 kV
17,5 kV
24 kV

**Shunt tripping coil**
N: Without tripping coil
_: 230 Vc.a.
R: Tripping coil 230Vca and relay IA50 (51-51N)

**Fuses**
J: Associated
_: Combined

☐ ☐ / ☐ ☐ ☐ ☐ ☐

**Ith/Ipk**
A: 12,5 (1s) /31,5 kA
B: 16 (1s) / 40 kA
C: 20 (1s) / 50 kA
D: 12,5 (3s) /31,5 kA
E: 16 kA (3s)/40 kA

**Bottom Frame**
_: Without
G: With 400mm.

**Auxiliary Contacts**
_: Without c.a.
x: x c.a. Open + x c.a. Close

**Rated Current**
400 : 400 A
630 : 630 A

☐ ☐ ☐ ☐

Other configurations please ask

iberica
de aparellajes

## CONTACTE CON NOSOTROS

## CONTACT WITH US


*Camino del Mar, s/n.*
*Tel: +34 96 145 20 46 Fax: +34 96 145 22 10*
*E-46130 MASAMAGRELL (VALENCIA) ESPAÑA*
*Web: http://www.iberapa.es • e-mail:iberapa@iberapa.es*


## CONTACTEZ-NOUS

Software de calculo de proyectos eléctricos disponible en Internet

Descargue nuestros catálogos actualizados en Internet
Download our updated catalogues from internet
Déchargé nos catalogues actualisés d´Internet