

**ETNA**  
 INDUSTRIE

# MAKE SWITCH 17,5kV



## MAIN FEATURES

This equipment is used in laboratories. Its function is to close high A.C. electrical circuits with a very accurate closing time ( $\pm 0,1\text{ms}$ ).

An electronical control unit allows the control, regulation and monitoring of the make-switch.

This make-switch can be used under permanent current (1500 A) and cannot open under load.

## PRINCIPLE OF OPERATION

An oleo-pneumatic actuator, triggered by a hydraulic drive, achieves the displacement of the mobile contact.

In closed position, the mobile contact is tightly pressed against the fixed contacts in order to ensure the passage of very high current.

High actuator speed reduces the pre-arcing time and minimises the wear of the contacts at closing.

## DESCRIPTION

The make-switch components are:

- 1) A vessel filled with SF6 under pressure which contains:
  - 2 fixed contacts linked to the connexion bars
  - 1 mobile contact driven by the oleo-pneumatic actuator rod.
- 2) A hydraulic drive allowing the displacement of the actuator rod for closing and opening. This drive located under the vessel consists of:
  - 1 oleo-pneumatic actuator on which is fitted:
    - 1 control block driven by 2 electromagnets (one for opening of contacts, the other for closing)
    - 1 oil reservoir
    - 1 oleo-pneumatic accumulator used as a reserve of energy
  - 1 motor pump unit (controlled by a pressure switch).
- 3) Electrical equipment consisting in a make-switch cabinet and a control unit (\*) (fitted in a rack 19") allows the control in remote or local mode of the following functions:
  - Regulation of hydraulic pressure
  - Control of SF6 pressure
  - Electromagnet order equipment with anti-pumping function
  - Make-switch contact position indicator
  - 1 pump restarts counter
  - 1 operations counter.

Option: Auxiliary contacts unit.

(\*): *€C approval*

## INSTALLATION

This is an indoor type make-switch.  
In order to keep its very accurate closing time ability, the temperature has to be kept between + 5°C and + 40°C.

The frame has to be properly fixed on an even ground (\*).

Special care has to be taken as to the interface between the make-switch bar ends and the circuit to be tested (\*).

Static and electrodynamic efforts have to be minimised as much as possible.

(\*): ETNA Industrie can advise you upon request.

## COMMISSIONING

The commissioning is carried out in a few very easy steps:

- 1) Fill the oil reservoir.
- 2) Inflate the vessel with SF6 (not provided).  
The vessel is delivered pre-charged with Sf6 at 1,3 bar absolute.
- 3) Proceed with electrical connection of the Equipment:
  - Continuous supply (electro-magnets)
  - Alternative supply (motor pump unit, control unit).

## CHARACTERISTICS

Rated voltage (*) .....	17.5	KV
Insulation level impulse voltage.....	95	kV pk
Insulation level at nominal frequency .....	38	kV rms
Rated frequency .....	50 - 60	Hz
Contacts closing in SF6 under pressure of .....	6.8	bar absolute
Closing time .....	< 10	ms
Tolerance on closing time (with tolerance of supply voltage of the electro-magnets within $\pm 2$ volts) .....	$\pm 0.1$	ms
Maximum making current (symmetrical) .....	120	kA rms
Maximum making current (asymmetrical) .....	325	kA pk
Occasional permanent current .....	1.5	kA rms
Electro-magnets for D.C. supply:		
- Opening operation .....	300	W
- Closing operation .....	1000	W
Reliability ( number of operations before inspection):		
- 100% of closing at I <sub>max</sub> .....	500	Operations
- 50% of closing at I <sub>max</sub> .....	1,000	Operations
- 10% of closing at I <sub>max</sub> .....	4,000	Operations
- Hydraulic drive .....	10,000	Operations

## WORLDWIDE REFERENCES

ETNA Industrie make switches with nominal voltage from 15 to 80 kV have been dispatched all around the world to laboratories such as:

**SPAIN**  
ORMAZABAL

**SOUTH KOREA**  
LGIS  
KERI

**BELGIUM**  
LABORELEC  
ACEC

**CANADA**  
KINECTRICS  
BC HYDRO  
IREQ

**ITALY**  
CESI  
ABB SACE

**BRASIL**  
CEPEL

**NORWAY/SWEDEN**  
ABB

**BOSNIA**  
ENERGOINVEST

**INDIA**  
CPRI  
BHEL

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*Do not hesitate to contact us*

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