



# SPS

Removable functional units



# Committed to expertise

*Since SERVELEC started in 1946, it has always given top priority to imagination, the will to succeed and service.*

*The experience acquired and the capacity for adaptation have made SERVELEC leaders in the design and manufacturing of low voltage systems.*

*A global approach providing advice, research, on-site commissioning and maintenance keeps us on the leading edge of electrical engineering, automation, industrial DP and regulation technology.*

## Key figures

- Sales: 10 000 000 €  
People: 70
- Industrial capacity:  
100 000 hours of which 20 % is devoted to research
- Floorspace: 5 500 sq.m. Site area: 1.7 ha.

## The SERVELEC approach

### Client-centred organisation

Awareness, requirement analysis, discussion, reactivity and availability are the success factors in meeting the needs our customers and building long-term relationships.

### Progress through innovation

Continuous system development, staying on the leading edge of technology by giving every opportunity to creative flair through an on-going quest for excellence.

### People and know-how

People come first at SERVELEC and all members of our company continuously refresh their skills and know-how. Reception, sales, research and development, purchasing, production, tests and warehousing... all the different links in the chain are vital. Everyone is important and free to voice their opinion.

### One priority objective: Quality

Quality is present at every phase from system design to implementation. Servelec had already achieved ISO 9002 certification in 1993 – official recognition and an additional guarantee for the industrial companies who have chosen us.



A new

## view of service

SERVELEC provides a wide range of solutions for numerous industrial sectors (chemistry, petroleum chemistry, metallurgy, textile, automobile, food-processing...) as well as service sector, local authorities and administrations.

Co-operation and idea-centred discussions are our approach to developing the technological success stories of tomorrow.



### SERVELEC delivers full services in its fields of expertise



#### Electrical engineering

Design, development, manufacturing, tests and on-site commissioning for motor control centers (MCC) and power control centers (PCC).

#### Automation, industrial DP and regulation

- General layout studies
- Design and programming studies
- Manufacturing
- Assembly
- Automation training
- Maintenance

Sectors concerned: processes, special machine and handling equipment automation, monitoring systems.

#### Industrial electronics

Expertise in digital data acquisition and processing system based on microcontroller technologies.  
'Customised' services comprising research, implementation, tests, commissioning and on-site maintenance.

# Committed to respect

The main standards involved in low voltage system are:

- Low-voltage switchgear and controlgear assemblies IEC 439-1
- Degrees of protection provided by enclosures IEC 529
- Apparatus IEC 947 – IEC 269
- Electrical installations of buildings IEC 364
- Corpus of rules and laws.

## Summary of definitions

**Functional unit:** set of devices comprising all the mechanical and electrical elements that contribute to the fulfilment of the same function.

**Type-tested assembly (TTA):** a low-voltage switchgear and controlgear assembly conforming to an established type or system without deviations likely to significantly influence the performance, from the typical ASSEMBLY verified to be in accordance with this standard.

**Partially type-tested assembly (PTTA):** a low-voltage switchgear and controlgear assembly, containing both type-tested and non-type-tested arrangements provided that the latter are derived (e.g. by calculation) from type-tested arrangements which have complied with the relevant tests.

IEC 439-1 standard defines the seven test types and three routine tests required to verify compliance for a given type of ASSEMBLY.

### Type tests

- ① vérification of temperature-rise limits
- ② vérification of dielectric properties
- ③ vérification of the short-circuit withstand strength
- ④ vérification of effectiveness of the protective circuit
- ⑤ vérification of clearances and creepage distances
- ⑥ vérification of mechanical operation
- ⑦ vérification of the degree of protection

### Routine tests

- ① inspection of the assembly and electrical operation test
- ② dielectric test
- ③ checking of protective measures and of the electrical continuity of the protective circuits.

M.P.C. encoding was introduced by French standard NFC 63-412. The objective was to categorise the different types of withdrawable products by connection type, protection against direct contact and form of internal separation.

The approach stipulated by the standard was modified by a classification based on two criteria:

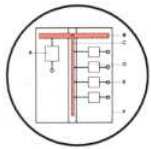
1 **The functional unit electrical connection type (three letter code)**

- The first letter denotes the type of electrical connection of the main incoming circuit
- The second letter denotes the type of electrical connection of the main outgoing circuit
- The third letter denotes the type of electrical connection of the auxiliary circuits.

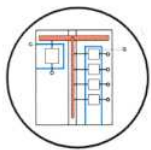
The following letters shall be used:

- **F** for fixed connections
- **D** for disconnectable connections
- **W** for withdrawable connections

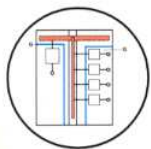
2 **Typical forms of separation by barriers or partitions.**



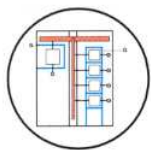
**Form 1 :**  
No separation.



**Form 2a :**  
Separation of busbars from the functional units. Terminals for external conductors do not need to be separated from busbars.



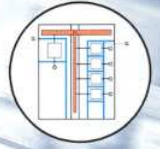
**Form 2b :**  
Separation of busbars from the functional units. Terminals for external conductors are separated from busbars.



**Form 3a :**  
Separation of busbars from the functional units and separation of all functional units from one another. Separation of the terminals for external conductors from the functional units, but not from each other. Terminal for external conductors do not need to be separated from busbars.

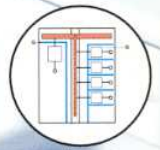
**Form 3b :**

Separation of busbars from the functional units and separation of all functional units from one another. Separation of the terminals for external conductors from the functional units, but not from each other. Terminal for external conductors are separated from busbars.



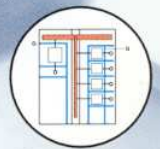
**Form 4a :**

Separation of busbars from functional units and separation of all functional units from one another, including the terminals for external conductors which are an integral part of the functional unit. Terminals for external conductors are in the same compartment as the associated functional unit.



**Form 4b :**

Separation of busbars from functional units and separation of all functional units from one another, including the terminals for external conductors which are an integral part of the functional unit. Terminals for external conductors are not in the same compartment as the associated functional unit, but in individual, separate, enclosed protected spaces or compartments.



# Committed to listening



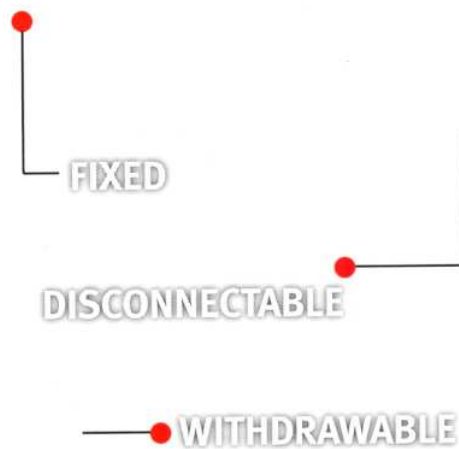
Electric panels are the basis for all distribution and command/control functions for industry and the services sector.

As a key element, they must be defined as precisely as possible to ensure they comply with application requirements.

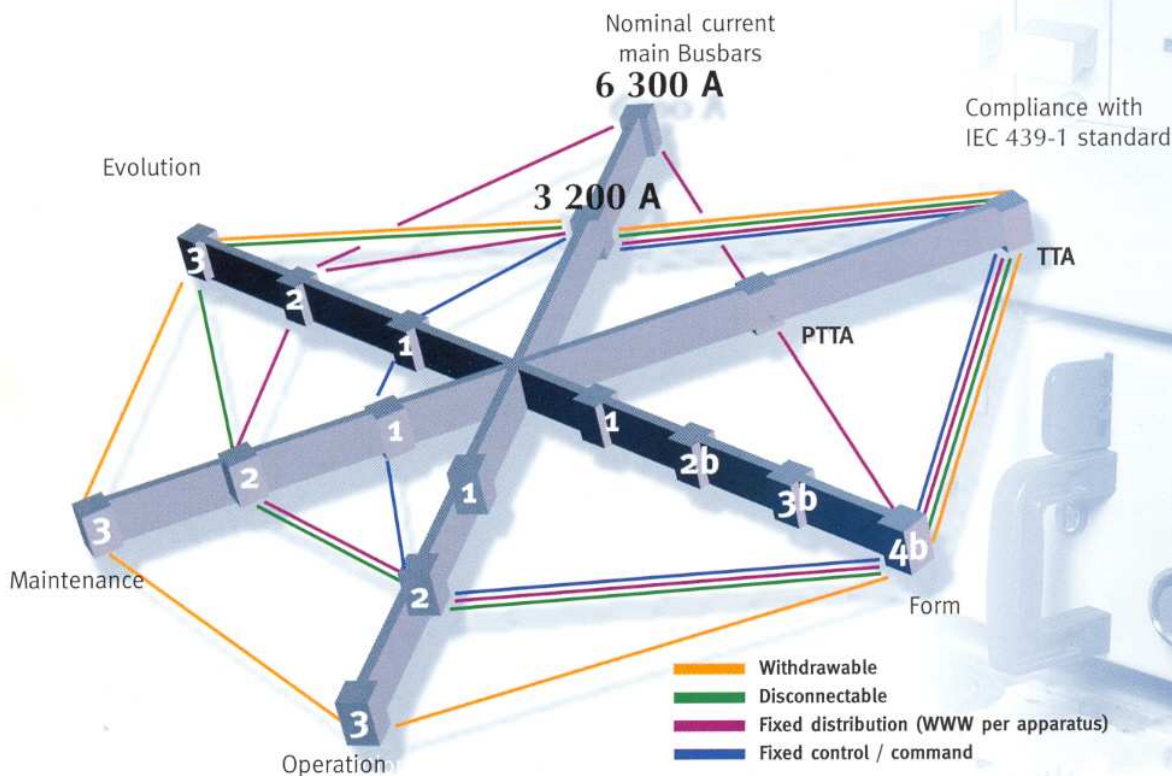
To optimise your equipment, SERVELEC helps you to define your needs by analysing the following criteria:

- Environmental conditions
- Continuous or discontinuous process
- Properties of the upstream and downstream electrical networks
- Operational requirements
- Centralised data management requirements
- Maintenance policy
- ...

Following this analysis, several solutions may meet your specific needs. This is why SERVELEC has developed the SPS system - a full, homogeneous range of control panels in three product families:



# Committed to satisfaction



Compliance with IEC 439-1 standard

## Service index

### Operation

Locking or padlocking of a functional unit.

- 1 – Resulting in total control panel shutdown.
- 2 – Resulting in shutdown to the functional unit concerned.
- 3 – Resulting in shutdown of main supply to the functional unit concerned but permitting tests of automated sections enabling full-scale system test before restart.

### Maintenance

Panel maintenance capabilities.

- 1 – Resulting in total control panel shutdown.
- 2 – Shutdown is restricted to the functional unit concerned. Replacement requires work on downstream connections.
- 3 – Shutdown is restricted to the functional unit concerned. Replacement does not require work on connections.

### Evolution

Panel upgrade capability.

- 1 – Resulting in total control panel shutdown.
- 2 – Shutdown restricted to the functional unit concerned. Sufficient numbers and sizes of spares for functional units were built into the original design.
- 3 – Shutdown with no control panel interruption is restricted to the functional unit concerned.

# Committed to excellence

## A full range

Three product families to find the technical cost-effective solution to your problems.

## Upgradeability

Whatever product family you opt for, you can always change your mind at a later date without having to start from scratch. The families are inter-compatible.

You can also add centralised control to systems which were not initially designed to handle this function. Progressive upgradeability of new integrated administrator versions is guaranteed.

## All three product families share standardised components

The three SERVELEC families are based on the same smart system, structure and standard components to optimise costs and harmonise maintenance.

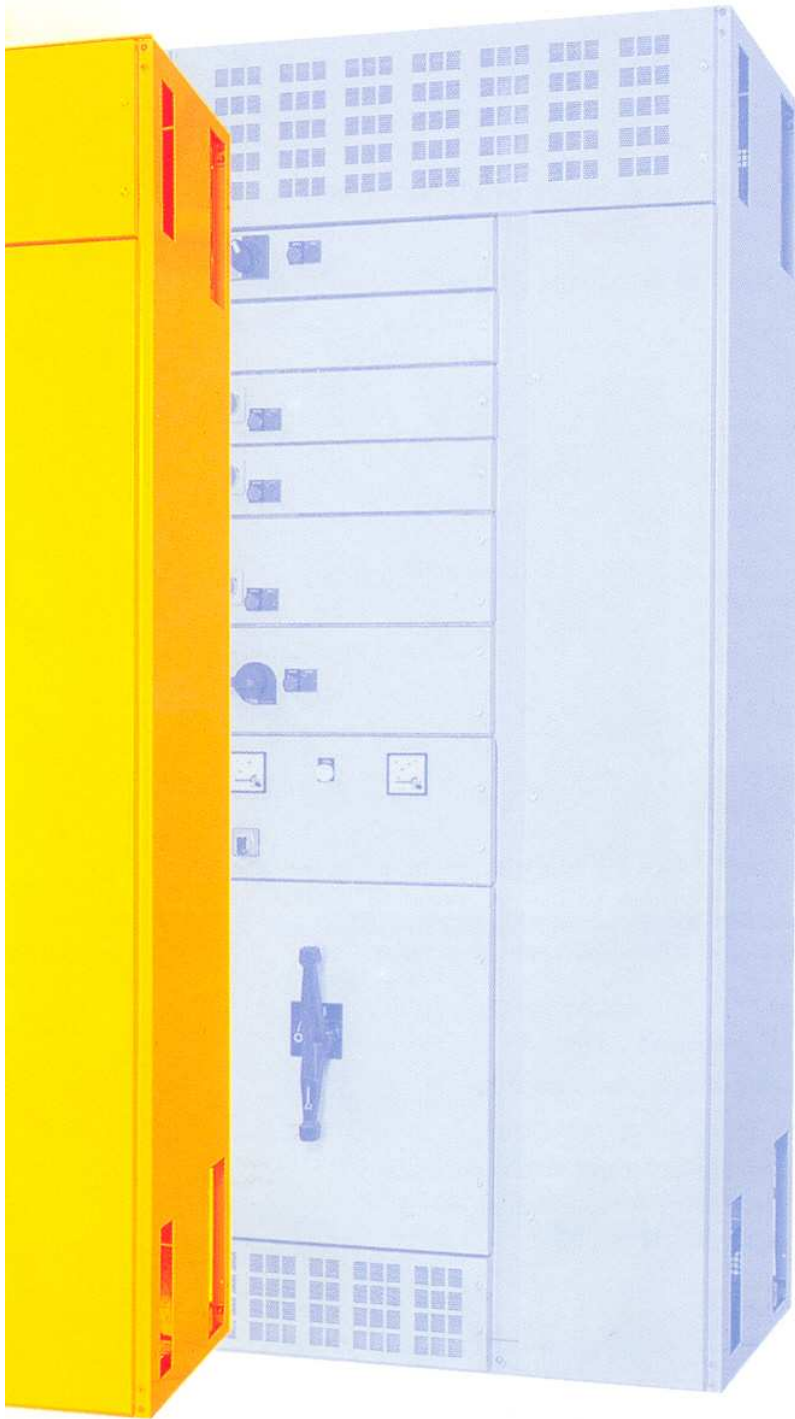


## Recognised technical expertise

State of the art design system using leading edge technologies.

## Maintainability

Maintenance access does not penalise operations. Problems can be anticipated to reduce maintenance costs.



## Open

Apparatus from every manufacturer can be used in the SPS product range.

## Respect of standards

Design of all range products complies with major standards.

## Operating safety

The safety of the installation and operators is assured in all SPS products by the use of optimised components and implementation in total compliance with ever relevant standards.

# Committed to solutions

## sps

a full range

SPS, a range of three types of electric panels

FIXED

DISCONNECTABLE

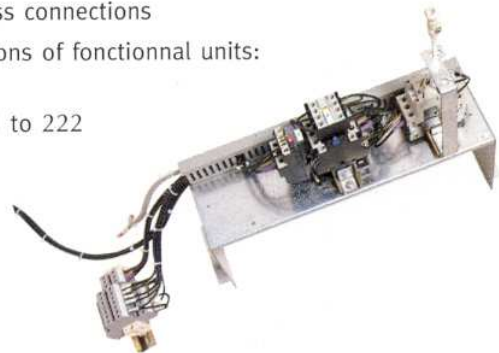
WITHDRAWABLE

sps

## fixed

Fixed column structure built with standardised components and fitted with mounting plates.

- TTA or PTTA
- Current distributed  $\leq 6\,300\text{ A}$
- Modularised structure (form 2b to 4b)
- Front or rear access connections
- Electrical connections of fonctionnal units:  
F F F to W W W
- Service index: 211 to 222

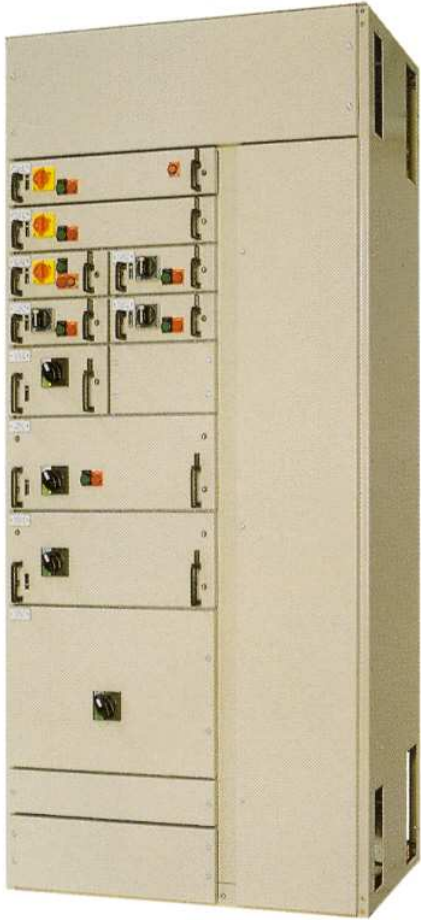


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## withdrawable

Withdrawable column structure built with standardised components and fitted with drawers.

- TTA
- Current distributed  $\leq 3\ 200\ A$
- Modularised structure (form 3b to 4b)
- Front or rear access connections
- Electrical connections of fonctionnal units: W W W
- Service index: 333

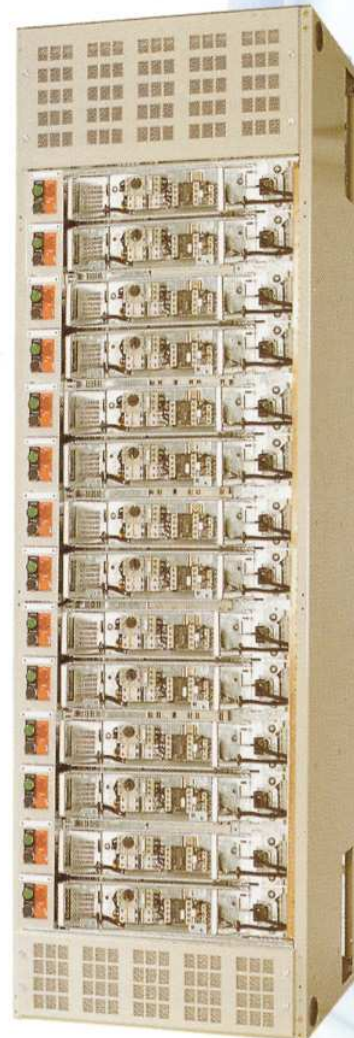


sps

## disconnectable

Disconnectable column structure built with standardised components and fitted with mounting plates.

- TTA
- Current distributed  $\leq 3\ 200\ A$
- Modularised structure (form 2b to 4b)
- Front access connections
- Electrical connections of fonctionnal units: W F D
- Service index: 223



# Committed to performance

## Electrical characteristics

Rated insulation voltage $U_i$	1 000 VAC
Rated operational voltage $U_e$	690 VAC
Rated frequency	50/60 Hz

	Main busbars	Distribution busbars
Rated current	800 to 6 300 A	1 000 A
Rated short-time withstand current $I_{cw}$ (1 s)	50 - 70 - 100 kA	50 - 70 kA
Rated peak withstand current $I_{pk}$	100 - 160 - 230 kA	100 - 160 kA

## Normal service conditions

**Installation:** indoors.

**Ambient air temperature:** minimum:  $-5^{\circ}\text{C}$ ; maximum:  $\leq 35^{\circ}\text{C}$

**Relative humidity:** 50% at  $40^{\circ}\text{C}$

**Altitude:**  $\leq 2\,000\text{m}$

**Pollution degree:**  $\leq 3$

## Design and construction

**Classification:** Type-tested assembly (TTA) or Partially type-tested assembly (PTTA)

**Access connections:** front or rear depending on column type

**Cable entry:** bottom and top

**Degree of protection:** IP 31 to IP 54

**EZ metalsheet** with polyester powder coating

**Insulation equipment:** V0 Class according to UL 94

**Internal separation:** form 2b to 4b.

**Electrical connections of functional units:**

- fixed column: F F F to W W W per apparatus
- disconnectable column: W F D per mounting plate
- withdrawable column: W W W per drawer.

**Service index:** 211 to 333 depending on column type.

**Output cell dimension:** (see specific documentation).



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