



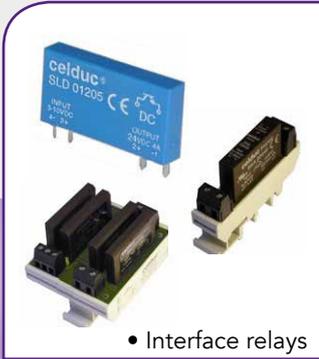
# RAILWAY INDUSTRY by **celduc**<sup>®</sup> relais

[www.celduc-relais.com](http://www.celduc-relais.com)

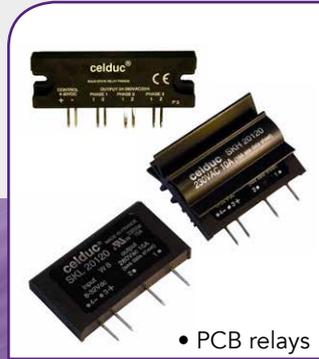
DESIGNER &  
MANUFACTURER OF  
SOLID STATE RELAYS  
FOR THE RAILWAY  
INDUSTRY

RAILWAY APPLICATIONS :  
ROLLING STOCK, SIGNALLING  
& ACCESSORIES ON TRAINS





• Interface relays



• PCB relays



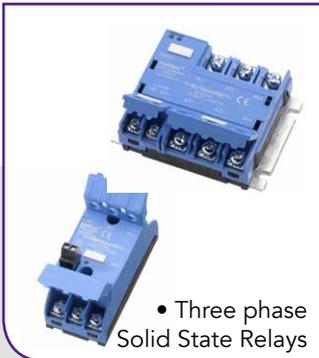
• Single phase SSR and optional modules for diag. function



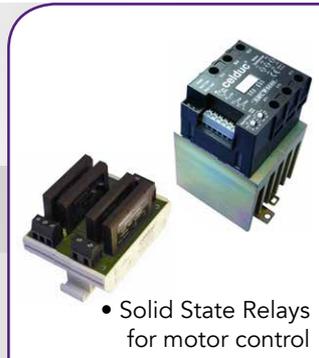
• Two phase Solid State Relays



## THE SOLE SOLID STATE RELAY TECHNOLOGY made in France for more than 50 years !



• Three phase Solid State Relays



• Solid State Relays for motor control



• Phase angle controllers



• DC Solid State Relays

Large temperature variations, shocks, vibrations, electromagnetic interferences, and more : electrical components for the railway industry must provide safe and reliable operations even under extreme application conditions.

**celduc® relais** has developed its SSR with the highest quality standards.

We have been a reliable and experienced partner in the railway industry for many years.

You can rely on our solutions !

## ■ **SOLID STATE RELAYS** AC OR DC FOR LOAD SWITCHING IN THE RAILWAY INDUSTRY

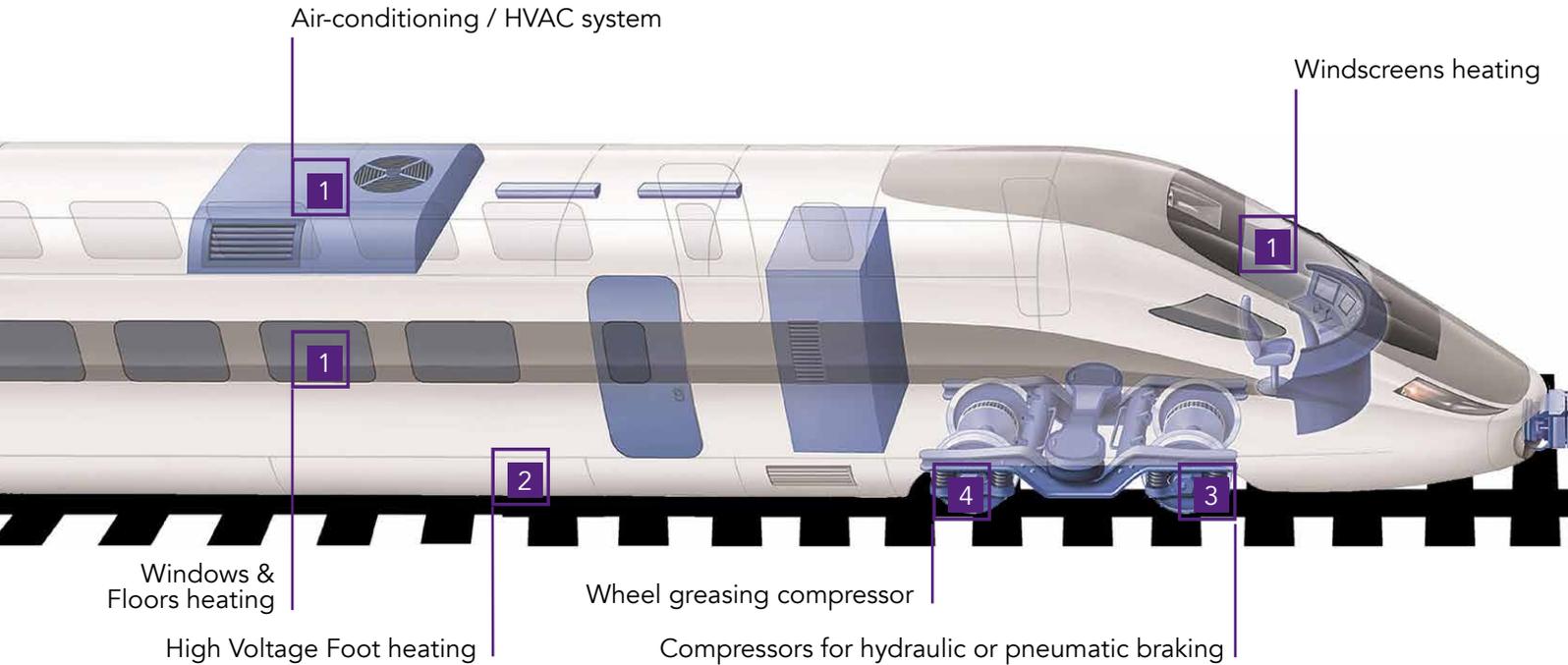
→ AC switching up to 125A / 690VAC

→ DC switching up to 50A / 1700Vp  
or 150A / 100Vp

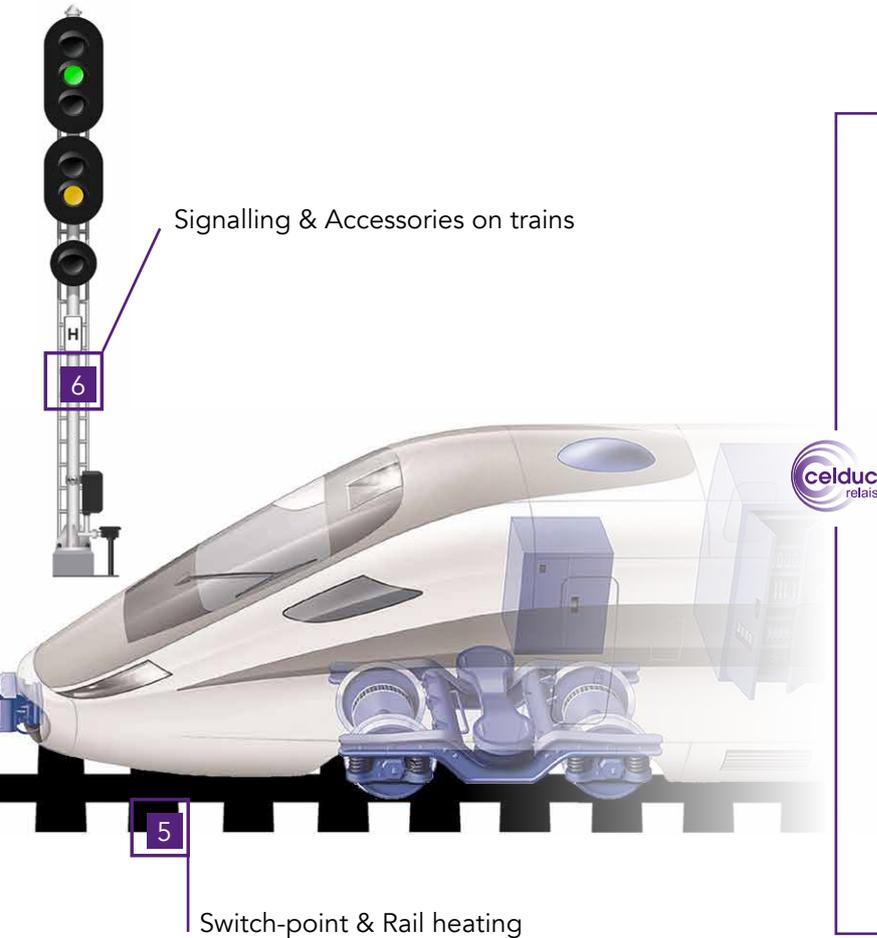
→ Diagnostic and protections available

ENERGY SAVING & RELIABILITY

# SSRs FOR EVERY APPLICATION AREA



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# WHO ARE WE ?

**celduc® group** specializes in electrical engineering and electronics.

With many years of experience **celduc®** is fully focused on serving its market and customers all over the world. The company was founded in 1964 by Michel Guichard. Set up near Saint-Etienne, the **celduc® group** is the only French company producing and selling solid state relays. Today **celduc® group** group has:

- 200 employees
- Two production centers totaling 10 000 square meters
- A worldwide presence

A strong innovation to challenge the future

**celduc® relais** constant product development and commitment to work with customers to develop bespoke solutions increase our production capacity by around 10 to 15 % per year.

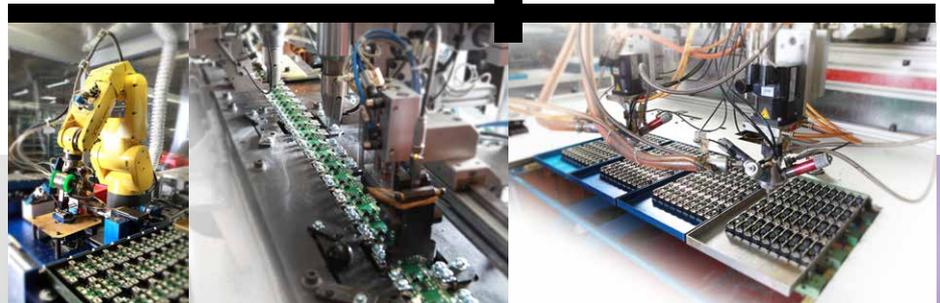
Innovation is the challenge that **celduc® relais** has to take up every day by anticipating the market trends and implementing specific knowledge and skills in partnership with industry and research.

From design to manufacturing

**celduc® relais** controls the complete chain : design, development, production, testing and marketing.

**celduc® relais** manufactures the most comprehensive range of Solid State Relays but has also developed its own production equipment to ensure the most efficient manufacturing methods.

Thanks to this high-capacity and unique tooling, **celduc®** products can be found all over the world and have been recognized by the most renowned industrial companies.



# HIGH QUALITY PRODUCTS

Quality is of paramount importance and maintained at all times, aided by our own specially developed in house testing equipment. **celduc® relais** solid state relays and magnetic sensors are manufactured in accordance with the major international standards (UL, CSA, EN, VDE, CE, ATEX, ...)...



pending



All products are designed, tested and manufactured in compliance with the strictest international standards and always with reliability and safety in front of our mind

The solutions displayed in this brochure should be considered as non-exhaustive examples.



Air-conditioning / HVAC system  
Floor heating  
Windows / windscreens heating

MANY OF THE WORLD'S LARGEST ROLLING STOCK  
MANUFACTURERS RELY ON OUR PRODUCTS

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# celpac<sup>®</sup> 2G

The 22,5mm pitch SSR solution !



Reference	Thyristor rating	Max. switching current at 25°C	Switching voltage	Peak voltage	Control voltage	I²t
SUL865970	50A	32A	24-510VAC	1200V	160-240VAC	1 680A²s
SUL867070	75A	35A	24-510VAC	1200V	3,5-32VDC	7 200A²s

Optional Modules ESUC & ECOM

Add a diagnostic function to our SUL SSR



Reference	Specifications	Current range	Control
ESUC0450	Current monitoring module	2-40A	8-30VDC
ESUC0480	Current monitoring module	2-40A	24-45VDC
ECOM0010	Temperature controller PID, current monitor and communication interface		

Status feedback for safety - Save room - Save costs  
Add functions !

# okpac<sup>®</sup>

High voltage single phase Solid State Relays



Reference	Thyristor rating	Switching voltage	Peak voltage	Control voltage	I²t
SO885960	50A	24-690VAC	1600V	20-265VAC/DC	2 800A²s
SO889060	125A	24-690VAC	1600V	3,5-32VDC	22 000A²s

Other models available please visit our website [www.celduc-relais.com](http://www.celduc-relais.com)

## High Voltage Foot Heating

AT CELDUC® RELAIS,  
DC POWER SWITCHING UNDER CONTROL !

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# DC SSR – IGBT Technology

50A-750Vdc fully protected HV DC SSR for controlling HV foot heaters supplied directly from the catenary

Our IGBT based SDI SSR can switch 50 A @ 750 VDC nominal in a fast, reliable and safe way. In every situation, safety operation is preserved :

- Built-in over-voltage protection for inductive DC supply lines (max L/R = 20ms), OV4
- Built-in load short circuit protection : by detection of IGBT saturation, short circuits on the load will block the unit, keeping it safe
- Built-in over load temperature protection : should over-heating occur, the unit will automatically switch off
- Status feedback for Safety
- HL2 (Hazard Level EN 45545-2)

The SDI SSR is definitely designed for the most demanding DC power switching applications, the unit that the railway companies, on rolling stock or infrastructure, have expected for years !



Reference	Switching current	Switching voltage	Peak voltage	Control voltage	Integrated protection
SDI0501700	50A	24-940VDC	1700V	16,8-24VDC	- over-voltage protection - load short circuit protection - over-load temperature protection
SDI0501710	50A	24-940VDC	1700V	72-110VDC	

Other models available please visit our website [www.celduc-relais.com](http://www.celduc-relais.com)



## Compressors for hydraulic or pneumatic braking

INNOVATION AND QUALITY ARE THE DRIVERS  
OF OUR THINKING AND DOING

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## Tramway wheel greasing compressor

FOR EACH APPLICATION,  
THE CORRESPONDING TECHNOLOGY !

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# DC SSR – MOSFET Technology

## DC Solid State Relays for motor control

**celduc® relais** offers a complete range of DC solid state relays up to 1700Vdc, 0 to 150A for DC applications. Our DC SSRs are used to control wheel greasing compressors.



SCM range



SOM range + voltage protection ESO01000



This system is designed for lubricating wheel flanges of trams. The system works on the principle of applying lubricant mixture to the contact area of tram wheel flanges with rails by means of pressure air.

Reference	Switching current	Switching voltage	Peak voltage	Control voltage	Integrated protection	Dimensions mm
SCM0100200	100A	0-200VDC	200V	4,5-32VDC	-	44,5 x 58,2 x 27
SCM0150100	150A	0-100VDC	100V	4,5-32VDC	-	
SOM040200	40A	5-110VDC	200V	3,5-32VDC	Transil	45 x 58,5 x 30
SOM06075	60A	5-40VDC	75V	3,5-32VDC	Transil	
ESO01000	0-80A	0-130VDC	200V	Protection against line inductance (C1, D2) : option for SOM range	Diode + capacitor	

Other models available please visit our website [www.celduc-relais.com](http://www.celduc-relais.com)

## Railway Switch-points heating

WORLD LEADER IN SOLID-STATE POWER SWITCHING  
& CONTROL !

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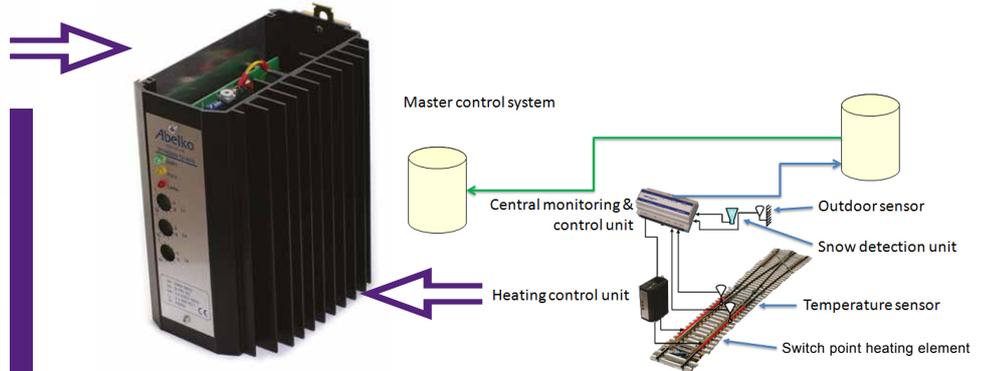




In climatic regions which frequently experience temperatures below freezing, malfunction of railroad rail switch mechanisms is often a problem. Temperatures below freezing and accumulation of snow and ice result in malfunction of railroad switch mechanisms.

The solution is railroad switch heaters.

Our SSRs are used to control these electric switch heaters. As showed below, the system could be equipped, for automatic operations, with Rails Snow Detectors and temperature sensors.



To ensure that the system operates efficiently **choosing reliable components is important.** celduc's SO range is used in this system.

Other models available  
please visit our website  
[www.celduc-relais.com](http://www.celduc-relais.com)



## Railway switch-point motors

WORLD LEADER IN SOLID-STATE POWER SWITCHING  
& CONTROL !

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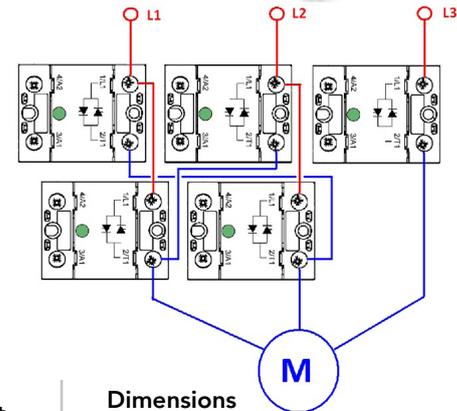
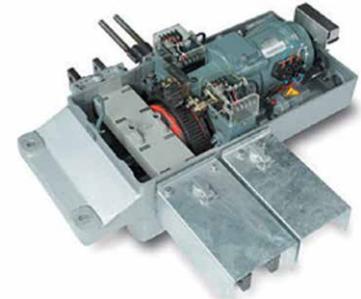
# okpac<sup>®</sup>

## High Voltage AC Solid State Relays to control motors for switch-points

Motor control has always been something difficult to tackle with as a motor is first of all an inductive type of load with high starting currents and over voltages generated at turn-off. This is why Solid State solutions are more and more popular to control motor loads.

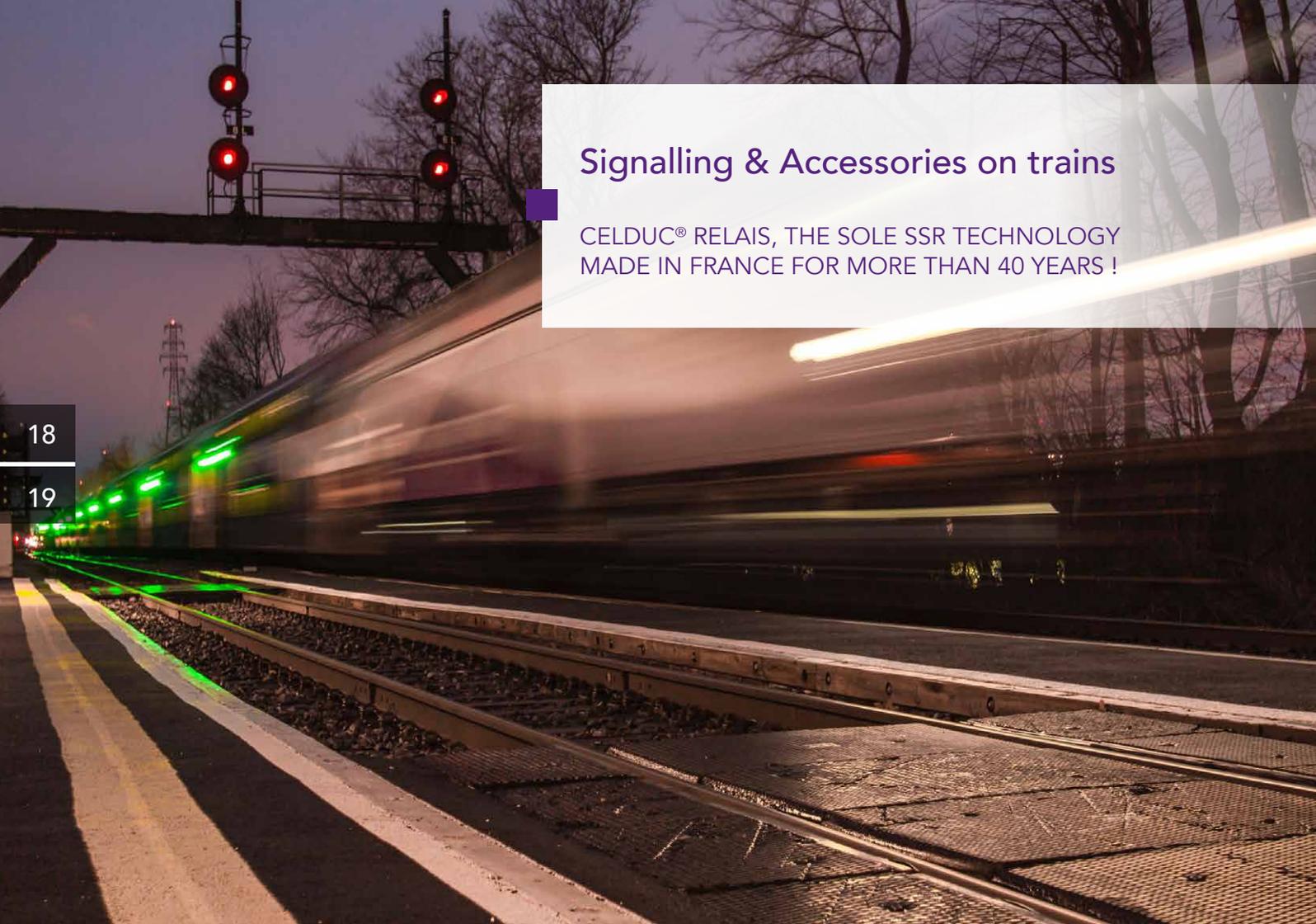
celduc's Solid-State-Relays are offering the best possible features to cover all of the above mentioned requirements.

**Our solution :**  
**5 x High voltage AC SSR for motor reversing**



Reference	Thyristor rating	Switching voltage	Peak voltage	Control voltage	I <sup>2</sup> t	Dimensions mm
SO887060	75A	24-690VAC	1600V	3,5-32VDC	7 200A <sup>2</sup> s	45 x 58,5 x 30

Other models available please visit our website [www.celduc-relais.com](http://www.celduc-relais.com)



## Signalling & Accessories on trains

CELDUC® RELAIS, THE SOLE SSR TECHNOLOGY  
MADE IN FRANCE FOR MORE THAN 40 YEARS !

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# PCB RELAYS

## Interface Solid State Relays AC or DC For all types of loads

**celduc® relais** offers a wide range of Interface Solid State Relays

- **SKA range** (AC output) up to 6A 230 or 400VAC, with built-in voltage protection
- **SKD range** (DC output – Bipolar technology) up to 3A 60VDC or 200VDC and SKLD range (DC output – MOSFET technology) up to 12A 36VDC or 60VDC

Both ranges are completed by other products including a ceramic substrate (DCB technology : Direct Copper Bonding) :

- **SKL range** that can be mounted on a heatsink and which is ranging from 16A to 75A.
- **SKH range** with integrated heatsink which allows output current with ventilation up to 25A.

DCB technology (Direct Copper Bonding) combined with the TMS<sup>2</sup> technology (Thermo-Mechanical Stress Solution) considerably improve life-time expectancy thanks to the reduction of thermal stress.



Reference	Thyristor rating	Switching voltage	Control voltage	I <sup>2</sup> t	Specifications	Dimensions mm
SK541101	2,5A	24-280VAC	3-30VDC	50A <sup>2</sup> s	AC zero-cross output / normally closed	40x11x21
SKA10420	5A	12-275VAC	2,5-10VDC	50A <sup>2</sup> s	AC zero-cross output / most types of loads	43,2x10,2x25,4
SKA20441	5A	12-460VAC	4-30VDC	50A <sup>2</sup> s	AC random output / most types of loads	
SKL10560	50A	24-690VAC	4-14VDC	1800A <sup>2</sup> s	AC zero-cross output	43,4x6,3x24,5
SKL20740	75A	24-600VAC	8-32VDC	5000A <sup>2</sup> s	AC zero-cross output	
SKL10521	50A	12-280VAC	3-14VDC	2450A <sup>2</sup> s	AC random output	

Other models available please visit our website [www.celduc-relais.com](http://www.celduc-relais.com)

# Three-phase Solid State Relays & Contactors

NEW VISIONARY RANGES !

**cel3pac**

**sightpac**



SUPERIOR DESIGN, EASY TO INSTALL,  
OPTIMUM LIFESPAN AND PRICE EFFECTIVENESS ARE DELIVERED  
WITH THE NEW GENERATION OF THREE-PHASE SOLID STATE RELAYS

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# cel3pac sightpac

## New ranges of three-phase Solid State Relays & Contactors

For safety, use our SMB8670910:  
a SIL3 product with status or  
diagnostic.

### Performance & reliability

- Maximum peak voltage up to 1600V,
- Thyristor rating up to 125A,
- AC or DC Input control available,

- Using TMS<sup>2</sup> technology thyristors and RVF process (RoHs Void Free Process) for a longer lifespan (+40%),

- IP20 protection on terminals with removable flaps,
- Protections available : RC snubber, VDR, TVS.

Reference	Thyristor rating	Switching current AC-51 (at 40°C)	Switching current AC-53 (at 40°C)	Switching voltage	Peak voltage	Control voltage	I <sup>2</sup> t	Protections
<b>cel3pac range</b>								
SGT7690500	3x125A	3x64A	3x32A	24-520VAC	1600V	4-30VDC	22 000A <sup>2</sup> s	RC - VDR
SGT8678500	3x75A	3x54A	3x16A	24-520VAC	1600V	24-255VAC/DC	7 200A <sup>2</sup> s	RC – VDR
SGT8690500	3x125A	3x64A	3x32A	24-520VAC	1600V	4-30VDC	22 000A <sup>2</sup> s	RC – VDR
SGT8858200	3x50A	3x42A	3x12A	24-640VAC	1600V	24-255VAC/DC	2 800A <sup>2</sup> s	VDR
SGT8859200	3x50A	3x42A	3x12A	24-640VAC	1600V	90-280VAC/DC	2 800A <sup>2</sup> s	VDR
SGT8879200	3x75A	3x54A	3x16A	24-640VAC	1600V	90-280VAC/DC	7 200A <sup>2</sup> s	VDR
<b>sightpac range</b>								
SMB8670910	2x75A	3x35A	3x16A	150-520VAC	1600V	4-30VDC	7 200A <sup>2</sup> s	RC – VDR + auxiliary contact
SMT8620520	3x25A	3x20A	3x5A	24-520VAC	1200V	4-30VDC	380A <sup>2</sup> s	RC – VDR
SMT8628520	3x25A	3x20A	3x5A	24-520VAC	1200V	24-255VAC/DC	380A <sup>2</sup> s	RC - VDR

Other models available please visit our website [www.celduc-relais.com](http://www.celduc-relais.com)

# SSRs GIVE YOU THE FOLLOWING ADVANTAGES COMPARE TO EMRs

- Very High number of switching > 10 millions
- Very low consumption for control
- Not sensitive to shocks and vibrations
- Very High frequency switching (in temperature control, low switching frequency limits the accuracy)
- Bring special controls and diagnostics

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## CONCLUSION

- SSR to be used to control loads (temperature, motors, accessories) for reducing maintenance periods, reducing energy consumption.
- Additional features to the SSR, such as diagnostics, bus communication, local temperature controller, can save space, wiring and system information.
- Special attention should be taken regarding circuit isolation limits of SSR that could induced countermeasures to secure the circuits : please ask **celduc® relais**.

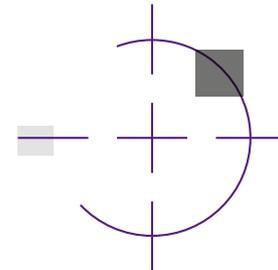
# WHY CHOOSING **celduc**<sup>®</sup>'s SOLID STATE RELAYS ?



- TMS<sup>2</sup> technology in AC
- A very high life expectancy compared to the majority of products on the market
- High quality level
- Special customer products :  
**celduc**<sup>®</sup> **relais** is a specialist in adapting designs to specific customers' applications
- High voltage in DC
- High insulation voltage
- A worldwide presence

For many years, **celduc**<sup>®</sup> **relais** hasn't stopped evolving while the team has remained the same. A dedicated team close to its customers and partners, ready to take on any challenge, in the midst of a severe global competition.

At **celduc**<sup>®</sup> **relais**, we have succeeded in achieving and maintaining efficiency and high quality level of production in France.



# celduc<sup>®</sup> relais IS ALSO PRODUCING

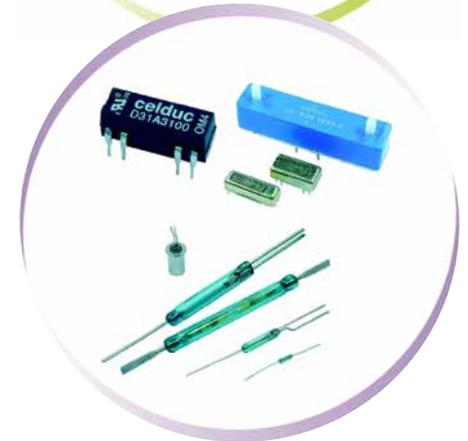
## Magnetic Proximity Sensors

If you are looking for level & flow, position, presence, safety or speed detection, then we will be able to offer a solution from our range



## Reed Relays & Switches

Detecting a clearance, a position, a level in extreme environments without mechanical link between the moving parts and without maintenance, such is the daily challenge of the Reed contact submitted to a magnetic field in industrial sectors.

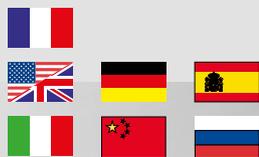


# MORE INFORMATION NEEDED ? [www.celduc-relais.com](http://www.celduc-relais.com)

## Catalogues and leaflets available on request



Product Guide



Single Phase SSRs & Contactors celpac range



Three-Phase SSRs & Contactors cel3pac & sightpac ranges



# celduc® relais

## worldwide presence in more than 60 countries

ALGERIA	MALAYSIA
ARGENTINA	MEXICO
AUSTRALIA	MOROCCO
AUSTRIA	THE NETHERLANDS
BELGIUM	NEW ZEALAND
BRAZIL	NORWAY
BULGARIA	PARAGUAY
CANADA	PHILIPPINES
CHILE	POLAND
CHINA	PORTUGAL
COLOMBIA	ROMANIA
CZECH REP.	RUSSIA
DENMARK	SINGAPORE
EGYPT	SLOVAKIA
ESTONIA	SLOVENIA
FINLAND	SOUTH AFRICA
FRANCE	SOUTH KOREA
GERMANY	SPAIN
GREECE	SWEDEN
HONG KONG	SWITZERLAND
HUNGARY	SYRIA
INDIA	TAIWAN
INDONESIA	THAILAND
IRAN	TURKEY
IRELANDE	UNITED KINGDOM
ISRAËL	UNITED STATES
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