



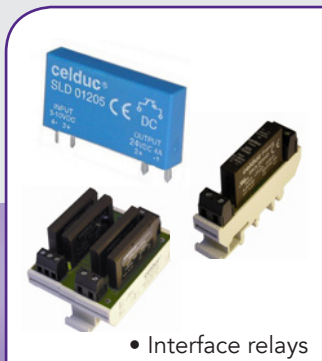
RAILWAY INDUSTRY by **celduc**[®] relais

www.celduc-relais.com

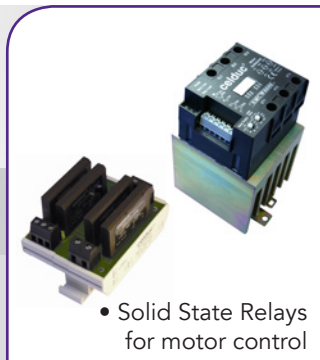
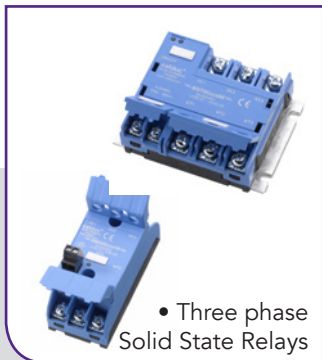
DESIGNER &
MANUFACTURER OF
SOLID STATE RELAYS
FOR THE RAILWAY
INDUSTRY

RAILWAY APPLICATIONS :
ROLLING STOCK, SIGNALLING
& ACCESSORIES ON TRAINS





THE SOLE SOLID STATE RELAY TECHNOLOGY made in France for more than 40 years !



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

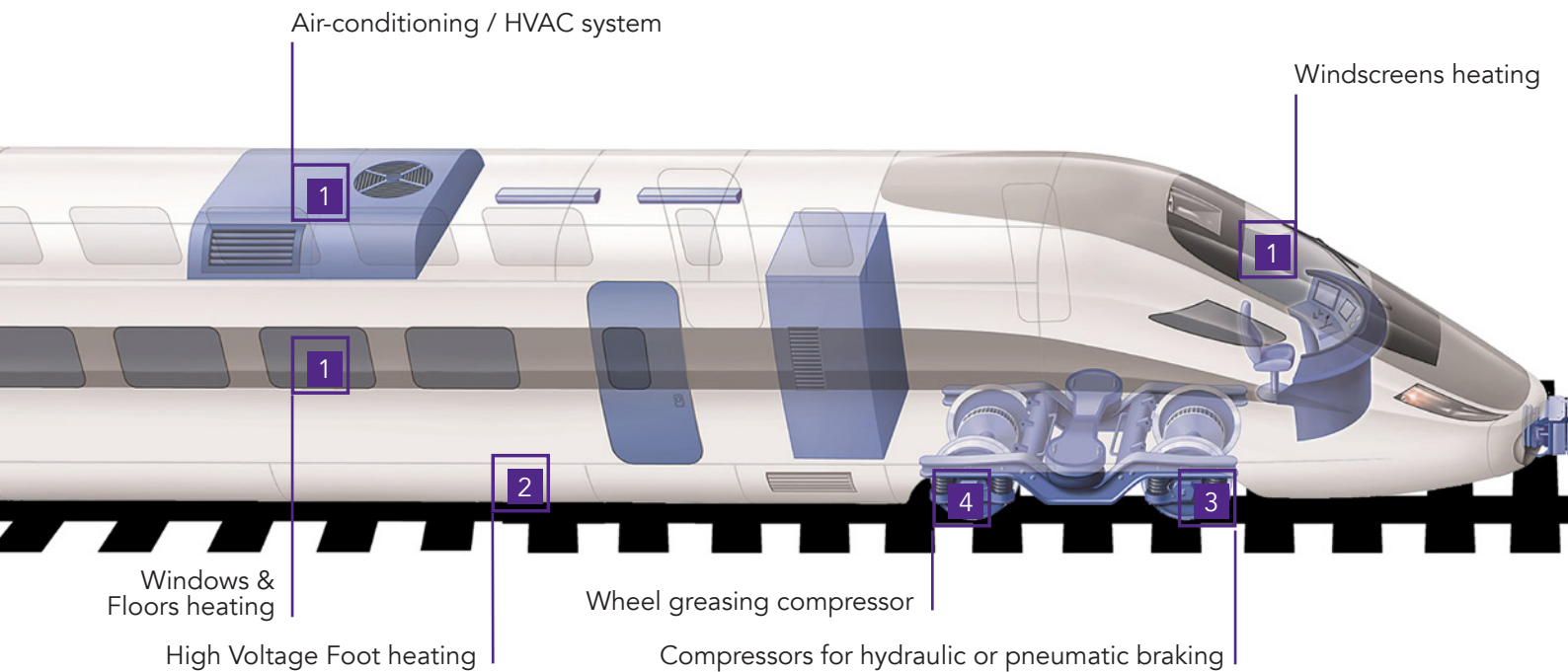
→ AC switching up to 125A / 690VAC

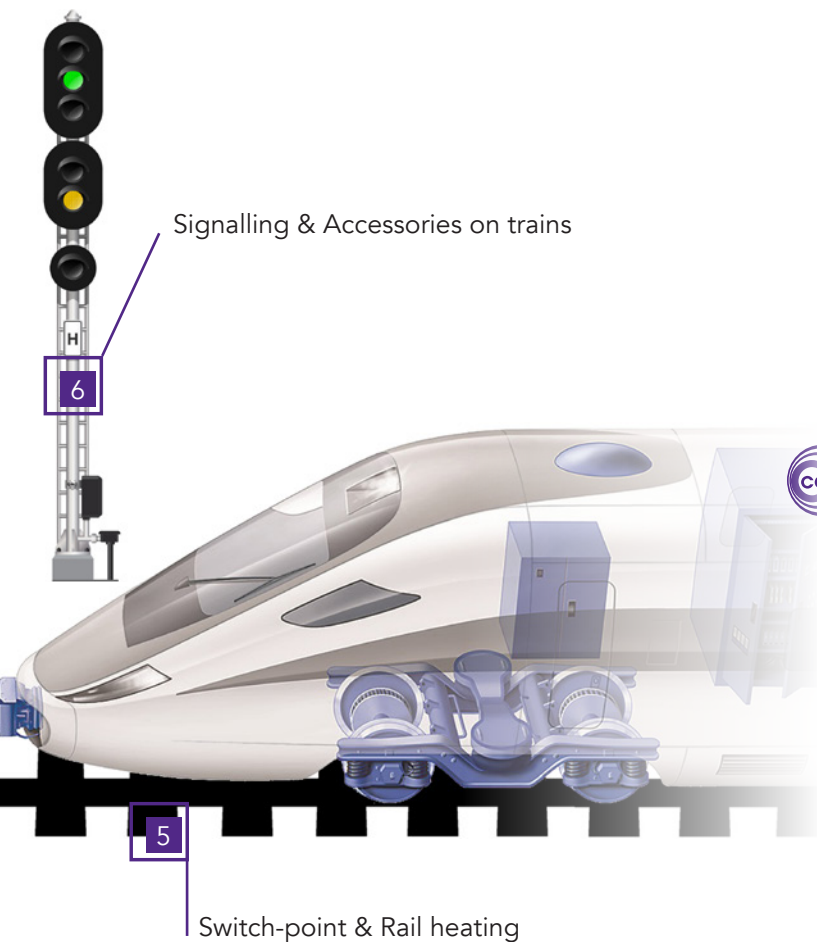
→ DC switching up to 50A / 1700Vp
or 150A / 100Vp

→ 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** 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.

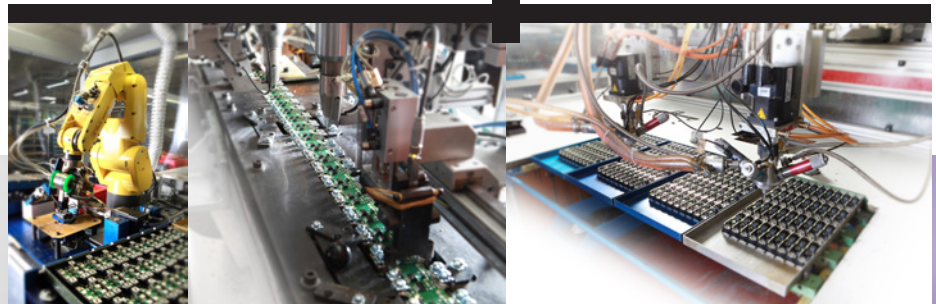
Innovation is the challenge that **celduc® relais** has to take up every day by anticipating the market trends and implementing specific knowledge and skills in partnership with industry and research.

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, ...)...



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





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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- Thyristor rating up to 75A
- Output voltage from 24 to 690VAC (600C – 1200V – 1600V peak)
- TMS² technology 4th generation with very long life time

Reference	Thyristor rating	Max. switching current at 25°C	Switching voltage	Peak voltage	Control voltage	I ² t	Spec.
SU842070	25A	Depends on heatsink	12-275VAC	600V	3-32VDC	600A ² s	
SUL865970	50A	32A	24-510VAC	1200V	160-240VAC	1 680A ² s	"ready to use" on 22,5mm heatsink
SUL867070	75A	35A	24-510VAC	1200V	3,5-32VDC	7 200A ² s	
SUM867070	75A	45A	24-510VAC	1200V	3,5-32VDC	7 200A ² s	"ready to use" on 45mm heatsink

For status feedback for safety, the solution with SSRs is to add a diagnostic function

celduc® relais offers 2 optional modules pluggable on our SU / SUL / SUM :

- ESUC : Current monitoring module
- ECOM : Temperature controller, current monitor and communication Interface in one unit.



Save room, save costs, add functions !

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		

Other models available
please visit our website

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

Compressors for hydraulic or pneumatic braking

INNOVATION AND QUALITY ARE THE DRIVERS
OF OUR THINKING AND DOING

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- This range is designed for all types of loads from 12 to 125A
- Output voltage from 24 to 690VAC (600C – 1200V – 1600V peak)
- TMS² technology 4th generation with very long life time expectancy

Hydraulic and pneumatic braking systems are composed of pumps and compressors.

Our SSRs are used for controlling these compressors.

Our okpac® range is one of the solution we offer but it all depends on system design, and electrical specifications vary with manufacturers. You can ask for our expertise!



Reference	Thyristor rating	Switching voltage	Peak voltage	Control voltage	I ² t	Dimensions mm
SO885960	50A	24-690VAC	1600V	20-265VAC/DC	2 800A ² s	45 x 58,5 x 30
SO867070	75A	24-510VAC	1200V	3,5-32VDC	7 200A ² s	

For status feedback for safety, the solution with SSRs is to add a diagnostic function.

celduc® relais offers a range of Power SSRs with diagnostics.



Reference	Thyristor rating	Switching voltage	Peak voltage	Control voltage	I ² t	Dimensions mm
SOD845180	50A	50-265VAC	600V	7-30VDC	2 800A ² s	45 x 58,5 x 33,6
SOD867180	75A	150-510VAC	1200V	7-30VDC	7 200A ² s	

Other models available please visit our website www.celduc-relais.com

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

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Railway Switch-points heating

WORLD LEADER IN SOLID-STATE POWER SWITCHING
& CONTROL !



okpac[®]

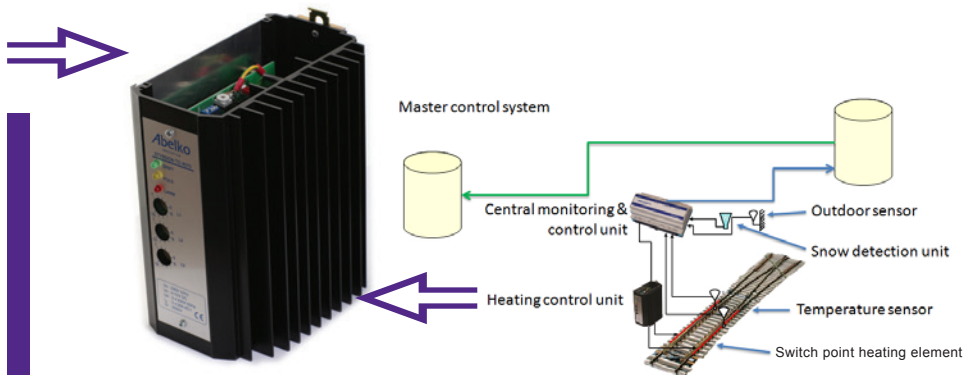
AC Solid State Relays



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



Railway switch-point motors

WORLD LEADER IN SOLID-STATE POWER SWITCHING
& CONTROL !

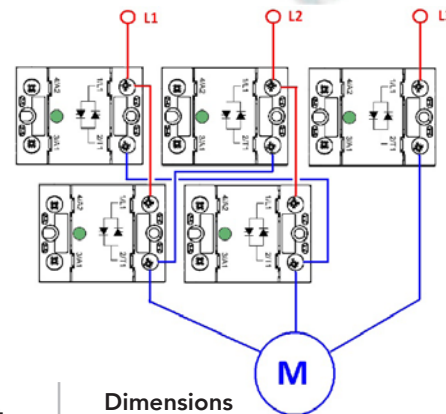
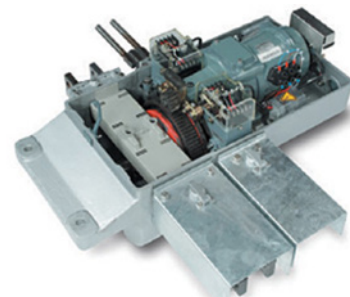
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Motor control has always been something difficult to tackle with as a motor is first of all an inductive type of load with high starting currents and over voltages generated at turn-off. This is why Solid State solutions are more and more popular to 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 ² t	Dimensions mm
SO887060	75A	24-690VAC	1600V	3,5-32VDC	7 200A ² s	45 x 58,5 x 30

Other models available please visit our website 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

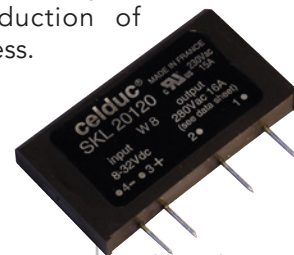
→ **SKD range** (DC output – Bipolar technology) up to 3A 60VDC or 200VDC and **SKLD range** (DC output – MOSFET technology) up to 12A 36VDC or 60VDC

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 TMS² 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 ² t	Specifications	Dimensions mm
SK541101	2,5A	24-280VAC	3-30VDC	50A ² s	AC zero-cross output / normally closed	40x11x21
SKA10420	5A	12-275VAC	2,5-10VDC	50A ² s	AC zero-cross output / most types of loads	43,2x10,2x25,4
SKA20441	5A	12-460VAC	4-30VDC	50A ² s	AC random output / most types of loads	
SKL10560	50A	24-690VAC	4-14VDC	1800A ² s	AC zero-cross output	43,4x6,3x24,5
SKL20740	75A	24-600VAC	8-32VDC	5000A ² s	AC zero-cross output	
SKL10521	50A	12-280VAC	3-14VDC	2450A ² s	AC random output	

Other models available please visit our website www.celduc-relais.com

Three-phase Solid State Relays & Contactors

NEW VISIONARY RANGES !

cel3pac

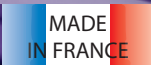
sightpac



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 TMS² 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 ² t	Protections
cel3pac range								
SGT7690500	3x125A	3x64A	3x32A	24-520VAC	1600V	4-30VDC	22 000A ² s	RC - VDR
SGT8678500	3x75A	3x54A	3x16A	24-520VAC	1600V	24-255VAC/DC	7 200A ² s	RC – VDR
SGT8690500	3x125A	3x64A	3x32A	24-520VAC	1600V	4-30VDC	22 000A ² s	RC – VDR
SGT8858200	3x50A	3x42A	3x12A	24-640VAC	1600V	24-255VAC/DC	2 800A ² s	VDR
SGT8859200	3x50A	3x42A	3x12A	24-640VAC	1600V	90-280VAC/DC	2 800A ² s	VDR
SGT8879200	3x75A	3x54A	3x16A	24-640VAC	1600V	90-280VAC/DC	7 200A ² s	VDR
sightpac range								
SMB8670910	2x75A	3x35A	3x16A	150-520VAC	1600V	4-30VDC	7 200A ² s	RC – VDR + auxiliary contact
SMT8620520	3x25A	3x20A	3x5A	24-520VAC	1200V	4-30VDC	380A ² s	RC – VDR
SMT8628520	3x25A	3x20A	3x5A	24-520VAC	1200V	24-255VAC/DC	380A ² s	RC - VDR

Other models available please visit our website 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**.

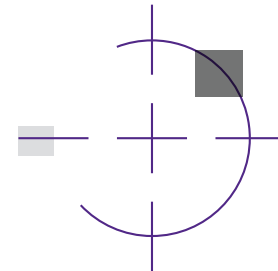
WHY CHOOSING **celduc**®'s SOLID STATE RELAYS ?



- TMS² technology in AC
- A very high life expectancy compared to the majority of products on the market
- High quality level
- Special customer products :
celduc® **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**® **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**® **relais**, we have succeeded in achieving and maintaining efficiency and high quality level of production in France.



celduc® relais IS ALSO PRODUCING

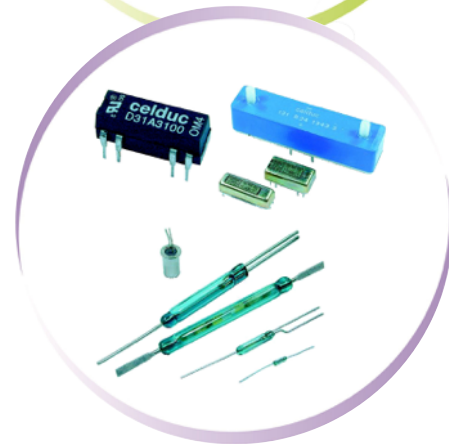
Magnetic Proximity Sensors

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

Catalogues and leaflets available on request



Product Guide



Single Phase SSRs &
Contactors celpac range



Three-Phase SSRs
& Contactors cel3pac
& sightpac ranges



SCR Power Controllers
MicroFusion range



celduc® relais

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worldwide presence in more than
60 countries



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