PLASTIC INDUSTRY

by celduc® relais

www.celduc-relais.com

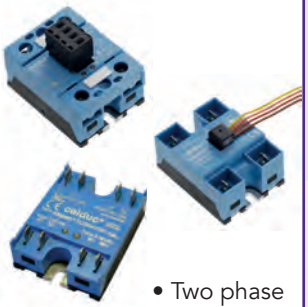
DESIGNER & MANUFACTURER OF SOLID STATE RELAYS AND MAGNETIC SENSORS

APPLICATIONS : TEMPERATURE CONTROL, MOTOR CONTROL AND MACHINE SAFETY IN PLASTIC PROCESSING EQUIPMENT

celduc® relais

• Interface & PCB relays

• Single phase SSR, modules for diag. function and temperature controller PID

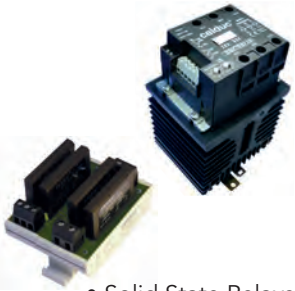


• Two phase Solid State Relays

• Three phase Solid State Relays

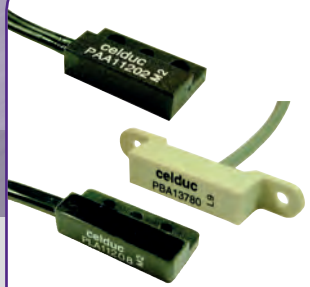
celduc® relais

PRODUCTS MADE IN FRANCE FOR MORE THAN 50 YEARS !



• Solid State Relays for motor control

• Phase angle controllers



• Magnetic sensors

• Safety sensors

CONTENTS

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:

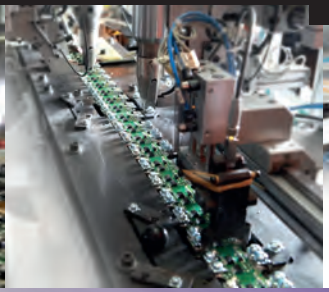
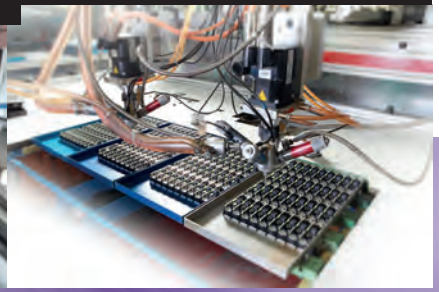
- 200 employees
- Two production centers totaling 10 000 square meters
- A worldwide presence

A strong innovation to challenge the future

celduc® relais constant product development and commitment to work with customers to develop bespoke solutions has increased our production capacity 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 is 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.

celduc® is now considered a specialist in its field, and we collaborate with the biggest industrial groups worldwide

OUR **STRENGTHS**

MORE THAN 50 YEARS OF EXPERIENCE ON THE MARKET AND A HIGH QUALITY LEVEL OF PRODUCTION IN FRANCE.

CONTROL OF THE COMPLETE CHAIN

design, development, production, testing and marketing.

ANALYSIS OF CUSTOMERS' REQUIREMENTS

celduc® relais is the indisputable global expert and preferred choice of companies all over the world.

A WORLDWIDE PRESENCE IN MORE THAN 60 COUNTRIES

for a better understanding of customer's needs and offering of solutions which fully meet their requirements.

CONSTANT PRODUCT DEVELOPMENT

our experienced R & D engineers constantly work on developing 10 to 15% of new products each year.

IN COMPLIANCE WITH THE MAJOR INTERNATIONAL STANDARDS

our products are designed, tested and manufactured in accordance with the strictest international standards.

EXTRUSION

- Pre-heating control
- Barrel heating control
- Motor control of the rollers & automation

CELDUC RELAIS' SSRS ARE THE RIGHT CHOICE FOR ACCURATE AND LONG LIFE TIME TEMPERATURE CONTROL

KEY PRODUCTS

SOLID STATE RELAYS

SINGLE PHASE	THREE-PHASE
	
SUL with ECOM module pages 12-13	cel3pac® page 23

Image courtesy of battenfeld-cincinnati

INJECTION MOLDING

- Pre-heating time process of the plastic material control
- Mold heating system control
- For aircraft and automotive industries, the use of composite materials with carbon fibers requires high power solutions.

USE DUAL RELAYS FOR SPACE SAVING IN YOUR CONTROL PANELS !

KEY PRODUCTS

SOLID STATE RELAYS SINGLE PHASE	SOLID STATE RELAYS TWO-PHASE	THYRISTORS POWER CONTROLLERS
		
celpac® SAL-SUL page 13	SOB pages 18-19	MicroFusion pages 26-27

BLOW MOLDING

1

Preform injection

2

Cooling and preform temperature stabilization

3

Re-heat station by infra red heating lamps

4

Preform temperature stabilization

5

Stretch Blow Molding with hot air

6

Container Eject

KEY PRODUCTS

SINGLE PHASE SSRs

1
5

okpac® & celpac® + diagnostics
pages 13-14-15

3

Phase angle controllers
pages 16-17

POWER CONTROLLER

3

Heating control unit
pages 16-17

Image courtesy of Nissei ASB Machine Co., Ltd

THERMOFORMING

- Pre-heating time process control
- Mold heating system control
- Machines safety during manual change process of thermoplastics foils

CHOOSING THE RIGHT SSRS HELPS MAXIMIZE PLANT UP-TIME AND MINIMIZE MAINTENANCE COSTS AND LOSS OF PRODUCTION

KEY PRODUCTS

SINGLE PHASE SSR "DIAGNOSTIC"

okpac® & celpac® pages 13-15

SAFETY SENSORS

Safety sensors pages 28-31

AUXILIARY EQUIPMENT & ACCESSORIES

- Temperature controllers
- Resin / Granulate dryers
- Hot air dehumidfying dryers
- Robotic systems

KEY PRODUCTS

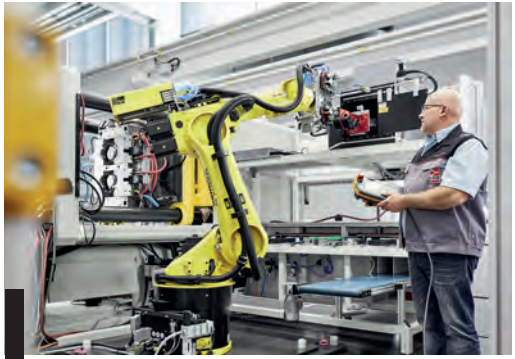
SOLID STATE RELAYS		HIGH POWER SOLUTIONS
SINGLE PHASE	THREE-PHASE	
		
celpac® page 13	sightpac® page 23	MicroFusion pages 26-27

FOR EACH APPLICATION, THE CORRESPONDING

Temperature controllers

SOLUTION !

System design and electrical specifications depend on each manufacturer and may vary: **"Contact us for expert advice!"**



Robotic systems

Conveying system

Air / water cooled chillers up to 380 kW nominal cooling capacity

Modular flow control with water up to 120°C

RECYCLING MACHINES

- Pre-heating and heating system control
- Granulates Sanitization system control

CELDUC® RELAIS IS A RELIABLE AND EXPERIENCED PARTNER IN THE PLASTIC INDUSTRY

→ You can rely on our solutions !

KEY PRODUCTS

SOLID STATE RELAYS

SINGLE PHASE	THREE-PHASE
	
okpac page 15	cel3pac® - sightpac page 23

celduc® relais' SOLUTIONS

In plastic processing, accurate temperature control is essential in determining the quality of the final outcome. SSRs offer a greater degree of control over the process than electromechanical relays or contactors, as they don't have moving parts and allow frequent switching of loads (low switching frequency limits the accuracy).
With our integrated back to back thyristors and TMS² technology (direct copper bonded ceramic), celduc relais' SSRs provide an extremely robust switching solution for plastic processing equipment manufacturers.

Energy saving & reliability

AC AND **DC** SOLID STATE RELAYS FOR LOAD SWITCHING **IN THE PLASTIC INDUSTRY**

- → AC switching up to 125A / 690VAC
- → DC switching up to 50A / 1700Vp
  or 150A / 100Vp
- → Diagnostics and protection available

The solutions displayed in this brochure should be considered as non-exhaustive examples, please visit: www.celduc-relais.com

celpac® 2G

BENEFIT FROM OUR INNOVATIVE, HIGH QUALITY SSRs

SOLID STATE RELAYS SU/SUL COMBINED WITH

Current monitoring module

SAVE ROOM
SAVE COSTS
ADD FUNCTIONS

Temperature controller PID

→ ADD TO YOUR SOLID STATE RELAYS ←

→ Diagnostic information for up to 5 heaters in parallel with:

- Permanent load current monitoring,
- Current teaching function,
- Two alarm thresholds : +/-16% of Iteach,
- Partial load break detection,
- Open load detection,
- Detection of short-circuited SSR.

→ Temperature controller with:

- PID with automatic or manual settings,
- Insulated inputs for J, K, T, E thermocouples,
- Auxiliary output for heating, cooling, alarm or to control a 3-phase Solid State Relay,
- Loop and heater break alarms.

→ Current monitoring and alarms up to 50A

→ RS485 communication interface (Modbus RTU)

celpac® 2G

22,5mm pitch Single phase Solid State Relays

SA range
screw connection on inputs

SU range
pluggable connector on inputs

- Thyristor rating up to 75A
- Output voltage from 24 to 690VAC (600C – 1200V 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	I²t	Specifications
SAL942460	25A	23A	12-280VAC	600V	3-32VDC	450A²s	Pluggable connector - 22.5mm heatsink
SAL965460	50A	32A	24-600VAC	1200V	3.5-32VDC	1680A²s	
SUL963460	35A	30A	24-600VAC	1200V	3.5-32VDC	882A²s	Screw connection - 22.5mm heatsink
SUL967460	75A	35A	24-600VAC	1200V	3.5-32VDC	7200A²s	

celduc® relais offers **2 optional plug-in modules for use on our SU / SUL / SUM:**

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

Reference	Specifications	Current range	Control
ESUC0450	Current monitoring module (plug-in option for use on SU/SUL/SUM)	2-40A	8-30VDC
ESUC0480	Current monitoring module (plug-in option for use on SU/SUL/SUM)	2-40A	24-45VDC
ECOM0010	Temperature controller PID, current monitor and communication interface (plug-in option for use on SU/SUL/SUM)		

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

okpac®

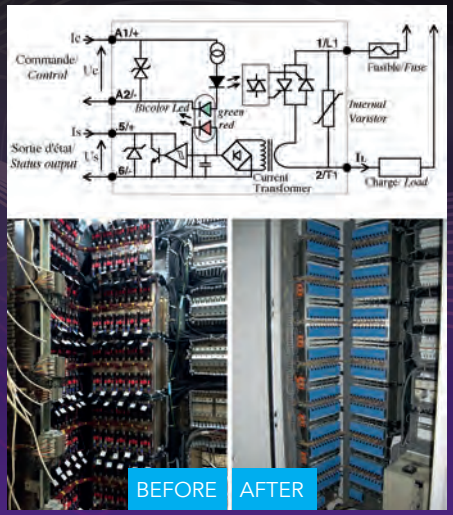
USE OUR POWER
SSRS WITH DIAGNOSTICS
TO SIGNAL SSR AND LOAD STATUS

NEW

SOI RANGE

with a current transformer (CT) built-in on the load side controlling a feedback status switch

Heating control used in thermoforming machines requires occasional connection or disconnection of the heating zones depending on the pre-heating area (foil size). Standard diagnostic relays or systems using external CTs would display an error with these zone disconnections. The SOI range power ON/OFF the load and simply gives the information about the load current flow, leaving the status interpretation to the user or the system.



Advantages :

- Less wiring : saving cost and time
- Elimination of pass through CT wires
- Elimination of costly analog PLC inputs

okpac®

Standard Single Phase Solid State Relays

- Thyristor rating up to 125A
- Output voltage from 24 to 690VAC (600V – 1200V – 1600V peak)

Reference	Thyristor rating	Switching voltage	Peak voltage	Control voltage	I²t
SO842974	25A	12-275VAC	600V	20-265VAC/DC	600A²s
SO867070	75A	24-510VAC	1200V	3.5-32VDC	7200A²s
SO869970	125A	24-510VAC	1200V	20-265VAC/DC	7200A²s
SO945460	50A	12-280VAC	600V	3-32VDC	2800A²s
SO963460	35A	24-600VAC	1200V	3.5-32VDC	1250A²s
SO965460	60A	24-600VAC	1200V	3.5-32VDC	2800A²s
SO967460	90A	24-600VAC	1200V	3.5-32VDC	7200A²s

SO8 – Zero-cross
designed for most types of loads
SO9 – Zero-cross
designed for resistive loads AC-51

okpac®

Power SSRs with diagnostics

- Our SOD range gives the status of the SSR and the load without external power supply
- Our SOI range has a current transformer (CT) built-in on the load side controlling a feedback status switch

Reference	Thyristor rating	Switching voltage	Peak voltage	Control voltage	I²t
SOD845180	50A	50-265VAC	600V	7-30VDC	2800A²s
SOD867180	75A	150-510VAC	1200V	7-30VDC	7200A²s
SOI885070	50A	24-625VAC	1600V	20-265VAC/DC	2800A²s

SOD SOI

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

celduc®

OUR RANGE OF CONTROLLERS FOR ACCURATE TEMPERATURE CONTROL

Control box for temperature control of infrared lamps

NEW

Anticipating market trends and needs, celduc® relais has developed a control box for fine temperature control of infrared lamps. These control boxes are equipped with 12 solid state relays and a built-in microcontroller based regulation card.
This gives very accurate regulation and also includes a communication interface that can be directly connected to a supervisory system to give load status and other parameters.

Single Phase angle controllers

Suitable for infra Red lamps control

Processes such as blow moulding require very accurate temperature control in the re-heat station in order to reduce the thickness of the product and in turn a reduction of the cost of the packaging material used. Infra red heating by halogen lamps allows precise control and consistency of the product wall thickness. The lamps on each side of the process preform track are driven by phase angle controllers such as celduc's SO4. Our range of phase angle controllers allow very accurate temperature control.

Reference	Thyristor rating	Switching voltage	Control voltage	Specifications
SO465020	50A	200-480VAC	0-10V	Phase angle controller
SO465320	50A	200-480VAC	Potentiometer	
SO467501	75A	160-450VAC	1-5V	
SO468420	95A	200-480VAC	4-20mA	
SO367001	75A	400VAC	0-10V	Burst control mode

Power controllers

Main characteristics of the heating control unit currently under development:

- Heating control unit available for up to 12 IR lamps (4kW max per power outputs)
- Control loop based on mains voltage (U^2 control regulation)
- Fault condition alarms : broken lamp< 250ms ; output overvoltage ; device over temperature; broken fuse
- Integrated Protection
- Profibus DP control

Marketing planned for end of 2018

okpac®

USE DUAL RELAYS FOR SPACE SAVING !

NEW

SOBR RANGE: **"PUSH-IN" SIMPLE CONNECTION**
WITH NO TOOLS REQUIRED

Always ahead in solid-state control innovation, celduc® relais has launched a new range of two phase Solid State Relays in okpac® housing with push-in spring power terminals.

okpac®

Two-phase Solid State Relays

Our two-phase range provides two solid state relays in a compact standard 45mm enclosure.

Advantages of using our two-phase SSRs :
- Cost reduction of the complete solution
- Simple wiring
- Compact standard 45mm housing

Connectors to be ordered separately

Reference	Thyristor rating	Switching voltage	Peak voltage	Control voltage	I²t	Specifications
SOB942660	2x25A	12-280VAC	600V	10-30VDC	600A²s	2 controls
SOB943360	2x35A	12-280VAC	600V	10-30VDC	1250A²s	1 control
SOB965660	2x50A	24-600VAC	1200V	10-30VDC	2500A²s	2 controls
SOB967660	2x75A	24-600VAC	1200V	10-30VDC	7200A²s	2 controls

New range of two phase Solid State Relays in okpac® housing with push-in spring power terminals. Limited to 24A by connections.

Reference	Thyristor rating	Switching voltage	Peak voltage	Control voltage	I²t	Specifications
SOBR965660	2x50A	24-600VAC	1200V	10-30VDC	2500A²s	2 controls
SOBR965560	2x50A	24-600VAC	1200V	10-30VDC	2500A²s	2 controls - 1 common internal connection on input

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

sightpac

2 LEGS THREE-PHASE SOLID STATE RELAYS

NEW

SMB RANGE : COMPACT 45MM VERSION

Our SGB range is designed for controlling three phase loads connected in delta or, if balanced, connected in star without the neutral connection. Two of the three phases are switched by the SSR, the third being directly connected.
Simplicity of wiring ensures this reliable solution can be easily integrated into control systems.

cel3pac
sightpac

2 legs three-phase solid state relays

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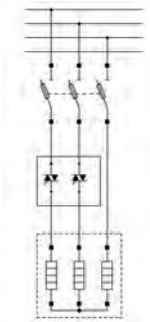


Reference	Thyristor rating	Switching current AC-51 (at 40°C)	Switching current AC-53 (at 40°C)	Switching voltage	Peak voltage	Control voltage	I²t	Protections
cel3pac range								
SGB8850200	2x50A	3x50A	3x12A	24-640VAC	1600V	4-30VDC	2800A²s	VDR
SGB8890200	2x125A	3x85A	3x32A	24-640VAC	1600V	4-30VDC	22000A²s	VDR
sightpac range								
SMB8650510	2x50A	3x30A	3x12A	24-640VAC	1600V	4-30VDC	2800A²s	RC - VDR
SMB8670910	2x75A	3x35A	3x16A	150-520VAC	1600V	4-30VDC	7200A²s	RC – VDR Aux. contact

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

cel3pac
sightpac

THREE-PHASE SOLID STATE RELAYS & CONTACTORS : NEW VISIONARY RANGES

SMT RANGE (45MM VERSION)
SGT RANGE (100MM VERSION)

NEW

Superior design, easy installation, optimum lifespan and price effectiveness are delivered with the new generation of three-phase Solid State Relays.

cel3pac
sightpac

Three-phase Solid State Relays & Contactors

- 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 (40°C)	Switching current AC-53 (40°C)	Switching voltage	V peak	Control voltage	I²t	Protections
cel3pac range								
SGT8678500	3x75A	3x54A	3x16A	24-520VAC	1600V	24-255VAC/DC	7 200A²s	RC – VDR
SGT8690500	3x125A	3x64A	3x32A	24-520VAC	1600V	4-30VDC	22 000A²s	RC – VDR
SGT8850200	3x50A	3x42A	3x12A	24-640VAC	1600V	4-30VDC	2800A²s	VDR
SGT8858200	3x50A	3x42A	3x12A	24-640VAC	1600V	24-255VAC/DC	2 800A²s	VDR
SGT9834300	3x35A	3x30A	-	24-660VAC	1600V	4-30VDC	1250A²s	TVS
SGT9854300	3x50A	3x42A	-	24-660VAC	1600V	4-30VDC	2800A²s	TVS
SGT9874300	3x75A	3x54A	-	24-660VAC	1600V	4-30VDC	7200A²s	TVS
sightpac range								
SMT8620520	3x25A	3x20A	3x5A	24-520VAC	1200V	4-30VDC	380A²s	RC – VDR
SMT8628520	3x25A	3x20A	3x5A	24-520VAC	1200V	24-255VAC/DC	380A²s	RC - VDR

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

SSRs GIVES YOU THE FOLLOWING

ADVANTAGES COMPARED TO **EMRs**

- → Very high number of switching cycles > 10 million
- → Very low consumption for control
- → Not sensitive to shocks and vibrations
- → Very High frequency switching (in temperature control, low switching frequency limits the accuracy)
- → Availability of special controls and diagnostics"

CONCLUSION

- SSRs can 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.

WHY CHOOSE
celduc®'s SOLID STATE RELAYS?

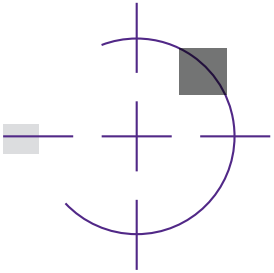
The sole solid state relay technology made in France for more than 40 years !

MADE IN FRANCE

For many years, **celduc® relais** as a company has continued to evolve while the personal has remained the same. We have a dedicated team close to its customers and partners, ready to take on any challenge, in the midst of tough global competition.

At **celduc® relais**, we have succeeded in achieving and maintening efficiency and a high quality level of production.

- → TMS² SCR in AC
- → Life time
- → Quality
- → Customization
- → High voltage in DC
- → High insulation
- → A worldwide presence

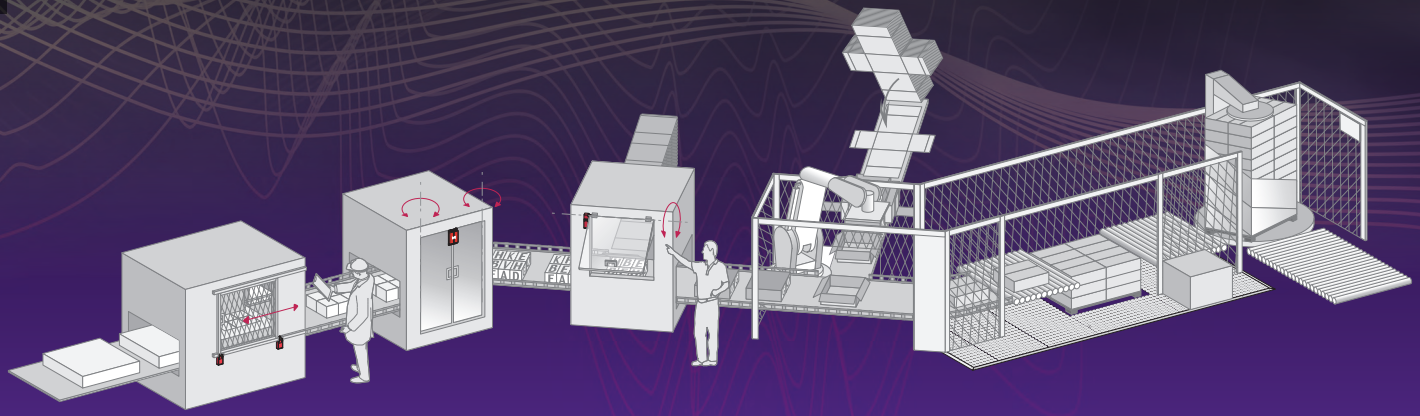


SAFETY SENSORS

ENSURE THE SAFETY OF MACHINE OPERATORS AND
MACHINE OPERATING RELIABILITY !

3 RANGES TO COVER ALL YOUR NEEDS:

- **PSS – PXS** - Coded magnetic Safety sensors (REED Technology)
- **P3S – P4S** - Coded magnetic Safety sensors (Fully electronics – Hall Effect Technology)
- **PRFID** - Coded magnetic Safety sensors (RFID Technology)



PSS / PXS range
with associated coded magnets

Reed coded safety Sensors

These products are designed for monitoring the doors, covers and guards of industrial machines with gates having imprecise guidance and or subject to frequent washing. They protect the operator by immediately stopping any dangerous movement as soon as the distance between the switch and its magnet is greater than 5 or 8mm.
Correctly installed with their associated coded magnets and connected to adapted safety modules, they can reach the following safety level:

SIL 2/category 3/ PL=d or SIL 3/category 4/ PL=e

PXS model with associated magnet P2000100

- Compact rectangular plastic body
- Pre-cabled, length 5m
- Contact status 2O ; O+C or 2O + 1C depending of the safety level required.

Contacts change state as soon as the magnet is at a distance from the sensor of approximately 8 mm

PSS model with associated magnet P3000100

- Standard rectangular plastic body
- Pre-cabled, length 5m
- Contact status 2O ; O+C or 2O + 1C depending of the safety level required

Contacts change state as soon as the magnet is at a distance from the sensor of approximately 5 mm

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

P3S / P4S range

Autonomous safety sensors with coded magnetic technology with safety module integrated !

These autonomous safety sensors protect the operator by immediately stopping any dangerous movement as soon as the distance between the switch and its magnet is greater than 10mm. They are particularly suitable for guards without accurate guidance and for use in difficult environments (dust, liquids, etc.).

SIL 2/category 3/ PL=d or SIL 3/category 4/ PL=e

Cable outputs (standard 2, 5 or 10 meters) or M12 connectors with high resistance to external attacks (cutting oils, ...)

Benefits of our new P3S/P4S range

- Compact and easy to integrate inside the cabinets,
- Entirely electronic with high coding level (inviolability),
- High resistance to shocks and vibrations,
- Self-protected static outputs (short-circuit of the load and temperature).
- Virtually unlimited life time (very high MTTFd).
- Safety levels: according to EN 13849-1 PL:e (EN 954-1) Category 3 and 4. According to EN 62061 (IEC 61508) SIL3
- Protection level : Very resistant IP67 plastic housing and high-pressure washing resistance (IP69K).

P3S model with redundancy and internal monitoring for using in category 3 according EN 13849-1. It is possible to connect up to 32 sensors in series.

P4S model with redundancy, internal and external monitoring of external contactors with EDM (External Devices Monitoring) feedback loop for using in category 4 according EN 13849-1. Status output informing any defect of the system.

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

PRFID range

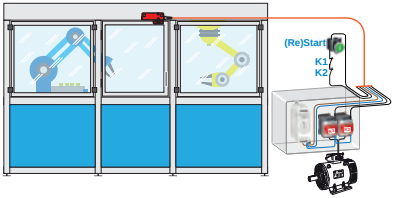
Contactless RFID safety switches

- "High" coding level thanks to an Unique Code to prevent tampering
- Numerous possible mounting configurations due to rotary transponder and symmetrical design

SIL 3/category 4/ PL=e
(if combined with an appropriate safety control unit – please consult us)

"Standalone" models

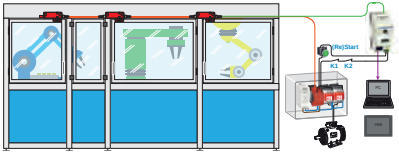
to avoid the use of Safety Interfaces – Cost effective solution !



- 2 OSSD safety outputs,
- Embedded EDM (external device monitoring),
- Manual or automatic start/restart depending on model

"Daisy-chain" models

Up to 20 switches can be connected in series without impacting the safety level.

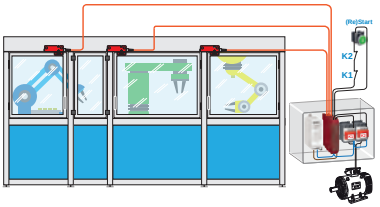


Less cabling time and connection means > Quick installation and cost savings

- 2 OSSD safety outputs,
- Diagnosis of the whole chain of switches possible using the optional diagnostic module (consult us)

Single models

Point-to-point connection to a safety interface.

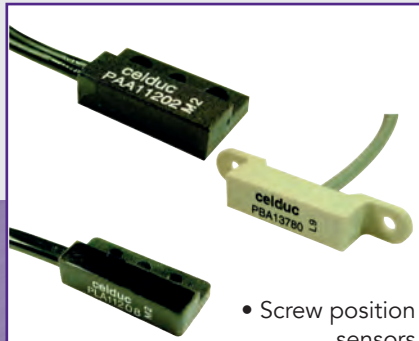


(safety controller or safety PLC).

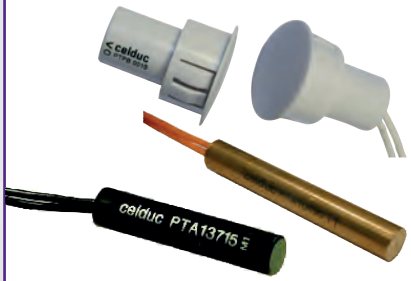
- 2 OSSD safety outputs

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

• Level & Flow sensors



• Screw position sensors



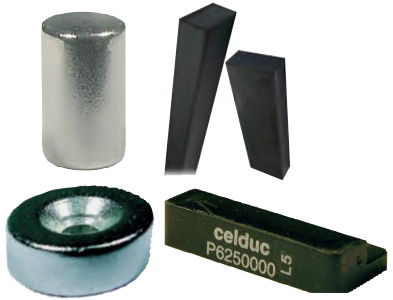
• Tubular position sensors

celduc® relais

If you are looking for position, presence, level or speed detection, then we can offer a solution from our extensive range of magnetic sensors.

• Hall-Effect sensors

• ATEX sensors



• Control magnets

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

celduc® relais' worldwide presence in more than 60 countries

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Austria
Belgium
Brazil
Bulgaria
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Chile
China
Colombia
Czech Rep.
Denmark
Egypt
Estonia
Finland
France
Germany
Greece
Hong Kong
Hungary
India
Indonesia
Iran
Irelande
Israël
Italy
Japan
Latvia
Lithuania
Malaysia
Mexico
Morocco
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New Zealand
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Philippines
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www.celduc-relais.com

Sales department France : Tél. +33 (0)4 77 53 90 20
Sales department for Asia : Tél. +33 (0)4 77 53 90 19
Sales department for Europe : Tél. +33 (0)4 77 53 90 21
Sales deparment for America : Tél. +33 (0)4 77 53 90 19

5 rue Ampère - BP 30004 - 42290 Sorbiers - France
Fax : +33 (0)4 77 53 85 51

All technical characteristics are subject to change without previous notice // Dec. 2018 – CATA-PLAST-UK-2018