



SIRCO *PV*

Disconnect switches for photovoltaic applications
from 100 to 3200 A, up to 1500 VDC

UL 98B & IEC 60947-3



You deserve **safe & reliable** PV installations

As a PV expert, you are challenged to differentiate yourself from the global competition with geographical disperse markets. Photovoltaic energy producers demand equipment and installations that combine a high production output, consistent reliability and safety with a low maintenance cost. Besides a high-efficiency production, the equipment must support the specificity and technical constraints of the severe environments related to solar applications. Specifically designed for photovoltaic applications, SIRCO PV solar disconnect switches have been tested for use in applications with high performance characteristics that meet or exceed of the latest industry standard requirements.



SOCOMEK - your **best asset**

European industrial group

- Created in 1922.
- Over 3000 employees.
- Present on five continents.

A culture of independence

- Family shareholders.
- Full control of the decision-making process.
- Respect for human values.

The spirit of innovation

- Almost 10 % of turnover is reinvested in R&D.

A flexible manufacturing structure

- Competitive production sites.
- Lean Management.
- Lead times, quality and cost guaranteed.

The vision of a specialist

- Expertise in technological modules.
- Custom adaptations to customer requirements.

A focus on service

- Advice, interventions, training.
- Teams located across the globe.

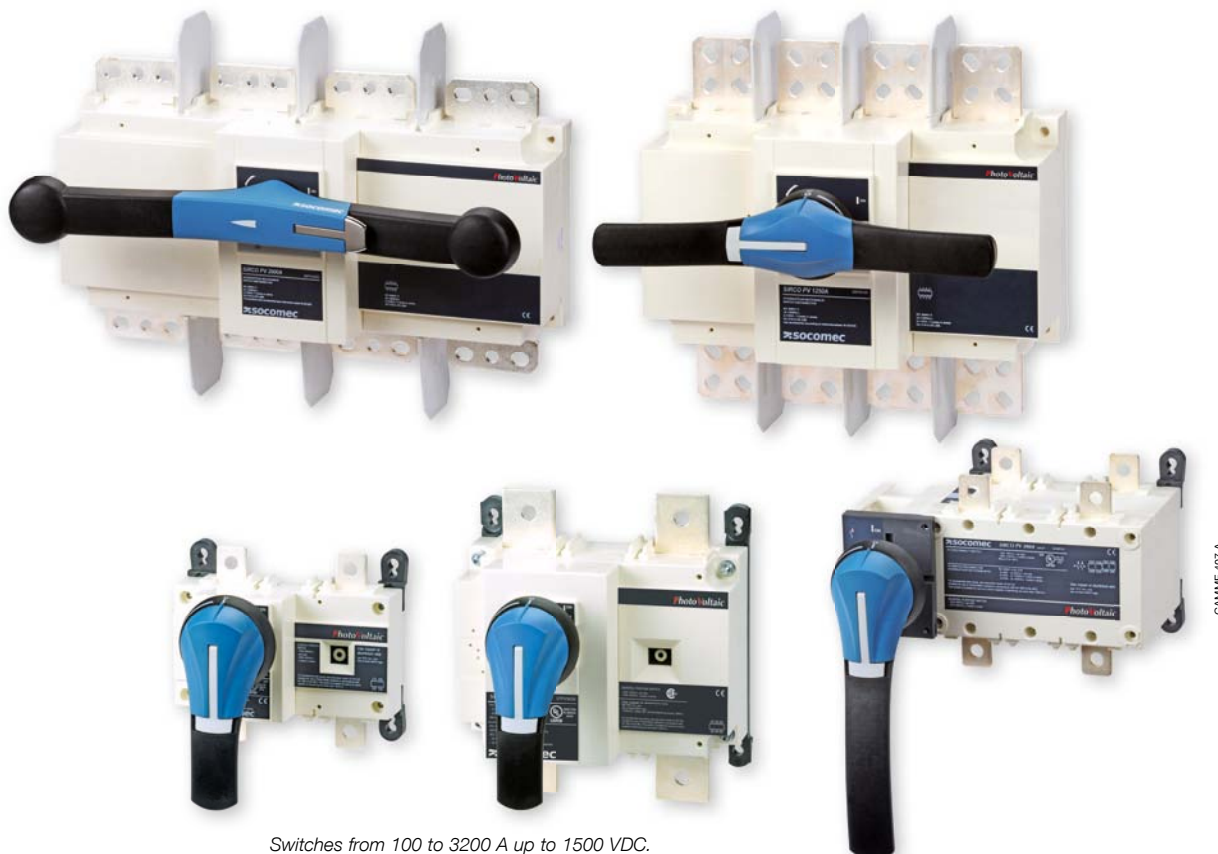
**ENERGY
SPECIALIST**
SINCE **1922**



SIRCO PV

A complete offer for any photovoltaic application
The spirit of innovation combined with proven technology

As an expert in solar switching equipment, SOCOMEC has the specialised know-how for implementing key strategic functions in PV facilities.



Switches from 100 to 3200 A up to 1500 VDC.

Four key applications: the know-how of a specialist

Ensuring the availability of high-quality power for critical applications.



Managing power and protecting individuals and property.

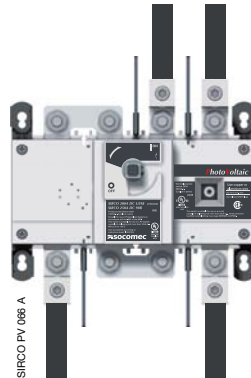
Improving the energy efficiency of buildings and facilities.



Guaranteeing the safety and durability of photovoltaic facilities.

New patented switching technology to break 500 VDC per pole

Most PV systems today are designed at 1000 VDC. Our new range of switches allows on-load breaking of 1000 VDC on just 2 poles. This innovation provides an extremely compact solution.



Classic solution
Example of connection of a 1000 VDC disconnect.



New
With our new range we can break 1000 VDC with 2 poles in series.

Optimise your investment

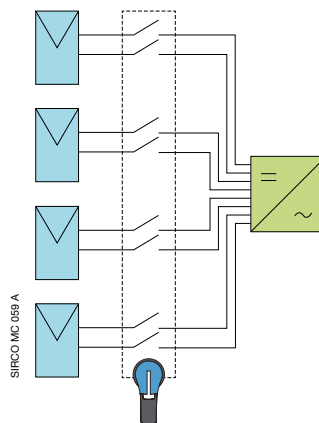
- Limit costs by reducing the number of jumpers per device.
- Gain time by having a less number of jumpers to install.
- Reduce the overall heat dissipation of the switch. A 2 pole SIRCO PV switch takes direct advantage of this, leading to **possibility to use a smaller enclosure**.

Limit potential risk

PV equipment is subject to extreme variation in temperature. Point of connection are therefore subject to potential loosening of connection due to breaking cooling effect. Limiting the number of poles greatly reduces the risk of a loose connection.

Allows to disconnect up to 4 circuits with one switch ("The Worlds first")

A compact and cost effective solution for recombinaer applications. Allows to break up to 24 circuits by respecting the NEC article 690.



4 MPPT switches, 4 circuits are switched together.

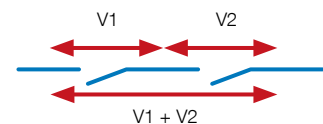


SIRCO PV 350 A
1000 VDC 4 circuits.

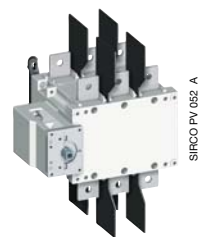
Achieving 1500 VDC characteristics in a compact footprint

SOCOMECS new technology enables utilisation at 1500 VDC by connecting three poles in series.

- Each pole of a switch has a maximum voltage breaking capacity. To break a high DC voltage it is necessary to connect poles in series. The global on-load breaking capacity of a switch is determined by multiplying the max voltage breaking capacity per pole by the number of poles in series.
- Paralleling the poles on our double-stack design permits a higher current rating to be achieved.



SIRCO PV 400 A
1500 VDC.



SIRCO PV 800 A
1500 VDC with a 400 A
double stack switch.

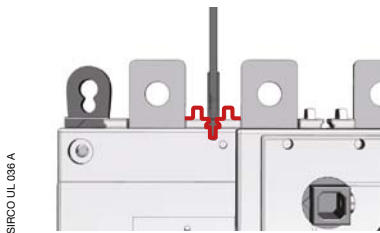
Benefit from the experience of a world leader in industrial switching

PV applications are one of the most stringent for disconnect switches. Extreme fluctuations in temperature, condensation, dust, UV exposure and oversized connection cables stress components. Our SIRCO range has been adapted to exceed industry standards and current solutions fully take into account the specific requirements of PV applications.

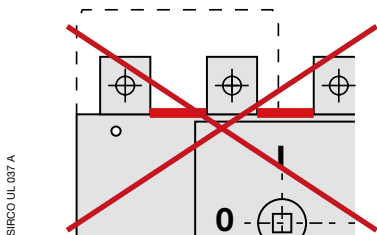
■ Guarantee isolation over time

Today most photovoltaic systems operate at 1000 VDC with voltages now moving towards 1500 VDC.

Aging of plastic due to high fluctuations in temperature combined with external elements (dust, condensation) may through time increase the risk of electrical breakdown. The creepage distance over insulation material between live parts is key in preventing this. SOCOMEC decided to exceed the requirements of IEC standard and increased this distance from 25 mm to 53 mm. A distance of 50 mm/2 inches is the mandatory distance comply with UL standards.



SIRCO UL 036 A
SOCOMEC design with 53 mm creepage distance over surface. This is true externally as well as internally.



SIRCO UL 037 A
Other manufacturers concept as often with a shorter distance. Note that external shrouding does not extend the creepage distance.

■ Ensure safe operation



The mechanism is completely independent from manual operation and provides quick make & quick break operations, thereby reducing the arc duration.

A reliable position indicator clearly shows the true state of the switch contacts.

■ Long lasting stable raw material

SIRCO PV is an extremely robust product, with all casings made from fiber glass reinforced polyester materials that allows:

- high mechanical withstand,
- high stability to temperatures (RTI of 130 °C),
- high dielectric performance (high CTI/tested according to ASTM D 2303).

The SIRCO PV range includes a heavy duty assortment of handles

- Door interlocked the ON position.
- Possibility to defeat the door interlock with the use of a tool.
- Padlockable in the OFF position whilst including a door interlock.
- High index of protection: up to IP65 IEC and 4, 4X UL.
- UV rated according to UL50.



A fully tested range...

Using tested and certified components is key for the success of the design for any photovoltaic system. The SIRCO PV range is tested and certified according to main standards used in the photovoltaic industry.

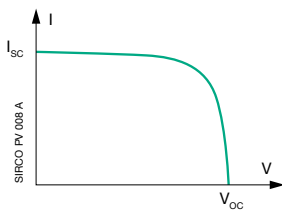
Global approvals

Our SIRCO PV solar disconnect range meets UL98B, IEC947-3 Standards and bear the CE mark. Using the SOCOMEC range in your design is therefore a unique opportunity to standardise your components and use the same switches on 5 continents.



PV critical current

Under particular conditions (cloudy, days, evenings...) PV systems can deliver a low current at high voltage. This type of current is extremely difficult to interrupt. Standard AC or DC products are usually not tested in these particular conditions and could therefore be unable to interrupt low currents at high DC voltage. If the electrical arc produced is not interrupted it may result in operator injury or fire. The SIRCO PV range has been specifically designed and tested to interrupt the current under all current/voltage conditions.



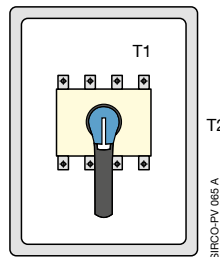
Current (I)/Voltage (V) curve of a PV system. When the current decreases (in the evening or when cloudy) the voltage may increase.
SC = Short-circuit, OC = Open-circuit

Short Circuit

The complete range is tested to withstand a short circuit of 10 kA for a duration of 50 ms without any specific protection. This allows the use of any overcurrent protection device for line protection.

Thermal current test

Thermal tests have been performed according to both IEC and UL standards.



According to UL Standard 98B, the maximum difference authorised between T1 (temperature of terminals) and T2 is 40 °K when the switch is fully loaded.



According to IEC947, switches are tested in free air. Maximum temperature elevation on terminals is 70 °K.

**OUR SWITCHES ARE CERTIFIED
UP TO 60 °C AMBIENT WITHOUT
DERATING**

The 5th largest European power laboratory

Since 1965, the Pierre Siat test laboratory has used its expertise to guarantee the reliability and compliance of SOCOMEC products and solutions.

This totally independent laboratory is recognised by the major certification bodies worldwide: member of UL, CSA and KEMA. It also works in partnership with numerous international certification organisations (CEBEC, ASTA, Lloyd's, Bureau Veritas, GOST-R, etc.). The quality and safety requirements specific to each country are therefore fully taken into account.

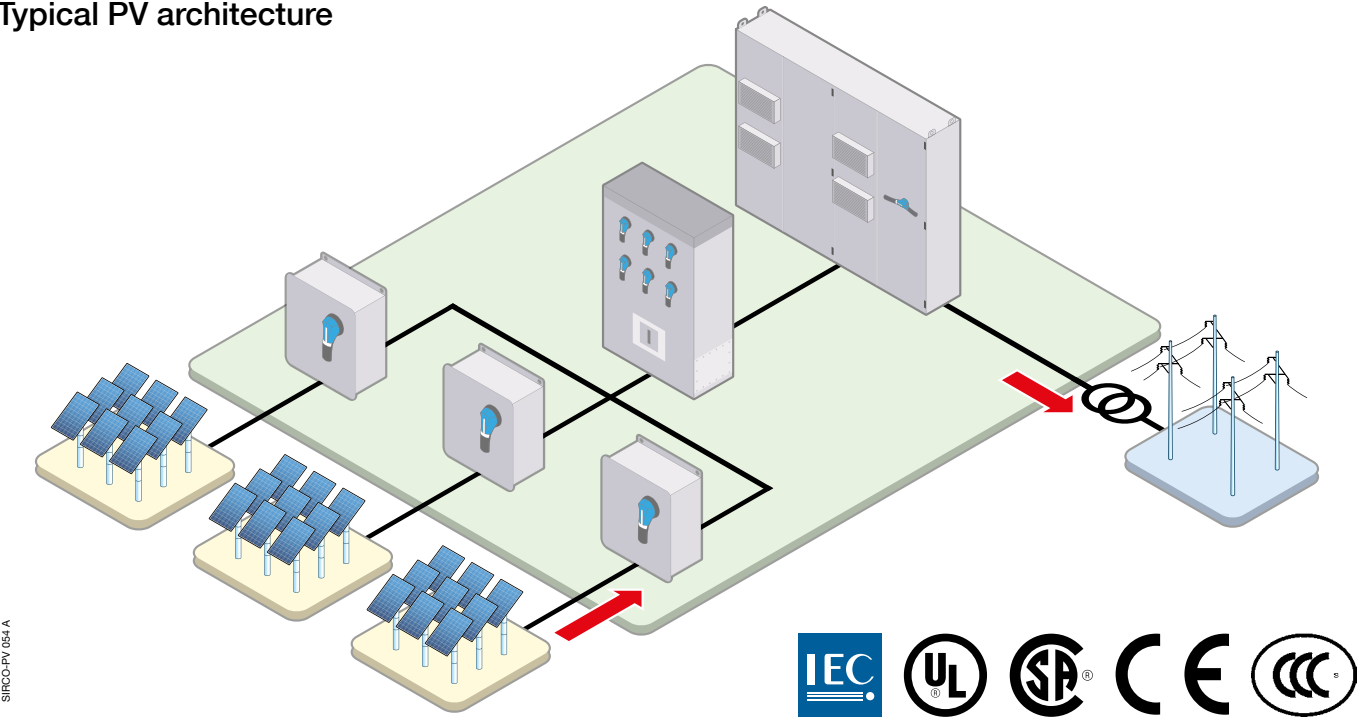
With its 100 MVA (Idc 100 kA rms 1 s) short-circuit platform, three 10 kA overload platforms and numerous other test instruments, in facilities covering 1500 m², the Pierre Siat laboratory is currently the 2nd largest French power laboratory. It combines expertise in electricity and mechanics, pneumatics and computing.



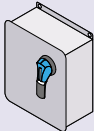

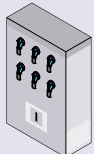
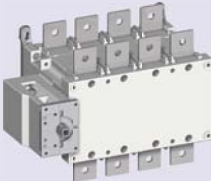
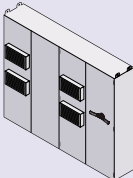
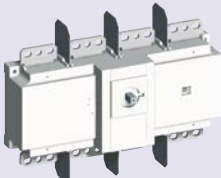
... for all your PV applications

The SIRCO PV range will provide safe disconnection and isolation at all levels of your PV installation.

Typical PV architecture

























SOCOMEK solutions

LEVEL OF INSTALLATION	SOCOMEK SOLUTIONS
Combiner box	<div></div> <div><div>SIRCO PV One circuit 100 to 500 A up to 1500 VDC</div></div>
Recombiner box	<div></div> <div><div>SIRCO PV 4 circuits 100 to 500 A at 1000 VDC 2 circuits 100 to 500 A at 1500 VDC</div></div>
Inverter	<div></div> <div><div>SIRCO PV One circuit 100 to 3200 A at 1000 VDC 100 to 3200 A at 1500 VDC</div></div>

The widest range on the market

Which
standard ?

IEC IEC 60947-3		100 A		160 A		250 A		315 A	
1 circuit	up to 1000 VDC	26PV 2010	B4	26PV 2016	B4	26PV 2025	B4	26PV 2031	B4
			2P ⁽²⁾		2P ⁽²⁾		2P ⁽²⁾		2P ⁽²⁾
1 circuit	1500 VDC	27PV 3026 275 A B5				27PV 3032 B5			
									
2 circuits	up to 1000 VDC	26PV 5010	B4ds	26PV 5016	B4ds	26PV 5025	B4ds	26PV 5031	B4ds
			2P ⁽²⁾		2P ⁽²⁾		2P ⁽²⁾		2P ⁽²⁾
2 circuits	1500 VDC	27PV 6026 275 A B5ds							
									

UL98B IEC IEC 60947-3		100 A		200 A		250 A		325 A	
1 circuit	up to 1000 VDC	27PV 2009	B4	27PV 2019	B4	27PV 2024	B4	27PV 2032	B5
			2P ⁽²⁾		2P ⁽²⁾		2P ⁽²⁾		2P ⁽²⁾
1 circuit	1500 VDC ⁽¹⁾	27PV 3026 275 A B5				27PV 3032 B5			
									
2 circuits	up to 1000 VDC	27PV 5009	B4ds	27PV 5024	B4ds	27PV 4032 B5			
			2P ⁽²⁾		2P ⁽²⁾				
2 circuits	1500 VDC ⁽¹⁾	27PV 6026 275 A B5ds				27PV 6032 B5ds			
									





















4 circuits 1000 VDC - Ref. 27PV 8026, IEC 275 A - UL 275 A
Ref. 27PV 8039, IEC 500 A - UL 350 A.
1 circuit 1000 VDC 3200 A is also available, please contact us.















(1) The 1500 VDC range is self-certified based on 1000 VDC UL standards at 1500 VDC. The UL standard at 1500 VDC has not yet been released.
 (2) Number of poles to reach the characteristic indicated per PV circuit.

How many
circuits ?

Which
voltage ?

Which
rating ?

400 A		500 A		630 A		800 A		1250 A		2000 A	
26PV 4040	B4	26PV 4050	B4	26PV 4063	B5	26PV 4080	B5	26PV 4120	B6	26PV 4200	B7
	4P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾
27PV 3032	B5	27PV 3039	B5	26PV 8063	B5Ds	26PV 8080	B6Ds	26PV 8120	B6Ds	26PV 8200	B7Ds
	3P ⁽²⁾		3P ⁽²⁾		8P ⁽²⁾		8P ⁽²⁾		8P ⁽²⁾		8P ⁽²⁾
27PV 4032	B5	27PV 4039	B5	26PV 8063	B5Ds	26PV 8080	B6Ds	26PV 8120	B6Ds	26PV 8200	B7Ds
	2P ⁽²⁾		2P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾
27PV 6032	B5Ds	27PV 6039	B5Ds								
	3P ⁽²⁾		3P ⁽²⁾								

400 A		600 A		800 A		1200 A		2000 A	
27PV 2039	B5	27PV 4060	B6	27DC 4081	B7	27DC 4121	B7	27DC 4201	B7
	2P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾		8P ⁽²⁾
27PV 3039	B5	27PV 8060	B6Ds	27DC 8081	B7Ds	27DC 8101 1000 A	B7Ds		
	3P ⁽²⁾		8P ⁽²⁾		8P ⁽²⁾		8P ⁽²⁾		
27PV 4039	B5	27PV 8060	B6Ds	27DC 8081	B7Ds	27DC 8101 1000 A	B7Ds		
	2P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾		4P ⁽²⁾		
27PV 6039 350 A	B5Ds								
	3P ⁽²⁾								

The **PV** range

A complete offer of load break switches for photovoltaic applications from 25 to 3200 A

SIRCO MC PV from 25 up to 45 A - 1000 VDC

Compact

Thanks to its compact design, the limited space within the combiner box or the solar inverter maybe utilised better.

High breaking capacity up to 1000 VDC

- Making and breaking capacity under load conditions up to 1000 VDC.
- Specific photovoltaic test beyond IEC 60947-3 standard requirements.
- Compliant with UL 508i.

Safety

- Pre-bridging is factory installed for easier, quicker and safer connection.
- Direct access to connection terminals for adequate tightening.

Easy mouting

Three mounting possibilities are available for optimum integration and time saving.

- DIN rail or back plate mounting.
- Door mounting.
- Quick Fix mounting to save time when integrating into solar inverters.

Multi-circuit breaking

The SIRCO MC PV for double circuits enables connection of two independent PV panel strings to a single switch. This will reduce the cost of the overall solution.



SIRCO MOT PV up to 2000 A - up to 1500 VDC

Main characteristics

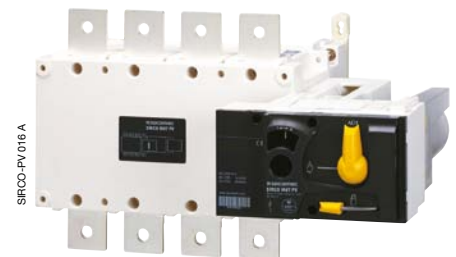
- Up to 1500 VDC.
- 2 stable positions (I, 0).
- AUTO/MANU selector.
- Padlocking in 0 position.
- Full range of accessories.

Remote disconnection system

With its remote motorised control, the SIRCO MOT PV can be utilised to provide safety disconnection for firefighters by meeting the remote disconnection requirements of the installation.

Manual emergency operation

In addition to its motorised operation, the SIRCO MOT PV also includes a manual operation facility, enabling the switch position to be changed on load in a safe and easy way.



SIRCO PV PA tripping from 100 A up to 800 A – 1000 VDC

SIRCO PV PA (Pneumatic Actuator) are PV switch disconnectors actuated by a pneumatic cylinder. Specially designed for roof-mounted PV installations, they ensure safe on-load breaking and making to provide safe isolation of PV circuits. Actuator can be activated with a compressed air cartridge or a compressed air network. The pneumatic power supply systems for safety are recognized and recommended by firefighters. This system operates in the same way as smoke extraction systems.

SOCOMEK is the first company to provide PV switch disconnectors and pneumatic actuators that are fully compliant with UTE C 15 712-1/-2 guide issued on 10/09/2012 and NF S 61-937 standard issued on 12/1990.



SIRCO-PV 063 A



Also available

SIRCO

Load break switches for power distribution

- From 125 to 5000 A.
- Up to 690 VAC - AC23.
- Reliability and performance.
- Simplicity.
- Easy to install.



SIRCO-AC 001 A

FUSERBLOC

Industrial fuse combination switches

- From 20 to 1250 A.
- Up to 690 VAC.
- Improved safety.
- High breaking capacity.
- SCCR 100 kA.



FUSER 548 B

DIRIS

Multifunction meters

- Monitor all electrical parameters of the installation.
- Detects wiring errors.
- Compliant with UL 61010-1.



DIRIS 744 A



Socomec worldwide

IN INDIA

CORPORATE OFFICE

Critical Power / Solar Power
B1, II Floor
Thiru-Vi-Ka Industrial Estate
Guindy, Chennai - 600 032
Tel: +91 44 3921 5400 / 5423 / 5466
Mob: +91 9940147003, +91 9790968731,
+91 9500092236
Fax: +91 44 39215450
info.ups.in@socomec.com
info.solar.in@socomec.com
Toll Free No. 1860 200 0808

Power Control & Safety / Energy Efficiency
756 Pace City II
Sector 37
Gurgaon - 122 001
Haryana
Tel: +91 124 4027 210 / 209 / 207
Fax: +91 124 4562 738
info.scp.in@socomec.com

BRANCH OFFICES

BANGALORE

160, Arun Arch, 2nd Floor
9th Cross, Indiranagar First Stage
Bangalore - 560 038
Tel: +91 80 41739101-03
Mob: +91 9972578171

COCHIN

47/590, Mattathumkattil
Narayanan Asan Road
Ponnuranni, Vyttila
Cochin - 682019
Mob: +91 9745012322

COIMBATORE

12, 3rd Cross Street
Lakshimpuram, Ganapathy
Coimbatore - 641 006
Mob: +91 9940137003, +91 9003032012

GURGAON

504, 5th Floor iPark
MVL Building Sector - 15
Gurgaon - 122001
Mob: +91 9711433154

HYDERABAD

3rd Floor
6-3-652/K/12, KAUTILYA Complex
Somajiguda
Hyderabad - 500 082
Mob: +91 9959444277, +91 8886446123

KOLKATA

AK-257, Sector-2
Salt Lake City, Kolkata - 700091
Mob: +91 8697709096, +91 8697709095

MUMBAI

The Mewad Industrial Premises CHS.
Unit No : 304, 305, 306
E.S. Patanwala Complex
L.B.S Marg, Opposite Sheryas Cinema
Nr. Petrol Pump, Ghatkopar (W)
Mumbai - 86
Tel: 022 - 25002793/94/95
Mob: +91 9987052602, +91 9819924289

NEW DELHI

B-40, D.D.A. Shed
Okhla Industrial Area
Phase II, New Delhi - 110 020
Tel: +91 11 41633750-53
Mob: +91 9560811228, +91 9958591714

PUNE

Plot No. 30, Wireless
Co-operative Society
Behind Convergys, Aundh
Pune 411 007
Telefax: +91 20 25881587
Mob: +91 9987052604

RESIDENT ENGINEERS

AHMEDABAD

+91 9727753931
+91 9376639333

AURANGABAD

+91 9320342700

CHANDIGARH

+91 9023154784

INDORE

+91 9329363033

PATNA

+91 9903566411

TRIVANDRUM

+91 9020179364

IN EUROPE

BELGIUM

FRANCE

GERMANY

ITALY

NETHERLANDS

POLAND

PORTUGAL

ROMANIA

RUSSIA

SLOVENIA

SPAIN

UNITED KINGDOM

TURKEY

IN ASIA PACIFIC

AUSTRALIA

CHINA

SINGAPORE

THAILAND

VIETNAM

IN MIDDLE EAST

UNITED ARAB EMIRATES

IN AMERICA

USA, CANADA & MEXICO

OTHER COUNTRIES

www.socomec.com/worldwide

HEAD OFFICE

SOCOMECS GROUP

S.A. SOCOMECS capital 10 816 800€
R.C.S. Strasbourg B 548 500 149
B.P. 60010 - 1, rue de Westhouse
F-67235 Benfeld Cedex - FRANCE
Tel. +33 3 88 57 41 41
Fax +33 3 88 74 08 00
info.scp.isd@socomec.com

YOUR DISTRIBUTOR

www.socomec.co.in

