

INSTRUCTION  
MANUAL

# SWITCH MOT PV

Motorised photovoltaic switches

EN



**Controlin** **Gawe**

We energize the best solutions **low voltage electrical manufacturer**

[www.gawe.com](http://www.gawe.com)

<b>1. GENERAL SAFETY INSTRUCTIONS</b>	<b>5</b>
<b>2. GENERAL OVERVIEW</b>	<b>6</b>
2.1. PRODUCT INTRODUCTION	6
2.2. PRODUCT IDENTIFICATION	7
2.3. ENVIRONMENTAL	8
2.3.1. IP RATING	8
2.3.2. OPERATING CONDITIONS	8
2.3.3. STORAGE CONDITIONS	8
<b>2.3.4. VOLUME AND SHIPPING WEIGHTS BY REFERENCE SWITCH MOT PV</b>	<b>9</b>
2.3.5. CE MARKING	9
2.3.6. LEAD FREE PROCESS	9
2.3.7. EMC STANDARD	10
2.4. SWITCH MOT PV ACCESSORIES AVAILABLE	10
2.4.1. CUSTOMER FITTED ACCESSORY	10
2.4.2. FACTORY FITTED ACCESSORY	10
<b>3. INSTALLATION</b>	<b>11</b>
3.1. PRODUCT DIMENSIONS	11
3.1.1. DIMENSIONS: FRAME B4 TO B5 (250 A TO 800 A)	11
3.1.2. DIMENSIONS: FRAME B6 & B7 (1000 A TO 2000 A)	12
3.1.3. DIMENSIONS : FRAME B8 (3200 A)	13
3.2. COPPER BAR CONNECTION FOR SWITCH MOT PV 3200 A	14
3.3. MOUNTING ORIENTATION	14
3.4. ASSEMBLY OF CUSTOMER MOUNTED ACCESSORIES	15
3.4.1. CONNECTION KITS FOR SWITCH MOT PV 3200 A	15
3.4.2. TERMINAL SHROUDS	16
3.4.3. TERMINAL SCREENS	16
3.4.4. INTER-PHASE BARRIERS	17
3.4.6. RAISED MOUNTING SPACERS	18
3.4.7. EXTERNAL POWER SUPPLY (400 VAC - 230 VAC)	18
3.5. FACTORY FITTED ACCESSORY	19
3.5.1. PADLOCKING KEY INTERLOCKS	19
3.5.2. ADDITIONAL AUXILIARY CONTACTS	19
<b>4. CONNECTIONS</b>	<b>20</b>
4.1. POWER CIRCUITS	20
4.2. CONNECTION CONFIGURATION	20
4.3. CABLE OR BAR CONNECTIONS	22
4.3.1. POWER CONNECTION TERMINALS	22
4.4. CONTROL CIRCUITS	22

4.4.1. TYPICAL SWITCH MOT PV WIRING ..... 2 2

4.4.2. SWITCH MOT PV INPUT AND OUTPUT CONTACTS ..... 2 3

**5. OPERATING MODES.....24**

5.1. MANUAL OPERATION.....25

5.1.1. EMERGENCY MANUAL OPERATION .....25

5.1.2. PADLOCKING .....25

5.2. ELECTRICAL OPERATION .....26

5.2.1. POWER SUPPLY.....26

5.2.2. FIXED INPUTS .....26




5.2.3. FIXED OUTPUTS - DRY CONTACTS.....28

**6. TROUBLE SHOOTING GUIDE .....30**



# 1. GENERAL SAFETY INSTRUCTIONS

- This instruction manual must be made accessible so as to be easily available to anyone who may need to read it in relation with the **SWITCH MOT PV**.
- The **SWITCH MOT PV** meets the European Directives governing this type of product and includes CE marking on each product.
- No covers on the **SWITCH MOT PV** should be opened (with or without voltage) as there may still be dangerous voltages inside the product such as those from external circuits.
- **Do not handle any control or power cables connected to the SWITCH MOT PV when voltage may be present on the product directly through the mains or indirectly through external circuits.**
- Voltages associated with this product may cause injury, electric shock, burns or death. Prior to carry out any maintenance or other work on live parts or other parts in the vicinity of exposed live parts, ensure that the switch including all control and associated circuits are de-energized.

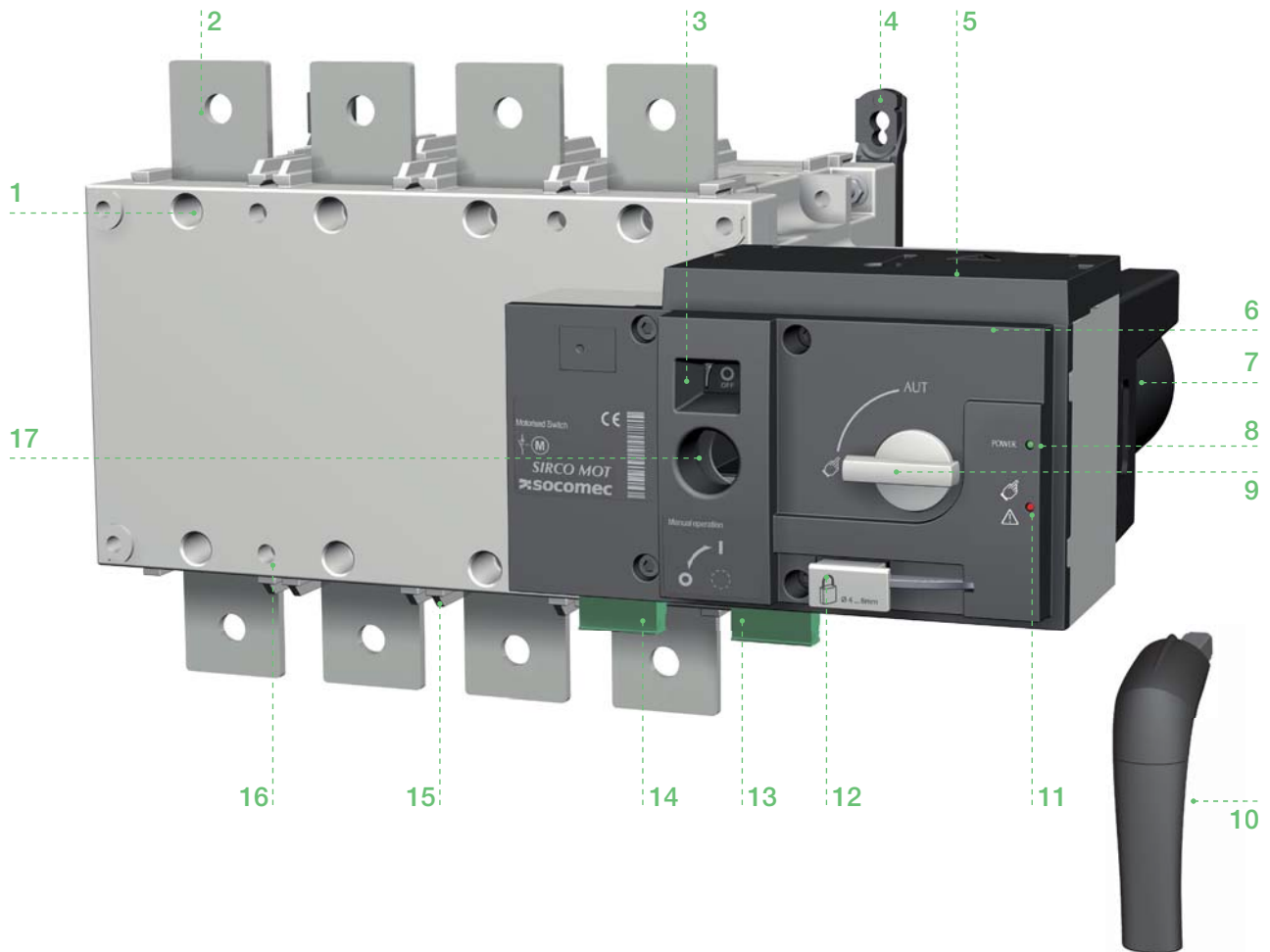
 <b>DANGER</b>	 <b>WARNING</b>	 <b>CAUTION</b>
<b>RISK:</b> Electric shock, burns, death	<b>RISK:</b> Possible personal injury	<b>RISK:</b> Equipment damage

- As a minimum the **SWITCH MOT PV** comply with the following international standards:
  - CEI 60947-3
  - IS 13947-3
  - EN 60947-3
  - NBN EN 60947-3
  - BS EN 60947-3

The information provided in this instruction manual is subject to change without notice, remains for general information only and is non-contractual.

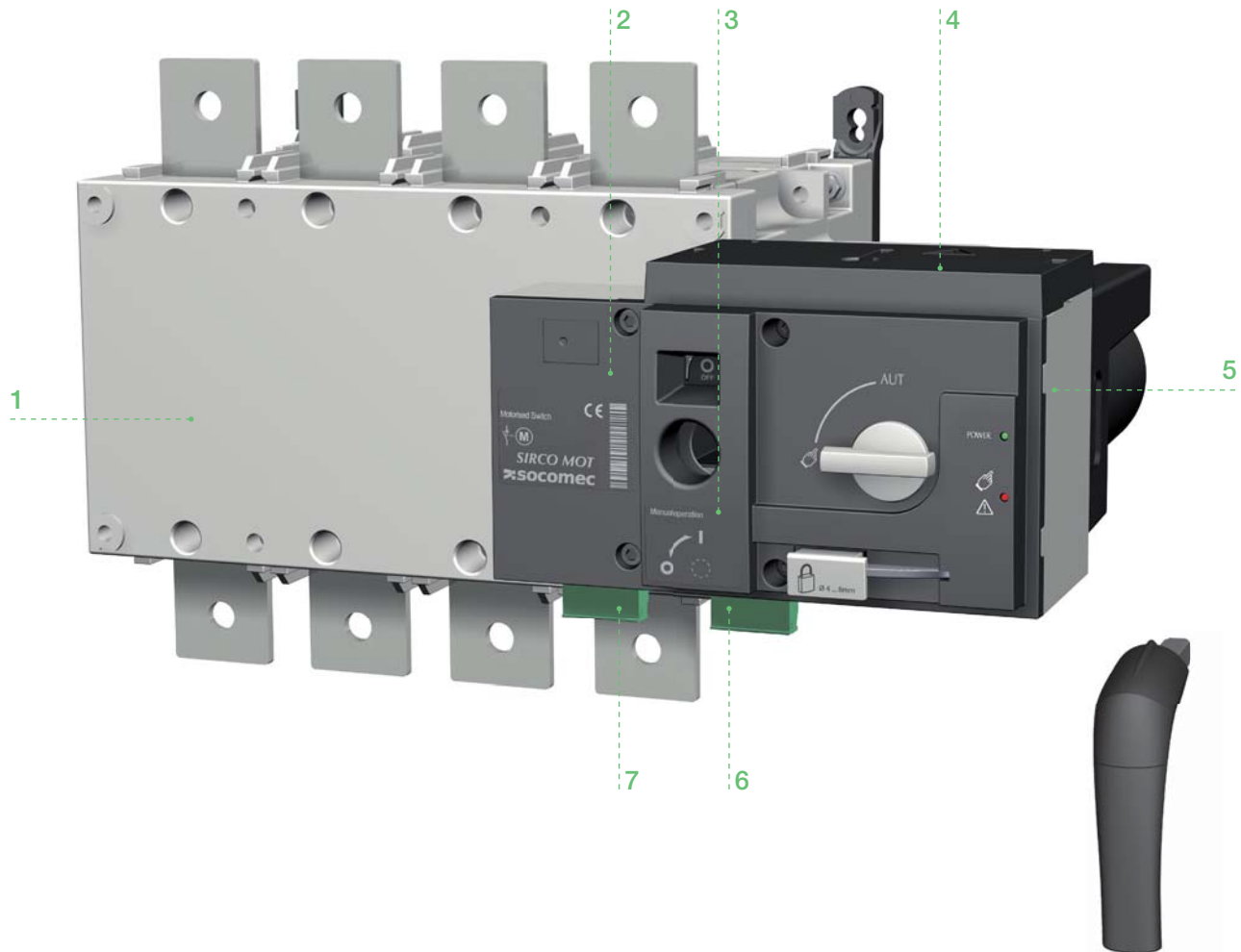
## 2. GENERAL OVERVIEW

### 2.1. Product introduction



1. Power Section : multipolar load break switch (3 or 4 poles)
2. Load break switch terminals
3. Switch position indication window :- I (On) – O (Off)
4. Back-plate mounting **SWITCH MOT PV** fixing lugs
5. Auxiliary power supply : 230Vac (208 – 277Vac  $\pm$  20%)
6. Motorized Control Unit
7. Motor housing
8. Green LED Indication : Power (**SWITCH MOT PV** control voltage input within specified range).
9. Auto / Manual mode selector switch
10. Emergency manual operation "Direct Handle"
11. Red LED Indication : Product Unavailable / Manual Mode / Fault Condition
12. Padlocking facility (Up to 3 padlocks of dia. 4 – 8mm)
13. Output contacts x 3 (Position indication I-O and product availability outputs)
14. Input contacts x 4 : Position order I-O - Remote control enable - Override controls and force to Off position
15. Sliders for Terminal Shields
16. Fixing holes for terminal Shields
17. Emergency manual operation shaft location (Accessible only in manual mode)

## 2.2. Product identification



1. Main motorised switch identification label :  
Electrical characteristics  
Applicable standards and  
Terminal incoming and outgoing wiring details.
2. Complete **SWITCH MOT PV** product current rating and reference number label (serial number, barcode and CE marking)
3. Emergency manual operation direction of rotation indication label
4. Auxiliary power supply contacts identification label
5. Motor barcode and serial number
6. Output contacts identification label
7. Input contacts identification label

## 2.3. Environmental

The **SWITCH MOT PV** product meets the following environmental requirements:

### 2.3.1. IP Rating



- IP2X against direct contact for the **SWITCH MOT PV** motorization control unit.
- IP2X against direct contact for the power section with the connections in place and when including suitable, correctly installed incoming and outgoing terminal shields.
- IP 0 for the bare power section without terminal shields in place.

### 2.3.2. Operating Conditions

#### 2.3.2.1. Temperature



- From -20 to +40°C without derating
- From -20 to +70°C when applying a Kt derating correction factor

Kt: Correction Factor	Temperature
0.9	40 °C ... 50 °C
0.8	50 °C ... 60 °C
0.7	60 °C ... 70 °C

\* Simplified derating method:  $I_{thu} \leq I_{th} \times K_f$

\* A more precise calculation may be done for specific applications. Should this be required please contact **GAVE**.

#### 2.3.2.2. Hygrometry



- 80% humidity without condensation at 55°C
- 95% humidity without condensation at 40°C

#### 2.3.2.3. Altitude



- Up to 2000m in altitude without derating
- For higher altitude the Ka correction factors below apply

Ka: Correction Factor	2000 m < A ≤ 3000 m	3000 m < A ≤ 4000 m
Ue	0.95	0.8
Ie	0.85	0.85

### 2.3.3. Storage Conditions



#### 2.3.3.1. Temperature



- From -40 to +70°C

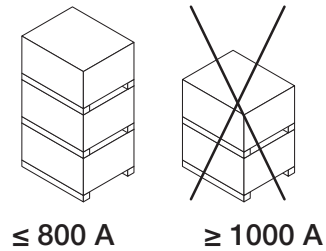


#### 2.3.3.2. Storage duration period

- Maximum storage up to a period of 12 months
- (Recommendation: To be stored in dry, non corrosive and non saline atmospheric conditions)

#### 2.3.3.3. Storage position

- ≤ 800 A : a maximum of 3 boxes may be stocked vertically  
 ≥ 1000 A : a maximum of 1 box may be stocked vertically



#### 2.3.4. Volume and shipping weights by reference SWITCH MOT PV

Frame Size	Rating	N° of Poles	Reference Number	Weight (kg)		Volume (cm) inc Packing
				Net	Gross	
B4	250 A	4	55MPV 4025			
	400 A	4	55MPV 4038			
B5	400 A	4	55MPV4039			
	400 A	4	55MPV4040			
	630 A	4	55MPV 4063			
	800 A	4	55MPV 4080			
B6	1000 A	4	55MPV 4100			
	1250 A	4	55MPV 4120			
B7	1600 A	4	55MPV 4160			
	2000 A	4	55MPV 4200			
B8	3200 A	4	55MPV 4320			

#### 2.3.5. CE marking

The **SWITCH MOT PV** complies the with the European directive for:

- The Electromagnetic compatibility no. 2004/108/CE dated 15th of December 2004.
- Low voltage directive no. 2006/95/CE dated 12th of December 2006.



#### 2.3.6. Lead free process

- The **SWITCH MOT PV** complies with the European directive for RoHS.



### 2.3.7. EMC standard

The **SWITCH MOT PV** is designed and built in accordance with IEC 60947-1 standards (Products intended to be installed in an «Industrial, Commercial and/or Residential Environment» therefore respecting both Class A as well as Class B EMC requirements).

Description	Std (IEC)	Requirement (criteria)
Conducted	CISPR 11	Class B
Radiated	CISPR 11	Class B
ESD contact	61000-4-2	4KV (B)
ESD air	61000-4-2	8KV (B)
Electromagnetic field	61000-4-3	10V/m (A)
RF Conducted	61000-4-6	10V (A)
Burst	61000-4-4	2KV (A) power 1KV (A) control
Surge Common	61000-4-5	2KV (A)
Surge differential	61000-4-5	1KV (B)

## 2.4. SWITCH MOT PV ACCESSORIES

### AVAILABLE 2.4.1. Customer fitted accessory

<p><b>TERMINAL SHROUDS (250 TO 800 A)</b> Incoming and outgoing protection against direct contact with the connection terminals or parts. Can be mounted top or bottom.</p> <p><b>TERMINAL SCREENS</b> Incoming and outgoing protection against direct contact with the connection terminals or parts.</p> <p><b>DOOR ESCUTCHEON PLATE</b> An accessory to be fixed onto a cabinet door to frame the motor part of flush mounted <b>SWITCH MOT PV</b> switches.</p>	<p><b>CONTROL VOLTAGE TRANSFORMER</b> Allows a standard 230 V AC device to be supplied with 400 VAC.</p> <p><b>MOUNTING SPACERS (250 TO 800 A)</b> Raises the device's terminals 10 mm away from the backplate or frame.</p>
---	--

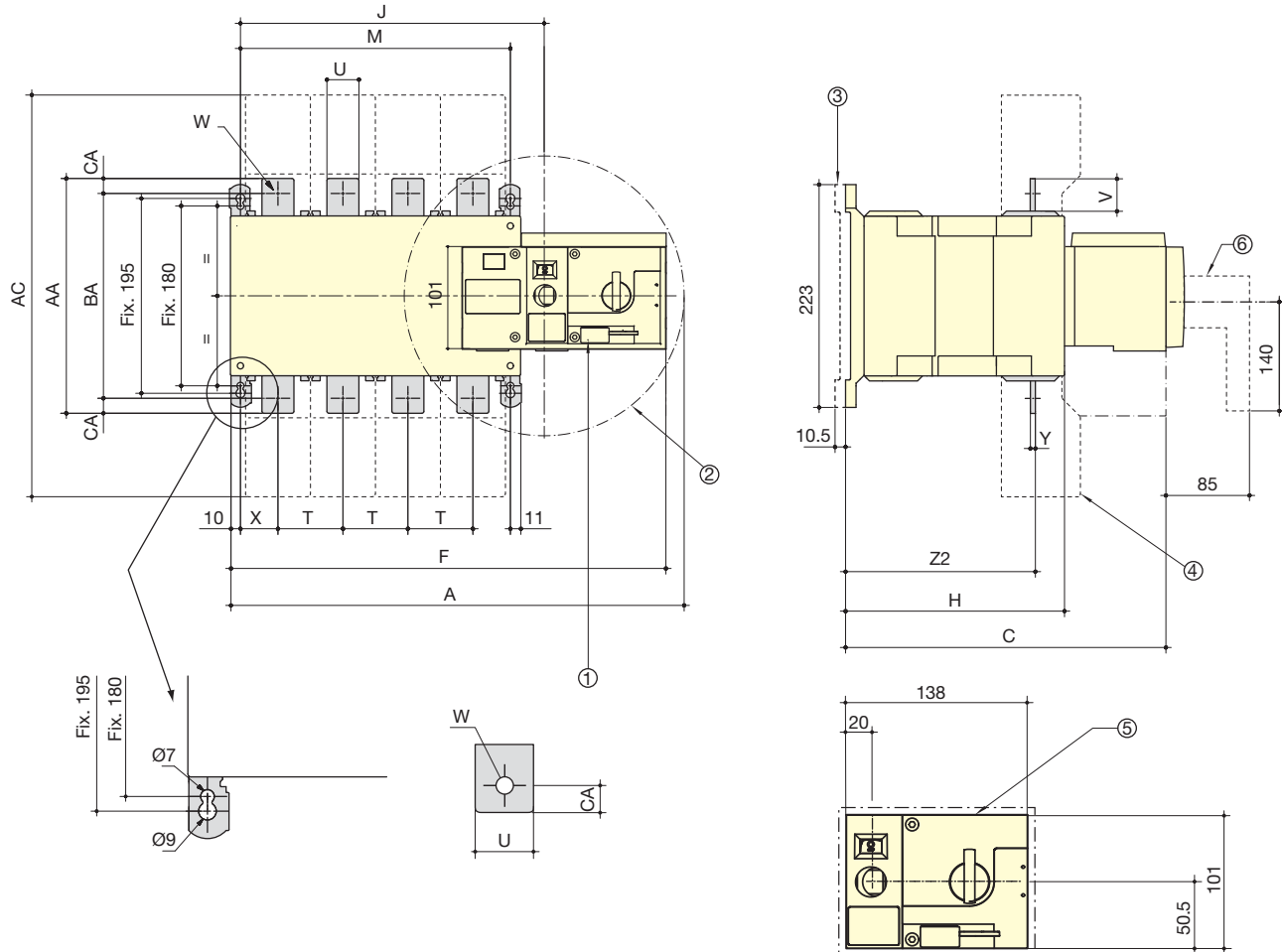
### 2.4.2. Factory fitted accessory

<p><b>SUPPLEMENTARY AUXILIARY CONTACT (AC)</b> Pre-breaking and signaling of positions I : 1 additional auxiliary contact NO / NC can be mounted. Included as standard for ratings from 3200A. For Low level AC: please consult gave.</p>	<p><b>RONIS KEY PADLOCKING</b> Locking of the electrical and manual operation by means of a RONIS EL11AP lock. Possibility of locking in all positions, if the "Padlocking in the 2 positions" option is ordered. Not compatible with flush mounting.</p> <p><b>PADLOCKING IN 2 POSITIONS</b> Allows locking of the operation in the 2 positions I and 0.</p>
---	---

## 3. INSTALLATION

### 3.1. Product dimensions

#### 3.1.1. Dimensions: Frame B4 to B5 (250 A to 800 A)



1. Padlocking Facility: Locking bracket for up to 3 padlocks of dia. 4 – 8mm
2. Emergency manual operation: Maximum operating radius with an operating angle of 90°
3. Mounting stand off with spacer accessory
4. Phase Barriers
5. Flush mounting cutout dimensions for front door
6. Emergency removable handle

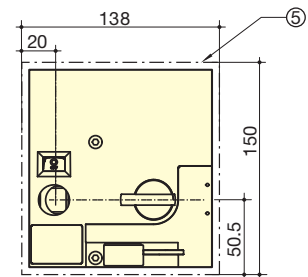


**CAUTION**

To consider the space required for manual operation and wiring.  
(When using the SWITCH MOT PV emergency handle).

Rating (A)	Overall dimensions		Terminal shrouds	Switch mounting				Connection										
	A 4p.	C		F 4p.	H	J 4p.	J1	M 4p.	T	U	V	W	X 4p.	Y	Z2	AA	BA	CA
250/B4	395	244	280	378	153	245	35	210	50	25	30	11	33	3.5	134.5	160	130	15
400/B4	395	244	280	378	153	245	35	210	50	35	35	11	33	3.5	134.5	170	140	15
400/B5	459	321	400	437	221	304	34	270	65	45	50	13	37.5	5	190	260	220	20
630/B5	459	321	400	437	221	304	34	270	65	45	50	13	37.5	5	190	260	220	20
800/B5	459	321	400	437	221	304	34	270	65	45	50	13	37.5	5	190	260	220	20

All dimensions in mm.



1600 A - 2000 A

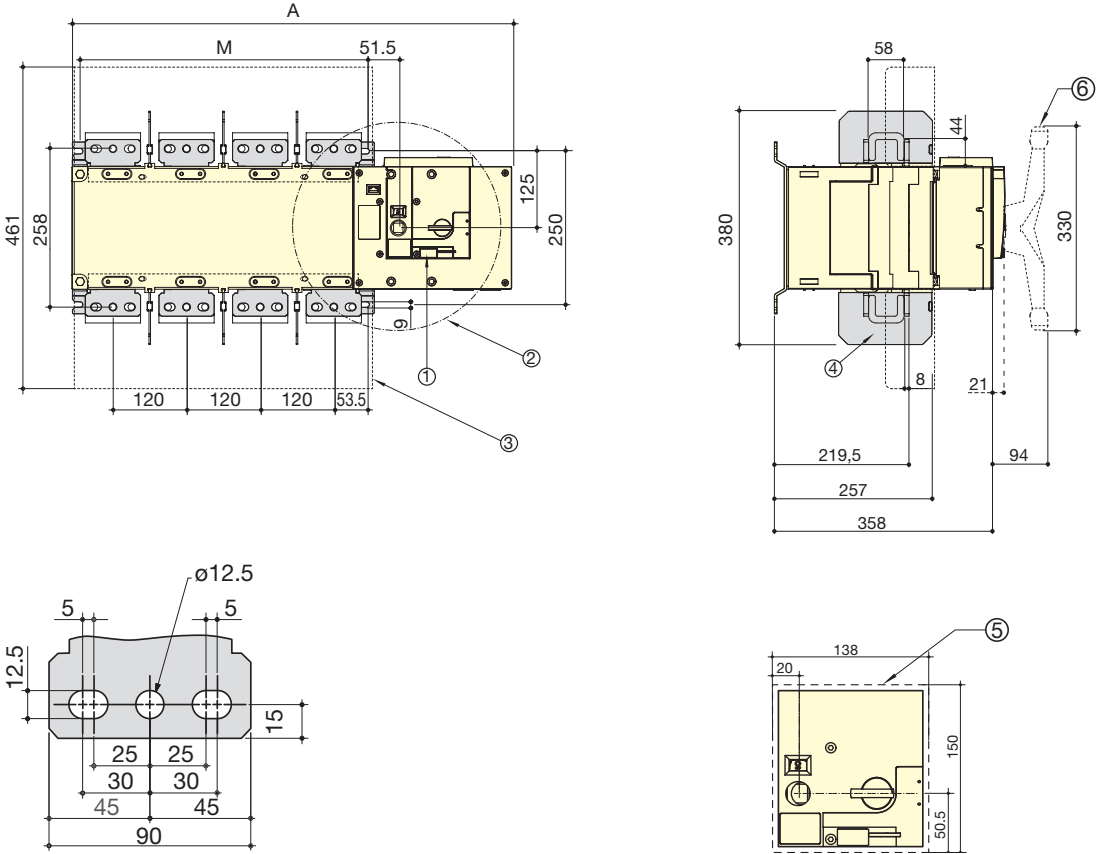


- 

To consider the space required for manual operation and wiring.  
(When using the SWITCH MOT PV emergency handle).

12 EN

3.1.3. Dimensions : Frame B8 (3200 A)



- 1. Padlocking Facility: Locking bracket for up to 3 padlocks of dia. 4 – 8mm
- 2. Emergency manual operation: Maximum operating radius with an operating angle of 90°
- 3. Terminal screens
- 4. Phase Barriers
- 5. Flush mounting cutout dimensions for front door
- 6. Emergency removable handle



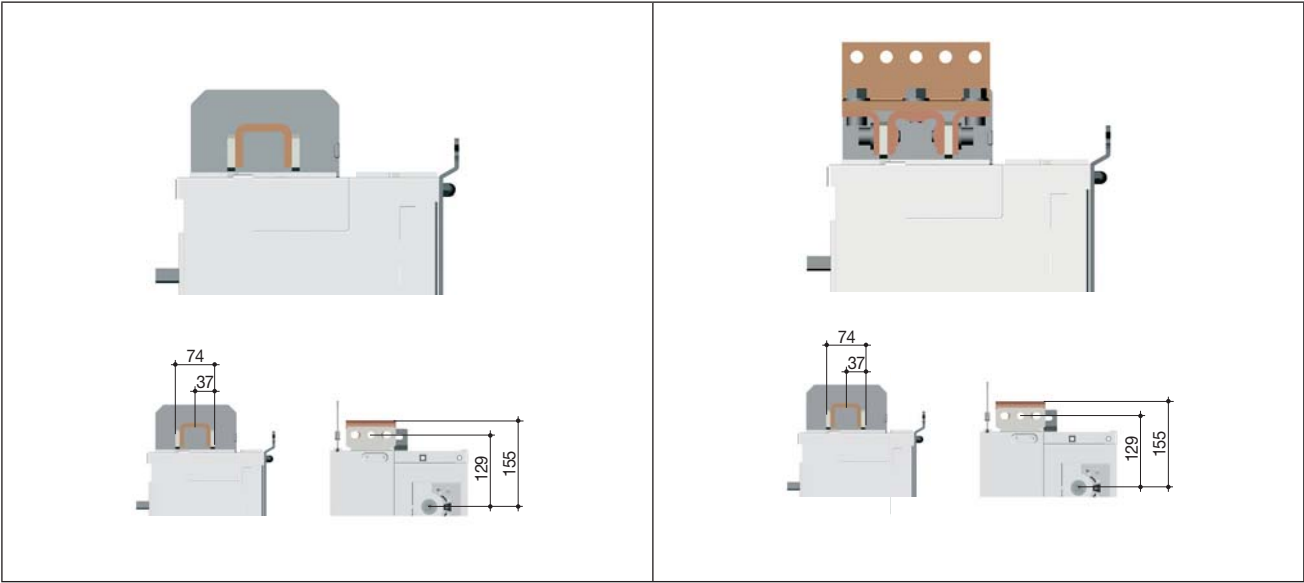
**CAUTION**

To consider the space required for manual operation and wiring.  
(When using the SWITCH MOT PV emergency handle).

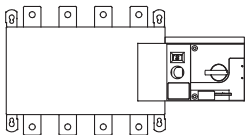
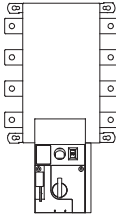
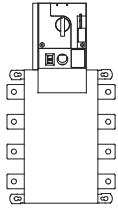
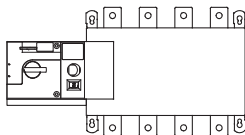
Rating (A)	Overall dimensions A 4p.	Switch mounting M 4p.
3200/B8	716	467

Toutes les dimensions sont en mm.

3.2. Copper bar connection for SWITCH MOT PV 3200 A



3.3. Mounting orientation

				
250 A to 800 A	Recommended	OK	Not Allowed	OK
1000 A to 3200 A	Recommended	Not Allowed	OK	OK



CAUTION

Always install the product on a flat and rigid surface.





### 3.4. Assembly of customer mounted accessories



**DANGER**

Never handle any customer mounted accessories while there may be the risk of voltage being or becoming present.

#### 3.4.1. Connection kits for SWITCH MOT PV 3200 A

Version* n°	Maximal current without downgrading (1)	Minimum Cu bar section <sup>(1)</sup>	 Included with 3200A product as standard	 + 708 lb-in 80 Nm	 + 708 lb-in 80 Nm	 708 lb-in 80 Nm  Washer MOY.M M12 NFE 25 511  H M12		
	<b>3</b>	Cu	2619 1200	2629 1200	2639 1200			
01	2500 A	2 x 100 x 10	-	-	-	H M12-35 6.8 - 6 x	12 x	6 x
02	2500 A	2 x 100 x 10	✓	✓	✓	H M12-55 6.8 - 3 x	6 x	3 x
03	2500 A	2 x 100 x 10	✓	✓	✓	H M12-55 6.8 - 5 x	10 x	5 x
04	3200 A	3 x 100 x 10	✓	-	-	H M12-35 6.8 - 3 x	3 x	-
05	3200 A	3 x 100 x 10	✓	-	-	H M12-45 6.8 - 3 x	6 x	-
06	2900 A	3 x 100 x 10	✓	✓	✓	H M12-65 6.8 - 3 x	6 x	3 x
07	3200 A	4 x 100 x 10	✓	-	-	H M12-45 6.8 - 6 x	6 x	-
08	3200 A	3 x 100 x 10	✓	✓	✓	H M12-65 6.8 - 5 x	10 x	5 x

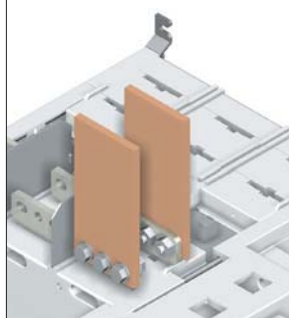
Note : Max Cu bar width - 100 mm. Reference numbers and quantity given above are for one connection and per pole. For a full set multiply the quantity indicated by the number of poles (3 or 4 pole)

(1) Conditions of use of these products may lead to a derating.

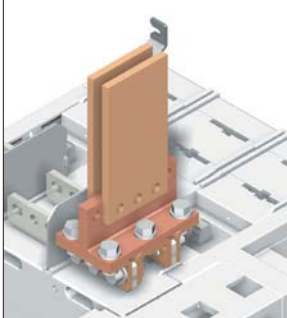
**3** I th = 3200 A  
4P  
55MPV 4320



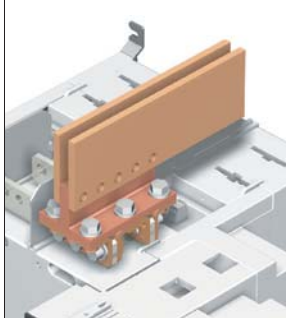
Version 01



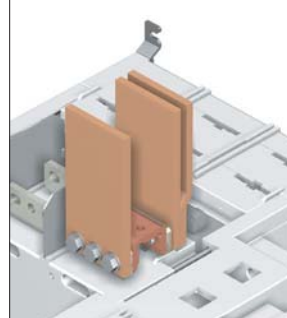
Version 02



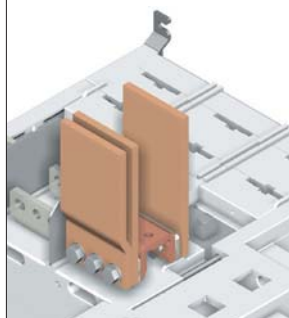
Version 03



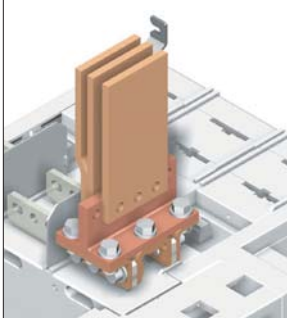
Version 04



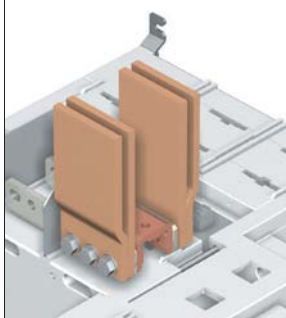
Version 05



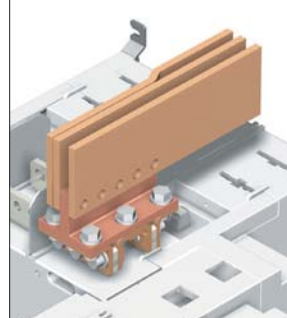
Version 06



Version 07

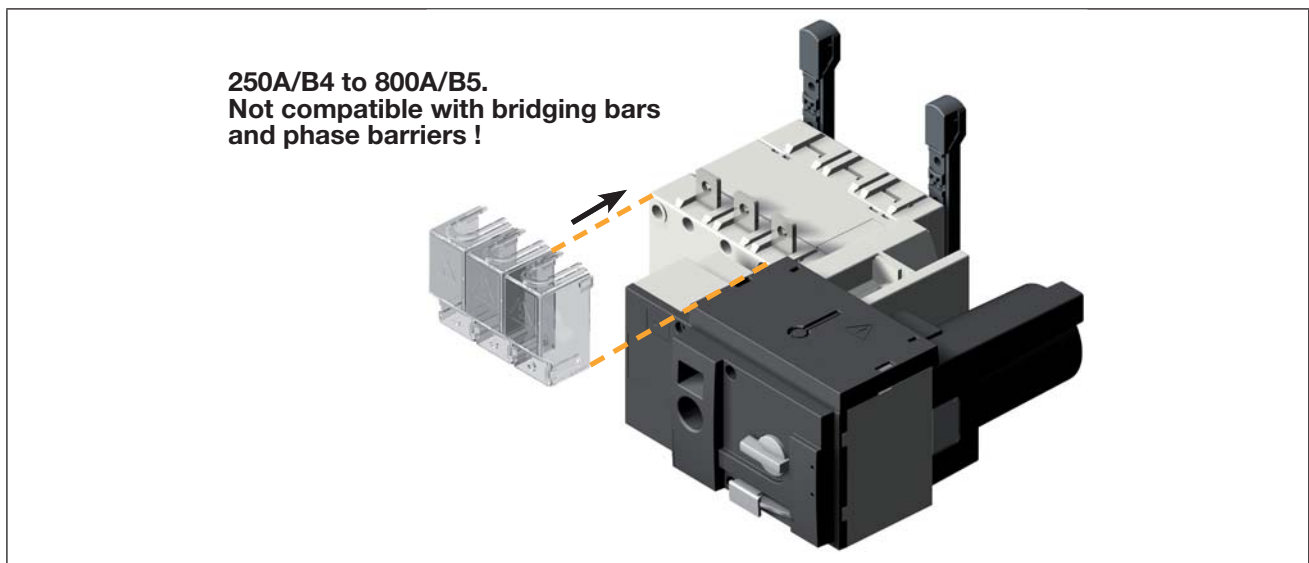


Version 08

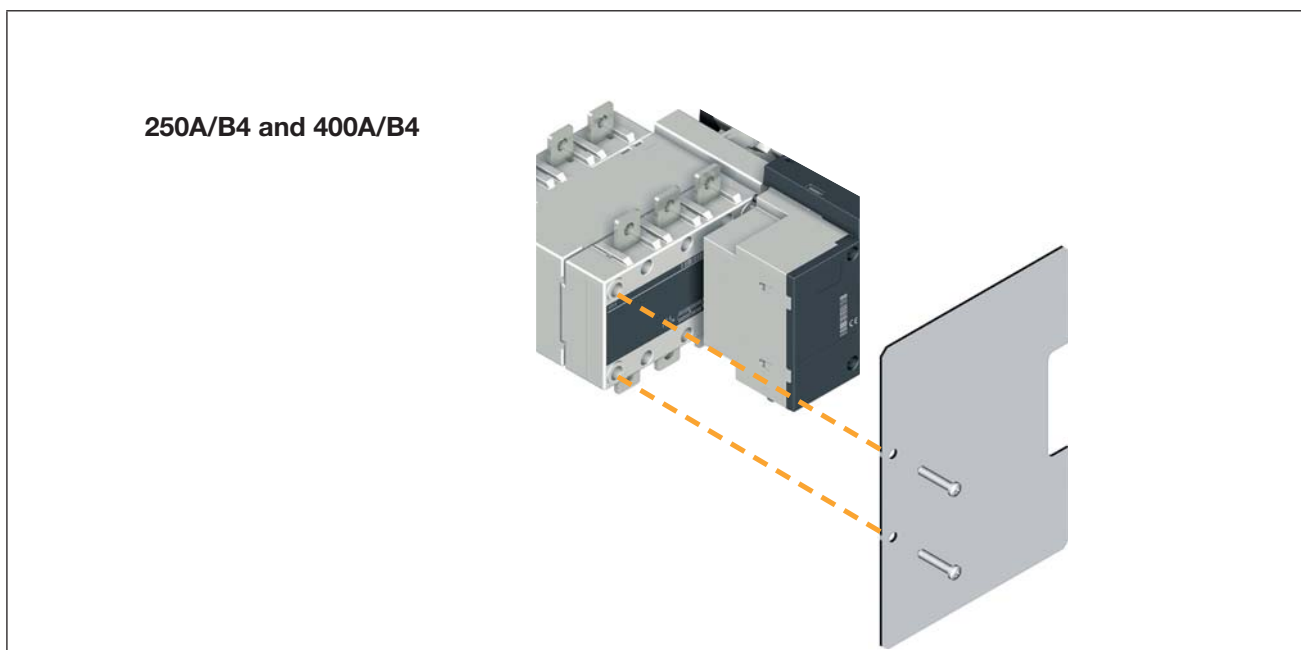


### 3.4.2. Terminal shrouds

Available from 250 A to 800 A. Upstream or downstream mounting.

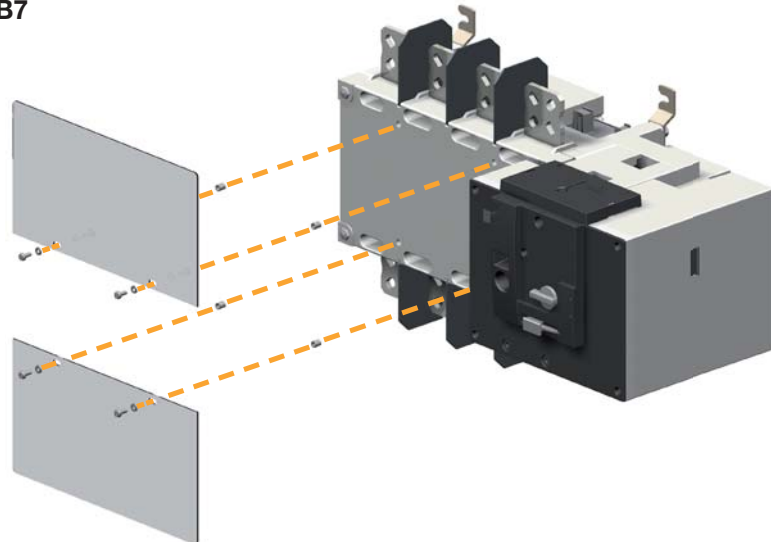


### 3.4.3. Terminal screens

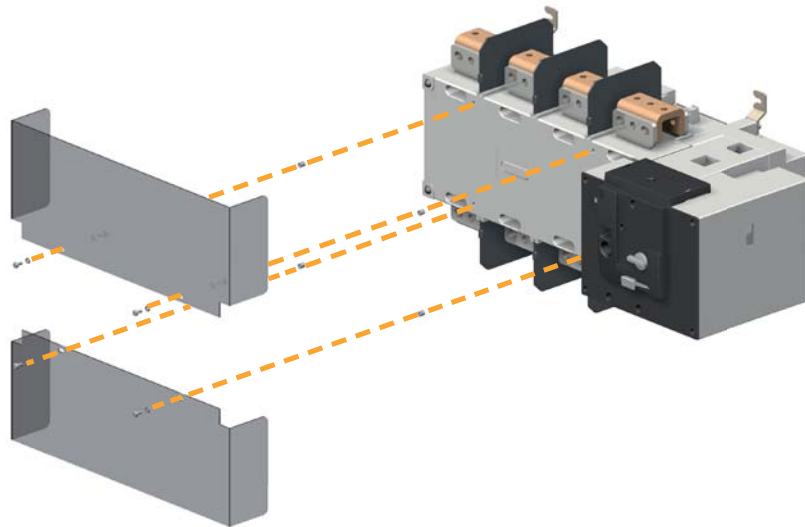




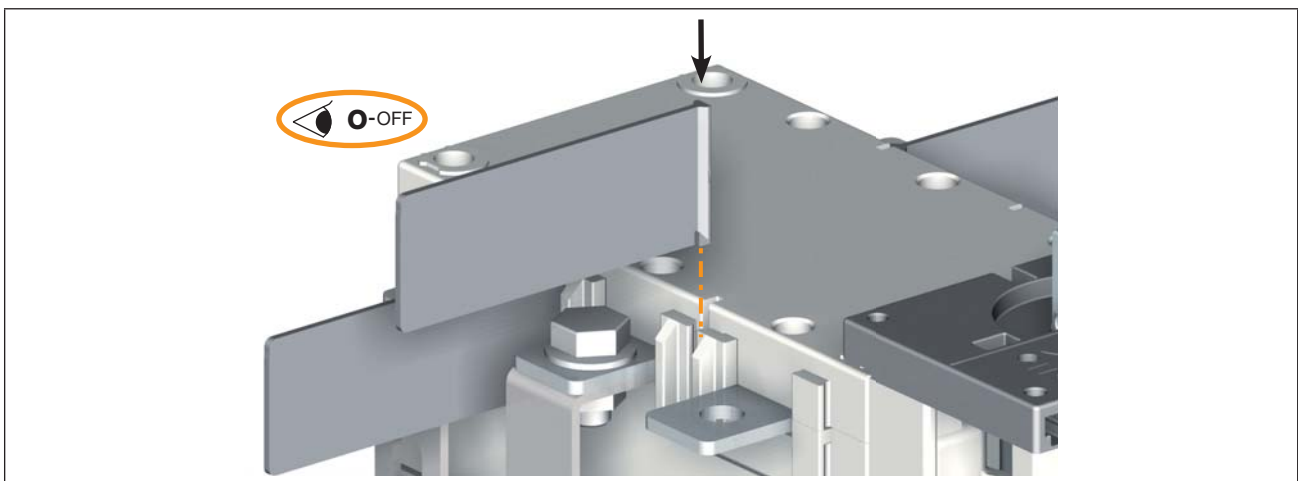
400A/B5 to 2000A/B7



3200A/B8

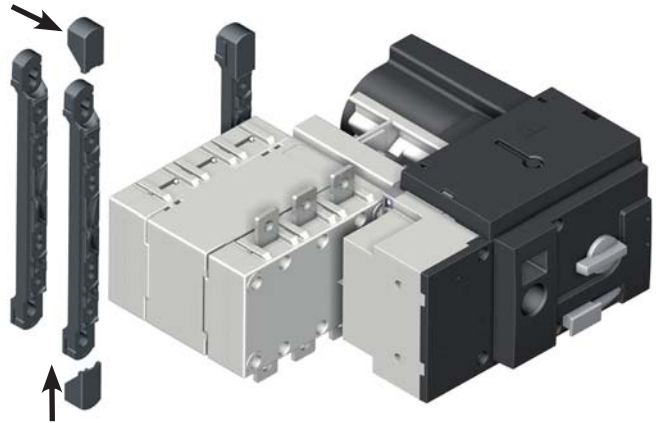


#### 3.4.4. Inter-phase barriers



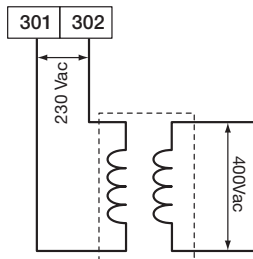
### 3.4.6. Raised mounting spacers

Available from 250 to 800 A.1 set including 2 spacers raises the device's terminals 10mm away from the bottom of the enclosure or frame on which the device is mounted. These may also be used to replace the original mounting spacers.



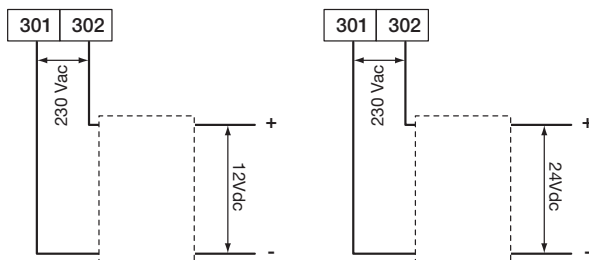
### 3.4.7. External Power supply (400 VAC - 230 VAC)

Power Transformer intended for 400VAC, Phase to Phase voltage applications that do not provide the availability of a neutral conductor. Transformer data: 400VAC – 230VAC: 200VA.



DC power supply available in 12Vdc as well as 24Vdc intended to allow a standard **SWITCH MOT PV** (250-1600A) to be powered from an appropriate DC supply. (Usually the battery of the backup generator source).

This converter is to be positioned as close as possible to the DC power source.



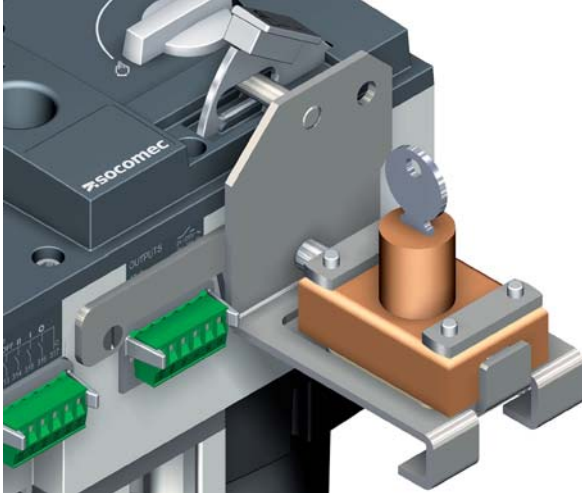
## 3.5. Factory fitted accessory

### 3.5.1. Padlocking key interlocks

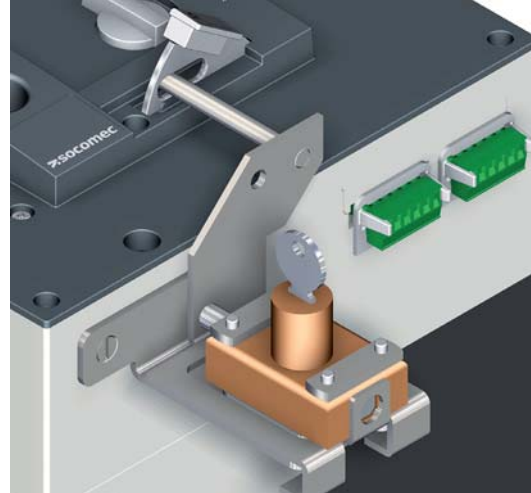
Intended for locking the electrical control and the backup control in position 0 using a RONIS EL11AP lock. As standard, key locking is in the 0 position.

Optionally and when including the option “padlocking in 2 positions” key locking will be in positions I, 0.

**250 A to 800 A**

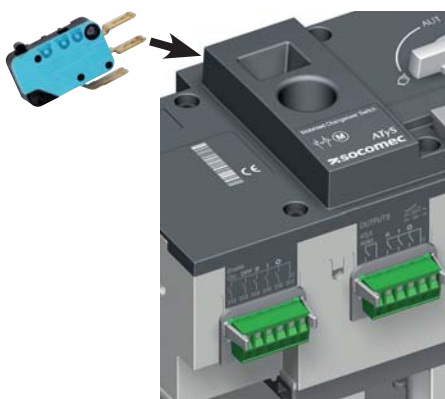
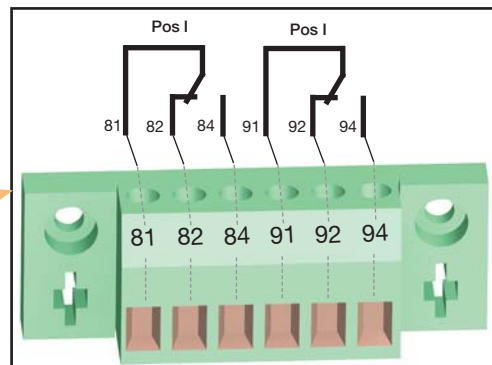


**1000 A to 3200 A**

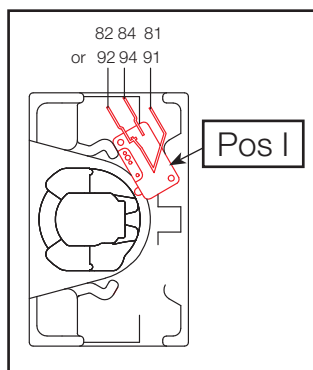


### 3.5.2. Additional auxiliary contacts

Intended for pre breaking and signaling of positions I. Up to 2 additional NO/NC auxiliary contacts can be fitted.



**250 A to 800 A (Optional)**



**1000 A to 2000 A (Optional)  
3200 A (Standard)**

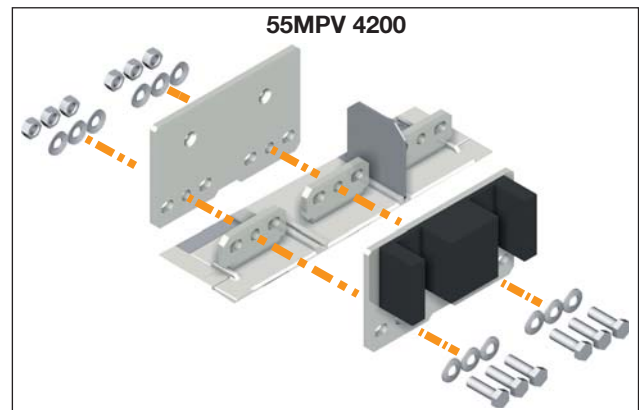
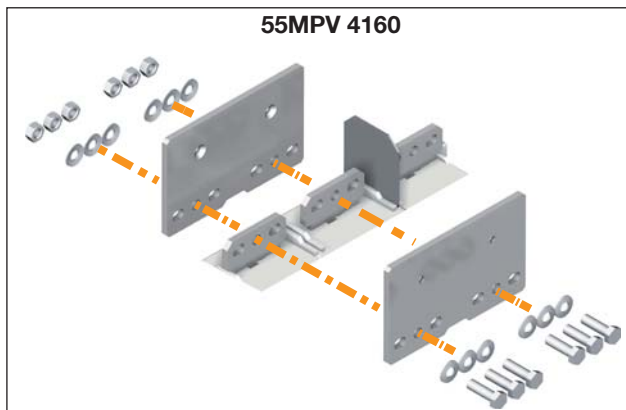
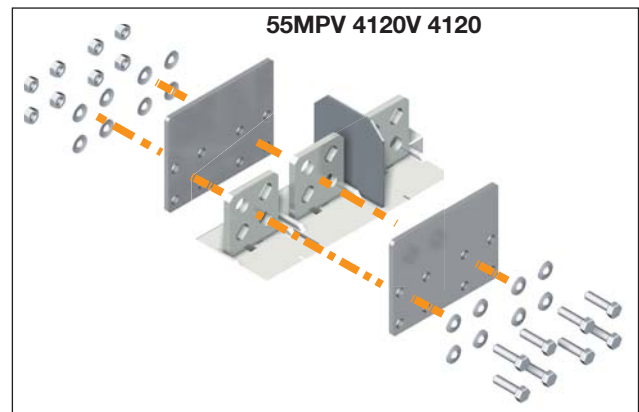
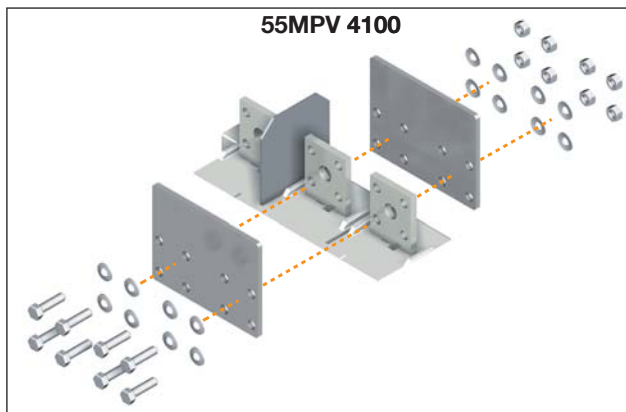
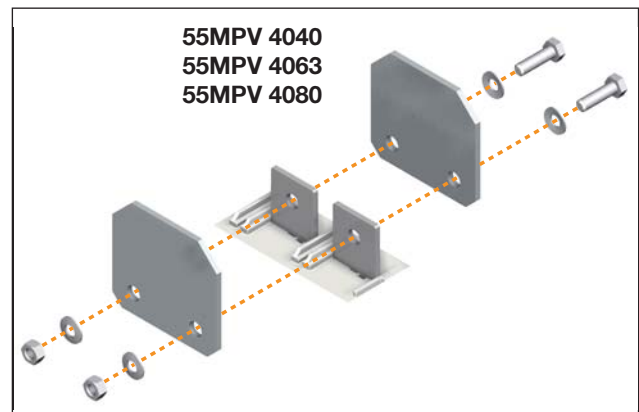
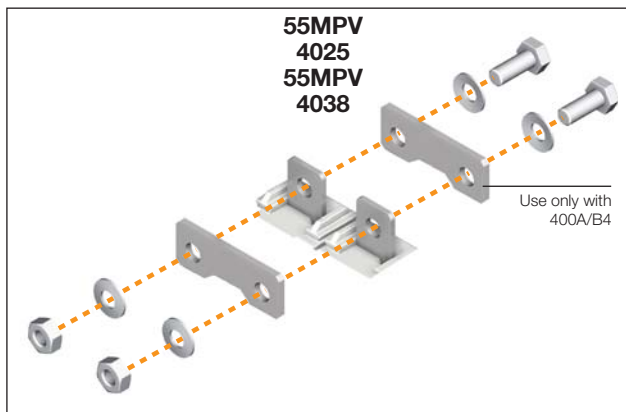
## 4. CONNECTIONS

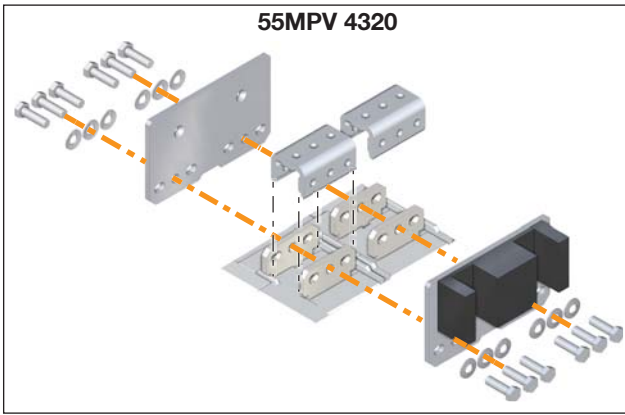
### 4.1. Power circuits

Note for all ratings: Take into account the connection cable lengths and/or others environmental specific operating conditions.

	250 A	400 A	400 A	630 A	800 A	1000 A	1250 A	1600A	2000 A	3200 A
Frame size	B4		B5			B6		B7		B8
Maximum cables section Cu (mm <sup>2</sup> )	120	240	240	2x185	2x240	2x240	2x240	6x185	-	-
Maximum bars width Cu (mm)	32	32	50	50	50	63	63	100	100	100
Tightening torque min./max (Nm)	20/26	20/26	40/45	40/45	40/45	40/45	40/45	40/45	40/45	40/45

### 4.2. Connection configuration

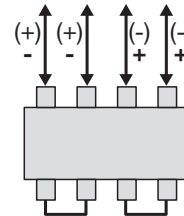
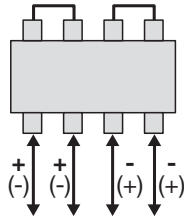




**2P +(-) / 2P -(+)**

Except 55MPV 4039

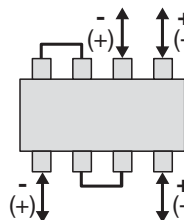
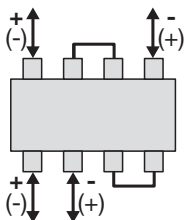
**2P +(-) / 2P -(+)**



**3P -(+ ) / 1P +(-)**

Except 55MPV 4039

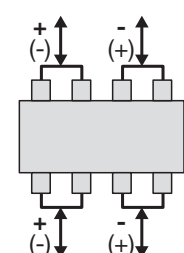
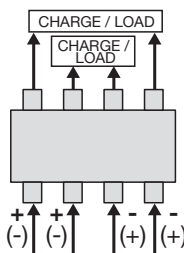
**3P -(+ ) / 1P +(-)**



**$I_e \leq 400A$**  per circuit

ONLY 55MPV 4039

**$I_e = 800A$**



## 4.3. Cable or bar connections

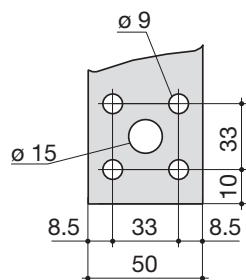
<p>Recommended tightening torque:</p> <ul style="list-style-type: none"> <li>• M6 : 4,5 N.m</li> <li>• M8 : 8,3 N.m</li> <li>• M10 : 20 N.m</li> <li>• M12 : 40 N.m</li> </ul>	<p>Maximum tightening torque:</p> <ul style="list-style-type: none"> <li>• M6 : 5,4 N.m</li> <li>• M8 : 13 N.m</li> <li>• M10 : 26 N.m</li> <li>• M12 : 45 N.m</li> </ul>
--	---

### 4.3.1. Power connection terminals

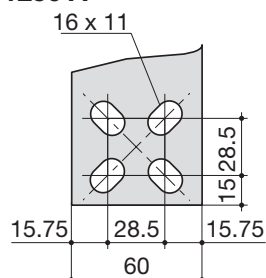
#### 250 A to 800 A

Refer to section "Product dimensions", page 11 for more informations about power connection terminals.

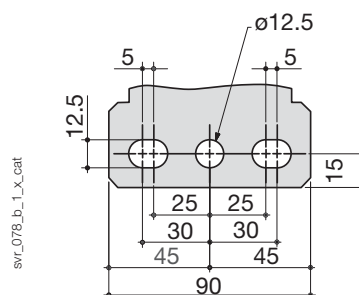
#### 1000 A



#### 1250 A



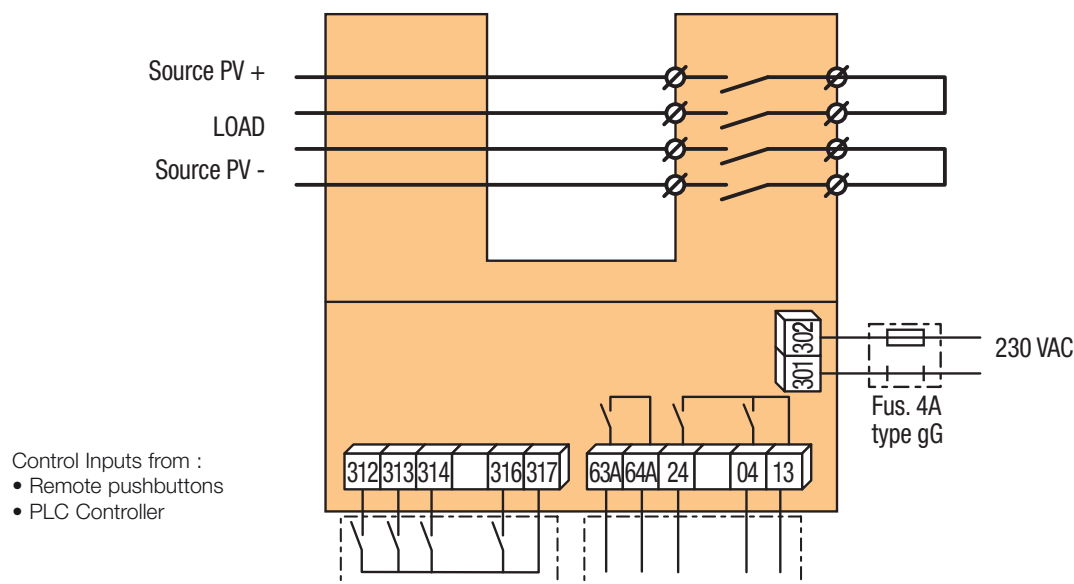
#### 1600 A à 3200 A



## 4.4. Control circuits

### 4.4.1. Typical SWITCH MOT PV wiring

Example: Control wiring for photovoltaic application



**CAUTION**

Verify that the Auxiliary power supply feeding terminals 301 and 302 are within the limits of 208VAC -> 277VAC  $\pm 20\%$  (166-332VAC).

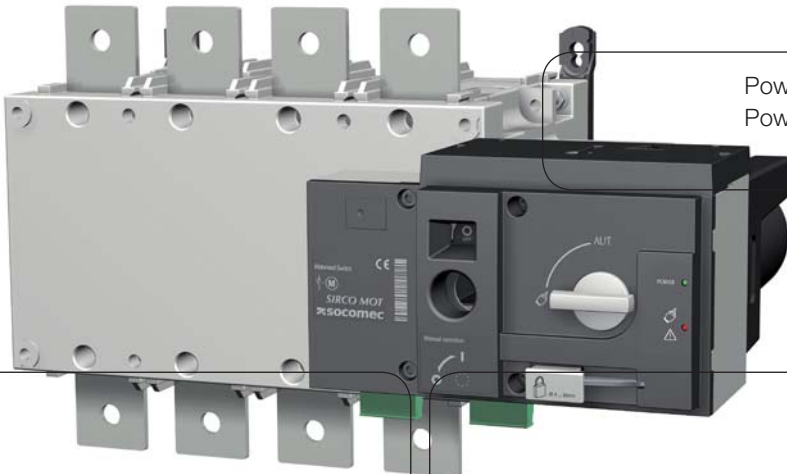


**DANGER**

Do not handle any control or power cables connected to the SWITCH MOT PV when voltage may be present.

## 4.4.2. SWITCH MOT PV input and output contacts

### 4.4.2.1. Terminal denomination, description and characteristics.



Power I/P L: 301  
Power I/P N: 302

301 302  
L N  
Aux. supply  
230V~  
(208-277V~ ±1-20%)

⚠ All pressure on the connector pins is to be avoided during wiring of the auxiliary cables

**CONTROL**

Enable Ctrl OFF I

312 313 314 316 317 C

Control Enable : 312  
Override to OFF : 313  
Switch to Pos I : 314  
Switch to Pos 0 : 316  
Common : 317

Prod Avail Common 63A  
Prod Avail O/P: 64A  
Pos I Aux Contact: 24  
Pos 0 Aux Contact: 04  
Common: 13

**OUTPUTS**

SIRCO MOT PV avail.

2A / 250V ~  
2A / 24V ---

63A 64A 24 04 13 C

Denomination	Terminal	Description	Characteristics	Recommended Cable Section
<b>Signalisation Outputs</b>	13	Common I - 0 for Aux Contacts	Dry Contacts 2A AC1 / 250V	1,5 mm <sup>2</sup>
	04	Aux Contact Position 0 - Normally Open Contact		
	24	Aux Contact position I : Normally Open Contact		
	63A	Product Available : Normally Open Contact. Closed when the <b>SWITCH MOT PV</b> is in Auto mode and motorisation is operational. (No Fault powered and ready to changeover)		
	64A			
<b>Additional Aux Contact</b>  Included with 3200A  Optional for 250A to 2000A	81 / 91	Common for Aux Contacts positions I	Dry Contacts 2A AC1 / 250V	1,5 – 2,5 mm <sup>2</sup>
	82 / 92	Aux Contact position I: Normally Closed Contact		
	84 / 94	Aux Contact position I: Normally Open Contact		
<b>Power supply Input</b>	301	Power supply – L	208 - 277VAC ± 20% : 50/60Hz	1,5 mm <sup>2</sup>
	302	Power supply – N		
<b>Control Inputs</b>	312	Remote Control Mode Enable when closed with 317	Attn: Do not connect to any Power supply  Max cable length 100m	1,5 mm <sup>2</sup>
	313	Position 0 order if closed with 317. (Priority order input forcing the product to remote control mode and 0 position)		
	314	Position I order if closed with 317		
	316	Position 0 order if closed with 317		
	317	Common control terminal for 312 - 316 <b>SWITCH MOT PV</b> (Specific Voltage Supply)		



**ATTENTION**

Do not connect terminals 312 to 317 to any power supply. These order inputs are powered through terminal 317 and external dry contacts ONLY.



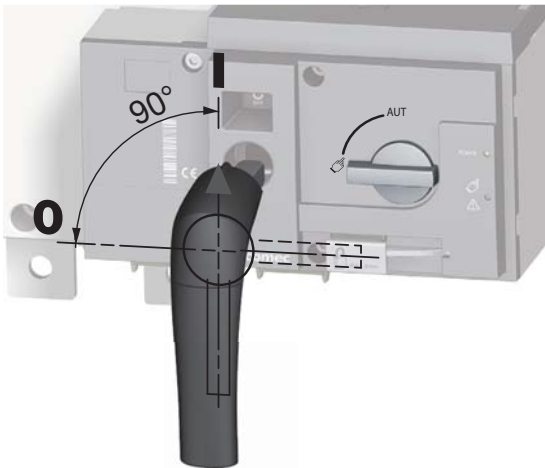








## 5. OPERATING MODES

The **SWITCH MOT PV** includes 3 safe and distinct operating modes through a selector switch located on the front of the product.

The modes of operation are as follows:

- Auto Mode: "Remotely operated transfer switching"
- Manual Mode: "Local emergency manual operation"
- Locked Mode: "Secure locked padlocking facility"

<p><b>AUT</b> MODE</p>		<p><b>AUT</b></p> <p><b>AUTO MODE:</b></p> <ul style="list-style-type: none"> <li>• Activates the remote control inputs.</li> <li>• Inhibits the padlocking facility</li> <li>• Inhibits the insertion of the manual operation handle when in AUT Mode</li> </ul> <p>AUTO Mode position is inhibited when padlocked or when the handle for manual operation is inserted into the <b>SWITCH MOT PV</b>.</p>
<p> MODE</p>		<p><b>AUT</b></p> <p><b>MANUAL MODE: (Not Padlocked)</b></p> <ul style="list-style-type: none"> <li>• Inhibits the control inputs.</li> <li>• Allows to insert the handle for emergency manual operation.</li> <li>• Allows padlocking in O Position. <i>(With the handle for manual operation removed)</i></li> </ul> <p>Turning the selector switch to  from AUT and back to AUT resets a fault state.</p>
<p>  MODE</p>		<p><b>AUT</b></p> <p><b>MANUAL MODE: (Padlocked)</b></p> <ul style="list-style-type: none"> <li>• Inhibits the control inputs.</li> <li>• Inhibits insertion of the emergency handle.</li> <li>• Allows padlocking when in O Position.</li> </ul> <p>  POS 0</p> <p>Padlocking in position I - O is possible when the optional function is included in the <b>SWITCH MOT PV</b>. (Refer to product catalogue)</p>



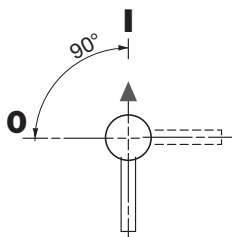
## 5.1. Manual operation

### 5.1.1. Emergency manual operation

The **SWITCH MOT PV** can be manually operated whilst retaining the electrical characteristics and performance of the power switching function. This function is usually used in case of emergencies or during maintenance.

To operate the **SWITCH MOT PV** manually ensure that no live parts are accessible, turn the front selector switch into the manual position and insert the handle into the emergency handle shaft location hole provided.

Turn the handle 90° clockwise or anti-clockwise (depending on the position to be reached) for each consecutive change in position. I -> O -> I.



#### CAUTION

Ensure to verify the product position and direction of rotation before effecting manual operation.

Ensure to remove the handle from the product before changing the selector switch back to AUT position.

### 5.1.2. Padlocking

The **SWITCH MOT PV** can be padlocked in the O position as standard whilst padlocking in positions I or O is available as a factory fitted option.

To padlock the **SWITCH MOT PV** first ensure that the **SWITCH MOT PV** mode selector switch is on Manual then ensure that the emergency manual operation handle is not inserted into the location hole. (Remove if inserted).

Pull the padlocking mechanism outwards to reveal the slot for inserting up to 3x dia. 4 - 8mm padlocks.

Padlock the device with approved quality padlocks of minimum diameter 4mm and maximum diameter of 8mm. A maximum of 3x 8mm padlocks may be padlocked onto the **SWITCH MOT PV** to padlocking mechanism.



#### CAUTION

As standard, padlocking is only made possible in the "O position", when in manual mode and with the emergency handle not inserted.

## 5.2. Electrical operation

### 5.2.1. Power supply

The **SWITCH MOT PV** is to be powered between terminals 301 and 302 with a supply within the limits of :

- 208 – 277Vac  $\pm 20\%$  (166 – 332Vac)
- 50/60Hz  $\pm 10\%$

Current Input:

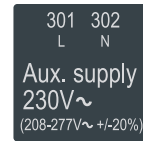
- 10mA (Standby mode)
- 15A max (Switching mode)
- 2A (Nominal operating current )

Surge Protection :

- Vin\_sg: 4 / 8KV – 1.2/50 $\mu$ s

Terminal connector:

- Minimum 1.5mm<sup>2</sup>
- Maximum 2.5mm<sup>2</sup>

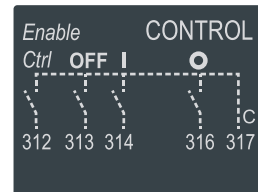


### 5.2.2. Fixed inputs

#### 5.2.2.1. Description

The **SWITCH MOT PV** includes for 4 off fixed inputs through a 6 pin connector installed on the motorisation module. No additional power supply should be used on these contacts as the inputs **MUST** be used with the common supply taken from terminal 317.

The **SWITCH MOT PV** Power Supply (301 - 302) must be available to activate inputs 312 to 317.



Pulse duration for activation of contact inputs:  $\geq 60$ ms.

- **Pin 312:** Remote Control Mode Enable when closed with 317.

This contact must be closed with 317 so as to activate all control inputs except for 313 that takes priority and is active immaterial of the state of input 312. Enabling remote control through 312 activates the remote control inputs.

- **Pin 313:** Position 0 order if closed with 317 when in AUTO. **(Force the switch to the OFF Position)**

This is a **“Priority Order Input”** meaning that when closed with 317 it takes priority over all other electrical commands. The **SWITCH MOT PV** will remain in 0 position as long as the contact 313 – 317 remains closed. Once the contact is open the **SWITCH MOT PV** is ready to receive new orders. This contact order is independent of other inputs and is also enabled without 312 connected to 317. Impulse duration to activate and start switching to position 0 is a minimum of 60ms. The product state will be unavailable.

- **Pin 314:** Position I order if closed with 317.

This contact is active with the **SWITCH MOT PV** in AUT mode with contact 312 – 317 closed and 313 – 317 open. Impulse duration to activate and switch to position I is a minimum of 60ms.

- **Pin 316:** Position 0 order if closed with 317

This contact is active with the **SWITCH MOT PV** in AUT mode with contact 312 – 317 closed and 313 – 317 open. Impulse duration to activate and switch to position 0 is a minimum of 60ms. For contactor logic maintain contacts on between terminal 316 and 317.

- **Pin 317:** Common

Common supply for inputs 312 to 316

### 5.2.2.2. Technical data

	Motorisation Module
Input Qty	5
Direct Current lin	0.35 to 0.5mA
Line resistance	1k $\Omega$
Line length	100m (Min. wire 1.5mm <sup>2</sup> #16AWG)
Pulse duration	60ms
Power per Input	0.06VA
Surge protection Vin_sg	4.8kV (1.2/50 $\mu$ s surge)
ESD withstand voltage (Contact/air)	2/4kV
Insulation (Common mode)	4.8kVAC (Between I/P and all common parts)
Terminal connector	1.5mm <sup>2</sup> minimum / 2.5mm <sup>2</sup> max

### 5.2.2.3. Remote control logic

Remote switching operation can be driven in AUT mode by external volt free contacts as described above using input contacts 312 to 317.

Depending on the wiring configuration there are two types of logic that may be applied to the **SWITCH MOT PV**.

- Impulse logic or
- Contactor logic.

In remote control, the **SWITCH MOT PV** inputs give priority to order I over 0 therefore contactor logic can be implemented by simply bridging terminals 316 and 317.

(NOTE: 313 – 317 closed / Force **SWITCH MOT PV** to OFF Position, takes priority over all other orders no matter of the control logic used.)

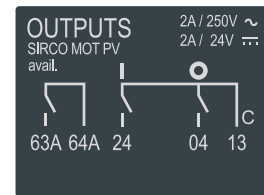
<p><b>Impulse logic (standard configuration) :</b></p> <p>The <b>SWITCH MOT PV</b> is driven to a stable position (I – O) after receiving an impulse order.</p> <ul style="list-style-type: none"> <li>• A switching command of at least 60 ms is necessary to initiate the switching operation</li> <li>• When switching command disappears, the product remains in its position</li> <li>• The switching command (pulse) can be of infinite duration without causing any product dysfunction</li> <li>• Order I have priority over order 0.</li> </ul>	<p style="text-align: center;"><b>Impulse logic</b></p> <p style="text-align: center;">Imp. <math>\geq</math> 60 ms</p> <p>(Note : Excludes position switching delays)</p>
<p><b>Contactor Logic :</b></p> <p>The <b>SWITCH MOT PV</b> is driven to the position I for as long as the order is maintained.</p> <ul style="list-style-type: none"> <li>• Order O is maintained. (Bridge 316 – 317)</li> <li>• Orders I have priority over order 0.</li> <li>• If order I disappears, the device returns to zero position. (With the power supply available).</li> </ul>	<p style="text-align: center;"><b>Contactor logic</b></p> <p style="text-align: center;">maintained</p> <p>(Note : Excludes position switching delays)</p>

### 5.2.3. Fixed outputs - Dry contacts

#### 5.2.3.1. Description

As standard, the **SWITCH MOT PV** is equipped with four fixed outputs located on the motorisation module.

(Dry contacts to be powered by the user).



#### 5.2.3.2. Position auxiliary contact

The **SWITCH MOT PV** is equipped with integrated position (I – O) auxiliary contact outputs through 3 off micro switches.

#### Pins 13, 04, 24

(Normally Open contacts with pin 13 as common)

#### 5.2.3.3. SIRCO MOT PV Product available output (motorisation)

##### Pin 63A – 64A

(Normally Open contact that is held closed when the motorisation is available).

This contact gives constant feedback about the product's availability and it's capacity to operate.

The **SWITCH MOT PV** performs a self diagnostics test on the motorisation module at startup, when put from Manual -> Auto and then every 5 minutes. This test ensures that the **SWITCH MOT PV** is operational in terms of control inputs. Should one of the tests fail, a second test is performed to reconfirm the error state. Should the **SWITCH MOT PV** motorisation module become unavailable, contact 63A – 64A are opened, the power/ready LED's are switched off, and the fault LED is activated. The fault LED will remain active for as long as sufficient power is available and the fault condition is not reset. The fault is reset when the product is switched from AUT -> Manual -> Auto mode.

**SWITCH MOT PV** (Motorisation) Product Available / Unavailable Watchdog relay will open for any of the following reasons below: For added security, "Product Availability" is informative and does not necessarily inhibit motor operation.

Product Unavailable + Warning LED Condition:	Inhibition
Product in manual mode	Yes
Motor not detected (Autotest)	No
Control voltage out of range	Yes
Operating factor fault active (N° of operations / min)	Yes
Powerfail active	Yes
Customer input autotest failed	No
Invalid product customisation	No
Abnormal switching when not in manual mode	Yes
Requested position not reached	Yes
Locked mode active when not in manual mode	Yes
External Fault -> User input	No
Unexpected current flowing through the motor when idle	Yes

*Sampling rate for the above is every 10 ms*

*Exception: motor detection sampling rate is every 5 min*

#### 5.2.3.4. Technical data

Auxiliary Contact Quantity	2
Configuration	NO
Mechanical Endurance	100 000 cycles
Response Time	5 – 10 ms
Startup duration	200ms
Rated Voltage / Switching Voltage	250VAC
Rated Current	5A
Surge protection Vin_sg:	4.8kV (1.2/50µs surge)
ESD withstand voltage (Contact/air):	2/4kV
Dielectric Strength contact/parts:	4.8kVAC (Reinforced Insulation)
Insulation:	4.8KVAC
Output Terminal:	1.5mm <sup>2</sup> minimum / 2.5mm <sup>2</sup> maximum

## 6. TROUBLE SHOOTING GUIDE

The <b>SWITCH MOT PV</b> does not operate electrically	<ul style="list-style-type: none"> <li>• Verify the power supply on terminals 301-302: 208 - 277 VAC <math>\pm 20\%</math></li> <li>• Verify that the front selector switch is in position (AUT)</li> <li>• Verify that contacts 313 and 317 are open.</li> <li>• Verify that the power LED (Green) is On whilst the fault LED (RED) is off.</li> <li>• Verify that the product is available with contacts 63A and 64A closed.</li> </ul>
It is not possible to manually operate the switch	<ul style="list-style-type: none"> <li>• Verify that the front selector switch position is on the Manual position.</li> <li>• Make sure that the product is not padlocked</li> <li>• Verify the rotation direction of the handle</li> <li>• Apply a sufficient progressive action in the direction as indicated on the handle</li> </ul>
Electrical operation does not correspond to external order I,O	<ul style="list-style-type: none"> <li>• Verify the selected control logic wiring (impulse or contactor)</li> <li>• Verify the connector connections.</li> </ul>
The fault/manual LED is ON	<ul style="list-style-type: none"> <li>• The FAULT / MANUAL LED is on when in manual mode (this is normal) and in AUT Mode when there is an internal fault in the <b>SWITCH MOT PV</b>. To reset a fault condition switch the <b>SWITCH MOT PV</b> from AUT to Manu and back to AUT. Should the fault LED remain on you will need to localize and clear the fault prior to reset.</li> <li>• The FAULT / Manual LED will also be on when contact 313 is closed with 317. (Force the <b>SWITCH MOT PV</b> to off position). This is a normal condition.</li> <li>• Should the Fault LED remain on abnormally, contact <b>gave</b>.</li> </ul>
Impossible to padlock	<ul style="list-style-type: none"> <li>• Verify that the front selector switch is in manual position</li> <li>• Verify that the emergency handle for manual operation is not inserted into the <b>SWITCH MOT PV</b> manual slot.</li> <li>• Verify that the <b>SWITCH MOT PV</b> is in 0 position (Padlocking is only possible in 0 position for standard products)</li> </ul>





+31 (0)180 33 05 22  
sales@controlin.nl  
www.controlin.nl



**low voltage electrical manufacturer**