

Switch disconnector for solar application according to IEC 60947-1&3 by Dekra (KEMA) and CCC (CQC)

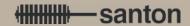


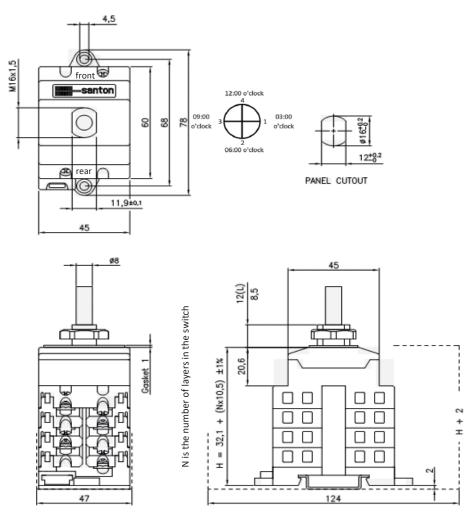




	Terminals Scheme									
Layer	Fron	t Side	Symbol	Symbol Rear Side		Or	Po	sitic	ns	
No.	Left	Right	Зуппоот	Left	Right	1	2	3	4	
	13		_/_	14			Х		Х	
5		11			12	Х		Х		
4			Empty							
3	-1		_/_	-1			Χ		Χ	
2		+1	_/_		+1		Χ		Χ	
1			Empty							

Technical data	Symbol Me	erit	Unit
rated operational voltage (DC poles)	Ue	100	00 V dc
rated operational current (DC poles)	le		16 A dc
rated operational voltage (second rating DC poles, if requested)	Ue	8.	50 V dc
rated operational current (second rating DC poles, if requested)	le		20 A dc
rated operational voltage (third rating DC poles, if requested)	Ue	80	00 V dc
rated operational current (third rating DC poles, if requested)	le		25 A dc
rated operational voltage (fourth rating DC poles, if requested)	Ue	6.	50 V dc
rated operational current (fourth rating DC poles, if requested)	le	:	32 A dc
method of mounting	both bottom and	single hole mounting [D]	
number of DC poles			2
utilization category DC	DC-21B		
actuator	motor		
positions	OFF at 3 hr, ON a	t 6 hr, OFF at 9 hr, ON at 12 h	nr
rated impulse withstand voltage	Uimp		8 kV
insulation voltage	Ui	100	00 V
rated thermal current uninterrupted duty	lu	:	25 A
rated short-time withstand current (1s)	Icw	7:	50 A
rated short-circuit making capacity	Icm	1	.,4 kA
rated conditional short-circuit current			5 kA
method of operation	independent ma	nual operation	
minimum required dimensions of enclosures L x W x H* (on DIN-rail H = -	+2mm) {space envelope}	124 x 47 x 84,	,6 mm
* see the drawing for the height of the switch. The number of layers N is:	:		5
knob operation force		max. 1	.,4 Nm
tightening torque terminal screws M4, min max.		1,5 1	.,7 Nm
tightening torque panel mounting nut, min max.		2,0 2	,5 Nm
tightening torque M3 screw in the standard black knob, min max.		0,5	,7 Nm
ambient temperature allowed between		- 25 to + 1	70 °C
storage temperature allowed between		- 40 to + 8	°C 08
maximum relative humidity, without condensation at 20 °C		(	90 %
pollution degree			2
IP rating terminals		IP:	20
IP rating gland of the shaft in case of single hole panel mounting		IPO	65
rated operational voltage (AC poles)	Ue		V ac
rated operational current (AC poles)	le		A ac
number of AC poles (for general use)			
minimum required fine wire cross-section: IEC60947-1, table 9			mm2
auxiliary contact(s), AC15 one chamber, 250V	′, 16A: [R]		
auxiliary contact ratings			
weight		25	4 g
accessories:	-		
	-		





In the application all ratings according to the datasheet have to be respected. After mounting, the wiring must be checked and the switch must operate smoothly. When building the switch in an enclosure, the space envelope must be respected according to the applicable standards.

### Maintenance

The X type switches are designed for a very long life but it is advised to do some simple yearly maintenance.

- Check the installation for signs of overload or overheating. The terminals may not exceed the limit of 85°C under full load.
- By operating the switch a few times (5x) the contacts will clean themselves and the switch will have a longer life.

### **Connection details**

Description	Symbol		Val	ues		Unit
Rated operational current (DC poles)	le	16	20	25	32	A dc
Required fine wire cross-section (minimal): IEC60947-1, table 9	А	2,5	4	4	6	mm²
max power dissipation	Р	0,5	0,8	1,2	1,9	W

The terminals, without interconnection can take copper wires up to 6 mm2.

The recommended Spade Tongue Terminals may have a maximum width of 9 mm.

For CSA and UL applications, registered Spade Tongue Terminals must be used.

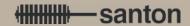
The registration numbers are UL: E13288 and CSA: LR7189 (for instance type 165015 from Tyco).

### **Registerd Spade Tongue Terminals**

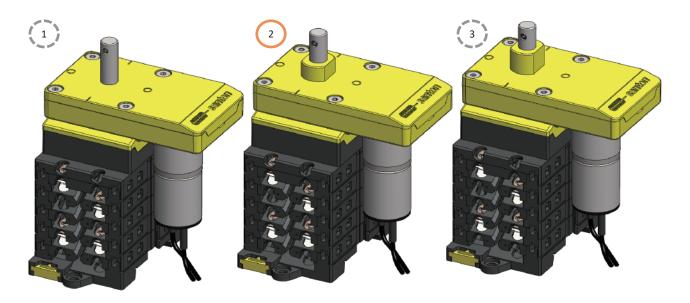
Recommend Manufacturer	Type number	Wire size (AWG)	Wire size (mm²)	Color
JST	FVD2-YS4A	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
TE connectivity	C-165012	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
Vogt	3635c	AWG 16 – AWG 14	1,5 – 2,5 mm²	Blue
TE connectivity	C-165015	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Vogt	3652c / 3653c	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Santon (JST)	52A1256.35	AWG 8 - AWG 10	10,5mm²-16mm² *1	*2

 $<sup>^{*1}\,</sup>$  16mm² only with fine stranded wire or two 6mm² is also possible

 $st^2$  To insulate the cable lugs, you can use the insulating spouts of the ES series from CEMBRE with the type designation ES3 ....



Motor driven switch disconnector for solar application IEC 60947-1&3 by Dekra (KEMA) and CCC (CQC)



Technical data - Motor	Symbol	Merit		Unit
rated operational voltage (± 5%)	Ue		24	V dc
rated operational current	le		0,3	A dc
No load current	1		0,08	V dc
No load speed	V		9,2	rpm
Rated load current	1		0,15	A dc
Rated load speed	V		7,5	rpm
Stall current	1		0,8	A dc
max power dissipation (at stall)	P		19,2	W
Motor terminal type	Solder lips (s	upplied without wiring)		
IP rating solder lips	IP00			
IP rating solder lips	IP00			
Technical data - Motor driven switch	Symbol	Merit		Unit
method of operation	independent	manual operation (90deg)	and	
	independen	t motor driven operation		
	(clockwise (	CW) or counter clockwise	(CCW))	
positions	OFF at 3 hr,	ON at 6 hr, OFF at 9 hr, O	N at 12 hr	
Accesoires	(1)	IP 65 gasket		
	(2) & (3)	IP 65 gasket & M16 Nut		
ambient temperature allowed between		- 2	25 to + 70	°C
storage temperature allowed between		- 4	40 to + 80	°C
maximum relative humidity, without condensation at 20°C			90	%
number of mechanical operations (on & off) operated by integrated motor according	ding to IEC609	947-3	10000	cycles
according to factory test (on & off) at room tempreture (20°C)			10000	cycles
Mounting method(s)	Dimensions		Х	
Bottom mounting or Panel mounting (four holes)	(1)		0	mm
Panel mounting (single hole), panel thickness 1-3mm	(2)		8,5	mm
Panel mounting (single hole), panel thickness 3-7mm	(3)		12	mm

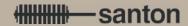
### Instructions for usage

The manual operation of the switch is only in 90 degree angle from each switch position.

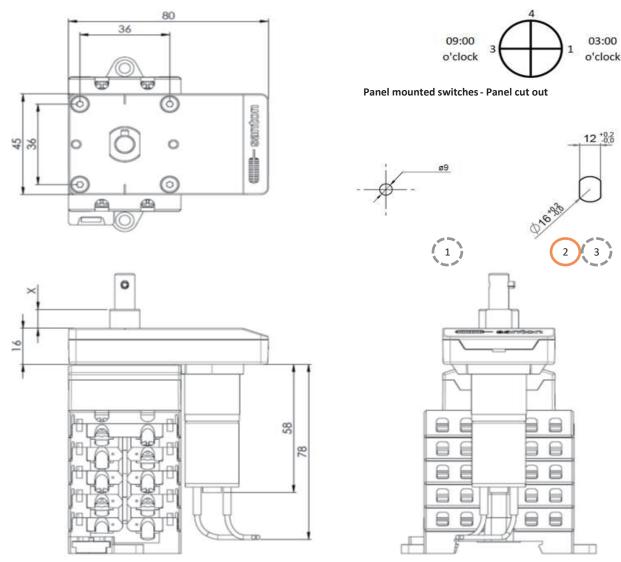
The direction of rotation is depending the motor direction, this means motor direction clockwise will result in manual direction clockwise from 9 o'clock to 12 o'clock and from 12 o'clock back to 9 o'clock. Otherwise this means motor direction counter clockwise will result in manual direction counter clockwise from 3 o'clock to 12 o'clock and from 12 o'clock back to 3 o'clock. See also below scheme for explaination.

- Do not force the manual operation with more than 1.5Nm.
- Do not block the manual operation during motor movement. This will damage the motor.

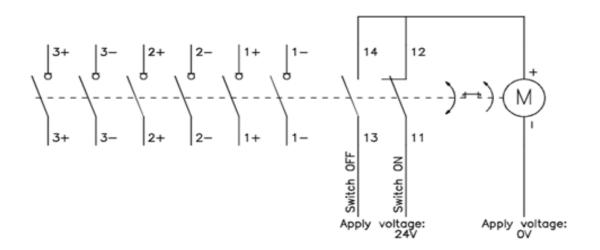
The technical details and connections for the X-type switch can be found in the datasheet/manual of the switch. The X type swi tch will be equipped with an Auxilairy contact that needs to be used for the motor control wiring, see wiring example.

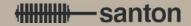






# Wiring example





Switch disconnector for solar application according to IEC 60947-1&3 by Dekra (KEMA) and CCC (CQC)



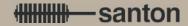


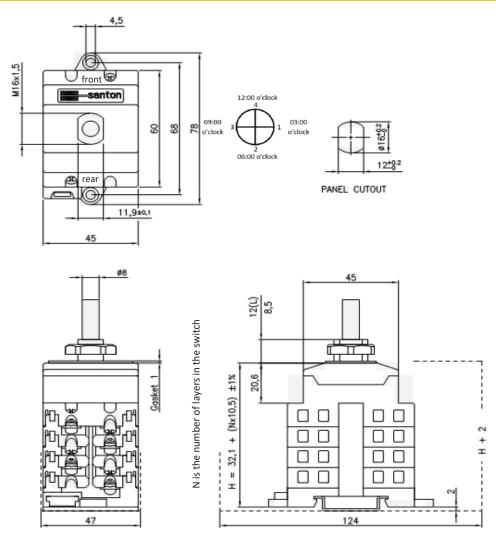


	Terminals Scheme									
Layer	Fron	t Side	Side Sumbal Re		Side	On Positions			ns	
No.	Left	Right	Symbol	Left	Right	1	2	3	4	
7	+2			+2			Х		Х	
6	72	-2		72	-2		X		X	
5	-1			-1			X		Х	
4		+1	_/_	_	+1		Х		Х	
3			Empty							
_	13			14			Х		Χ	
2		11			12	Χ		Х		
1			Empty							

Contacts are made in "X" marked position. Symbols for interconnection: [

	Symbols to	r interconnection: [		
Technical data	Symbol Meri	t		Unit
rated operational voltage (DC poles)	Ue		1000	V dc
rated operational current (DC poles)	le		16	A dc
rated operational voltage (second rating DC poles, if requested)	Ue		850	V dc
rated operational current (second rating DC poles, if requested)	le		20	A dc
rated operational voltage (third rating DC poles, if requested)	Ue		800	V dc
rated operational current (third rating DC poles, if requested)	le		25	A dc
rated operational voltage (fourth rating DC poles, if requested)	Ue		650	V dc
rated operational current (fourth rating DC poles, if requested)	le		32	A dc
method of mounting	both bottom and si	ngle hole mounting [D]		
number of DC poles			4	
utilization category DC	DC-21B			
actuator	motor driven switc	h with black knob [Q3/	١]	
positions	OFF at 3 hr, ON at 6	hr, OFF at 9 hr, ON at	L2 hr	
rated impulse withstand voltage	Uimp		8	kV
insulation voltage	Ui		1000	V
rated thermal current uninterrupted duty	lu		25	Α
rated short-time withstand current (1s)	Icw		750	Α
rated short-circuit making capacity	Icm		1,4	kA
rated conditional short-circuit current			5	kA
method of operation	independent manu	al operation		
minimum required dimensions of enclosures L x W x H* (on DIN-rail H = +	2mm) {space envelope}	124 x 47 x	105,6	mm
* see the drawing for the height of the switch. The number of layers N is:	,,,		7	
knob operation force		max.	1,4	Nm
tightening torque terminal screws M4 , min max.		1,5	1,7	Nm
tightening torque panel mounting nut, min max.		2,0	2,5	Nm
tightening torque M3 screw in the standard black knob, min max.		0,5	0,7	Nm
ambient temperature allowed between		- 25 to	+ 70	°C
storage temperature allowed between		- 40 to		°C
maximum relative humidity, without condensation at 20 °C			90	%
pollution degree			2	
IP rating terminals			IP20	
IP rating gland of the shaft in case of single hole panel mounting			IP65	
rated operational voltage (AC poles)	Ue			V ac
rated operational current (AC poles)	le			A ac
number of AC poles (for general use)				
minimum required fine wire cross-section: IEC60947-1, table 9				mm2
auxiliary contact(s), AC15	Both normally open and	l closed in one chambe	r. 250V	
auxiliary contact ratings	, - <sub> </sub> -		, ,	,
weight			315	g
accessories:	_			U





In the application all ratings according to the datasheet have to be respected. After mounting, the wiring must be checked and the switch must operate smoothly. When building the switch in an enclosure, the space envelope must be respected according to the applicable standards.

### Maintenance

The X type switches are designed for a very long life but it is advised to do some simple yearly maintenance.

- Check the installation for signs of overload or overheating. The terminals may not exceed the limit of 85°C under full load.
- By operating the switch a few times (5x) the contacts will clean themselves and the switch will have a longer life.

### **Connection details**

Description	Symbol	nbol Values			Unit	
Rated operational current (DC poles)	le	16	20	25	32	A dc
Required fine wire cross-section (minimal): IEC60947-1, table 9	А	2,5	4	4	6	mm²
max power dissipation	Р	1,0	1,5	2,4	3,9	W

The terminals, without interconnection can take copper wires up to 6 mm2.

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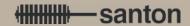
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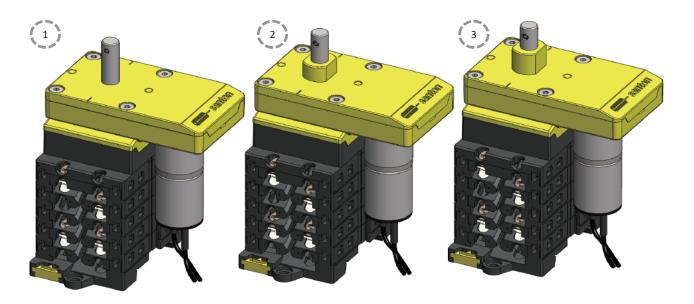
Recommend Manufacturer	Type number	Wire size (AWG)	Wire size (mm²)	Color
JST	FVD2-YS4A	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
TE connectivity	C-165012	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
Vogt	3635c	AWG 16 – AWG 14	1,5 – 2,5 mm²	Blue
TE connectivity	C-165015	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Vogt	3652c / 3653c	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Santon (JST)	52A1256.35	AWG 8 - AWG 10	10,5mm²-16mm² *1	*2

 $<sup>^{*1}\,</sup>$  16mm² only with fine stranded wire or two 6mm² is also possible

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Technical data - Motor	Symbol	Merit	Unit
rated operational voltage (± 5%)	Ue	24	V dc
rated operational current	le	0,3	A dc
No load current	1	0,08	V dc
No load speed	V	9,2	rpm
Rated load current	1	0,15	A dc
Rated load speed	V	7,5	rpm
Stall current	1	0,8	A dc
max power dissipation (at stall)	Р	19,2	W
Motor terminal type	Solder lips (s	upplied without wiring)	
IP rating solder lips	IP00		
IP rating solder lips	IP00		
Technical data - Motor driven switch	Symbol	Merit	Unit
method of operation	independent	manual operation (90deg) and	
	independent	t motor driven operation	
	(clockwise (0	CW) or counter clockwise (CCW))	
positions	OFF at 3 hr,	ON at 6 hr, OFF at 9 hr, ON at 12 h	r
Accesoires	(1)	IP 65 gasket	
	(2) & (3)	IP 65 gasket & M16 Nut	
ambient temperature allowed between		- 25 to + 70	°C
storage temperature allowed between		- 40 to + 80	°C
maximum relative humidity, without condensation at 20°C		90	%
number of mechanical operations (on & off) operated by integrated motor accord	ding to IEC609	47-3 10000	cycles
according to factory test (on & off) at room tempreture (20°C)		10000	cycles
Mounting method(s)	Dimensions	Х	
Bottom mounting or Panel mounting (four holes)	(1)	C	) mm
Panel mounting (single hole), panel thickness 1-3mm	(2)	8,5	mm
Panel mounting (single hole), panel thickness 3-7mm	(3)	12	. mm

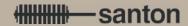
### Instructions for usage

The manual operation of the switch is only in 90 degree angle from each switch position.

The direction of rotation is depending the motor direction, this means motor direction clockwise will result in manual direction clockwise from 9 o'clock to 12 o'clock and from 12 o'clock back to 9 o'clock. Otherwise this means motor direction counter clockwise will result in manual direction counter clockwise from 3 o'clock to 12 o'clock and from 12 o'clock back to 3 o'clock. See also below scheme for explaination.

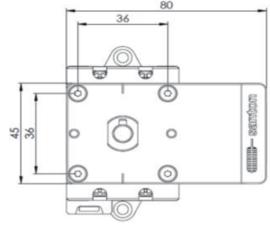
- Do not force the manual operation with more than 1.5Nm.
- Do not block the manual operation during motor movement. This will damage the motor.

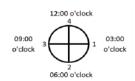
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12 +0.2



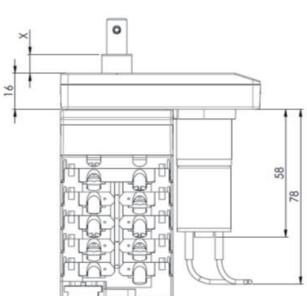




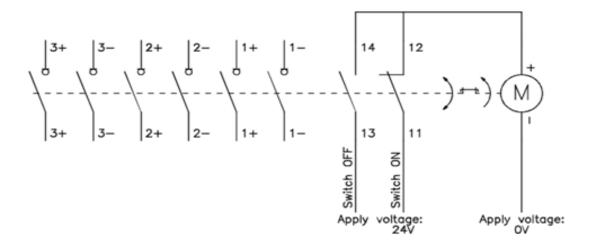
### Panel mounted switches - Panel cut out

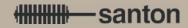
1



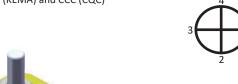


# Wiring example





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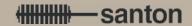


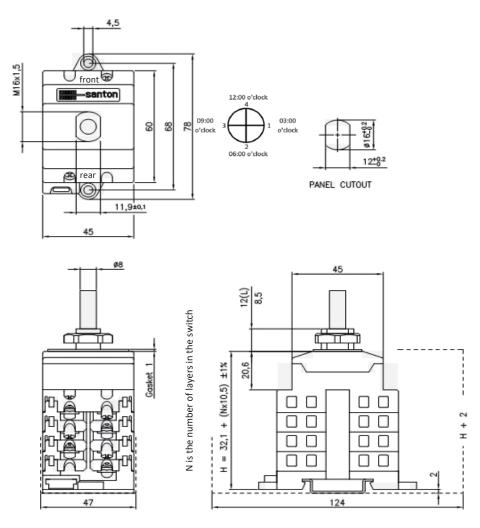


	Terminals Scheme										
Layer	Fron	t Side	Side Symbol		Side	On Positions			ns		
No.	Left	Right	Зуппоп	Left	Right	1	2	3	4		
9	-3		_/_	-3			Χ		Χ		
8		+3	_/_		+3		Χ		Χ		
7	+2		_/_	+2			Χ		Χ		
6		-2	-/-		-2		Χ		Χ		
5	-1		-/-	-1			Χ		Χ		
4		+1	-/-		+1		Χ		Χ		
3			Empty								
2	13		_/_	14			Χ		Χ		
		11			12	Χ		Χ			
1			Empty								

Contacts are made in "X" marked position. Symbols for interconnection: [

	Symbols	for interconnection:	l	
Technical data	Symbol M	lerit		Unit
rated operational voltage (DC poles)	Ue		1000	V dc
rated operational current (DC poles)	le		16	A dc
rated operational voltage (second rating DC poles, if requested)	Ue		850	V dc
rated operational current (second rating DC poles, if requested)	le		20	A dc
rated operational voltage (third rating DC poles, if requested)	Ue		800	V dc
rated operational current (third rating DC poles, if requested)	le		25	A dc
rated operational voltage (fourth rating DC poles, if requested)	Ue		650	V dc
rated operational current (fourth rating DC poles, if requested)	le		32	A dc
method of mounting	both bottom an	d single hole mountin	g [D]	
number of DC poles			6	
utilization category DC	DC-21B			
actuator	motor driven sv	vitch with black knob	[Q3A]	
positions	OFF at 3 hr, ON	at 6 hr, OFF at 9 hr, O	N at 12 hr	
rated impulse withstand voltage	Uimp		8	kV
insulation voltage	Ui		1000	V
rated thermal current uninterrupted duty	lu		25	Α
rated short-time withstand current (1s)	lcw		750	Α
rated short-circuit making capacity	Icm		1,4	kA
rated conditional short-circuit current			5	kA
method of operation	independent ma	anual operation		
minimum required dimensions of enclosures L x W x H* (on DIN-rail H = +:	2mm) {space envelope}	124 x	47 x 126,6	mm
* see the drawing for the height of the switch. The number of layers N is:			5	
knob operation force		max.	1,4	Nm
tightening torque terminal screws M4 , min max.		1,5	1,7	Nm
tightening torque panel mounting nut, min max.		2,0	2,5	Nm
tightening torque M3 screw in the standard black knob, min max.		0,5	0,7	Nm
ambient temperature allowed between		-	25 to + 70	°C
storage temperature allowed between		-	40 to + 80	°C
maximum relative humidity, without condensation at 20 °C			90	%
pollution degree			2	
IP rating terminals			IP20	
IP rating gland of the shaft in case of single hole panel mounting			IP65	
rated operational voltage (AC poles)	Ue			V ac
rated operational current (AC poles)	le			A ac
number of AC poles (for general use)				
minimum required fine wire cross-section: IEC60947-1, table 9				mm2
auxiliary contact(s), AC15	Both normally open	and closed in one cha	mber, 250V	, 16A: [R
auxiliary contact ratings	, . , . , . , . , . , . , . , . ,		,	,
weight			384	g
accessories:	_			





In the application all ratings according to the datasheet have to be respected. After mounting, the wiring must be checked and the switch must operate smoothly. When building the switch in an enclosure, the space envelope must be respected according to the applicable standards.

### Maintenance

The X type switches are designed for a very long life but it is advised to do some simple yearly maintenance.

- Check the installation for signs of overload or overheating. The terminals may not exceed the limit of 85°C under full load.
- By operating the switch a few times (5x) the contacts will clean themselves and the switch will have a longer life.

### **Connection details**

Description	Symbol	Values			Unit	
Rated operational current (DC poles)	le	16	20	25	32	A dc
Required fine wire cross-section (minimal): IEC60947-1, table 9	А	2,5	4	4	6	mm²
max power dissipation	Р	1,5	2,3	3,6	5,8	W

The terminals, without interconnection can take copper wires up to 6 mm2.

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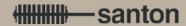
The registration numbers are UL: E13288 and CSA: LR7189 (for instance type 165015 from Tyco).

### **Registerd Spade Tongue Terminals**

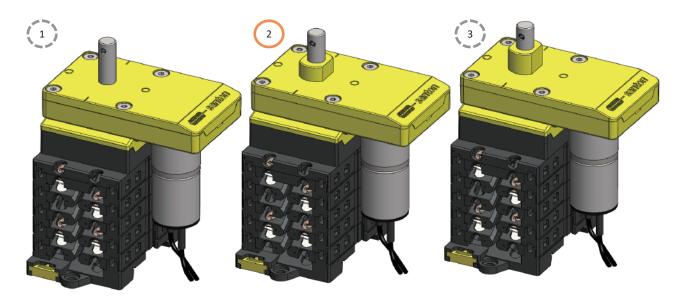
Recommend Manufacturer	Type number	Wire size (AWG)	Wire size (mm²)	Color
JST	FVD2-YS4A	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
TE connectivity	C-165012	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
Vogt	3635c	AWG 16 – AWG 14	1,5 – 2,5 mm²	Blue
TE connectivity	C-165015	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Vogt	3652c / 3653c	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Santon (JST)	52A1256.35	AWG 8 - AWG 10	10,5mm²-16mm² *1	*2

 $<sup>^{*1}\,</sup>$  16mm² only with fine stranded wire or two 6mm² is also possible

 $st^2$  To insulate the cable lugs, you can use the insulating spouts of the ES series from CEMBRE with the type designation ES3 ....



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Technical data - Motor	Symbol	Merit	Unit
rated operational voltage (± 5%)	Ue	24	V dc
rated operational current	le	0,3	A dc
No load current	1	0,08	V dc
No load speed	V	9,2	rpm
Rated load current	1	0,15	A dc
Rated load speed	V	7,5	rpm
Stall current	1	0,8	A dc
max power dissipation (at stall)	Р	19,2	W
Motor terminal type	Solder lips (s	upplied without wiring)	
IP rating solder lips	IP00		
IP rating solder lips	IP00		
Technical data - Motor driven switch	Symbol	Merit	Unit
method of operation	independent	manual operation (90deg) and	
	independent	t motor driven operation	
	(clockwise (0	CW) or counter clockwise (CCW))	
positions	OFF at 3 hr,	ON at 6 hr, OFF at 9 hr, ON at 12 hr	
Accesoires	(1)	IP 65 gasket	
	(2) & (3)	IP 65 gasket & M16 Nut	
ambient temperature allowed between		- 25 to + 70	°C
storage temperature allowed between		- 40 to + 80	°C
maximum relative humidity, without condensation at 20°C		90	%
number of mechanical operations (on & off) operated by integrated motor accord	ding to IEC609	10000	cycles
according to factory test (on & off) at room tempreture (20°C)		10000	cycles
Mounting method(s)	Dimensions	X	
Bottom mounting or Panel mounting (four holes)	(1)	0	mm
Panel mounting (single hole), panel thickness 1-3mm	(2)	8,5	mm
Panel mounting (single hole), panel thickness 3-7mm	(3)	12	mm

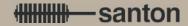
### Instructions for usage

The manual operation of the switch is only in 90 degree angle from each switch position.

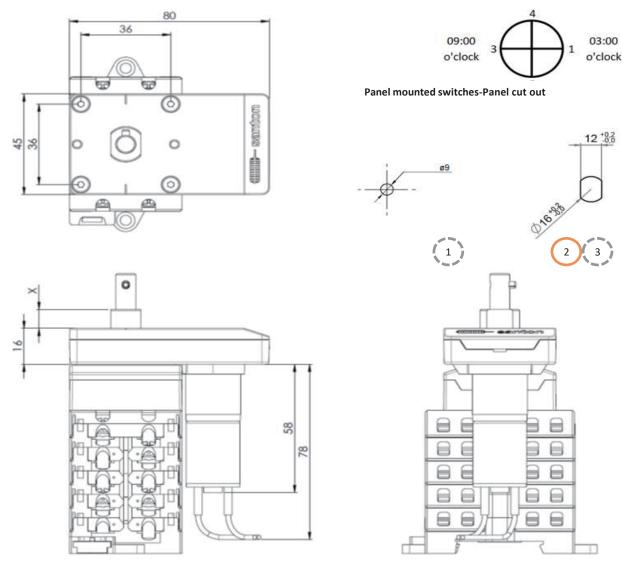
The direction of rotation is depending the motor direction, this means motor direction clockwise will result in manual direction clockwise from 9 o'clock to 12 o'clock and from 12 o'clock back to 9 o'clock. Otherwise this means motor direction counter clockwise will result in manual direction counter clockwise from 3 o'clock to 12 o'clock and from 12 o'clock back to 3 o'clock. See also below scheme for explaination.

- Do not force the manual operation with more than 1.5Nm.
- Do not block the manual operation during motor movement. This will damage the motor.

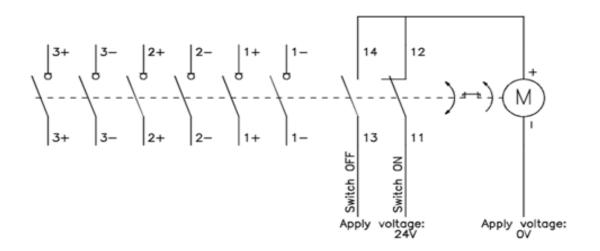
The technical details and connections for the X-type switch can be found in the datasheet/manual of the switch. The X type swi tch will be equipped with an Auxilairy contact that needs to be used for the motor control wiring, see wiring example.

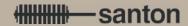






# Wiring example





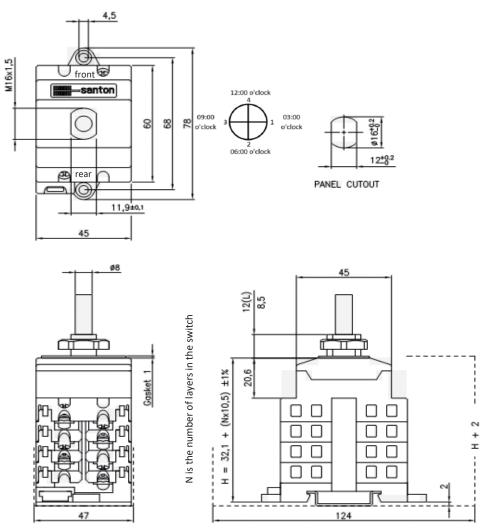
Switch disconnector for solar application according to IEC 60947-1&3 by Dekra (KEMA) and CCC (CQC) fourth rating only according to IEC



	Terminals Scheme										
Layer	Fron	t Side	Symbol	Rear	Side	Or	Po	sitic	ns		
No.	Left	Right	Зуппоп	Left	Right	1	2	3	4		
11	13		_/_	14			Х		Х		
		11			12	Χ		Χ			
10			Empty								
9	+4		_/_	+4			Χ		Χ		
8		-4	_/_		-4		Χ		Χ		
7	-3		_/_	-3			Χ		Χ		
6		+3	_/_		+3		Χ		Χ		
5	+2		_/_	+2			Χ		Χ		
4		-2	-/-		-2		Χ		Χ		
3	-1		_/_	-1			Χ		Χ		
2		+1	_/_		+1		Χ		Χ		
1			Empty								

Contacts are made in "X" marked position.

	Sy	mbols for inte	erconnect	ion: [	
Technical data	Symbol	Merit			Unit
rated operational voltage (DC poles)	Ue	1000			V dc
rated operational current (DC poles)	le	16			A dc
rated operational voltage (second rating DC poles, if requested)	Ue	850			V dc
rated operational current (second rating DC poles, if requested)	le	20			A dc
rated operational voltage (third rating DC poles, if requested)	Ue	800			V dc
rated operational current (third rating DC poles, if requested)	le	25			A dc
rated operational voltage (fourth rating DC poles, if requested)	Ue	650			V dc
rated operational current (fourth rating DC poles, if requested)	le	32			A dc
method of mounting	both botto	m and single	hole mou	nting [D]	
number of DC poles		8			
utilization category DC	DC-21B				
actuator	motor				
positions	OFF at 3 h	r, ON at 6 hr,	OFF at 9 h	r, ON at 12 hr	
rated impulse withstand voltage	Uimp	8			kV
insulation voltage	Ui	1000			V
ated thermal current uninterrupted duty	lu	25			Α
rated short-time withstand current (1s)	lcw	750			Α
ated short-circuit making capacity	Icm	1,4			kA
rated conditional short-circuit current		5			kA
method of operation	independe	ent manual or	eration		
minimum required dimensions of enclosures L x W x H* (on DIN-rail H = $+2$ r	nm) {space envelo	ope}	12	4 x 47 x 105,6	mm
see the drawing for the height of the switch. The number of layers N is:	, , ,	11			
knob operation force			max.	1,4	Nm
ightening torque terminal screws M4 , min max.			1,5	1,7	Nm
ightening torque panel mounting nut, min max.			2,0	2,5	Nm
ightening torque M3 screw in the standard black knob, min max.			0,5	0,7	Nm
ambient temperature allowed between				- 25 to + 70	°C
torage temperature allowed between				- 40 to + 80	°C
maximum relative humidity, without condensation at 20 ℃				90	%
pollution degree				2	
P rating terminals				IP20	
P rating gland of the shaft in case of single hole panel mounting		IP65			
rated operational voltage (AC poles)	Ue				V ac
rated operational current (AC poles)	le				A ac
number of AC poles (for general use)					
ninimum required fine wire cross-section: IEC60947-1, table 9					mm
	mally open and cl	osed in one c	hamher 2	50V 16A·[R]	
nuxiliary contact ratings	many open and ci	oscu ili olic c	namber, z	.50 t, 10A. [N]	
veight		453			g
accessories:	_	733			Б



In the application all ratings according to the datasheet have to be respected. After mounting, the wiring must be checked and the switch must operate smoothly. When building the switch in an enclosure, the space envelope must be respected according to the applicable standards.

### Maintenance

The X type switches are designed for a very long life but it is advised to do some simple yearly maintenance.

- Check the installation for signs of overload or overheating. The terminals may not exceed the limit of 85°C under full load.
- By operating the switch a few times (5x) the contacts will clean themselves and the switch will have a longer life.

### **Connection details**

Description	Symbol	Values				Unit
Rated operational current (DC poles)	le	16	20	25	32	A dc
Required fine wire cross-section (minimal): IEC60947-1, table 9	А	2,5	4	4	6	mm²
max power dissipation	Р	1,0	1,5	2,4	3,9	W

The terminals, without interconnection can take copper wires up to 6 mm2.

The recommended Spade Tongue Terminals may have a maximum width of 9 mm.

For CSA and UL applications, registered Spade Tongue Terminals must be used.

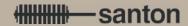
The registration numbers are UL: E13288 and CSA: LR7189 (for instance type 165015 from Tyco).

### **Registerd Spade Tongue Terminals**

Recommend Manufacturer	Type number	Wire size (AWG)	Wire size (mm²)	Color
JST	FVD2-YS4A	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
TE connectivity	C-165012	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
Vogt	3635c	AWG 16 – AWG 14	1,5 – 2,5 mm²	Blue
TE connectivity	C-165015	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Vogt	3652c / 3653c	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Santon (JST)	52A1256.35	AWG 8 - AWG 10	10,5mm²-16mm² *1	*2

 $<sup>\</sup>ensuremath{^{*^1}}$  16mm² only with fine stranded wire or two 6mm² is also possible

 $st^2$  To insulate the cable lugs, you can use the insulating spouts of the ES series from CEMBRE with the type designation ES3 ....



10000

10000

Χ

0

8,5

12

cycles

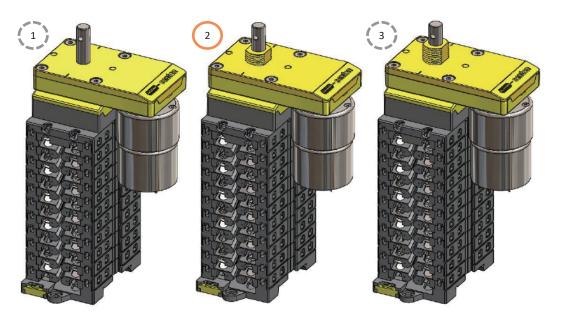
cycles

mm

mm

 $\mathsf{mm}$ 

Motor driven switch disconnector for solar application IEC 60947-1&3 by Dekra (KEMA) and CCC (CQC)



Technical data - Motor	Symbol Merit		Unit
rated operational voltage (± 5%)	Ue	24	V dc
rated operational current	le	0,3	A dc
No load current	I	0,08	V dc
No load speed	V	9,2	rpm
Rated load current	I	0,15	A dc
Rated load speed	V	7,5	rpm
Stall current	I	0,8	A dc
max power dissipation (at stall)	Р	19,2	W
Motor terminal type	Solder lips (supplied withou	ut wiring)	
IP rating solder lips	IP00		
Technical data - Motor driven switch	Symbol Merit		Unit
method of operation	independent manual opera	tion (90deg) and	
	independent motor driver	operation	
	(clockwise (CW) or counte	r clockwise (CCW))	
positions	OFF at 3 hr, ON at 6 hr, OF	F at 9 hr, ON at 12 hr	
Accesoires	(1) IP 65 gasket		
	(2) & (3) IP 65 gasket	& M16 Nut	
ambient temperature allowed between		- 25 to + 70	°C
storage temperature allowed between		- 40 to + 80	°C
maximum relative humidity, without condensation at 20°C		90	%

### Instructions for usage

Mounting method(s)

The manual operation of the switch is only in 90 degree angle from each switch position.

number of mechanical operations (on & off) operated by integrated motor according to IEC60947-3

The direction of rotation is depending the motor direction, this means motor direction clockwise will result in manual direction clockwise from 9 o'clock to 12 o'clock and from 12 o'clock back to 9 o'clock. Otherwise this means motor direction counter clockwise will result in manual direction counter clockwise from 3 o'clock to 12 o'clock and from 12 o'clock back to 3 o'clock. See also below scheme for explaination.

**Dimensions** 

(1)

(2)

(3)

- **Do not** force the manual operation with more than 1.5Nm.

according to factory test (on & off) at room tempreture (20°C)

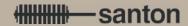
Bottom mounting or Panel mounting (four holes)

Panel mounting (single hole), panel thickness 1-3mm

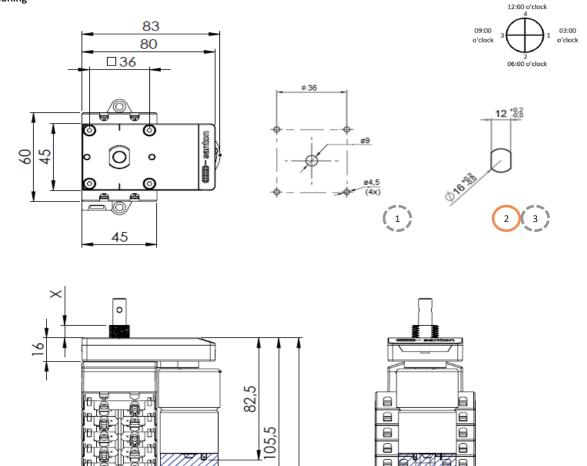
Panel mounting (single hole), panel thickness 3-7mm

-  $\mbox{\bf Do}$   $\mbox{\bf not}$  block the manual operation during motor movement. This will damage the motor.

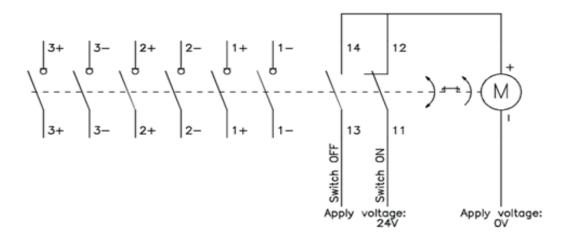
The technical details and connections for the X-type switch can be found in the datasheet/manual of the switch. The X type switch will be equipped with an Auxilairy contact that needs to be used for the motor control wiring, see wiring example.



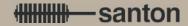
### Dimensioning



Wiring example



reserver as free space for Santon



Switch disconnector for solar application according to IEC 60947-1&3 by Dekra (KEMA) and CCC (CQC)



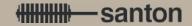


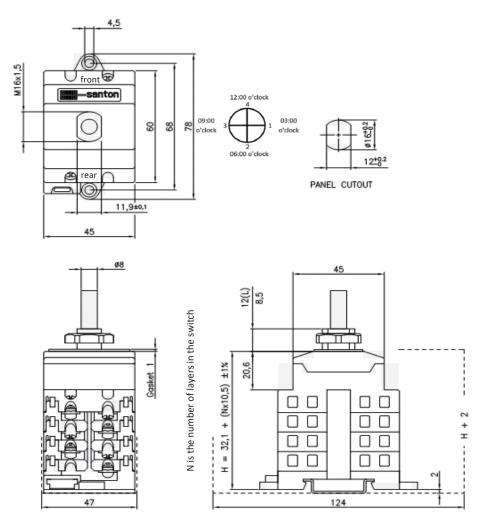


	Terminals Scheme										
Layer	Fron	t Side Symbo		Rear	Side	Or	ı Po	sitio	ns		
No.	Left	Right	Зуппрог	Left	Right	1	2	3	4		
_	13		-/-	14			Х		Х		
5		11			12	Χ		Х			
4			Empty								
3	-1		_/_	-1			Χ		Χ		
2		+1	_/_		+1		Χ		Χ		
1			Empty								

Contacts are made in "X" marked position. Symbols for interconnection: [

Technical data	Symbol N	Merit		Unit
rated operational voltage (DC poles)	Ue		1000	V dc
rated operational current (DC poles)	le		50	A dc
rated operational voltage (second rating DC poles, if requested)	Ue			V dc
rated operational current (second rating DC poles, if requested)	le			A dc
method of mounting	both bottom ar	nd single hole mounting	g [D]	
number of DC poles			2	
utilization category DC	DC-21B			
actuator	motor driven s	witch with black knob	[Q3A]	
positions	OFF at 3 hr, ON	at 6 hr, OFF at 9 hr, Of	N at 12 hr	
rated impulse withstand voltage	Uimp		8	kV
insulation voltage	Ui		1000	V
rated thermal current uninterrupted duty	lu		50	Α
rated short-time withstand current (1s)	lcw		750	Α
rated short-circuit making capacity	lcm		1,4	kA
rated conditional short-circuit current			5	kA
method of operation	independent m	nanual operation		
minimum required dimensions of enclosures $L \times W \times H^*$ (on DIN-rail $H = +2r$	nm) {space envelope}	124 x	47 x 84,6	mm
* see the drawing for the height of the switch. The number of layers N is:	Icm		5	
knob operation force		max.	1,4	Nm
tightening torque terminal screws M4 , min max.		1,5	1,7	Nm
tightening torque panel mounting nut, min max.		2,0	2,5	Nm
tightening torque M3 screw in the standard black knob, min max.		0,5	0,7	Nm
ambient temperature allowed between		-:	25 to + 70	°C
storage temperature allowed between			40 to + 80	°C
maximum relative humidity, without condensation at 20 °C			90	%
pollution degree			2	
IP rating terminals			IP20	
IP rating gland of the shaft in case of single hole panel mounting			IP65	
rated operational voltage (AC poles)	Ue			V ac
rated operational current (AC poles)	le			A ac
number of AC poles (for general use)				
minimum required fine wire cross-section: IEC60947-1, table 9				mm2
auxiliary contact(s), AC15	Both normally open	and closed in one cha	mber, 250V,	16A: [R]
auxiliary contact ratings				
weight			254	g
accessories:	-			





In the application all ratings according to the datasheet have to be respected. After mounting, the wiring must be checked and the switch must operate smoothly. When building the switch in an enclosure, the space envelope must be respected according to the applicable standards.

### Maintenance

The X type switches are designed for a very long life but it is advised to do some simple yearly maintenance.

- Check the installation for signs of overload or overheating. The terminals may not exceed the limit of 85°C under full load.
- By operating the switch a few times (5x) the contacts will clean themselves and the switch will have a longer life.

### **Connection details**

Description	Symbol	Values			Unit	
Rated operational current (DC poles)	le	50				A dc
Required fine wire cross-section (minimal): IEC60947-1, table 9	А	2x6				mm²
max power dissipation	Р	2,3				W

The terminals, without interconnection can take copper wires up to 6 mm2.

The recommended Spade Tongue Terminals may have a maximum width of 9 mm.

For CSA and UL applications, registered Spade Tongue Terminals must be used.

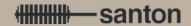
The registration numbers are UL: E13288 and CSA: LR7189 (for instance type 165015 from Tyco).

### **Registerd Spade Tongue Terminals**

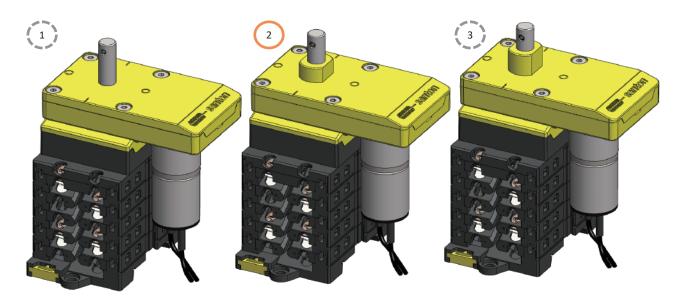
Recommend Manufacturer	Type number	Wire size (AWG)	Wire size (mm²)	Color
JST	FVD2-YS4A	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
TE connectivity	C-165012	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
Vogt	3635c	AWG 16 – AWG 14	1,5 – 2,5 mm²	Blue
TE connectivity	C-165015	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Vogt	3652c / 3653c	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Santon (JST)	52A1256.35	AWG 8 - AWG 10	10,5mm²-16mm² *1	*2

 $<sup>^{*1}\,</sup>$  16mm² only with fine stranded wire or two 6mm² is also possible

 $st^2$  To insulate the cable lugs, you can use the insulating spouts of the ES series from CEMBRE with the type designation ES3 ....



Motor driven switch disconnector for solar application Not certified yet



Technical data - Motor	Symbol	Merit		Unit
rated operational voltage (± 5%)	Ue		24	V dc
rated operational current	le		0,3	A dc
No load current	1		0,08	V dc
No load speed	V		9,2	rpm
Rated load current	1		0,15	A dc
Rated load speed	V		7,5	rpm
Stall current	1		0,8	A dc
max power dissipation (at stall)	Р		19,2	W
Motor terminal type	Solder lips (s	upplied without wiring)		
IP rating solder lips	IP00			
IP rating solder lips	IP00			
Technical data - Motor driven switch	Symbol	Merit		Unit
method of operation	independent	manual operation (90deg)	and	
	independen	t motor driven operation		
	(clockwise (	CW) or counter clockwise (	(CCW))	
positions	OFF at 3 hr,	ON at 6 hr, OFF at 9 hr, ON	N at 12 hr	
Accesoires	(1)	IP 65 gasket		
	(2) & (3)	IP 65 gasket & M16 Nut		
ambient temperature allowed between		- 2	5 to + 70	°C
storage temperature allowed between		- 4	0 to + 80	°C
maximum relative humidity, without condensation at 20°C			90	%
number of mechanical operations (on & off) operated by integrated motor accor	ding to IEC609	947-3	10000	cycles
according to factory test (on & off) at room tempreture (20°C)			10000	cycles
Mounting method(s)	Dimensions		Χ	
Bottom mounting or Panel mounting (four holes)	(1)		0	mm
Panel mounting (single hole), panel thickness 1-3mm	(2)		8,5	mm
Panel mounting (single hole), panel thickness 3-7mm	(3)		12	mm

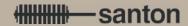
### Instructions for usage

The manual operation of the switch is only in 90 degree angle from each switch position.

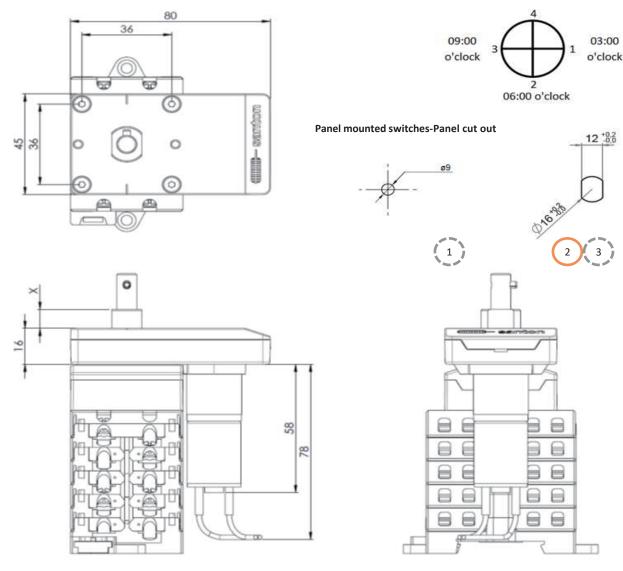
The direction of rotation is depending the motor direction, this means motor direction clockwise will result in manual direction clockwise from 9 o'clock to 12 o'clock and from 12 o'clock back to 9 o'clock. Otherwise this means motor direction counter clockwise will result in manual direction counter clockwise from 3 o'clock to 12 o'clock and from 12 o'clock back to 3 o'clock. See also below scheme for explaination.

- Do not force the manual operation with more than 1.5Nm.
- Do not block the manual operation during motor movement. This will damage the motor.

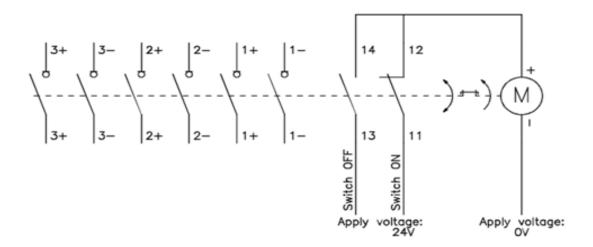
The technical details and connections for the X-type switch can be found in the datasheet/manual of the switch. The X type swi tch will be equipped with an Auxilairy contact that needs to be used for the motor control wiring, see wiring example.

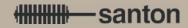






# Wiring example





Switch disconnector for solar application according to IEC 60947-1&3 by Dekra (KEMA) CCC and also IEC PV-1



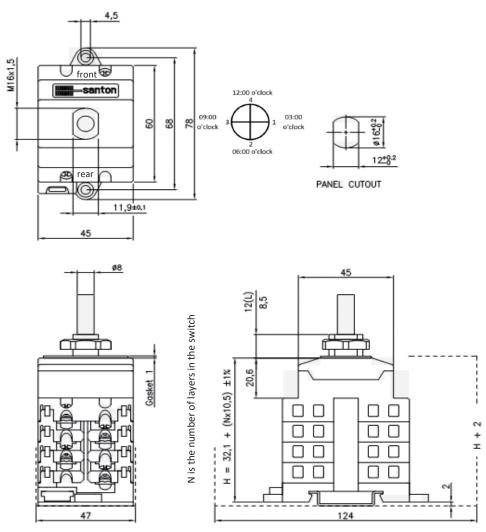




Terminals Scheme												
Layer	Fron	t Side Symbol		Rear	Side	Or	Po	sitio	ns			
No.	Left	Right	Зуппрог	Left	Right	1	2	3	4			
	42			4.4			.,		.,			
7	13	4.4	_/_	14	42	.,	Х	.,	Х			
		11			12	Χ		Х				
6			Empty									
5	+2		-/-	+2			Χ		Χ			
4		-2	_/_		-2		Χ		Χ			
3	-1		-/-	-1			Χ		Χ			
2		+1	-/-		+1		Χ		Χ			
1			Empty									

Contacts are made in "X" marked position. Symbols for interconnection: [

Technical data	Symbol Mer	it		Unit
rated operational voltage (DC poles)	Ue		1000	V dc
rated operational current (DC poles)	le		50	A dc
rated operational voltage (second rating DC poles, if requested)	Ue			V dc
rated operational current (second rating DC poles, if requested)	le			A dc
method of mounting	both bottom and s	ingle hole mountir	ng [D]	
number of DC poles			4	
utilization category DC	DC-21B and DC PV-	-1		
actuator	motor driven switc	ch with black knob	[Q3A]	
positions	OFF at 3 hr, ON at	6 hr, OFF at 9 hr, O	N at 12 hr	
rated impulse withstand voltage	Uimp		8	kV
insulation voltage	Ui		1000	V
rated thermal current uninterrupted duty	lu		50	Α
rated short-time withstand current (1s)	lcw		750	Α
rated short-circuit making capacity	Icm		1,4	kA
rated conditional short-circuit current			5	kA
method of operation	independent manu	ual operation		
minimum required dimensions of enclosures L x W x H* (on DIN-rail H =	+2mm) {space envelope}	124 x	47 x 105,6	mm
* see the drawing for the height of the switch. The number of layers N is			7	
knob operation force		max.	1,4	Nm
tightening torque terminal screws M4 , min max.		1,5	1,7	Nm
tightening torque panel mounting nut, min max.		2,0	2,5	Nm
tightening torque M3 screw in the standard black knob, min max.		0,5	0,7	Nm
ambient temperature allowed between		-	25 to + 70	°C
storage temperature allowed between		-	40 to +80	°C
maximum relative humidity, without condensation at 20 ℃			90	%
pollution degree			2	
IP rating terminals			IP20	
IP rating gland of the shaft in case of single hole panel mounting			IP65	
rated operational voltage (AC poles)	Ue			V ac
rated operational current (AC poles)	le			A ac
number of AC poles (for general use)				
minimum required fine wire cross-section: IEC60947-1, table 9				mm2
auxiliary contact(s), AC15	Both normally open and	d closed in one cha	mber, 250V,	16A: [R]
auxiliary contact ratings	, , ,		,	
weight			315	g
accessories:	-			



In the application all ratings according to the datasheet have to be respected. After mounting, the wiring must be checked and the switch must operate smoothly. When building the switch in an enclosure, the space envelope must be respected according to the applicable standards.

### Maintenance

The X type switches are designed for a very long life but it is advised to do some simple yearly maintenance.

- Check the installation for signs of overload or overheating. The terminals may not exceed the limit of 85°C under full load.
- By operating the switch a few times (5x) the contacts will clean themselves and the switch will have a longer life.

### **Connection details**

Description	Symbol	Values			Unit
Rated operational current (DC poles)	le	50			A dc
Required fine wire cross-section (minimal): IEC60947-1, table 9	А	2x6			mm²
max power dissipation	P	4,5			W

The terminals, without interconnection can take copper wires up to 6 mm2.

The recommended Spade Tongue Terminals may have a maximum width of 9 mm.

For CSA and UL applications, registered Spade Tongue Terminals must be used.

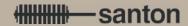
The registration numbers are UL: E13288 and CSA: LR7189 (for instance type 165015 from Tyco).

### **Registerd Spade Tongue Terminals**

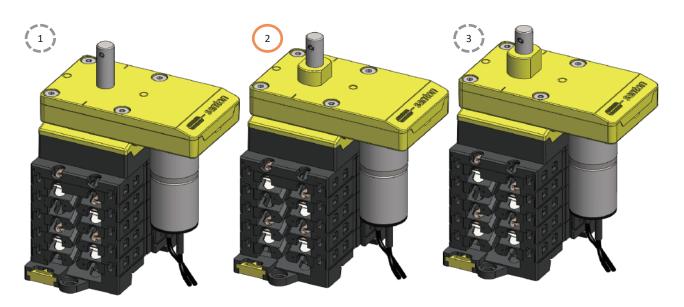
Recommend Manufacturer	Type number	Wire size (AWG)	Wire size (mm²)	Color
JST	FVD2-YS4A	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
TE connectivity	C-165012	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
Vogt	3635c	AWG 16 – AWG 14	1,5 – 2,5 mm²	Blue
TE connectivity	C-165015	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Vogt	3652c / 3653c	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Santon (JST)	52A1256.35	AWG 8 - AWG 10	10,5mm²-16mm² *1	*2

 $<sup>^{*1}\,</sup>$  16mm² only with fine stranded wire or two 6mm² is also possible

 $st^2$  To insulate the cable lugs, you can use the insulating spouts of the ES series from CEMBRE with the type designation ES3 ....



Motor driven switch disconnector for solar application Not certified yet



Technical data - Motor	Symbol	Merit	Unit
rated operational voltage (± 5%)	Ue	24	V dc
rated operational current	le	0,3	A dc
No load current	1	0,08	V dc
No load speed	V	9,2	rpm
Rated load current	1	0,15	A dc
Rated load speed	V	7,5	rpm
Stall current	1	0,8	A dc
max power dissipation (at stall)	Р	19,2	W
Motor terminal type	Solder lips (s	supplied without wiring)	
IP rating solder lips	IP00		
IP rating solder lips	IP00		
Technical data - Motor driven switch	Symbol	Merit	Unit
method of operation	independent	manual operation (90deg) and	
	independen	t motor driven operation	
	(clockwise (	CW) or counter clockwise (CCW))	
positions	OFF at 3 hr,	ON at 6 hr, OFF at 9 hr, ON at 12 hr	
Accesoires	(1)	IP 65 gasket	
	(2) & (3)	IP 65 gasket & M16 Nut	
ambient temperature allowed between		- 25 to + 70	°C
storage temperature allowed between		- 40 to + 80	°C
maximum relative humidity, without condensation at 20°C		90	%
number of mechanical operations (on & off) operated by integrated motor accor	ding to IEC609	947-3 10000	cycles
according to factory test (on & off) at room tempreture (20°C)		10000	cycles
Mounting method(s)	Dimensions	X	
Bottom mounting or Panel mounting (four holes)	(1)	0	mm
Panel mounting (single hole), panel thickness 1-3mm	(2)	8,5	mm
Panel mounting (single hole), panel thickness 3-7mm	(3)	12	mm

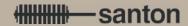
### Instructions for usage

The manual operation of the switch is only in 90 degree angle from each switch position.

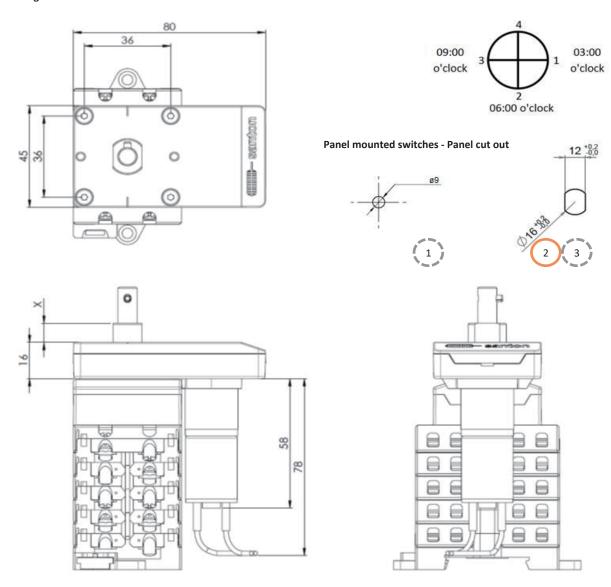
The direction of rotation is depending the motor direction, this means motor direction clockwise will result in manual direction clockwise from 9 o'clock to 12 o'clock and from 12 o'clock back to 9 o'clock. Otherwise this means motor direction counter clockwise will result in manual direction counter clockwise from 3 o'clock to 12 o'clock and from 12 o'clock back to 3 o'clock. See also below scheme for explaination.

- Do not force the manual operation with more than 1.5Nm.
- Do not block the manual operation during motor movement. This will damage the motor.

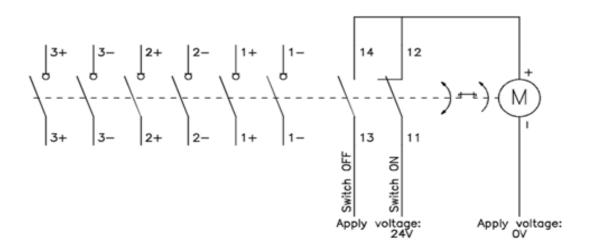
The technical details and connections for the X-type switch can be found in the datasheet/manual of the switch. The X type swi tch will be equipped with an Auxilairy contact that needs to be used for the motor control wiring, see wiring example.

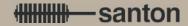


### Dimensioning



# Wiring example





Switch disconnector for solar application according to IEC 60947-1&3 by Dekra (KEMA) CCC and also IEC PV-1

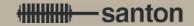


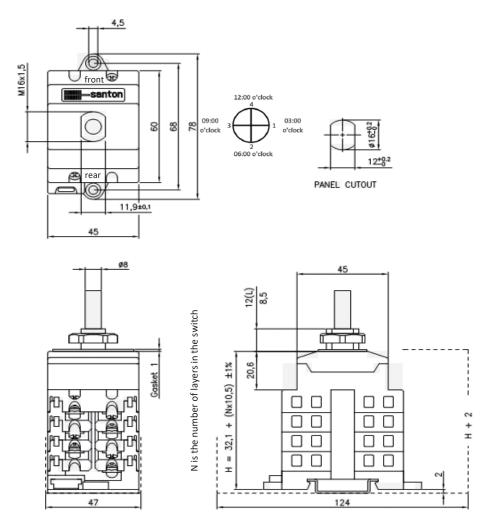


Terminals Scheme										
Layer	Front Side		ide Symbol		Side	Or	Po	sitio	ns	
No.	Left	Right	Зуппоп	Left	Right	1	2	3	4	
9	13		-/-	14			Χ		Χ	
		11			12	Χ		Χ		
8			Empty							
7	-3		_/_	-3			Χ		Χ	
6		+3	_/_		+3		Χ		Χ	
5	+2		-/-	+2			Χ		Χ	
4		-2	_/_		-2		Χ		Χ	
3	-1		_/_	-1			Χ		Χ	
2		+1	-/-		+1		Χ		Χ	
1			Empty							

Contacts are made in "X" marked position. Symbols for interconnection: [

Technical data	Symbol Me	erit		Unit
rated operational voltage (DC poles)	Ue		1000	V dc
rated operational current (DC poles)	le		50	A dc
rated operational voltage (second rating DC poles, if requested)	Ue			V dc
rated operational current (second rating DC poles, if requested)	le			A dc
method of mounting	both bottom and	single hole mountir	ng [D]	
number of DC poles			6	
utilization category DC	DC-21B and DC P	V-1		
actuator	motor driven sw	itch with black knob	[Q3A]	
positions	OFF at 3 hr, ON a	t 6 hr, OFF at 9 hr, O	N at 12 hr	
rated impulse withstand voltage	Uimp		8	kV
insulation voltage	Ui		1000	V
rated thermal current uninterrupted duty	lu		50	Α
rated short-time withstand current (1s)	lcw		750	Α
rated short-circuit making capacity	lcm		1,4	kA
rated conditional short-circuit current			5	kA
method of operation	independent ma	nual operation		
minimum required dimensions of enclosures $L \times W \times H^*$ (on DIN-rail $H = +2r$	mm) {space envelope}	124 x	47 x 126,6	mm
* see the drawing for the height of the switch. The number of layers N is:	Icm		9	
knob operation force		max.	1,4	Nm
tightening torque terminal screws M4 , min max.		1,5	1,7	Nm
tightening torque panel mounting nut, min max.		2,0	2,5	Nm
tightening torque M3 screw in the standard black knob, min max.		0,5	0,7	Nm
ambient temperature allowed between		-	25 to + 70	°C
storage temperature allowed between		-	40 to +80	°C
maximum relative humidity, without condensation at 20 °C			90	%
pollution degree			2	
IP rating terminals			IP20	
IP rating gland of the shaft in case of single hole panel mounting			IP65	
rated operational voltage (AC poles)	Ue			V ac
rated operational current (AC poles)	le			A ac
number of AC poles (for general use)				
minimum required fine wire cross-section: IEC60947-1, table 9				mm2
auxiliary contact(s), AC15	Both normally open a	ind closed in one cha	amber, 250V,	16A: [R]
auxiliary contact ratings				
weight			384	g
accessories:	-			





In the application all ratings according to the datasheet have to be respected. After mounting, the wiring must be checked and the switch must operate smoothly. When building the switch in an enclosure, the space envelope must be respected according to the applicable standards.

### Maintenance

The X type switches are designed for a very long life but it is advised to do some simple yearly maintenance.

- Check the installation for signs of overload or overheating. The terminals may not exceed the limit of 85°C under full load.
- By operating the switch a few times (5x) the contacts will clean themselves and the switch will have a longer life.

### **Connection details**

Description	Symbol	Values			Unit
Rated operational current (DC poles)	le	50			A dc
Required fine wire cross-section (minimal): IEC60947-1, table 9	А	2x6			mm²
max power dissipation	Р	2,3			W

The terminals, without interconnection can take copper wires up to 6 mm2.

The recommended Spade Tongue Terminals may have a maximum width of 9 mm.

For CSA and UL applications, registered Spade Tongue Terminals must be used.

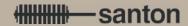
The registration numbers are UL: E13288 and CSA: LR7189 (for instance type 165015 from Tyco).

### **Registerd Spade Tongue Terminals**

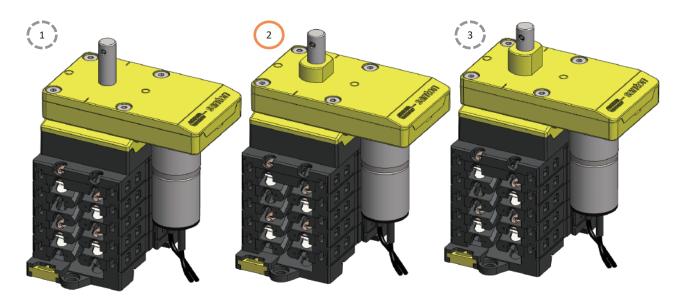
Recommend Manufacturer	Type number	Wire size (AWG)	Wire size (mm²)	Color
JST	FVD2-YS4A	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
TE connectivity	C-165012	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
Vogt	3635c	AWG 16 – AWG 14	1,5 – 2,5 mm²	Blue
TE connectivity	C-165015	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Vogt	3652c / 3653c	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Santon (JST)	52A1256.35	AWG 8 - AWG 10	10,5mm²-16mm² *1	*2

 $<sup>^{*1}\,</sup>$  16mm² only with fine stranded wire or two 6mm² is also possible

 $st^2$  To insulate the cable lugs, you can use the insulating spouts of the ES series from CEMBRE with the type designation ES3 ....



Motor driven switch disconnector for solar application Not certified yet



Technical data - Motor	Symbol	Merit	Unit
rated operational voltage (± 5%)	Ue	24	V dc
rated operational current	le	0,3	A dc
No load current	1	0,08	V dc
No load speed	V	9,2	rpm
Rated load current	1	0,15	A dc
Rated load speed	V	7,5	rpm
Stall current	1	0,8	A dc
max power dissipation (at stall)	Р	19,2	W
Motor terminal type	Solder lips (s	supplied without wiring)	
IP rating solder lips	IP00		
IP rating solder lips	IP00		
Technical data - Motor driven switch	Symbol	Merit	Unit
method of operation	independent	t manual operation (90deg) and	
	independen	t motor driven operation	
	(clockwise (	CW) or counter clockwise (CCW))	
positions	OFF at 3 hr,	ON at 6 hr, OFF at 9 hr, ON at 12 hr	
Accesoires	(1)	IP 65 gasket	
	(2) & (3)	IP 65 gasket & M16 Nut	
ambient temperature allowed between		- 25 to + 70	°C
storage temperature allowed between		- 40 to + 80	°C
maximum relative humidity, without condensation at 20°C		90	%
number of mechanical operations (on & off) operated by integrated motor according	ding to IEC609	947-3 10000	cycles
according to factory test (on & off) at room tempreture (20°C)		10000	cycles
Mounting method(s)	Dimensions	X	
Bottom mounting or Panel mounting (four holes)	(1)	0	mm
Panel mounting (single hole), panel thickness 1-3mm	(2)	8,5	mm
Panel mounting (single hole), panel thickness 3-7mm	(3)	12	mm

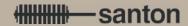
### Instructions for usage

The manual operation of the switch is only in 90 degree angle from each switch position.

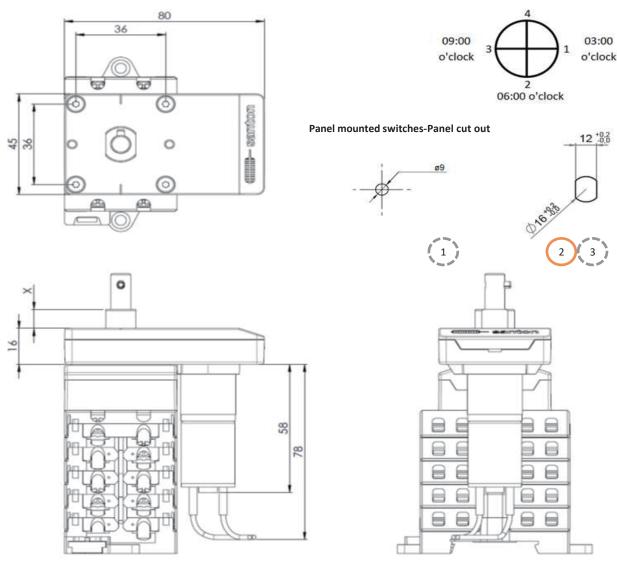
The direction of rotation is depending the motor direction, this means motor direction clockwise will result in manual direction clockwise from 9 o'clock to 12 o'clock and from 12 o'clock back to 9 o'clock. Otherwise this means motor direction counter clockwise will result in manual direction counter clockwise from 3 o'clock to 12 o'clock and from 12 o'clock back to 3 o'clock. See also below scheme for explaination.

- Do not force the manual operation with more than 1.5Nm.
- Do not block the manual operation during motor movement. This will damage the motor.

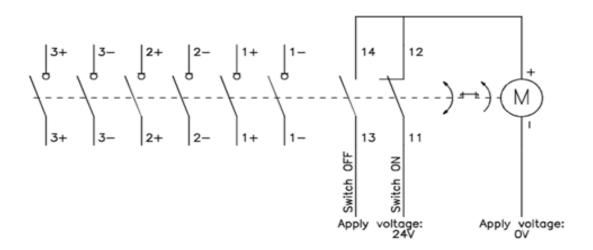
The technical details and connections for the X-type switch can be found in the datasheet/manual of the switch. The X type swi tch will be equipped with an Auxilairy contact that needs to be used for the motor control wiring, see wiring example.

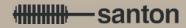






# Wiring example





Switch disconnector for solar application according to IEC 60947-1&3 by Dekra (KEMA) CCC and also IEC PV-1



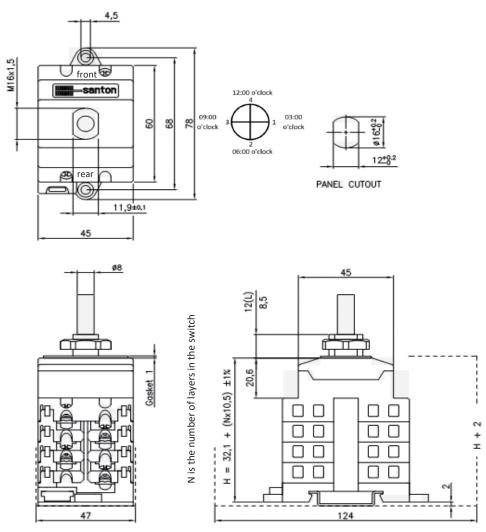




Terminals Scheme										
Layer	Front Side		t Side Symbol		Side	Or	Po	sitio	ns	
No.	Left	Right	Зуппрог	Left	Right	1	2	3	4	
11	13		-/-							
		11								
10			Empty							
9	+4		-/-							
8		-4	-/-				Χ		Χ	
7	-3		-/-	+2		Χ		Χ		
6		+3	-/-		-2					
5	+2		-/-	+2			Χ		Χ	
4		-2	-/-		-2		Χ		Χ	
3	-1		-/-	-1			Χ		Χ	
2		+1	-/-		+1		Χ		Χ	
1			Empty							

Contacts are made in "X" marked position. Symbols for interconnection: [

Technical data	Symbol Me	erit		Unit
rated operational voltage (DC poles)	Ue		1000	V dc
rated operational current (DC poles)	le		50	A dc
rated operational voltage (second rating DC poles, if requested)	Ue			V dc
rated operational current (second rating DC poles, if requested)	le			A dc
method of mounting	both bottom and	single hole mountin	g [D]	
number of DC poles			8	
utilization category DC	DC-21B and DC P	V-1		
actuator	motor driven switch with black knob [Q3A]			
positions	OFF at 3 hr, ON a	t 6 hr, OFF at 9 hr, O	N at 12 hr	
rated impulse withstand voltage	Uimp		8	kV
insulation voltage	Ui		1000	V
rated thermal current uninterrupted duty	lu		50	Α
rated short-time withstand current (1s)	lcw		750	Α
rated short-circuit making capacity	Icm		1,4	kA
rated conditional short-circuit current			5	kA
method of operation	independent ma	nual operation		
minimum required dimensions of enclosures L x W x H* (on DIN-rail H = $+2$	mm) {space envelope}	124 x	47 x 147,6	mm
* see the drawing for the height of the switch. The number of layers N is:			11	
knob operation force		max.	1,4	Nm
tightening torque terminal screws M4 , min max.		1,5	1,7	Nm
tightening torque panel mounting nut, min max.		2,0	2,5	Nm
tightening torque M3 screw in the standard black knob, min max.		0,5	0,7	Nm
ambient temperature allowed between		-	25 to + 70	°C
storage temperature allowed between		-	40 to + 80	°C
maximum relative humidity, without condensation at 20 °C			90	%
pollution degree			2	
IP rating terminals			IP20	
IP rating gland of the shaft in case of single hole panel mounting			IP65	
rated operational voltage (AC poles)	Ue			V ac
rated operational current (AC poles)	le			A ac
number of AC poles (for general use)				
minimum required fine wire cross-section: IEC60947-1, table 9				mm2
auxiliary contact(s), AC15	Both normally open a	nd closed in one cha	mber, 250V.	16A: [R]
auxiliary contact ratings	, , , , ,		-,,	
weight			453	g
accessories:				U



In the application all ratings according to the datasheet have to be respected. After mounting, the wiring must be checked and the switch must operate smoothly. When building the switch in an enclosure, the space envelope must be respected according to the applicable standards.

### Maintenance

The X type switches are designed for a very long life but it is advised to do some simple yearly maintenance.

- Check the installation for signs of overload or overheating. The terminals may not exceed the limit of 85°C under full load.
- By operating the switch a few times (5x) the contacts will clean themselves and the switch will have a longer life.

### **Connection details**

Description	Symbol		Values	Unit
Rated operational current (DC poles)	le	50		A dc
Required fine wire cross-section (minimal): IEC60947-1, table 9	А	2x6		mm²
max power dissipation	Р	9,0		W

The terminals, without interconnection can take copper wires up to 6 mm2.

The recommended Spade Tongue Terminals may have a maximum width of 9 mm.

For CSA and UL applications, registered Spade Tongue Terminals must be used.

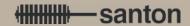
The registration numbers are UL: E13288 and CSA: LR7189 (for instance type 165015 from Tyco).

### **Registerd Spade Tongue Terminals**

Recommend Manufacturer	Type number	Wire size (AWG)	Wire size (mm²)	Color
JST	FVD2-YS4A	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
TE connectivity	C-165012	AWG 16 – AWG 14	1,0 – 2,5 mm²	Blue
Vogt	3635c	AWG 16 – AWG 14	1,5 – 2,5 mm²	Blue
TE connectivity	C-165015	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Vogt	3652c / 3653c	AWG 12 - AWG 10	3,0 - 6,0 mm²	Yellow
Santon (JST)	52A1256.35	AWG 8 - AWG 10	10,5mm²-16mm² *1	*2

 $<sup>^{*1}\,</sup>$  16mm² only with fine stranded wire or two 6mm² is also possible

 $st^2$  To insulate the cable lugs, you can use the insulating spouts of the ES series from CEMBRE with the type designation ES3 ....



mm

mm

 $\mathsf{mm}$ 

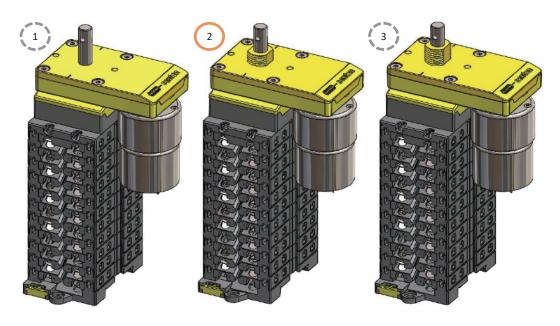
Х

0

8,5

12

Motor driven switch disconnector for solar application Not certified yet



Technical data - Motor	Symbol	Merit	Unit
rated operational voltage (± 5%)	Ue	24	V dc
rated operational current	le	0,3	A dc
No load current	1	0,08	V dc
No load speed	V	5,3	rpm
Rated load current	I	0,2	A dc
Rated load speed	V	4,2	rpm
Stall current	1	0,8	A dc
max power dissipation (at stall)	Р	19,2	W
Motor terminal type	Solder lips (	supplied without wiring)	
IP rating solder lips	IP00		
Technical data - Motor driven switch	Symbol	Merit	Unit
method of operation			
method of operation	independer	it manual operation (90deg) and	
method of operation	•	nt manual operation (90deg) and not or motor driven operation	
method of operation	independe	, , ,	
positions	independer (clockwise	nt motor driven operation	
	independer (clockwise	nt motor driven operation (CW) or counter clockwise (CCW))	
positions	independer (clockwise OFF at 3 hr	nt motor driven operation (CW) or counter clockwise (CCW)) , ON at 6 hr, OFF at 9 hr, ON at 12 hr	
positions	independer (clockwise OFF at 3 hr (1)	nt motor driven operation (CW) or counter clockwise (CCW)) , ON at 6 hr, OFF at 9 hr, ON at 12 hr IP 65 gasket	°C
positions Accesoires	independer (clockwise OFF at 3 hr (1)	nt motor driven operation (CW) or counter clockwise (CCW)) , ON at 6 hr, OFF at 9 hr, ON at 12 hr IP 65 gasket IP 65 gasket & M16 Nut	°C °C
positions Accesoires ambient temperature allowed between	independer (clockwise OFF at 3 hr (1)	nt motor driven operation (CW) or counter clockwise (CCW)) , ON at 6 hr, OFF at 9 hr, ON at 12 hr IP 65 gasket IP 65 gasket & M16 Nut - 25 to + 70	
positions Accesoires ambient temperature allowed between storage temperature allowed between	independer (clockwise OFF at 3 hr (1) (2) & (3)	nt motor driven operation (CW) or counter clockwise (CCW)) , ON at 6 hr, OFF at 9 hr, ON at 12 hr IP 65 gasket IP 65 gasket & M16 Nut - 25 to + 70 - 40 to + 80	°C

### Instructions for usage

Mounting method(s)

The manual operation of the switch is only in 90 degree angle from each switch position.

The direction of rotation is depending the motor direction, this means motor direction clockwise will result in manual direction clockwise from 9 o'clock to 12 o'clock and from 12 o'clock back to 9 o'clock. Otherwise this means motor direction counter clockwise will result in manual direction counter clockwise from 3 o'clock to 12 o'clock and from 12 o'clock back to 3 o'clock. See also below scheme for explaination.

**Dimensions** 

(1)

(2)

(3)

- **Do not** force the manual operation with more than 1.5Nm.

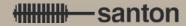
Bottom mounting or Panel mounting (four holes)

Panel mounting (single hole), panel thickness 1-3mm

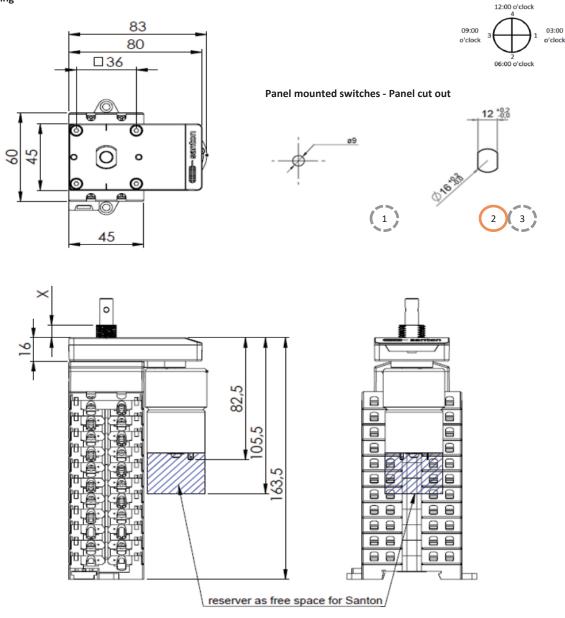
Panel mounting (single hole), panel thickness 3-7mm

-  $\mbox{\bf Do not}$  block the manual operation during motor movement. This will damage the motor.

The technical details and connections for the X-type switch can be found in the datasheet/manual of the switch. The X type switch will be equipped with an Auxilairy contact that needs to be used for the motor control wiring, see wiring example.







Wiring example

