

CERTIFICATE OF COMPLIANCE

Certificate Number 20181127-E210376
Report Reference E210376-20181108
Issue Date 2018-November-27

Issued to: SMA Solar Technology AG
Sonnallee 1
34266 Niestetal GERMANY

**This is to certify that
representative samples of**

STATIC INVERTERS, CONVERTERS AND
ACCESSORIES FOR USE IN INDEPENDENT POWER
SYSTEMS - Permanently-connected, utility Interactive, 3-
phase inverter.

SMA Solar Technology AG Models STP 33-US-41, STP 50-
US-41, STP 62-US-41 inverter, which is intended for DC
input from photovoltaic modules.

Integral Type 1 Photovoltaic DC Arc-Fault Circuit Interrupter
Protection for STP 33-US-41, STP 50-US-41, STP 62-US-
41 model inverter.

Listed Accessory for use with inverter model STP 33-US-
41, STP 50-US-41, STP 62-US-41: Universal Mounting
System UMS-KIT-10


Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

Standard(s) for Safety: See addendum page for standards.

Additional Information: See the UL Online Certifications Directory at
www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's
Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.



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The UL Recognized Component Mark generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark: , may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Standards for Safety:

UL 62109-1 Safety of power converters for use in photovoltaic power systems – Part 1: General requirements

Evaluated to the requirements of the Standard for Safety for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, UL 1741, Second Edition, dated January 28, 2010, with revisions through February 15, 2018. Including the requirements in UL 1741 Supplement A, sections as noted in the Technical considerations.


IEEE 1547, IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems.

IEEE 1547.1, IEEE Standard for Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems.

UL 1699B, Standard for Photovoltaic (PV) DC Arc-Fault Circuit Protection, First Edition, August 22, 2018

This description covers the SMA Solar Technology AG Models STP 33-US-41, STP 50-US-41, STP 62-US-41 inverters.

USL - Evaluated to the requirements of the Standard for Safety for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, UL 1741,



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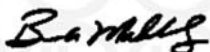
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Products covered by this certificate provide functionality in compliance with UL 1741 Supplement A (SA) when used in a UL Listed end product which has been evaluated by UL for its intended purpose.

Compliance testing was conducted on samples of the products according to the test methods in UL 1741 with compliant results, and product ratings were reviewed for fulfillment of the requirements in the following SRDs:

See also Appendix A for UL 1741 Supplement A (SA)

Certified functions. Cross Reference table – UL 1741 SA to SRD	Source Requirement Document(s)	Test Standard(s) and Section (s)	Report Date
ANTI-ISLANDING PROTECTION - UNINTENTIONAL ISLANDING WITH GRID SUPPORT FUNCTIONS ENABLED	Electric Rule No. 21 Hh.1a	UL 1741 SA 8	2018-11-08
LOW/HIGH VOLTAGE RIDETHROUGH	Electric Rule No. 21 Table Hh.1	UL 1741 SA 9	2018-11-08
LOW/HIGH FREQUENCY RIDETHROUGH	Electric Rule No. 21 Table Hh.2	UL 1741 SA10	2018-11-08
RAMP RATES	Electric Rule No. 21 Hh.2k	UL 1741 SA11	2018-11-08
RECONNECT BY "SOFT START"	Electric Rule No. 21 Hh.2k	UL 1741 SA11	2018-11-08
SPECIFIED POWER FACTOR	Electric Rule No. 21 Hh.2i	UL 1741 SA12	2018-11-08
DYNAMIC VOLT/VAR OPERATIONS	Electric Rule No. 21 Hh.2J	UL 1741 SA13	2018-11-08
FREQUENCYWATT	Electric Rule No. 21 Hh.2.I	UL 1741 SA14	2018-11-08
VOLT-WATT	Electric Rule No. 21 Hh.2.m	UL 1741 SA15	2018-11-08



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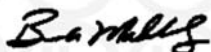
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Testing conducted to the requirements of UL 1741 SA corresponds to the minimum requirements for CA Rule 21, 2015. An enumeration of functions tested, including complete ratings, and available certified settings for the Grid Support functions, are recorded in the appendix to this document. Test data and detailed results of compliance testing are retained in the complete UL Report for this product.



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Appendix A

Detailed Testing Summary	Test Standard(s) and Section(s)	Fixed / Adjustable	Pass / Fail
UNINTENTIONAL ISLANDING WITH GRID SUPPORT FUNCTIONS ENABLED	UL 1741 SA 8	Adjustable	Pass
HIGH VOLTAGE RIDE-THROUGH DURATION	UL 1741 SA 9.1	Adjustable	Pass
HIGH VOLTAGE RIDE-THROUGH / MUST TRIP MAGNITUDES	UL 1741 SA 9.2	Adjustable	Pass
HIGH VOLTAGE MUST TRIP CLEARING TIMES	UL 1741 SA 9.2	Adjustable	Pass
LOW VOLTAGE RIDE-THROUGH DURATION	UL 1741 SA 9.1	Adjustable	Pass
LOW VOLTAGE RIDE-THROUGH / MUST TRIP MAGNITUDES	UL 1741 SA 9.2	Adjustable	Pass
LOW VOLTAGE MUST TRIP CLEARING TIMES	UL 1741 SA 9.2	Adjustable	Pass
HIGH FREQUENCY RIDE-THROUGH DURATION	UL 1741 SA10.1	Adjustable	Pass
HIGH FREQUENCY RIDE-THROUGH / MUST TRIP MAGNITUDES	UL 1741 SA10.2	Adjustable	Pass
HIGH FREQUENCY MUST TRIP CLEARING TIMES	UL 1741 SA10.2	Adjustable	Pass
LOW FREQUENCY RIDE-THROUGH DURATION	UL 1741 SA10.1	Adjustable	Pass
LOW FREQUENCY RIDE-THROUGH / MUST TRIP MAGNITUDES	UL 1741 SA10.2	Adjustable	Pass
LOW FREQUENCY MUST TRIP CLEARING TIMES	UL 1741 SA10.2	Adjustable	Pass
NORMAL RAMP RATE	UL 1741 SA 11.2	Adjustable	Pass
"SOFT START" RAMP RATE	UL 1741 SA 11.4	Adjustable	Pass
SPECIFIED POWER FACTOR	UL 1741 SA 12	Adjustable	Pass
VOLT/VAR MODE (Q(V))	UL 1741 SA 13	Adjustable	Pass
FREQUENCY-WATT (FW)	UL 1741 SA 14	Adjustable	Pass
VOLT-WATT (VW)	UL 1741 SA 15	Adjustable	Pass



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Inverter Firmware Version:		
UL 1998	Date	Version/Revision
Compliant	2018	01.09.03.R



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Inverter Ratings - Output	All models, with individual differences as shown		
Output phase configuration	3/3-(N)-PE		
Nominal (line to line) output voltage V ac	480 /277 WYE		
Operating voltage range V ac	244 – 305		
Line Synchronization Characteristics	Method 2		
Normal out frequency Hz	60		
models	STP 33- US-41	STP 50- US-41	STP 62- US-41
Rated output current (A ac)	40	64	79.5
Rated output power, (kW)	33.3	50	62.5
Max. Branch Circuit overcurrent protection (A ac)	100		
Maximum Air Ambient (°C)	60		

Other ratings:	
Max. output fault current (A) / duration (ms)	440Apeak/26ms
Max. utility backfeed current to PV input (A)	0
Line Synchronization Characteristics / In-rush current	Method 2 / NA
Limits of accuracy of voltage measurement	+/- 2%
Limits of accuracy of frequency measurement	+ /- 0.05 Hz
Manufacturers stated accuracy of time response for voltage trips	< 0.1 s
Manufacturers stated accuracy of time response for frequency trips	<0.1s
*Enclosure Ratings	Type 4X/3SX

INTERCONNECTION INTEGRITY TEST CATEGORIES:	
C62.42.2 Ring Wave Surge Category	B
C62.42.2 Combination Wave Surge Category	B
C37.90.1 RF Immunity - compliance	Yes
C37.90.2 Communication circuit - compliance	Yes



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Magnitude and time Limits - Utility interconnection voltage magnitude limits, Ride Through time limits and trip times:

Nominal voltage	/ Single/Split phase / Single/Split phase					
UL 1741 SA9:	Magnitudes (% of nominal)		Ride Through (Seconds) (+)		Must Trip (Seconds)	
Boundary designation (++)	Min	Max	Min	Max	Min	Max
HV3	79.42	120.00	1	30	0.1	59
HV2	79.42	120	1	30	0.1	59
HV1	79.42	110	1	30	0.1	60
LV1	37.36	100	1	30	0.1	60
LV2	37.36	100	1	30	0.1	60
LV3	37.36	100	1	30	0.1	60

Magnitude and time Limits - Utility interconnection Frequency magnitude limits, Ride Through time limits and trip times:

Nominal Frequency	60 Hz					
UL 1741 SA10:	Magnitudes (Frequency)		Ride Through (Seconds) (+)		Must Trip (Seconds)	
Boundary designation	Min	Max	Min	Max	Min	Max
HF3	-	-	-	-	-	-
HF2	50.0	66.0	10	999.0	0.1	1000.0
HF1	50.0	66.0	10	999.0	0.1	1000.0
LF1	44.0	60.0	10	999.0	0.1	1000.0
LF2	44.0	60.0	10	999.0	0.1	1000.0
LF3	-	-	-	-	-	-



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SA11 Ramp Rate test ratings (RR)		
Minimum normal ramp-up rate	0.2	%Irated/SEC
Maximum normal ramp-up rate	20	%Irated/SEC
Minimum soft start ramp-up rate	0.1	%Irated /SEC
Maximum soft start ramp-up rate	20	%Irated /SEC

SA12 SPF Specified Power Factor (INV3)	
Minimum Inductive (Underexcited) Power Factor (<0)	-0.8
Minimum Capacitive (Overexcited) Power Factor (>0)	+0.8

SA13 Volt/Var Mode (VV) extent of curve range settings				
		Qmax Values - Maximums	Qmin Values - Minimums	Units
Reactive power production setting	Q ₁	60	15	%VAR
Reactive power absorption setting at the left edge of the deadband	Q ₂	0	0	%VAR
Reactive power absorption setting at the right edge of the deadband	Q ₃	0	0	%VAR
Reactive power absorption setting	Q ₄	-60	-15	%VAR

Functional in the following priority modes: active power priority reactive power priority (RPP)

		Maximum	Minimum	Units
The voltage at Q ₁	V ₁	97.83	92.00	%Vnom
The voltage at Q ₂	V ₂	100.00	96.00	%Vnom
The voltage at Q ₃	V ₃	104.00	100.00	%Vnom
The voltage at Q ₄	V ₄	108.00	102.17	%Vnom



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SA14 Frequency-Watt (FW) extent of curve range settings

Settings	Frequency		Power level	
Low end of the adjustment range of the start of the curtailment function	F _{start_min}	60.1	100 %	%Watts
High end of the adjustment range of the start of the curtailment function	F _{start_max}	62.0	100 %	%Watts
Low end of the adjustment range of the endpoint of the curtailment function	F _{stop_min}	60.78	0 %	%Watts
High end of the adjustment range of the endpoint of the curtailment function	F _{stop_max}	65.5	0 %	%Watts

SA15 Volt-Watt (VW) extent of curve range settings

Settings	Volts		Power level	
Low end of the adjustment range of the start of the curtailment function	V _{start_min}	103 %	100%	%Watts
High end of the adjustment range of the start of the curtailment function	V _{start_max}	103 %	100 %	%Watts
Low end of the adjustment range of the endpoint of the curtailment function	V _{stop_min}	106%	0 %	%Watts
High end of the adjustment range of the endpoint of the curtailment function	V _{stop_max}	110 %	0 %	%Watts



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