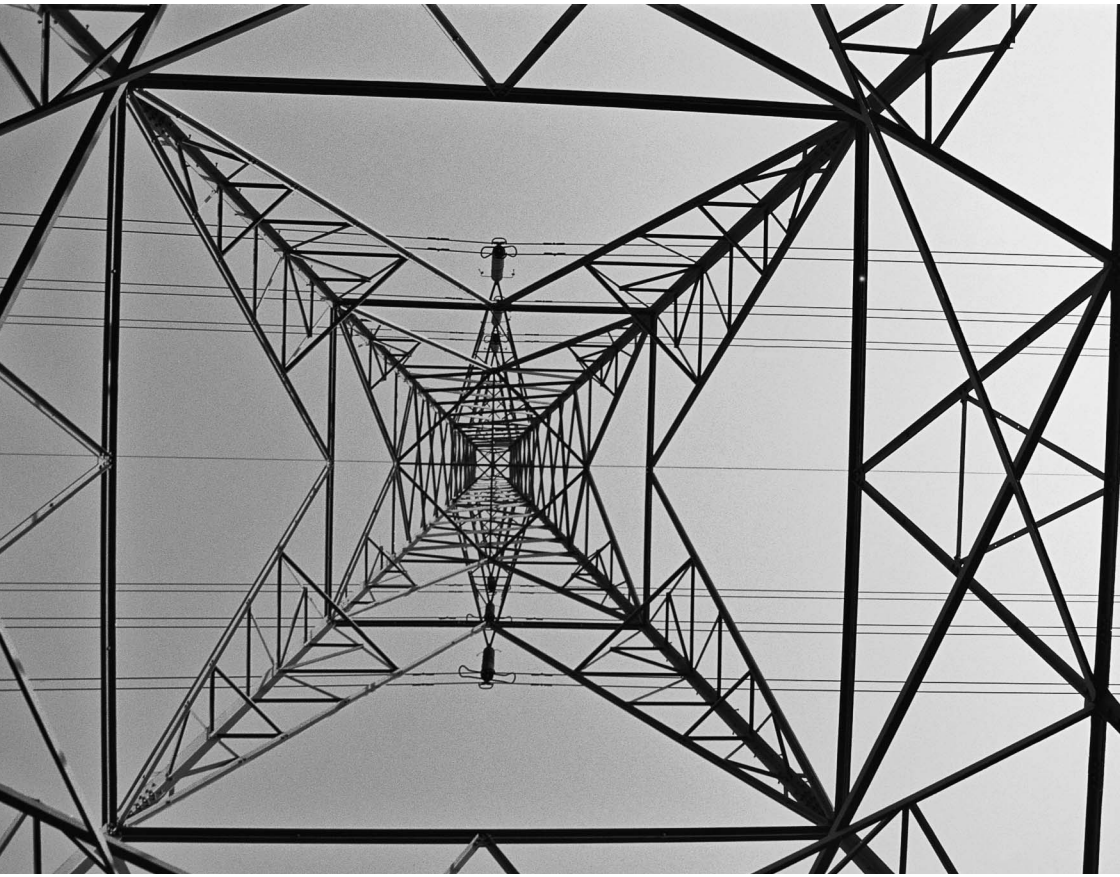
Compliance with the Requirements of the Delibera AEEG 084-12 Directive
Parameter Configuration in the Transition Period to CEI 0-21

SUNNY BOY
SUNNY MINI CENTRAL
SUNNY TRIPOWER

Technical Description



PAR_DELIBERA-TEN121110 | Version 1.0

EN

Table of Contents

1 Information on this Manual

1.1 Validity

This manual describes the setting of the frequency limits stipulated in the Delibera AEEG 084-12 for the transition period until 30 June 2012 for the following SMA inverters subject to the availability of a valid certificate for Italy:

Sunny Boy	Sunny Mini Central	Sunny Tripower
Sunny Boy 1200	Sunny Mini Central 5000A	Sunny Tripower 8000TL
Sunny Boy 1700	Sunny Mini Central 6000A	Sunny Tripower 10000TL
Sunny Boy 2000HF	Sunny Mini Central 6000TL	Sunny Tripower 12000TL
Sunny Boy 2500	Sunny Mini Central 7000HV	Sunny Tripower 15000TL
Sunny Boy 2500HF	Sunny Mini Central 7000TL	Sunny Tripower 17000TL
Sunny Boy 3000	Sunny Mini Central 8000TL	
Sunny Boy 3000HF	Sunny Mini Central 9000TL	
Sunny Boy 3000TL	Sunny Mini Central 10000TL	
Sunny Boy 3300	Sunny Mini Central 11000TL	
Sunny Boy 3800		
Sunny Boy 4000TL		
Sunny Boy 5000TL		

1.2 Target Group

This manual is intended for skilled persons. The tasks described in this manual must be performed by electrically qualified persons only.

2 Interim Regulation until the CEI 0-21 Comes into Force

Directive of the "Autorità per l'Energia Elettrica e il Gas" AEEG to Enhance Grid Stability in the Low-voltage and Medium-voltage Grid

According to recent GSE reports, PV plants with an aggregate output of approximately 12.9 GWp are installed in Italy. Grid monitoring for plants in the low-voltage grid is therefore generally configured according to the guideline "Guida per le connessioni alla rete elettrica di ENEL Distribuzione" with an operating frequency range from 49.7 Hz to 50.3 Hz. Should these limiting values be reached, undercut or exceeded, a simultaneous shutdown of many PV plants, and hence a possible loss of feed-in power would be the consequence. This could in turn have serious effects on the grid stability of the European electricity grid, including large-scale power outages.

In order to address this problem, the AEEG in collaboration with Terna (transmission network operator) has issued a directive (Delibera AEEG 084-12 of 8 March 2012)[1] governing an interim regulation which will have binding force from 1 April 2012.

The changes resulting from this directive are described in the following.

Requirements for PV Plants on the Low-Voltage Grid

1. From 1 April 2012: in accordance with the Delibera AEEG 084-12, the setting values of the operating frequency range are to be extended to include values between 49 Hz and 51 Hz. This applies to all inverters commissioned in the low-voltage grid as of 1 April 2012. A manufacturer's declaration of conformity is required for the inverters and protective devices.
2. From 1 July 2012: all requirements of the Allegato A70 and the CEI 0-21 (apart from Low Voltage Fault Ride Through, LVFRT) will be mandatory for new plants. A manufacturer's declaration of conformity is required for the inverters and protective devices.
3. From 1 January 2013: compliance with the CEI 0-21 for all new plants with certified inverters

Requirements for PV Plants on the Medium-Voltage Grid

1. From 1 April 2012: in accordance with the Allegato A70 issued by Terna, the setting values of the operating frequency range are to be extended to include values between 47.5 Hz ... 51.5 Hz. It also prescribes the installation of a central grid interface with functions defined in Allegato A70. This applies to all new plants installed in the medium-voltage grid as of 1 April 2012. A manufacturer's declaration of conformity is required for the inverters and protective devices.

1: http://www.autorita.energia.it/allegati/docs/12/084-12.pdf

2. From 1 July 2012: the provisions of the Allegato A70 by Terna must be fully complied with. These apply in particular to the following functions:

   a) Frequency-dependent power reduction P(f), as defined in the CEI 0-21

   b) Grid reconnection conditions, as defined in the CEI 0-21

   c) LVFRT, as defined in the CEI 0-21

   A manufacturer's declaration of conformity is required for the inverters and protective devices.
3. From 1 January 2013: compliance with the CEI 0-16 for all new plants with certified inverters
4. From 31 March 2013: by this deadline, all existing PV plants with capacities from 50 kWp which were installed prior to 1 April 2012 must comply with the extended operating frequency range of 47.5 Hz ... 51.5 Hz and must be equipped with a central grid interface fulfilling the functions stipulated in the Allegato A70. The conversion of the PV plants will be subsidised as defined in the following table.

The settings on the supplementary default settings sheet under 'Setting according to standard" are to be documented with the entry "AEEG 084-12 LVtg, inverter for operation on the low-voltage grid" and "AEEG 084-12 MVtg, inverters for operation on the medium-voltage grid".

SMA will be implementing the interim regulation according to Delibera AEEG 084-12 for deliveries as of 26 March 2012.

All inverters ordered for Italy will have as their default setting the frequency limits for low voltage as per Delibera AEEG 084-12.

The subsequent configuration of the inverters for connection to medium voltage or to comply with Enel-GUIDA can be performed at any time. The necessary procedure for this modification is described in this document.

Conversion of PV Plants with Capacities from 50 kWp which were Installed and Approved on the Medium-Voltage Grid before 1 April 2012.

Conversion of Plant on the Medium-Voltage Grid according to Delibera AEEG 084-12						
Time Period	01 April 2012 to 30 June 2012	01 July 2012 to 31 July 2012	01 August 2012 to 31 August 2012	01 September 2012 to 30 September 2012	01 October 2012 to 31 October 2012	from 01 November 2012
Retrofitting bonus from TERNA[1]	[a] € 5,000 or [b] € 2,000	[a] € 4,000 or [b] € 1,600	[a] € 3,000 or [b] € 1,200	[a] € 2,000 or [b] € 800	[a] € 1,000 or [b] € 400	€ 0

1: There are two possible compensation payments.

a: Protection equipment installed according to the technical guideline CEI 82-25 (plants installed after September 2010)

b: Protection equipment not installed according to the technical guideline CEI 82-25 (plants installed before September 2010)

3 Requirements for Parameter Changes

To change parameter settings, the following conditions must be fulfilled:

- There must be a valid certificate for Italy available for the inverter.
- The inverter is listed in the validity section of this document (see Section 1.1 "Validity", page 5). For all other inverter types, no changes in frequency limits according to Delibera AEEG 084-12 are permissible for technical reasons.
- Changes to parameters may be performed by electrically qualified persons only.
- In order to display and change parameters, you will need a communication product (e.g., data logger, software).

4 Setting Parameters according to the Interim Regulation

For SMA inverters installed in PV plants which are to be accepted and connected after 1 April 2012, the frequency limits must be extended in accordance with the interim regulation Delibera AEEG 084-12. To do this, carry out the following steps:

1. Change parameters.
2. Mark the inverter.
3. Inform the network operator of the parameter change.

Changing Parameters

To adjust the settings to comply with the interim regulation Delibera AEEG 084-12, certain parameters of the country data set Enel-GUIDA are modified via external communication. In the display of the inverter, the message "trimmed" or "ADJ" (special setting) will then appear. You will find the setting values for the inverter types in Section 4.1 "Setting Parameters to Fixed Values", page 9.

Marking the Inverter

Mark inverters which have been adjusted according to the interim regulation by writing the following with a permanent marker on the type label: "AEEG 084 LV" for inverters in the low-voltage grid and "AEEG 084 MV" for inverters in the medium-voltage grid.

4.1 Setting Parameters to Fixed Values

In the transition period until 30 June 2012, SMA Solar Technology AG inverters with frequency limits in accordance with Delibera AEEG 084-12 are permitted. The table below shows the assignment of setting values to inverter types for connection to the low-voltage grid and to the medium-voltage grid. At first, the country data set DK5940 or Enel-GUIDA must be selected via the communication (see Section 5). The frequency limits can then be adjusted according to the following table.

Depending on the type of communication, RS485 or *Bluetooth*® Wireless Technology, the parameters will be displayed differently.

Low Voltage - Upper Frequency Limit

Inverter	RS485	*Bluetooth*	Setting value
Sunny Boy 1200	Fac-delta+	Frequency monitoring lower maximum threshold	0.98 Hz
Sunny Boy 1700	Fac-delta+		0.98 Hz
Sunny Boy 2000HF	FrqCtl.hLim		51 Hz
Sunny Boy 2500	Fac-delta+		0.98 Hz
Sunny Boy 2500HF	FrqCtl.hLim		51 Hz
Sunny Boy 3000	Fac-delta+		0.98 Hz
Sunny Boy 3000HF	FrqCtl.hLim		51 Hz
Sunny Boy 3000TL*	FrqCtl.hLim		51 Hz
Sunny Boy 3300	Fac-delta+		0.98 Hz
Sunny Boy 3800	Fac-delta+		0.98 Hz
Sunny Boy 4000TL*	FrqCtl.hLim		51 Hz
Sunny Boy 5000TL*	FrqCtl.hLim		51 Hz
Sunny Mini Central 5000A	Fac-delta+		0.98 Hz
Sunny Mini Central 6000A	Fac-delta+		0.98 Hz
Sunny Mini Central 6000TL	Fac-delta+		0.98 Hz
Sunny Mini Central 7000HV	Fac-delta+		0.98 Hz
Sunny Mini Central 7000TL	Fac-delta+		0.98 Hz
Sunny Mini Central 8000TL	Fac-delta+		0.98 Hz
Sunny Mini Central 9000TL	Fac-delta+		0.98 Hz
Sunny Mini Central 10000TL	Fac-delta+		0.98 Hz
Sunny Mini Central 11000TL	Fac-delta+		0.98 Hz
Sunny Tripower 8000TL	FrqCtl.hLim		51 Hz
Sunny Tripower 10000TL	FrqCtl.hLim		51 Hz
Sunny Tripower 12000TL	FrqCtl.hLim		51 Hz
Sunny Tripower 15000TL	FrqCtl.hLim		51 Hz
Sunny Tripower 17000TL	FrqCtl.hLim		51 Hz

*For this inverter type, it is additionally necessary to set the parameter "frequency monitoring upper maximum threshold/ FrqCtl.Max" to 51 Hz.

Low Voltage - Lower Frequency Limit

Inverter	RS485	*Bluetooth*	Setting value
Sunny Boy 1200	Fac-delta-	Frequency monitoring upper minimum threshold	0.98 Hz
Sunny Boy 1700	Fac-delta-		0.98 Hz
Sunny Boy 2000HF	FrqCtl.ILim		49 Hz
Sunny Boy 2500	Fac-delta-		0.98 Hz
Sunny Boy 2500HF	FrqCtl.ILim		49 Hz
Sunny Boy 3000	Fac-delta-		0.98 Hz
Sunny Boy 3000HF	FrqCtl.ILim		49 Hz
Sunny Boy 3000TL*	FrqCtl.ILim		49 Hz
Sunny Boy 3300	Fac-delta-		0.98 Hz
Sunny Boy 3800	Fac-delta-		0.98 Hz
Sunny Boy 4000TL*	FrqCtl.ILim		49 Hz
Sunny Boy 5000TL*	FrqCtl.ILim		49 Hz
Sunny Mini Central 5000A	Fac-delta-		0.98 Hz
Sunny Mini Central 6000A	Fac-delta-		0.98 Hz
Sunny Mini Central 6000TL	Fac-delta-		0.98 Hz
Sunny Mini Central 7000HV	Fac-delta-		0.98 Hz
Sunny Mini Central 7000TL	Fac-delta-		0.98 Hz
Sunny Mini Central 8000TL	Fac-delta-		0.98 Hz
Sunny Mini Central 9000TL	Fac-delta-		0.98 Hz
Sunny Mini Central 10000TL	Fac-delta-		0.98 Hz
Sunny Mini Central 11000TL	Fac-delta-		0.98 Hz
Sunny Tripower 8000TL	FrqCtl.ILim		49 Hz
Sunny Tripower 10000TL	FrqCtl.ILim		49 Hz
Sunny Tripower 12000TL	FrqCtl.ILim		49 Hz
Sunny Tripower 15000TL	FrqCtl.ILim		49 Hz
Sunny Tripower 17000TL	FrqCtl.ILim		49 Hz

*For this inverter type, it is additonally necessary to set the parameter "frequency monitoring lower minimum threshold/FrqCtl.Min" to 49 Hz.

Medium Voltage - Upper Frequency Limit

Inverter	RS485	*Bluetooth*	Setting value
Sunny Boy 1200	Fac-delta+	Frequency monitoring lower maximum threshold	1.45 Hz
Sunny Boy 1700	Fac-delta+		1.45 Hz
Sunny Boy 2000HF	FrqCtl.hLim		51.5 Hz
Sunny Boy 2500	Fac-delta+		1.45 Hz
Sunny Boy 2500HF	FrqCtl.hLim		51.5 Hz
Sunny Boy 3000	Fac-delta+		1.45 Hz
Sunny Boy 3000HF	FrqCtl.hLim		51.5 Hz
Sunny Boy 3000TL*	FrqCtl.hLim		51.5 Hz
Sunny Boy 3300	Fac-delta+		1.45 Hz
Sunny Boy 3800	Fac-delta+		1.45 Hz
Sunny Boy 4000TL*	FrqCtl.hLim		51.5 Hz
Sunny Boy 5000TL*	FrqCtl.hLim		51.5 Hz
Sunny Mini Central 5000A	Fac-delta+		1.45 Hz
Sunny Mini Central 6000A	Fac-delta+		1.45 Hz
Sunny Mini Central 6000TL	Fac-delta+		1.45 Hz
Sunny Mini Central 7000HV	Fac-delta+		1.45 Hz
Sunny Mini Central 7000TL	Fac-delta+		1.45 Hz
Sunny Mini Central 8000TL	Fac-delta+		1.45 Hz
Sunny Mini Central 9000TL	Fac-delta+		1.45 Hz
Sunny Mini Central 10000TL	Fac-delta+		1.45 Hz
Sunny Mini Central 11000TL	Fac-delta+		1.45 Hz
Sunny Tripower 8000TL	FrqCtl.hLim		51.5 Hz
Sunny Tripower 10000TL	FrqCtl.hLim		51.5 Hz
Sunny Tripower 12000TL	FrqCtl.hLim		51.5 Hz
Sunny Tripower 15000TL	FrqCtl.hLim		51.5 Hz
Sunny Tripower 17000TL	FrqCtl.hLim		51.5 Hz

*For this inverter type, it is additionally necessary to set the parameter "frequency monitoring upper maximum threshold/ FrqCtl.Max" to 51.5 Hz.

Medium Voltage - Lower Frequency Limit

Inverter	RS485	*Bluetooth*	Setting value
Sunny Boy 1200	Fac-delta-	Frequency monitoring upper minimum threshold	2.45 Hz
Sunny Boy 1700	Fac-delta-		2.45 Hz
Sunny Boy 2000HF	FrqCtl.ILim		47.5 Hz
Sunny Boy 2500	Fac-delta-		2.45 Hz
Sunny Boy 2500HF	FrqCtl.ILim		47.5 Hz
Sunny Boy 3000	Fac-delta-		2.45 Hz
Sunny Boy 3000HF	FrqCtl.ILim		47.5 Hz
Sunny Boy 3000TL*	FrqCtl.ILim		47.5 Hz
Sunny Boy 3300	Fac-delta-		2.45 Hz
Sunny Boy 3800	Fac-delta-		2.45 Hz
Sunny Boy 4000TL*	FrqCtl.ILim		47.5 Hz
Sunny Boy 5000TL*	FrqCtl.ILim		47.5 Hz
Sunny Mini Central 5000A	Fac-delta-		2.45 Hz
Sunny Mini Central 6000A	Fac-delta-		2.45 Hz
Sunny Mini Central 6000TL	Fac-delta-		2.45 Hz
Sunny Mini Central 7000HV	Fac-delta-		2.45 Hz
Sunny Mini Central 7000TL	Fac-delta-		2.45 Hz
Sunny Mini Central 8000TL	Fac-delta-		2.45 Hz
Sunny Mini Central 9000TL	Fac-delta-		2.45 Hz
Sunny Mini Central 10000TL	Fac-delta-		2.45 Hz
Sunny Mini Central 11000TL	Fac-delta-		2.45 Hz
Sunny Tripower 8000TL	FrqCtl.ILim		47.5 Hz
Sunny Tripower 10000TL	FrqCtl.ILim		47.5 Hz
Sunny Tripower 12000TL	FrqCtl.ILim		47.5 Hz
Sunny Tripower 15000TL	FrqCtl.ILim		47.5 Hz
Sunny Tripower 17000TL	FrqCtl.ILim		47.5 Hz

*For this inverter type, it is additionally necessary to set the parameter "frequency monitoring lower minimum threshold/FrqCtl.Min" to 47.5 Hz.

5 Resetting the Parameters to Enel-GUIDA or DK 5940 Settings

If so required by the network operator, you can reset the SMA inverters to the Enel-GUIDA or DK 5940 settings. To do this, you need to reload the country data set for Italy. Depending on the inverter type, there are various ways of doing this.

Configuration in the Device or via External Communication

Depending on the type of communication, RS485 or *Bluetooth*, the parameters and messages are displayed differently.

Inverter type	Configuration in the Device	RS485	*Bluetooth*	Setting value
Sunny Boy 2000HF Sunny Boy 2500HF Sunny Boy 3000HF	Configure the country data set via the rotary switch for language settings (see installation manual of the inverter)	CntrySet	Set country standard	Enel-GUIDA or DK5940
Sunny Boy 3000TL Sunny Boy 4000TL Sunny Boy 5000TL				
Sunny Tripower 8000TL Sunny Tripower 10000TL Sunny Tripower 12000TL Sunny Tripower 15000TL Sunny Tripower 17000TL				

Configuration via Communication

Inverter type	RS485	*Bluetooth*	Setting value
Sunny Boy 1200/Sunny Boy 1700	Default	Set country standard	DK5940
Sunny Boy 2500/Sunny Boy 3000			
Sunny Boy 3300/Sunny Boy 3800			
Sunny Mini Central 5000A Sunny Mini Central 6000A			
Sunny Mini Central 6000TL Sunny Mini Central 7000TL Sunny Mini Central 8000TL			
Sunny Mini Central 7000HV			
Sunny Mini Central 9000TL Sunny Mini Central 10000TL Sunny Mini Central 11000TL			

6 Contact

If you have technical problems concerning our products, please contact the SMA Service Line. We require the following information in order to provide you with the necessary assistance:

- Inverter type
- Inverter serial number
- Type and number of the PV modules connected
- Event number or display message on the inverter
- Optional equipment (e.g. communication devices)
- If applicable: type of external wiring of the multi-function relay

SMA Solar Technology AG

Sonnenallee 1

34266 Niestetal, Germany

www.SMA.de

SMA Service Line

Inverters	+49 561 9522 1499
Communication:	+49 561 9522 2499
Fax:	+49 561 9522 4699
E-Mail:	ServiceLine@SMA.de

The information contained in this document is the property of SMA Solar Technology AG. Publishing its content, either partially or in full, requires the written permission of SMA Solar Technology AG. Any internal company copying of the document for the purposes of evaluating the product or its correct implementation is allowed and does not require permission.

Exclusion of liability

The general terms and conditions of delivery of SMA Solar Technology AG shall apply.

The content of these documents is continually checked and amended, where necessary. However, discrepancies cannot be excluded. No guarantee is made for the completeness of these documents. The latest version is available online at www.SMA.de or from the usual sales channels.

Guarantee or liability claims for damages of any kind are excluded if they are caused by one or more of the following:

- Damages during transportation
- Improper or inappropriate use of the product
- Operating the product in an unintended environment
- Operating the product whilst ignoring relevant, statutory safety regulations in the deployment location
- Ignoring safety warnings and instructions contained in all documents relevant to the product
- Operating the product under incorrect safety or protection conditions
- Altering the product or supplied software without authority
- The product malfunctions due to operating attached or neighboring devices beyond statutory limit values
- In case of unforeseen calamity or force majeure

The use of supplied software produced by SMA Solar Technology AG is subject to the following conditions:

- SMA Solar Technology AG rejects any liability for direct or indirect damages arising from the use of software developed by SMA Solar Technology AG. This also applies to the provision or non-provision of support activities.
- Supplied software not developed by SMA Solar Technology AG is subject to the respective licensing and liability agreements of the manufacturer.

SMA Factory Warranty

The current guarantee conditions come enclosed with your device. These are also available online at www.SMA.de and can be downloaded or are available on paper from the usual sales channels if required.

Trademarks

All trademarks are recognized even if these are not marked separately. Missing designations do not mean that a product or brand is not a registered trademark.

The *Bluetooth*® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by SMA Solar Technology AG is under license.

SMA Solar Technology AG

Sonnenallee 1

34266 Niestetal

Germany

Tel. +49 561 9522-0

Fax +49 561 9522-100

www.SMA.de

E-Mail: info@SMA.de

SMA Solar Technology

www.SMA-Solar.com

SMA Solar Technology AG
www.SMA.de
SMA America, LLC
www.SMA-America.com
SMA Technology Australia Pty., Ltd.
www.SMA-Australia.com.au
SMA Benelux SPRL
www.SMA-Benelux.com
SMA Beijing Commercial Co., Ltd.
www.SMA-China.com
SMA Czech Republic s.r.o.
www.SMA-Czech.com
SMA France S.A.S.
www.SMA-France.com
SMA Hellas AE
www.SMA-Hellas.com
SMA Ibérica Tecnología Solar, S.L.
www.SMA-Iberica.com
SMA Italia S.r.l.
www.SMA-Italia.com
SMA Technology Korea Co., Ltd.
www.SMA-Korea.com