



**BUREAU
VERITAS**

Certificate of compliance

Applicant: REFU Elektronik GmbH
Marktstraße 185
72793 Pfullingen
Germany

Product: Grid-tied photovoltaic (PV) inverter

Model: REFUsol 08K (867P008)
REFUsol 10K (867P010)
REFUsol 13K (867P013)
REFUsol 17K (867P017)
REFUsol 20K (867P020)
REFUsol 23K (867P023)

Use in accordance with regulations:

The inverters are tested according the IEC 61683:1999, EN 61683:2000, DIN EN 61683:2000 procedure for measuring efficiency.

Applied rules and standards:

IEC 61683:1999, EN 61683:2000, DIN EN 61683:2000

Photovoltaic systems – Power conditioners – Procedure for measuring efficiency

At the time of issue of this certificate the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.

Report number: 14TH0086-IEC61683_2

Certificate number: U16-0629

Date of issue: 2016-11-10

Certification body



Dieter Zitzmann



Deutsche
Akkreditierungsstelle
D-ZE-12024-01-00

Certification body of Bureau Veritas Consumer Products Services Germany GmbH
Accredited according to DIN EN ISO/IEC 17065

Measuring of efficiency

Extract from test report according the IEC 61683

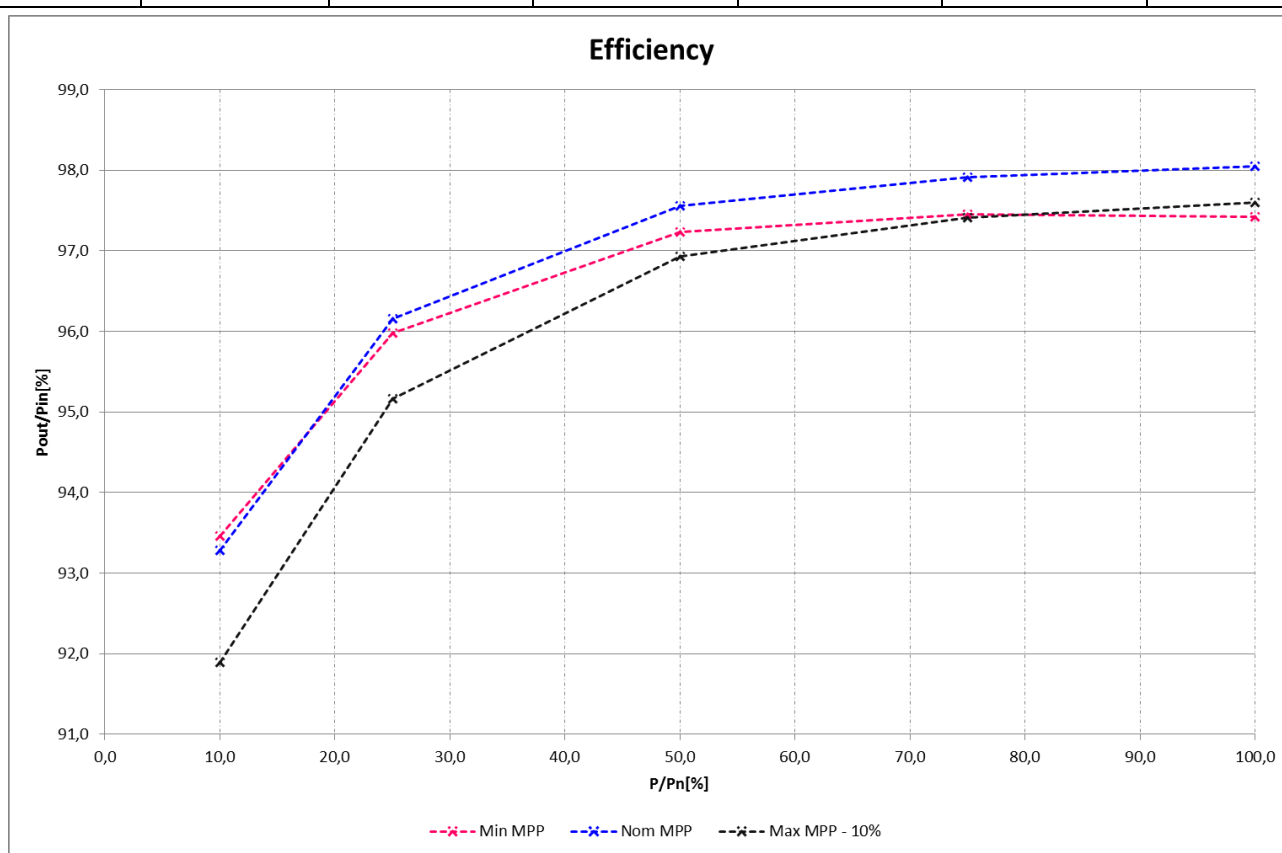
Nr. 14TH0086

Efficiency measurement conditions test results

REFUsoI 08K (867P008)

Power in [W] (nom. 8250W)

Input voltage [Vdc]		Power in [W] (nom. 8250W)				
		10%	25%	50%	75%	100%
		825W	2063W	4125W	6188W	8250W
		η in [%]				
V_{min}	370,0	93,5	96,0	97,2	97,5	97,4
$V_{nominal}$	620,0	93,3	96,2	97,6	97,9	98,0
V_{max} (90% MPPT)	765,0	91,9	95,2	96,9	97,4	97,6



Measuring of efficiency

Extract from test report according the IEC 61683

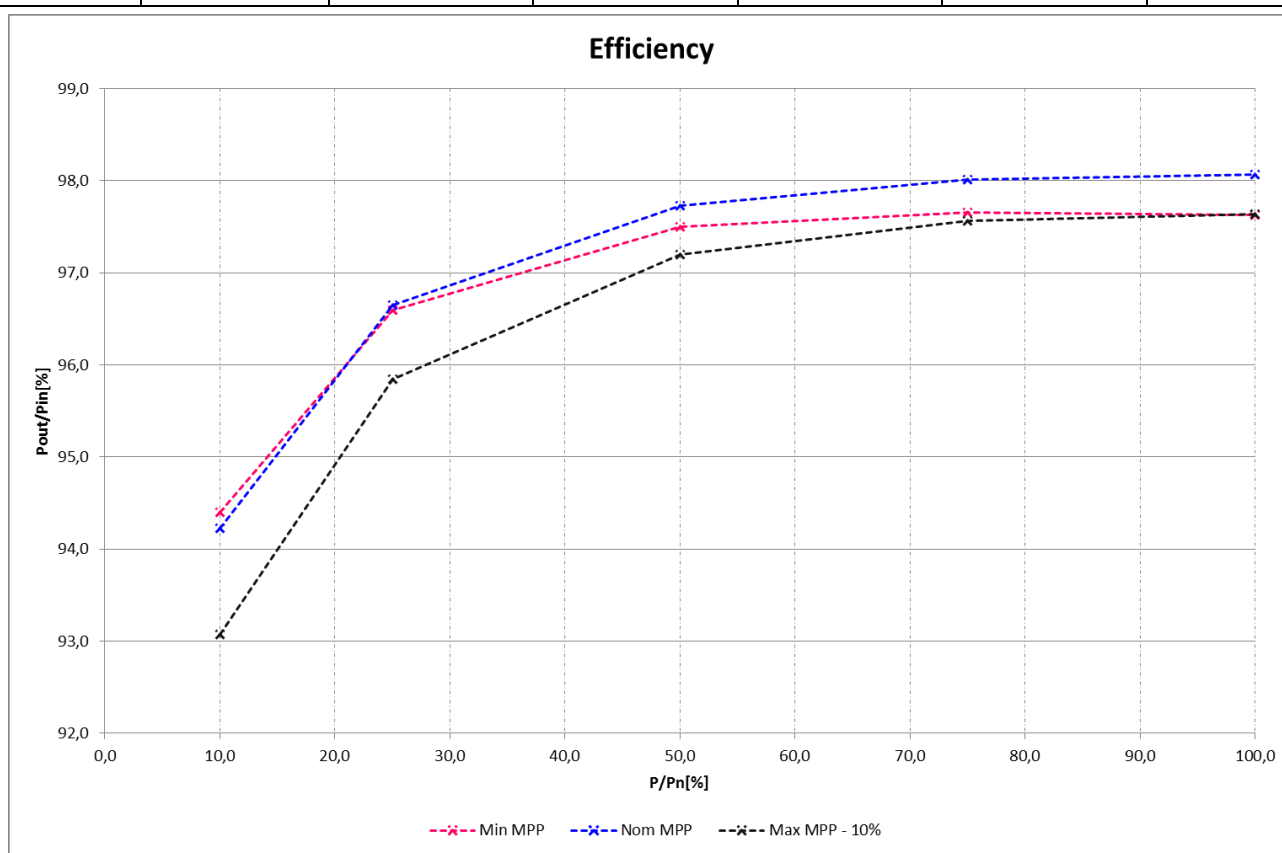
Nr. 14TH0086

Efficiency measurement conditions test results

REFUso1 10K (867P010)

Power in [W] (nom. 10000W)

Input voltage [Vdc]		Power in [W] (nom. 10000W)				
		10%	25%	50%	75%	100%
		1kW	2,5kW	5kW	7,5kW	10kW
		η in [%]				
V _{min}	410,0	94,4	96,6	97,5	97,7	97,6
V _{nominal}	620,0	94,2	96,6	97,7	98,0	98,1
V _{max (90% MPPT)}	765,0	93,1	95,8	97,2	97,6	97,6



Measuring of efficiency

Extract from test report according the IEC 61683

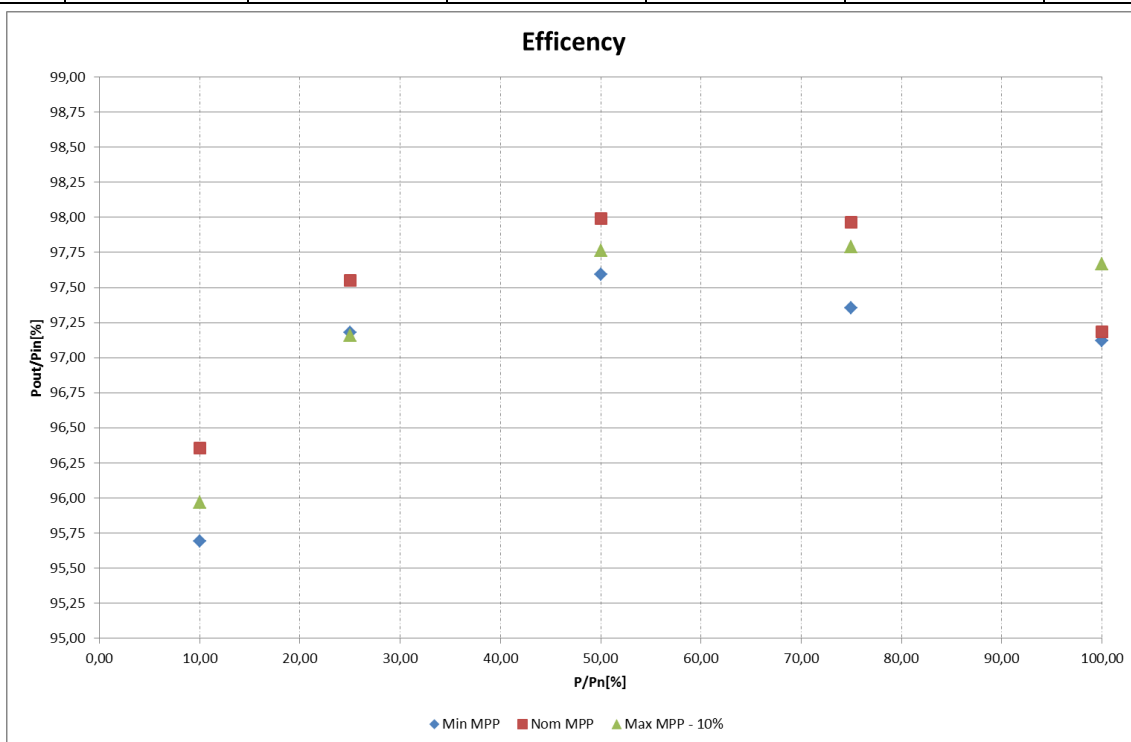
Nr. 14TH0086

Efficiency measurement conditions test results

REFUso1 13K (867P013)

Power in [W] (nom. 13000W)

Input voltage [Vdc]		Power in [W] (nom. 13000W)				
		10%	25%	50%	75%	100%
		1,3kW	3,25kW	6,5kW	9,75kW	13,0kW
		η in [%]				
V_{min}	430,00	95,69	97,18	97,59	97,35	97,12
V_{nominal}	620,00	96,36	97,55	97,99	97,96	97,19
V_{max} (90% MPPT)	765,00	95,97	97,16	97,76	97,79	97,67



Measuring of efficiency

Extract from test report according the IEC 61683

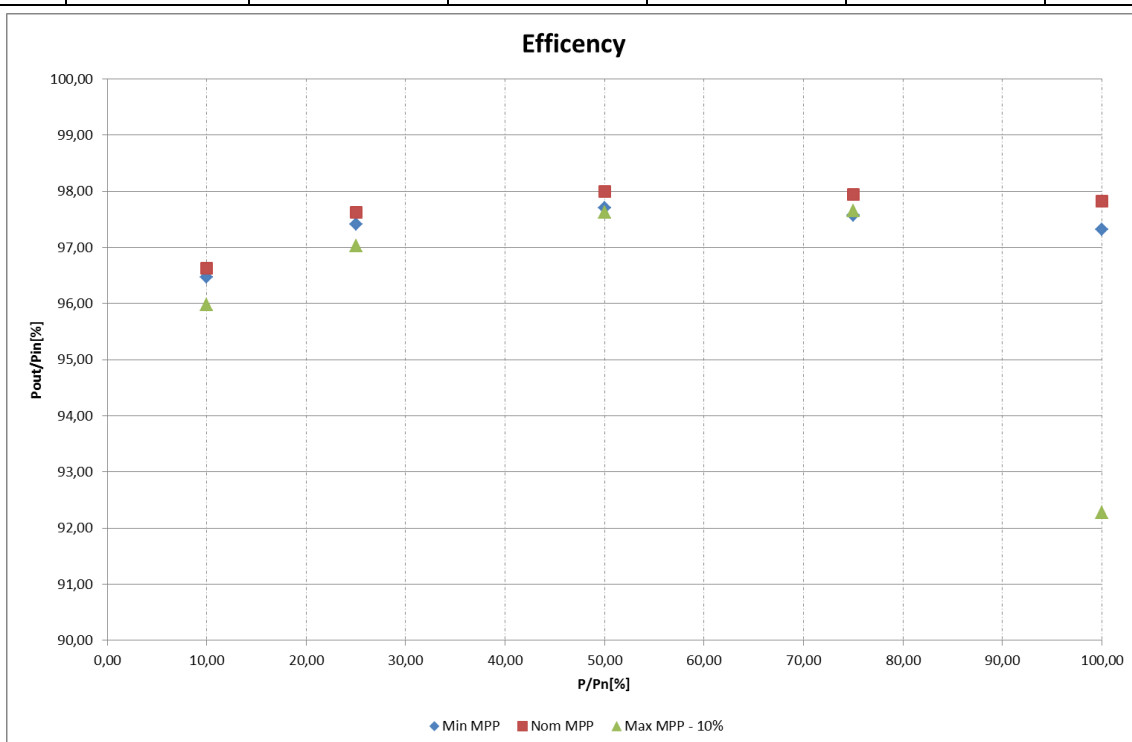
Nr. 14TH0086

Efficiency measurement conditions test results

REFUso1 17K (867P017)

Power in [W] (nom. 17000W)

Input voltage [Vdc]		Power in [W] (nom. 17000W)				
		10%	25%	50%	75%	100%
		1,7kW	4,25kW	8,5kW	12,75kW	17,0kW
		η in [%]				
V_{min}	460,00	96,47	97,41	97,71	97,57	97,33
$V_{nominal}$	620,00	96,63	97,63	98,00	97,95	97,82
V_{max} (90% MPPT)	765,00	95,98	97,03	97,62	97,65	92,27



Measuring of efficiency

Extract from test report according the IEC 61683

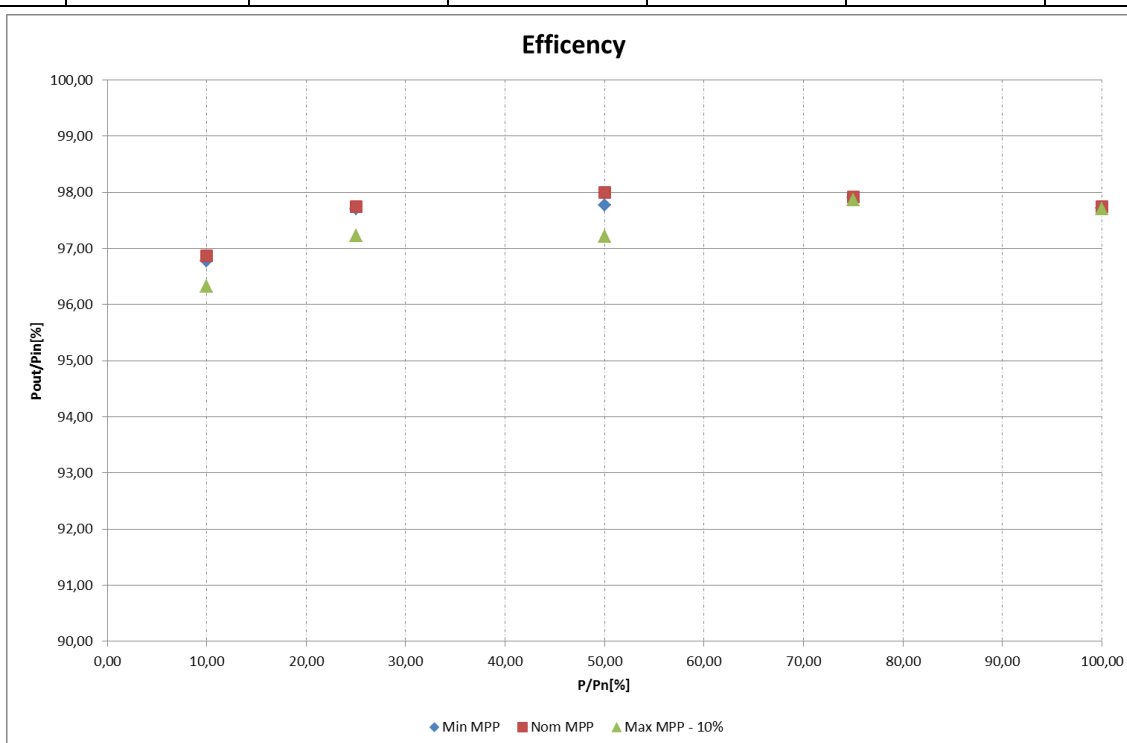
Nr. 14TH0086

Efficiency measurement conditions test results

REFUsoI 20K (867P020)

Power in [W] (nom. 20000W)

Input voltage [Vdc]		Power in [W] (nom. 20000W)				
		10%	25%	50%	75%	100%
		2,0kW	5,0kW	10,0kW	15,kW	20,0kW
		η in [%]				
V_{min}	490,00	96,77	97,70	97,77	97,90	97,72
V_{nominal}	633,00	96,87	97,74	98,00	97,92	97,74
V_{max} (90% MPPT)	765,00	96,33	97,22	97,21	97,87	97,71



Measuring of efficiency

Extract from test report according the IEC 61683

Nr. 14TH0086

Efficiency measurement conditions test results

REFUso1 23K (867P023)

Power in [W] (nom. 23000W)

Input voltage [Vdc]		Power in [W] (nom. 23000W)				
		10%	25%	50%	75%	100%
		2,3kW	5,75kW	11,5kW	17,25kW	23,0kW
		η in [%]				
V_{min}	575,00	97,05	97,89	98,08	97,92	97,71
V_{nominal}	620,00	97,15	97,96	98,16	98,04	97,87
V_{max} (90% MPPT)	765,00	97,17	97,96	98,14	98,06	97,87

