



TEST REPORT

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

No.588 West Jindu Road,
Songjiang District,
Shanghai, China



SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing Center E&C, Songjiang District

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Testing laboratory: SGS-CSTC Standards Technical Services(Shanghai) Co., Ltd.

Address: 588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Applicant's name.....: BEIJING EPSOLAR TECHNOLOGY CO., LTD.

Address: NO.228, BLOCK A, 2ND FLOOR, BLDG 1, NO.3 STREET, SHANGDI
XINXI CHANYE JIDI, HAIDIAN DISTRICT, BEIJING, CHINA

Test specification: IEC 62509:2010

Test item description: MPPT Solar Charge Controller

Trade mark: EPEVER

Manufacturer: HUIZHOU EPEVER TECHNOLOGY CO., LTD.

NO.103, DONGXING RD, CHENJIANG STREET, ZHONGKAI HIGH-
TECH ZONE, HUIZHOU, CHINA

Factory.....: HUIZHOU EPEVER TECHNOLOGY CO., LTD.

NO.103, DONGXING RD, CHENJIANG STREET, ZHONGKAI HIGH-
TECH ZONE, HUIZHOU, CHINA

Model/Type reference: Tracer10420AN

Tracer8420AN

Tracer6420AN

Ratings: Refer to page 5 to 6



Signature

Tested by: Erin Lin



Signature

Approved by: Van Hua



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Summary of testing

Tracer10420AN, Tracer8420AN and Tracer6420AN selected as representative samples are tested according to IEC 62509:2010 in this test report. And rating test items were repeated on other models.

All the samples have been tested and found to comply with the above-mentioned standards' requirements.

Details of test result are shown in this test report.

Tests performed (name of test and test clause):

EN 62509:2011 / IEC 62509:2010

Testing location:

Shenzhen Academy of Metrology and Quality Inspection
NETC Building, No.4 Tongfa road, Xili, Nanshan, Shenzhen, China

Copy of marking plate / device under test:



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Possible test case verdicts:

- Test case does not apply to the test object	N/A
- Test object does meet the requirement	Pass (P)
- Test object does not meet the requirement	Fail (F)

General remarks:

The test results presented in this report relate only to the object tested.

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Throughout this report, a point is used as the decimal separator.

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Contents:

- 1) The main report.
- 2) Attachment 1: User Manual
- 3) Attachment 2: Constructional Data Form (CDF) for Solar Charger Controller

General product information



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General product information:

1. The equipment under test is a MPPT solar charge controller for sealed lead-acid battery, Gel lead-acid battery, Open lead-acid battery and other types of battery. The equipment can be connected to a solar panel to charge the battery. The voltage of the battery could be 12V/24V/36V/48V. The unit is with Battery over voltage protection, Battery over Dis-voltage protection, PV over current protection and PV short circuit protection, also with the LED indicator and LCD display. which can assure the working normally and safety use.
2. All tests were conducted on model Tracer10420AN to represent the others. Other model supplement Charging cycles tests, Load disconnect/ load reconnect test, Standby self-consumption test and Efficiency test.
3. The electrical principle and structure of this series of products are basically the same, the difference is that the electrical parameters of the products are different, so the circuit and key components are also slightly different.

Rating:

Item	Tracer6420AN	Tracer8420AN	Tracer10420AN
Nominal system voltage	12/2436/48VDC or Auto		
Battery input Voltage range	8-68VDC		
Rated charge current	60A	80A	100A
Rated charge power	750W/12V 1500W/24V 2250W/36V 3000W/48V	1000W/12V 2000W/24V 3000W/36V 4000W/48V	1250W/12V 2500W/24V 3750W/36V 5000W/48V
Max conversion efficiency	98.1%	98.5%	98.5%
MPPT voltage range	battery voltage+2V~144V		
Battery type	Lead-acid battery: Sealed(Default)/Gel/Flooded/User; Lithium battery LiFePO4/Li(NiCoMn)O2/User		
Equalize charging Voltage	Sealed:14.6V/Gel: No/Flooded:14.8V/User:9-17V(x2/24V)		
Boost charging Voltage	Sealed:14.4V/Gel: 14.2V /Flooded:14.6V/User:9-17V(x2/24V)		
Float charging Voltage	Sealed/Gel/Flooded:13.8V/User:9-17V(x2/24V)		
Low Voltage Reconnect Voltage	Sealed/Gel/Flooded:12.6V/User:9-17V(x2/24V)		
Low Voltage Disconnct	Sealed/Gel/Flooded:11.1V/User:9-17V(x2/24V)		



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Voltage	
Working environment temperature	-25°C~+60°C (Derate above 45°C)
Temperature compensation coefficient	-3mv/°C/2V(Lithium battery do not have Temperature compensation coefficient)



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1. Test specification and test result

Clause	Requirement + Test	Result - Remark	Verdict
4.3	Battery lifetime protection requirements		P
4.3.1	Prevent leakage current from battery to PV generator		P
	The allowable reverse current on the PV side shall be $\leq 0.1\%$ of the BCC rated input current when the battery voltage is equal to the rated voltage.	Rated input current: 100A Allowable reverse current: 100mA	P
	Compliance shall be verified by the test according to 5.2.1.	Adjust the Battery voltage to 2.1V/cell, thus the battery voltage is: 50.4/37.8/25.2V/12.6V No Negligible current (Negligible current is measured in the R_{PV} loop.)	P
4.3.2	Basic battery charging functions		P
4.3.2.1	General		P
	The BCC shall provide appropriate charging set-point and load disconnect set-points for the specific battery technology or technologies it is intended to be used for.	The controller is suitable for sealed lead-acid battery, Gel lead-acid battery, Flooded lead-acid battery and Lithium battery. When the user set the battery type to any of the above, the BCC will automatically match the different charging and load disconnect set-points for that type of battery. Besides the battery types above, the user could also self-customized the set points within the allowable voltage range and according to the certain principles. The default system set-points of the sealed lead-acid battery are checked during the test.	P



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4.3.2.2	Protect battery from over-charge		P
	The BBC shall cut out or regulate the charging current to avoid over-charging of the battery according to battery manufacture recommended end of charge set-point.	The controller cut out the charging current to avoid over-charging of the battery. Refer to below.	P
	Compliance shall be determined by test according to 5.2.2.	Refer to the table 5.2.2 for detail.	P
4.3.2.3	Protect battery from over-discharge		P
	The BCC shall have a provision to prevent the battery from over-discharging.	Refer to the table 5.2.3 for detail.	P
	If battery over-discharge protection is achieved by means of audible or visible alarms that prompt the system user to distance all or non-essential load, this shall be clearly stated in the operation manual.	The controller shut off the output automatically.	N/A
	If over-discharge protection is reliant on the installation of an external device that provides over-discharge protection, this fact shall be clearly stated in the installation manual.	The over-discharge protection is reliant on the charge BCC itself.	N/A
	Battery over-discharge protection can be triggered by a battery voltage measurement, a state of charge calculation, a combination of both or other algorithms.	The over-discharge protection is triggered by a battery voltage measurement	P
	The BBC documentation and/or interface shall clearly specify the algorithms and criteria used to establish the load disconnect and reconnect set-points		P
	Compliance shall be determined by test according to 5.2.3	Refer to the table 5.2.3 for detail.	P
4.3.2.4	Set-point accuracy		P
	The BBC measurement accuracy for voltage set-points for charge control shall be $\pm 1\%$ or better. For load disconnect it shall be $\pm 2\%$ or better.	The BCC measurement accuracy for voltage set-points for charge control is within $\pm 1\%$. For load disconnect it is within $\pm 2\%$. Refer to table 5.2.2 and 5.2.3 for details.	P
	Compliance shall be determined by test according to 5.2.2 and 5.2.3.		P
4.3.3	Charging regime		P
4.3.3.1	General		P



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	The BBC shall be matched to the specific battery technology for its intended use to ensure that correct charging set-points are implemented.	The controller is suitable for sealed lead-acid battery, Gel lead-acid battery, Flooded lead-acid battery and Lithium battery. When the user set the battery type to any of the above, the BCC will automatically match the different charging and load disconnect set-points for that type of battery. Besides the battery types above, the user could also self-customized the set points within the allowable voltage range and according to the certain principles. The default system set-points of the sealed lead-acid battery are checked during the test.	P
4.3.3.2	Required charging stages		P
	As a minimum, PV battery charge controllers shall have bulk and float charging stages.	The BCC has Equalize, Boost and float charging stages.	P
4.3.3.3	Recommended charging stages		P
	In addition to 4.3.3.2, battery charge controllers should provide equalise charge periodically to the battery. The periodicity of equalise charge should be more than 7 days.	The controllers have equalise charge stage provided. And The periodicity of equalise charge is the 28th of every month.	P
4.3.3.4	Adjustable charging set-points		P



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	Charging set-points should be adjustable or automatically selected either by means of individual set-point adjustment, or by battery type selection or self-detection of type of battery.	The controller is suitable for sealed lead-acid battery, Gel lead-acid battery, Flooded lead-acid battery and Lithium battery. When the user sets the battery type to any of the above, the BCC will automatically match the different charging and load disconnect set-points for that type of battery. Besides the battery types above, the user could also self-customize the set points within the allowable voltage range and according to the certain principles. The default system set-points of the sealed lead-acid battery are checked during the test.	P
	The specific charging regime used depends on the battery technology specified.	See above	P
	Self-adaptive set-points based on advanced algorithms shall be able to be verified using information provided by the user interface and the BCC documentation.		N/A
4.3.3.5	Temperature compensated charging set-points	Temperature compensated function is provided for sealed lead-acid battery.	P
	Bulk, float, and other high voltage or end of charge set-points should be temperature compensated.		P
	Temperature compensation if provided should be in accordance with battery manufacturer recommendations for the particular type of battery.		P
	Temperature compensated set-points shall be identifiable from the charge controller documentation.		P
4.3.3.6	Voltage drop compensation for set-point measurement	No voltage drop compensation function is provided.	N/A
	The BCC should provide a means to compensate for voltage drop in battery cables, or provide installation instructions to minimize voltage drop.		N/A



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	If the battery charge controller has the provision for battery sense cables, it shall be able to operate with or without these. This requirement is tested according to 5.2.2 and 5.2.3		N/A
4.3.4	Set-point security	<p>The controller is suitable for sealed lead-acid battery, Gel lead-acid battery, Flooded lead-acid battery and Lithium battery. When the user set the battery type to any of the above, the BCC will automatically match the different charging and load disconnect set-points for that type of battery.</p> <p>Besides the battery types above, the user could also self-customized the set points within the allowable voltage range and according to the certain principles.</p> <p>The default system set-points of the sealed lead-acid battery are checked during the test.</p>	N/A
	Charging set-points shall be secured against change other than by a deliberate and qualified action		N/A
	Compliance shall be determined by inspection of the unit and accompanying operating instructions.		N/A
4.3.5	Load disconnect capability	The BCC is not provided with the load, but the under-voltage protection function is realized by the on and off of the relay	P
	Where over-discharge protection is provided by means of load disconnect functionality the load disconnect and reconnect set-points shall be verified by testing according 5.2.3	Refer to the table 5.2.3 for detail.	P
	The load could be either a load directly switched or a load controlled by the BBC by other means.	Directly switched	P
	In case of a BBC directly switching the load this should be provided by means of an integrated load breaking switching device.	No load	P
4.4	Energy performance requirements		P
4.4.1	Stand by self-consumption		P



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	With no PV input or load the self-consumption of a PV BCC shall be as detailed in table 1, when the battery voltage is equivalent to 2.1V/Cell $\pm 2\%$, and the ambient temperature is 25°C $\pm 2^\circ\text{C}$	For Tracer10420AN, Tracer8420AN, Tracer6420AN: Nominal charging current: 100A,80A,60A Maximum self-consumption: 50mA. (According to customer requirements)	P
	Compliance shall be determined by test according to 5.3.1	Refer to the table 5.3.1 for detail.	P
4.4.2	BBC efficiency		P
	Power efficiency of the BBC shall be evaluated from 10% to 100% of the rated charging current, at a battery voltage equivalent to 2.2V/cell $\pm 2\%$ and at ambient temperature of 25°C $\pm 2^\circ\text{C}$	Refer to the table 5.3.2 for detail.	P
	The efficiency shall be determined by test according to 5.3.2	Refer to Table 5.3.2 for detail.	P
4.5	Protection and fail safe requirements		P
4.5.1	Thermal performance	Refer to the table 5.4.1 for detail.	P
	The BBC shall be capable of handling rated input current/power from the generator and, simultaneously, rated load current to load terminals (if provided) for at least 1h at the manufacture' s specified maximum rated ambient operating temperature $\pm 2^\circ\text{C}$. Battery voltage shall be 2.2V/cell $\pm 2\%$	the manufacture's specified maximum rated ambient operating temperature: 60°C Battery voltage: 52.8 V Charging current: 100 A Operating time: 1 h Note: the Battery voltage is adjusted to 2.2V/cell, thus the battery pack voltage is 52.8 V	P
	Compliance shall be determined by test according to 5.4.1	The BCC operates for 1h normally. Refer to the table 5.4.1 for detail.	P
4.5.2	Overcurrent operation		P
4.5.2.1	PV side		P
	The BCC shall not be damaged by excessive current from the PV generator up to 125% of the full rated current. The BBC shall continue to operate normally after such an event and shall not require manual resetting	Rated current: 100A The maximum sustained test charging current is 94.20A. Operating time: 1h	P



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	Compliance shall be determined by test according to 5.4.2	After 1h, the BCC is not damaged. The BCC continue to operate normally after such an event and does not require manual resetting. Refer to the table 5.4.2 for detail.	P
4.5.2.2	Load side	No load	N/A
	If the BBC has a load terminal, this terminal shall be current protected to prevent over loads from causing damage to the operation of the essential PV BCC functions.		N/A
	Compliance shall be determined by test according to 5.4.3		N/A
4.5.3	PV generator and battery reverse polarity		P
	The BBC shall be protected from reverse polarity connection of the PV generator or the battery by hardware or by documented procedure and markings.	When the PV generator reverse polarity the BCC won't work and won't cause any damage. But the battery is not reverse polarity by the documentation	P
	Compliance shall be determined by test according to 5.4.4 and 5.4.5		P
4.5.4	Open circuit on battery terminals (no battery connection)		P
	BCC with load terminals shall be protected from damage to itself and protect the load from the open circuit voltage of the PV generator in case of battery disconnection	No load	N/A
	Compliance shall be determined by test according to 5.4.6	The BCC is not damaged and operates normally under normal condition.	P
4.6	User interface requirements		P
4.6.1	General		P
	The type of the user interface		P
	The user interface shall provide the user with valuable information about the system operation if implemented properly		P
	The user interface may be integrated into another system component separate from the BCC.		N/A



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4.6.2	Operational information		P
4.6.2.1	General		P
	The level of information provided to the user is determined by the intended application and its specific requirements		P
4.6.2.2	Recommended operation information		P
	An indication of charging status	By charging LED indicator green slowly flashing and LCD display.	P
	An indication of load-disconnect state	By LCD display	P
	An indication of the state-of-charge of the connected battery	By Fault LED indicator red on solid and LCD display	P
	Other additional operational information displayed by the unit may include but is not limited to: Charging set-point Battery voltage Charging current Energy input/output	By LCD display	P



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4.6.3	User adjustable set-points and parameters	<p>The controller is suitable for sealed lead-acid battery, Gel lead-acid battery, Flooded lead-acid battery and Lithium battery. When the user set the battery type to any of the above, the BCC will automatically match the different charging and load disconnect set-points for that type of battery.</p> <p>Besides the battery types above, the user could also self-customized the set points within the allowable voltage range and according to the certain principles.</p> <p>The default system set-points of the sealed lead-acid battery are checked during the test.</p>	P
	If user-adjustable set-points or parameters are provided, the user interface shall provide a facility to modify and display those adjustments as specified in 4.3.3.4		P
	Compliance shall be determined by inspection of the unit and accompanying user/installation manual		P
4.6.4	Alarms		P
	The following condition should be signalled by the user interface:		P
	Low battery state of charge/ low battery voltage/ low availability		P
	Load disconnect	By Fault LED indicator red on solid	P
	BCC trip	The BCC has over temperature function	P



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	Visible and/or audible alarms, clearly identifiable by the system user, shall be triggered within the unit in case of any of the above conditions occurring. Audible alarms shall be time limited and revert to a visible alarm or be pulsed.	Visual alarm provided	P
	Compliance shall be determined by test according to 5.2.2 and 5.2.3		P

5.2.2	Charging cycle test (ON-OFF controller)		N/A
Chamber temperature (°C)	End of charge voltage (V)	Return to charge voltage (V)	
--	--	--	
--	--	--	

Note: --

5.2.2	Charging cycle test (PWM or MPPT controller)						P
√ MPPT controller □ PWM controller							
Charmber temperauter		25°C					
Battery voltage=2.1V/cell±2%		50.4V					
Model number of the BCC		Tracer10420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.68	6.50	57.16	7.68	\	\	\
End of bulk charge	69.97	0.63	57.42	0.66	57.6	57.42	-0.31%
Charmber temperauter		40°C					
Battery voltage=2.1V/cell±2%		50.4V					
Model number of the BCC		Tracer10420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.35	10.01	55.86	11.97	\	\	\
End of bulk charge	69.97	0.62	56.47	0.66	\	56.47	\
Charmber temperauter		25°C					



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Battery voltage=2.1V/cell±2%			37.8V				
Model number of the BCC			Tracer10420AN				
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.49	6.32	42.65	9.85	\	\	\
End of bulk charge	69.97	0.49	43.13	0.68	43.2	43.13	-0.16%
Charmber temperauter			40°C				
Battery voltage=2.1V/cell±2%			37.8V				
Model number of the BCC			Tracer10420AN				
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.39	10.01	41.56	15.87	\	\	\
End of bulk charge	69.98	0.48	42.43	0.68	\	42.43	\
Charmber temperauter			25°C				
Battery voltage=2.1V/cell±2%			25.2V				
Model number of the BCC			Tracer10420AN				
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	59.95	6.15	28.13	12.30	\	\	\
End of bulk charge	59.98	0.40	28.78	0.70	28.8	28.78	-0.07%
Charmber temperauter			40°C				
Battery voltage=2.1V/cell±2%			25.2V				
Model number of the BCC			Tracer10420AN				
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	68.91	5.01	27.73	11.74	\	\	\
End of bulk charge	69.97	0.34	28.26	0.70	\	28.26	\



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Charmber temperauter		25°C					
Battery voltage=2.1V/cell±2%		12.6V					
Model number of the BCC		Tracer10420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	58.42	2.01	14.22	7.37	\	\	\
End of bulk charge	59.98	0.24	14.42	0.72	14.4	14.42	0.14%
Charmber temperauter		40°C					
Battery voltage=2.1V/cell±2%		12.6V					
Model number of the BCC		Tracer10420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.79	2.79	13.42	13.02	\	\	\
End of bulk charge	69.98	0.21	14.04	0.72	\	14.04	\
Charmber temperauter		25°C					
Battery voltage=2.1V/cell±2%		50.4V					
Model number of the BCC		Tracer8420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.87	13.83	56.87	16.40	\	\	\
End of bulk charge	69.97	0.63	57.41	0.66	57.6	57.41	-0.33%
Charmber temperauter		40°C					
Battery voltage=2.1V/cell±2%		50.4V					
Model number of the BCC		Tracer8420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.89	3.35	56.17	4.00	\	\	\



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End of bulk charge	69.98	0.62	56.52	0.66	\	56.52	\
Charmber temperauter		25°C					
Battery voltage=2.1V/cell±2%		37.8V					
Model number of the BCC		Tracer8420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.55	10.01	42.46	15.76	\	\	\
End of bulk charge	69.97	0.48	43.14	0.68	43.2	43.14	-0.14%
Charmber temperauter		40°C					
Battery voltage=2.1V/cell±2%		37.8V					
Model number of the BCC		Tracer8420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.81	3.70	42.09	5.86	\	\	\
End of bulk charge	69.97	0.48	42.51	0.68	\	42.51	\
Charmber temperauter		25°C					
Battery voltage=2.1V/cell±2%		25.2V					
Model number of the BCC		Tracer8420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	59.71	8.01	28.24	16.07	\	\	\
End of bulk charge	59.98	0.41	28.82	0.72	28.8	28.82	0.07%
Charmber temperauter		40°C					
Battery voltage=2.1V/cell±2%		25.2V					
Model number of the BCC		Tracer8420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point	Measured Voltage(V)	Accuracy (%)



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					(V)		
Bulk charge	69.09	4.01	27.84	9.27	\	\	\
End of bulk charge	69.98	0.34	28.32	0.70	\	28.32	\
Charmber temperauter		25°C					
Battery voltage=2.1V/cell±2%		12.6V					
Model number of the BCC		Tracer8420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	59.85	3.70	13.83	14.59	\	\	\
End of bulk charge	59.98	0.24	14.29	0.72	14.4	14.29	-0.76%
Charmber temperauter		40°C					
Battery voltage=2.1V/cell±2%		12.6V					
Model number of the BCC		Tracer8420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.80	3.70	13.42	16.58	\	\	\
End of bulk charge	69.98	0.21	14.10	0.72	\	14.10	\
Charmber temperauter		25°C					
Battery voltage=2.1V/cell±2%		50.4V					
Model number of the BCC		Tracer6420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.58	7.01	56.88	8.34	\	\	\
End of bulk charge	69.97	0.61	57.41	0.66	57.6	57.41	-0.33%
Charmber temperauter		40°C					
Battery voltage=2.1V/cell±2%		50.4V					
Model number of the BCC		Tracer6420AN					



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Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.07	2.01	56.37	2.37	\	\	\
End of bulk charge	69.96	0.60	56.51	0.66	\	56.51	\
Charmber temperauter		25°C					
Battery voltage=2.1V/cell±2%		37.8V					
Model number of the BCC		Tracer6420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.26	7.01	42.56	10.96	\	\	\
End of bulk charge	69.97	0.48	43.34	0.68	43.4	43.34	-0.14%
Charmber temperauter		40°C					
Battery voltage=2.1V/cell±2%		37.8V					
Model number of the BCC		Tracer6420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.76	3.87	42.13	6.15	\	\	\
End of bulk charge	69.97	0.47	42.44	0.68	\	42.44	\
Charmber temperauter		25°C					
Battery voltage=2.1V/cell±2%		25.2V					
Model number of the BCC		Tracer6420AN					
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	49.67	7.01	28.24	11.69	\	\	\
End of bulk charge	49.97	0.47	28.61	0.70	28.8	28.61	-0.66%
Charmber temperauter		40°C					



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Battery voltage=2.1V/cell±2%			25.2V				
Model number of the BCC			Tracer6420AN				
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.28	4.00	27.70	9.37	\	\	\
End of bulk charge	69.97	0.34	28.29	0.70	\	28.29	\
Charmber temperauter			25°C				
Battery voltage=2.1V/cell±2%			12.6V				
Model number of the BCC			Tracer6420AN				
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	39.94	6.58	13.46	17.77	\	\	\
End of bulk charge	39.99	0.33	14.32	0.72	14.4	14.32	-0.56%
Charmber temperauter			40°C				
Battery voltage=2.1V/cell±2%			12.6V				
Model number of the BCC			Tracer6420AN				
Charging stages	Input voltage(V)	Input current(A)	Output voltage(V)	Output current(A)	Set-point (V)	Measured Voltage(V)	Accuracy (%)
Bulk charge	69.88	3.37	13.61	15.08	\	\	\
End of bulk charge	69.97	0.20	14.18	0.72	\	14.18	\
Note: The BCC is provided with the temperature compensation function							

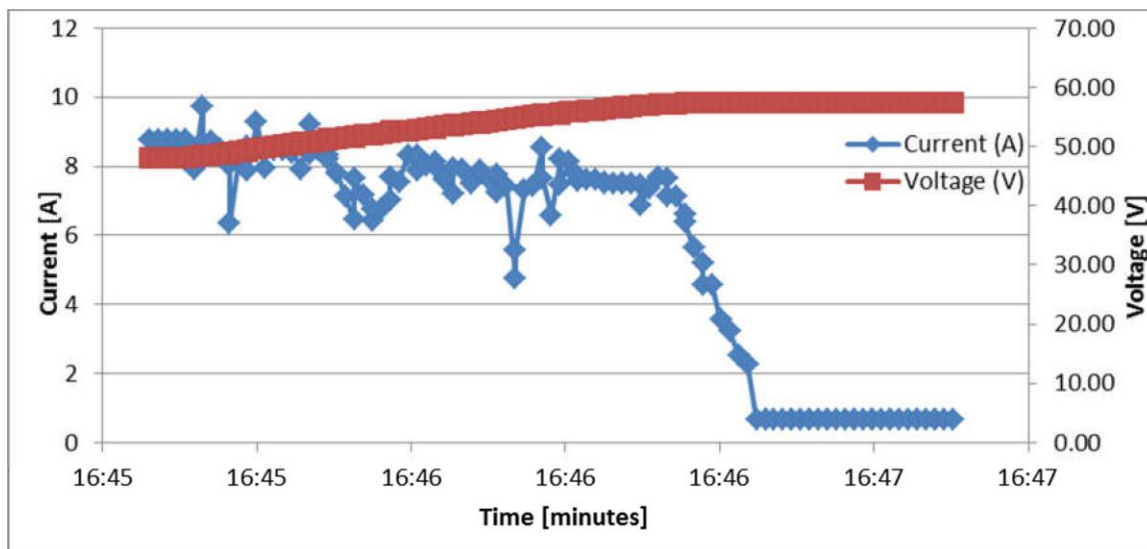


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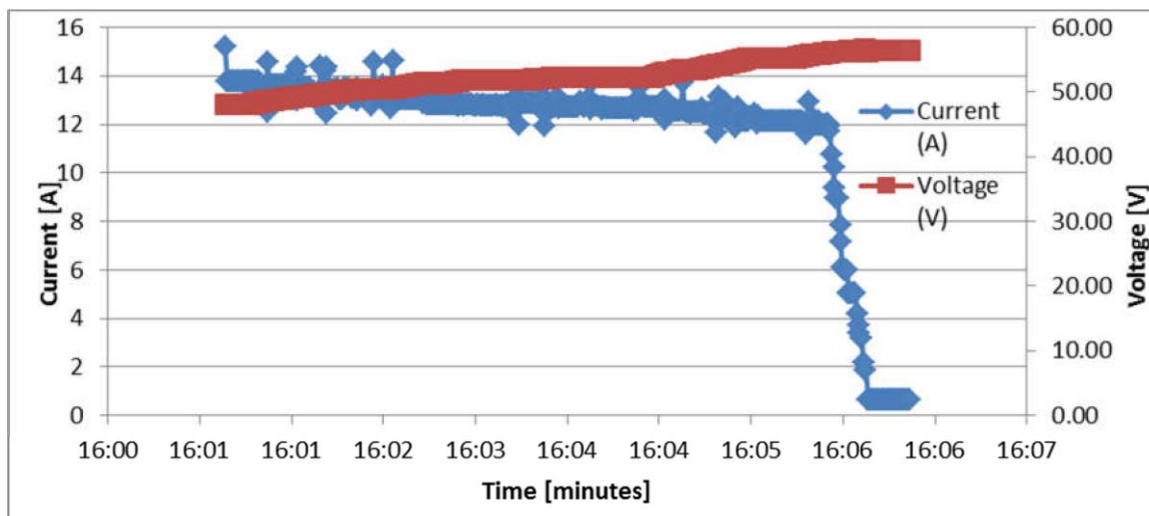
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Charging curve at 48V (Tracer10420AN) @25°C

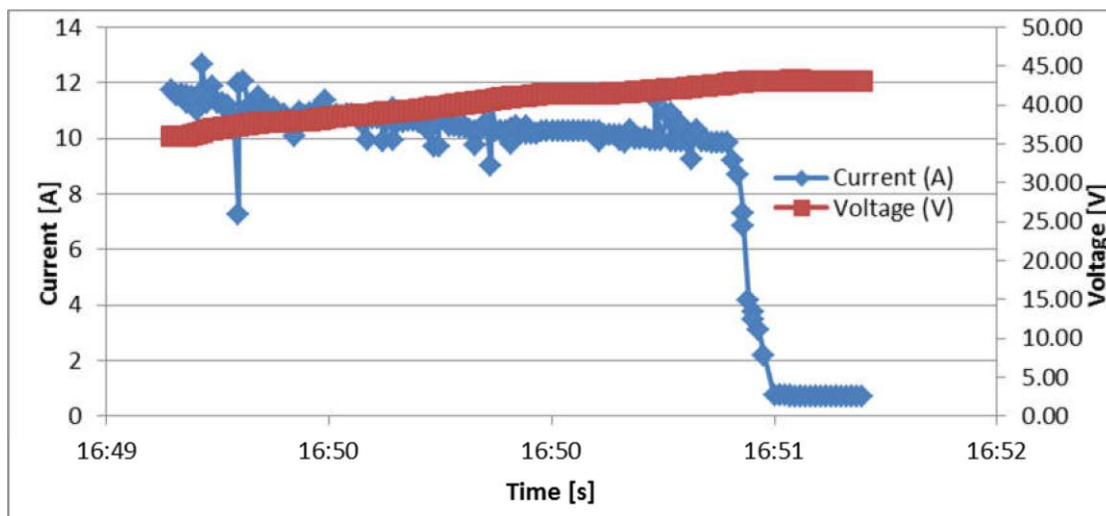


Charging curve at 48V (Tracer10420AN) @40°C

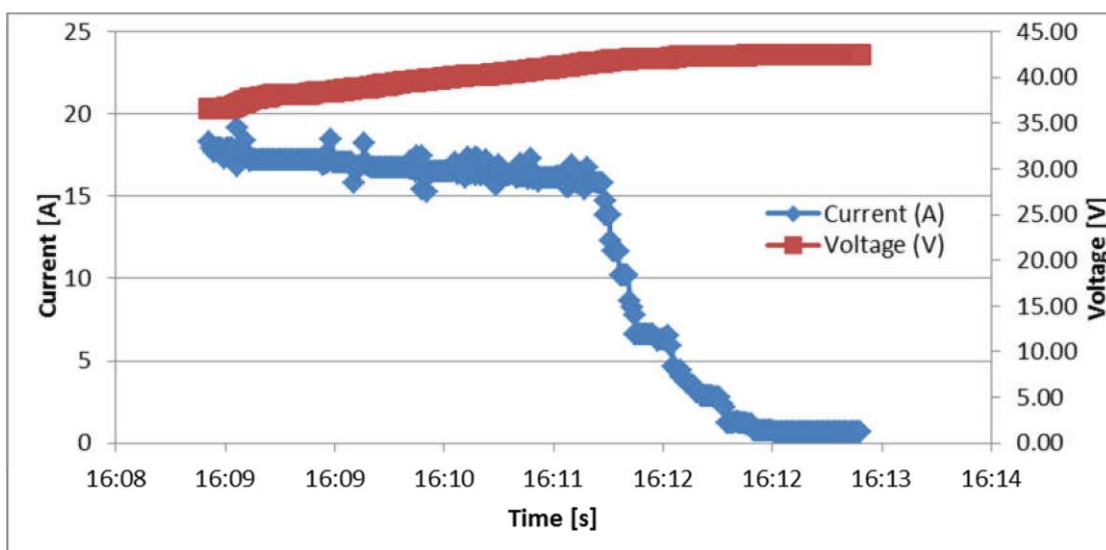


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Charging curve at 36V (Tracer10420AN)@25°C

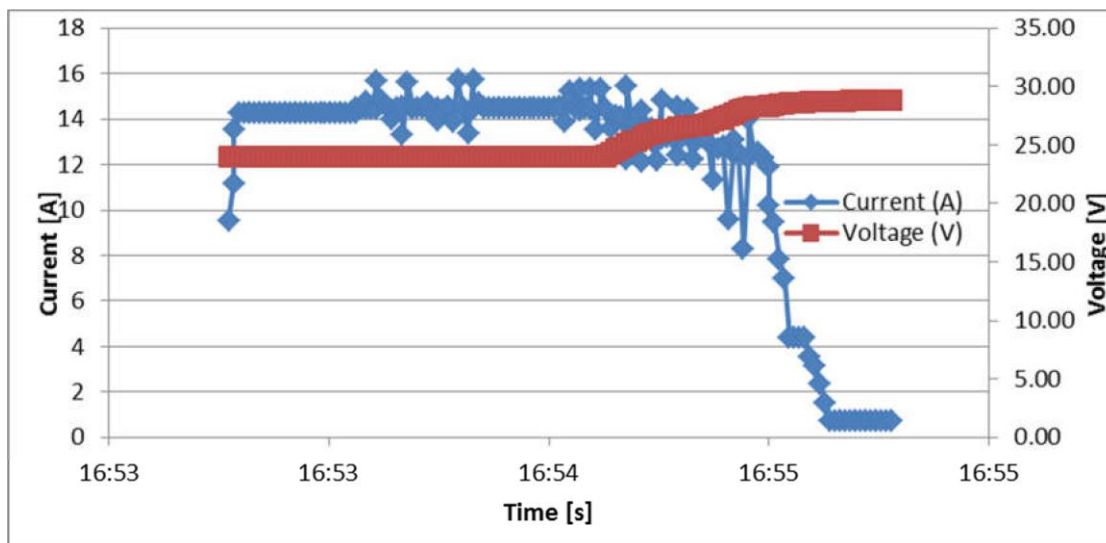


Charging curve at 36V (Tracer10420AN) @40°C

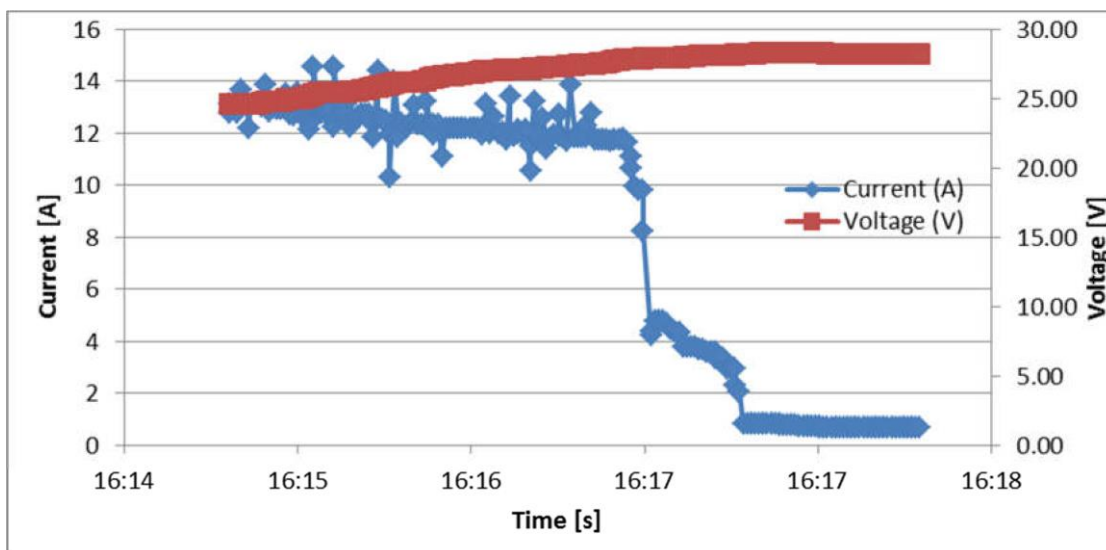


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Charging curve at 24V (Tracer10420AN) @ 25°C

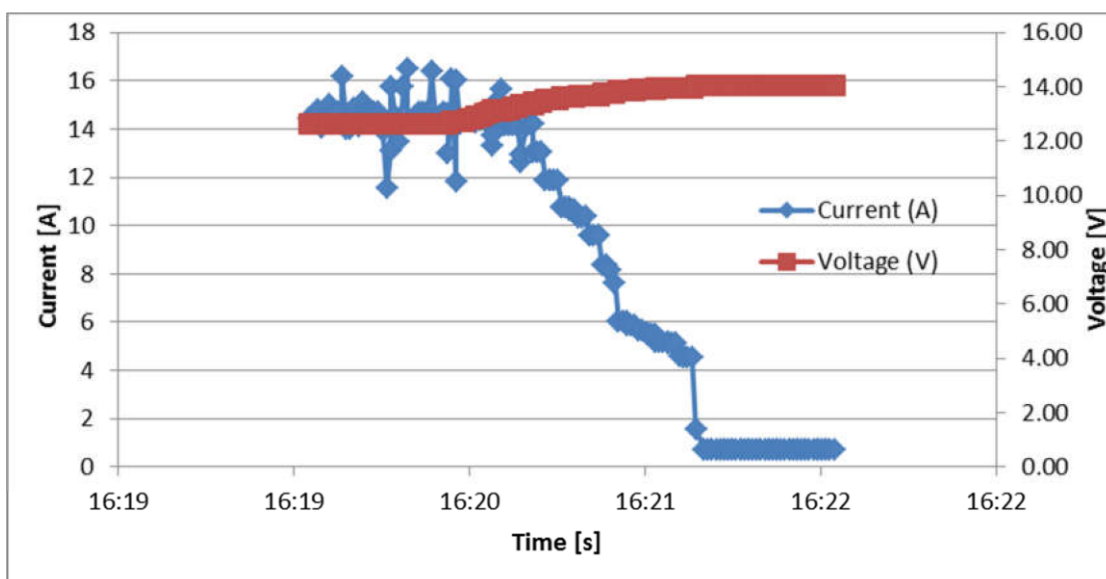
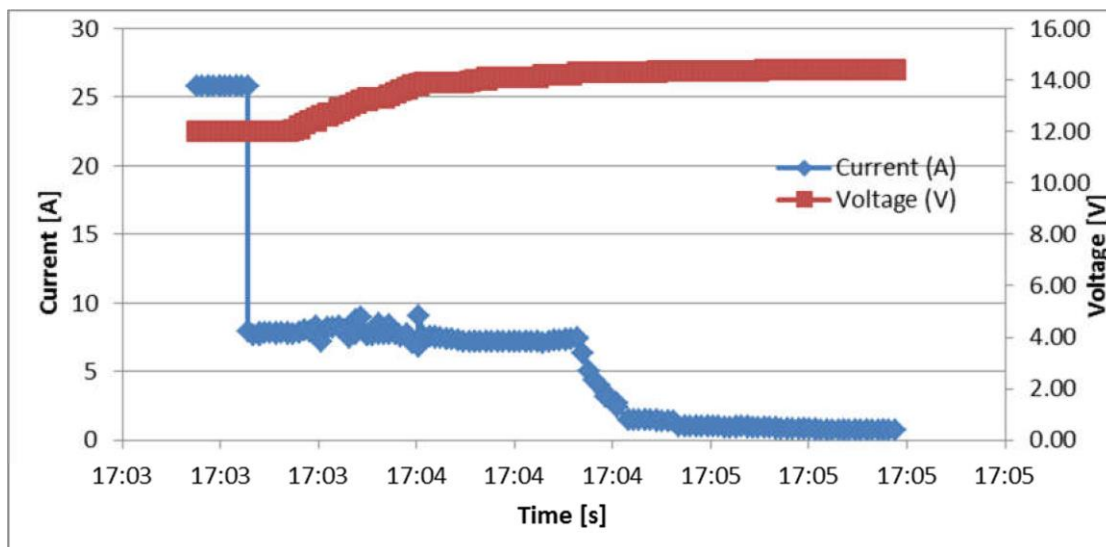


Charging curve at 24V (Tracer10420AN) @ 40°C



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5.2.3	Load disconnect/load reconnect test				P
Battery voltage:=2.1V/cell±2%		50.4V			
Model number of the BCC		Tracer10420AN			
Champer temperatuer (°C)	End of discharge voltage (V)	Set-point for disconenct (V)	Accuracy (%)	Return to discharge voltage (V)	
25	44.32	44.4	-0.18%	50.43	
40	44.86	\	\	50.98	
Battery voltage:=2.1V/cell±2%		37.8V			
Model number of the BCC		Tracer10420AN			
Champer temperatuer (°C)	End of discharge voltage (V)	Set-point for disconenct (V)	Accuracy (%)	Return to discharge voltage (V)	
25	33.24	33.3	-0.18%	37.85	
40	33.67	\	\	38.35	
Battery voltage:=2.1V/cell±2%		25.2V			
Model number of the BCC		Tracer10420AN			
Champer temperatuer (°C)	End of discharge voltage (V)	Set-point for disconenct (V)	Accuracy (%)	Return to discharge voltage (V)	
25	22.15	22.2	-0.23%	25.24	
40	22.45	\	\	25.55	
Battery voltage:=2.1V/cell±2%		12.6V			
Model number of the BCC		Tracer10420AN			
Champer temperatuer (°C)	End of discharge voltage (V)	Set-point for disconenct (V)	Accuracy (%)	Return to discharge voltage (V)	
25	11.05	11.1	-0.45%	12.65	
40	11.15	\	\	12.75	
Battery voltage:=2.1V/cell±2%		50.4V			
Model number of the BCC		Tracer8420AN			
Champer temperatuer (°C)	End of discharge voltage (V)	Set-point for disconenct (V)	Accuracy (%)	Return to discharge voltage (V)	
25	44.35	44.4	-0.11%	50.47	
40	44.86	\	\	50.97	
Battery voltage:=2.1V/cell±2%		37.8V			



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Model number of the BCC		Tracer8420AN		
Chamber temperature (°C)	End of discharge voltage (V)	Set-point for disconnection (V)	Accuracy (%)	Return to discharge voltage (V)
25	33.25	33.3	-0.15%	37.86
40	33.67	\	\	38.27
Battery voltage:=2.1V/cell±2%		25.2V		
Model number of the BCC		Tracer8420AN		
Chamber temperature (°C)	End of discharge voltage (V)	Set-point for disconnection (V)	Accuracy (%)	Return to discharge voltage (V)
25	22.15	22.2	-0.23%	25.24
40	22.46	\	\	25.56
Battery voltage:=2.1V/cell±2%		12.6V		
Model number of the BCC		Tracer8420AN		
Chamber temperature (°C)	End of discharge voltage (V)	Set-point for disconnection (V)	Accuracy (%)	Return to discharge voltage (V)
25	11.04	11.1	-0.54%	12.64
40	11.15	\	\	12.75
Battery voltage:=2.1V/cell±2%		50.4V		
Model number of the BCC		Tracer6420AN		
Chamber temperature (°C)	End of discharge voltage (V)	Set-point for disconnection (V)	Accuracy (%)	Return to discharge voltage (V)
25	44.25	44.4	-0.38%	50.47
40	44.86	\	\	50.97
Battery voltage:=2.1V/cell±2%		37.8V		
Model number of the BCC		Tracer6420AN		
Chamber temperature (°C)	End of discharge voltage (V)	Set-point for disconnection (V)	Accuracy (%)	Return to discharge voltage (V)
25	33.25	33.3	-0.15%	37.87
40	33.56	\	\	38.17
Battery voltage:=2.1V/cell±2%		25.2V		
Model number of the BCC		Tracer6420AN		



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Chamber temperature (°C)	End of discharge voltage (V)	Set-point for disconnection (V)	Accuracy (%)	Return to discharge voltage (V)
25	22.15	22.2	-0.23%	25.25
40	22.35	\	\	25.56
Battery voltage: $\pm 2.1V/cell \pm 2\%$		12.6V		
Model number of the BCC		Tracer10420AN		
Chamber temperature (°C)	End of discharge voltage (V)	Set-point for disconnection (V)	Accuracy (%)	Return to discharge voltage (V)
25	11.04	11.1	-0.54%	12.64
40	11.15	\	\	12.75
Note:				
1. The BCC is not provided with the load.				
2. Over-discharge protection is protected by the on and off of the relay				

5.3.1	Standby self-consumption test			P
Model	Tracer10420AN			
Battery voltage [V]	48			
Battery voltage $\pm 2.1V/Cell \pm 2\%$	50.4V			
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]	
2.1	50.41	47.40	59	
2.0	48.17	47.33	59	
1.9	45.61	56.44	59	
1.8	43.27	57.20	59	
1.7	40.82	58.08	59	
Model	Tracer10420AN			
Battery voltage [V]	36			
Battery voltage $\pm 2.1V/Cell \pm 2\%$	37.8V			
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]	
2.1	37.82	49.68	67	
2.0	36.18	50.22	67	
1.9	34.27	62.13	67	



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1.8	32.42	63.64	67
1.7	30.63	65.35	67
Model	Tracer10420AN		
Battery voltage [V]	24		
Battery voltage =2.1V/Cell±2%	25.2V		
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]
2.1	25.21	57.96	86
2.0	24.18	58.11	86
1.9	22.83	77.51	86
1.8	21.61	80.32	86
1.7	20.40	83.40	86
Model	Tracer10420AN		
Battery voltage [V]	12		
Battery voltage =2.1V/Cell±2%	12.6V		
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]
2.1	12.61	91.26	150
2.0	12.18	93.66	150
1.9	11.42	134.90	150
1.8	10.81	139.15	150
1.7	10.21	145.96	150
Model	Tracer8420AN		
Battery voltage [V]	48		
Battery voltage =2.1V/Cell±2%	50.4V		
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]
2.1	50.41	47.92	59
2.0	48.17	48.06	59
1.9	45.63	56.70	59
1.8	43.21	57.58	59
1.7	40.81	58.66	59
Model	Tracer8420AN		



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Battery voltage [V]	36		
Battery voltage =2.1V/Cell±2%	37.8V		
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]
2.1	37.81	50.12	67
2.0	36.22	50.73	67
1.9	34.21	63.28	67
1.8	32.41	64.78	67
1.7	30.62	66.70	67
Model	Tracer8420AN		
Battery voltage [V]	24		
Battery voltage =2.1V/Cell±2%	25.2V		
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]
2.1	25.21	58.97	86
2.0	24.19	60.25	86
1.9	22.81	79.40	86
1.8	21.63	83.73	86
1.7	20.41	85.60	86
Model	Tracer8420AN		
Battery voltage [V]	12		
Battery voltage =2.1V/Cell±2%	12.6V		
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]
2.1	12.62	95.66	150
2.0	12.18	95.74	150
1.9	11.41	136.15	150
1.8	10.80	142.65	150
1.7	10.22	149.62	150

Model	Tracer6420AN		
Battery voltage [V]	48		
Battery voltage =2.1V/Cell±2%	50.4V		



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Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]
2.1	50.41	46.60	59
2.0	48.01	46.57	59
1.9	45.57	55.66	59
1.8	43.17	56.35	59
1.7	40.77	57.22	59
Model	Tracer6420AN		
Battery voltage [V]	36		
Battery voltage =2.1V/Cell±2%	37.8V		
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]
2.1	37.81	48.22	67
2.0	36.00	48.77	67
1.9	34.20	60.67	67
1.8	32.41	62.15	67
1.7	30.61	63.80	67
Model	Tracer6420AN		
Battery voltage [V]	24		
Battery voltage =2.1V/Cell±2%	25.2V		
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]
2.1	25.21	55.90	86
2.0	24.00	57.32	86
1.9	22.81	76.00	86
1.8	21.61	78.52	86
1.7	20.41	81.61	86
Model	Tracer6420AN		
Battery voltage [V]	12		
Battery voltage =2.1V/Cell±2%	12.6V		
Battery voltage [V/Cell]	Battery voltage [V]	Battery current [mA]	Limits self-consumption [mA]
2.1	12.60	87.71	150
2.0	12.00	93.80	150



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1.9	11.40	129.68	150
1.8	10.80	136.20	150
1.7	10.21	143.18	150

Note: The Limits self-consumption [mA] shown in the table above is based on the customer's requirements.

5.3.2	Efficiency test						P
Battery voltage =2.2V/Cell±2%			52.8V				
Type			Tracer10420AN				
Charging current is 100A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	70.05	7.84	549.10	52.78	10.13	534.73	97.39
20	70.28	15.43	1084.40	52.81	20.13	1063.29	98.05
30	69.56	23.27	1618.26	52.85	30.14	1592.51	98.41
40	69.49	31.05	2158.05	52.86	40.14	2121.95	98.33
50	69.66	38.73	2698.35	52.87	50.11	2649.18	98.18
60	70.20	46.15	3239.49	52.89	60.04	3175.12	98.01
70	70.27	53.97	3792.93	52.87	70.18	3710.45	97.83
80	70.32	61.71	4339.27	52.89	80.10	4236.29	97.63
90	70.22	69.64	4890.47	52.90	90.06	4764.21	97.42
100	74.21	69.19	5134.62	52.89	94.53	4999.71	97.37
Battery voltage =2.2V/Cell±2%			39.6V				
Type			Tracer10420AN				
Charging current is 100A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	69.25	5.99	414.72	39.60	10.08	399.00	96.21
20	68.04	12.06	820.23	39.64	20.10	796.72	97.13
30	69.00	17.63	1216.60	39.67	30.04	1191.87	97.97
40	69.51	23.35	1623.32	39.71	40.02	1589.13	97.89
50	69.49	29.28	2034.71	39.75	50.04	1989.02	97.75
60	69.55	35.23	2450.28	39.78	60.09	2390.57	97.56



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70	69.33	41.29	2862.40	39.82	69.98	2786.84	97.36
80	69.25	47.47	3287.20	39.79	80.25	3192.95	97.13
90	69.25	53.46	3702.03	39.83	90.08	3587.68	96.91
100	71.59	56.31	4030.62	39.86	97.82	3898.72	96.73
Battery voltage =2.2V/Cell±2%		26.4V					
Type		Tracer10420AN					
Charging current is 100A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	60.69	4.61	279.71	26.40	10.04	265.03	94.75
20	60.57	9.17	555.43	26.44	20.11	531.66	95.72
30	60.77	13.47	818.49	26.47	30.08	796.24	97.28
40	60.95	17.91	1091.27	26.51	40.01	1060.64	97.19
50	60.53	22.63	1369.60	26.54	50.05	1328.51	97.00
60	60.51	27.26	1649.71	26.58	60.04	1596.02	96.75
70	60.70	31.82	1931.86	26.62	70.01	1863.67	96.47
80	60.61	36.64	2220.38	26.66	80.09	2134.99	96.15
90	60.69	41.32	2507.57	26.70	90.02	2403.51	95.85
100	63.25	43.26	2735.87	26.73	97.85	2615.85	95.61

Battery voltage =2.2V/Cell±2%		13.2V					
Type		Tracer10420AN					
Charging current is 100A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	50.48	2.92	147.35	13.24	10.09	133.53	90.62
20	50.37	5.79	291.72	13.28	20.18	267.90	91.84
30	50.88	8.26	420.03	13.31	30.14	401.20	95.52
40	50.18	11.17	560.60	13.35	40.04	534.51	95.34
50	50.91	13.85	705.00	13.38	50.02	669.45	94.96
60	50.95	16.75	853.19	13.42	60.09	806.39	94.52
70	50.81	19.72	1002.01	13.46	70.05	942.65	94.08



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80	50.83	22.68	1152.93	13.49	79.96	1079.02	93.59
90	51.09	25.76	1315.81	13.54	90.45	1224.42	93.05
100	52.32	27.13	1418.87	13.57	96.96	1315.25	92.70
Battery voltage =2.2V/Cell±2%		52.8V					
Type		Tracer8420AN					
Charging current is 100A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	70.43	6.24	439.27	52.81	8.10	427.97	97.43
20	69.67	12.48	869.55	52.84	16.11	851.39	97.91
30	71.23	18.27	1301.52	52.87	24.13	1275.73	98.02
40	71.23	24.26	1728.06	52.90	32.11	1698.35	98.28
50	71.29	30.30	2160.39	52.87	40.11	2120.81	98.17
60	70.88	36.58	2592.68	52.85	48.07	2541.00	98.01
70	71.26	42.55	3032.10	52.88	56.10	2966.78	97.85
80	71.26	48.63	3465.23	52.77	64.13	3383.92	97.65
90	71.26	54.80	3904.98	52.81	72.06	3805.40	97.45
100	73.37	55.79	4093.23	52.87	75.40	3986.05	97.38
Battery voltage =2.2V/Cell±2%		39.6V					
Type		Tracer8420AN					
Charging current is 80A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	68.66	4.81	330.44	39.59	8.04	318.47	96.38
20	69.31	9.52	659.68	39.62	16.14	639.51	96.94
30	69.47	14.21	986.84	39.65	24.18	958.58	97.14
40	69.49	18.73	1301.30	39.68	32.09	1273.24	97.84
50	69.21	23.50	1626.18	39.62	40.11	1589.07	97.72
60	69.14	28.23	1952.09	39.64	48.05	1904.48	97.56
70	69.53	32.86	2284.87	39.67	56.08	2224.71	97.37
80	68.94	37.97	2617.70	39.70	64.06	2543.16	97.15
90	68.65	42.90	2945.37	39.63	72.03	2854.42	96.91



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100	72.32	43.87	3172.43	39.65	77.42	3069.67	96.76
Battery voltage =2.2V/Cell±2%		26.4V					
Type		Tracer8420AN					
Charging current is 80A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	50.26	4.46	224.32	26.39	8.12	214.30	95.53
20	50.64	8.72	441.48	26.42	16.05	423.97	96.03
30	51.09	12.99	663.93	26.45	24.13	638.13	96.11
40	51.49	16.94	872.41	26.47	32.03	848.05	97.21
50	50.91	21.50	1094.57	26.46	40.13	1061.81	97.01
60	50.71	25.94	1315.15	26.43	48.13	1272.29	96.74
70	51.07	30.10	1536.93	26.46	56.04	1483.01	96.49
80	50.94	34.59	1762.11	26.43	64.10	1694.38	96.16
90	51.04	38.91	1985.56	26.42	72.01	1902.66	95.82
100	53.16	40.61	2158.06	26.44	78.01	2062.96	95.59
Battery voltage =2.2V/Cell±2%		13.2V					
Type		Tracer8420AN					
Charging current is 80A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	49.95	2.37	118.46	13.21	8.13	107.42	90.71
20	50.19	4.63	232.48	13.24	16.08	212.93	91.59
30	50.09	6.97	349.04	13.27	24.14	320.29	91.76
40	50.50	8.91	450.00	13.30	32.21	428.37	95.19
50	50.46	11.10	560.06	13.26	40.08	531.45	94.89
60	50.81	13.30	675.94	13.25	48.18	638.56	94.47
70	50.73	15.51	786.66	13.18	56.09	739.37	93.99
80	50.82	17.83	905.80	13.21	64.12	847.13	93.52
90	50.71	20.28	1028.28	13.24	72.22	956.41	93.01
100	52.98	21.02	1113.63	13.26	77.78	1031.38	92.61
Battery voltage =2.2V/Cell±2%		52.8V					



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Type		Tracer6420AN					
Charging current is 60A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	70.92	4.74	336.06	52.81	6.19	326.99	97.30
20	71.80	9.11	654.06	52.83	12.11	639.72	97.81
30	70.88	13.80	977.73	52.85	18.14	958.61	98.04
40	70.92	18.33	1299.54	52.87	24.10	1274.34	98.06
50	69.90	23.19	1621.30	52.89	30.11	1592.58	98.23
60	71.14	27.38	1947.43	52.83	36.16	1910.36	98.10
70	71.50	31.75	2270.12	52.84	42.09	2223.58	97.95
80	71.16	36.47	2595.21	52.86	48.01	2537.61	97.78
90	71.20	41.14	2929.57	52.88	54.07	2859.38	97.60
100	75.45	40.68	3069.21	52.89	56.61	2994.28	97.56
Battery voltage =2.2V/Cell±2%		39.6V					
Type		Tracer6420AN					
Charging current is 60A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	70.95	3.59	254.66	39.59	6.19	245.15	96.26
20	71.41	6.97	498.08	39.61	12.18	482.56	96.89
30	71.09	10.44	742.00	39.63	18.19	720.95	97.16
40	70.75	13.93	985.78	39.65	24.16	957.99	97.18
50	71.20	17.18	1223.01	39.68	30.16	1196.52	97.84
60	71.05	20.66	1467.83	39.70	36.13	1434.22	97.71
70	71.10	24.10	1713.13	39.64	42.15	1670.96	97.54
80	71.39	27.43	1957.97	39.64	48.09	1906.35	97.36
90	71.35	30.90	2204.98	39.66	54.02	2142.60	97.17
100	73.56	32.71	2405.48	39.68	58.80	2333.30	97.00
Battery voltage =2.2V/Cell±2%		26.4V					
Type		Tracer6420AN					
Charging current is 60A							



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PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	60.85	2.80	170.58	26.39	6.14	161.95	94.94
20	61.18	5.49	335.55	26.41	12.15	320.92	95.64
30	60.79	8.26	501.83	26.43	18.20	481.12	95.87
40	60.30	11.03	664.76	26.45	24.09	637.39	95.88
50	60.78	13.53	822.42	26.48	30.18	799.05	97.16
60	60.67	16.21	983.38	26.42	36.09	953.42	96.95
70	60.96	18.90	1152.11	26.42	42.19	1114.62	96.75
80	60.76	21.68	1316.99	26.44	48.07	1271.03	96.51
90	60.78	24.51	1489.53	26.46	54.17	1433.52	96.24
100	63.94	24.98	1597.27	26.48	57.95	1534.33	96.06

Battery voltage =2.2V/Cell±2%		13.2V					
Type		Tracer6420AN					
Charging current is 60A							
PV input current [%]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Charging efficiency [%]
10	50.23	1.76	88.47	13.21	6.09	80.49	91.01
20	49.29	3.53	173.81	13.23	12.09	159.93	92.02
30	50.34	5.17	260.46	13.26	18.11	240.07	92.17
40	50.52	6.89	348.05	13.28	24.12	320.21	92.00
50	50.03	8.33	416.78	13.20	30.11	397.42	95.36
60	50.24	9.98	501.35	13.22	36.04	476.37	95.02
70	50.28	11.74	590.17	13.24	42.18	558.40	94.62
80	50.91	13.30	676.81	13.26	48.07	637.49	94.19
90	50.25	15.28	767.78	13.28	54.18	719.73	93.74
100	53.38	15.43	823.84	13.30	57.86	769.48	93.40

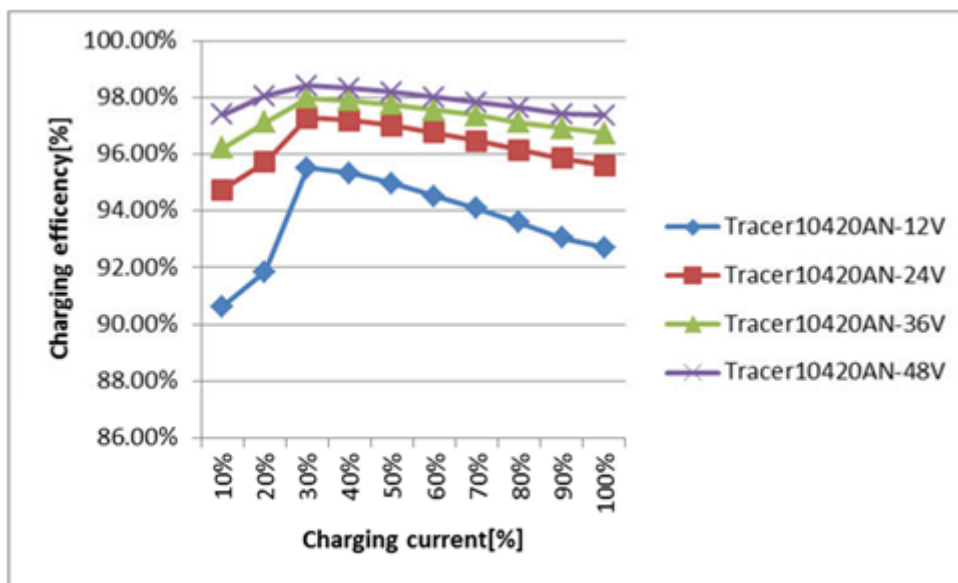


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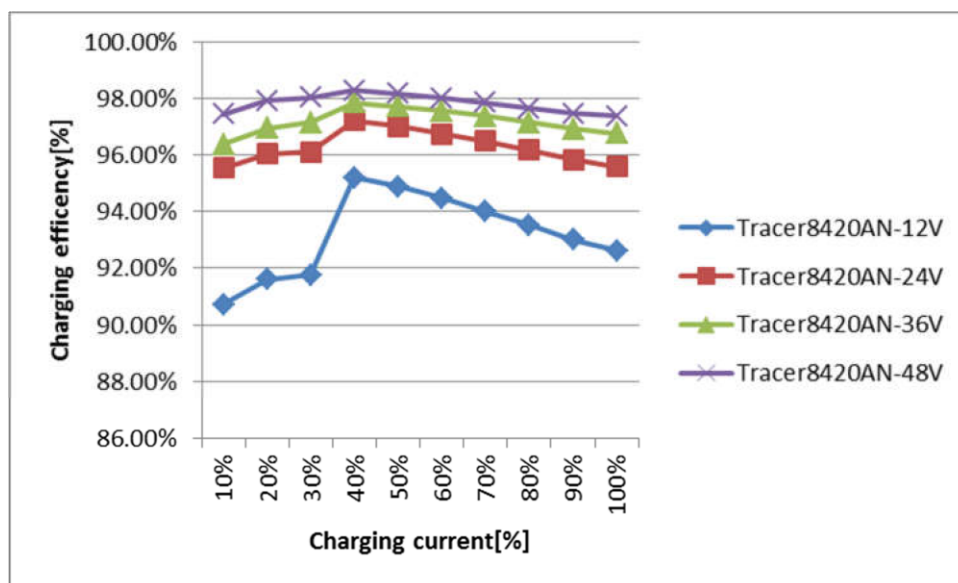
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Tracer 10420AN-Charging efficiency chart

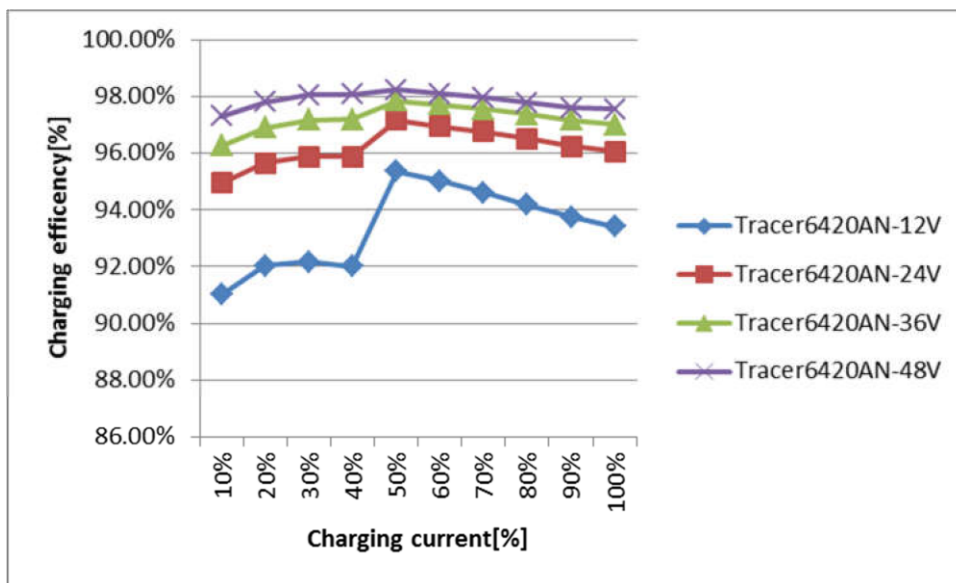


Tracer 8420AN-Charging efficiency chart



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Tracer 6420AN-Charging efficiency chart



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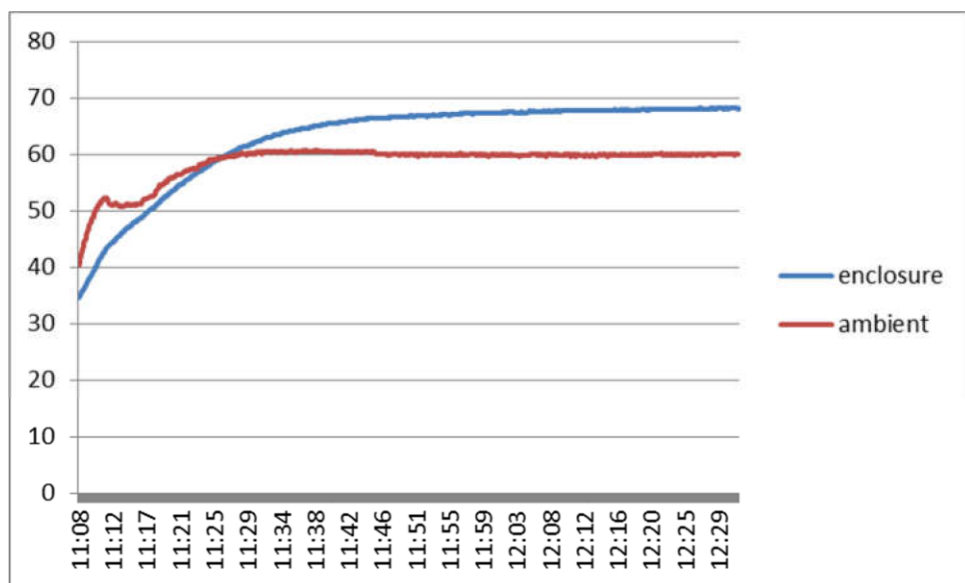
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5.4.1	Thermal performance test							P
type				Tracer10420AN				
Battery voltagege =2.2V/Cell±2%				52.8				
Charging current[A]				100				
Operatiing time				1h				
Chamber temperature [°C]				60				
Maximum temperature of the heatsink [°C]				68.2				
PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]	Load voltage [V]	Load current [A]	Load power [W]
64.63	76.70	4957.12	53.27	90.60	4826.26	--	--	--



Temperature chart

Note: The BCC has a heatsink attached with the enclosure, the temperature was measured at the middle of the heatsink.



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5.4.2		PV Over Current Protection Test					P
Operating time		1 h					
Type		Tracer10420AN					
Chamber temp. [°C]	Heat-sink maximum temp. [°C]	PV voltage [V]	PV current [A]	PV power [W]	Battery voltage [V]	Battery current [A]	Battery power [W]
25.6	43.7	82.45	62.02	5115.50	52.89	94.20	4981.90
Note:							
1. Rated charging current:100 A.							
2. The controller has the limit charge current function. The BCC could not overload to 1.25 times of 100A in PV side.							

5.4.5	PV Generator Reverse Polarity Test							P
Operating time				5min				
Battery voltage [V]	Battery current [mA]	Battery power [W]	Load voltage [V]	Load current [mA]	Load power [W]	PV voltage [V]	PV current [mA]	PV power [W]
0.00	0.00	0.00	--	--	--	1.865	20.02	37.40
Any alarms displayed by BCC?			LED indicator and LCD display is off					
Any damage to the BCC?			No					
Has reverse voltage been fed to the load?			No					



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Fig1 Front view of the BCC-Tracer10420AN

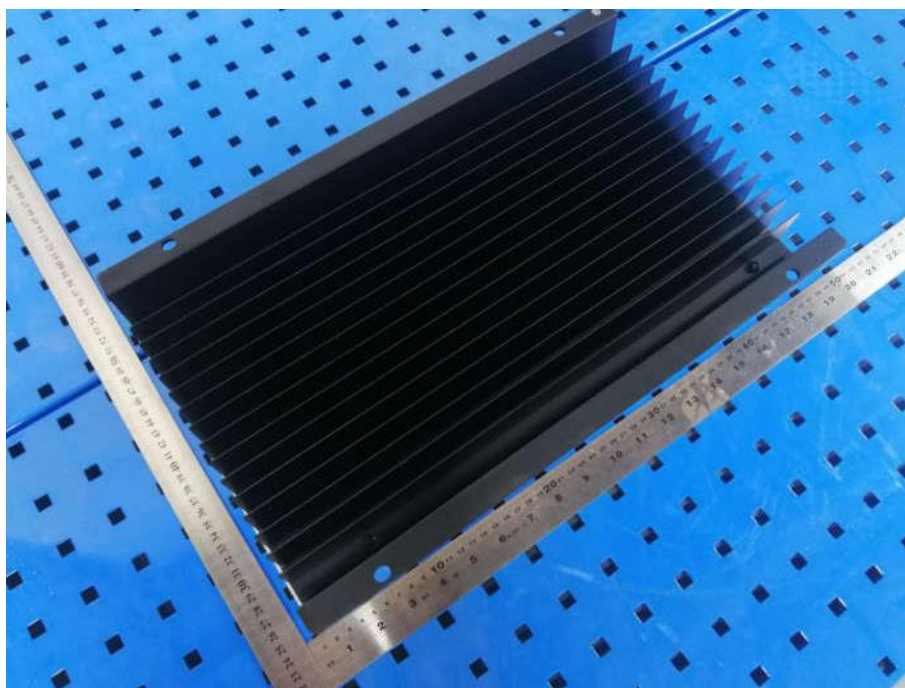


Fig2 Back of the BCC-Tracer10420AN



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Fig3 Internal terminal identification of the BCC--Tracer10420AN

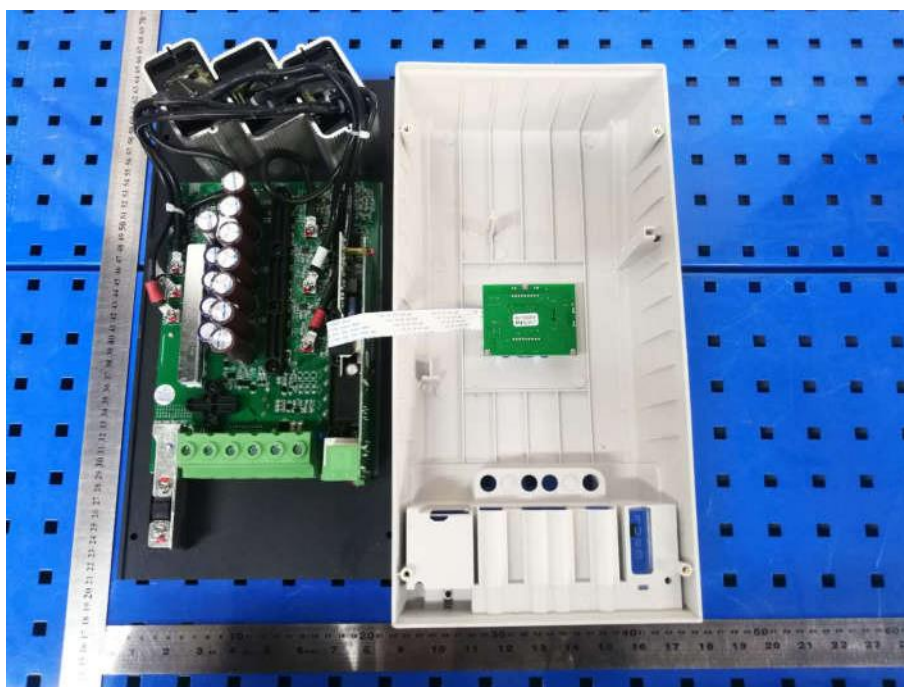


Fig4 Internal positive of the BCC--Tracer10420AN



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Fig5 Front view of the PCB-Tracer10420AN

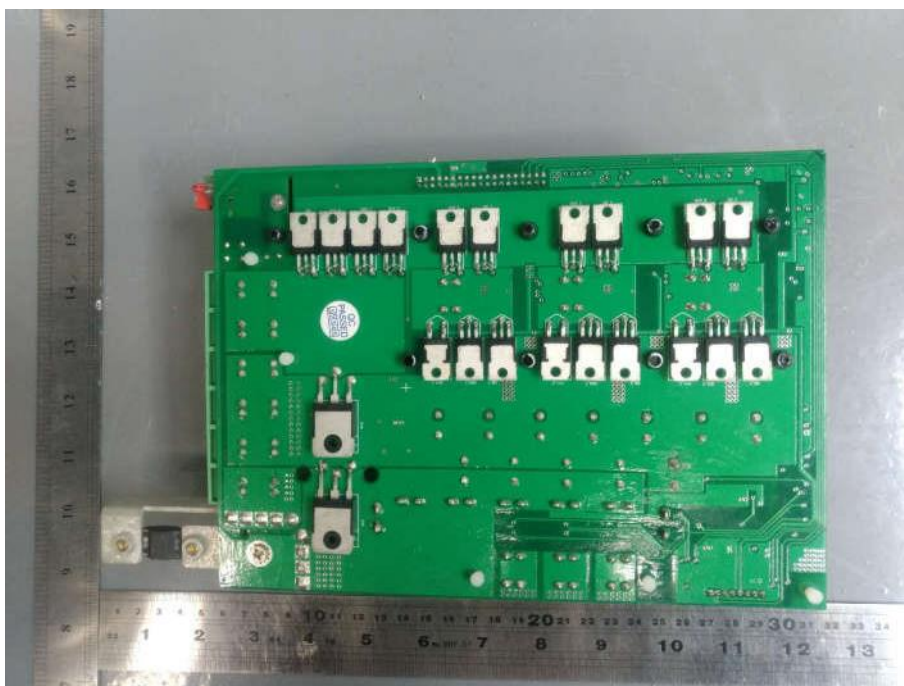


Fig6 Back of the PCB-Tracer10420AN



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2. List of measurement equipment

Identification #	Description	Calibration expire date
SB9146	Oscilloscope	03/27/2021
SB9148	Current sensor	02/25/2021
SB7661	High-voltage probe	12/28/2020
SB11208	Multimeter	02/26/2021
SB9807	Temperature recorder	12/14/2020
SB8556	Sound level meter	08/06/2020
SB9150/20	Test finger	04/10/2021
SB8900	Power analyzer	08/13/2020
SB9618/05	Current transformer	10/26/2020
SB9618/06	Current transformer	10/26/2020
SB11485	Contact current tester	07/30/2020
SB9814	Contact resistance tester	08/21/2020
SB9815	Withstand voltage tester	02/26/2021
SB9808	Impulse voltage generator	12/17/2020
SB8556	High-low temperature test chamber	08/06/2020
SB8081	Water Proof tester	03/11/2021
SB150/08	Finger	01/10/2021

3. Statement of the estimated uncertainty of the test results

The estimated uncertainty fulfils the requirements from the CTL decision sheet DSH 251B / 2009.

----- End of Test Report -----



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