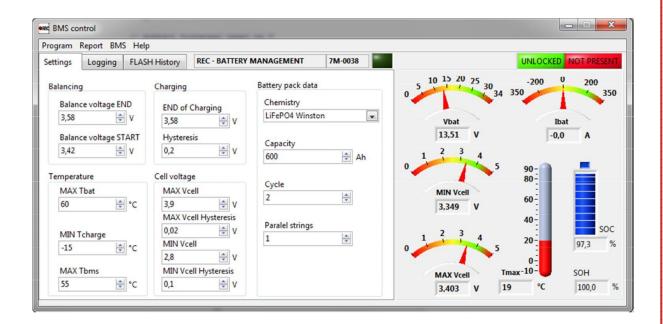
PC Software BMS Master Control User Manual





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Installing the BMS Control Software:

Run the Setup.exe application in the Installer folder on your Setup CD. Click "Next" at the **Welcome to the BMS Master Control Installation Wizard**.

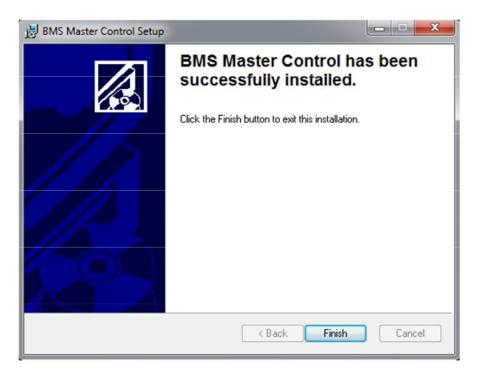


Choose the Destination folder where the application will be installed.

BMS Master Control Setup	
Destination Folder Select a folder where the application will be installed.	
The installation wizard will install the files for BMS Master Control in the followin To install into a different folder, click the Browse button, and select another fol You can choose not to install BMS Master Control by clicking Cancel to exit the installation wizard.	der.
Destination Folder C:\Program Files\BMS Master Control\ Brow	wse
< Back Next >	Cancel



You have now successfully installed the software. Click the "Finish" button to exit the installation.



Setting communication with BMS:

When the RS-485 communication cable is inserted in the USB for the first time in Windows XP and older, the device is not recognized. The **Found New Hardware Wizard** pop-up window appears. Choose "Install the software automatically" option and click Next.

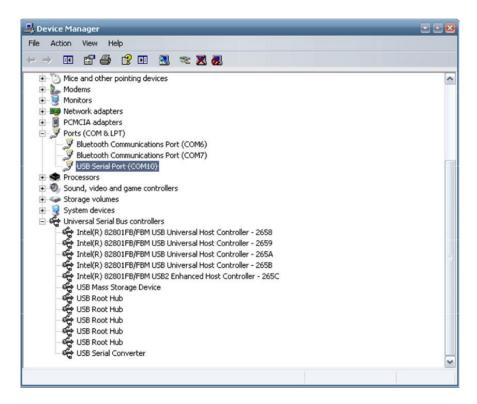




Windows completes the Found New Hardware Wizard by clicking the "Finish" button.



The RS-485 cable behaves as virtual com port (VCP). A number is assigned to the VCP in the Control panel/System/Device Manager under Ports (COM & LPT). This port number is used to set the communication parameters in the **Set communication properties** window of the BMS Control software.



Drivers can also be found on the FTDI web site: <u>http://www.ftdichip.com/Drivers/VCP.htm</u>



You can now run the BMS Control software. If this is the first time you have been running the program, the VCP has not been set yet and the Error 10733807346 occurs. You must follow the procedure described below. Click the "Continue" button.

ogram	Report BM	5 Help		
ettings	Logging	FLASH History		UNLOCKED NOT PRESENT
Cell volt	age [V]	Cell resistance [mC		25 30 -200 U 200 34 350 350 350
			Error -1073807343 occurred at Property Node (arg 1) in VISA Configure Serial Port (Instr).vi- > Main BMS.vi	V 0,0 A
			Possible reason(s): VISA: (Hex 0x8FFF0011) Insufficient location information or the device or resource is not present in the system. 	4 5 80- 80- 60-
			VISA: (Hex 0xBFFF0011) Insufficient location information or the device or resource is not present in the system. Continue	40 4 20 5 20 0,0
			- MAX Vcell 0,000	0- Tmax-10- V 0 °C 0,0

The BMS is not connected to the BMS Control software, the sign **NOT PRESENT** is turned on and **Reading BMS configuration** window pops out. Click the "Cancel" button and open **Set communication properties** in the Program menu.

rogram	Report BM	S Help			
Settings	Logging	FLASH History		LOCKED	NOT PRESEN
Cell volt	age [V]	Cell resistance	[m0hm]	Loggin stopped 5 10 15 20 25 30 -200 0	200
				Loggin stopped 10 15 20 25 30 -200 0 File path 0 1 34 350 10 <th></th>	
				0 1 2 3 4 5 0 MAX Vcell 0 0 0 0 0 0 0 0 0 0 0 0 0	50H



Set communication properties 🛛 🛛 🔀	
COM port	
R5-232 Bitrate	
MAIN Address 6 🛞 CTL Address 0 🛞 Timeout	
350 ms Present?	
OK Cancel	

Select the COM port number that was assigned by VCP and set the parameters as they are listed in Table 1:

 Table 1: RS-485 Communication properties.

Parameter	Settings
Bitrate	56 000
MAIN Address	BMS Address (See BMS PIN Configuration) or 16 for Master
CTL Address	0 or 16 for Slave Units
Timeout	350 ms

When the communication properties are set properly, the **Present?** Light turns green. To confirm the settings, press "OK".

If you are using Windows 7 Premium Home Edition, the BMS communicate software is unable to detect the dedicated RS-485 cable on COM port. Extra drivers should be installed. Run Visa426Full.zip file on your installation CD and wait until it extracts to a temporary location on your computer.



Continue the installation by selecting "Next".



Select the location for National Instruments VISA Drivers.

UI-VISA 4.6.2	
Destination Directory Select the primary installation directory.	
National Instruments software will be installed in a subfolder of the following. different folder, click the Browse button and select another.	To install into a
Destination Directory C:\Program Files\National Instruments\	Browse
< < Back	Next >> Cancel



For the RS485 Cable to work, only Serial, USB and COM Support Drivers under "Run Time Support" should be chosen.

USA 4.6.2	a States	
Features Select the features to install.		ATIONAL STRUMENTS
Run Time Support Run Time Support PXI GPIB Serial GPIB-VXI Ethernet	Use Measurement & Automation Exconfigure, test, and communicate v Instruments hardware. You must ir appropriate driver software for your appear in MAX.	with your National Istall the
Remote ————————————————————————————————————	This feature will not be installed.	
	This feature and its selected subco require up to 0,00 Bytes of disk spa	
Directory for NI Measurement & Automation Explorer 4.6.		Browse
Restore Feature Defaults Disk Co	C K Back Next >>	Cancel

Restart the computer when the VISA drivers are installed.

BMS settings setup:

When BMS and BMS Master Control software on the PC are properly connected, the program downloads all system parameters the Settings tab.

Program Report	rt BMS Hel	p				
Settings Log	ging FLAS	H History				LOCKED PRESENT
Balancing		Charging		Battery pack data	5 10 15 20 25 30	-200 0 200
Balance vol	tage END	END of Ch	maina	Chemistry	0	4 350 35
4,18	e v	4,18	V V	Li-po Kokam High capacity 💌	Vbat	Ibat
Balance vol	tage START	Hysteresis		*******	11.64 V	0,0 A
3,95	(1) V	0,1	10 V	Capacity 210 🔄 Ah	1 2 3 4	
Temperature		Cell voltage			0 5	90-
MAX That				Cycle	MIN Vcell	
60	÷	4,2	÷ v	30 🔄	2.884 V	60-
			Hysteresis	Destablished		40-
MIN Tcharg	e	0,015	÷ V	Paralel strings	. 2 3 .	500
-15	and the second state of th		ell	0	0 - 5	20-
	the state	3,24	10 V			0-
MAX Tbms		MIN Vcell	Hysteresis		MAX Vcell	Tmax-10- SOH
60	⊕ *C	0,03	÷ v		2.927 V	21 °C 99,6



If you want to change the settings of your BMS, the BMS has to be unlocked first. To unlock the device select the tag Locked from BMS menu (Ctrl+L) or click the red "LOCKED" button in the top-right corner of the window.

The window **Enter password** appears. The password is written as a serial number on the BMS you have purchased without the first »-« e.g.: 1Q-0953 or 1A-0298.

ogram	Report BMS	Help			
ttings	Logging	FLASH History			LOCKED PRESENT
Balancin	g	Charging	Battery pack data	5 10 15 20 25	30 -200 U 200 34 350 535
Balan	ce voltage END	END of Chargin	Chemistry	0	34 350 35
4,18	-	V 4,18	Enter password	Vbat	Ibat
Balan	ce voltage STA	RT Hysteresis		11,64 V	0,0 A
3,95	1		Enter password	1 2 3 4	
				0	5 90-
l'empera		Cell voltage	OK Cancel		80-
MAX		MAX Vcell	OK Cancer	MIN Vceli	60-
60	-		4	2,884 V	
		MAX Vcell Hyst			40- SOC
MIN	Tcharge	0,015	V Paralel strings	1 2 3 4	20.
-15		°C MIN Vcell		0	5 20- 0,5 9
		3,24	÷ V		0-
MAX	Tbms	MIN Vcell Hyst	eresis	MAX Vcell	Tmax-10- SOH
60	*		🗢 V	MAX VCell	21 °C 99,6

Once you unlock the BMS, you get a permission to change the original settings on the device. The sign in the right top corner **LOCKED** should change to **UNLOCKED**.



Table 2: BMS Parameter description.

Parameter	Description					
Balance Voltage	Sets the balancing voltage above which the individual cell is balanced					
END	100%.					
Balance Voltage	Sets the average battery pack voltage above which the BMS performs					
START	the balancing while charging. Special balancing algorithm is used to					
	determine which cells have to be balanced until the Balance Voltage END					
	is reached.					
END of Charging	Sets the end of charge voltage of the individual cell.					
Hysteresis	Sets the Charging hysteresis of individual cell.					
MAX Tbat	Battery pack is disconnected from the system, if the T_{BAT} temperature is					
	higher than the MAX Tbat. MAX Tbat hysteresis is set to 2°C.					
MIN Tcharge	Charging is not allowed under this T_{BAT} . MIN Tcharge hysteresis is set to					
	2°C.					
MAX Tbms	Sets the maximum allowable temperature of the BMS T_{BMS} due to the					
	passive balancing. The BMS Tmax hysteresis is set to 5°C. The balancing					
	and charging are stopped until the temperature does not drop under the					
	set value.					
MAX Vcell	The highest allowed voltage of the individual cell.					
MAX Vcell	The highest allowed voltage of the individual cell voltage					
Hysteresis	hysteresis.					
MIN Vcell	The lowest allowed voltage of the individual cell.					
MIN Vcell	The lowest allowed voltage of the individual cell voltage					
Hysteresis	hysteresis.					
Chemistry	Cell chemistry.					
Capacity	Battery capacity (Single string).					
Cycle	Number of effective battery cycles.					
Parallel Strings	Number of parallel strings in the battery pack.					



Data logging:

All parameters of the BMS can constantly be monitored on the right side of the screen. To see the individual cell voltage, Cell resistance, package and BMS temperature the Logging window should be chosen. To record and save the data you collect during an operation (charging, testing, etc.) choose the **File** and set the **Time interval** you want BMS to save. When the Time interval is set to 00:00:00 the software logs the data with its maximum achievable speed. By pressing the "Start" button you start the logging, to stop recording, just press the button "Stop".





Service Instructions:

Additional Service Parameters are available in BMS tab under Communicate. Additional instructions and custom-made parameter instructions are described in the individual BMS user manual.

A new window pops-up. BMS receiver address has to be filled-in first. Read and Write instruction are possible. When the parameter should be read from the BMS a question mark should follow 4-letter instruction (e.g. VMAX?). If the parameter should be changed a new parameter value should follow the instruction + a single space (e.g. VMAX 3.95). »Query« button answers with the parameter settings or confirms the new value with »SET«. If the Run time window appears, repeat the instruction. The BMS is busy with the measurement. »Send« is used in case when no respond is required.

ogram	Report BN		lelp		1			
ettings	Logging	FL	ASH H	istory	REC - BATTERY MANAGEMENT	7R-0180		UNLOCKED PRESENT
Cell volt	tage [V]		Cell r	esistand	e [mOhm] Loggin stopped		10 15 20 25 30	-200 0 200
1	2.885	•	1	0.55	• Communicate		30 34	350 35
2	2.908		2	0.55				
3	2.928		3	0.55	Send to address	Representation	Sender Address	Ibat
4	2.921		4	0.55	2	Text 💌	2	0,0 A
				- 1	Send Message	Received Messag	e	10,0 11
					*IDN?	REC - BATTERY MANAGEMENT	SYSTEM	90-
					Send Query	Receive	Init	60- 40- sc
				l			5	20- 0- Tmax-10- SOH
							Card and the second	Fmax-10- SOH 21 °C 99,6



Firmware upgrade:

BMS firmware can be upgraded with RS-485 Cable and BMS Master Control software. When the BMS is turned ON it waits for an instruction for firmware update for the first 0.5 s. Then it jumps to the normal mode of operation. When a firmware upgrade should be done a "Firmware upgrade" option should be chosen in the "BMS" menu.

ogram	Report	BMS He	elp												
ettings	Loggir	Comm	Settings	Ctrl+Y	BAT	TERY N	ANAGEMENT	7R-	0180				UNLOCKED	PRESE	NT
	tage [V]	Time/I Passwi		Ctrl+T Ctrl+W	m]	Logg	in stopped			5 1	0 15 20 25	0	-200 (200	
1	2.885	Comm	nunicate	Ctrl+C	F	File	e path			0		34 350		-	35
2	2.908	Firmw	are upgra				• • •			-					۲.
3	2.928	Locked	d	Ctrl+L							Vbat		Iba	at	
4	2.921		4 (0.55			Start	Stop	>		11,64 V		0,0		
						Tir	me interval				11,04 V		0,0	Α	
						00	0:00:01	۲		1	2 3 4				
								-		0		5	90-0		
						Packa	age temperatures	BMS ten	nperatures				80-		
						1	21.5	1	21.0	1	MIN Vcell				
								_			2,885 V		60-		
						-					12,000		40-		
											2 2				so
										1	2 3 4		20-	0,3	-
										0		5		10,5	
													0-		
										1	MAX Vcell	Tmax	10-0	SOH	
		-			*						2,928 V	22	°C	99,6	

A new firmware binary file should be selected from the "Select binary flash file" window.

ogram	Report BN	IS Hel	P								_		
etting	s Logging	FLAS	H History	REC - BAT	TERY MANAGEN	AENT 7R	-0180			10	CHED	PRESE	ar.
Cell vo	oltage [V]	c	ell resistanc	e ImOhml	Lossin stones	d		10	15 20 25		0 0	200	
1	3.485	- [1 ••• Se	elect binary !	flash file!			-	1	×			35
2	3.513		2	Last in	Con Press			0.4	-				
3	3.536		3	Look in:	Software_s	anodoru			1 🖻 🖽 -	5	Ibat		
4	3.529		4	G.	Name			Date n	nodified	Туре	0,0	A	
				2	B Doc			4.3.202	3 22:34	File folder			
			Red	cent Places	bms_8_1_8	ootloader		22.3.20	13 14:16	Binary file		-	
				Desktop Libraries Computer		Louising	fied: 22.3.2013 14:1				6	0,7 SOH 99,6	50
				Network	and the second second	-					-		
					File name:					OK			
					Files of type:	Custom Patt	em ("hin)		-	Cancel			



A new window pops-up with Bootloader status. BMS should be turned OFF and ON to start the new firmware upgrade. When the firmware is downloaded to the BMS, it should not be turned OFF! When the new firmware is updated the BMS restarts on its own.

end BMS co	ontrol										
Program	Report BN	/IS	Help								
Settings	Logging	F	FLASH Hi	istory	REC - BATTERY MANAGEMENT	7R-0180		OCKED PRESENT			
Cell volt	tage [V]		Cell re	sistance	[mOhm] Loggin stopped		10 15 20 25 30	200 0 200			
1		*	1	0.55	BMS programmer		30 34 350	350			
	3.513 3.536		2	0.55	Bootloader status						
	3.529		4	0.55	Please turn the BMS off and	at					
							Vcell IS V 6				
					Ca	ancel	3 4 2	0			
		*			•		3,536 V 22	°C 99,6 %			