

CAN Bus Protocol for Battery Communications

8/19/21

Revision	Changelog	Author	Date
1.0	Initial creation	William Hopkins	8/18/21
1.1	Updated Interface Configuration	William Hopkins	8/19/21

CAN Bus Interface Configuration:

The inverter only recognizes standard CAN Bus frames containing 8 bytes of data. CAN FD with 64 data bytes is not supported.

Communication Rate: 500kbps

Data Endianness: Little Endian

Transmission Cycle Rate: Data should be transmitted to the inverter once every second.

Inverter Heartbeat Response: Each time the inverter correctly receives data it will respond with CAN ID 0x305 containing "00 00 00 00 00 00 00 00" as data.

NOTE: All data sent to the inverter must represent aggregate, minimum, or maximum values from all batteries connected in parallel. Each battery cannot send this data to the inverter individually and must instead communicate to some form of aggregator responsible for combining and managing all the batteries' data. This aggregator can be either inside a single battery or external to the pack.

CAN Bus Data Definition Tables:

CAN ID 0x359

Byte Number	Name	Description
0	Protection Byte 1	See table 1 for bitfield settings
1	Protection Byte 2	See table 2 for bitfield settings
2	Alarm Byte 1	See table 3 for bitfield settings
3	Alarm Byte 2	See table 4 for bitfield settings
4	Module Number	8-bit integer representing quantity of parallel connected batteries.
5	Reserved	Unused: byte should be "00"
6	Reserved	Unused: byte should be "00"
7	Reserved	Unused: byte should be "00"

Table 1 - Protection Byte 1 Bitfield:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Discharge Over-Current	N/A	N/A	Cell Under-Temp	Cell Over-Temp	Cell/Module Under-Voltage	Cell/Module Over-Voltage	N/A

Table 2 – Protection Byte 2 Bitfield:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
N/A	N/A	N/A	N/A	System Error	N/A	N/A	Charge Over-Current

Table 3 – Alarm Byte 1 Bitfield:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Discharge High Current	N/A	N/A	Cell Low Temp	Cell High Temp	Cell/Module Low Voltage	Cell/Module High Voltage	N/A

Table 4 – Alarm Byte 2 Bitfield:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
N/A	N/A	N/A	N/A	Critical System Error	N/A	N/A	Charge High Current

CAN ID 0x351

Byte Number	Name	Unit	Description
0	Recommended Charge Voltage	0.1V	Requested voltage at which the inverter should charge the battery
1			
2	Charge Current Limit	0.1A	Maximum charge current the inverter should source
3			
4	Discharge Current Limit	0.1A	Maximum discharge current the inverter should sink
5			
6	Reserved		Unused: byte should be "00"
7	Reserved		Unused: byte should be "00"

CAN ID 0x355

Byte Number	Name	Unit	Description
0	State of Charge	1%	Average SoC of all parallel connected batteries
1			
2	State of Health	1%	Average SoH of all parallel connected batteries
3			
4	Reserved		Unused: byte should be "00"
5	Reserved		Unused: byte should be "00"
6	Reserved		Unused: byte should be "00"
7	Reserved		Unused: byte should be "00"

CAN ID 0x356

Byte Number	Name	Unit	Description
0	Battery Terminal Voltage	0.1V	Instantaneous voltage present at the battery terminals
1			
2	Total Pack Current	0.1A	Instantaneous current into/out of the battery (signed value)
3			
4	Battery Temperature	0.1A	Instantaneous temperature of the battery
5			
6	Reserved		Unused: byte should be "00"

7	Reserved		Unused: byte should be "00"
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CAN ID 0x35C

Byte Number	Name	Unit	Description
0	BMS Request Flag	Bitfield	See table 5 below
1	Reserved		Unused: byte should be "00"
2	Reserved		Unused: byte should be "00"
3	Reserved		Unused: byte should be "00"
4	Reserved		Unused: byte should be "00"
5	Reserved		Unused: byte should be "00"
6	Reserved		Unused: byte should be "00"
7	Reserved		Unused: byte should be "00"

Table 5 – BMS Request Flag Bitfield:

Bit Number	Name	Description
0	Reserved	Unused: bit should be "0"
1	Reserved	Unused: bit should be "0"
2	Reserved	Unused: bit should be "0"
3	Full Charge Request	Set if the battery has not been fully charged for a long time. Fully charging the battery allows the SOC calculation algorithm in the BMS to re-calibrate itself.
4	Forced Charge Request 1	Set when the battery reaches a low SoC threshold defined in the BMS itself.
5	Forced Charge Request 2	Set when the battery reaches a low SoC threshold defined in the BMS itself.
6	Discharge Enabled	Set when discharging from the battery is allowed.
7	Charge Enabled	Set when charging to the battery is allowed.

CAN ID 0x35E

Byte Number	Name	Unit	Description
0	Manufacturer Name	ASCII Char	Character 1 of manufacturer's name
1		ASCII Char	Character 2 of manufacturer's name
2		ASCII Char	Character 3 of manufacturer's name
3		ASCII Char	Character 4 of manufacturer's name
4		ASCII Char	Character 5 of manufacturer's name
5		ASCII Char	Character 6 of manufacturer's name
6		ASCII Char	Character 7 of manufacturer's name
7		ASCII Char	Character 8 of manufacturer's name