

CAN-communication-protocol

General

EcoFlow Project-number	2023-01-0001	
model	Power Kits Emulator to Van Data	
CAN-protocol-standard	J1939 CAN-Open	
CAN Baud Rate	250k	

File history

Version	Initiated by	Date	Comment
1	daric.wang	2023/01/05	Emulator Power Kits - Van Data - 1st draft edition
1.01	breeze.zhao	2023/11/21	
1.02	breeze.zhao	2024/05/08	Add protocol to communicate with alternator charger

Communication Details

J1939 Messages Table

PGN Name	Broadcast Rate	PGN Number	Default Source Address	Byte 1	Byte 2	Byte 3	Byte 4	Byte5	Byte 6	Byte 7	Byte8
DLC = 8, CAN rate = 250kbps											
BATTERY_TOTAL_STATUS	1s	0x00E100	0x46	Total battery capacity		Total battery SOC		Total Actual battery power		Remaining run time	
BATTERY_STATUS_1	1s	0x00E200	0x46	Battery ID	Actual battery power		Battery voltage		Battery current		
BATTERY_STATUS_2	1s	0x00E300	0x46	Battery ID	Battery SOC	Remaining run time		Date of production			
BATTERY_STATUS_3	1s	0x00E400	0x46	Battery ID	Nominal Battery capacity		Estimated residual capacity		Battery temperature		
INPUT_TOTAL_STATUS	1s	0x00E500	0x46	Total actual input power							
INPUT_STATUS_1	1s	0x00E600	0x46	Input device ID	Actual input power		Input voltage		Input current		
OUTPUT_TOTAL_STATUS	1s	0x00E700	0x46	Total actual output power							
OUTPUT_STATUS_1	1s	0x00E800	0x46	Output device ID	Actual output power		Output voltage		Output current		
VEHICLE_TOTAL_STATUS	1s	0x00E900	0xE5	Fault State		Fault Level	CAN protocol version				
KITS_TOTAL_STATUS	1s	0x00EA00	0x46	Fault State		Fault Level	CAN protocol version				
LOAD_STATUS_1	1s	0x00EB00	0x46	Load channel ID	Actual Channel status	Output power		Output voltage		Output current	
LOAD_STATUS_2	1s	0x00EC00	0x46	Load channel ID	Error code		Relay status				
BATTERY_CHARGE_STATUS	1s	0x00ED00	0x46	Desired Charge State	Desired Charge Voltage		Desired Charge Current				
INPUT_CONTROL_CMD	as needed 1s, Stop receiving ack	0x00D100	0xE5	Input device ID	Cmd type	Vehicle charging enabled	Maximum AC Input current	Maximum Alternator Input current			
OUTPUT_CONTROL_CMD	as needed 1s, Stop receiving ack	0x00D200	0xE5	Output device ID	Cmd type	GFCI Enable	Dc Output Voltage				
BATTERY_CONTROL_CMD_1	as needed 1s, Stop receiving ack	0x00D300	0xE5	Battery ID	Charge level	Discharge level	Smart generator auto on	Smart generator auto off	Turn off the battery	Discharge heating	Clear charging error
BATTERY_CONTROL_CMD_2	as needed 1s, Stop receiving ack	0x00D400	0xE5	Battery ID	Battery screen standby time						
PARAM_SET_CMD	as needed 1s, Stop receiving ack	0x00D500	0xE5	Power Kits Address	Vehicle Address	Communication Rate					
KITS_CMD_ACK	as needed 1s, Stop as cmd stop	0x00D600	0x46	PGN Number			Results	Failure Results			
VEHICLE_CMD_ACK	as needed 1s, Stop as cmd stop	0x00D700	0xE5	PGN Number			Results	Failure Results			
LOAD_CONTROL_CMD	as needed 1s, Stop as cmd stop	0x00D800	0xE5	Load channel ID	Channel relay enable						
ALT_CHARGER_STATUS	1s	0x00D900	0xE5	Charger State	Charger Voltage		Charger Current				

NOTE:Other data consisting of 2 or more bytes should be transmitted first with the most significant byte.

Message 1 - Information and commands			
Sender	Power Kits Emulator		
Receiver	Van Data control box		
PGN Name	BATTERY_TOTAL_STATUS		
PGN Number	0x00E100	TBD	
Sample CAN ID	0X18E1E546	TBD	
DATA			
Position	Data description	Detail	
BYTE 1	Total battery capacity	1Wh/bit, Offset: 0 sample: hex: 07D0 is decimal 2000, means setting 2kWh	
BYTE 2			
BYTE 3	Total battery SOC	0.1%/bit, Offset: 0 sample: hex 031E is decimal 798, means setting 79,8%	
BYTE 4			
BYTE 5	Total Actual battery power	1W/bit, Offset: -20000 sample: hex 4A38 is decimal 19000, means setting -1000W(Positive means charging power, negative means discharging power)	
BYTE 6			
BYTE 7	Remaining run time	1min/bit, Offset: 0 sample: hex 0145 is decimal 325, means setting 325 min.(The remaining charging time is indicated when charging, and the remaining running time is indicated when discharging.)	
BYTE 8			
sample protocol	0FA0 027B 0866 0019	0FA0 = Nominal battery capacity 4kWh 027B = SOC 63,5% 4A38 = power load 1000W 0019 = remaining run time 25 minutes	
Information/remarks			

Message4 - Information and commands											
Sender		Power Kits Emulator									
Receiver		Van Data control box									
PGN Name		BATTERY_STATUS_3									
PGN Number		0x00E400			TBD						
Sample CAN ID		0X18E4E546			TBD						
DATA											
Position		Data description				Detail					
BYTE 1		Battery ID				Instance of the BMS on CAN network, range 1-3, defines a Battery ID Battery ID					
BYTE 2		Nominal Battery capacity				1Wh/bit, Offset: 0					
BYTE 3						sample: hex: 07D0 is decimal 2000, means setting 2kWh					
BYTE 4		Estimated residual capacity				1Wh/bit, Offset: 0					
BYTE 5						sample: hex: 07D0 is decimal 2000, means setting 2kWh					
BYTE 6		Battery temperature				1°C/bit, Offset: -40°C					
BYTE 7											
BYTE 8											
sample protocol											
Information/remarks											

Message7 - Information and commands				
Sender	Power Kits Emulator			
Receiver	Van Data control box			
PGN Name	OUTPUT_TOTAL_STATUS			
PGN Number	0x00E700	TBD		
Sample CAN ID	0X18E7E546	TBD		
DATA				
Position	Data description	Detail		
BYTE 1	Total actual output power	1W/bit, Offset: 0		
BYTE 2		sample: hex 04EB is decimal 1259, means setting 1259W		
BYTE 3				
BYTE 4				
BYTE 5				
BYTE 6				
BYTE 7				
BYTE 8				
sample protocol				
Information/remarks				
Message8 - Information and commands				
Sender	Power Kits Emulator			
Receiver	Van Data control box			
PGN Name	OUTPUT_STATUS_1			
PGN Number	0x00E800	TBD		
Sample CAN ID	0X18E8E546	TBD		
DATA				
Position	Data description	Detail		
BYTE 1	Output device ID	Instance of the Output device on CAN network, range 1-2 1: AC 2: DC		
BYTE 2	Actual power	1W/bit, Offset: 0		
BYTE 3		sample: hex 04EB is decimal 1259, means setting 1259W		
BYTE 4	Output voltage	0.1V/bit, Offset: 0		
BYTE 5		sample: hex 031E is decimal 798, means setting 79,8V		
BYTE 6	Output current	0.1A/bit, Offset: 0		
BYTE 7		sample: hex 031E is decimal 798, means setting 79,8A		
BYTE 8				
sample protocol				
Information/remarks				
Message9 - Information and commands				
Sender	Van Data control box			
Receiver	Power Kits Emulator			
PGN Name	VEHICLE_TOTAL_STATUS			
PGN Number	0x00E900	TBD		
Sample CAN ID	0X18E946E5	TBD		
DATA				
Position	Data description	Detail		
BYTE 1	Fault State	bit0	Hardware Status	0: ok 1: failure
		bit1	Communication Status	0: ok 1: failure
		bit2-7	reserved	
		bit8-15	reserved	
BYTE 2				
BYTE 3	Fault Level	Instance of theFault Level, range 1-3		
BYTE 4	CAN protocol version	High nibble major, low nibble minor, (e.g. 0x10 for V1.0)		
BYTE 5				
BYTE 6				
BYTE 7				
BYTE 8				
sample protocol				
Information/remarks				

Message10 - Information and commands				
Sender	Power Kits Emulator			
Receiver	Van Data control box			
PGN Name	KITS_TOTAL_STATUS			
PGN Number	0x00EA00	TBD		
Sample CAN ID	0X18EAE546	TBD		
DATA				
Position	Data description	Detail		
BYTE 1	Fault State	bit0	Hardware Status	0: ok 1: failure
		bit1	Communication Status	0: ok 1: failure
		bit2-7	reserved	
		bit8-15	reserved	
BYTE 2				
BYTE 3	Fault Level	Instance of theFault Level, range 1-3		
BYTE 4	CAN protocol version	High nibble major, low nibble minor, (e.g. 0x10 for V1.0)		
BYTE 5				
BYTE 6				
BYTE 7				
BYTE 8				
sample protocol				
Information/remarks				
Message11 - Information and commands				
Sender	Van Data control box			
Receiver	Power Kits Emulator			
PGN Name	INPUT_CONTROL_CMD			
PGN Number	0x00D100	TBD		
Sample CAN ID	0X18D146E5	TBD		
DATA				
Position	Data description	Detail		
BYTE 1	Input device ID	Instance of the Input device on CAN network, range 1-5 1: Alternator 2: Solar1 3: Solar2 4: Solar3 5: AC 0xff: Invalid value (Send when no action is required)		
BYTE 2	Cmd type	0: off 1: on 0xff: Invalid value (Send when no action is required)		
BYTE 3	Vehicle charging enabled	0: disenabled 1: enabled 0xff: Invalid value (Send when no action is required)		
BYTE 4	Maximum AC Input current	1A/bit, Offset: 0, range 1-15 0xff: Invalid value (Send when no action is required) sample: hex 04 is decimal 4, means setting 4A		
BYTE 5	Maximum Alternator Input current	1A/bit, Offset: 0, range 5-60 0xff: Invalid value (Send when no action is required) sample: hex 0A is decimal 10, means setting 10A		
BYTE 6				
BYTE 7				
BYTE 8				
sample protocol				
Information/remarks				
Message12 - Information and commands				
Sender	Van Data control box			
Receiver	Power Kits Emulator			
PGN Name	OUTPUT_CONTROL_CMD			
PGN Number	0x00D200	TBD		
Sample CAN ID	0X18D246E5	TBD		
DATA				
Position	Data description	Detail		
BYTE 1	Output device ID	Instance of the Output device on CAN network, range 1-2 1: AC 2: DC 0xff: Invalid value (Send when no action is required)		
BYTE 2	Cmd type	0: off 1: on 0xff: Invalid value (Send when no action is required)		
BYTE 3	GFCI Enable	0: disenabled 1: enabled 0xff: Invalid value (Send when no action is required)		
BYTE 4	Dc Output Voltage	0: 12V 1: 24V 0xff: Invalid value (Send when no action is required)		
BYTE 5				
BYTE 6				
BYTE 7				
BYTE 8				
sample protocol				
Information/remarks				

Message13 - Information and commands											
Sender		Van Data control box									
Receiver		Power Kits Emulator									
PGN Name		BATTERY_CONTROL_CMD_1									
PGN Number		0x00D300			TBD						
Sample CAN ID		0X18D346E5			TBD						
DATA											
Position		Data description				Detail					
BYTE 1		Battery ID				Instance of the BMS on CAN network, range 1-3, defines a Battery ID Battery ID					
BYTE 2		Charge level				1%/bit, Offset: 0, Valid value:0-100, Invalid value:0xff (Send when no action is required) sample: hex 31 is decimal 798, means setting 49%					
BYTE 3		Discharge level				1%/bit, Offset: 0, Valid value:0-100, Invalid value:0xff (Send when no action is required) sample: hex 31 is decimal 798, means setting 49%					
BYTE 4		Smart generator auto on				1%/bit, Offset: 0, Valid value:0-100, Invalid value:0xff (Send when no action is required) sample: hex 31 is decimal 798, means setting 49%					
BYTE 5		Smart generator auto off				1%/bit, Offset: 0, Valid value:0-100, Invalid value:0xff (Send when no action is required) sample: hex 31 is decimal 798, means setting 49%					
BYTE 6		Turn off the battery				0: off 1: on 0xff: Invalid value (Send when no action is required)					
BYTE 7		Discharge heating				0: off 1: on 0xff: Invalid value (Send when no action is required)					
BYTE 8		Clear charging error				0: not 1: Clear 0xff: Invalid value (Send when no action is required)					
sample protocol											
Information/remarks											

Message16 - Information and commands											
Sender	Power Kits Emulator										
Receiver	Van Data control box										
PGN Name	KITS_CMD_ACK										
PGN Number	0x00D600			TBD							
Sample CAN ID	0X18D6E546			TBD							
DATA											
Position	Data description			Detail							
BYTE 1	PGN Number			PNG of the response							
BYTE 2											
BYTE 3											
BYTE 4	Results			0: successful 1: failure 0xff: Invalid value							
BYTE 5	Failure Results			0: normal 1: Hardware fault 2: Communication fault 0xff: Invalid value							
BYTE 6											
BYTE 7											
BYTE 8											
sample protocol											
Information/remarks											

Message17 - Information and commands											
Sender	Van Data control box										
Receiver	Power Kits Emulator										
PGN Name	VEHICLE_CMD_ACK										
PGN Number	0x00D700			TBD							
Sample CAN ID	0X18D746E5			TBD							
DATA											
Position	Data description			Detail							
BYTE 1	PGN Number			PNG of the response							
BYTE 2											
BYTE 3											
BYTE 4	Results			0: successful 1: failure 0xff: Invalid value							
BYTE 5	Failure Results			0: normal 1: Hardware fault 2: Communication fault 0xff: Invalid value							
BYTE 6											
BYTE 7											
BYTE 8											
sample protocol											
Information/remarks											

Message18 - Information and commands											
Sender	Power Kits Emulator										
Receiver	Van Data control box										
PGN Name	LOAD_STATUS_1										
PGN Number	0x00EB00			TBD							
Sample CAN ID	0X18EBE546			TBD							
DATA											
Position	Data description			Detail							
BYTE 1	Load channel ID			bit7~6:	Load Type	0: AC 1: DC					
				bit5~0	Channel number	0: Ch1 1: Ch2 2: Ch3					
BYTE 2	Actual channel status			0: off 1: on							
BYTE 3	Output power			1W/bit, Offset: 0 sample: hex 04EB is decimal 1259, means setting 1259W							
BYTE 4											
BYTE 5	Output voltage			0.1V/bit, Offset: 0 sample: hex 031E is decimal 798, means setting 79,8V							
BYTE 6											
BYTE 7	Output current			0.1A/bit, Offset: 0 sample: hex 031E is decimal 798, means setting 79,8A							
BYTE 8											
sample protocol											
Information/remarks											

Message19 - Information and commands						
Sender	Power Kits Emulator					
Receiver	Van Data control box					
PGN Name	LOAD_STATUS_2					
PGN Number	0x00EC00	TBD				
Sample CAN ID	0X18ECE546	TBD				
DATA						
Position	Data description	Detail				
BYTE 1	Load channel ID	bit0-5	Channel number	0: Ch1 1: Ch2 2: Ch3		
		bit6-7	Load Type	0: AC 1: DC		
BYTE 2	Error code	bit0	OVERLOAD	0:false 1:true		
		bit1	UNDERVOL	0:false 1:true		
		bit2	OVERVOL	0:false 1:true		
		bit3	FUSH_BAD	0:false 1:true		
		bit4-7	Reserved	Always 0		
BYTE 3		bit8-15	Reserved	Always 0		
BYTE 4	Relay status	0: off 1: on 0xff: Relayless				
BYTE 5						
BYTE 6						
BYTE 7						
BYTE 8						
sample protocol						
Information/remarks						

Message20 - Information and commands						
Sender	Van Data control box					
Receiver	Power Kits Emulator					
PGN Name	LOAD_CONTROL_CMD					
PGN Number	0x00D800	TBD				
Sample CAN ID	0X18D846E5	TBD				
DATA						
Position	Data description	Detail				
BYTE 1	Load channel ID	bit0-5	Channel number	0: Ch1 1: Ch2 2: Ch3		
		bit6-7	Load Type	0: AC 1: DC		
BYTE 2	Channel relay enable	0: off 1: on 0xff: Invalid value (Send when no action is required)				
BYTE 3						
BYTE 4						
BYTE 5						
BYTE 6						
BYTE 7						
BYTE 8						
sample protocol						
Information/remarks						

Message21 - Information and commands						
Sender	Power Kits Emulator					
Receiver	Van Data control box					
PGN Name	BATTERY_CHARGE_STATUS					
PGN Number	0x00ED00	TBD				
Sample CAN ID	0X18EDE546	TBD				
DATA						
Position	Data description	Detail				
BYTE 1	Desired Charge State	0 – undefined, charger decides, usually indicates bulk stage. This is default value. 1 – Do not charge. Signals the charger to stop immediately, based on BMS decision to protect the battery from cell level or pack level overcharge or a fault condition				
BYTE 2	Desired Charge Voltage	0.1V/bit, Offset: 0 sample: hex 031E is decimal 798, means setting 79,8V				
BYTE 3						
BYTE 4	Desired Charge Current	0.1A/bit, Offset: 0 sample: hex 031E is decimal 798, means setting 79,8A				
BYTE 5						
BYTE 6						
BYTE 7						
BYTE 8						
sample protocol						
Information/remarks						

Message22 - Information and commands			
Sender	Van Data control box		
Receiver	Power Kits Emulator		
PGN Name	ALT_CHARGER_STATUS		
PGN Number	0x00D900	TBD	
Sample CAN ID	0X18D946E5	TBD	
DATA			
Position	Data description	Detail	
BYTE 1	Charger State	0 – active 1 – inactive	
BYTE 2	Charger Voltage	0.1V/bit, Offset: 0 sample: hex 031E is decimal 798, means setting 79,8V	
BYTE 3			
BYTE 4	Charger Current	0.1A/bit, Offset: 0 sample: hex 031E is decimal 798, means setting 79,8A	
BYTE 5			
BYTE 6	MAX Cahrger Current	0.1A/bit, Offset: 0 sample: hex 031E is decimal 798, means setting 79,8A	
BYTE 7			
BYTE 8			
sample protocol			
Information/remarks			