

迪龙 DC/DC 转换器 (N+X) 通信协议 V6.8

(标准版)

VCU/DCDC 节点



CAN 总线通信协议规范

DILONG DC/DC CONVERTER(N+X) COMMUNICATION PROTOCOL V6.8 (STANDARD VERSION)

VCU/DCDC NODE

CAN BUS COMMUNICATION PROTOCOL SPECIFICATION

适用范围：2019.01.19 之后新订购的单机及多台独立控制 DC/DC 转换器

Application Suitable Field: Single DC/DC or Multiple sets DC/DC ordered after 2024.9.1

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版本号 Version	更改对象 · 更改内容 Content changed	修改人 Principle	完成日期 Date
V5.9	拟制 Formulate	王冰 Bing wang	2019.01.19
V6.0	波特率改为 500Kbps Baud Rate changed to 500kbps	李强 Qing li	2019.03.16
V6.1	增加波特率 125Kbps 说明 Adding CAN Baud rate 125kbps explanation	李强 Qing li	2019.04.10
V6.2	修改发送 ID Modify sending ID	李强 Qing li	2019.11.22
V6.3	优化协议细节说明 Optimization protocol details	李强 Qing li	2021.01.25
V6.5	增加 M>2 报文信息 Adding M>2 CAN Bus Message	李强 Qing li	2023. 03. 09
V6.6	增加并机状态扩展协议，并且统一并机单机状态协议 Add parallel state extension protocol and unify parallel and single machine state protocols	李强 Li Qiang	2024.1.9
V6.7	增加烧写地址协议。 增加波特率自适应。 Add program address protocol Increase band rate adaptation	李强 Li Qiang	2024.5.13
V6.8	增加软硬件版本信息 Add software and hardware version information	李强 Li Qiang	2024.9.01

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一、网络结构及硬件规范

1. NETWORK STRUCTURE AND HARDWARE SPECIFICATION

- 1、CAN 网络采用总线拓扑结构，网络上的节点包括：整车控制系统（VCU）、DCDC控制系统两个节点，各节点通过屏蔽双绞线连接到总线网络上。
- 2、CAN 信息帧格式：CAN2.0B、29bit标识符、扩展数据帧。
- 3、物理层符合ISO11898，SAEJ1939标准，120Ω匹配电阻，电流对称驱动。
- 4、本协议默认不带终端电阻。

1.1 CAN network adopts bus topology structure, and the nodes on the network include: vehicle control system (VCU) and DCDC control system, each node is connected to the bus network through shielded twisted pair.

1.2 CAN information frame format: CAN2.0B, 29bit identifier, extended data frame.

1.3 The physical layer conforms to ISO11898, SAEJ1939 standard, 120 Ω matching resistance, current symmetrical drive.

1.4 This protocol does not have terminal resistor by default.

二、CAN 网络的通信约定

2. COMMUNICATION APPOINTMENT OF CAN NETWORK

CAN 网络波特率：波特率自适应。

CAN network baud rate: self-adaption baud rate。

- 1、CAN数据排列格式：Intel。

2.1 CAN data format: Intel.

2、CAN具体信息位定义如下表所示:

2.2 The definition of CAN specific information bits is shown in the table below

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	7	6	5	4	3	2	1	0
Byte1	15	14	13	12	11	10	9	8
Byte2	23	22	21	20	19	18	17	16
Byte3	31	30	29	28	27	26	25	24
Byte4	39	38	37	36	35	34	33	32
Byte5	47	46	45	44	43	42	41	40
Byte6	55	54	53	52	51	50	49	48
Byte7	63	62	61	60	59	58	57	56

三、报文信息 CAN BUS MESSAGE

各节点报文信息如下图所示: The CAN bus message for each node is as below:

NO.	ID	Type	Period(ms)	Size(byte)	VCU	DCDC
1	0x18m0F5E5	P	200	8	T	R
2	0x180mE5F5	P	200	8	R	T
3	0x180mE6F5	P	200	8	R	T

备注:

(1)、P 表示周期发送,S 表示单次发送。

(2)、T 表示发送节点

(3)、R 表示接收节点

(4)、VCU 表示与 DCDC 直接通信的节点

5)、ID 中“0x18m0F5E5”和“0x180mE5F5”中的 m 的值取决于客户所选择 DCDC 的额定输出电压值,当额定输出电压值处于下表所规定的相应范围内时,m 取相对应的值。具体范围可参考下表。下表 V 代表 DCDC 额定输出电压。(额定输出电压值以我司出具的规格书为

准)。

Note:

1. P means periodic transmission, S means single transmission

2. T means sending node

3. R means receiving node

4. VCU means the node that communicates directly with the DC-DC converter

5. The value of m in "0x18m0F5E5" and "0x180mE5F5" in the ID depends on the rated output voltage value of the DCDC selected by the customer. When the rated output voltage value is within the corresponding range specified in the table below, m takes the corresponding value. Please refer to the table below for specific ranges. The following table V represents the rated output voltage of the DCDC. (The rated output voltage value is subject to the specifications issued by our company).

输出电压范围 Output voltage range	m值 M value
$0V \leq V < 16V$	0
$16V \leq V < 32V$	1
$32V \leq V < 52V$	2
$52V \leq V < 62V$	3
$62V \leq V < 78V$	4
$78V \leq V < 100V$	5
$100V \leq V < 300V$	6
$300V \leq V < 500V$	7
$500V \leq V < 700V$	8
$700V \leq V < 1000V$	9

例：DCDC 额定输出电压为 28V，m 取值为 1。对应 DCDC 接收 ID0x1810F5E5、DCDC 发送 ID0x1801E5F5。

Example: The rated output voltage of the DCDC is 28V, and the value of m is 1. Corresponding to DCDC receiving ID0x1810F5E5, DCDC sending ID0x1801E5F5.

四. 消息报文说明 **CAN BUS MESSAGE EXPLANATION**

1、报文名称：DCDC 工作指令设定报文

4.1 Message name:DCDC work order setting message

OUT	IN	CAN ID	Cycle (ms)
VCU	DC/DC	0X18m0F5E5	200
Data			
位置	数据名称 Data name		
BYTE0	预留 Reserve		
BYTE1	开关机控制 Switch on/off control		Bit0: 1: 开机指令 1: Power on command 0: 关机指令 0: Shutdown command
BYTE2	设定电压低字节（低 8 位）Set voltage low Byte (low 8 bit)	0.1V/bit Offset: 0 e.g Vset = 140(BYTE2+ BYTE3*256), its corresponding 14.0V	
BYTE3	设定电压高字节（高 8 位）Set voltage high Byte (high 8 bit)		
BYTE4	设定电流低字节（低 8 位）Set current low Byte (low 8 bit)	0.1A/bit Offset: 0 e.g Iset = 1000(BYTE4+ BYTE5*256), its corresponding 100A	
BYTE5	设定电流高字节（高 8 位）Set current high Byte (high 8 bit)		
BYTE6	预留 reserve		
BYTE7	预留 reserve		

备注：

- (1)、Byte1 的 Bit0 为 1 表示开机，0 表示关机。
- (2)、m 取值参考上面报文信息第 5 条备注说明。
- (3)、我司部分 DCDC 机型不支持电压电流设定功能，具体功能以我司所出具规格书为准。

Note:

- (1) Bit0 of Byte1 is 1 means on, 0 means off.

(2) For the value of m, refer to the remarks in Article 5 of the above message information.

(3) Some of our DCDC models do not support the voltage and current setting function, and the specific functions are subject to the specifications issued by our company.

2、报文名称：DCDC 状态信息报文

(1) 当 $M < 2$ (输出额定电压小于 32V 时) 时，采用 4.2 的报文。

(2) 当 $M \geq 2$ (输出额定电压大于等于 32V 时) 时，采用 4.3 的报文。

2.Message name:DCDC Status Message Protocol

(1)When $M < 2$ (The rated output voltage is less than 32V),adopt message 4.2.

(2)When $M \geq 2$ (The rated output voltage is equal or greater than 32V),adopt message 4.3.

4. 2 DCDC Status Message Protocol

OUT	IN	CAN ID	Cycle (ms)
DC/DC	VCU	0X180mE5F5	200
Data			
位置 Location	数据名称 data name		
BYTE0	预留 Reserve		
BYTE1	故障报警低字节 Fault alarm low Byte		<div>Bit0: 温度过高关机 0: 正常 1: 故障</div> <div>Bit1: 输出过流报警 0: 正常 1: 故障</div> <div>Bit2: 输出过压报警 0: 正常 1: 故障</div> <div>Bit3: 输出欠压报警 0: 正常 1: 故障</div> <div>Bit4: 输入过压报警 0: 正常 1: 故障</div> <div>Bit5: 输入欠压报警 0: 正常 1: 故障</div> <div>Bit6: 输出短路保护 0: 正常 1: 故障</div> <div>Bit7: 内部保护告警 0: 正常 1: 保护</div> <div>Bit0: Over temperature shutdown 0: normal, 1: fault</div> <div>Bit1: Output over-current alarm 0: normal, 1: fault</div> <div>Bit2: Output over-voltage alarm 0: normal, 1: fault</div> <div>Bit3: Output under voltage alarm 0: normal, 1: fault</div> <div>Bit4: Input over-voltage alarm 0: normal, 1: fault</div>

		Bit5: Input under voltage alarm 0: normal, 1: fault Bit6: Output short circuit protection 0: normal, 1: fault Bit7: Internal fault alarm 0: normal, 1: fault
BYTE2	故障报警高字节 Fault alarm high Byte	Bit0: 通讯超时报警 0: 正常 1: 故障 Bit1: 预留 0: 正常 1: 故障 Bit2: 预留 0: 正常 1: 故障 Bit3: 预留 0: 正常 1: 故障 Bit4: 预留 0: 正常 1: 故障 Bit5: 预留 0: 正常 1: 故障 Bit6: 预留 0: 正常 1: 故障 Bit7: 预留 0: 正常 1: 故障 Bit0: Communication fault alarm 0: normal, 1: fault Bit1: Reserve 0: normal, 1: fault Bit2: Reserve 0: normal, 1: fault Bit3: Reserve 0: normal, 1: fault Bit4: Reserve 0: normal, 1: fault Bit5: Reserve 0: normal, 1: fault Bit6: Reserve 0: normal, 1: fault Bit7: Reserve 0: normal, 1: fault
BYTE3	输出电流低字节(低 8 位) Output current low Byte (low 8 bit)	0.1A/bit Offset: 0 e.g Iset = 1000, its corresponding 100A
BYTE4	输出电流高字节(高 8 位) Output current high Byte (high 8 bit)	
BYTE5	输出端电压 Output end voltage	0.2V/bit Offset: 0
BYTE6	工作状态 Working status	0: 工作 1: 停止 0: work 1: stop
BYTE7	DCDC 内部温度 DCDC inner temperature	1V/bit Offset: -40 e.g Temp = 40, its corresponding 0℃

4. 3 DCDC Status Message Protocol

OUT	IN	CAN ID	Cycle(ms)
DC/DC	VCU	0X180mE5F5	200
Data			
位置 Location	数据名称 Data name		
BYTE0	故障报警低字节		Bit0: 温度过高关机 0: 正常 1: 故障

	Fault alarm low Byte	<p> Bit1: 输出过流报警 0: 正常 1: 故障 Bit2: 输出过压报警 0: 正常 1: 故障 Bit3: 输出欠压报警 0: 正常 1: 故障 Bit4: 输入过压报警 0: 正常 1: 故障 Bit5: 输入欠压报警 0: 正常 1: 故障 Bit6: 输出短路保护 0: 正常 1: 故障 Bit7: 内部故障报警 0: 正常 1: 故障 </p> <p> Bit0: Over temperature shutdown 0: normal, 1: fault Bit1: Output over-current alarm 0: normal, 1: fault Bit2: Output over-voltage alarm 0: normal, 1: fault Bit3: Output under voltage alarm 0: normal, 1: fault Bit4: Input over-voltage alarm 0: normal, 1: fault Bit5: Input under voltage alarm 0: normal, 1: fault Bit6: Output short circuit protection 0: normal, 1: fault Bit7: Internal fault alarm 0: normal, 1: fault </p>
BYTE1	BIT0-BIT4: 故障报警高字节 Fault alarm high Byte BIT5-BIT7: 输入电压低字节(低 3 位) Input voltage low Byte (low 3 bit)	<p> Bit0: 通讯故障报警 0: 正常 1: 故障 Bit1: 工作状态 0: 工作 1: 停止 Bit2: 预留 0: 正常 1: 故障 Bit3: 预留 0: 正常 1: 故障 Bit4: 预留 0: 正常 1: 故障 </p> <p> Bit0: Communication fault alarm 0: normal, 1: fault Bit1: Working status 0: normal, 1: fault Bit2: Reserve 0: normal, 1: fault Bit3: Reserve 0: normal, 1: fault Bit4: Reserve 0: normal, 1: fault </p> <p> BIT5-BIT7: 1V/bit Offset: 100 e.g VIN = 100, it's corresponding 100V </p>
BYTE2	输入电压高字节(高 8 位) Input voltage high Byte (high 8 bit)	1V/bit Offset: 100 e.g VIN = 100, its corresponding 100V
BYTE3	输出电流低字节(低 8 位) Output current low Byte (low 8 bit)	0.1A/bit Offset: 0 e.g Iset = 1000, its corresponding 100A
BYTE4	输出电流高字节(高 8 位) Output current high Byte (high 8 bit)	
BYTE5	输出电压低字节(低 8 位) Output voltage low Byte (low 8 bit)	0.1V/bit Offset: 0 e.g Vset = 1000, its corresponding 100V
BYTE6	输出电压高字节(高 8 位) Output voltage high Byte (high 8 bit)	

BYTE7	DCDC 内部温度 DCDC inner temperature	1℃/bit Offset: -40 e.g Temp = 40, its corresponding 0℃
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4. 4 DCDC Version Message Protocol

OUT	IN	CAN ID	Cycle(ms)
DC/DC	VCU	0X180mE6F5	200
Data			
位置 Location	数据名称 Data name		
BYTE0	软件版本低字节(L) 版本描述:V H.L Software version low byte (L), Version description: V H.L		软件版本 Software version
BYTE1	软件版本高字节(H) 版本描述:V H.H Software version high byte (H), Version description: V H.H		软件版本 Software version
BYTE2	硬件版本低字节(L) 版本描述:V H.L Hardware version low byte (L) Version description: V H.L		硬件版本 Hardware version
BYTE3	硬件版本高字节(H) 版本描述:V H.H Hardware version low byte (H) Version description: V H.H		硬件版本 Hardware version
BYTE4	保留 Reserve		
BYTE5	保留 Reserve		
BYTE6	保留 Reserve		
BYTE7	保留 Reserve		

备注:

- (1)、Byte1 和 Byte2 所包含的所有项: 0 表示正常, 1 表示故障。
- (2)、输入过欠压故障 DCDC 无需重启, 当输入电压恢复到正常范围 (参考电气指标) 之后 DCDC 自动恢复工作。
- (3)、温度故障 DCDC 无需重启, 当温度恢复到正常范围 (参考电气指标) 之内后 DCDC 自动恢复工作。
- (4)、输出短路、输出过欠压故障无需重启, 当故障排除之后 DCDC 自动恢复工作。
- (5)、温度计算存在 40 的偏移, -40℃ 上传 0℃, 50℃ 上传 90℃; 既上传值减去 40 为正常温度值。

(6)、m 取值参考上面报文信息第 5 条备注说明。

Note:

1. All the items contained by Byte1 and Byte2: 0 means normal, 1 means failure.
2. The input over-voltage and under-voltage fault, DC-DC does not need to be restarted. When the input voltage returns to the normal range (refer to electrical specifications),DC-DC will automatically resumes work.
3. Temperature failure DC-DC does not need to be restarted, when the temperature returned to normal range (reference electrical indicators) DC-DC will automatically resume work.
4. Output short circuit, output over-voltage and under-voltage faults,DC-DC does not need to be restarted, and DC-DC will automatically resumes operation after troubleshooting.
5. There is a 40 offset in the temperature calculation, uploading 0°C at -40°C and uploading 90°C at 50°C; that is, the uploaded value minus 40 is the normal temperature value.
6. For the value of m, refer to the remarks in Article 5 of the above message information.