**电子油泵通讯协议V1.1**

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**更改记录**

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| --- | --- | --- | --- |
| **版本** | **日期** | **更改内容** | **作者** |
| 1.0 | 2018.06.02 | 初版 | 成建明 |
| 1.1 | 2018.06.29 | 修改部分指令定义 | 胡建昌 |
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## 3.5控制通讯协议

电子油泵简称EOP，与TCU通过CAN2.0B进行通讯，应用层基于SAEJ1939通讯协议，具体协议定义如下。

### 3.5.1 PGN=0x004100 TCU Control Request to EOP TCU发送控制需求给EOP

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 发送  Transmit | 接收  Receive | ID | | | | | | | | | 通讯周期  Period | |
| 0x0C41D503 | | | | | | | | |
| TCU | EOP | PGN = 0x004100 | | | | | | | | | 10ms | |
| P | R | | DP | | PF | PS | SA | |
| 0x03 | 0x00 | | 0x00 | | 0x41 | 0xD5 | 0x03 | |
| **数据** | | | | | | | | | | | | |
| **位置**  **Byte** | **数据名称（中文）**  **Signal description** | | | **位数**  **Bits** | | **单位**  **Uint** | **缺省值**  **Default** | **范围**  **Range** | | **偏移量**  **Offset** | **分辨率**  **Scaling** | **时序**  **Order** |
| 1.1 | EOP running enable  command  电机使能指令 | | | 2bits | | — | 0 | 0~2 | | 0 | 1 | — |
| 1.3 | EOP control mode  电机控制模式 | | | 2bits | | — | 0 | 0~2 | | 0 | 1 | — |
| 2 | EOP request torque  油泵电机需求扭矩 | | | 8bits | | Nm | 0 | 0~32 | | 0 | 0.125 | — |
| 3 | EOP request speed  油泵电机需求转速 | | | 16bits | | rpm | 0 | 0  ~5000 | | 0 | 1 | 低Low |
| 4 | 高High |
| 5 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |
| 6 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |
| 7 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |
| 8 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |

**Byte 1:**

**1.1：2bits, EOP\_ctrl\_en**

**电机使能指令 EOP running enable command**

00：电机停机指令-电机停机 Disenable (Stop)

01：清故障指令-电机控制器清除电机相关故障 Error reset

10：电机工作指令-电机开始工作 Enable (Start)

**1.3：2bits EOP\_ctrl\_mode**

**电机控制模式**

00：无控制 Idle

01：扭矩控制模式 Torque control 实际用的到吗？扭矩太小了，分辨率无法控制

10：转速控制模式 Speed control

|  |  |  |
| --- | --- | --- |
| 油泵电机控制模式  Control mode | 扭矩指令  Command | 转速指令  Command |
| 扭矩控制 Torque control | 电机需求扭矩 Target torque | 电机转速限制 Speed limitation |
| 转速控制 Speed control | 电机需求转速 Target speed | 电机扭矩限制 Torque limitation |

### 3.5.2 PGN=0x004200 EOP transmit messages to TCU EOP控制状态反馈

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 发送  Transmit | 接收  Receive | ID | | | | | | | | | 通讯周期  Period | |
| 0x0C42D3D5 | | | | | | | | |
| EOP | TCU | PGN = 0x004200 | | | | | | | | | 10ms | |
| P | R | | DP | | PF | PS | SA | |
| 0x03 | 0x00 | | 0x00 | | 0x42 | 0x03 | 0xD5 | |
| **数据** | | | | | | | | | | | | |
| **位置**  **Byte** | **数据名称（中文）**  **Signal description** | | | **位数**  **Bits** | | **单位**  **Uint** | **缺省值**  **Default** | **范围**  **Range** | | **偏移量**  **Offset** | **分辨率**  **Scaling** | **时序**  **Order** |
| 1.1 | EOP acutal running enable  电机实际使能 | | | 2bits | | — | 0 | 0~2 | | 0 | 1 | — |
| 1.3 | EOP actual control mode  油泵电机实际控制模式 | | | 2bits | | — | 0 | 0~2 | | 0 | 1 | — |
| 2 | EOP actual torque  油泵电机实际转矩 | | | 8bits | | NM | 0 | 0~32 | | 0 | 0.125 | — |
| 3 | EOP actual speed  油泵电机实际转速 | | | 16bits | | rpm | 0 | 0  ~5000 | | 0 | 1 | 低Low |
| 4 | 高High |
| 5 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |
| 6 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |
| 7 | EOP error Level | | | 8bits | | — | 0 | 0~4 | | 0 | 1 | — |
| 8 | EOP error code  故障码 | | | 8bits | | — | 0 | 0~255 | | 0 | 1 | — |

**Byte 1:**

**1.1：2bits, EOP\_ctrl\_en**

**电机使能EOP running enable**

00：电机停机指令-电机停机 Disenable (Stop)

01：电机工作指令-电机开始工作 Enable (Start)

**1.3：2bits, EOP\_ctrl\_mode\_acu**

**电机当前控制模式 EOP actual run mode**

00：无控制 Idle

01：扭矩控制模式 Torque control mode

10：转速控制模式 Speed control mode

**Byte 8：EOP\_Error\_Code**

**Below table define the EOP failure information**

**下表由电机厂家提供故障信息**

|  |  |  |
| --- | --- | --- |
|  | 定义 Definition | 状态含义 Description |
|  |  |  |
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### 3.5.3 PGN=0x004300 EOP transmit messages to TCU EOP电流电压状态反馈

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 发送  Transmit | 接收  Receive | ID | | | | | | | | | 通讯周期  Period | |
| 0x0C43D3D5 | | | | | | | | |
| EOP | TCU | PGN = 0x004300 | | | | | | | | | 10ms | |
| P | R | | DP | | PF | PS | SA | |
| 0x03 | 0x00 | | 0x00 | | 0x43 | 0x03 | 0xD5 | |
| **数据** | | | | | | | | | | | | |
| **位置**  **Byte** | **数据名称（中文）**  **Signal description** | | | **位数**  **Bits** | | **单位**  **Uint** | **缺省值**  **Default** | **范围**  **Range** | | **偏移量**  **Offset** | **分辨率**  **Scaling** | **时序**  **Order** |
| 1 | EOP dc\_current  母线电流 | | | 8bits | | A | 0 | 0~255 | | 0 | 1 | — |
| 2 | EOP dc\_voltage  母线电压 | | | 16bits | | V | 0 | 0  ~1000 | | 0 | 1 | 低Low |
| 3 | 高High |
| 4 | EOP ac\_current  相电流 | | | 8bits | | A | 0 | 0~255 | | 0 | 1 | — |
| 5 | EOP ac\_voltage  相电压 | | | 16bits | | V | 0 | 0  ~1000 | | 0 | 1 | 低Low |
| 6 | 高High |
| 6 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |
| 7 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |

### 3.5.3 PGN=0x004400 EOP transmit messages to TCU EOP温度及功率状态反馈

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 发送  Transmit | 接收  Receive | ID | | | | | | | | | 通讯周期  Period | |
| 0x0C44D3D5 | | | | | | | | |
| EOP | TCU | PGN = 0x004400 | | | | | | | | | 10ms | |
| P | R | | DP | | PF | PS | SA | |
| 0x03 | 0x00 | | 0x00 | | 0x44 | 0x03 | 0xD5 | |
| **数据** | | | | | | | | | | | | |
| **位置**  **Byte** | **数据名称（中文）**  **Signal description** | | | **位数**  **Bits** | | **单位**  **Uint** | **缺省值**  **Default** | **范围**  **Range** | | **偏移量**  **Offset** | **分辨率**  **Scaling** | **时序**  **Order** |
| 1 | EOP actual\_power  电机实际电功率 | | | 16bits | | kW | 0 | -300~300 | | -300 | 0.01 | 低Low |
| 2 | 高High |
| 3 | EOP actual\_totegy  电机实际消耗电能累计 | | | 16bits | | kWh | 0 | -300~300 | | -300 | 0.01 | 低Low |
| 4 | 高High |
| 5 | wind\_temperature  电机绕组温度 | | | 8bits | | ℃ | 0 | -40~210 | | -40 | 1 | — |
| 6 | inverter\_temperature  逆变器温度 | | | 8bits | | ℃ | 0 | -40~210 | | -40 | 1 | — |
| 7 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |
| 8 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |

### 3.5.3 PGN=0x004500 EOP transmit messages to TCU EOP软件版本状态反馈

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 发送  Transmit | 接收  Receive | ID | | | | | | | | | 通讯周期  Period | |
| 0x0C45D3D5 | | | | | | | | |
| EOP | TCU | PGN = 0x004500 | | | | | | | | | 10ms | |
| P | R | | DP | | PF | PS | SA | |
| 0x03 | 0x00 | | 0x00 | | 0x45 | 0x03 | 0xD5 | |
| **数据** | | | | | | | | | | | | |
| **位置**  **Byte** | **数据名称（中文）**  **Signal description** | | | **位数**  **Bits** | | **单位**  **Uint** | **缺省值**  **Default** | **范围**  **Range** | | **偏移量**  **Offset** | **分辨率**  **Scaling** | **时序**  **Order** |
| 1 | EOP year  年 | | | 8bits | | - | 0 | 0~99 | | 0 | 1 | - |
| 2 | EOP month  月 | | | 8bits | | - | 0 | 1~12 | | 1 | 1 | — |
| 3 | EOP day  日 | | | 8bits | | — | 0 | 1~31 | | 1 | 1 | — |
| 4 | EOP hour  时 | | | 8bits | | — | 0 | 0~23 | | 0 | 1 | — |
| 5 | EOP minute  分 | | | 8bits | | — | 0 | 0~59 | | 0 | 1 | — |
| 6 | EOP motor power  电机额定功率 | | | 8bits | | W | 0 | 0~255 | | 0 | 1 | — |
| 7 | EOP motor max torque  电机最大扭矩 | | | 8bits | | NM | 0 | 0~255 | | 0 | 1 | — |
| 8 | Reserved  保留置0xFF | | | 8bits | | — | — | — | | — | — | — |