Enpower

Controller- MC3818 Programmer(EPC) Operation Manual

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三、Basic introduction of programmer software interface

1、Programmer main interface and introduction.
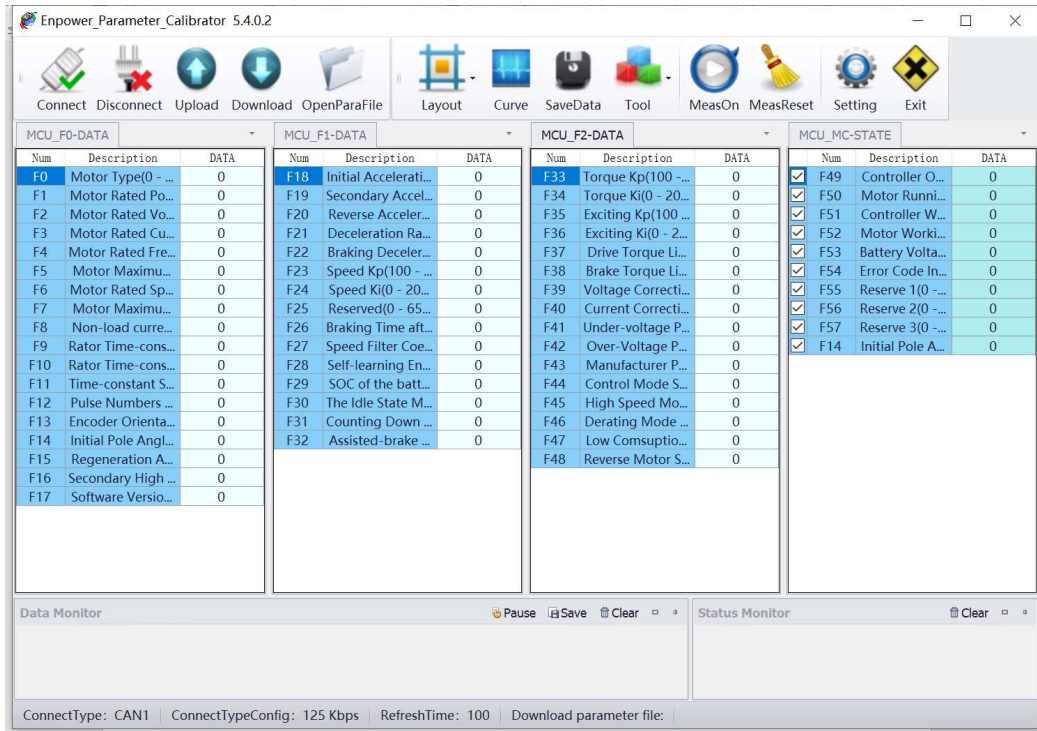
## 2、Introduction of EPC function subitem

(1) Function bar

① **Connect**: Click this button to start the CAN communication with controller when cable connected.

② **Disconnect**: Cut off the CAN communication with controller through the button.

③ **Upload**: You can save the controller parameters and monitoring data on your laptop in txt format through this button when communication connected.

(Controller→PC)

④ **Download**：You can load the parameters file in txt format into the controller through this button (The file must be compatible with interface contents). (PC →Controller)

⑤ **Openparafile**：Click the "Openparafile" option to open the text document of the parameters saved by user.

⑥ **Layout**：Different display interfaces can be set according to the user's preference.

⑦ **Curve**：You can select the optional data in the MC-STATE column to generate curve. Interface is as following.
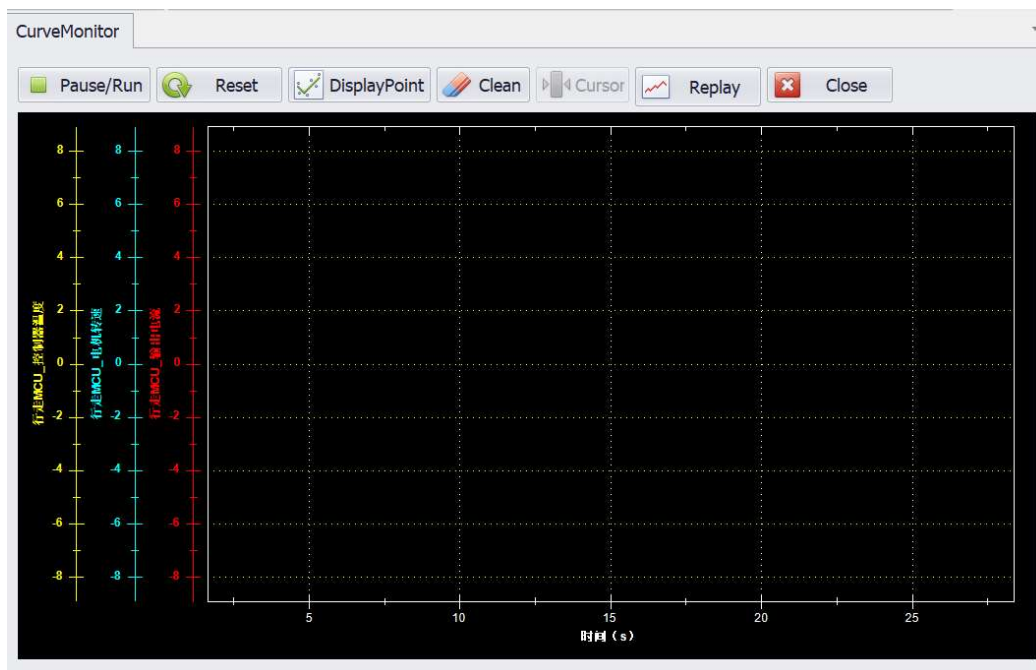
⑧ **SaveData**：Click this button to set the cycle time of CAN Bus message and save

the data of real-time collection in the MC-STATE.

⑨ **Tool:** Five extended function of the programmer.

⑩ **MeasOn:** It will show the MAX and MIN value of the data in the MC-STATE column when it starts. It closes when it's over.

⑪**MeasReset:** Value reset for the measurement.

⑫**Setting:** It's for setting of connect type, baud rate, changing of configuration tables. You need to finish this setting before starting the communication connection. The display interface is as bellows.:
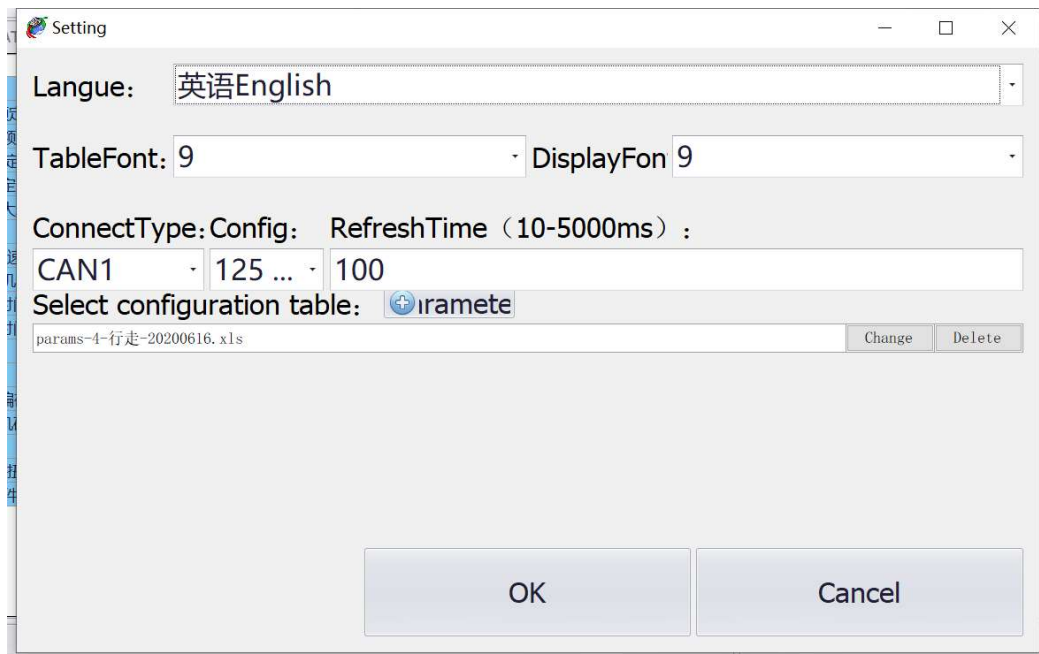
⑬**Exit:** Click the "Exit" option to shut down the EPC.

⑵ Parameters Setting Column

The adjustment of various functions of MCU can be completed by modifying parameter in this section. There are 89 parameters in 4 columns with detailed description in the following.

①MCU_F0-DATA : Contains 18 parameters（F0—F17）.

②MCU_F1-DATA: Contains 15 parameters（F18—F32）.

③MCU_F2-DATA: Contains 16 parameters（F33—F48）.

④MCU_F3-DATA: Contains 40 parameters（F58—F97）.Many parameters in this column which contains a lot of reserved items. It could be custom-design according to requirements of the clients. (Remark：Unavailable column)

⑶ Parameters monitoring column

According to the actual demand, showing the corresponding detection data to monitor the state of the system in real time. Monitoring information and description of the controller:

	Num	Description	DATA
✓	F49	Controller Output Current(A)	0
✓	F50	Motor Running Speed(rpm)	0
✓	F51	Controller Working Temprature(℃)	0
✓	F52	Motor Working Temprature(℃)	0
✓	F53	Battery Voltage(V)	0
✓	F54	Error Code Indicate	0
✓	F55	Reserve 1(0 - 65535)	0
✓	F56	Reserve 2(0 - 65535)	0
✓	F57	Reserve 3(0 - 65535)	0

MCU_MC-STATE

F49 Output current：Phase current in real-time，unit: A

F50 Motor speed：Actual motor speed in real-time，unit: rpm

F51 Controller Temp.：Unit: ℃

F52 Motor Temp: Unit:℃

F53 Battery pack voltage：Unit: V

F54 Fault code: Ongoing fault code.

F55 Fault code of last record：Information of the latest fault code record.

F56 Display of throttle signal value：Corresponding value from 0 to peak

（full throttle）

F57 Gear position information：0=Neutral，1=Forward，2=Reverse

8=Low Speed Mode

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(4) Fault code information

The fault code in the list was made based on the CAN bus protocol. It shows in F54. The corresponding relationship between digital status and fault is as bellows:

1(0x1): High pedal failure.
4(0x4): The controller overheated.
5(0x5): The main circuit powered off.
6(0x6): Fault of current sampling circuit.
7(0x7): Encoder fault/locked rotor fault.

9(0x9): Battery pack undervoltage.
10(0xA): Battery pack overvoltage.
11(0xB): The motor overheated.
12(0xC): Parameter storage verifying failure.
13(0xD): Throttle fault.
15(0xF): Electromagnetic brake failure.
21(0x15): Calibration host computer failed.
23(0x17): Output overcurrent fault.

⑸ Data monitor

After the communication connected, the received and sent data will be refreshed and displayed constantly in this part, and the process can be paused, saved and cleared.

⑹ Status monitor

After the communication connected, the parameter modification status (parameter download/upload status, parameter modification value, etc.) can be displayed here.

⑺ Functions setting information display

After the function bar setting items are configured accordingly, they will be displayed accordingly at the bottom.

四、Controller parameters setting and defination

1、MCU_F0-DATA setting and defination

Num	Description	DATA
MCU_F0-DATA		▾
F0	Motor Type(0 - 3)	0
F1	Motor Rated Power(0 - 150.0k...	0
F2	Motor Rated Voltage(0 - 400....	0
F3	Motor Rated Current(10 - 600...	0
F4	Motor Rated Frequency(10 - 3...	0
F5	Motor Maximum Frequency(1...	0
F6	Motor Rated Speed(100 - 600...	0
F7	Motor Maximum Speed Limit(...	0
F8	Non-load current of an AC Mo...	0
F9	Rator Time-constant 1(0 - 100...	0
F10	Rator Time-constant 2(0 - 100...	0
F11	Time-constant Switching Freq...	0
F12	Pulse Numbers per Round of t...	0
F13	Encoder Orientation(0 - 1)	0
F14	Initial Pole Angle of PMSM Mo...	0
F15	Regeneration Against Acceler...	0
F16	Secondary High Speed limit(1...	0
F17	Software Version(0 - 32767)	0

Parameters F1-F6 are filled in with the motor real information（Usually finished already and no need to change）；

F4 ： Motor rated frequency.

F6 ： Motor rated speed ： Relation of the value: F4x30=F6

F7： Motor maximum speed limit： It decides the vehicle maximum speed. Only fine adjustment suggested. It will cause effects on the motor running current.

F8: Non-load current of an AC motor： Control the phase current output.

F9 ：Rotor time-constant 1: Motor torque output, value range 550~850, and increasing by 50 only, It could be calibrated on site. The vehicle could move when the value is over 400 （Special case:F9 is 350, it's up to the motor）

F10： Rotor time-constant 2： It's value is 150 bigger than F9 大 150 （it is generally set at the factory, no need to change）

F11: Time-constant switching frequency： Fixed parameter. No need to change.

F12 ： Pulse number of the encoder： Filled in with the actual motor data. （Wrong value will cause abnormal running and the vehicle will not run or vibrating）

F13 ： Encoder orientation（0~1） ： If motor running vibration, alter 1 or 0。

F14 ： Speedometer data setting: The bigger value to be set,the faster speed it shows.

F15 ： Time setting for lead acid battery discharging procedure.

F16 ： Motor speed setting of ECO mode.

F17： Software version

2、MCU_F1-DATA setting and setting and defination

MCU_F1-DATA	MCU_F2-DATA	
Num	Description	DATA
F18	Initial Acceleration(10 - 40000...	0
F19	Secondary Acceleration(100 - ...	0
F20	Reverse Acceleration(100 - 40...	0
F21	Deceleration Rate(10 - 40000)	0
F22	Braking Deceleration Rate(100...	0
F23	Speed Kp(100 - 40000)	0
F24	Speed Ki(0 - 20000)	0
F25	Reserved(0 - 65535)	0
F26	Braking Time after loosing the ...	0
F27	Speed Filter Coefficients(0 - 7)	0
F28	Self-learning Enable Position(0...	0
F29	SOC of the battery(0 - 100%)	0
F30	The Idle State Motor Torque S...	0
F31	Counting Down Coefficients(0 ...	0
F32	Assisted-brake Start-up Speed...	0

Data Monitor

(F18~F22 set based on the customer's requirement)

F18 Initial acceleration： Throttle response time, Usually it's range is 400~1000； Bigger

    value, faster response time.

F19 Secondary acceleration： （mostly value bigger than F1, range from 0 to 500；

F20 Reverse acceleration: Reverse action response time；

F21 Deceleration time： Response time for deceleration.

F22 Brake declaration

F23 Speed KP

F24 Speed KI

F25 Assisted-brake start-up delay setting

F26 Assisted-brake start-up voltage setting.

F27 Filter coefficient of measuring motor speed

F28 Startup position

F29 Lead acid battery SOC setting （0~100%）

F30 Idle torque value setting.

F31 Start-up voltage point of assisted-brake remaining （0~100.0V）

F32 Assisted-brake start-up speed point setting （0~1500rpm）

3、MCU_F2-DATA setting and defination

Num	Description	DATA
MCU_F1-DATA	MCU_F2-DATA	
F33	Torque Kp(100 - 40000)	0
F34	Torque Ki(0 - 20000)	0
F35	Exciting Kp(100 - 40000)	0
F36	Exciting Ki(0 - 20000)	0
F37	Drive Torque Limit(0 - 350%)	0
F38	Brake Torque Limit(0 - 350%)	0
F39	Voltage Correction Coefficient(...	0
F40	Current Correction Coefficient(...	0
F41	Under-voltage Point Setting(0 ...	0
F42	Over-Voltage Point Setting(50...	0
F43	Manufacturer Parameter 1(0 - ...	0
F44	Control Mode Selection(0 - 7)	0
F45	High Speed Mode Torque Limi...	0
F46	Derating Mode Start-up Volta...	0
F47	Low Comsuption Mode Speed ...	0
F48	Reverse Motor Speed Limit(0 -...	0

Data Monitor

F33—Torque KP

F34—Torque KI

F35- Exciting KP

F36-Exciting KI

F37-Drive torque current setting）

F38-Brake torque current setting

F39- Voltage Correction coefficient

F40-Current Correction coefficient

F41-Undervoltage point setting

F42-Overvoltage point setting

F43- Manufacturer's parameter

F44-Reserved

F45-Torque current limit setting at high-speed stage

F46-Derating voltage point setting

F47-Low consumption model speed limit setting.

F48-Reverse speed limit setting