Servo Software---Communication

1. Basic functions of software

The position of basic function buttons of RSConfigurator software is shown in Figure 1. There are 7 common buttons, which are ① Language, ② Communication Settings, ③ Parameter editing and management, ④ Tunning and scope, ⑤ Driver status, ⑥Modbus 03 Read register, ⑦Modbus 06 Write signle register.



Figure 1

1 Language

RSConfigurator software language supports Chinese and English, and the two languages can be switched. It should be noted that the software needs to be restarted each time the language is switched to take effect.

2 Communication settings

The communication settings are shown in Figure 2. Among them, the port information can be checked through "Computer-Properties-Device Manager". After selecting the port correctly, click "Connect" to successfully communicate.



Figure 2

3 Parameter editing and management

The interface of parameter editing and management is shown in Figure 3. In this interface, there are 7 function buttons. They are "Read parameters", "Save parameters", "Save to file", "Load from file" and "Compare config file", "Factory reset".

| rameters Save parameter: | Save to file Load fro | n fil.Compare config file | Factory | reset | | | | Exit |
|--------------------------|---------------------------|---------------------------|---------|------------|---------|---------|-----|------|
| V1_0 | addres Name | Val | Default | Uni t | Min val | Max val | R/W | |
| Besic | 0 Motor No | 0 | 0 | NULL | 0 | 65535 | RW | |
| : I/O | 1 Driver ID | 0 | 0 | 0.1 | 0 | 65535 | R | |
| Position control | 2 DSP Software version | 0 | 0 | 0.1 | 0 | 65535 | R | |
| Speed control | 17 Rated power | 40 | 40 | 0.01KW | 1 | 65535 | RW | |
| Goin | 18 Rated voltage | 220 | 200 | VAC | 1 | 380 | RW | |
| Auto tunning | 19 Rated current | 25 | 25 | 0.1A | 0 | 65535 | RW | |
| Communication | 20 Rated speed | 3000 | 3000 | RPM | 100 | 6000 | RW | |
| Position table | 21 Maximum speed | 3000 | 3000 | RPM | 100 | 6000 | RW | |
| Speed table | 22 Rated torque | 140 | 140 | 0.01NM | 1 | 65535 | RW | |
| | 23 Maximum torque | 140 | 140 | 0.01NM | 1 | 65535 | RW | |
| | 24 Moment of inertia-Jm | 100 | 100 | 0.01kg.cm | 1 | 65535 | RW | |
| | 25 Motor pole pair | 4 | 4 | 1 | 1 | 50 | RW | |
| | 26 Stator resistance | 1000 | 1000 | mOhm | 1 | 65535 | RW | |
| | 27 Stator inductance-Lq | 1000 | 1000 | 0.01mH | 1 | 65535 | RW | |
| | 28 Stator inductance-Ld | 1000 | 1000 | 0.01mH | 1 | 65535 | RW | |
| | 29 Back emf coefficient-b | .e 4 | 4 | 0.01mv/RPM | 1 | 65535 | RW | |
| | 30 Torque coefficient-Kt | 4 | 4 | 0.01kg.cm | 1 | 65535 | RW | |
| | 31 Electrical const. | 0 | 0 | - | 0 | 65535 | RW | |
| | 32 Mechanical const. | 0 | 0 | - | 0 | 65535 | RW | |
| | 33 rsvd | 0 | 0 | - | 0 | 65535 | RW | |
| | 34 Encoder Type | -ABZ-province line type - | 0 | 10000 | 0 | 1 | RW | |
| | 37 Absolute encoder resol | ut 17 | 17 | Bit | 10 | 23 | RW | |
| | 38 Incremental encoder re | sc 10000 | 10000 | Pulse/rev | 1000 | 65535 | RW | |

Figure 3

As shown in Figure 3, don't modify the parameters of group P00. This group of parameters are motor parameters, which are stored in the encoder. Abnormal parameters will cause the drive to alarm.

Read parameters: Read the data from the drive to the debugging software.

Save parameters: Permanently save the currently set/modified parameters to the drive.

Save to file: Save the parameters of the drive in the computer in the form of a file.

Load from file : Import the drive parameter file saved before into the debugging software.

Compare config file: There are two comparison functions:

- A. Import two different parameter files, which can be compared automatically, and it is convenient to check the difference parameters.
- B. Import only one parameter file, and then check "Current drive parameters" to compare the current drive parameters with the saved parameter file, which is convenient for checking the difference parameters.

Reset: Restore the parameters of the drive to the factory default values.

(4) Tunning and scope

The interface of tunning and scope is shown in Figure 4.



Figure 4

5 Driver status

The interface of driver status is shown in Figure 5.





POS CMD CNT: Determine whether the motor has lost steps by monitoring the input of the number of pulses. This function can only be seen after the drive is enabled.

FDB speed : Monitor the current maximum speed of the motor and the difference between the actual speed and the given speed.

FDB torque : Determine whether the motor is in an overload state by monitoring the state of the motor running torque.

Current fault status: Display the alarm information of the drive.

Input/Output Port: Monitor the IO status of the drive.

6 Modbus 03 Read register

| laveID: | 1 | |
|-----------|------------|---------------|
| | | 1st DATA read |
| \ddress: | ₽ 0 | 0 |
| Quantity: | 1 | |
| | Send | |
| | | |
| | Exit | |

Figure 6

7 Modbus 06 Write signle register

| SlaveID: 🕴 1 | |
|--------------|--------------|
| Address: 🗘 0 | <u>S</u> end |
| Value: 📋 O | <u>E</u> xit |



As shown in Figure 7, write the address of the target parameter in "Address", write the parameter value of the target parameter in "Value", and finally click "Send".

2. Motion test

On the basis of successful communication, motion test can be performed. As shown in Figure 8, the control mode selects "Position", the IN1 level selects "High", the speed command source selects "Tunning", and the pulse source selects "Tunner".

| RSConfigurato | or RTELLIGEN | T Build Ver 1.0.0.9 | 1 | | | | | | | |
|---|--|-------------------------------------|------------------------------|--|--|---|-----------------------------------|--|---------|-----------------------------|
| | | | 3 06 Slave ID | | | | | | | |
| Tunning and se | cope | | Control mode Position | IN1 level High 🔽 | 100 - | | | | | -100 |
| Current lo I_Kp 500 | op I_Ki 500 | Test current(| D.1%) IRef_Filter | IFdb_Filter 500 | 90 - | | | | | -90 -80 |
| ALCOLO | | | Step test | 2000 | 70 - | | | | | -70 -60 |
| Speed loop Spd_Kp1 0 Spd_Kvff 0 | Spd_Ki1 0 Spd_Fvff 0 | Spd_Kp2 0 SPD_FV1 0 | Spd_Ki2 0 SPD_FV2 0 | Speed comma Tunning 🔻 | 50 - nd cource 10 - 30 - | | | | | -50 -40 -30 |
| Position 1 POS_KP1 0 | 00p POS_Kp2 1 0 | Corque feedforward | g:Torque feedforward f | ilter frequençulse source Tunner 🔽 | 20- 10- 0.000 | 20. 000 | 40. 000 Tin | 60.000 | 80. 000 | -20 -10 -0 100,000 |
| Test Mode | Acc time(ms) 0 Initial dir Positive |) Dec time(mm) 0 ection count | Fulse | Wait time(ms) 10 CCW Jog CW W - Go CW | Channe POS Cyclic sampling Yellow curyz 20 | error t interval 1.00 ¥_L1 1.00 ¥_L2 | Channe 2 0.00 Y 2 0.00 Y | POS error sampling speed 1 R1 0.00 R2 0.00 | | Start sample |

Figure 8

3. Oscilloscope monitoring operation

The oscilloscope monitoring interface is shown in Figure 9.

| 1000 111 | M 💷 🔬 | | | | | | | | | |
|----------------|--------------|------------------|----------------------|-----------------------------|-------------------|------------|-------------|---------------------------|--------|-----------|
| 14 | | | Slave I | | | | | | | |
| | | | | | | | | | | |
| nning and sco | pe | | Control mode | INI lever | | | | | | |
| | | | Position 💌 | High 🔻 | 100 - | | | | | |
| -Current loop | i | | | | 90- | | | | | |
| I_Kp | I_Ki | Test current(O | 1%) IRef_Filter | IFdb_Filter | | | | | | |
| 500 | 500 | 10 | 500 | 500 | - 08 | | | | | |
| | | - | 1 | | 70 - | | | | | |
| | | | Step test | | 60- | | | | | |
| -Speed loop | Spd_Ki1 | Spd_Kp2 | Spd_Ki2 | | 50- | | | | | |
| O D | 0 | 0 | 0 | Speed comman | d cource | | | | | |
| and Kuff | Snd Fuff | SPD FV1 | SPD FV2 | Tunning 💌 | 40- | | | | | |
| 0 | 0 | 0 | 0 | | 30 - | | | | | |
| | | | | | 20 - | | | | | |
| -Position loo | | | | | | | | | | |
| POS_KP1 | POS_Kp2 To | rque feedforward | g:Torque feedforward | filter frequendPulse source | 10- | | | | | |
| 0 | 0 | 0 | 0 | Tunner 🔻 | 0- | 20,000 | 40,000 | 60 000 | 80,000 | 100 |
| Westing Acres | | | | | 0.000 | 20.000 | 40.000 T | ime(ms | 00.000 | 100.0 |
| Countral (mar) | And Marten | | Pulsa | Wait time(ms) | Channe A Pos | | c1 | 1 diana | | |
| Speea(rpm) | ACC time(hs) | Dec time(ms) | 10 | 10 | ros | | Channe | T ^{rOS} error | | |
| 100 | 10 | 19 | 20 | | Cyclic sampling * | t interval | | sampling speed | | |
| | | | T | og CCW Tog CW | 1 3 100 | | | 31 | | Start sam |
| Iest Mode | Initial dire | ction codit | St | | Red our sore X1 | 0.00 ¥_L1 | 0.00 | Y_R1 0.00 | | |
| vecibLocs A | rositive 🔻 | 1 | Start Ge (| Go CW -> | 1 12 | | | province and and a second | Г | |

Figure 9

The oscilloscope can sample two parameters at the same time, so as to

get a more detailed understanding of the changing trend of the parameters during the operation of the motor.

For the use of oscilloscope, first set the contents to be observed on channel 1 and channel 2. Set the sampling speed to an appropriate value to collect waveforms of one or more running cycles, which can be set according to specific conditions, and then sample when the motor is running.

The following is a sampling example of commonly used parameters.

A. Speed loop setting and speed feedback monitoring

The speed of the motor is sampled while the motor is running continuously at 2000 rpm.



From the sampling results, it can be seen that the speed loop of the motor is given in line with the 2000 rpm condition we set. The speed feedback of the motor is around 2000 rpm, and there is a deviation of 15, which is a normal situation.

B. Current monitoring



Sampling the motor current waveform when the motor runs forward and reverse at 2000 rpm, 3 times overload, and no load. (Motor rated current 2.1A)

The results show that the peak current under this condition is only 0.9A.

C. Pulse command speed and position error monitoring



From the command speed curve and position error curve, the real-time situation of the command given by the host computer can be detected, and the corresponding time length of the motor in different states can be measured. Waiting time, time required to accelerate from 0 to specified speed, time to run at specified speed, time to decelerate from specified speed to 0. In the actual situation, if the monitored position error curve fluctuates greatly, the corresponding parameters can be adjusted according to the curve.

D. Position given monitoring



The position given curve can detect the actual position of the motor. The above figure shows that the motor is always moving between two points. The constant value part of the red curve in the above figure is that the motor is always in the current position, and its area represents the time spent at the current position. The dwell time in the above figure is 994ms; the rising (falling) curve represents the movement from the starting point to the end point (the end point to the end point to 994ms). starting point), its length is the time for the motor to run a distance, the running time in the above figure is 1894ms.