



ZHAFIR

Fully Electrical Injection Molding Machine

Maintenance manual for VE series

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NINGBO ZHAFIR VENUS series fully electrical injection molding machine maintenance handbook

Preface

This handbook is specially used as an instruction of repairing key components of fully electrical injection molding machinnes, including servo motor, synchronization belt and synchronization wheel, servo inverter, PLC(C-IPC) and other key components.

Compared to hydraulic machines, the fully electrical injection molding machine has essential differences. Its highly precision and special requirements on shielding demand maintenance strictly under this handbook to do step by step very carefully. Even an oversight in any step or parameter might issue in whole system losses. If any accidental problem doesn't been explained in this handbook, please contact our technical engineers.

Notice

- Before any exchanging of related components, please do confirm the code, type and parameters, in order to make sure that they are the same components.
- 2 During exchanging, please be careful and patient. Any careless or wrong operation may lead bad effects on the machine or even cause broken of related components.
- 3. Fully electrical molding machine EMChas very high requires, so it makes shielding grounding wire revert to type, while exchanging the components. Any question, please consult with our technical engineers. Please do not neglect any detail notice.
- 4. After exchanging, it needs to find out the servo motor reference, so it is better for maintainers to learn some computer knowledge, and with some operation experience.
- 5. While exchanging of related components of Sigmatek controller, please ensure out of electric power. Do not touch the live plug. Meanwhile, please treat components carefully and keep them clean.

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Chapter 1 Summary and Components Introduction

1.1 Introduction of control principles of fully electrical injection molding machine

Control components of fully electrical injection molding machine contain human-machine interface, logic controller, C-IPC, servo drivers, temperature controller and sensor. Fully electrical injection molding machine controls the whole machine by servo inverters, then drive servo motors, and drive synchronization wheels by synchronization belts, at last drive ballscrews to work.



Fig 1.1 Illustrative diagram of the controller

1.2 Introduction of control components of fully

electrical injection molding machine

From fig 1.1, we can separate a whole machine into following key components: controller, servo inverter, servo motor, synchronization belt, synchronization wheel and ballscrews. Referring to Zhafir's fully electrical injection molding machine, they are Sigmatek controller (human-machine interface and C-IPC) KEB inverter, servo motor, synchronization belt, synchronization wheel and ballscrews.



Fig 1.2(1) Sigmatek human-machine interface (touchable display and keyboard)

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Fig 1.2(2) C-IPC



Fig 1.2(3) DKI module



Fig 1.2(4) KEB inverter

Chapter 2 Motor Malfunctions

2.1 Basic steps of changing the motor

- 1、 Take down the broken servo-motor;
- 2、Install a new servo-motor;
- 3、Connect KEB inverter;
- 4、Test the servo-motor and adjust the rotation direction;
- 5. Install synchronous-belt and adjust the tension;
- 6、 Check the mechanical reference;
- 7、Trial run of whole machine;
- 8、Finish.

2.2 Concrete operations

2.2.1 Dismantle the motor from full-electric injection molding

machine

1. Below sketch shows how to install a motor on the fully electrical injection molding machine

At least four servo-motors and two normal motors install on one fully electrical injection molding machine, including:

①Clamping servo-motor ②Plastification servo-motor ③Carriage motor ④Ejector servo-motor ⑤Injection servo-motor ⑥Mold adjusting motor

Take VE900 for example to explain position of these motors (As other types are different, circumstances alter cases):



Fig 2.2.1(1) Motor Layout (1)



Fig 2.2.1(2) Motor Layout (2)

2. Installation drawing of servo-motor on full-electric injection molding machine (1). Clamping unit



Fig 2.2.1(3) Clamping unit



(2)、Plastification unit

Fig 2.2.1(5) Ejector unit



(4), Injection unit

Fig 2.2.1(6) Injection unit

3、Dismantle synchronous-belt and servo-motor

Take the clamping servo-motor for example to explain the process of dismantle synchronous-belt and servo-motor.

(1)、Clamping servo-motor

Step 1: Dismantle safety cover and gear protection cover



① Dismantle rear cover



② Dismantle gear protection cover

Step2: Dismantle synchronous-belt



1 Loosen adjusting screw nuts



③Loosen flange connection bolts



⑤Push clamping motor to the machine to loosen synchronous-belt

Step3: Dismantle motor



2 Loosen tension adjusting bolts



(4) Loosen cover bolts remove gear cover



⁽⁶⁾Take out the synchronous-belt slowly and softly



 $(1)\mbox{Dismantle synchronous-belt with wheel}$



② Dismantle tension adjusting bolts (2 pieces)



③ Dismantle flange installation ground, bolts(4 pieces)



 ④ Take down the motor and place on flat then dismantle motor installation bolts (4pieces), and at last take out the motor

- (2) $\$ Plastification servo-motor
- Step1: Dismantle safety cover;

Step2: Dismantle synchronous belt.

Because of same construct, the dismantle method is the same as above. About assembly codes, please see Fig 2.2.1(4) plastification unit

1) Loosen adjusting nuts10 (2 pieces);

2 Loosen tension adjusting bolts 11(2 pieces);

③ Loosen flange connection bolts 8(4pieces);

④ Loosen cover bolts 9 (3 pieces); remove gear cover 5;

⑤ Push plastification motor 1 to the machine to loosen synchronous-belt;

(6) Take out the synchronous-belt 2 slowly and softly.

Step3: Dismantle motor

- ① Dismantle synchronous-belt with wheel 3
- 2 Dismantle tension adjusting bolts 11 (2 pieces);

③ Dismantle flange installation bolt 8 (4 pieces);

④ Take down the motor 1 and place on flat ground, then dismantle motor installation bolts 7, and at last separate the motor from flange.

(3)、Ejector servo-motor

Step1: Dismantle safety cover;

Step2: Dismantle synchronous belt.

Because of same construct, the dismantle method is the same as above.

About assembly codes, please see Fig 2.2.1(6) ejector unit

1) Loosen adjusting nuts10 (2 pieces);

2 Loosen tension adjusting bolts 11(2 pieces);

③ Loosen flange connection bolts 8(4pieces);

- ④ Loosen cover bolts 9 (3 pieces); remove gear cover 5;
- ⑤ Push plastification motor 1 to the machine to loosen synchronous-belt;
- (6) Take out the synchronous-belt 2 slowly and softly.
- Step3: Dismantle motor
- (1) Dismantle synchronous-belt with wheel 3 $\,$
- 2 Dismantle tension adjusting bolts 11 (2 pieces);
- ③ Dismantle flange installation bolt 8 (4 pieces);

④ Take down the motor 1 and place on flat ground, then dismantle motor installation bolts 7, and at last separate the motor from flange.

(4), Injection servo-motor

Because of same construct, the dismantle method is the same as above.

About assembly codes, please see 2.2.1(7) injection unit

Step1: Dismantle safety cover;

Step2: Dismantle synchronous belt

① Loosen adjusting nuts10 (2 pieces);

② Loosen tension adjusting bolts 11(2 pieces);

③ Loosen flange connection bolts 8(4pieces);

④ Loosen cover bolts 9 (3 pieces); remove gear cover 5;

⑤ Push plastification motor 1 to the machine to loosen synchronous-belt;

(6) Take out the synchronous-belt 2 slowly and softly.

Step3: Dismantle motor

(1) Dismantle synchronous-belt with wheel 3 $\,$

2 Dismantle tension adjusting bolts 11 (2 pieces);

③ Dismantle flange installation bolt 8 (4 pieces);

④ Take down the motor 1 and place on flat ground, then dismantle motor installation bolts 7, and at last separate the motor from flange.



4、Mold adjusting motor

Fig 2.2.1(8) Mold height adjusting equipments

Because of same construct, the dismantle method is the same as above. About assembly codes, please see Fig 2.2.1(8) mold height adjusting equipments

Step1: Dismantle safety cover;

Step2: Dismantle motor

- ① Screw off bolts9 (3 pieces);
- 2) Take down gear cover5 and mold height Gear3;
- ③ Screw off flange installation bolts8 (4 pieces);
- ④ Place motor1 and flange6 on ground carefully;
- ⑤ Dismantle motor installation bolts7, then separate motor from flange.
- 5、Attentions

(1)、 Attentions of dismantling synchronous-belt.

A、Make sure that synchronous-belt has been loosened before dismantling. Do not draw it hard.

B、Keep both hands clean while dismantling the synchronous-belt. Greasy hands must not touch the synchronous-belt.

C、Dismantled synchronous-belt should be placed carefully. No twist.

(2), Attentions of dismantling motor.

A、Please pay attention to dismantle motor, especially to dismantle flange installation bolts which connect motor with the machine.

B、Place the motor gently to avoid unnecessary damages.

(3)、Attentions of dismantling synchronous-belt gear.

A、 If synchronous-belt gear is too tight to take out by hands, on the premise of not to damage the gear, can use other assistant equipments, hard hammers or some other hard stuffs are forbidden. (A rubber hammer is recommended.)

2.2.2 Install a new servo-motor

1、Clamping servo-motor.



①Install motor installation bolts7 (4 pieces)



②Install flange connect bolts8 (4 pieces)

2、Plastification servo-motor

Because of same construct, the dismantle method is the same as above.

About assembly codes, please see Fig 2.2.1(4) plastification unit.

① Install motor installation bolts7 (4 pieces)

2 Install flange connect bolts8 (4 pieces)

3、Ejector servo-motor

Because of same construct, the dismantle method is the same as above. About assembly codes, please see Fig 2.2.1 (6) ejector unit.

① Install motor installation bolts7 (4 pieces)

2 Install flange connect bolts8 (4 pieces)

4、Injection servo-motor

Because of same construct, the dismantle method is the same as above.

About assembly codes, please see Fig 2.2.1 (7) injection unit.

① Install motor installation bolts7 (4 pieces)

2 Install flange connect bolts8 (4 pieces)

5、Mold height adjusting motor

Because of same construct, the dismantle method is the same as above.

About assembly codes, please see Fig 2.2.1 (8) mold height adjusting equipments.

① Install motor installation bolts7 (4 pieces)

2 Install flange connect bolts8 (4 pieces)

2.2.3 Search for the servo motor's reference by a laptop

Steps:

- 1、Electrify;
- 2、Connect KEB inverter with a laptop;
- 3、Search for the reference of servo motor;
- 4、Warnings and solutions of searching for the reference.

Detail explanations

1、Electrify

First, make sure all electric down-leads of the full-electrical injection molding machine are well-connected. Then turn on the air on-off in the right front of the machine. (Notice: Do not turn on the motor when the machine starts.)

2、Connect KEB inverter with a laptop

(1)、 Connect DKI module with an end of HSP5 line, see fig 2.2.3(2).

(2) Connect serial port of the laptop with the other end of HSP5 line, see fig 2.2.3(3).

Get hardware connection between the laptop and KEB inverter.



(3), Double click the shortcut \bigcirc on the desktop to open the software.

(4), Get software connection between the laptop and KEB inverter, see fig 2.2.3(5).



Fig2.2.3(1) HSP5 line



Fig2.2.3(2) Connect the DKI module with an end of HSP5 line



Fig2.2.3(3) Connect the serial port of a laptop with the other end of HSP5 line



Fig2.2.3 (4) be connected

COMBIVIS 5 - New project UNR	EGISTERE	D DEMO VERSION - only	for evaluation !!
<u>File E</u> dit <u>V</u> iew <u>P</u> roject-explorer <u>H</u> elp			
	Q	ž 🙆 🚡 🖪 🖷	a,
😫 Project-explorer - New project			
Dew project	Parameter	list Group properties	
Node 0		Name:	Value:
Inverter parameter	10.	inverter state	12: power unit pot readu
R ru: run parameter	1000	set value display	0.000.1/min
op: operational parameter	1001	set value display	0.000 1/min
P protection parameter	1002	actual frequencu displau	0.0000 Hz
	1000	actual value display	0.0001/min
B uf: u/f parameter	ru09	encoder 1 speed	0.000 1/min
D dr: drive parameter	ru10	encoder 2 speed	0.000 1/min
cn: control parameter	ru11	set torque display	0.00 Nm
E ec: encoder parameter	ru12	actual torque display	0.00 Nm
U ud: user definition para.	ru13	actual utilization	0%
F fr: free programmable para.	ru14	peak utilization	0%
A an: analog I/U parameter	ru15	apparent current	0.0 A
Gi digital input parameter	ru16	peak apparent current	0.0 A
	ru17	active current	0.0 A
B ns: pos/syn parameter	ru18	actual DC voltage	0∨
In: information parameter	ru19	peak DC voltage	0∨
V sy: system parameter	ru20	output voltage	0∨
Z aa: adjustment assist, para.	ru21	input terminal state	1: ST
pp: prog. parameter	ru22	internal input state	1: ST
🛛 🖹 Work lists	ru23	output condition state	4: C2
🗠 🔁 Download lists	ru24	state of output flags	4: F2
🔤 🚧 Scope files	ru25	output terminal state	4: B1
Additional files	ru26	active parameter set	0
All linked files	ru27	AN1 pre amplifier disp.	-0.1 %
	ru28	AN1 post amplifier disp.	0.0 %
	ru29	AN2 pre amplifier disp.	0.0 %

Fig2.2.3(5) Get software connection between the laptop and KEB inverter

3、 Search for the reference of servo motor

Main steps including:

- (1)、 Reset the KEB inverter (set up the control bit, **di02=**0).
- (2)、Electrify

(3) Input start codes to search for the reference. (Set up parameter **Ec02** to 2206)

- (4)、 Set up KEB inverter to work state (clear the inverter's control bit, di02=1)
- (5)、 Observe the state to the end of searching.
- (6)、Reset the KEB inverter (set the inverter's control bit to zero, di02=0).

Detail explanations as below:

(1)、Reset the KEB inverter

Set up the control bit, di02=0

A、Set up parameter **di** (see fig2.2.3(6)).

Click parameter **di** on the left of below dialog box.

💁 Project-explorer - New project					
New project	Parameter	list Group properties			
Vode U	ID:	Name:	Value:		
Inverter parameter	di00	PNP / NPN selection	0: PNP		
0 op: operational parameter	di01	select signal source	1: ST		
P pn: protection parameter	di02	digital input setting	1: ST		
C cs: control speed parameter	di03	digital noise filter	0 ms		
S ds: drive spec. control para	di04	input logic	0: no input		
B uf: u/f parameter	di05	input trigger	0: no input		
D dr: drive parameter	di06	select strobe source	0: no input		
N cn: control parameter	di07	strobe mode	0: pos. slope		
E ec: encoder parameter	di08	input strobe dependence	0: no input		
	di09	reset input selection	3: ST+RST		
F fr: free programmable para.	di10	neg slope f.reset inputs	3: ST+RST		
	di11	11 functions	1: sf1		
	di12	12 functions	2: sf2		
	di13	13 functions	8192: ef		
	di14	14 functions	0: no function selected		
in: information parameter	di15	IA functions	0: no function selected		
	190	ID C C	• · · · · · ·		

Fig2.2.3(6) Click di parameter

B、Set up parameter **di02** to zero (see fig2.2.3(7)).

Double click parameter $di02 \rightarrow$ input zero to the value box \rightarrow click OK.



Fig2.2.3(7) set up parameter di02 to zero

(2)、Electrify

Turn on "motor on" on the controller to let the driver work.

(3) Input start codes to search for the reference. (Set up parameter **Ec02** to 2206)

A. Set up parameter **Ec** (see fig2.2.3(8)).

Click Ec on the left of below dialog box.

💐 Project-explorer - New project					
New project	Parameter	ist Group properties			
Node U	ID:	Name:	Value:		
Inverter parameter R ru: run parameter O op: operational parameter P pn: protection parameter C cs: control speed parameter S ds: drive spec. control para B uf: u/f parameter D dr: drive parameter C cn: control parameter C d: drive parameter	ID: Ec00 Ec01 Ec02 Ec03 Ec04 Ec05 Ec06 Ec07 Ec10 Ec11	Name: encoder 1 interface encoder 1 (inc/r) absolute pos. enc.1 time 1 for speed calc. gear 1 numerator gear 1 determinator enc.1 rotation enc.1 trigger/mult. encoder 2 interface encoder 2 (inc/r)	Value: 19: Resolver Interface 1024: 1024 inc 57057 3: 4,0 ms 1000 1000 0: not invers+off 2: 4 times 2: Incremental Out 1024: 1024 inc		
Fr: free programmable para. Fr: free programmable para. An: analog I/O parameter G di: digital input parameter G di: digital output parameter L le: level parameter Fr ps: pos/syn parameter I in: information parameter	Ec11 Ec12 Ec13 Ec14 Ec15 Ec16 Ec17	encoder 2 (inc/r) absolute pos. enc. 2 time 2 for speed calc. gear 2 numerator gear 2 determinator enc.2 rotation enc.2 trigger/mult.	1024: 1024 inc 57057 3: 4,0 ms 1000 1000 0: not invers+off 2: 4 times		

Fig2.2.3(8) set up parameter **Ec**

B、Set up parameter Ec02 2206 (see fig2.2.3(9))

Double click parameter $Ec \rightarrow input 2206$ to the value box $\rightarrow click OK$.

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Fig2.2.3(9) set up parameter Ec02 to 2206

(4)、Set up KEB inverter to work state

Clear the inverter's control bit, di02=1

Then the inverter is ready to work.

A、Set up parameter di (see fig2.2.3(10)).

Click the parameter di in the left of dialog box.

🛃 Project-explorer - New project					
New project	Parameter	list Group properties			
Node 0	ID:	Name:	Value:		
	di00	PNP / NPN selection	0: PNP		
O op: operational parameter	di01	select signal source	1: ST		
P pn: protection parameter	di02	digital input setting	0: no input		
C cs: control speed parameter	di03	digital noise filter	0 ms		
	di04	input logic	0: no input		
B uf: u/f parameter	di05	input trigger	0: no input		
D dr: drive parameter	di06	select strobe source	0: no input		
n: control parameter	di07	strobe mode	0: pos. slope		
E ec: encoder parameter	di08	input strobe dependence	0: no input		
ud: user definition para.	di09	reset input selection	3: ST+RST		
II. nee programmable para.	di10	neg slope f.reset inputs	3: ST+RST		
	di11	11 functions	1: sf1		
T do: digital outout parameter	di12	12 functions	2: sf2		
le: level parameter	di13	13 functions	8192: ef		
	di14	14 functions	0: no function selected		
in information parameter	di15	IA functions	0: no function selected		

Fig2.2.3(10) set up the parameter di

B、Set the parameter di02 1 (as the fig2.2.3(11)).

Double click parameter $di02 \rightarrow input$ 1 to the dialog box \rightarrow click the OK button.

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Fig2.2.3(11) set up parameter di02 to 1

(5), Observe the state to the end of searching.

The state of searching for zero can be judged by observing parameter as following:

Parameter	Parameter's content	Parameter's state
ru00	inverter state	calculate drive data
ru15	apparent current	Increase from zero to the
		rated current
EC02	absolute pos. enc.1	Changing

Table2.2.3(1) parameters in searching

The inverter works well when actual parameters are the same as table 2.2.3(1). After a while (about 20 or 30 seconds), observe parameter **Ec02**. It is the reference of the inverter' software when parameter **Ec02** is fixed.

(6)、Reset the KEB inverter (set the inverter's control bit to zero, **di02=**0). Operate following step 1.

2.2.4 Trial test of servo motor

Steps:

- 1、Cut off communication with the controller;
- 2、Low speed test;
- 3、High speed test;
- 4、 Resume communication with the controller;
- 5、Warnings and solutions in this course.

Detail explanations

1、Cut off communication with the controller

Set up parameter Sy24 –1. Cut off communication with the controller. A, Set up the parameter Sy24 (see fig2.2.4(1)).



Fig2.2.4(1) set up parameter Sy24



Fig2.2.4(2) set up parameter Sy24 -1

2、Low speed test

(1)、Set up parameter oP03 50. It means let the motor rotate 50 rotations per

minute.

A、 Click parameter **op** (see fig2.2.4(3)).

👱 Project-explorer - New project					
New project	Parameter	ist Group properties			
Node 0	ID:	Name:	Value:		
Inverter parameter	▶ oP00	reference source	0: analog REF		
0 op: operational parameter	▶ oP01	rotation source	7: reference, no LS		
P pn: protection parameter	▶ oP02	rotation setting	0: low speed		
C cs: control speed parameter	▶ oP03	reference setting	0.000 1/min		
	▶ oP05	reference setting %	0.0 %		
B uf: u/f parameter	▶ oP06	min. reference forward	0.000 1/min		
D dr: drive parameter	▶ oP07	min, reference reverse	-1: = forward parameter		
	▶ oP10	max. reference forward	2100.000 1/min		
E ec: encoder parameter	▶ oP11	max. reference reverse	-1: = forward parameter		
	▶ oP14	abs. max. reference for	4000.000 1/min		
F: free programmable para.	▶ oP15	abs. max. reference rev	-1: = forward parameter		
An analog I/U parameter	▶ oP18	step value rot, source	7: reference, no LS		
Gi: digital input parameter	oP19	step value input sel. 1	16: 11		
	oP20	step value input sel. 2	32: 12		
Fig2.2.4	(3) click	parameter op			
B、Set up parameter oP03 50 (see fig2.2.4(4)).					



- Fig2.2.4(4) set up parameter **oP03** 50
- (2)、 Set up KEB inverter to work state (clear inverter's control bit, di02=1).
 - A、Click parameter di (see fig2.2.4(5)).
 - B、Set up parameter di02 1(see fig2.2.4(6)).

💁 Project-explorer - New project					
New project	Parameter	list Group properties			
Node 0	ID:	Name:	Value:		
Inverter parameter	di00	PNP / NPN selection	0: PNP		
	di01	select signal source	1: ST		
P pr: protection parameter	di02	digital input setting	0: no input		
C cs: control speed parameter	di03	digital noise filter	0 ms		
	di04	input logic	0: no input		
B uf: u/f parameter	di05	input trigger	0: no input		
D dr: drive parameter	di06	select strobe source	0: no input		
	di07	strobe mode	0: pos. slope		
E ec: encoder parameter	di08	input strobe dependence	0: no input		
U ud: user definition para.	di09	reset input selection	3: ST+RST		
F rr: rree programmable para.	di10	neg slope f.reset inputs	3: ST+RST		
R dia diatal input parameter	di11	11 functions	1: sf1		
TL do: digital output parameter	di12	12 functions	2: sf2		
	di13	13 functions	8192: ef		
	di14	14 functions	0: no function selected		
	di15	IA functions	0: no function selected		

Fig2.2.4(5) click parameter di



Fig2.2.4(6) set up parameter di02 1

(3)、 Observe the state of motor

When the inverter is in working state, servo motor starts to run. We can

Parameter	Parameter's content	Parameter's state		
ru00	Inverter state	forward constant		
ru02	Ramp output display	Fifty		
ru09	Encoder 1 speed	About fifty		
ru15	Apparent current	Infinitesimal current		

observe the state of motor by parameters as following:

Table 2.2.4(1) parameters of working motor

Servo motor and inverter work well when actual parameters are the same as table 2.2.4(1).

(4), Set up rotation direction of the motor.

Observe rotation direction of the motor from the side of axial direction when the motor works at low speed.

Fig 2.2.4(7) shows concept of the axial direction:



Fig 2.2.4(7) concept of the axial direction

If the rotation direction isn't correct, adjust parameter Ec06

motor	axial direction				
	VE600	VE900	VE1200	VE1500	VE4100
Inject servo motor	anticlockwise	anticlockwise	anticlockwise	anticlockwise	anticlockwise
Mould servo motor	anticlockwise	anticlockwise	anticlockwise	anticlockwise	anticlockwise
Charge servo motor	clockwise	clockwise	clockwise	clockwise	Clockwise
Eject servo motor	clockwise	anticlockwise	anticlockwise	anticlockwise	anticlockwise

Table 2.2.4(2) axial directions of different motors

Set-up steps:

i $\$ Reset the KEB inverter (set up parameter di02 to zero). A $\$ Click parameter di (see fig 2.2.4(8)).



Fig 2.2.4(8) click parameter di





Fig2.2.4(9) set up parameter di02 to zero

- ii 、Set up parameter Ec06.
- A、Click parameter Ec.

👱 Project-explorer - New project			
New project	Parameter list Group properties		
Node U	ID:	Name:	Value:
R ru: run parameter	Ec00	encoder 1 interface	19: Resolver Interface
op: operational parameter	Ec01	encoder 1 (inc/r)	1024: 1024 inc
P pn: protection parameter	Ec02	absolute pos. enc.1	57057
cs: control speed parameter	Ec03	time 1 for speed calc.	3: 4,0 ms
	Ec04	gear 1 numerator	1000
	Ec05	gear 1 determinator	1000
dr: drive parameter	Ec06	enc.1 rotation	0: not invers+off
	Ec07	enc.1 trigger/mult.	2: 4 times
E ec: encoder parameter	Ec10	encoder 2 interface	2: Incremental Out
ud: user definition para.	Ec11	encoder 2 (inc/r)	1024: 1024 inc
In: tree programmable para.	Ec12	absolute pos. enc. 2	57057
an: anaiog i/U parameter	Ec13	time 2 for speed calc.	3: 4,0 ms
di: digital input parameter	Ec14	gear 2 numerator	1000
	Ec15	gear 2 determinator	1000
B ns: nos/sun parameter	Ec16	enc.2 rotation	0: not invers+off
	Ec17	enc.2 trigger/mult.	2: 4 times
		· ·	· - ·

Fig 2.2.4(10) click the parameter ec

B、 Double click parameter **Ec06** \rightarrow change state of the inverter system (change on to off or change off to on) \rightarrow click OK (see fig2.2.4 (11)).





$\rm iii$. Set up the inverter to working state (set up parameter di02 to zero).

A、Click parameter **di** (see fig 2.2.4(12)).

🚉 Project-explorer - New project				
New project	Parameter list Group properties			
New project Node 0 Inverter parameter Inverter parameter parameter Inverter parameter parameter Inverter parameter parameter Inverter parameter parameter parameter Inverter parameter paramete	Parameter ID: di00 di01 di02 di03 di04 di05 di06 di07 di08 di09 di10	Ist Group properties Name: PNP / NPN selection select signal source digital input setting digital input setting digital input setting digital noise filter input logic input logic select strobe source strobe mode input strobe dependence reset input selection neg slope f.reset inputs	Value: 0: PNP 1: ST 0: no input 0 ms 0: no input 0: no input 0: no input 0: no input 0: no s. slope 0: no input 3: ST+RST 3: ST+RST	
di: digital input parameter do: digital output parameter le: level parameter H ps: pos/syn parameter	di11 di12 di13 di14 di15	11 functions 12 functions 13 functions 14 functions 1A functions	1: sf1 2: sf2 8192: ef 0: no function selected 0: no function selected	

Fig 2.2.4(12) click parameter di

B_{\sim} Set up parameter **di02** 1(see fig2.2.4 (13)).



Fig 2.2.4(13) set the parameter di02 one

 $\operatorname{iv}_{\times}$ Make sure the motor rotates in correct direction.

(5), Finish the low speed test.

😫 Project-explorer - New projec 🛅 New project Parameter list Group properties 🥒 Node 0 ID: Value: Name: Inverter parameter ▶ oP00 2: digital abs (op.3) reference source R ru: run parameter oP01 7: reference, no LS rotation source O op: operational parameter oP02 0: low speed rotation setting P pn: protection parameter oP03 reference setting 50.000 1/min Þ C cs: control speed parameter S ds: drive spec. control para oP05 reference setting % 0.0% ► B uf: u/f parameter oP06 min. reference forward 0.000 1/min D dr: drive parameter oP07 min, reference reverse -1: = forward parameter N cn: control parameter ۲ oP10 may reference forward 1500.000.1/min E ec: encoder parameter oF Edit value x Þ • U ud: user definition para. oP03 reference setting ; Inv. 0 ; Set I 🕨 of F fr: free programmable para. 0 Þ of • A an: analog I/O parameter 🕨 oF 4 ۲ G di: digital input parameter oF I do: digital output parameter oF L le: level parameter 🕨 oF 🧹 Ok X Cancel H ps: pos/syn parameter 🕨 oF I in: information parameter oP23 step value 3 0.000 1/min 🔍 su: sustem narameter

Click parameter 'op'. Set up parameter oP03 to zero. Stop the motor. (See fig2.2.4(14)).

Fig 2.2.4(14) set up parameter oP03 zero

3、High speed test

Refer to steps 2 in low speed test to set up parameter **oP03**, and test servo motor in high speed.

(1)、 Run the servo motor in high speed (500r/m).

Click parameter op. Set up parameter oP03 to 500. (See fig2.2.4(15)).





Observe parameters as following:

Parameter	Parameter's content	Parameter's state
ru00	inverter state	forward constant
ru02	ramp output display	500
ru09	encoder 1 speed	About 500
ru15	apparent current	Infinitesimal current

Table 2.2.4(3) observe the parameters in a high speed

The servo motor works in normal state if no shake and abnormal noises.

(2)、 Let the motor work in rated speed. (**oP03=dr24**).

A、Click parameter dr. Observe dr24. (See fig2.2.4(16))

👱 Project-explorer - New project					
New project	Parameter	list Group properties			
Node 0	ID:	Name:	Value:		
	dr15 dr23	max torque FU DSM rated current	131.31 Nm 15.9 A		
P pr: protection parameter	dr24	DSM rated speed	1200 1/min		
C cs: control speed parameter	dr25	DSM rated frequency	80.0 Hz		
S ds: drive spec. control para	dr26	DSM EMK voltage constant	376		
B uf: u/f parameter	dr27	DSM rated torque	60.0 Nm		
D dr: drive parameter	dr28	DSM curr. f. zero speed	18.5 A		
	dr30	DSM stator resistance	1.091 Ohm		
E ec: encoder parameter	dr31	DSM inductance	17.14 mH		
ud: user definition para.	dr32	DSM rated power	7.53 kW		
F: free programmable para.	dr33	DSM max. torque	130.0 Nm		
An: analog I/O parameter	dr34	mot.prot. time 300% Id	0.5 s		
G di: digital input parameter	dr35	mot.prot. time Imax	0.2 s		
[1] do: digital output parameter	dr36	mot.prot. recovery time	5.0 s		

Fig 2.2.4(16) click parameter **dr24**

B、Click parameter **op**. Set parameter **oP03** and parameter **dr24** equivalent (see fig 2.2.4(17))

🖳 Project-explorer - New project				
New project	Parameter list Group properties			
Node 0	ID: Name:	Value:		
Inverter parameter Inverter parameter Inverter parameter O op: operational parameter O op: operational parameter	 oP00 reference source oP01 rotation source oP02 rotation setting 	2: digital abs (op.3) 7: reference, no LS 0: low speed		
C cs: control speed parameter	 oP03 reference setting 	0.000 1/min		
C cs: control speed parameter S ds: drive spec. control para Uf: u/f parameter O dr: drive parameter C cn: control parameter C cn: control parameter C cn: control parameter U ud: user definition para. F fr: free programmable para. F fr: free programmable para. G di: digital input parameter G di: digital output param	 oP03 reference setting oP05 reference setting % oP05 reference setting % oP06 min. reference forward oP07 min. reference reverse oP10 max reference forward oP07 televence forward <l< td=""></l<>			
·····[H] ps: pos/syn parameter ·····[] in: information parameter ·····[Y] sy: system parameter	or	0.000 1/min		

Fig 2.2.4(17) set the parameter **oP03** as the same as the parameter **dr24**

(3)、 If no abnormal, the servo motor will work normally.

4、Resume communication with the control

Click parameter **sy.** Set up parameter **sy** 0303h. (See fig2.2.4(18)) Double click parameter **Sy24** \rightarrow Input 0303h to the value box \rightarrow Click OK





2.2.5 Search for the motor's reference and trial test running of

the motor by Sigmatek controller

Notice

Please make sure the synchronous belt is off before searching or will cause serious ecological consequences.

$I \space{-1mu}$ Search for the motor reference by Sigmatek controller

Main steps of searching for the motor reference of VENUS:

- 1、 Electrify
- 2、 Search for the motor's reference.

Detail explanations:

- 1、Electrify
- (1) Weak electricity on

Make sure there are no short-curcuit on the whole electric circuitry, then turn on the switch of chief line on the front of the machine. See fig2.2.5(1).



Fig 2.2.5(1)

Notice: Don't press 'motor on' on the keyboard when power is on.

(2) Force electricity on

Under the situation that all I/O signals are normal, turn on two bottons [heat on] and [motor on] on the keyboard. See fig 2.2.5(2).



图 2.2.5(2)

Notice:

In order to ensure the injection part on fully electrical injection machine safe, the programmes include security designs of injection and storing parts that demand VENUS has to meet two requirements as below.

① If the tempreture deviation between the setted value and current value is within the allowed scope or not. See fig 2.2.5(3) in which the tempreture has reached the setted one.

② Screw cold boot to prevent delay time to the setted one. See fig2.2.5(4) in which the delay time is 100s. Then start the inverter.

See fig2.2.5(5), if the inverter enables, then [inverter on] lights on; otherwise, [inverter on] lights off.
Manu	ial				Barrel He	ating	Cycle Mold: Cycle Time:	0 0.00 s	Login
	193.2	198.1	199.8	203.7	195.3	,,,,,,	<u>111111</u>	38.1	
C°	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5			Hopper	
SET	200.0	200.0	200.0	200.0	200.0			35.0	
REAL	193.2	198.1	199.8	203.7	195.3			38.1	-
MAX +	10.0	10.0	10.0	10.0	10.0			10.0	Para
MIN -	10.0	10.0	10.0	10.0	10.0			10.0	2000
MODE	PID	PID	PID	PID	PID				Tuning
STANDBY	150.0	150.0	150.0	150.0	150.0				
STATUS				_	•			•	Barrel
ALARM									
Standby M	Mode Off)	St St	andby Time	100.00	0.00 mi	n			Schedule
Setup	Heating		np	nject	<mark>)</mark> ର Product	Mold Info	Overview	Alarm Pa	"/~ arameter
Alarm								18:49:12	18.12.07

Fig 2.2.5(3)



Fig 2.2.5(4)



Fig 2.2.5(5)

2、 Search for the motor's reference.

(1) Start searching

Click 'update' on 'inject KEB parameter' menu, with green lights on. Then click the button 'Motor Reference', and click 'start' in the dialog box to start searching. See fig 2.2.5(7)

Notice: Please check again that the belt is off, otherwise, it will cause serious damage to machine parts. Meanwhile, 'update' must be turned on with operators near by while searching.

(2) During searching

Fig 2.2.5(8) shows midway on searching and 2.2.5(9) shows the end of searching.

While searching, consult fig 2.2.5(6) to check if the searching process is normal and if the searching is finish.

Observing parameter **ru00**, while the value reaches 82, then it means reference starting.

(3) End of searching

Observe parameter **Ec02**. It is the reference of the inverter' software when parameter **Ec02** is fixed.

After searching, set di02=0, then set di02=1.

Turn off "motor off:

Turn on "motor on"

The reference searching is finish now.

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	82
Ru15	Apparent current	0——rated current
Ec02	absolute pos. enc.1	Dynamic changing

Fig 2.2.5(6)

Other 3 servo motors have the similar searching process, so do not describe here any more.

Manual		Injecti	on KEB Paramete	Cycle Mo	ld: 618	Login
		Injecti		Cycle Tim	ie: 0.00 s	5
Injection KEB Parame	ter	Injection KEB Param	ieter	Update	•	Cantrallar
ru00 Invert State	0	cs06 KP speed	2000	Reset KEB		Controller
ru01 Set Value Display	0 rpm	cs09 KI speed	700			
ru09 Encoder Speed	0 rom	cS19 Ahs Torque Ref	205.00 Nm	Motor Ref		Cpu Info
ru11 Set Torque Displ					×	
ru12 Actual Torque Di		M	lotor Reference			Special
ru15 Apparent Currunt						
ru17 Active Currunt		You must tak	e care of this conditions:			K-Mold
ru20 Output Voltage		- Motor has	to be free revolably	2		-
ru54 Actual Position		- Stay at the	e machine during motor r	eterence		K-Inject
Overspeed Protect		- Motor has	to be turned on			
			Start			32
Over Speed Offset						K-Eject
Over Speed Check Time						1
le04	0.00 rpm	Parameter Nr	030A	Read		K-Plast
doO4	0	Parameter Value	16400	Com		
			10400	Save		
				·		
				Sanda L		
Setup Heatin	ng Clamp	Inject P	Product Mold In	fo Overview	Alarm	Parameter
Alarm					12:59:33	11.12.07

Fig 2.2.5(7) dialog boxes of searching for the reference

Manual			Injection Kt	EB Parar	nete	er	Cycle Mo Cycle Tin	ild: ne:	618 0.00 s	Login	
Injection KEB Paramete	ər		Injection KEB Parameter				Update	0			1
ru00 Invert State	82		cs06 KP speed	2000			Bacat KER			Controlle	ər
ru01 Set Value Display	0	rpm	cs09 KI speed	700			Reserved				
ru09 Encoder Speed	0	rpm	cS19 Abs.Torque.Ref	205.00	Nm		Motor Ref			Cpu Info	ð
ru11 Set Torque Display	31.67	Nm	fr10 Load.Mot.Dependent.Para	0							1
ru12 Actual Torque Display	31.76	Nm	diO1 Select Signal Source	1						Special	1
ru15 Apparent Currunt	13.2	A	diO2 Digital Input Setting	1							
ru17 Active Currunt	13.3	A	ec00 Encoder Interface	16						K-Mold	
ru20 Output Voltage	12	v	ec01 Encoder(Inc/r)	512							
ru54 Actual Position	46640344		ec02 Absolute Position.Enc	44249							
Overspeed Protection F	, Parameter		ec06 Encoder Rotation	0						K-IIIject	-
			op03 Reference Setting	0	rpm					1	
Over Speed Offset	10									K-Eject	t
Over Speed Check Time	0.50									3	
leO4	0.00	rpm	Parameter Nr	030A			Read			K-Plast	ł
do04	0		Desemator Value	10.400							1
			Parameter value	16400			Save				
	-	_		_	_	_	_	_	_		
	1							4	1	Ĵ~~	
Setup Heating	g Cli	amp	Inject Produ	ct Mo	Id In	fo -	Overview	A	arm F	Parameter	ſ
Alarm								1	3:01:39	11.12.07	

Fig 2.2.5(8) midway on searching

Manual			Injection K	EB Parar	mete	er	Cycle Mo	old:	618	Login
	_	_					Cycle Tin	ne:	0.00 s	
Injection KEB Paramete	ər		Injection KEB Parameter] [Update	•		
ru00 Invert State	82		cs06 KP speed	2000	1		Reset KEB			Controller
ru01 Set Value Display	0	rpm	cs09 KI speed	700	-					
ru09 Encoder Speed	0	rpm	cS19 Abs.Torque.Ref	205.00	Nm		Motor Ref			Cpu Info
ru11 Set Torque Display	72.00	Nm	fr10 Load.Mot.Dependent.Para	0						
ru12 Actual Torque Display	72.00	Nm	diO1 Select Signal Source	1						Special
ru15 Apparent Currunt	29.9	A	diO2 Digital Input Setting	1						-
ru17 Active Currunt	29.9	A	ec00 Encoder Interface	1680000010	Ī					K-Mold
ru20 Output Voltage	16	v	ec01 Encoder(Inc/r)	512						-
ru54 Actual Position	46640343		ec02 Absolute Position.Enc	44246						K-Inject
Overspeed Protection F	Parameter		ec06 Encoder Rotation	0						TK Injour
			op03 Reference Setting	0	rpm					1
Over Speed Offset	10									K-Eject
Over Speed Check Time	0.50									3
leO4	0.00	rpm	Parameter Nr	030A	1		Read			K-Plast
do04	0		Decementar Value	40.400	-					
			Falameter value	16400			Save			
						-				
	-	_		_	_	_		_	_	
		51			•		STORE.			
Setup Heating	g Ci	amp	Inject Produ	ct Mo	ld Ir	nfo	Overview	A	arm I	Parameter
Alarm								1	3:02:15	11.12.07

Fig 2.2.5(9) the end of searching

$\mathrm{II}\,\smallsetminus\,$ Test running of the servo motor

Venus has 4 servo motors in all. Here, mainly introduce test running process of the injection servo motor, while other three are similar.

(1)、 Test running of the injection servo motor

Steps as following:

- 1. Return to mechanical reference
- 2. Test running at low speed
- 3. Test running at middle speed
- 4. Test running at high speed

1、Return to mechanical reference

Enter into menu "Zero Setting". Choose "On" in the dialog of "Zero Status", and then click "Zero End" of "Injection Axis" with "Encoder Value" to 0.00mm. See fig 2.2.5(10).

Manual	Zero Setting Cycle Mold: 618 Login	n
Move Reference	Cycle Time: 0.00 s 5	5
Zero Setup	Screw Parameter	ng 1
Zero Status On 🗸	Screw Diameter 32.00 mm	,
Speed 1.0 %	Max Injection Force 161.0 KN 8.05 V Settin	ng 2
Force 10.0 %	Max Holding Force 128.8 KN 6.44 V	ce 1
Servo Axis Zero Confirm Encoder Value Position	Standard Load Cell 200.0 KN	
Injection Axis Zero End 46640341 0.00 mm	Load Cell 0.00 V 0.0 KN Source	ce 2
Mold Axis Zero End 1060167435 2.95 mm	Load Cell Zero 0.31 V Mon	itor
Ejector Axis Zero End 20564433 0.00 mm	Injection Pressure 0.05 Mpa	1
Mold Adjust Axis Zero End 0 0.00 mm	Act Charge Axis Torque 0.00 Nm 0.0 %	Set
Dias Bus	Act Clamp Axis Torque 0.00 Nm 0.0 % Prin	5 iter
Bus Statistic 29	Act Eject Axis Torque 0.00 Nm 0.0 %	a1
	Act Inject Axis Torque 0.00 Nm 0.0 %	>
Setup Heating Clamp	Product Mold Info Overview Alarm Parame	ter
Alarm	13:03:53 11.12.07	

Fig 2.2.5(10)

2、Test running at low speed

(1) "Suck back" settings

Enter into menu 'Charge'. Set up 'Zones' to '1', then set up 'SE' to maximal. (For this machine the maximal injection stroke is 115mm)

Next set up the suck back speed to 15mm/s (We set 10% of the maximal speed as low speed in test running, while maximal speed is 150mm/s). At last set up 'Safety Time' to '20s'. See fig 2.2.5(11).

Manual	Charge Settings	Cycle Mold: 618 Lo	gin
		Cycle Time: 0.00 s	5
Pressure Release	Charge	Suck Back	
Position 30.00 mm	Position V1 V2 VF	Zones Position (Offset value) 0.00 mm	_
Velocity 30.00 mm/s	Velocity 40 rpm	1 Velocity 15.00 mm/s	
Safety Time 5.00 0.00 s	P1 P2 PE Pressure 60.0 %	Safety Time 20.00 2.18 s	
	Back Pressure 0.00 Mpa		Para
401 ∱v (rpm) 36.00	Delay 1 Charge	Fime Before Charge 0.00 0.00 s Safety time 100.00 0.00 s	arriage
	Screw	Backward Mode Charge & Hold.	a ja Inject
0	115.00 Position (mm)		
Screw Position 36.00 mm	V/P Position 0.00 mm Back Pressure 0	.05 Mpaharge Axis Torque 0.0 %	Curve
Injection Peak 0.00 Mpa	V/P Velocity 0.00 mm/s Min. Cushion 0 Position 0	.00 mm Screw Rotate 0 rpm 0	Charge
V/P Time 0.00 s	V/P Pressure 0.00 Mpa Cushion Complete 0	.00 mm	
Setup Heating	Clamp Inject Product Mole	Info Overview Alarm Parar	neter
Alarm		13:05:19 11.12	2.07

(2) "Injection" settings

Enter into 'Injection' of menu "Injection settings". Enter into 'position mode' of menu 'V/P mode', and set up 'V/P time' to 20s. Then set up injection 'speed' with 15mm/s (This speed is 10% of the maxium speed, the same as the suck back speed). Set up 'pressure' with 100Mpa (Notice: This value cannot be 0Mpa). At last set up 'zones' to 3. See fig 2.2.5(12)

Fig 2.2.5(11)

Manual	Injection Settings	Cycle Mold: 618 Login Cycle Time: 0.00 s 3 5
Pressure Holding Pressure P E ← P 3 ← P 2 ← P 1 0.00 Mpa T E T 3 T 2 Time 0.00 s Zones 1	Injection Position S6 S5 S4 S3 0.00 V6 V5 V4 V3 Velocity 15.00 Injection P Pressure Injection P Press	S 2 ← S 1 ← SB 4.99 25.00 115.00 mm 3 V 2 V 1 15.00 15.00 mm/s P Zones eak 0.00 100.00 Mpa 3
V/P Position V/P Time 10.00 s V/P Position 0.00 mm V/P Velocity 0.00 mm/s	re(MPa) 149.86 V (mm/s) 0.00 36.00 VP	Cooling Time 0.00 0.00 s Injection Delay Time 0.00 0.00 s Linject
Screw Position 36.00 mm V/P Position Injection 0.05 Mpa V/P Velocity Injection Peak 0.00 Mpa V/P Pressure Pressure 0.00 Mpa V/P Pressure	Time (ms) F 0.00 mm V/P Time 0.00 s Cha 0.00 mm/s Min. Cushion 0.00 mm 0.00 mm/s Cushion Complete 0.00 mm 0.00 Mpa Cushion Complete 0.00 mm	Position (mm) arge Axis Torque 0.0 % Screw Rotate 0 rpm Speed 0 rpm
Setup Heating Clamp	Inject Product Mold Info	Overview Alarm Parameter

Fig 2.2.5(12)

(3) Observe the running status

Turn on 'heating' and 'motor on' on the keyboard. Press buttons 'inject' and 'suck back' to rotate motor. Enter into menu 'Injection KEB Parameter' to observe the running status.

If actual parameters correspond with those in table 2.2.5(13) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	66
Ru01	setpoint value display	±1600
Ru09	encoder 1 speed	close to±1600
Ru15	apparent current	less than 1 A

Fig 2.2.5(13)

(4) Set the direction of motor rotation.

Press the button 'inject' and 'suck back' on the keyboard. Observe the motor's rotation from the axis direction. Fig 2.2.5(14) gives the concept of axis

direction.



Fig 2.2.5(14)

Motor	Direction of the axis						
	VE400—VE4100						
Injection Servo Motor	Inject	Anticlockwise	Suck back	Clockwise			
	E : 0.0						

If the direction is as fig 2.2.5(15), then it is correct. If not we have to adjust it, and the method is as fig 2.2.5(16).

Manual		Injection KE	EB Parame	ter	Cycle Molo	1: 618 S: 0.00 S	Login
Injection KEB Paramete ru00 Invert State ru01 Set Value Display ru09 Encoder Speed ru11 Set Torque Display ru12 Actual Torque Display ru15 Apparent Currunt ru17 Active Currunt ru20 Output Voltage ru54 Actual Position Over Speed Protection F Over Speed Offset Over Speed Check Time le04 do04	13 rpm 0 rpm 0.00 Nm 0.00 Nm 0.00 A 0.0 A 0.0 V 48739468 V 2arameter 10 0.50 rpm 0.00 rpm	Injection KEB Parameter cs06 KP speed cs09 KI speed cS19 Abs.Torque.Ref fr10 Load.Mot.Dependent.Para di01 Select Signal Source di02 Digital Input Setting ec00 Encoder Interface ec01 Encoder(Inc/r) ec02 Absolute Position.Enc ec06 Encoder Rotation op03 Reference Setting Parameter Nr Parameter Value	2000 700 205.00 1 1 1 1 512 44246 0 0 0 0 0 rpr		Cycle Time Update Reset KEB Motor Ref Read Save	e: 0.00 \$ ***	5 Controller Cpu Info Special K-Mold K-Inject
Setup Heating		nject	ot Mold	Info	Overview	Alarm	Parameter
Alarm						13:08:18	11.12.07

Fig 2.2.5(16)

Fig 2.2.5(15)

1
Injection KEB Parameter Update ru00 lovert State 13 ru01 Set Value Display 0 ru02 Encoder Speed 0 ru13 Set Value Display 0.00 ru11 Set Torque Display 0.00 ru12 Actual Torque Display 0.00 ru13 Actual Torque Display 0.00 ru14 Actual Torque Display 0.00 ru15 Apparent Currunt 0.0 0.0 A ru12 Output Voltage 0 vu14 Actual Position 48739467 Over Speed Offset 10 Over Speed Offset 10 Over Speed Check Time 0.50 le04 0.00 004 0
Setup Heating Clamp Inject Product Mold Info

Fig 2.2.5(17)

Set up the value of 'ec06' to adjust the direction.

If the current value of 'ec06' is '0', then change the value to '16' to adjust the direction;

If the current value of 'ec06'is '16', then change the value to '0' to adjust the direction;

If the current value of 'ec06' is '1', then change the value to '17' to adjust the direction;

If the current value of 'ec06' is '17', then change the value to '1' to adjust the direction.

Please reconfirm the directions of inject and suck back.

See fig 2.2.5(17).

3、Test running at middle speed

Turn on "motor off" and set up the speed of 'inject' and 'suck back' into '50%', which is 75mm/s here.

Turn on "Motor on" and choose "Inject" and "Suck back" on the keyboard. Then enter into menu "Injection KEB Parameter' to observe the status. If actual parameters correspond with those in table 2.2.5(18), but no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	66
Ru01	setpoint value display	±8000
Ru09	encoder 1 speed	close to±8000
Ru15	apparent current	less than 1 A

Table 2.2.5(18)

4、Test running at high speed

Turn on "motor off" and set up the speed of 'inject' and 'suck back' to the maximal speed, which is 15mm/s here.

Turn on "Motor on" and choose "Inject" and "Suck back" on the keyboard. Then enter into menu "Injection KEB Parameter' to observe the status. If actual parameters correspond with those in table 2.2.5(19), but no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	66
Ru01	setpoint value display	±16000
Ru09	encoder 1 speed	close to±16000
Ru15	apparent current	less than 1 A

Table 2.2.5(19)

Now, test running of servo motor has been finished have finished. Next is to install the synchronous belt on servo motor.

(2). Test running of other motors

Preplastic axis doesn't need to return to the mechanical reference.

Test running of the charge motor has following steps:

- 1. Test running at low speed
- 2. Test running at middle speed

3. Test running at high speed

1. Test running at low speed

(1) Charge settings

Enter into the nemu "charge settings"

Manual		Charge Settings	Cycle Mold: 618 Cycle Time: 0.00 s	Login ත 5
Pressure Release	Charge		Suck Back	
Position 30.00 mm	Position V1 V2	S 2 - S E 115.00 mm Zones V E 40 rom 1	Position (Offset value) 0.00 mm Velocity 15.00 mm/s	
Safety Time 5.00 0.00 s	P1 P2 Pressure BP1 BP2	P E 60.0 % BPE	Safety Time 20.00 2.18 s	
	Back Pressure	0.00 Mpa		Para
401 tv (pm) 36.00 36.				
	<u>.</u>	115.00 Position (mm)		
Screw Position 36.00 mm	V/P Position 0.00 mm	Back Pressure 0.05 Mpa	iharge Axis Torque 0.0 %	Curve
Injection Peak 0.00 Mpa Pressure	V/P Velocity 0.00 mm/s	Min. Cushion 0.00 mm Position	Screw Rotate 0 rpm	Charge
V/P Time 0.00 s	V/P Pressure 0.00 Mpa	Cushion Complete 0.00 mm		
Setup Heating	Clamp	Product Mold Info	Overview Alarm Pa	rameter
Alarm			13:10:50 1	1.12.07

Fig 2.2.5(20)

Set up charge 'Velocity' to 40 (10% of the maximal speed), 'Pressure' to 60%, 'Back pressure' to 0, and 'Charge safty time' to 100s.

See fig 2.2.5(20).

(2) Observe the running status

Turn on 'Heating on' and 'Motor On'. Press the button 'Charge' on the keyboard, so the motor rotate. Enter into menu 'Charge KEB Parameter' to observe the running status.

If actual parameters correspond with those in table2.2.5(21) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	66
Ru01	setpoint value display	±1600
Ru09	encoder 1 speed	close to±1600
Ru15	apparent current	less than 1 A

Table 2.2.5(21)

(3) Set the direction of motor's rotation.

Observe motor's rotation from axis direction.

Motor	Direction of the axis	
	40T410T	
Charge Servo Motor	Charge	Clockwise

Table 2.2.5(22)

If the direction is opposite, please see also the injection motor adjustment.

2. Test running at middle speed

Turn on "Motor off" and set up the charge 'Velocity' to 200rpm (50% of the maximal speed).

Turn on "Motor on', and then click 'Charge' on the keyboard to rotate the motor. Enter into menu 'Inject KEB Parameter' to observe the running status.

If actual parameters correspond with those in table2.2.5(23) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	66
Ru01	setpoint value display	±8000
Ru09	encoder 1 speed	close to±8000
Ru15	apparent current	less than 1 A

Table 2.2.5(23)

3. Test running at high speed

Turn on "Motor off" and set up the charge 'Velocity' to the maximal. Here is 400rmp.

Turn on "Motor on" and click 'Charge' on the keyboard to rotate the motor.

Enter into menu 'Inject KEB Parameter' to observe the running status.

If actual parameters correspond with those in table2.2.5(24) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	66
Ru01	setpoint value display	±16000
Ru09	encoder 1 speed	close to±16000
Ru15	apparent current	less than 1 A

Table 2.2.5(24)

Till now, test running of charge motor has been finished. After the charge motor starts working, the synchronous belt can be put on

(3). Test running of mold motor

Main steps:

- 1. Return to the mechanical reference
- 2. Test running at low speed
- 3. Test running at middle speed
- 4. Test running at high speed

1. Return to the mechanical reference

See also test running of injection servo motor.

2. Test running at low speed

- (1) Mold open settings
- Set 'Zones' to 3, 'Safty time' to 12s and 'Velocity' to 10%. See fig 2.2.5(25)
- (2) Mold close settings

Set 'Zones' to 4, 'Safty time' to 15s and 'Velocity' to 10%. See fig 2.2.5(26)



Fig 2.2.5(25)



Fig 2.2.5(26)

(3) Observe running status

Turn on "Motor on" and click 'Mold open' and' Mold close'on the keyboard to rotate the motor.

Enter into menu 'Mold KEB Parameter' to observe the running status.

If actual parameters correspond with those in table2.2.5(27) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	setpoint value display	±1600
ru09	encoder 1 speed	close to±1600
ru15	apparent current	less than 1 A

Table 2.2.5(27)

(4) Set up the rotating direction

At low speed, observe the motor's rotation from the axis direction. See fig2.2.5(28).

Motor	Direction of the axis			
	40T410T			
Mold Servo Motor	Mold Open	Clockwise	Mold clamp	Anticlockwise

Table 2.2.5(28)

If the direction is opposite, please see also the injection motor adjustment.

3. Test running at middle speed

Turn on "Motor off" and set up mold 'Velocity' to 50%.

Turn on "Motor on', and then click 'Mold open' and 'Mold close' on the keyboard to rotate the motor. Enter into menu 'Mold KEB Parameter' to observe the running status.

If actual parameters correspond with those in table2.2.5(29) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±8000
ru09	encoder 1 speed	close to±8000
ru15	apparent current	less than 1 A

Table 2.2.5(29)

4. Test running at high speed

Turn on "Motor off" and set up mold 'Velocity' to 100%.

Turn on "Motor on" and click 'Mold open' and 'Mold close'on the keyboard to rotate the motor.

Enter into menu 'Mold KEB Parameter' to observe the running status.

If actual parameters correspond with those in table2.2.5(30) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±16000
ru09	encoder 1 speed	close to±16000
ru15	apparent current	less than 1 A

Table 2.2.5(30)

Till now, test running of mold motor has been finished. After the mold motor starts working, the synchronous belt can be put on

(4). Test running of ejector motor

Main steps:

- 1. Return to the mechanical reference
- 2. Test running at low speed
- 3. Test running at middle speed
- 4. Test running at high speed

1. Return to the mechanical reference

See also test running of injection servo motor.

2. Test running at low speed

(1) Ejector settings

Set up eject forward 'Zones' to 1, 'Position' to the maximal position (Which is 80mm here), 'Velocity' to 10%. Set up eject backward 'Zones' to 1, 'position' 'SE' to 0,'Velocity' to 10%. Set 'Eject Mode' to semi eject, 'Eject Counter' to 1, and 'Safety Time' to 12s. See fig 2.2.5(31).

Manual		Ejector Settings	Cycle Mold: Cycle Time:	618 Logir 0.00 s 5	n 5
Eject Forward		Eject Backward			
Position	SE Zones 80.00 mm 1	SE SE S2	← S1	Zones	
Velocity	10.0 %	Velocity 10.0	%		?
100 ₁ ∨ (%)		100 <mark>t ∨ (%)</mark>		Cor	re
0.00		0.00		Ai	10-
0		0		Comp	J.Inj.
0	80.00 Position (mm)		P	80.00 osition (mm)	
Eject Mode Semi Eject		Act Eject	Axis Torque 0.0	% Оре	en
Eject Counter	Eject On The Fly	Yes 🗸	Mold Position 2.95	mm Clos	i se
Delay Time 0.00 0.00	s Start Position	204.00 mm Crossh	nead Position 41.88	mm 🍺 Ejec)- ctor
Standby Time 0.00 0.00) s Safety time	12.00 0.00 s Eje	ctor Position 0.00	mm	
Setup Heating	Diamp	Product Mold Info	Overview Ala	rm Paramet	ter
Alarm			13:	13:38 11.12.07	

Fig 2.2.5(31)

(2) Observe running status

Turn on "Motor on" and click 'Eject Forward' and 'Eject Backward' on the keyboard to rotate the motor.

Enter into menu 'Eject KEB Parameter' to observe the running status.

If actual parameters correspond with those in table2.2.5(32) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	setpoint value display	±1600
ru09	encoder 1 speed	close to±1600
ru15	apparent current	less than 1 A

Table 2.2.5(32)

(3) Set the direction of motor's rotation

At low speed, observe the motor's rotation from the axis direction. See fig 2.2.5(33)

Motor	Direction of the axis				
	40T410T				
Ejector Servo	Ejector	Anticlockwise	Ejector	Clockwise	
Motor	Forward		Backward		

Table 2.2.5(33)

If the direction is opposite, please refer to the injection motor adjustment.

3. Test running at middle speed

Turn on "Motor off" and set up eject forward and eject backward to 50%.

Turn on "Motor on', and then click 'Eject Forward' and 'Eject Backward' on the keyboard to rotate the motor. Enter into menu 'Eject KEB Parameter' to observe the running status.

If actual parameters correspond with those in table2.2.5(34) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±8000
ru09	encoder 1 speed	close to±8000
ru15	apparent current	less than 1 A

Table 2.2.5(34)

4. Test running at high speed

Turn on "Motor off" and set up eject forward and eject backward to 100%.

Turn on "Motor on', and then click 'Eject Forward' and 'Eject Backward' on the

keyboard to rotate the motor. Enter into menu 'Eject KEB Parameter' to observe the running status.

If actual parameters correspond with those in table2.2.5(35) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±16000
ru09	encoder 1 speed	close to±16000
ru15	apparent current	less than 1 A

Table 2.2.5(35)

Till now, test running of eject motor has been finished. After the eject motor starts working, the synchronous belt can be put on

Remarks: The value display of 'ru01' and 'ru09' is based on motor's 'rated speed', which is 2000/rpm in this example.

1、For test running at low speed;

Ru01=2000×10%×8=1600rpm, |Ru09| is close to 1600rpm.

2、For test running at middle speed;

Ru01=2000×50%×8=8000rpm, |Ru09| is close to 8000rpm.

3、For test running at middle speed;

Ru01=2000×100%×8=16000rpm, |Ru09| is close to 16000rpm.

It is the same to calculate values of other rated speed motors.

2.2.6 Install synchronous-belt and test the tension

Clamping unit (Codes of components, see Fig 2.2.1(4) clamping unit.)
 (1) Install synchronous-belt for clamping unit.



①Put a belt on one gear, then tighten the belt and put the belt on the other gear.



③ Strain the synchronous-belt by moving the motor outward (as the arrow shows).



②Install bolts (3 pieces) and gear cover.



④ Tighten flange installation bolts (4bolts must be tightened at same time)



Fig 2.2.6(1) Test method of tensiometer (2)、 Test on clamping synchronous-belt tension.

⁽⁵⁾ Put the professional tensiometer. See fig 2.2.6(1). (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendix I), to check if the belt tension is right or not.

6 If actual value is bigger, then it means the belt is too tight. First, loosen



flange installation bolts; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. Adjust the tension until its value is equal to the standard.

 \bigcirc If the value is right, then tighten nuts first, and then screw down flange installation bolts.

Notice

Two tension adjusting bolts should be screwed down synchronously, to avoid imbalance and damage to the synchronous-belt while working.

2、Plastification unit

(1) Install synchronous-belt for plastification unit. (See Fig 2.2.1(3) plastification unit for codes of components)

① Put the belt on one gear, then tighten the belt and put the belt on the other gear.

2 Install bolts (3 pieces) and gear cover.

③ Strain the synchronous-belt by moving the motor outward.

④ Tighten flange installation bolts (the four bolts must be tightened synchronously).

(2)、 Plastification synchronous-belt tension testing.

⁽⁵⁾ Put the professional tensiometer. See fig 2.2.6(1). (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendix I), to check if the belt tension is right or not.

⑥ If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is

smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. Adjust the tension until its value is equal to the standard.

 $\ensuremath{\overline{0}}$ If the value is right, then tighten nuts first, and then screw down flange installation bolts.



Fig 2.2.6(3) Ejector unit and the four parts of the belt (2)

(1)Install synchronous-belt.

①Rotate the synchronous-belt wheels4 (2 pieces) by hands. Let the ejector guide-panel on limit position (front-end or back-end).

⁽²⁾Put the belt on synchronous-belt wheels. Notice: tighten the first and third part of belt to keep the belt tension. Then the belt goes around tighten wheels, at the same time tighten the first and second part of belt to keep the belt tension. Finally put the belt on motor-wheel3 and keep the belt tension.

(2)、Test on ejector synchronous-belt tension.

Divide the ejector synchronous-belt into fours parts, as Fig2.2.6(1). If the belt is well installed, according to the theory, when the belt is zero-distortion, the tension of each part should be same. So it is ok to test the first part which is longest part.

Testing approaches:

Tighten flange installation bolts (the four bolts must be tightened simultaneously).

⁽⁵⁾Put the professional tensiometer (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendix I), to check if the belt tension is right or not.

⁽⁶⁾ If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts4; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. If the value is equal to the standard.

Notice: Two tension adjusting bolts should be screwed down synchronously,

to avoid imbalance and damage to the synchronous-belt while working.

 \bigcirc If the value is right, then tighten nuts first, and then screw down flange installation bolts. Installation and adjustment are finished.

4、Injection unit.

(1)、Install synchronous-belt for injection unit.(Codes of components see Fig 2.2.6(3) injection unit.)

① Put the belt on one gear, then tighten the belt and put the belt on the other gear.

2 Install the bolts (3 pieces) and gear cover.

③ Strain the synchronous-belt by moving the motor outward.

④ Tighten flange installation bolts. (Four bolts must be tightened synchronously)

(2)、 Injection synchronous-belt tension testing.

⁽⁵⁾Put the professional tensiometer (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendix I), to check if the belt tension is right or not.

⁽⁶⁾ If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts4; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. Adjust the tension until its value is equal to the standard.

Notice: Two tension adjusting bolts should be screwed down synchronously,

in order to avoid imbalance and damage to the synchronous-belt while working.

 \bigcirc If the value is right, then tighten nuts first, and then screw down flange installation bolts. Installation and adjustment are finished.

5、Notice



1、Do not use a rubber hammer to hit the belt when testing the belt to avoid absorbing the vibration wave.

2、Test the belt finally after tighten all screws to avoid unnecessary errors.

2.2.7 Search for the mechanical reference

Searching Steps:

1, Login the dialog box of zero set;

2、After choosing zero set function, move related mechanical components to the reference;

3、Set the reference and adjust the proximity switch;

4、Test the machine to check the actual stroke;

5、Finish..

Detail explanations:

1、Login the fourth level

- (1)、Electrify (Turn off the motor);
- (2)、 Click 'login' on the screen;
- (3)、 Type login passwords '020808' to the dialog box;
- (4)、Enter.

(See fig2.2.7(1))

Manual	Machine Overview	Cycle Mold: 618 Cycle Time: 0.00 ^s	Login
Software Version D - V01_13-01.01.127 Machine Type HTD86 - E210 Passed Ratio 100.0 % H1 H2 Passed Product 618 111.6 136.7 Rejected Product 0 Mold Position 2.95 mm Ejector Position 0.00 mm Clamp Force 86 0 top	1 2 3 4 5 6 0 W E R T A S D F G Z X C V B	7 8 9 0 Y U I O P H J K L N M	
Inj. Compress OFF		Back Pressure	a
Mold close 0.00 s Suck Back 2.	.18 s Holding Pressure 0.00 s	Cycle Interval 0.00	overview s
Plastication 0.00 s Injection 0.	.00 s Ejection 0.00 s	Cuple Time 0.00	Cycle
ing, one i orward out s Mold Open o.	s country 0.00 s		
Setup Heating Clamp Inject	tt Product Mold Info	Overview Alarm	Parameter
Alarm		13:29:36	11.12.07

Fig 2.2.7(1) login the fourth level

$\mathbf{2}_{\mathbf{v}}$ Login the menu of zero setting

- (1)、 Click 'parameter' on the right of the screen;
- (2)、 Click 'zero set' on the right of parameter menu.(See fig2.2.7(2))

Manual				Zero Setting	Cycle Mold:	618	Login
					Cycle Time:	0.00 s	4
Zero Setup				Screw Parameter			
Zero Status	Dff 🗙			Screw Diameter 32	.00 mm		
Speed	2.0 %			Max Injection Force 16	1.0 <mark>KN</mark> 8.05	v	
Force	30.0 %			Max Holding Force 12	3.8 <mark>KN</mark> 6.44	v	
Servo Axis	Zero Confirm Encod	er Value 🛛 Pos	sition	Standard Load Cell Calibration(10V) 200	D.O KN		
Injection Axis	Zero End 4873	39464 36.0	0 mm	Load Cell Current Voltage	00 V 0.0	KN	
Mold Axis	Zero End 1060	167435 2.95	ōmm	Load Cell Zero Offset	31 V		<u></u> Monitor
Ejector Axis	Zero End 2056	64433 0.00) mm	Injection Pressure	.05 Mpa		÷~~
Mold Adjust Axis	Zero End	0 0.00) mm	Act Charge Axis Torque	00 Nm 0.0	%	Zero Set
Dias Bus	<u> </u>	Л		Act Clamp Axis Torque	00 Nm 0.0	%	Printer
Bus Statistic	29			Act Eject Axis Torque	00 Nm 0.0	%	
				Act Inject Axis Torque	00 Nm 0.0	%	Parat
Setup He				Product Mold Info	Overview A	A larm F	ff~ Parameter
Alarm						3:46:42	11.12.07

Fig 2.2.7(2) zero setting menu

$3_{\scriptscriptstyle N}$ Set up speed and pressure of zero set

- (1)、 Click dialog box of speed;
- (2)、 Click '2' in the dialog box;
- (3)、 Click green hook;
- (4), Set up the pressure to 30.

(See fig2.2.7(3))

Manual			Zero Setting	Cycle Mold:	618	Login
				Cycle Time:	0.00 s	- 4
Zero Setup			Screw Parameter			
Zero Status	Dff 🗙			×		
Speed	<mark>2.0</mark> %		Reference Speed	% I 8.05	v	
Force	30.0 %		Old 2.0 Min Max	1.0 20.0 1 6.44	v	
Servo Axis	Zero Confirm Encoder Value	Position	7 8 9 0	1 P		
Injection Axis	Zero End 48739464	36.00 mm	555	0.0	KN	
Mold Axis	Zero End 1060167435	2.95 mm				<u>L</u> Monitor
Ejector Axis	Zero End 20564433	0.00 mm	1 2 3	ba		Ű~~
Mold Adjust Axis	Zero End O	0.00 mm	. 0	n 0.0	%	Zero Set
Dias Bus	it ji		Act Clamp Axis Torque U.	UU Nm 0.0	%	Printer
Bus Statistic	29		Act Eject Axis Torque	00 Nm 0.0	%	
			Act Inject Axis Torque	00 Nm 0.0	%	Paral
Setup He	ating Clamp	Inject	Product Mold Info	Overview Al	1 arm	fir Parameter
Alarm				1	3:48:44	11.12.07

Fig 2.2.7(3) set up speed and pressure

$4_{\rm N}$ Click 'on' and move to the reference

- (1)、Click 'motor on';
- (2)、 Click 'zero set', and then click 'on';
- (3)、 Choose the axis. Operations as following:

(See fig 2.2.7(5))

axis needs to set	Set zero	motion
Injection axis	Inject	Suck back
Mold axis	Mold chose	Mold open
Ejection axis	Eject back	Eject forward

Table 2.2.7(4) operational keys

Manual			Zero Setting	Cycle Mold:	618 L	₋ogin
Move	Reference			Cycle Time:	0.00 s 🛰	🤌 4
Zero Setup			Screw Parameter			
Zero Status	On 🗸		Screw Diameter	32.00 mm		_
Speed	2.0 %		Max Injection Force	161.0 KN 8.05	v	
Force	30.0 %		Max Holding Force	128.8 KN 6.44	v	
Servo Axis	Zero Confirm Encoder	Value Position	Standard Load Cell Calibration(10V)	200.0 KN		_
Injection Axis	Zero End 48739	1464 36.00 mm	Load Cell Current Voltage	0.00 V 0.0	KN	
Mold Axis	Zero End 106016	i7435 2.95 mm	Load Cell Zero	0.31 V		<u></u> Monitor
Ejector Axis	Zero End 20564	1433 0.00 mm	Injection Pressure	0.05 Mpa		<u> </u>
Mold Adjust Axis	Zero End O	0.00 mm	Act Charge Axis Torque	0.00 Nm 0.0	%	Zero Set
Dias Bus	IL IL	JL	Act Clamp Axis Torque	0.00 Nm 0.0	%	Printer
Bus Statistic	29		Act Eject Axis Torque	0.00 Nm 0.0	%	
			Act Inject Axis Torque	0.00 Nm 0.0	%	Para1
Setup Heating Clamp Inject Product Mold Info						ameter
Alarm					13:55:10 11.	.12.07

Fig 2.2.7(5) zero setting menu

5、Click operational keys of zero setting and move the axis to the reference

(1) Dismantle the two proximity switches corresponding to axis loosely. Make sure it does not affect zero set.

(2)、According to table 2.2.7(4), press the key until the axis move to the reference, and then press 'Zero End'. Then "actual reference" shows 'zero'. (Until it can't move)

(3)、According to table 2.2.7(4), press the key of clamping. When the numeric value of actual reference is between 2mm and 3mm, press the key of 'zero set' again. It's the actual mechanical reference.

(4). Turn on the proximity switch of zero set to. Then fix them up.

(5) Move the model axis. When the numeric value of the actual reference is between 5mm and 10mm, press the key of zero set. Observe the proximity switch when actual reference is zero. If the light is not on, trim the sensor till all lights on.

(6), Move the model axis. Observe actual reference, and wait until it reaches to the maximum stroke. The system will stop.

(7)、 If actual reference doesn't reach maximum, adjust it as step 3.

- (8)、 Adjust the proximity switch to make them on at stroke end.
- (9)、Click 'off' to quit.

6、Test the machine to check the actual stroke

(1). Set the axis stroke from zero to maximum stroke.

(2)、 Observe the maximal stroke to check whether it is the same as actual stroke.

(3)、Observe the zero stroke to check whether it is the same as actual stroke. **7**、**Finish**

Attention

During zero setting, operated speed must be below 3% of speed and operated pressure below 30% of pressure. Otherwise, the machine will be broken.

2.2.8 Test running of full-electrical injection moulding machine

(1), At the manual model, test the machine at low speed and pressure and with full stroke. In the test, set speed about 10% and pressure about 30%.

(2). At the manual model, test the machine at middle speed and pressure and with full stroke. In the test, set speed about 30%, pressure about 50%.

(3) At the manual model, test the machine at high s speed and pressure and with full stroke. In the test, set speed about 99%, pressure about 100%.
(4) Finish.

Notice

During tests, please press 'Stop' button immediately if any abnormal happens. Find out the reason, and then do tests again.

2.2.9 Finish

- 1、Clean up the machine.
- 2. Fix the belt, protective covering and protective door.
- 3, Finish changing the servo motor.

Chapter 3 Synchronous-belt Malfunctions

3.1 Approaches of changing synchronous-belt

- 1. Dismantle the broken synchronous-belt;
- 2. Install synchronous-belt and adjust the tension;
- 3、 Check the mechanical reference;
- 4、Test running of the machine;
- 5、Finish.

3.2 Change synchronous-belt in detail

3.2.1 Take down the synchronous-belt from the machine

(1) Synchronous-belt for clamping unit.

Step1: Dismantle safety cover and gear protection cover;



① Dismantle rear cover Step2: Dismantle synchronous-belt.



② Dismantle gear protection cover





① Loosen adjusting nuts (2 pieces) ② Loosen tension adjusting bolts (2 pieces)



③ Loosen flange installation bolts(4 pieces)



⑤ Push clamping motor to the machine. Loosen synchronous-belt



④ Screw off bolts (3 pieces), and take down the gear cover



⁽⁶⁾Take out the synchronous-belt slowly and softly

- (2)、Synchronous-belt for plastification unit.
- Step1: Dismantle safety cover;

Step2: Dismantle synchronous belt.

Because of same construct, the dismantle method is the same.

About assembly codes, please see Fig 2.2.1(4) plastification unit

- 1) Loosen adjusting nuts10 (2 pieces);
- 2 Loosen tension adjusting bolts 11(2 pieces);
- ③ Loosen flange connection bolts 8(4pieces);
- ④ Loosen cover bolts 9 (3 pieces); remove gear cover 5;
- ⑤ Push plastification motor 1 to the machine to loosen synchronous-belt;
- (6) Take out the synchronous-belt 2 slowly and softly.
- (3) Synchronous-belt for ejector unit.
- Step1: Dismantle safety cover;

Step2: Dismantle synchronous belt.

Because of same construct, the dismantle method is the same.

About assembly codes, please see Fig 2.2.1(6) ejector unit.

- ① Loosen adjusting nuts10 (2 pieces);
- 2 Loosen tension adjusting bolts 11(2 pieces);
- ③ Loosen flange connection bolts 8(4pieces);
- ④ Loosen cover bolts 9 (3 pieces); remove gear cover 5;
- ⑤ Push plastification motor 1 to the machine to loosen synchronous-belt;
- 6 Take out the synchronous-belt 2 slowly and softly.

(4) Synchronous-belt for injection unit

Because of same construct, the dismantle method is the same.

About assembly codes, please see 2.2.1(7) injection unit

Step1: Dismantle safety cover;

Step2: Dismantle synchronous belt

- ① Loosen adjusting nuts10 (2 pieces);
- 2 Loosen tension adjusting bolts 11(2 pieces);
- ③ Loosen flange connection bolts 8(4pieces);
- ④ Loosen cover bolts 9 (3 pieces); remove gear cover 5;
- ⑤ Push plastification motor 1 to the machine to loosen synchronous-belt;
- (6) Take out the synchronous-belt 2 slowly and softly.

3.2.2 Install synchronous-belt and test the tension

1、Clamping unit (Codes of components, see Fig 2.2.1(4) clamping unit.)

(1)、 Install synchronous-belt for clamping unit.



①Put a belt on one gear, then tighten the belt and put the belt on the other gear.



③ Strain the synchronous-belt by moving the motor outward (the arrow shows).



2 Install bolts (3 pieces) and gear cover



(4) Tighten flange installation bolts (four bolts must be tightened synchronously)



Fig 3.2.2(1) Test methods of tensiometer

(2)、Test on clamping synchronous-belt tension.

⁽⁵⁾Put the professional tensiometer. See fig 3.2.2(1). (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendix I), to check if the belt tension is right or not.

⑥If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts; second, loosen tension adjusting bolts, at last do



remember to tighten flange installation bolts before testing again. If the value is smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. Adjust the tension until its value is equal to the standard.

⑦ If the value is right, then tighten nuts first, and then screw down flange installation

bolts.



Notice

Two tension adjusting bolts should be screwed down synchronously, to avoid imbalance and damage to the synchronous-belt while working.

2、Plastification unit

(1)、Install synchronous-belt for plastification unit.(Codes of components see Fig 2.2.1(3) plastification unit)

① Put the belt on one gear, then tighten the belt and put the belt on the other gear.

② Install bolts (3 pieces) and gear cover.

③ Strain the synchronous-belt by moving the motor outward.

④ Tighten flange installation bolts (the four bolts must be tightened synchronously).

(2)、 Plastification synchronous-belt tension testing.

⁽⁵⁾ Put the professional tensiometer. See fig 3.2.2(1) (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendis I), to check if the belt tension is right or not.

⁽⁶⁾ If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. Adjust the tension until its value is equal to the standard.

 $\ensuremath{\overline{\mathcal{O}}}$ If the value is right, then tighten nuts first, and then screw down flange installation bolts.





Fig 3.2.2(2) Ejector unit and the four parts of the belt



Fig 3.2.2(3) Ejector unit and the four parts of the belt

(1)Install synchronous-belt.

①Rotate the synchronous-belt wheels4 (2 pieces) by hands. Let the ejector guide-panel on limite position (front-end or back-end).

⁽²⁾Put the belt on synchronous-belt wheels. Notice: tighten the first and third part of belt to keep the belt tension. Then the belt goes around tighten wheels, at the same time tighten the first and second part of belt to keep the belt tension. Finally put the belt on motor-wheel3 and keep the belt tension.

(2)、Test on ejector synchronous-belt tension.

Divide the ejector synchronous-belt into fours parts, as Fig3.2.2(2). If the belt is well installed, according to the theory, when the belt is zero-distortion, the tension of each part should be same. So it is ok to test the first part which is longest part.

Testing approaches:

Tighten flange installation bolts (the four bolts must be tightened simultaneously).

^⑤Put the professional tensiometer (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendis I), to check if the belt tension is right or not.

⁽⁶⁾ If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts4; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is smaller, then it means the belt is to loose. First, loosen flange installation bolts;

second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. Adjust the tension untill its value is equal to the standard.

Notice: Two tension adjusting bolts should be screwed down synchronously,

to avoid imbalance and damage to the synchronous-belt while working.

 \bigcirc If the value is right, then tighten nuts first, and then screw down flange installation bolts. Installation and adjustment are finished.

4、Injection unit.

(1) Install synchronous-belt for injection unit.

(Codes of components see Fig 3.2.2(7) injection unit.)

① Put the belt on one gear, then tighten the belt and put the belt on the other gear.

② Install the bolts (3 pieces) and gear cover.

③ Strain the synchronous-belt by moving the motor outward.

④ Tighten flange installation bolts. (Four bolts must be tightened synchronously)

(2)、 Injection synchronous-belt tension testing.

⁽⁵⁾ Put the professional tensiometer (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendis I), to check if the belt tension is right or not.

⁽⁶⁾ If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts4; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. If the value is second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. Adjust the tension untill its value is equal to the standard.

Notice: Two tension adjusting bolts should be screwed down synchronously,

to avoid imbalance and damage to the synchronous-belt while working.

1 If the value is right, then tighten nuts first, and then screw down flange installation bolts. Installation and adjustment are finished.

5、Notice:

Notice

1、Do not use a rubber hammer to hit the belt when testing the belt to avoid absorbing the vibration wave.

2、Test the belt finally after tighten all srews to avoid unnecessary errors.
3.2.3 Search for the mechanical reference

Searching Steps:

- 1, Login the dialog box of zero set;
- 2. After choosing zero set function, move related mechanical components to the reference;
- 3、Set the reference and adjust the proximity switch;
- 4、Test the machine to check the actual stroke;
- 5、Finish.

Detail explanations:

1、Login the fourth level

(1). Turn on the power supply. (Don't turn on the button 'Motor on' on the keyboard.)

- (2)、 Click 'login' on the screen;
- (3)、 Type login passwords '020808' to the dialog box;
- (4)、Enter.

(See fig 3.2.3(1))

Manual	Machine Overview	Cycle Mold: Cycle Time:	618 Login 0.00 s 1
Software Version D - V01_13-01.01.127 Machine Type HTD86 - E210 Passed Ratio 100.0 Passed Product 618 Rejected Product 0 Mold Position 0 Z.95 mm Ejector Position 0.00 O.00 mm Clamp Force model	1 2 3 4 5 6 Q W E R T A S D F G Z X C V B	Y U T H J K N M	
Inj. Compress OFF Mold close 0.00 s Suck Back Plastication 0.00 s Injection	2.18 s Holding Pressure 0.00 s 0.00 s Ejection 0.00 s	Cycle Interval	k Pressure J5 Mpa 0.00 s 0.00 s
Inj. Unit Forward 0.00 s Mold Open	0.00 s Cooling 0.00 s	Cycle Time	Cycle
Setup Heating Clamp Inj Alarm	ect Product Mold Info	Overview A	larm Parameter 13:29:36 11.12.07

Fig3.2.3(1) login the fourth level

2、Login the menu of system's zero set

- (1)、 Click 'parameter' on the right of the screen;
- (2)、 Click 'zero set' on the right of parameter menu.

(See fig3.2.3(2))

Manual			Zero Setting	Cycle Mold:	618	Login
			Zero oetting	Cycle Time:	0.00 s	4
Zero Setup			Screw Parameter			
Zero Status	Dff 🗙		Screw Diameter 32	.00 mm		
Speed	2.0 %		Max Injection Force 161	I.O KN 8.05	v	
Force	30.0 %		Max Holding Force 128	3.8 <mark>KN</mark> 6.44	v	
Servo Axis	Zero Confirm Encoder Valu	e Position	Standard Load Cell 200 Calibration(10V)	0.0 KN		
Injection Axis	Zero End 48739464	36.00 mm	Load Cell Current Voltage	0.0 V 0.0	KN	
Mold Axis	Zero End 1060167435	2.95 mm	Load Cell Zero 0.3 Offset	31 V		Monitor
Ejector Axis	Zero End 20564433	0.00 mm	Injection Pressure 0.	05 Mpa		, ()
Mold Adjust Axis	Zero End O	0.00 mm	Act Charge Axis Torque 0.	00 Nm 0.0	%	Zero Set
Dias Bus	<u>п п</u>		Act Clamp Axis Torque	00 Nm 0.0	%	Printer
Bus Statistic	29		Act Eject Axis Torque 0.	00 Nm 0.0	%	
			Act Inject Axis Torque	00 <mark>Nm</mark> 0.0	%	Paral
Setup He	ating Clamp	Inject	Product Mold Info	Overview A	<u>A</u> .larm	Parameter
Alarm		_			13:46:42	11.12.07

Fig3.2.3(2) zero setting menu

$3 \$ Set up speed and pressure of zero set

- (1)、 Click dialog box of speed;
- (2)、 Click '2' in the dialog box;
- (3)、Click green hook;
- (4). Set up the pressure to 30.
- (See fig3.2.3(3))

Manual			Zero Setting	Cycle Mold:	618	Login
				Cycle Time:	0.00 s	
Zero Setup			Screw Parameter			
Zero Status 🛛 🖸	ff 🗙			× n		
Speed	<mark>2.0</mark> %		Reference Speed	% I 8.05	v	
Force	30.0 %		Old 2.0 Min Max	1.0 20.0 1 6.44	v	
Servo Axis	Zero Confirm Encoder Value	Position	7 8 9 1			
Injection Axis	Zero End 48739464	36.00 mm		0.0	KN	
Mold Axis	Zero End 1060167435	2.95 mm				Landon Monitor
Ejector Axis	Zero End 20564433	0.00 mm	1 2 3	- pa		(î~~~
Mold Adjust Axis	Zero End O	0.00 mm		/ n 0.0	%	Zero Set
Dias Bus		I	Act Clamp Axis Lorque	.UU Nm 0.0	%	Printer
Bus Statistic	29		Act Eject Axis Torque	.00 Nm 0.0	%	Revol
			Act Inject Axis Torque	.00 Nm 0.0	%	Parat
Setup	ating Clamp	Inject	Product Mold Info	Overview A	1 larm	Parameter
Alarm					13:48:44	11.12.07

Fig3.2.3(3) set speed and pressure

4、 Click 'on' and move to the reference

- (1)、 Click 'motor on';
- (2)、 Click 'zero set', and then click 'on';

(3). Choose the axis which need be setted zero. Operations as following: (See fig 3.2.3(5))

axis needs to set	Set zero	motion
Injection axis	Inject	Suck back
Mold axis	Mold chose	Mold open
Ejection axis	Eject back	Eject forward

Table 3.2.3(4) operational keys

Manual				Zero Setting	Cycle Mold:	618	Login
Move	Reference			Loro Couling	Cycle Time:	0.00 s	4
Zero Setup				Screw Parameter			
Zero Status	On 🗸			Screw Diameter 32	2.00 mm		
Speed	2.0 <mark>%</mark>			Max Injection Force 16	1.0 KN 8.05	v	
Force	30.0 %			Max Holding Force 12	8.8 KN 6.44	v	
Servo Axis	Zero Confirm	Encoder Value	Position	Standard Load Cell 20 Calibration(10V) 20	0.0 KN		
Injection Axis	Zero End	48739464	36.00 mm	Load Cell Current Voltage	00 V 0.0	KN	
Mold Axis	Zero End	1060167435	2.95 mm	Load Cell Zero Offset	31 V		Landon Monitor
Ejector Axis	Zero End	20564433	0.00 mm	Injection Pressure	.05 Mpa		ű~~
Mold Adjust Axis	Zero End	0	0.00 mm	Act Charge Axis Torque	.00 Nm 0.0	%	Zero Set
Dias Bus	JI		I <u></u>	Act Clamp Axis Torque	.00 Nm 0.0	%	Printer
Bus Statistic	29			Act Eject Axis Torque	.00 Nm 0.0	%	
				Act Inject Axis Torque	.00 Nm 0.0	%	Para1
Setup He	ating	Clamp	Inject	Product Mold Info	Overview A	<u>Å</u> Jarm	Parameter
Alarm						13:55:10	11.12.07

Fig3.2.3(5) zero setting menu

 $5\,{\scriptstyle \smallsetminus}\,$ Click operational keys of zero setting and move the axis to the reference

(1)、 Dismantle the two proximity switches corresponding to axis loosely. Make sure it does not affect zero set.

(2)、According to table 3.2.3(1), press the key until the axis move to the reference, and then press 'Zero End'. Then "actual reference" shows 'zero'. (Until it can't move)

(3) $\$ According to table 3.2.3(1), press the key of clamping. When the numeric value of actual reference is between 2mm and 3mm, press the key of 'zero set' again. It's the actual mechanical reference.

(4)、 Turn on the proximity switch of zero set to. Then fix them up.

(5) Move the model axis. When the numeric value of the actual reference is between 5mm and 10mm, press the key of zero set. Observe the proximity switch when actual reference is zero. If the light is not on, trim the sensor till all lights on.

(6), Move the model axis. Observe actual reference, and wait until it reaches to the maximum stroke. The system will stop.

(7)、 If actual reference doesn't reach maximum, adjust it as step 3.

- (8)、 Adjust the proximity switch to make them on at stroke end.
- (9)、Click 'off' to quit.

6、Test the machine to check the actual stroke

(1), Set the axis stroke from zero to maximum stroke.

(2)、Observe the maximum stroke to check whether it is the same as actual stroke.

(3), Observe the zero stroke to check whether it is the same as actual stroke.

7、Finish

Notice

During zero setting, operated speed must be below 3% of speed and operated pressure below 30% of pressure. Otherwise, the machine will be broken.

3.2.4 Test running of full-electrical injection molding machine

(1), At the manual model, test the machine at low speed and pressure and with full stroke. In the test, set speed about 10% and pressure about 30%.

(2)、 At the manual model, test the machine at middle speed and pressure and with full stroke. In the test, set speed about 30%, pressure about 50%.

(3) At the manual model, test the machine at high s speed and pressure and with full stroke. In the test, set speed about 99%, pressure about 100%.
(4) Finish.

Notice

During tests, please press 'stop' button immediately if any abnormal happens. Find out the reason, and then do tests again.

3.2.5 Finish

- 1、Clean up the machine; tighten all wires;
- 2. Dismantle protective cover of the synchronous belt and install it rightly;
- 3. Dismantle the protective door and install it rightly;
- 4、Finish changing.

Chapter 4 Synchronous-wheel Malfunctions

4.1 Approaches of changing synchronous- wheel

- 1. Dismantle the broken synchronous- wheel;
- 2. Install synchronous-belt and adjust the tension;
- 3、 Check the mechanical reference;
- 4、Test running of the machine;
- 5、Finish.

4.2 Change synchronous-wheel in detail

4.2.1 Take down the synchronous-wheel from the machine

1. Synchronous-wheel for the clamping unit

Methods of dismantling the synchronous-belt and motor-wheel have already been introduced in chapter 2.2.1, so here mainly explain methods of dismantling another synchronous-wheel which fixed on the ball screw.



Fig 4.2.1(1) synchronous-wheel for clamping unit

- ①Dismantle the nut1 and nut2;
- ②Dismantle the synvhronous-wheel.
- 2 Synchronous-wheel for the plastification unit



Fig 4.2.1(2) synchronous-wheel for plastification unit

① Because the space of plastification unit is small, it's better to plastify backwards to the end before dismantling.

② It's better to measure the diameter of the wheel and the distance of tie bars before dismantling to check if a tie bar need be taken off or not.

- ③ Dismantle half ring
- ④ Take out the screw.
- ⑤ Dismantle the wheel fixed bolts and plastification wheel.
- 3、Ejector unit



Fig 4.2.1(3) synchronous-wheel for ejector unit

Because of the same construct, the dismantling methods are the same.

- ① Dismantle the nuts (2 pieces).
- ② Dismantle the synvhronous-wheel from the shaft.
- 4、Injection unit



Fig 4.2.1(4) synchronous-wheel for injection unit

(1)Loosen the distant gear: loosen the distant bolts, 12 pieces in Fig4.2.1(4) (bolts quantities may be different according to different types of machines), and then screw down the white dismantlement bolt to eject the distensible gear.

(Remarks: Don't need to dismantle the nuts, but just the distant gear) ②Dismantle the injection synchro-wheel.

4.2.2 Install synchro-wheel

1. The installation methods of injection synchro-wheel(because of the distant gear) are different from others. The installation methods of other synchro-wheel are opposite.

2、Following is mainly to explain how to install and adjust the injection wheel: Installation methods as follow:

Use a **torque spanner** to tighten in cross-type and tighten for 3 times.

According to the sequence of tighten times, the torque for each time is one **1/3**, **2/3** and **one time** of needed torque.

Take VE600-120 as an example:



Fig 4.2.2(1) screws place on synchronous-wheel

(1), Injection seat capacity is 120/120h

There are 12 distant bolts, marked as bolt1, bolt2, bolt3, bolt4, bolt5, bolt6, bolt7, bolt8, bolt9, bolt10, bolt11, and bolt12. The torque needed by each bolt is 15(N.M).

Bolts should be screwed down for the first time by following orders: bolt1, bolt7, bolt2, bolt8, bolt3, bolt9, bolt4, bolt10, bolt5, bolt11, bolt6, bolt12. In this time, the torque of each bolt is $15 \times (1/3) = 5(N.M)$.

Bolts should be screwed down for the second time by following orders: bolt12, bolt6, bolt11, bolt5, bolt10, bolt4, bolt9, bolt3, bolt8, bolt2, bolt7, bolt1. In this time, the torque of each bolt is $15 \times (2/3) = 10(N.M)$.

Bolts should be screwed down for the third time by following orders: bolt1, bolt7, bolt2, bolt8, bolt3, bolt9, bolt4, bolt10, bolt5, bolt11, bolt6, bolt12. In this time, the torque of each bolt is $15 \times 1=15(N.M)$.

(2)、 Injection seat capacity is 210/210h
There are 8 pieces distant gears. Orders as following:
First time: bolt1, bolt5, bolt2, bolt6, bolt3, bolt7, bolt4, bolt8.
Second time: bolt8, bolt4, bolt7, bolt3, bolt6, bolt2, bolt5, bolt1.
Third time: bolt1, bolt5, bolt2, bolt6, bolt3, bolt7, bolt4, bolt8.

(3)、 Injection seat capacity is **300/300h**, **430/430h**, **580/580h**, **750/750h** There are 9 pieces distant gears. Orders as following: First time: bolt1, bolt5, bolt2, bolt6, bolt3, bolt7, bolt4, bolt8, bolt9. Second time: bolt9, bolt4, bolt8, bolt3, bolt7, bolt2, bolt6, bolt1, bolt5. Third time: bolt1, bolt5, bolt2, bolt6, bolt3, bolt7, bolt4, bolt8, bolt9.

As to the installation methods of other machines, please refer to the above.

Type of machine	Quantity of bolts (pcs)	The torque need of each bolt(N.M)
VE600-120	12-M6	15
VE900-210	8-M8	35
VE1200-320	9-M8	35
VE2300-820	9-M10	70
VE4100-1500	10-M12	100

Table 4.2.2(2) synchronous-wheel

(4)、Notice



Notice

1. Please install the distant gear according to the torque given in the table, otherwise, synchro-wheel may be broken or serious results.

2、 If the type of machine doesn't be listed in the table above, please contact supplier's service department.

4.2.3 Search for the mechanical reference

Steps:

1、Login the dialog box of zero set;

2. After choosing zero set function, move related mechanical components to the reference;

- 3、Set the reference and adjust the proximity switch;
- 4、Test the machine to check the actual stroke;
- 5、Finish.

Detail explanations:

1、Login the fourth level

- (1). Turn on the main power supply. (Do not turn on the button 'Motor on')
- (2)、 Click 'login' on the screen;
- (3)、 Type login passwords '020808' to the dialog box;
- (4)、Enter.

(See fig4.2.3(1))

Manual	Machine Overview	Cycle Mold: Cycle Time:	618 Login 0.00 s 1
Software Version Machine Type Passed Ratio Passed Ratio Passed Product Rejected Product D Mold Position 2.95 mm Ejector Position 0.00 mm Clamp Force 86.0 ton Inj. Compress OFF		7 8 9 Y U 1 4 H J K N M .	Pressure Mpa
Mold close 0.00 s Suck Back Plastication 0.00 s Injection Inj. Unit Forward 0.00 s Mold Open	2.18 s Holding Pressure 0.00 s 0.00 s Ejection 0.00 s 0.00 s Cooling 0.00 s	Cycle Interval	0.00 s 0.00 s 0.00 s
Setup Heating Clamp Inje	ect Product Mold Info	Overview Ala	rm Parameter

Fig 4.2.3 (1) login the fourth level

$\mathbf{2}_{\mathbf{v}}$ Login the menu of system's zero set

- (1), Click 'parameter' on the right of the screen;
- (2), Click 'zero set' on the right of 'parameter' menu.
- (See fig4.2.3 (2))

Manual				Zero Setting	Cycle Mold:	618	Login
				Zero Getting	Cycle Time:	0.00 s	
Zero Setup				Screw Parameter			
Zero Status	Off 🗙 III			Screw Diameter 32	.00 mm		
Speed	2.0 %			Max Injection Force 16	1.0 KN 8.05	v	
Force	30.0 <mark>%</mark>			Max Holding Force 120	3.8 <mark>KN</mark> 6.44	v	
Servo Axis	Zero Confirm	Encoder Value	Position	Standard Load Cell Calibration(10V) 200	0.0 KN		
Injection Axis	Zero End	48739464	36.00 mm	Load Cell Current Voltage	00 V 0.0	KN	
Mold Axis	Zero End	1060167435	2.95 mm	Load Cell Zero Offset	31 V		Monitor
Ejector Axis	Zero End	20564433	0.00 mm	Injection Pressure 0	.05 Mpa		бî~~
Mold Adjust Axis	Zero End	0	0.00 mm	Act Charge Axis Torque	00 <mark>Nm</mark> 0.0	%	Zero Set
Dias Bus				Act Clamp Axis Torque	00 Nm 0.0	%	Printer
Bus Statistic	29			Act Eject Axis Torque	00 <mark>Nm</mark> 0.0	%	
			,	Act Inject Axis Torque	00 Nm 0.0	%	Paral
Setup He	ating	Diamp	Inject	Product Mold Info	Overview A	<u>/</u> larm	Parameter
Alarm						13:46:42	11.12.07

Fig 4.2.3(2) zero setting menu

3、Set up speed and pressure of zero set

- (1)、 Click dialog box of 'speed';
- (2)、 Click '2' in the dialog box;
- (3)、 Click 'green hook';
- (4), Set up 'pressure' to 30.

(See fig4.2.3(3))

Manual			Zero Se	ettina	Cycle	Mold:	618	Login
			2010 0	sting	Cycle	Time:	0.00 s	4
Zero Setup			Screw Pa	arameter				
Zero Status	Off 🗙			_	X			
Speed	<mark>2.0</mark> %		R	eference Speed 2.0	%	8.05	v	
Force	30.0 %		Old	2.0 Min Max	1.0 20.0	6.44	v	
Servo Axis	Zero Confirm Encoder	Value Position	7	8 9	CL			
Injection Axis	Zero End 48739	464 36.00 mm				0.0	KN	
Mold Axis	Zero End 106016	7435 2.95 mm		2 0				Monitor
Ejector Axis	Zero End 20564	433 0.00 mm		2 3	- 08	ı		í~~
Mold Adjust Axis	Zero End O	0.00 mm		o		0.0	%	Zero Set
Dias Bus	<u>n n</u>	JL.	Act Clamp	Axis lorque	U.UU Nm	0.0	%	Printer
Bus Statistic	29		Act Eject A	Axis Torque	0.00 Nm	0.0	%	
			Act Inject	Axis Torque	0.00 Nm	0.0	%	Paral
Setup He	ating	Inject	<mark>)</mark> ୁ Product	Mold Infe	o Overvi	ew Al	1 arm	Parameter
Alarm						1	3:48:44	11.12.07

Fig 4.2.3(3) set up speed and pressure

$4_{\rm N}$ Click 'on' and move to the reference

(1)、Click 'motor on';

- (2)、 Click 'zero set', and then click 'on';
- (3) Choose the axis which need be setted zero. Operations as following: (See fig 4.2.3(5))

axis needs to set	Set zero	motion
Injection axis	Inject	Suck back
Mold axis	Mold chose	Mold open
Ejection axis	Eject back	Eject forward

Table 4.2.3(4) operational keys

Manual	Reference		-	Zero Setting	Cycle Mold:	618	Login
Zero Setup	- Ttelefende			Screw Parameter	Cycle fille.	0.00 0	
Soeed	20 %			Screw Diameter 32		-	
Force	30.0 %			Max Injection Force		Č	
	7 6 6	E 1 21	D it	Standard Load Cell	.8 KN 6.44	×	
Servo Axis	Zero Confirm	Encoder Value	Position	Calibration(10V)		_	
Injection Axis	Zero End	48739464	36.00 mm	Current Voltage	00 V 0.0	KN	
Mold Axis	Zero End	1060167435	2.95 mm	Load Cell Zero 0.3 Offset	n v		Monitor
Ejector Axis	Zero End	20564433	0.00 mm	Injection Pressure 0.	05 Mpa		<u>ш</u>
Mold Adjust Axis	Zero End	O	0.00 mm	Act Charge Axis Torque	DO Nm O.O	%	Zero Set
Dias Bus][]			Act Clamp Axis Torque 0.	DO Nm 0.0	%	Printer
Bus Statistic	29			Act Eject Axis Torque 0.	00 Nm 0.0	%	
				Act Inject Axis Torque	DO Nm 0.0	%	Para
Setup	ating (Diamp	Inject	Product Mold Info	Overview A	A larm F	dif
Alarm						13:55:10	11.12.07

Fig 4.2.3(5) zero setting

$5\,$ Click operational keys of zero setting and move the axis to the reference

(1) Dismantle the two proximity switches corresponding to axis loosely. Make sure it does not affect zero set.

(2)、According to table 4.2.3(4), press the key until the axis move to the reference, and then press 'Zero End'. Then "actual reference" shows 'zero'. (Until it can't move)

(3)、According to table 4.2.3(4), press the key of clamping. When the numeric value of actual reference is between 2mm and 3mm, press the key of 'zero set' again. It's the actual mechanical reference.

(4). Turn on the proximity switch of zero set to. Then fix them up.

(5) Move the model axis. When the numeric value of the actual reference is between 5mm and 10mm, press the key of zero set. Observe the proximity switch when actual reference is zero. If the light is not on, trim the sensor till all lights on.

(6), Move the model axis. Observe actual reference, and wait until it reaches to the maximum stroke. The system will stop.

(7)、 If actual reference doesn't reach maximum, adjust it as step 3.

- (8)、 Adjust the proximity switch to make them on at stroke end.
- (9)、Click 'off' to quit.

6、Test the machine to check the actual stroke

(1). Set the axis stroke from zero to maximum stroke.

(2)、Observe the maximum stroke to check whether it is the same as actual stroke.

(3)、Observe the zero stroke to check whether it is the same as actual stroke. **7**、**Finish**

Notice

During zero setting, operated speed must be below 3% of speed and operated pressure below 30% of pressure. Otherwise, the machine will be broken.

4.2.4 Test running of full-electrical injection moulding machine

(1), At the manual model, test the machine at low speed and pressure and with full stroke. In the test, set speed about 10% and pressure about 30%.

(2)、 At the manual model, test the machine at middle speed and pressure and with full stroke. In the test, set speed about 30%, pressure about 50%.

(3)、 At the manual model, test the machine at high s speed and pressure and with full stroke. In the test, set speed about 100%, pressure about 100%.
(4)、 Finish.

Notice

During tests, please press 'stop' button immediately if any abnormal happens. Find out the reason, and then do tests again.

4.2.5 Finish

- 1、Clean up the machine; tighten all wires;
- 2. Dismantle protective cover of the synchronous belt and install it rightly;
- 3、Dismantle the protective door and install it rightly;
- 4、Finish changing.

Chapter 5 KEB Malfunctions

5.1 Steps of changing KEB

- 1、Demount the broken KEB;
- 2、Replace a good KEB;
- 3、Upload KEB parameters;
- 4、 Connect a laptop with KEB, then search for the servo motor reference;
- 5、Test running of servo motor;
- 6、Set up the synchronization belt and adjust the tension;
- 7. Search for the mechanical reference;
- 8、Test running;
- 9、Finish.

5.2 Changing KEB in detail





5.2.1 Demount the broken KEB

1、 Open the back cabinet;

2、Remove DKI's wires which are connected to KEB, then remove KEB from inverter;

- Pull out signal terminals of KEB on the back of DKI and remove wires at the bottom of KEB;
- 4、Remove setscrews;
- 5、Take care of the replaced KEB.

<u> Notice</u>

Be careful when remove KEB, and keep it clean.

5.2.2 Replace a good KEB

🚹 Warning

After replace a new KEB, don't electrify before checking out broken reasons, otherwise, it will also make the new KEB broken easily.

- 1. Install KEB to the cabinet;
- 2. Connect wires to right terminals, according to below diagram;



Fig 5.2.2(1) KEB's power terminals

'L1、L2、L3' is connected to three face power supply, '+、 -' is connected to DC, 'PB、 +' is connected to trig resistance, 'T1、T2' is connected to servo motor's PTC's, and 'U、V、W' is connected to servo motor.



Fig 5.2.2(2) KEB's control terminals

1: analog '1+'; 2: analog '1-'; 5: analog output '1+'; 7: 10V power output; 8: analog grounding; 16: enable; 20: 24V power output; 21: 24V power input; 22: digital grounding.

- 3、Insert KEB enable terminal;
- 4、Insert DKI to KEB, and make circuitry well connected;
- 5、Check terminals and EMC.

5.2.3 Upload KEB parameters

Steps of uploading KEB parameters:

- 1、Set up parameter Ud02, and select KEB's mode
- 2、Open up dw5 file which needs to be uploaded
- 3、Upload

4、Turn off power supply after uploading, then connect hardware enable terminals.

Detail explanations:

- 1、Set up parameter Ud02, and select KEB's mode
- A. Choose parameter ud (as fig 5.2.3(1)).



Fig 5.2.3(1) Choose parameter ud

B $\$ Set parameter Ud02 to 8. Double click 'Ud02'—input 8—click 'ok'. (See Fig 5.2.3(2))



Fig 5.2.3(2) set up parameter ud





Fig 5.2.3(3) choose new edition

2、Open up dw5 file which needs to be uploaded

Click 'open' in KEB software→select dw5→click. (See Fig 5.2.3(4))

COMBIVIS 5 - New project UNREGISTERED DEMO VERSION - only for Eile Edit View Project-explorer Help	evaluation
Project-explorer - New project Parameter list Group properties ID: Name:	Value:
Image: Relation of the second state ruloo inverter state 打开 ? × 查找范围(L): 36t-keb	13: power un 0.000 1/min 0.000 1/min 0.0000 Hz 0.000 1/min
Image: second state of the second s	0.000 1/min 0.000 1/min 0.00 Nm 0.00 Nm
☐ mold.dw5 ☐ mold_mainparameter.dw5 文件名 ⑭): eject.dw5 [打开 ⑭]	0 % No Answer 0.0 A 0.0 A 0.0 A
文件类型 ①: Program files (*. pr5;*. wr5;*. dw5;*. s ▼ 取消 □ sur sustem parameter ru20 output voltage Fig 5.2.3(4) choose new edition	

- 3、Upload
- A、 Click 'down arrowhead' marked by red \rightarrow click 'Yes'.
- (See Fig 5.2.3(5), Fig 5.2.3(6))

KB	COMBI	IVIS 5 -	New pr	oject	UNR	EGISTERED DEMO VER	RSION - only for evaluation !!	
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	Projec	t-explo	rer - Ne	ew proje	et			
[····	Parameter list Group properties							
	Node 0							
		nvert	er parame	eter		ru00 inverter state	13: power upit pot readu	
	E C·\	KehDat	a\ Com	hivis5\ 8f	it-kek	\screw.dw5 - Node (
		REDBUI	.u /oom	014130 \01	JC KEL	Jonennano noue		
	<u> </u>							
	864	R/W	Set	Addr	ID	Parameter	Value Remarks 📥	
	0	WA	I.	0801h	Ud01	password	0	
	1	WA	I	0909h	Fr09	indirect set pointer	0	
	2	WA	I	0002h	SyO2	inverter identifier	1736: F5-S/V2.80 4000r	
	3			00001	F 00			
	4	WA		0909h	Frug	indirect set pointer		
	0	HU DO		0200h	ru00	inverter state	scrow dw5	
	12	RU DO		0201h	ru01	set value display	SCI EW.UWJ	
	6			02020	1002	actual frequency display	Process Download (write parameter list)	
	lå –	BO	-	0203h 0207h	1003	actual requericy display	to inverter Node 0 ?	
	10	BO	i i	0207H	1007	encoder 1 speed	I	
	11	BO	i i	0203H 0204h	nu10	encoder 2 speed		
	12	BO	i	020Bb	ru11	set torque display	Yes 🚫 No	
	13	RO	i	020Ch	ru12	actual torque display		
	14	RO	Ì	020Dh	ru13	actual utilization	0%	
	15	BW	I.	020Eh	ru14	peak utilization	75 %	
							• • • • • • • • • • • • • • • • • • •	
L *	1 1	<u> </u>	1000 1000				x-rago	

Fig5.2.3(5) upload inverter parameters

<mark>(E</mark> COMBI Eile <u>E</u> dit	IVIS 5 - ⊻iew so	New pr trew.dw5	oject <u>W</u> indow:	UNR 5 <u>H</u> elp	egistered demo ver	SION - only for evaluat	ion !!	
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Net	New project Parameter list Group properties							
₽ C:\1	KebDat	a∖Comb	ivis5\8	6t-keb	\screw.dw5 - Node O	1		- 🗆 ×
		_ ,			,			
								-
864	B/W	Set	Addr	ID	Parameter	Value	Remarks	
0	WA	I	0801h	Ud01	password	0		
12	WA WA		0909h 0002h	Fr09 Su02	indirect set pointer	0 1736: F5-S A/2 80 4000r		
3			000211	5902	Inverter identilier	1130.133772.0040001		
4	WA	1	0909h	Fr09	indirect set pointer	0		
15	RU BO		0200h 0201h	ru00	set value disclam	66: forward constant 0.000 12-34		
7	RO	i	0202h	ru02	ramp outpu screw.dw5			
8	RO	1	0203h	ru03	actual freq	Up/Download in pr	oaress	
19	RU BO		0207h 0209h	ruU7 ru09	actual valu encoder 1		- 3	
11	RO	i	020Ah	ru10	encoder 2	27%		
12	RO	1	020Bh	ru11	set torque	21/8		
13	RU BO		020Ch 020Dh	ru12	actual torg		-	
15	RW	i	020Eh	ru14	peak utiliza	Cancel		
: :	t ala () (ada	liaka			ru23 output conditi	on state A-177		

Fig 5.2.3(6) process of uploading

В、	Click	'ok'	to	finish

KE	COMI	BIVIS 5	- New pi	roject	UN	REGISTERED DEMO	VERS	ION - only for evaluat	tion !!	
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2	Proje	ect-expl	orer - N	ew proj	ject					
Fi		KobDat		iuie5\ O	6t-kok	l (10.0	1		
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Hi	004	P /bi/	Set	Adde	ID	Parameter		Value	Bemerke	
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Ш	2	WA	i	0002h	Sv02	inverter identifier		1736: F5-S/V2.80 4000r		
Ш	3				-,					
Ш	4	WA	1	0909h	Fr09	indirect set pointer		0		
Ш	5	RO	I.	0200h	ru00	inverter state		66: forward constant		
Ш	6	RO	1	0201h	ru01	set value display		0.000 1/min		
Ш	7	RO	I	0202h	ru02	ramp output display		0.000 1/min		
Ш	8	RU		0203h	ruU3	actual frequiscrew.d	w5			
Ш	5 10	R0		0207h 0209h	ru07	actual value encoder 1 s				
Ш	11	BO	1	0203n 0204h	nu10	encoder 1 s		Up/Download in pi	ogress	
Ш	12	RO	i	020Bh	ru11	set torque d				
Ш	13	RO	i i	020Ch	ru12	actual torgu		100%		
Ш	14	RO	1	020Dh	ru13	actual utiliza				
Ш	15	BW	1	020Eh	ru14	peak utilizat			ha l	
Ш							screw	r.dw5		
12	•						-	Up/Download finished.	₽	
17		M	no: nroa n	arameter	. para.	ru22 internal)		
Ε.			rp: prog. p k liete	aramotor		ru23 output	~			
			unload lists			ru24 state of				
		- bow Sco	ne files			ru25 outout		Ok 🗸		
		~							I	

Fig 5.2.3(7) uploading finish

4. Turn off power supply after uploading, then connect hardware enable terminals.

Hardware enable terminals are 16 and 20 terminations of the inverter.

5.2.4 Search for the servo motor reference by a laptop

Steps:

(1)、Reset KEB inverter (set up inverter's enable control bit to zero, di02=0)

(2)、Electrify

(3)、Input start codes for searching the reference.(Set up parameter **Ec02** 2206)

- (4)、 Set KEB inverter to work (clear inverter's enable control, di02=1)
- (5)、Observe the searching status
- (6)、Reset KEB inverter (Set up inverter's enable control bit to zero)

Detail explanations:

(1) Reset KEB inverter (Set up inverter's enable control bit to zero, di02=0)

A、 Choose parameter di. (See fig 5.2.4(1))

Click parameter di in the left dialog box.

🖳 Project-explorer - New project						
New project	Parameter list Group properties					
Node U	ID:	Name:	Value:			
R ru: run parameter	di00	PNP / NPN selection	0: PNP 1: ST			
······································	di02	digital input setting	1: ST			
C: cs: control speed parameter	di03	digital noise filter	0 ms 0: no incut			
B uf: u/f parameter	di04	input trigger	0: no input			
dr: drive parameter	di06	select strobe source	0: no input			
ec: encoder parameter	di07	strobe mode input strobe dependence	U: pos. slope 0: no input			
ud: user definition para.	di09	reset input selection	3: ST+RST			
an: analog 1/0 parameter	di10	neg slope f.reset inputs 11. functions	3:ST+RST 1:∞11			
G di: digital input parameter	di12	12 functions	2: sf2			
	di13	13 functions	8192: ef			
	di14 di15	14 functions IA functions	U: no function selected 0: no function selected			
	L 196	10 C C	• · · · · ·			

Fig 5.2.4(1) choose the parameter di

B、Set parameter **di02** to zero. (See fig 5.2.4(2))

Double click parameter $di02 \rightarrow type$ zero into the dialog box \rightarrow click 'OK'.



Fig 5.2.4(2) set parameter di02 to zero

(2)、Electrify

Click 'motor on' to let drivers work.

(3). Input start codes for searching the reference. (Set up parameter $\mathbf{Ec02}$ 2206)

A、Set up parameter ec (See fig 5.2.4(3))

Click parameter ec in the left of the dialog box.

🔄 Project-explorer - New project				
New project	Parameter I	ist Group properties		
Node 0	ID:	Name:	Value:	
 Inverter parameter ru: run parameter op: operational parameter pn: protection parameter cs: control speed parameter ds: drive spec. control para d: u/f parameter d: drive parameter d: drive parameter d: drive parameter cn: control parameter c: ec: encoder parameter ud: user definition para. f: free programmable para. f: free programmable para. d: digital input parameter d: digital output parameter le: level parameter in: information parameter 	ID: Ec00 Ec01 Ec02 Ec03 Ec04 Ec05 Ec06 Ec07 Ec10 Ec11 Ec12 Ec13 Ec14 Ec15 Ec16 Ec17	Name: encoder 1 interface encoder 1 (inc/r) absolute pos. enc.1 time 1 for speed calc. gear 1 numerator gear 1 determinator enc.1 rotation enc.1 trigger/mult. encoder 2 interface encoder 2 (inc/r) absolute pos. enc. 2 time 2 for speed calc. gear 2 numerator gear 2 determinator enc.2 rotation enc.2 trigger/mult.	Value: 19: Resolver Interface 1024: 1024 inc 57057 3: 4,0 ms 1000 1000 0: not invers+off 2: 4 times 2: Incremental Out 1024: 1024 inc 57057 3: 4,0 ms 1000 0: not invers+off 2: Incremental Out 1024: 1024 inc 57057 3: 4,0 ms 1000 1000 0: not invers+off 2: 4 times	
· · · · · · · · · · · · · · · · · · ·		• •		

Fig 5.2.4(3) set parameter Ec

 B_{\sim} Set up parameter **Ec02** 2206. (See fig 5.2.4(4))

1 21		0	
😫 Project-explorer - New project			
····· 🛅 New project	Parameter list		
	ID: N	Name:	Value:
	Ec00 e	encoder 1 interface	19: Resolver Interface
op: operational parameter	Ec01 e	encoder 1 (inc/r)	1024: 1024 inc
P pn: protection parameter	Ec02 a	absolute pos. enc.1	57057
C cs: control speed (Edit value	2		x
S ds: drive spec. col Ec02 abs	olute pos. enc.1 ;	;Inv.0;SetI	
B ul: u/t parameter 2206			
			tio-
E ec: encoder paran			
U ud: user definition			
Fr: free programma		🗸 Ok	🗙 Cancel
🔤 🖪 an: analog I/O pai			
di: digital input parameter	Ec14 o	jear 2 numerator	1000
do: digital output parameter	Ec15 o	jear 2 determinator	1000
le: level parameter	Ec16 e	enc.2 rotation	0: not invers+off
in: information parameter	Ec17 e	enc.2 trigger/mult.	2: 4 times
	Ec20 e	enc.operating mode	1: Output+term, resistor-
aa: adjustment assist. para.	Ec21 9	SSI multiturn res.	12

Double click parameter $Ec \rightarrow type$ 2206 into the dialog box \rightarrow click 'OK'.



(4) \smallsetminus Set KEB inverter to work (clear inverter's enable control, di02=1) The inverter is ready to work.

A、Set up parameter **di.** (See fig5.2.4(5))

Click the parameter **di** in the left of dialog box.

A Project-explorer - New project						
New project	Parameter	list Group properties				
Node U	ID:	Name:	Value:			
Inverter parameter Inverter parameter ru: run parameter op: operational parameter pr: protection parameter cs: control speed parameter ds: drive spec. control para uf: u/f parameter uf: drive parameter cn: control parameter inverter inver inverter inver inverter in	ID: di00 di01 di02 di03 di04 di05 di06 di07 di00	Name: PNP / NPN selection select signal source digital input setting digital noise filter input logic input trigger select strobe source strobe mode input strobe decondence	Value: 0: PNP 1: ST 0: no input 0 ms 0: no input 0: no input 0: no input 0: no input 0: no slope 0: pos. slope			
C. encode parameter U ud: user definition para. Fr: free programmable para. A an: analog I/O parameter G d: digital input parameter C do: digital output parameter L le: level parameter Fr: ps: pos/syn parameter Fr: inc information parameter	di08 di09 di10 di11 di12 di13 di14 di15	input strobe dependence reset input selection neg slope f.reset inputs I1 functions I2 functions I3 functions I4 functions IA functions	0: no input 3: ST+RST 3: ST+RST 1: sf1 2: sf2 8192: ef 0: no function selected 0: no function selected			

Fig 5.2.4(5) set the parameter **di**

B、Set up parameter di02 1. (See fig5.2.4(6))

Double click parameter $di02 \rightarrow input 1$ to the dialog box \rightarrow click 'OK'.



Fig 5.2.4(6) set the parameter di02 1

(5). Observe the searching status

The status could be judged by observing parameters as following

parameter	Parameter's content	Parameter's state					
ru00	inverter state	calculate drive data					
ru15	apparent current	Increase from zero to					
		rated current					
EC02	absolute pos. enc.1	changing					

Table 5.2.4(1) parameters in the state of finding

The inverter is in the right state when the parameter is the same as the content of table 2.2.3(1). Wait for a while (about between 20 to 30 seconds) to observe the parameter **Ec02**. It is the reference of the inverter' software when parameter **Ec02** is fixed.

(6)、Reset KEB inverter (set up inverter's enable control bit to zero, **di02**=0) Refer to step 1.

5.2.5 Test running of servo motor

Steps:

- 1、Cut off communication with the control;
- 2、Test running at low speed;
- 3、Test running at high speed;
- 4、Resume communication with the control;
- 5、Warnings and solutions.

Detail explanations.

1、Cut off communication with the control

Set up parameter Sy24 –1. Cut off communication with the control.

A、Set up parameter Sy24. (See fig5.2.5(1))





Fig 5.2.5(2) set the parameter Sy24 -1

2、Test running at low speed

(1). Set up parameter **oP03** 50, which means let the motor rotates by 50 rotation per minter.

A、Click parameter op. (See fig5.2.5(3))

Fig 5.2.5(3) click the parameter op





Fig 5.2.5(4) set the parameter oP03 50

(2)、Set up KEB inverter into work state. (Clear the inverter's enable control, **di02=**1)

- A、Click parameter di.(See fig 5.2.5(5))
- B_{\sim} Set up parameter **di02** to 1. (See fig 5.2.5(6))

🚉 Project-explorer - New project					
New project	Parameter	Parameter list Group properties			
Node 0	ID:	Name:	Value:		
Inverter parameter	di00	PNP / NPN selection	0: PNP		
op: operational parameter	di01	select signal source	1: ST		
P pn: protection parameter	di02	digital input setting	0: no input		
C cs: control speed parameter	di03	digital noise filter	0 ms		
- 5 ds: drive spec. control para	di04	input logic	0: no input		
B uf: u/f parameter	di05	input trigger	0: no input		
D dr: drive parameter	di06	select strobe source	0: no input		
cn: control parameter	di07	strobe mode	0: pos. slope		
E ec: encoder parameter	di08	input strobe dependence	0: no input		
U ud: user definition para.	di09	reset input selection	3: ST+RST		
F II: free programmable para.	di10	neg slope f.reset inputs	3: ST+RST		
H an: analog I/U parameter	di11	11 functions	1: sf1		
TL do: digital output parameter	di12	12 functions	2: sf2		
	di13	13 functions	8192: ef		
B ns: nos/sun parameter	di14	14 functions	0: no function selected		
□ in: information parameter	di15	IA functions	0: no function selected		

Fig 5.2.5(5) choose parameter di



Fig 5.2.5(6) set up parameter di02 to 1

(3), Observe the state of the motor.

While the inverter is working, servo motor starts to run. We can observe the state of the motor by parameters as following.

Parameter	Parameter's content	Parameter's state			
ru00	Inverter state	forward constant			
ru02	Ramp output display	Fifty			
ru09	Encoder 1 speed	About fifty			
ru15 Apparent current		Infinitesimal current			
Table 5.0.5(4) a superstant while the prostantic working					

Table 5.2.5(1) parameters while the motor is working

When actual parameters are the same as, it means both servo motor and inverter run exactly.

(4), Set direction of the motor' rotation.

Observe rotation direction from the side of axial direction when the motor works at low speed.

Fig 5.2.5(7) shows the concept of axial direction:



Fig 5.2.5(7) the concept of axial direction

If the rotation direction isn't correct, adjust parameter Ec06.

Motor	axial direction						
	VE600	VE900	VE1200	VE1500	VE4100		
Inject servo motor	anticlockwise	anticlockwise	anticlockwise	anticlockwise	anticlockwise		
Mould servo motor	anticlockwise	anticlockwise	anticlockwise	anticlockwise	anticlockwise		
Charge servo motor	clockwise	clockwise	clockwise	clockwise	clockwise		
Eject servo motor	clockwise	anticlockwise	anticlockwise	anticlockwise	anticlockwise		

Table 5.2.5(2) axial directions of different motors

Set-up procedures:

 $\rm i$ \backsim Reset KEB inverter. (Set up parameter di02 to zero)

A、Click parameter di. (See fig 5.2.5(8))

😫 Project-explorer - New project						
New project	Parameter list Group properties					
Node 0	ID: Name:		Value:			
R ru: run parameter	di00	PNP / NPN selection	0: PNP			
op: operational parameter	di01	select signal source	1: ST			
P pn: protection parameter	di02	digital input setting	1: ST			
C cs: control speed parameter	di03	digital noise filter	0 ms			
	di04	input logic	0: no input			
B uf: u/f parameter	di05	input trigger	0: no input			
D dr: drive parameter	di06	select strobe source	0: no input			
cn: control parameter	di07	strobe mode	0: pos. slope			
E ec: encoder parameter	di08	input strobe dependence	0: no input			
U ud: user definition para.	di09	reset input selection	3: ST+RST			
Fr: free programmable para.	di10	neg slope f.reset inputs	3: ST+RST			
	di11	11 functions	1: sf1			
	di12	12 functions	2: sf2			
	di13	13 functions	8192: ef			
	di14	14 functions	0: no function selected			
In: information parameter	di15	IA functions	0: no function selected			
	L rae	ID C C				

Fig 5.2.5(8) click the parameter di





Fig 5.2.5(9) set the parameter di02 zero

- ii 、Set up parameter Ec06.
 - A、Select parameter ec.

😫 Project-explorer - New project						
New project	Parameter list Group properties					
Node U	ID:	Name:	Value:			
	Ec00	encoder 1 interface	19: Resolver Interface			
	Ec01	encoder 1 (inc/r)	1024: 1024 inc			
P pn: protection parameter	Ec02	absolute pos. enc.1	57057			
C cs: control speed parameter	Ec03	time 1 for speed calc.	3: 4,0 ms			
S ds: drive spec. control para	Ec04	gear 1 numerator	1000			
B uf: u/f parameter	Ec05	gear 1 determinator	1000			
D dr: drive parameter	Ec06	enc.1 rotation	0: not invers+off			
N cn: control parameter	Ec07	enc.1 trigger/mult.	2: 4 times			
ec: encoder parameter	Ec10	encoder 2 interface	2: Incremental Out			
U ud: user definition para.	Ec11	encoder 2 (inc/r)	1024: 1024 inc			
Fr: rree programmable para.	Ec12	absolute pos. enc. 2	57057			
in an analog i/o parameter	Ec13	time 2 for speed calc.	3:4,0 ms			
do: digital output parameter	Ec14	gear 2 numerator	1000			
	Ec15	gear 2 determinator	1000			
	Ec16	enc.2 rotation	0: not invers+off			
in: information parameter	Ec17	enc.2 trigger/mult.	2: 4 times			

Fig 5.2.5(10) click the parameter ec

B、 Double click parameter **Ec06** \rightarrow change the state of the inverter system (change 'on' to 'off 'to 'on') \rightarrow click 'OK' (See fig5.2.5(11)).



Fig 5.2.5(11) set the parameter **Ec06**

- iii、Set the inverter to work. (Set up parameter di02 to zero)
- A、Click parameter di. (See fig 5.2.5(12))

😫 Project-explorer - New project							
New project	Parameter list Group properties						
 New project Node 0 Inverter parameter ru: run parameter op: operational parameter pr: protection parameter cs: control speed parameter ds: drive spec. control para uf: u/f parameter dr: drive parameter ch: control parameter ch: control parameter fr: free programmable para. fr: digital input parameter 	Parameter ID: di00 di01 di02 di03 di04 di05 di06 di07 di08 di08 di09 di10 di11 ii10	Group properties Name: PNP / NPN selection select signal source digital input setting digital noise filter input logic input trigger select strobe source strobe mode input strobe dependence reset input selection neg slope f.reset inputs 11 functions	Value: 0: PNP 1: ST 0: no input 0 ms 0: no input 0: no input 0: no input 0: no input 0: pos. slope 0: no input 3: ST+RST 3: ST+RST 1: sf1				
do: digital output parameter do: le: level parameter H ps: pos/syn parameter in: information parameter	di12 di13 di14 di15	12 functions 13 functions 14 functions 1A functions	2: sf2 8192: ef 0: no function selected 0: no function selected				

Fig 5.2.5(12) click the parameter di

B、Set up parameter **di02** to 1. (See fig5.2.5(13))



Fig 5.2.5(13) set the parameter di02 one

 $\operatorname{iv}_{\times}$ Make sure the motor rotates in correct direction.

(5), Finish the low speed test

Click parameter 'op'. Set up parameter op03 to zero. At last stop the motor. (See fig5.2.5(14))



Fig 5.2.5(14) set the parameter oP03 zero

3、Test running at high speed

Set up parameter **oP03** to test the servo motor at a high speed.

(1)、 Run the servo motor at high speed. (500r/m)

Click parameter op. Set parameter oP03 to 500. (See fig5.2.5(15))



Fig 5.2.5(15) set the parameter oP03 five hundred

Observe parameters as following:

Parameter	Parameter's content	Parameter's state
ru00	inverter state	forward constant
ru02	ramp output display	500
ru09	encoder 1 speed	About 500
ru15	apparent current	Infinitesimal current

Table 5.2.5(3) observe the parameters in a high speed

The servo motor works well if there is no shake or abnormal noise.

(2)、 Let the motor work at rated speed. (oP03=dr24)

A、Click parameter dr, and select parameter dr24. (See fig5.2.5(16))

😫 Project-explorer - New project						
New project	Parameter list Group properties					
Node 0	ID:	Name:	Value:			
R ru: run parameter O op: operational parameter	dr15 dr23	max torque FU DSM rated current	131.31 Nm 15.9 A			
pn: protection parameter	dr24	DSM rated speed	1200 1/min			
C cs: control speed parameter S ds: drive spec. control para	dr25 dr26	DSM rated frequency DSM EMK voltage constant	80.0 Hz 376			
B uf: u/f parameter	dr27	DSM rated torque	60.0 Nm			
	dr28 dr30	DSM curr. f. zero speed DSM stator resistance	18.5 A 1.091 Ohm			
E ec: encoder parameter	dr31	DSM inductance	17.14 mH			
F] fr: free programmable para.	dr32	DSM rated power	7.53 kW			
- A an: analog I/O parameter	dr33 dr34	mot.prot. time 300% Id	0.5 s			
	dr35	mot.prot. time Imax	0.2 s			
I la laval naramatar	0136	modprod recovery time	0.0 %			

Fig 5.2.5(16) click the parameter dr24

B、Click parameter **op**. Set parameter **oP03** the same as parameter **dr24**. (See fig5.2.5 (17))



Fig 5.2.5(17) set parameter **oP03** the same as parameter **dr24**

(3) The servo motor works well if there is no shake or abnormal noise.
Select parameter **op.** Set up **Op03** to 0, and then the motor stops working. **4** Resume communication with the control

Click parameter **sy**. Set up parameter **sy** 0303h. (See fig5.2.5(18)) Double click parameter **Sy24** \rightarrow Type 0303h into the dialog box \rightarrow Click 'OK'.



Fig 5.2.5(18) set up parameter sy 0303h

5.2.6 Search for the motor's reference and trial test running of

the motor by Sigmatek controller

Notice

Please make sure the synchronous belt is off before searching or will cause serious ecological consequences.

$I \space{-1mu}$ Search for the motor's reference by Sigmatek controller

Main steps of searching for the motor reference of VENUS:

- 1、 Electrify
- 2、 Upload related parameters of servo motor
- 3、 Search for the motor's reference

Detail explanations:

1、Electrify

(1) Weak electricity on

Make sure that whole electric circuitry is ok. Then turn on the switch of chief line on the front of the machine. See fig 5.2.6(1).

Notice: Don't press 'motor on' on the keyboard when power is on.

(2) Force electricity

Under the situation that all I/O signals are normal, turn on two bottons [heat

on] and [motor on] on the keyboard. See fig 5.2.6 (2) .



图 5.2.6 (2)

Notice:

In order to ensure the injection part on fully electrical injection machine safe, the programmes include security designs of injection and storing parts that demand VENUS has to meet two requirements as below.

 If the tempreture deviation between the setted value and current value is within the allowed scope or not. See fig 5.2.6(3) in which the tempreture has reached the setted one.

② Screw cold boot to prevent delay time to the setted one. See fig5.2.6(4) in which the delay time is 100s. Then start the inverter.

See fig5.2.6(5), if the inverter enables, then [inverter on] lights on; otherwise, [inverter on] lights off.

Manua	al			Barrel Heating			Cycle Mole	d: 0	Login
							Cycle Time	e: 0.00 s	
								T	
	193.2	198.1	199.8	203.7	195.3			38.1	
C*	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5			Hopper	
SET	200.0	200.0	200.0	200.0	200.0			35.0	
REAL	193.2	198.1	199.8	203.7	195.3			38.1	227.0.22
MAX +	10.0	10.0	10.0	10.0	10.0			10.0	Para
MIN -	10.0	10.0	10.0	10.0	10.0			10.0	200 200 a
MODE	PID	PID	PID	PID	PID				Tuning
STANDBY	150.0	150.0	150.0	150.0	150.0				
STATUS					•				Barrel
ALARM									
Standby M	Node Off)	K St	andby Time	100.00	0.00 mii	i -			Schedule
		-							
Satur					Product	Mold Info	SPEC	Alarm	f
Alarm	Heattin	g Olai						18:49:12	18.12.07

Fig 5.2.6(3)



Synchron 🔲

Act Torque 0.0 %

DKI Version

52

1111111111

Alarm

V01.01

111111111

0

Synchron 🦳

DKI Version V01.01

Act Torque 0.0 %

Cycle

JU

18.12.07
- 2、Upload related parameters of servo motor
- (1)、 Connect the computer with a special U disk. See fig 5.2.6(6)



Fig 5.2.6(6) Connect the USB connecter with a special U disk

(2)、Reset KEB inverter

Before uploading motor's parameters to KEB inverter, we must resume KEB settings, called RESET KEB.

Steps as following:

① After entering into the main menu, click 'Parameter' to enter into 'Parameter-setting' menu. See fig 5.2.6(8)

② Click 'Triangle button' on bottom right to turn to 'Confidential parameter' menu. See fig 5.2.6(8)

Manual	Main Parameter	Cycle Mold	: 618	Login
		Cycle Time	: 0.00 s	5
Language Setting	Time Setting	Screen Saver		
English	Time 12:52:28	Screen Saver Delay Time	10.00 min	Setting 1
Unit Metric	Date 11.12.07			Setting 2
Modify Password Old Password New Password Confirm Password confirm				Source 2 Source 2 Monitor Zero Set
Setup Heating Clamp	Inject Product Mold	Info	Alarm	Para1
Alarm			12:52:28	11.12.07

Fig 5.2.6(8) Parameter-setting menu

③ Click 'KEB-Inject' to enter into 'Injection KEB parameter' menu.

See fig 5.2.6(9)

Notice: 'KEB-Inject' corresponds to the servo inverter.

④ Click 'Reset KEB', then click 'Yes' in the dialog area to reset KEB. The screen and keyboard will reboot.

See fig 5.2.6(10) and fig 5.2.6(11)

Manual		Controller				Cycle Mold:	618	Login
						Cycle Time:	0.00 s	5
Motor - Speed C	Controller					Injectio	on	
	Injection	Mold	Ejector	Charge		Кр	550	Controller
КV	10000	10000	10000	20000		Tn	300	
VU	300	525	100	0		Kp Pressure	0	
						Tn Pressure	0	Special
OL2 Protection					Inje	ct Controll Mode	Speed Mode	
Speed Hz	3	3	6	6		Speed Limit	1.00 mm/s	K-Mold
Force %	68.0	75.0	100.0	70.0	Back Pressure			1
Force Release						Кр	350	K-Inject
	Injection	Mold	Ejector			Tn	100	
Velocity mm/s	20.00	20.00	20.00			Holdin	9	K-Eject
Acc/Dec mm/s ^z	20.00	20.00	20.00			Кр	66	K-Plast
Force %		15.0	15.0			Tn	50000	
Force Mpa	10.00					Speed Limit	149.00 mm/s	
					_			
Setup Heating Clamp Inject Product Mold Info								
Alarm							12:52:51	11.12.07

Fig 5.2.6(9) selecting menu of inverter

Manual		Injection KE	EB Paramet	er Cycle Mo	ld: 618	Login
Injection KEB Parameter ru00 Invert State ru01 Set Value Display ru09 Encoder Speed ru11 Set Torque Display ru12 Actual Torque Display ru15 Apparent Currunt ru17 Active Currunt ru20 Output Voltage ru54 Actual Position Over Speed Offset Over Speed Check Time le04 do04	13 rpm 0 rpm 0.00 Nm 0.00 A 0.00 A 0.00 A 0.0 A 10 0.0 v 16629666 v 10 10 0.50 rpm 10 0.50 rpm	Injection KEB Parameter cs06 KP speed cs09 KI speed cs19 Abs.Torque.Ref fr10 Load.Mot.Dependent.Para di01 Select Signal Source di02 Digital Input Setting ec00 Encoder Interface ec01 Encoder(Inc/r) ec06 Encoder Rotation op03 Reference Setting	2000 700 205.00 Mm 0 1 1 1 1 512 44240 0 0 0 0 0 0 0 0 1 6400	Update Reset KEB Motor Ref		Controller Cpu Info Special K-Mold
Setup Heating	Clam	D Inject Produc	t Mold II	nfo Overview	Alarm	Parameter
Alarm					12:53:20	11.12.07

Fig 5.2.6(10) KEB parameter menu of injection

Manual		Injection KEB Parameter	Cycle Mold:	618	Login
			Cycle Time:	0.00 s 🛸	
Injection KEB Paramete	ər	Injection KEB Parameter	Update		
ru00 Invert State	13	cs06 KP speed 2000	Reset KEB		Controller
ru01 Set Value Display	0 rpm	cs09 KI speed 700			
ru09 Encoder Speed	0 rpm	cS19 Abs.Torque.Ref 205.00 Nm	Motor Ref		Cpu Info
ru11 Set Torque Display	0.00 Nm	fr10_Load Mot Decendent Para			
ru12 Actual Torque Display	0.00 Nm	×			Special
ru15 Apparent Currunt	0.0 A				
ru17 Active Currunt	0.0 A	Do yo really want to Reset?			K-Mold
ru20 Output Voltage	0 v	Yes No			-
ru54 Actual Position	46629666				K-Inject
Overspeed Protection F	Parameter	ec06 Encoder Rotation 0			_
		op03 Reference Setting 0 rpm			32
Over Speed Offset	10				K-Eject
Over Speed Check Time	0.50				52
	200.00 rpm	Parameter Nr 030A	Read		K-Plast
doU4	U	Parameter Value 16400	Sava		
			Guit		
			5000%		<u> </u>
Setup Heating	g Clamp	Inject Product Mold Info	Overview A	larm Pa	rameter
Alarm				12:54:28 1	1.12.07

Fig 5.2.6(11) KEB reset dialog box

- (3) Search for the motor's reference
- ① After reboot, click 'mold info'. See fig 5.2.6(12).

Manual		Mold Info	Cycle Mold:	618 Login
			Cycle Time:	0.00 s 🔭 😏 5
Directory	C:\ZHAFIR	1		File Type
I≇-C:\ZHAFIR —	Nr Filename	Time	Date 🔺	Mold Info
	_			
				Save
				Del
				Сору
				Paste
Setup	Clamp Inject F	De Mold Info	Overview	Alarm Parameter
Alarm				12:56:26 11.12.07

Fig 5.2.6(12) menu of mould data

② On the left of the menu there is a 'Directory'. Select 'E' disc after insert an USB. Then select the files in which contains motor parameters, that is E—KEB Motor Parameter—ALPHA60 (Notice: ALPHA60 includes four motor parameter files). Select 'KEB Injection File' which is in the 'File Type' option. Then there appears a file in the middle of the menu named 'INJECT.IK'. See fig5.2.6(13).

Manual		Mold Info	Cycle Mold:	618	Login
		inola inic	Cycle Time:	0.00 s	
Directory	E:\KEB Motor Parameter\ALPH	HA60		File Type	
C:VZHAFIR	Nr Filename	Time 09:59:20	Date	KEB Injec	tion File
-CruzerLock2				Inject Config File	•
-PocketCache Trial Ve				Crosshead Table	,
₱ 01_12_USB				Bitmap	
KEB Motor Paramete				KEB Mold File KEB Ejector File	
♥SRC00				KEB Injection Fi	le V
- SRC					
					Save
					Del
	_				Сору
	1			-	
			▼		Paste
Setup Heating	Clamp	Product Mold Info	Overview	Alarm	Parameter
Alarm				12:57:31	11.12.07

Fig 5.2.6(13) steps before parameter uploading

③ Double-click 'INJECT.IK'. There will appear a dialog box. Select 'Yes' to upload injection motor parameters to KEB inverter, and click 'OK' when uploading completes.

See fig 5.2.6(13) and fig 5.2.6(14)

Now, preparative works of searching for the reference have been done.

Manual		Mold Info		Cycle Mc	old:	618	Login
				Cycle Tin	ne:	0.00 s	
Directory	E:\KEB Motor Parameter\ALPH Nr Filename 1 INJECT.IK	IA60	Time 09:59:20	Date 12.06.07		File Type KEB Injec	tion File
CruzerLock2 CruzerSync PocketCache Trial Ve ₱01_12_USB							
⊕parameter ⊖-KEB Motor Paramete └-ALPHA60 Seccoor			_			×	
SRC		?	Load	I this file ? INJECT.IK			
		N	Yes		lo		Save
	_						Del
							Сору
	,				•		Paste
Setup Heating	Clamp Inject F	De Mok	d Info	Overview		Alarm	Parameter
Alarm				(12:58:13	11.12.07

Fig 5.2.6(14) upload dialog box



Fig 5.2.6(15) uploading finished

3、Search for the motor's reference.

(1) Start searching

Click 'update' on 'inject KEB parameter' menu, with green lights on. Then click the button 'Motor Reference', and click 'start' in the dialog box to start searching. See fig 5.2.6(16)

Notice: Please check again that the belt is off, otherwise, it will cause serious damage to machine parts. Meanwhile, 'update' must be turned on with operators near by while searching.

(2) During searching

Fig 2.2.5(17) shows midway on searching and 5.2.6(18) shows the end of searching.

While searching, consult fig 5.2.6(15) to check if the searching process is normal and if the searching is finish.

Observing parameter **ru00**, while the value reaches 82, it means reference starting.

(3) End of searching

Observe parameter **Ec02**. It is the reference of the inverter' software when parameter **Ec02** is fixed.

After searching, set di02=0, then set di02=1.

Turn off "motor off:

Turn on "motor on"

The reference searching is finish now.

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	82
Ru15	apparent current	0——rated current
Ec02	absolute pos. enc.1	Dynamic changing

Table 5.2.6(15)

Other 3 servo motors have the similar searching process, so do not describe here any more.

Manual	Injection KEB Parameter	Cycle Mold: 618 Cycle Time: 0.00 s	Login					
Injection KEB Parameter ru00 Invert State 0 ru01 Set Value Display 0 rpm ru09 Encoder Speed 0 ru11 Set Torque Displ	Injection KEB Parameter cs06 KP speed cs09 KI speed 700 cs19 Abs Torque Ref 205 00	Update Reset KEB Motor Ref	Controller Cpu Info					
ru12 Actual Torque Di ru15 Apparent Currunt ru17 Active Currunt ru20 Output Voltage ru54 Actual Position Overspeed Protect Over Speed Offset	The Di Motor Reference Motor Reference You must take care of this conditions: - Motor has to be free revolably - Stay at the machine during motor reference - Motor has to be turned on Start							
Over Speed Check Time le04 0.00 rpm do04 0	Parameter Nr 030A Parameter Value 16400	Read Save	K-Plast					
Setup Heating Clamp	Inject Product Mold Info	Overview Alarm	Parameter					

Fig 5.2.6(16) dialog boxes of searching for the reference

Manual Injection KEB Parameter					er	Cycle M	old:	618		ogin	
		_					Cycle Tir	ne:	0.00 s		🤣 5
Injection KEB Paramete	ər		Injection KEB Parameter] [Update	•			
ru00 Invert State	82		cs06 KP speed	2000	Ī		Reset KEB				Controller
ru01 Set Value Display	0	rpm	cs09 KI speed	700	Ī		INCOUTINED				
ru09 Encoder Speed	0	rpm	cS19 Abs.Torque.Ref	205.00	Nm		Motor Ref				Cpu Info
ru11 Set Torque Display	31.67	Nm	fr10 Load.Mot.Dependent.Para	0	Ī						
ru12 Actual Torque Display	31.76	Nm	diO1 Select Signal Source	1	Ī						Special
ru15 Apparent Currunt	13.2	A	diO2 Digital Input Setting	1	[
ru17 Active Currunt	13.3	A	ec00 Encoder Interface	16							K-Mold
ru20 Output Voltage	12	v	ec01 Encoder(Inc/r)	512	[
ru54 Actual Position	46640344		ec02 Absolute Position.Enc	44249							K-Inject
Overspeed Protection F	Parameter		ec06 Encoder Rotation	0	[1	ix inject
			op03 Reference Setting	0	rpm						8
Over Speed Offset	10										K-Eject
Over Speed Check Time	0.50										8
le04	0.00	rpm	Parameter Nr	030A	1		Read				K-Plast
do04	0		Barameter Value	40.400	-						
				16400			Save				
						-					
	_	_		_	_	_		_	_		
		51		-1-	•		STER.			D.C.	
Setup Heating		amp	Inject Produc	et Mc	old Ir	nfo	Overview	A	arm	Par	ameter
Alarm									3:01:39	11	.12.07

Fig 5.2.6(17) midway on searching

Manual	Injection KEB Parameter	Cycle Mold: 618 Login Cycle Time: 0.00 ^s ~~ 5
Injection KEB Parameter ru00 Invert State 82 ru01 Set Value Display 0 ru09 Encoder Speed 0 ru11 Set Torque Display 72.00 ru12 Actual Torque Display 72.00 ru15 Apparent Currunt 29.9 ru20 Output Voltage 16 ru54 Actual Position 46640343 Overspeed Protection Parameter 0	Injection KEB Parametercs06 KP speed2000cs09 KI speed700cs19 Abs.Torque.Ref205.00nfr10 Load.Mot.Dependent.Para0di01 Select Signal Source1di02 Digital Input Setting1ec00 Encoder Interface680000010ec01 Encoder(Inc/r)512ec02 Absolute Position.Enc44246ec06 Encoder Rotation0op03 Reference Setting0	Cycle Time: 0.00 \$ 5
Over Speed Check Time 0.50 le04 0.00 de04 0	Parameter Nr 030A Parameter Value 16400	Read Save

Fig 5.2.6(18) the end of searching

${\rm I\hspace{-1.5pt}I}$ \backsim Test running of the servo motor

Venus has 4 servo motors in all. Here, mainly introduce test running process of the injection servo motor, while other three are similar.

(1), Test running of the injection servo motor

Steps as following:

- 1. Return to mechanical reference
- 2. Test running at low speed
- 3. Test running at middle speed
- 4. Test running at high speed

1、Return to mechanical reference

Enter into menu "Zero Setting". Choose "On" in the dialog of "Zero Status", and then click "Zero End" of "Injection Axis" with "Encoder Value" to 0.00mm. See fig

5.2.6(19).

Manual Move Reference	Zero Setting Cycle Mold: 618 Cycle Time: 0.00 ^s	Login
Zero Setup	Screw Parameter	
Zero Status On 🗸	Screw Diameter 32.00 mm	Setting 1
Speed 1.0 %	Max Injection Force 161.0 KN 8.05 V	Setting 2
Force 10.0 %	Max Holding Force 128.8 KN 6.44 V	Source 1
Servo Axis Zero Confirm Encoder Value Position	Standard Load Cell 200.0 KN	
Injection Axis Zero End 46640341 0.00 mm	Load Cell 0.00 V 0.0 KN	Source 2
Mold Axis Zero End 1060167435 2.95 mm	Offset 0.31 V	Monitor
Ejector Axis Zero End 20564433 0.00 mm	Injection Pressure 0.05 Mpa	(i)
Mold Adjust Axis Zero End 0 0.00 mm	Act Charge Axis Torque 0.00 Nm 0.0 %	Zero Set
Dias Bus	Act Clamp Axis Torque 0.00 Nm 0.0 %	Printer
Bus Statistic 29	Act Eject Axis Torque 0.00 Nm 0.0 %	Pare1
	Act Inject Axis Torque 0.00 Nm 0.0 %	
Setup Heating Clamp Inject	Product Mold Info	Parameter
Alarm	13:03:53	11.12.07

Fig 5.2.6(19)

2 Test running at low speed

(1) "Suck back" settings

Enter into menu 'Charge'. Set up 'Zones' to '1', then set up 'SE' to maximal. (For this machine the maximal injection stroke is 115mm)

Next set up the suck back speed to 15mm/s (We set 10% of the maximal speed as low speed in test running, while maximal speed is 150mm/s). At last set up 'Safety Time' to '20s'. See fig 5.2.6(20).

Manual		Charge Settings	Cycle Mold: 618 Cycle Time: 0.00 s	Login 🌝 5
Pressure Release	Charge		Suck Back	
Position 30.00 mm	Position V1 V2	S 2 - S E 115.00 mm Zones V E	Position (Offset value) 0.00 mm Velocity 15.00 mm/s	
Safety Time 5.00 0.00 s	Pressure P1 P2 BP1 BP2	PE 60.0 % BPE	Safety Time 20.00 2.18 s	
	Back Pressure	0.00 Mpa		Para
401 ∱y (rpm) 		Delay Time Befo Charge Safety t Scre w Backward	ore Charge 0.00 0.00 s ime 100.00 0.00 s d Mode Charge & Hold.	Carriage
0	L	115.00 Position (mm)		
Screw Position 36.00 mm	V/P Position 0.00 mm	Back Pressure 0.05 Mpa	iharge Axis Torque 0.0 %	Curve
Injection Peak 0.00 Mpa	V/P Velocity 0.00 mm/s	Min. Cushion 0.00 mm	Screw Rotate 0 rpm	Charge
V/P Time 0.00 s	V/P Pressure 0.00 Mpa	Cushion Complete 0.00 mm		Charge
Setup	Clamp	Product Mold Info	Overview Alarm Pa	rameter
Alarm		-	13:05:19 1	1.12.07

Fig 5.2.6(20)

(2) "Injection" settings

Enter into 'Injection' of menu "Injection settings". Enter into 'position mode' of menu 'V/P mode', and set up 'V/P time' to 20s. Then set up injection 'speed' with 15mm/s (This speed is 10% of the maxium speed, the same as the suck back speed). Set up 'pressure' with 100Mpa (Notice: This value cannot be 0Mpa). At last set up 'zones' to 3. See fig 5.2.6(21)

Manual	Injection Settings	Cycle Mold: 618 Login Cycle Time: 0.00 s 3 5
Pressure Holding Pressure P E ← P 3 ← P 2 ← P 1 0.00 Mpa TE T3 T2 T1 Time 0.00 s Zones 1 1 1	Injection Position S 6 S 5 S 4 S 3 C 0.00 V 6 V 5 V 4 V Velocity 15.00 Injection Pressure Press	S 2 ← S 1 ← SB 4.99 25.00 115.00 mm 3 V 2 V 1 15.00 15.00 mm/s P Zones sure 0.00 100.00 Mpa 3
V/P Position V/P Time 10.00 s V/P Position 0.00 mm V/P Velocity 0.00 mm/s	Ure(MPa) 149.861 V (mm/s)	Cooling Time 0.00 0.00 s Injection Delay Time 0.00 0.00 s Lipietter 115.00 HPM
Screw Position 36.00 mm V/P Position Injection 0.05 Mpa V/P Velocity Injection Peak 0.00 Mpa V/P Pressure	0.00 mm V/P Time 0.00 s Characterization 0.00 mm/s Min. Cushion Position 0.00 mm 0.00 Mpa Cushion Complete Position 0.00 mm	arge Axis Torque 0.0 % Screw Rotate 0 rpm Speed 0 rpm
Setup Heating Clamp	Inject Product Mold Info	Overview Alarm Parameter

Fig 5.2.6(21)

(3) Observe the running status

Turn on 'heating' and 'motor on' on the keyboard. Press buttons 'inject' and 'suck back' to rotate motor. Enter into menu 'Injection KEB Parameter' to observe the running status.

If actual parameters correspond with those in table 5.2.6(22) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	66
Ru01	setpoint value display	±1600
Ru09	encoder 1 speed	close to±1600
Ru15	apparent current	less than 1 A

Table 5.2.6(22)

(4) Set the direction of motor rotation.

Press the button 'inject' and 'suck back' on the keyboard. Observe the motor's rotation from the axis direction. Fig 5.2.6(23) gives the concept of axis

direction.



Fig 5.2.6(23) the concept of axis direction

Motor	Direction of the axis			
	40T——410T			
Injection Servo Motor	Inject Anticlockwise Suck back Clockwise			
Table 5.2.6(24)				

If the direction is as fig 5.2.6(24), then it is correct. If not, we have to adjust it. Methods as following:

Enter into 'Injection KEB Parameter'. See fig 5.2.6(25).

Manual	Manual Injection KEB Parameter Cycle Mold: 618 Log						Login			
		_					Cycle Tir	ne:	0.00 s	5
Injection KEB Paramete	er		Injection KEB Parameter			1	Update			
ru00 Invert State	13		cs06 KP speed	2000		1	Bacat KEB			Controller
ru01 Set Value Display	0	rpm	cs09 KI speed	700		l	Reset KLD			
ru09 Encoder Speed	0	rpm	cS19 Abs.Torque.Ref	205.00	Nm		Motor Ref			Cpu Info
ru11 Set Torque Display	0.00	Nm	fr10 Load.Mot.Dependent.Para	0						
ru12 Actual Torque Display	0.00	Nm	diO1 Select Signal Source	1						Special
ru15 Apparent Currunt	0.0	A	diO2 Digital Input Setting	1						
ru17 Active Currunt	0.0	A	ec00 Encoder Interface	16						K-Mold
ru20 Output Voltage	0	v	ec01 Encoder(Inc/r)	512						
ru54 Actual Position	48739468		ec02 Absolute Position.Enc	44246						K Inject
Overspeed Protection F	Parameter		ec06 Encoder Rotation	0						K-Inject
			op03 Reference Setting	0	rpm					1
Over Speed Offset	10									K-Eject
Over Speed Check Time	0.50									1
le04	0.00	rpm	Parameter Nr	030A		1	Read			K-Plast
do04	0		Parameter Value	40.400						
				16400		l	Save			
			13			8				
		_		_	_	_				
		5			•		STER.			in the second se
Setup Heating		amp	Inject Produc	et Mo	ld In	fo	Overview	Al	arm	Parameter
Alarm					-			1	3:08:18	11.12.07

Fig 5.2.6(25)

Injection KEB Parameter Injection KEB Parameter Update ru00 Invert State 13 co06 KP speed co07 KI speed ru01 Set Value Display 0 rpm rpm Injection KEB Parameter Update ru11 Set Torque Display 0.00 npm ru12 Actual Torque Display 0.00 Nm ru12 Actual Torque Display 0.00 Nm ru13 Select Signal Se 7 8 9 CL ru20 Output Voltage 0 v ru54 Actual Position 48739467 V e00 Encoder Interface 4 5 6 + Overspeed Offset 10 0.00 rpm 1 2 3 - op03 Reference Settir 0 op03 Reference Settir 0 0 Save Ver Speed Check Time 0.50 10 0 Gaune Tor Gaune Tor K-Plast dodd 0 0 rpm 030A Read Save F F	Manual	Injection KEB Parameter	Cycle Mold: 618 Login Cycle Time: 0.00 ^s 76 5	Mold: 618 Login Time: 0.00 ^s 5
	Injection KEB Parameter ru00 Invert State 13 ru01 Set Value Display 0 ru09 Encoder Speed 0 ru11 Set Torque Display 0.00 ru12 Actual Torque Display 0.00 ru15 Apparent Currunt 0.0 ru20 Output Voltage 0 v v ru54 Actual Position 48739467 Over Speed Offset 10 Over Speed Offset 10 Over Speed Offset 0.00 le04 0.00	Injection KEB Parameter cs06 KP speed cs09 KI speed cs19 Abs.Torque.Ref fr10 Load.Mot.Depen di01 Select Signal So di02 Digital Input Sett ec01 Encoder (Inc/r) eC02 Absolute Positio parameter Nr D30A Parameter Value	Update Controll B Cpu Inf B B Cpu Inf Specia Cpu Inf Cpu	Controller Cpu Info Special K-Inject K-Eject
Setup Heating Clamp Inject Product Mold Info Overview Alarm Parameter	Setup Heating Clam	nject Product Mold Info	Overview Alarm Paramete	Alarm Parameter

Fig 5.2.6(26)

Set up the value of 'ec06' to adjust the direction.

If the current value of 'ec06' is '0', then change the value to '16' to adjust the direction;

If the current value of 'ec06'is '16', then change the value to '0' to adjust the direction;

If the current value of 'ec06' is '1', then change the value to '17' to adjust the direction;

If the current value of 'ec06' is '17', then change the value to '1' to adjust the direction.

Please reconfirm the directions of inject and suck back.

See fig 5.2.6(26).

3、Test running at middle speed

Turn on "motor off" and set up the speed of 'inject' and 'suck back' into '50%', which is 75mm/s here. Turn on "Motor on" and choose "Inject" and "Suck back" on the keyboard. Then enter into menu "Injection KEB Parameter' to observe the status. If actual parameters correspond with those in table 5.2.6(27), but no

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	66
Ru01	Setpoint value display	±8000
Ru09	encoder 1 speed	close to±8000
Ru15	apparent current	less than 1 A

vibration or noise, then the motor and the inverter both work well.

Table 5.2.6(27)

4、Test running at high speed

Turn on "motor off" and set up the speed of 'inject' and 'suck back' to the maximal speed, which is 15mm/s here.

Turn on "Motor on" and choose "Inject" and "Suck back" on the keyboard. Then enter into menu "Injection KEB Parameter' to observe the status. If actual parameters correspond with those in table 5.2.6(28), but no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
Ru00	inverter state	66
Ru01	Setpoint value display	±16000
Ru09	encoder 1 speed	close to±16000
Ru15	apparent current	less than 1 A

Table 5.2.6(28)

Now, test running of servo motor has been finished have finished. Next is to install the synchronous belt on servo motor.

(2), Test running of charge motor

The charge axis need not return to mechanical reference.

Steps:

- 1. Test running at low speed
- 2、 Test running at middle speed
- 3、 Test running at high speed
- 1、Test running at low speed

(1) Charge settings

Enter into menu 'Charge settings'.

Manual	Charge Settings		Cycle Mold: 618	Login		
			Cycle Time: 0.00 s 🍨			
Pressure Release	Charge		Suck Back			
Position 30.00 mm	Position V1 V2	S 2 - S E 115.00 mm Zones V E	Position (Offset value) 0.00 mm			
Velocity 30.00 mm/s	Velocity	40 rpm 1	Velocity 15.00 mm/s			
Safety Time 5.00 0.00 s	P 1 P 2 Pressure BP1 BP2	P E 60.0 % BPE	Safety Time 20.00 2.18 s			
	Back Pressure	0.00 Mpa		Para		
401 tv (rpm) Delay Time Before Charge 0.00 0.00 s Charge Safety time 100.00 0.00 s						
		Screw Backward	I Mode Charge & Hold.	Inject		
0	<u>.</u>	115.00 Position (mm)				
Screw Position 36.00 mm	V/P Position 0.00 mm	Back Pressure 0.05 Mpa	harge Axis Torque 0.0 %	Curve		
Injection Peak Pressure 0.00 Mpa	V/P Velocity 0.00 mm/s	Min. Cushion 0.00 mm	Screw Rotate 0 rpm	Charge		
V/P Time 0.00 s	V/P Pressure 0.00 Mpa	Cushion Complete Position 0.00 mm				
Setup Heating Clamp Inject Product Mold Info						
Alarm		0	13:10:50	1.12.07		

Fig 5.2.6(29)

Set 'Velocity' to '40rpm' (10% of the maximal speed), 'Pressure' to '60%', 'Back pressure' to 0 and 'Charge Safety Time' to '100s'. See fig 5.2.6(29)

(2) Observe running status

Turn on 'Heating' and 'Motor On' on the keyboard and click 'Charge' to rotate the motor. Enter into the menu 'Charge KEB Parameter'.

If actual parameters correspond with those in table 5.2.6(30) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±1600
ru09	encoder 1 speed	close to±1600
ru15	apparent current	less than 1 A

(3) Set the direction of motor's rotation.

Observe the motor's rotation from the axis direction.

Motor	Direction of the axis		
	40T	410T	
Charge Servo Motor	Charge	Clockwise	

Fig 5.2.6(31)

If the direction is as fig 5.2.6(31), then it is correct. If not, we have to adjust it. Methods refer to injection motor.

2、Test running at middle speed

Turn on 'motor off' and set charge 'Velocity' to 50%, which is 200rmp in this example.

Turn on 'Motor on' and choose 'Charge' on the keyboard to rotate the motor. Then enter into menu "Injection KEB Parameter' to observe the status. If actual parameters correspond with those in table 5.2.6(32), but no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±8000
ru09	encoder 1 speed	close to±8000
ru15	apparent current	less than 1 A

Fig 5.2.6(32)

3、Test running at high speed

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±16000
ru09	encoder 1 speed	close to±16000
ru15	apparent current	less than 1 A

Fig 5.2.6(33)

Turn on 'motor off' and set charge 'Velocity' to 100%, which is 400rmp in this example.

Turn on 'Motor on' and choose 'Charge' on the keyboard to rotate the motor. Then enter into menu "Injection KEB Parameter' to observe the status. If actual parameters correspond with those in table 5.2.6(33), but no vibration or noise, then the motor and the inverter both work well.

Now, test running of servo motor has been finished have finished. Next is to install the synchronous belt on servo motor.

(3)、Test running of mold motor

Steps:

- 1、 Return to mechanical reference
- 2、 Test running at low speed
- 3、 Test running at middle speed
- 4、 Test running at high speed
- 1、Return to mechanical reference

Please refer to injection servo motor.

2、Test running of low speed

(1) Mold Open Settings

Set 'Zones' to 3, 'Safty time' to 12s, 'Velocity' to 10%. See fig 5.2.6(34).

Manual	Mold Open Settings	Cycle Mold: 618 Login Cycle Time: 0.00 s 3 5
SE S5 S2 Position 320.00 VE V5 Velocity 10.0	1 S3 S2 S1 20.00 10.00 V4 V3 V2 10.0 10.0	Zones mm 3 V 1 10.0 %
100 v (%)	2.95	Safety Time 12.00 0.00 s
320.00 Mold Position 2.95 mm Crosshead Position 41.88 mm Ejector Position 0.00 mm	Position (mm) Clamping Force 86.0 ton Eject On The Fly Yes Air Blow 1 Off X	Air Blow 1 Off X (Female) Off X Air Blow 2 Off X Air Blow 2 Off X (Male) Off X
Alarm		13:11:29 11.12.07

Fig 5.2.6(34)

(2) Mold Close Settings

Set 'Zones' to '4', 'Safety Time' to '12s' and 'Velocity' to'10%'. See fig 5.2.6(35).

Manual	Mold Close Settings	Cycle Mold: 618 Login Cycle Time: 0.00 s 3 5
S 0 S 1 S 2 Position 320.00 190.00 5.00 V 1 V 2 V2 Velocity 10.0 10.0 Act Clamp Axis Torque 0.0 %	S3 S4 S5 1.50 1.50 V3 V4 V5 Protect Force 30.0 % Clamp Force	S E Zones 0.00 mm 4 E 0 % Clamp Time 0.00 s B6.0 ton Core 2 Time 15.00 0.00 s
0 320.00	2.95 C Position (mm)	Core C Core B Copen
Mold Position 2.95 mm Crosshead Position 41.88 mm Ejector Position 0.00 mm	Clamping Force 86.0 ton Eject On The Fly Yes Air Blow 1 Off X	Air Blow 1 Off Close (Female) Off Close Air Blow 2 Off Ejector Air Blow 2 Off Close Close
Setup Heating Clamp	Inject Product Mold Info	Overview Alarm Parameter

Fig 5.2.6(35)

(3) Observe running status

Turn on 'Motor On' and click 'Mold Open' and 'Mold Close' on the keyboard to rotate the motor. Enter into the menu 'Mold KEB Parameter' to observe the running status.

If actual parameters correspond with those in table 5.2.6(36) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±1600
ru09	encoder 1 speed	close to±1600
ru15	apparent current	less than 1 A

Table 5.2.6(36)

(4) Set the direction of motor's rotation

Observe the motor's rotation from the axis direction.

Motor	Direction of the axis			
	40T410T			
Mold Servo Motor	Mold Open	Clockwise	Mold clamp	Anticlockwise
Table E $2 C(27)$				

Table 5.2.6(37)

If the direction is the same as in fig 5.2.6(37), then it is correct. If not, we have to adjust it. Methods refer to injection motor.

3、Test running at middle speed

Turn on 'Motor Off' and set mold close 'Velocity' to 50%.

Turn on 'Motor On' and click 'Mold Open' and 'Mold Close' on the keyboard to rotate the motor. Enter into the menu 'Mold KEB Parameter' to observe the running status.

If actual parameters correspond with those in table 5.2.6(38) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±8000
ru09	encoder 1 speed	close to±8000
ru15	apparent current	less than 1 A

Table 5.2.6(38)

4、Test running at high speed

Turn on 'Motor Off' and set mold close 'Velocity' to 100%.

Turn on 'Motor On' and click 'Mold Open' and 'Mold Close' on the keyboard to rotate the motor. Enter into the menu 'Mold KEB Parameter' to observe the running status.

If actual parameters correspond with those in table 5.2.6(39) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±16000
ru09	encoder 1 speed	close to±16000
ru15	apparent current	less than 1 A

Table 5.2.6(39)

Now, test running of servo motor has been finished have finished. Next is to install the synchronous belt on servo motor.

(4)、Test running of ejector motor

Steps:

- 1、 Return to mechanical reference
- 2、Test running at low speed
- 3、Test running at middle speed
- 4、Test running at high speed
- 1、Return to mechanical reference

Please refer to injection servo motor.

2、Test running of low speed

(1) Ejector Settings

Set 'Zones' of Eject forward to 1, 'Position' to the maximum, which is 80mm in this example, and set 'Velocity' to 10%.

Set 'Zones' of Eject Backward to 1, 'position' 'SE' to 0, 'Velocity' to 10%. Set 'Eject Mode' to 'Semi Eject', Eject Counter' to 1, 'Safty time' to 12s. See fig 5.2.6(40).

Manual	Ejector Settings Cycle Mold: 618 Cycle Time: 0.00 s		618 Login
			0.00 s 号 5
Eject Forward	Eject Backward		
S1 -> S2 -> SE Zones	SE 🗲 S2 -	← S 1	Zones
Position 80.00 mm 1	Position 0.00	mm L	
	Velocity 10.0	V2 V1	Para
100 <u>p</u> ∨ (%)	100↑V (%)		Core
0.00	0.00		Air
			HE
0			Comp.lnj.
D 80.0 Position (mr	້ວ ບັ າ)	P	80.00 osition (mm)
Eject Mode Semi Eject	Act Eject	Axis Torque 0.0	% Open
Eject Counter 1 Eject On The Fly	Yes	fold Position 2.95	mm Close
Delay Time 0.00 0.00 s Start Position	204.00 mm Crossh	ead Position 41.88	mm)- Ejector
Standby Time 0.00 0.00 s Safety time	12.00 0.00 s Eje	ctor Position 0.00	mm
Setup Heating Clamp Inject	Product Mold Info	Overview Ala	rm Parameter
Alarm		13:	13:38 11.12.07

Fig 5.2.6(40)

(2) Observe running status

Turn on 'Motor On' on the keyboard and click 'Eject Forward' and 'Eject Backward' to rotate the motor. Enter into the menu 'Eject KEB Parameter'. If actual parameters correspond with those in table 5.2.6(41) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±1600
ru09	encoder 1 speed	close to±1600
ru15	apparent current	less than 1 A

Table 5.2.6(41)

(3) Set the direction of the motor's rotation.

Observe the motor's rotation from the axis direction.

Motor	Direction of the axis			
		40T——	410T	
Ejector Servo Motor	Ejector Forward	Anticlockwise	Ejector Backward	Clockwise

Table 5.2.6(42)

If the direction is the same as in table 5.2.6(42), then it is correct. If not, we have to adjust it. Methods refer to injection motor.

3、Test running at middle speed

Turn on 'Motor Off' and set 'Velocity' of eject forward and eject backward to 50%.

Turn on 'Motor On' and click 'Eject Forward' and 'Eject Backward' on the keyboard to rotate the motor. Enter into the menu 'Eject KEB Parameter' to observe the running status.

If actual parameters correspond with those in table 5.2.6(43) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	setpoint value display	±8000
ru09	encoder 1 speed	close to±8000
ru15	apparent current	less than 1 A

Table 5.2.6(43)

4、Test running at high speed

Turn on 'Motor Off' and set 'Velocity' of eject forward and eject backward to 100%.

Turn on 'Motor On' and click 'Eject Forward' and 'Eject Backward' on the keyboard to rotate the motor. Enter into the menu 'Eject KEB Parameter' to observe the running status.

If actual parameters correspond with those in table 5.2.6(44) and there is no vibration or noise, then the motor and the inverter both work well.

Parameter	Content of parameter	Parameter state display
ru00	inverter state	66
ru01	Setpoint value display	±16000
ru09	encoder 1 speed	close to±16000
ru15	apparent current	less than 1 A

Table 5.2.6(44)

Now, test running of servo motor has been finished have finished. Next is to install the synchronous belt on servo motor.

Remarks: 'ru01' and 'ru09' display values are on the basis of the motor's 'rated speed', which is 2000/rpm in this example, so we calculate like this:

For test running at low speed, |ru01|=2000×10%×8=1600rpm, |ru09| is around 1600rpm.

For test running at middle speed, |ru01|=2000×50%×8=8000rpm, |ru09| is around 8000rpm.

For test running at middle speed, |ru01|=2000×100%×8=16000rpm, |ru09| is around 16000rpm.

It is the same to calculate values of other rated speed motors.

5.2.7 Install synchronous-belt and test the tension

Clamping unit (Codes of components, see Fig 5.2.7(1) clamping unit.)
 Install synchronous-belt for clamping unit





① Put a belt on one gear, then tighten ②Install bolts (3 pieces) and gear cover the belt and put the belt on the other gear.



③ Strain the synchronous-belt by moving the motor outward(as the arrow shows).



④Tighten flange installation bolt(4 bolts must be tightened simultaneous)



Fig 5.2.7(1) Test method of tensiometer

(2) Test on clamping synchronous-belt tension

⑤ Put the professional tensiometer (fig 5.2.7(1)) (Tensiometer directions refer

to appendix II) away from the synchronous-belt about 10mm, and the best

position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendix I), to check if the belt tension is right or not.

(6) If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is



smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. Adjust the tension until its value is equal to the standard.

⑦ If the value is right, then tighten nuts first, and then screw down flange installation bolts.



Notice

Two tension adjusting bolts should be screwed down synchronously, to avoid imbalance and damage to the synchronous-belt while working.

2、Plastification unit

(1) Install synchronous-belt for plastification unit. (Codes of components see fig 2.2.1(3) plastification unit)

1 Put the belt on one gear, then tighten the belt and put the belt on the other gear.

② Install bolts (3 pieces) and gear cover.

③ Strain the synchronous-belt by moving the motor outward.

④ Tighten flange installation bolts (4 bolts must be tightened synchronously).

(2) Plastification synchronous-belt tension testing.

⁽⁵⁾ Put the professional tensiometer (fig 5.2.7(1)) (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendix I), to check if the belt tension is right or not.

⁽⁶⁾ If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten

flange installation bolts before testing again. Adjust the tension until its value is equal to the standard.

 $\ensuremath{\overline{\textit{O}}}$ If the value is right, then tighten nuts first, and then screw down flange installation bolts.



Fig5.2.7(3) Ejector unit and the four parts of the belt

(1) Install synchronous-belt.

①Rotate the synchronous-belt wheels4 (2 pieces) by hands. Let the ejector guide-panel on limit position (front-end or back-end).

⁽²⁾Put the belt on synchronous-belt wheels. Notice: tighten the first and third part of belt to keep the belt tension. Then the belt goes around tighten wheels, at the same time tighten the first and second part of belt to keep the belt tension. Finally put the belt on motor-wheel3 and keep the belt tension.

(2) Test on ejector synchronous-belt tension.

Divide the ejector synchronous-belt into fours parts, as Fig5.2.7(1). If the belt is well installed, according to the theory, when the belt is zero-distortion, the tension of each part should be same. So it is ok to test the first part which is longest part.

Testing approaches:

Tighten flange installation bolts (the four bolts must be tightened simultaneously).

⁽⁵⁾Put the professional tensiometer (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendix I), to check if the belt tension is right or not.

⁽⁶⁾ If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts4; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. Adjust the tension until its value is equal to the standard.

Notice: Two tension adjusting bolts should be screwed down synchronously, to avoid imbalance and damage to the synchronous-belt while working.

⑦ If the value is right, then tighten nuts first, and then screw down flange installation bolts. Installation and adjustment are finished.

4、Injection unit.

(1) Install synchronous-belt for injection unit. (Codes of components see Fig 2.2.1(7) injection unit.)

① Put the belt on one gear, then tighten the belt and put the belt on the other gear.

2 Install the bolts (3 pieces) and gear cover.

③ Strain the synchronous-belt by moving the motor outward.

④ Tighten flange installation bolts. (Four bolts must be tightened synchronously)

(2) Injection synchronous-belt tension testing.

⁽⁵⁾ Put the professional tensiometer (Tensiometer directions refer to appendix II) away from the synchronous-belt about 10mm, and the best position is in the middle of tow gears, then tension the belt by hands. The tensiometer displays tension values by measuring air vibration. Then compare to synchronous-belt tension-form (appendix I), to check if the belt tension is right or not.

⁽⁶⁾ If actual value is bigger, then it means the belt is too tight. First, loosen flange installation bolts4; second, loosen tension adjusting bolts, at last do remember to tighten flange installation bolts before testing again. If the value is smaller, then it means the belt is to loose. First, loosen flange installation bolts; second, screw down the tension adjusting bolts; at last do remember to tighten flange installation bolts before testing again. If the value is equal to the standard.

Notice: Two tension adjusting bolts should be screwed down synchronously, to avoid imbalance and damage to the synchronous-belt while working.

1 If the value is right, then tighten nuts first, and then screw down flange installation bolts. Installation and adjustment are finished.

5、

Notice

1. While testing the synchronous belt, do not knock with a rubber hammer or other similar thing.

2. Please double check the synchronous-belt after installation to avoid unnecessary errors.

5.2.8 Search for the mechanical reference

Searching Steps:

- 1、Login the dialog box of zero set;
- 2、After choosing zero set function, move related mechanical components to the reference;
- 3、Set the reference and adjust the proximity switch;
- 4、Test the machine to check the actual stroke;
- 5、Finish..

Detail explanations:

$1 \mathbf{x}$ Login the fourth level

- (1)、 Turn on the main power supply (Do not turn on the button 'Motor on');
- (2)、Click 'login' on the screen;
- (3)、 Type login passwords '020808' to the dialog box;
- (4)、Click 'Enter'.

See fig 5.2.8(1)

Manual	Machine Overview	Cycle Mold: Cycle Time:	618 0.00 s	Login 🍤 1
Software Version D - V01_13-01.01.127 Machine Type HTD86 - E210 Passed Ratio 100.0 % H1 H2 Passed Product 618 Rejected Product 0 Mold Position 0 2.95 mm Ejector Position 0.00 mm Clamp Force 86.0 ton 1nj. Compress OFF 0	2 3 4 5 6 D W E R T A S D F G Z X C V B	Y U I H J K N M .	0 P 0 P L 7 ew Speed 1 rpm k Pressure 05 Mpa	
Mold close 0.00 s Suck Back 2.18 s Plastication 0.00 s Injection 0.00 s Inj. Unit Forward 0.00 s Mold Open 0.00 s Setup Heating Clamp Inject	Holding Pressure 0.00 s Ejection 0.00 s Cooling 0.00 s	Cycle Interval Cycle Time	0.00 s	Overview Cycle

Fig 5.2.8(1) login the fourth level

$\mathbf{2}_{\mathbf{v}}$ Login the menu of system's zero setting

- (1), Click 'parameter' on the right of the screen;
- (2)、 Click 'zero set' on the right of parameter menu

(See fig5.2.8(2))

Manual	Manual		Zero Setting	Cycle Mold:	618	Login
				Cycle Time:	0.00 s	4
Zero Setup			Screw Parameter			
Zero Status	X nc		Screw Diameter 32	2.00 mm		
Speed	2.0 %		Max Injection Force 16	1.0 KN 8.05	v	
Force	30.0 %		Max Holding Force 12	8.8 KN 6.44	v	
Servo Axis	Zero Confirm Encoder Value	Position	Standard Load Cell 20 Calibration(10V)	0.0 KN		
Injection Axis	Zero End 48739464	36.00 mm	Load Cell Current Voltage	00 V 0.0	KN	
Mold Axis	Zero End 1060167435	2.95 mm	Load Cell Zero Offset 0.	31 V		<u>L</u> Monitor
Ejector Axis	Zero End 20564433	0.00 mm	Injection Pressure	.05 Mpa		(î~~
Mold Adjust Axis	Zero End O	0.00 mm	Act Charge Axis Torque	.00 Nm 0.0	%	Zero Set
Dias Bus	``````````````````````````````````````		Act Clamp Axis Torque	.00 Nm 0.0	%	Printer
Bus Statistic	29		Act Eject Axis Torque	.00 Nm 0.0	%	
			Act Inject Axis Torque	.00 Nm 0.0	%	Paral
Setup Heating Clamp Inject Product Mold Info Overview Alarm Parameter						arameter
Alarm					3:46:42	11.12.07

Fig 5.2.8(2) zero setting menu

$3_{\scriptscriptstyle N}$ Set up speed and pressure of zero set

- (1), Click dialog box of speed;
- (2)、 Click '2' in the dialog box;
- (3)、 Click green hook;
- (4), Set up the pressure to 30.
 - (See fig5.2.8(3))

Manual			Zero Setting	Cycle Mold:	618	Login
			Zero octaing	Cycle Time:	0.00 s	4
Zero Setup			Screw Parameter			
Zero Status	off 🗙			X		
Speed	<mark>2.0</mark> %		Reference Speed	% I 8.05	v	
Force	30.0 %		Old 2.0 Min Max	1.0 20.0 6.44	v	
Servo Axis	Zero Confirm Encoder Value	Position	7 8 9 0			
Injection Axis	Zero End 48739464	36.00 mm		0.0	KN	
Mold Axis	Zero End 1060167435	2.95 mm				<u></u> Monitor
Ejector Axis	Zero End 20564433	0.00 mm	1 2 3	- Da		(j~~
Mold Adjust Axis	Zero End O	0.00 mm		0.0	%	Zero Set
Dias Bus	JL R		Act Clamp Axis lorque U.	UU Nm 0.0	%	Printer
Bus Statistic	29		Act Eject Axis Torque	00 Nm 0.0	%	
Act Inject Axis Torque 0.00 Nm 0.0 %						
Setup Heating Clamp Inject Product Mold Info						
Alarm					3:48:44	11.12.07

Fig 5.2.8(3) set up speed and pressure

4、 Click 'on' and move to the reference

- (1)、 Click 'motor on';
- (2), Click 'zero setting', and then click 'on';
- (3) Select the axis which need be setted to zero. Operations as following:

axis needs to set	Set zero	motion
Injection axis	Inject	Suck back
Mold axis	Mold chose	Mold open
Ejection axis	Eject back	Eject forward

Table 5.2.8(4) operational keys

Manual	Poforonac	_		Zero Setting	Cycle Mold:	618	Login
lviove	Reference				Cycle Time:	0.00 s	- 4
Zero Setup				Screw Parameter			
Zero Status	On 🗸			Screw Diameter 32.	.00 mm		
Speed	2.0 %			Max Injection Force 161	.0 KN 8.05	v	
Force	30.0 %			Max Holding Force 128	1.8 KN 6.44	v	
Servo Axis	Zero Confirm	Encoder Value	Position	Standard Load Cell 200 Calibration(10V)	1.0 KN		
Injection Axis	Zero End	48739464	36.00 mm	Load Cell Current Voltage	0.0 V 0.0	KN	
Mold Axis	Zero End	1060167435	2.95 mm	Load Cell Zero 0.3 Offset	81 V		Monitor
Ejector Axis	Zero End	20564433	0.00 mm	Injection Pressure 0.	05 Mpa		<u> </u>
Mold Adjust Axis	Zero End	0	0.00 mm	Act Charge Axis Torque 0.	DO Nm 0.0	%	Zero Set
Dias Bus	<u>, </u>			Act Clamp Axis Torque 0.	DO Nm 0.0	%	Printer
Bus Statistic	29			Act Eject Axis Torque	00 <mark>Nm</mark> 0.0	%	
				Act Inject Axis Torque	DO Nm O.O	%	Paral
Setup	ating C	Dan K	Inject	Product Mold Info	Overview A	A larm F	Å rameter
Alarm						3:55:10	11.12.07

Fig 5.2.8(4) zero setting menu

5、Click operational keys of zero setting and move the axis to the reference

(1) Dismantle the two proximity switches corresponding to axis loosely. Make sure it does not affect zero set.

(2) According to table 5.2.8(4), press the key until the axis move to the reference, and then press 'Zero End'. Then "actual reference" shows 'zero', which means sto moving. (3) According to table 5.2.8(4), press the key of clamping. When the numeric value of actual reference is between 2mm and 3mm, press the key of 'zero set' again. It's the actual mechanical reference.

(4). Turn on the proximity switch of zero set to. Then fix them up.

(5) Move the model axis. When the numeric value of the actual reference is between 5mm and 10mm, press the key of zero set. Observe the proximity switch when actual reference is zero. If the light is not on, trim the sensor till all lights on.

(6), Move the model axis. Observe actual reference, and wait until it reaches to the maximum stroke. The system will stop.

(7)、 If actual reference doesn't reach maximum, adjust it as step 3.

(8). Adjust the proximity switch to make them on at stroke end.

(9)、 Click 'off' to quit.

6、Test the machine to check the actual stroke

(1). Set the axis stroke from zero to maximum stroke.

(2). Observe the maximum stroke to check whether it is the same as actual stroke.

(3) \smallsetminus Observe the zero stroke to check whether it is the same as actual stroke. **7** \checkmark **Finish**

Notice

During zero setting, operated speed must be below 3% of speed and operated pressure below 30% of pressure. Otherwise, the machine will be broken.

5.2.9 Test running of full-electrical injection moulding machine

(1). At the manual model, test the machine at low speed and pressure and with full stroke. In the test, set speed about 10% and pressure about 30%.

(2)、 At the manual model, test the machine at middle speed and pressure and with full stroke. In the test, set speed about 30%, pressure about 50%.

(3)、 At the manual model, test the machine at high s speed and pressure and with full stroke. In the test, set speed about 99%, pressure about 100%.
(4)、 Finish.



During tests, please press 'stop' button immediately if any abnormal happens. Find out the reason, and then do tests again.

5.2.10 Finish

- 1、 Clean up the machine; tighten all wires;
- 2. Close the back cover of the button chest, and fasten setscrews.



Chapter 6 C-IPC Malfunctions

Fig6 C-IPC interfaces

6.1 Steps of changing C-IPC

- 1、 Demount the broken C-IPC;
- 2、Install a good C-IPC;
- 3、Upload the main program to C-IPC;
- 4、 Upload configuration files and system files to C-IPC;
- 5. Search for the mechanical reference of the injection machine;
- 6、Test running of the machine;
- 7、Finish.

6.2 Changing C-IPC in detail

6.2.1 Demount the broken C-IPC





Shown as fig 6.2.1(1), we should remove the C-IPC bus shielding grounding wire and main grounding wire at first, then pull out 24V power wire C-DIAS bus and S-DVI data wire, at last pull out the whole C-IPC.

Notice

Be careful when pull out the C-IPC.

6.2.2 Install a good C-IPC

Notice

Don't electrify C-IPC before find out the broken reason; otherwise, C-IPC will be easily broken again.

1. There are two bus terminals on the base of C-IPC. Insert C-DIAS bus terminals to relevant position. Then tighten two screws. Insert C-DIAS bus and S-DVI data wire, and connect grounding wire and C-DIAS bus shielding grounding wire to C-IPC PE. See fig 6.2.1(1).



C-DIAS ports



DIAS ports

Fig 6.2.2(1) C-IPC bottom ports

2. Check the circuitry from 24v electrical source and recover malfunctions which make the C-IPC broken before electrification.



6.2.3 Upload the main program to C-IPC

1、Open USB plastic covers, and then insert a U-disc (including program files) and USB keyboard to any two USB connectors.



Fig 6.2.3(1) three USB connectors on the display

2、Electrify the injection machine and update system files. As fig 6.2.3(2), there are five options on the screen:
online parame G Evit	eter of remote station: IP/192.168.100.1
9 Exit 1 update p 2 update s	project sisualization
3 update 0 4 update s	DS system_Files
please enter	a number:

Fig 6.2.3(2) after starting

(1), Input 4 and click 'Enter';

(2). After finishing copying files, there will be prompts as following fig6.2.3(3). Press 'Enter' to return to the main menu.



Fig 6.2.3(3) copy over

(3)、 Pull out U-disc, and input 0 to quit. Then press 'Enter' to see fig6.2.3(4))



Fig 6.2.3(4) enter '0' to quit

(4)、 Press 'Enter' to reset the system and update is over.

3、Checkout the touch screen

After reboot, go to C root and input command 'CALIB'. See fig 6.2.3(5)

C:>LSLLOAD	
CHECKING PROJECT	[
LOB-HEHDERS MOD.DEPENDENCY	100%
FIXUP VAR. PRE-INIT	100% 100%
CHECK FIXUPS	100%
DONE PROJECT LOP	IDED
C:∖>	



(1)、 Click the cross cursor on top left corner;

(2)、 Click the cross cursor on the right

(3)、 Click the cross cursor at he bottom;

(4). Then the program will save files automatically and restart. See 6.2.3(5). Touch screen starts working now.

If you do any step wrong during the course, please input command 'CALIB' under C root, and follow above steps again.

Varning

Only command 'CALIB' can be inputted after reboot. Any other command is not allowed.

4、Upload main programs

Close electrical source and insert U-disc again. Electrify after one minute.



Fig 6.2.3(6) main menu after reboot

(1), Input 1 to update main programs.

(2) Wait a moment, the system enters into a new menu as fig 6.2.3(7). Press 'Enter', to return to main menu. (as fig 6.2.3(6))



Fig 6.2.3(7) Uploading finished

- 5、Reboot system
- (1)、 Pull out U-disc and keyboard, plug plastic covers on USB.

(2)、 Select '0' on the main menu and click 'Enter'. The system restarts and enters into injection machine menu automatically.



Notice

Please use a special U-disc from Zhafir, or it may cause data losing and damages to the machine.



Please make sure there is no scrap iron or other foreign matters on U-disc and keyboard. Plug plastic covers in time.

6.2.4 Upload configuration files and system files to C-IPC

Steps:

- (1), Upload mold configuration files;
- (2), Upload injection configuration files;
- (3), Upload ballscrews conversion table;
- (4)、Upload system files.

Types of configuration files are listed in below table.

Type of uploading files	extension	example
mold configuration files	CFG	VE600.CFG
injection configuration files	HTD	210.HTD
ballscrew conversion table	CSV	VE600.CSV
system files	SYS	VE600.SYS

Table 6.2.4(1) types of configuration files

- 1、Upload mold configuration files
- (1)、Insert U-disc;
- (2), Login in forth level consumer purview.

Click the login in level \rightarrow input '020808' in blank \rightarrow click 'Enter' (See fig 6.2.4(1))

Manual			Machine Overview	Cycle Mold:	11111	Login
				Cycle Time:	0.00 \$	2
Software Version Machine Type	D - V01_13-01.01.127					
Decend Detie	400.0 %					
Passed Ratio	100.0 %					_
Passed Product		mmm		~~~~~	\dots	C°
Rejected Product	0					
Mold Position				Sc	rew Position	
					0.00 j mm	
D 00 mm					2.26 Moa	-
					crew Seed	-
56.0 ton					0 rpm	
Inj. Compress			* *	s 🗉 🛛 🛛 🕞 Ba	ack Pressure	
OFF				2	2.26 Мра	
				<u> </u>		
Mold close	0.00 s S	uck Back 0.11	s Holding Pressure 0.50 s	Cycle Interva	al 0.00 s	Overview
Plastication	2.93 s	Injection 8.69	s Ejection 0.00 s	,		
						Cycle
Inj. Unit Forward	I 0.00 s M	old Open 0.00	s Cooling 0.00 s	Cycle Tim	e 0.00 s	
Setup	Heating		Product Mold Info	Overview	Alarm F	Paramet <u>er</u>
Alarm					13:57:28	27.12.07

Fig 6.2.4(1) login in forth level consumer purview

(3)、 Click 'molding' to enter into the menu of mold data. See fig 6.2.4(2)



Fig 6.2.4(2) molding menu

(4). Click 'E' to check content of the U-disc. Select a folder to save these configuration files. For example, select a folder named 'moldconfig' as in fig 6.2.4(3).

Manual		Mold Info	Cycle Mold: Cycle Time:	11111 0.00 s	Login
Directory Image: Cruzer Lock2 -Cruzer Sync -PocketCache Trial V -230 -60 LPHA Parameter Full Ver Image: ALPHA60-e120H Image: ALPHA2300-e750H Image: ALPHA230-e750H Image: ALPHA230-e750H	E: Nr Filename	Time	Date	File Type	nfig File Save Del Copy Paste
Setup Heating	Clamp Inject	Product Mold Info	Overview	Alarm	Parameter

Fig 6.2.4(3) contents of U-disc

(5), Select mold configuration files in 'mold info' in yellow. See fig 6.2.4(4).



Fig 6.2.4(4) choose the type of files

(6)、There are four files in 'moldconfig' folder. See fig 6.2.4(5)

Manual				Mold In	fo	Cycle Mol	d: 11111	Login
	· · · ·			intoid int		Cycle Tim	e: 0.00	s 🔭 🍋 4
Directory C:V2HAFIR DATALOG -TOOLS -SOURCE -SYSTEM -TABLE -KEB -BITMAP E-E -CruzerLock2	E: Nr 1	Filename VE600.CFG			Time 07:43:10	Date 10.08.07	File Type	Config File
-CruzerSync -PocketCache Trial V -SRC KEB Motor Paramete -KEBSTUDY -moldconfig -injectconfig -screwtable -SYSFILE	•						▼.	Save Del Copy Paste
Setup		amp (Inject	Product	Mold Info	Overview	Alarm	Parameter
Alarm							13:58:31	27.12.07

Fig 6.2.4(5) mold configuration files

(7). Double click the mold configuration file which is fit for the machine, then select 'yes' in the block. Configuration files will copy automatically. See fig 6.2.4(6) (the extension is '.CFG').



Fig 6.2.4(6) upload mold configuration files

(8) $\$ After copying mold configuration files, there will appear a block. Click 'OK' to confirm. See fig6.2.4(7)

Manual		Mold Info	Cycle Mold: Cycle Time:	11111 0.00 s	Login
Directory	Nr Filename 1 ALPHA60.cfg	complete	Date	File Type	nfig File
	MOLD CONFI				Save Del
			▼		Copy Paste
Setup He	ating Clamp Inject Pro	duct Mold Info	Overview	Alarm I 14:02:05	Parameter 27.12.07

Fig 6.2.4(7) finish uploading

2 Upload injection configuration files

(1)Use the same method of uploading mold configuration files to select a folder to copy injection configuration files. Then select injection configuration in the yellow block on the top right. See fig 6.2.4(8). (The extension is '.HTD')



Fig 6.2.4(8) injection configuration files

(2)See the center screen. Double click the injection configuration file which is fit for the machine. See fig 6.2.4(9)

Manual		Mold Info	Cycle Mold:	11111	Login
			Cycle Time:	0.00 s	~~ 4
Directory →C:HAITIAN →E -CruzerLock2 -CruzerSync -PocketCache Trial Ve -230 -60 LPHA Parameter Full Ver →ALPHA60-e120H →ALPHA2300-e750H →- -VE SERIES DWG -PICTURES -New Simsun →SRC -20071212 →Fonts	E: Nr Filename 1 120.htd	Time 15:21:10	d this file ? 120.htd	File Type Inject Co	nfig File
Setup Heating	Clamp	Product Mold Info	Overview	<u>A</u> larm	Parameter
Alarm				15:21:34	27.12.07

Figs 6.2.4(9) upload injection configuration files

(3). The injection configuration file will copy automatically after clicking 'yes'. It will show 'over', and then click 'ok'. See fig 6.2.4(10)



Fig 6.2.4(10) uploading over

3、Upload ballscrew conversion table

(1) Select a folder to copy files, and at the top right corner, select ballscrew conversion table in the yellow block, and select ',' as the delimiter, then double click the file in the center of screen to copy it. (The extension is '.CSV') See fig 6.2.4(11).

Manual		Mold Info	Cycle Mold: Cycle Time:	11111 Login 0.00 s - 4
Directory	E: 1 VE600.CSV	Time 07:47:54	Date 10.08.07	File Type Crosshead Table Table Split Sign ,
Setup Heating	Clamp Inject F	Product Mold Info	Overview	Alarm Parameter

Fig 6.2.4(11) upload ballscrew conversion table

(2)The system automatically copies the conversion table after click 'yes', and then click 'ok' after finishing. See fig (6.2.4(12))



Fig 6.2.4(12) uploading over

4、Upload system files

(1) $\$ Select a folder to copy files, and at the top right corner, select system files in the yellow block. (The extension is '.SYS') See fig 6.2.4(13)

Manual	Mold Info		Cycle Mold:	11111	Login
			Cycle Time:	0.00 s	
Directory	E: Nr Filename 1 VE600-120.sys	Time 15:22:40	Date 27.12.07	File Type	m File Save Del Copy Poste
Setup Heating	Clamp Inject Product	Aold Info	Overview	Alarm	Parameter
Alarm				13.22.47	27.12.07

Fig 6.2.4(13) system files

(2) $\$ See the center screen. Double click the injection configuration file which is fit for the machine. See fig 6.2.4(14)



Fig 6.2.4(14) uploading system file

(3) The system automatically copies the conversion table after click 'yes', and then click 'ok' after finishing. See fig (6.2.4(15))

Manual		Mold Info	Cycle Mold:	11111	
Directory	E: Nr Filename 1 VE600-120.sys Loa S	Time 15:22:40 ding complete /STEM FILE Ок	Date	File Type System	n File
		<u></u>	▼		Copy Paste
Alarm				15:23:11	27.12.07

Fig 6.2.4(15) uploading over

6.2.5 Search for the mechanical reference

Steps of searching for the mechanical reference:

1、Login the dialog box of zero setting;

2. After selecting the zero setting function, move the mechanical component which need be setted to the reference;

3、Set up the reference and adjust the photo sensor;

4. Test the machine to check whether the actual stroke reaches the rated stroke or not;

5、Finish searching.

Detail explanations:

1、Login the fourth level

(1) $\$ Turn on the main power supply. (Don't turn on the button 'Motor on' on the keyboard.)

- (2)、 Click 'login' on the screen;
- (3)、 Input login passwords '020808' to the dialog box;
- (4)、Click 'Enter'.

(See fig6.2.5(1))

VENUS series fully electrical injection molding machine service manual

Software Version D - V01_13-01.01.127 Machine Type HT086 - E210 Passed Ratio 100.0 % H1 H2 Passed Product 618 618 111.6 0 W E R T Y U I O P A S D F G H J K L 7 Mold Position 2.95 Ejector Position 0.00 Clamp Force Screw Speed
OFF 0.05 Mpa
Mold close 0.00 s Suck Back 2.18 s Holding Pressure 0.00 s Cycle Interval 0.00 s Plastication 0.00 s Injection 0.00 s Ejection 0.00 s Cycle
Inj. Unit Forward 0.00 s Mold Open 0.00 s Cooling 0.00 s Cycle Time 0.00 s
Setup Heating Clamp Inject Product Mold Info Overview Alarm Parameter

Fig 6.2.5(1) login the fourth level

$2 \$ Login the menu of system's zero setting

- (1)、 Click 'parameter' on the right of the screen;
- (2)、 Click 'zero setting' on the right of parameter menu.

(See fig6.2.5(2))

Manual				Zero Setting	Cycle Mold:	618	Login
				Loro couling	Cycle Time:	0.00 s	
Zero Setup				Screw Parameter			
Zero Status	X #C			Screw Diameter 32	.00 mm		
Speed	2.0 %			Max Injection Force 16	I.O <mark>KN</mark> 8.05	v	
Force	30.0 %			Max Holding Force 120	3.8 <mark>KN</mark> 6.44	v	
Servo Axis	Zero Confirm	Encoder Value	Position	Standard Load Cell 200 Calibration(10V)	D.O KN		
Injection Axis	Zero End	48739464	36.00 mm	Load Cell Current Voltage	0.0 V 0.0	KN	
Mold Axis	Zero End	1060167435	2.95 mm	Load Cell Zero Offset	31 V		Landon Monitor
Ejector Axis	Zero End	20564433	0.00 mm	Injection Pressure 0	.05 Mpa		(î~
Mold Adjust Axis	Zero End	0	0.00 mm	Act Charge Axis Torque 0.	00 Nm 0.0	%	Zero Set
Dias Bus	L			Act Clamp Axis Torque 0.	00 Nm 0.0	%	Printer
Bus Statistic	29			Act Eject Axis Torque	00 Nm 0.0	%	
				Act Inject Axis Torque	00 Nm 0.0	%	Para1
Setup	ating	Diamp	Inject	Product Mold Info	Overview A	<u>/</u> larm	Parameter
Alarm						13:46:42	11.12.07

Fig 6.2.5(2) zero setting menu

3、Set up speed and pressure

- (1)、 Click the dialog box of speed;
- (2), Click '2' in the dialog box;
- (3)、 Click green hook;
- (4). Set up the pressure to '30' in the same way.
- (See fig6.2.5(3))

Manual			Zero Setting	Cycle Mold:	618	Login
				Cycle Time:	0.00 s	~~ 0 4
Zero Setup			Screw Parameter			
Zero Status	off 🗙			×		
Speed	2.0 %		Reference Speed	<mark>% 1</mark> 8.05	v	
Force	30.0 %		Old 2.0 Min Max	1.0 20.0 1 6.44	v	
Servo Axis	Zero Confirm Encoder Valu	e Position	7 8 9 CI			
Injection Axis	Zero End 48739464	36.00 mm		0.0	KN	
Mold Axis	Zero End 1060167435	2.95 mm				<u></u> Monitor
Ejector Axis	Zero End 20564433	0.00 mm	1 2 3 -	pa		
Mold Adjust Axis	Zero End O	0.00 mm	. 0	n 0.0	%	Zero Set
Dias Bus	нн		Act Clamp Axis Torque	JU Nm 0.0	%	Printer
Bus Statistic	29		Act Eject Axis Torque	00 Nm 0.0	%	
			Act Inject Axis Torque	00 Nm 0.0	%	Para1
Setup Heating Clamp Inject Product Mold Info						
Alarm					13:48:44	11.12.07

Fig 6.2.5(3) set up speed and pressure

4、 Click 'on' and move to the reference

- (1)、Click 'motor on';
- (2), Click 'zero set', then click 'on' ;
- (3)、 Select the axis which need be setted. Operations as following:

axis needs to set	Set zero	motion
Injection axis	Inject	Suck back
Mold axis	Mold chose	Mold open
Ejection axis	Eject back	Eject forward

Table 6.2.5(4) operational keys to the the axis need to set zero

VENUS series fully electrical injection molding machine service manual

Manual				Zero Setting	Cycle Mold:	618	Login
Move	Reference				Cycle Time:	0.00 s	<u>~~</u> 4
Zero Setup				Screw Parameter			
Zero Status	Dn 🗸			Screw Diameter 32	.00 mm		
Speed	2.0 %			Max Injection Force 161	.0 KN 8.05	v	
Force	30.0 %			Max Holding Force 128	3.8 KN 6.44	v	
Servo Axis	Zero Confirm	Encoder Value	Position	Standard Load Cell 200 Calibration(10V)	1.0 KN		
Injection Axis	Zero End	48739464	36.00 mm	Load Cell Current Voltage	0.0 V 0.0	KN	
Mold Axis	Zero End	1060167435	2.95 mm	Load Cell Zero 0.3 Offset	31 V		<u>La</u> Monitor
Ejector Axis	Zero End	20564433	0.00 mm	Injection Pressure 0.	05 Mpa		<u>ш</u>
Mold Adjust Axis	Zero End	0	0.00 mm	Act Charge Axis Torque 0.	00 Nm 0.0	%	Zero Set
Dias Bus	n			Act Clamp Axis Torque 0.	00 Nm 0.0	%	Printer
Bus Statistic	29			Act Eject Axis Torque 0.	00 Nm 0.0	%	Rara1
Act Inject Axis Torque 0.00 Nm 0.0 %							
Setup Heating Clamp Inject Product Mold Info							
Alarm						13:55:10	11.12.07

Fig 6.2.5(5) the menu of zero setting

5. Click the operational keys of zero setting and move the axis to the reference

(1), Dismantle two photo sensors which correspond to the axis loosely. Make sure it does not affect the zero setting.

(2)、See table 6.2.5(4). Press the key until the axis moves to the reference. Then select 'Zero End'. Actual reference shows 'zero', which means stop moving.

(3) See table 6.2.5(4). Press the key for clamping. When the numeric value of the actual reference is between 2mm and 3mm, click 'Zero Setting' again. It's the actual mechanical reference.

(4)、 Adjust photo sensors of zero setting. Then fix them up.

(5)、 Move the model axis. When the numeric value of the actual reference is between 5mm and 10mm, click 'zero setting'. Observe when actual reference is zero, whether the photo sensor is on or not. If not, trim the sensor.

(6) Move the model axis. Observe actual reference. When it reaches the maximum stroke, the system will stop.

(7)、 If actual reference doesn't reach the maximum stroke, adjust it as step 3.

- (8)、 Adjust the photo sensors to make them on at stroke end.
- (9)、Click 'off' to quit.

6、 Check whether actual stroke reaches the rated stroke or not

- (1). Set up the stroke of the axis from zero to maximum stroke.
- (2)、 Observe the actual stroke.
- (3), Observe the zero stroke.

7、Finish zero setting

🕂 Warning

During zero setting, the speed must be under 3% of the max speed and 30% of the max pressure, or the machine will be broken.

6.2.6 Test the full-electrical injection moulding machine

(1). At the manual model, test the machine at low speed and pressure and test with full stroke. Set up the speed about 10% and the pressure about 30%.
(2). At the manual model, test the machine at middle speed and pressure and test with full stroke. Set up the speed about 30% and the pressure about 50%.
(3). At the manual model, test the machine at high speed and pressure and test with full stroke. Set up the speed about 100% and the pressure about 50%.

(4)、Finish testing.

Notice

If any abnormal during texting, please press 'stop' immediately. Find out the reason and then do tests again.

6.2.7 Finish

- $1\,{\scriptstyle \smallsetminus}\,$ Take off the sundries, and make up the wires together.
- 2、Close the back cover of the button chest, and fasten setscrews.

Chapter 7 Touch Display Malfunctions



Fig 7 touch display

7.1 Steps of changing the touch display

- 1、Remove the broken touch display;
- 2、Install a new touch display;
- 3、Set up the interface of the touch display;
- 4、 Connect electrical apparatus with the touch display;
- 5、Finish.

7.2 Changing the touch display in detail

7.2.1 Remove the broken touch display from the fully electrical

injection molding machine

<u> </u>Warning

Do not insert or demount any connector with electricity, or it will be broken.

- 1. Open the back cover of the button chest.
- 2. Remove three wires connecting with back of the touch display.
- 3、Remove the touch display setscrews.
- 4、Remove the touch display.

7.2.2 Install a new touch display

<u> W</u>arning

Don't electrify the touch display before find out the broken reason; otherwise, the touch display will be easily broken again.

- 1. Install a new touch display to button chest.
- 2、Fasten setscrews at the back of the touch display.

7.2.3 Set up the interface of the touch display

1. Introduction of the interface



Fig 7.2.3(1) the interface at the back of the touch display

2、Set up switches (8 bit)

Turn switch '1' 'on', and the sequence of switches is 00001011.



initialization

ultimate

Fig 7.2.3(2) set up the interface

7.2.4 Connect electrical apparatus of the touch display

1. Connect the grounding wire of the touch display to PE (at the back of the touch display).

2、Connect the wire of keyboard and the touch display with CAN1 (at the back of the touch display).

3、Connect the S-DVI wire to S-DVI, and fasten setscrews.

7.2.5 Finish

- 1. Take off the sundries, and make up the wires together.
- 2. Close the back cover of the button chest, and fasten setscrews.

Chapter 8 Operation Keyboard Malfunctions



Fig 8 the operation keyboard

8.1 Steps of changing the operation keyboard

- 1. Remove the broken operation keyboard;
- 2、Install a new operation keyboard;
- 3、Set up the interface of the operation keyboard;
- 4、 Connect electrical apparatus with the operation keyboard;
- 5、Finish.

8.2 Changing the operation keyboard in detail

8.2.1 Remove the broken operation keyboard from the fully

electrical injection molding machine



Do not insert or demount any connector with electricity, or it will be broken.

1. Open the back cover of the button chest.

2. Remove the three wires which is connected with the back of operation keyboard.

- 3、Remove the operation keyboard setscrew.
- 4、Remove the operation keyboard.

8.2.2 Install a new operation keyboard

<u> W</u>arning

Don't electrify the operation keyboard before find out the broken reason; otherwise, the operation keyboard will be easily broken again.

- 1. Install a new operation keyboard to the button chest.
- 2、Fasten setscrews at the back of the operation keyboard.

8.2.3 Set up the interface of the operation keyboard

1. Introduction of the interface



Fig 8.2.3(1) the interface at the back of the operation keyboard

2、Set up switches (8 bit)

Turn switch '1' 'on', and the sequence of the switches is 01001011





ultimate

Initialization

Fig 8.2.3(2) set up the interface

8.2.4 Connect electrical apparatus with the operation keyboard

1. Connect the grounding wire of the operation keyboard to PE (at the back of the operation keyboard).

2、Connect the wire of the operation keyboard with CAN1 (at the back of the operation keyboard).

3、Connect the emergence stop interface with the emergence stop terminal (at the back of the operation keyboard). There are four pins on the emergence stop terminal. From left to right, each two pins are as a part of NC.

8.2.5 Finish

- 1. Take off the sundries, and tighten all wires.
- 2、Close the back cover, and fasten setscrews.



Chapter 9 DKI Module Malfunctions

Fig 9 DKI module

9.1 Steps of changing DKI module

- 1、Remove the broken DKI module;
- 2、Install a new DKI module;
- 3、Running tests;
- 4、Finish.

9.2 Changing the DKI module in detail

9.2.1 Remove the broken DKI module from KEB inverter

\ Warning

Do not insert or demount any connector with electricity, or it will be broken.

- 1. Open the back cabinet;
- 2、Remove DIAS bus which is connected with DKI module;
- 3、Remove DKI module from KEB inverter.

9.2.2 Install a new DKI module

Warning

Don't electrify the operation keyboard before find out the broken reason; otherwise, the operation keyboard will be easily broken again.

1. Introduce the interfaces of DKI module



Fig 9.2.2(1) the interface of DKI module

2、DKI address

Inverter	Inject Molding charge eject					
DKI address	11 12 13 14					
	Table 9.2.2(1) DKI module					

(1), Set up DKI address. See table 9.2.2(1);

(2) \smallsetminus Turn on two terminal resistance switches which are at the DKI of injection KEB inverter.

3、Install DKI module to relevant KEB inverters.

4、Insert DIAS bus to DIAS terminal, and insert shielding grounding wires to PE.

9.2.3 Running test

1、Check up the state of DKI module

(1)、 Electrify the fully electrical injection molding machine;

(2). Login in the forth level;

(3) $\$ Select menu 'state', and menu 'inverter', then it will show the connection state of DKI. See fig 9.2.3(1).

2、Check up DKI communication

(1) $\$ Select menu 'parameter', and menu 'reference', then it will show the bus statistics.

(2), If the bus statistics is less than ten, it is satisfied. If not stable, please make sure the DIAS bus pin is inserted well, and also check up bus shielding

grounding wires. If the bus statistics is still not stable, please contact with technicians.



Fig 9.2.3(1) DKI connection state(normal)



Fig 9.2.3(2) DKI connection(molding DKI disconnection)

VENUS series fully electrical injection molding machine service manual

Manual			Zero Setting	Cycle Mold:	11111	Login
Zara Satua			Scrow Daramatar	Cycle Time:	0.00 \$	4
Zero Setup			Sciew Falameter			
Zero Status	off 🗙		Screw Diameter 22			
Speed	1.0 %		Max Injection Force 10	6.2 KN 8.16	v	
Force	30.0 %		Max Holding Force	5.0 <mark>KN</mark> 6.53	v	
Servo Axis	Zero Confirm Encoder Value	Position	Standard Load Cell 13 Calibration(10V)	D.O KN		
Injection Axis	Zero End 571567017	90.00 mm	Load Cell Current Voltage	06 V 0.7	KN	
Mold Axis	Zero End 86446371	270.00 mm	Load Cell Zero 0. Offset	13 V		Monitor
Ejector Axis	Zero End -904133931	0.00 mm	Injection Pressure 2	.05 Mpa		(i)~~
Mold Adjust Axis	Zero End O	0.00 mm	Act Charge Axis Torque	.00 Nm 0.0	%	Zero Set
Dias Bus	1		Act Clamp Axis Torque	.00 Nm 0.0	%	Printer
Bus Statistic	160		Act Eject Axis Torque	.00 Nm 0.0	%	Paral
			Act Inject Axis Torque	00 Nm 0.0	%	. arat
Setup He	eating		Product Mold Info	Overview A	A larm F	arameter
Alarm					14:03:40	27.12.07

Fig 9.2.3(3) DKI bus state

9.2.4 Finish

- 1. Take off the sundries, and make up wires together.
- 2、Close the back cover of the back cabinet, and fasten setscrews.

Chapter 10 Other Components Malfunctions

10.1 Change the battery of C-IPC

The battery is used for saving RAM's programs and data when there is no power. The battery is already installed.

10.1.1 Notice



Use a special battery Zhafir provided, or it will cause data losing and apparatus broken.



The battery must change every year or it may cause data losing.



Do not change the battery with electricity. A new battery must be installed on within 15 minutes after discharging the old one, or it may cause data losing.

10.1.2 Steps of changing C-IPC battery

1. Unscrew setscrews on the top of C-IPC, then remove the shuck.



Fig 10.1.2(1) removing the shuck

2. Install a new battery, then screw setscrews to fasten the shuck.



Fig 10.1.2(2) exchanging C-IPC battery



Pay attention to the battery polarity while changing.



10.2 Change C-IPC memorizer—CF card

CF card is used for saving programs and data, and it has been already installed.

10.2.1 Steps of changing CF card

1. Unscrew setscrews on the top of C-IPC, then remove the shuck. See fig 10.2.1(1)



Fig 10.2.1(1) remove the shuck



Keep the C-IPC clean.

 $2\,{\scriptstyle \smallsetminus}\,$ Install a new CF card, then screw setscrews to fasten the shuck



Fig 10.2.1(2) change CF card

10.3 Install the dish spring



Fig 10.3(1) Dish spring fixed position

1	Cylinder for dish spring		
2	Plumbago bush		
3	Carriage leader		
4	Dish spring		
5	Washer		
6	Nuts		

Table 10.3(1) codes of each part

1. Installation methods

a. Clean up the plumbago bush (code 2) and cool in the icebox. Take them out some time later and put them into the cylinder for dish spring (code 1) quickly, keeping the end surface close to another part.

b. Take off the carriage leader (code 3) through the base hole, then fix the cylinder (code 1) on the carriage leader (code 3). See fig 10.3(1). Keep the end surface close to another part.

c. Assemble the dish spring (code 4) and carriage leader (code 3). (Notice: Quantity of dish springs on other machines is different.)

d. Assemble the washer (code 5) and nuts (code 6) together with carriage leader and screw down. (Before testing the machine, the force of nozzle touch should be adjusted already.)

- e. At last, fix the assemble part with bolts.
- f. Clean up the workshop and tools.
- 2、Adjust dish springs



1 Screw the first nut down with hand, and then use a spanner rotate the nut for "n" loop (value of "n" as following)

|--|

Туре	N(loop)	Remarks
VE600	0.5	
VE900	0.5	
VE1200	0.5	
VE1500	0.5	
VE2300	0.5	

Table 10.3(2)

3、	Disk springs	of VENUS series	
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Туре	Quantity	Free	Distortion	Max. load	Specification
VE600	20 pieces (at one side)	56mm	9.2mm	1.8T	56x28.5x2
VE900	36 pieces (at one side)	91.2mm	9.24mm	2.4T	6x28.5x2
VE1200	20 pieces (at one side)	67.5mm	10.7mm	2.7T	63x31x2.5
VE2300	24 pieces (at one side)	90.4mm	9.68mm	5T	80x41x3

Table 10.3(2) parameters of dish springs

4、Installation methods: VE600, VE1200 (Apposition)

VE900, VE2300 (Combination)



Appendix I

Set the limit current in protection switches of ejection unit motor and mold adjusting motor

Туре	Protection switches of	Protection switches of
туре	FIDECIDIT SWICHES DI	FIDIECTION SWITCHES DI
	injection unit motor	mold adjust motor
VE600	0.8A	0.8A
VE900	1.2A	1.2A
VE1200	1.2A	1.2A
VE1500	1.2A	2A
VE1900	2A	3.5A
VE2300	2A	3.5A
VE3000	3.5A	4.7A
VE4100	3.5A	4.7A