

Servodrive



WLDR/TLDR-S
Instruction Manual
V2. 45/3. 45

<http://www.wlzdhtech.com>

Thank you for choosing this weiling product

We will be glad to receive any possible information which could help us improving this manual. The e-mail: 392468686@qq.com . Before using the product, read the safety instruction section carefully. Keep the manual in a safe place and available to engineering and installation personnel during the product functioning period. Weiling has the right to modify products, data and dimensions without notice. The data can only be used for the product description and they can not be understood as legally stated properties. All rights reserved. This manual is updated according to software version V2.45/3.45.

The identification number of the software version can be read on the drive (or inverter) nameplate or on the label on the FLASH memories mounted on the regulation card.

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Chapter 1 – Safety Precautions

1.1 Safety Precautions

- Do not install near the vicinity flammable and explosive items
- Do not to restrict or prohibit the use of places to use the machine
- Must be sure the power is off before wiring
- If you want remove the drive,you must operate in five minutes when the drive power is off,otherwise there is a risk of electric shock
- The drive must be reliable grounding,otherwise there is a risk of electric shock.
- Do not disassemble, repair or modify the drive for yourself.
- This series is used only for the control of permanent magnet synchronous motor
- Do not use damaged drive
- Do not touch the braking resistor
- Must be in accordance with the terminal voltage polarity connection

1.2 Use Precautions

- Must carry on the wiring, installation and operation by professional personnel.
- The drive must be use with matching servo motor , And keep a good thermal environment.
- Do not provide commercial power directly to the servo motor, otherwise it will be damaged
- It is strictly prohibited to hammer percussion servo motor, otherwise may cause damage to the encoder.
- It is strictly prohibited to disassemble the servo motor
- Please follow the instructions to correct wiring, otherwise it will damage the drive
- Drive installation must avoid direct sunlight, high temperature, dust, metal powder, moisture environment

Chapter 2 - Functions and General Features

WLDR-Series——For our company, it is a new generation of high performance servo drive , field oriented control, large output torque, good ability of instantaneous overload 。 Specially used in injection molding machine。

Drive Features:

- Fast, accurate, stable speed control mode;
- Function of An adaptive PID;
- Lower noise by using space vector modulation;
- Store the latest 3 fault code and record number of failure;
- Overload protection;
- Flux reduction function;
- Convenient maintenance and commissioning;
- High performance rotary transformer decoding chip;
- 3 differential analog input;
- 4 two-way digital signal input;
- 2 relay switch output。

Chapter 3 - Delivery Inspection and Product Specifications

3.1 Delivery Inspection Procedures

Upon delivery, check the following:

- the packaging for any external damage.
- whether the delivery note matches your order. Open the packaging with suitable tools. Check whether any parts were damaged during transport.
- the device type corresponds to your order.

In the event of any damage or of an incomplete or incorrect delivery, please notify the responsible sales offices immediately.

The devices should only be stored in dry rooms within the specified temperature ranges .

3.2 Drive type designation

TL DR – S xxx
1 2 3 4

1: WL/TL – Products name WEILING;

2: DR – Motor drive series;

3: S – Product is applied to the injection machine and other industries;

4: Drive power=Its value is divided by 10, unit: kW;

For example: TLDR-S220 indicate that the drive power is $220 / 10 = 22\text{kW}$.

伺 服 驱 动 器		WEILING
型 号:	<u>TLDR-S075</u>	版 本 号: <u>V200</u>
功 率:	<u>7.5 kW</u>	
输 入:	<u>240-440VAC 3PH 50/60Hz 16A</u>	
输 出:	<u>0-400VAC 3PH 0-400Hz 16A</u>	
序 列 号:		
	TLDR-S075 100040350001	

3.3 Technical indicators

3.3.1 Permissible environmental conditions

➤ Environment

Degree of protection — IP20

Installation altitude —— Max 1000 m (3281 feet) above sea level; Above 1000 m(3281 feet) a current reduction of 1.2% for every 100 m (328feet) of additional height applies.。

➤ Temperature

operation —— 0~40℃ (32~104 ℉)

storage —— -20~55℃ (-4~131 ℉)

transport —— -20~60℃ (-4~140 ℉)

➤ Air humidity

operation —— 5%~85%, without moisture condensation or icing

storage —— 5%~95%

3.3.2 AC Input/Output Specifications

The drive must be connected to an AC mains supply, No external connection of the regulator power supply to the existing AC Input supply is required since the power supply is taken from the DC Link circuit. When commissioning, set the Mains voltage parameter to the value of the AC Input voltage concerned. This automatically sets the threshold for the Undervoltage alarm at the appropriate level

In some cases AC Input chokes, and possibly noise suppression filters should be fitted on the AC Input side of the device.

Table 3.3.2.1: Input/Output Specifications PN

Input												
S		030	040	055	075	110S	110	110H	150	185	220S	220
AC Input Voltage	V	400V -15% / +10%										
Input Frequency	Hz	50/60Hz ±5%										
AC Input Current	A	7	10	14	18	22	25	29	32	38	47	53
Output												
Output power for continuous service	kW	3	4	5.5	7.5	10	11	13	15	18.5	20	22
Recommended motor power	kW	2	3	5	5.5	7.5	9	11	13	16	18.5	22
Max output voltage	V	0.98 * AC Output										
Max output frequency	Hz	0 - 400										
Output Current for continuous service	A	6	9	13	17	21	24	26	30	36	45	50
Switching frequency	kHz	8kHz									5 kHz	
Iovld	A	See table 3.3.3.1										
Braking Unit	W	300			500					750		

Resistance	Ω	68			40			28		20		
wave filter/ reactor	A	10	20		25			35		50		65
Input air switch	A	15	25		30			40		50		65
Input												
S		30 0	370-S	370	450-S	450	550	750	900	1100	1300	1600
T		30 0	350	370	450	500	550	750	900	1100	1300	1600
AC Input Voltage	V	400V -15% / +10%										
Input Frequency	Hz	50/60Hz ±5%										
AC Input Current	A	63	73	78	93	98	115	145	185	210	260	310
Output												
Output power for ontinuous service	kW	30	35	37	42	45	55	75	90	110	130	160
Recommended motor power	kW	25	30	35	37	42	53	60	80	90	110	130
Max output voltage	V	0.98 * AC Output										
Max output frequency	Hz	0 - 400										
Output Current for continuous service	A	60	70	75	90	95	110	140	180	200	250	300
Switching frequency	kHz	5kHz								4 kHz		
Iovld	A	See table 3.3.3.1										
Braking Unit Resistance	W	1500			2000			3000				
	Ω	15			12			8				
wave filter/ reactor	A	65	80		100		120	150	200		250	300
Input air switch	A	80	100		120		150	200	250		300	400

3.3.3 Drive overload current

TLDR-S managed I2xT algorithm that dedicated to applications where a limited overload is

required for a longer period of time. The current rated and overload values as shown in table 3.3.3.1

Table 3.3.3.1: Drive overload current

Type S or T	Powe r	f _{out} =0 Hz			0 < f _{out} < f ₁	f _{out} >f ₁			f ₁	T	
	P	In	I slow ovld	I fast ovld		In	I slow ovld	I fast ovld		slow ovld	fast ovld
	[kW]	[Arms]	[Arms]	[Arms]		[Arms]	[Arms]	[Arms]	[Hz]	[S]	[S]
030	3	5	7	10	-	6	9	12	3	60	0.5
040	4	7	10	14		9	13	18	3	60	0.5
055	5.5	10	15	20		13	19	26	3	60	0.5
075	7.5	14	26	28		17	20	34	3	60	0.5
110-S	10	17	21	34		21	26	42	3	60	0.5
110	11	19	28	38		24	32	48	3	60	0.5
110-H	13	21	31	42		26	36	52	3	60	0.5
150	15	24	36	48		30	45	60	3	60	0.5
185	18.5	29	43	58		36	54	72	3	60	0.5
220-S	22	36	54	72		45	68	90	3	60	0.5
220	25	40	60	80		50	75	100	3	60	0.5
300	30	48	72	96		60	90	120	3	60	0.5
370-S	35	56	84	112		70	105	140	3	60	0.5
Type S or T	Powe r	f _{out} =0 Hz			0 < f _{out} < f ₁	f _{out} >f ₁			f ₁	T	
	P	In	I slow ovld	I fast ovld		In	I slow ovld	I fast ovld		slow ovld	fast ovld
	[kW]	[Arms]	[Arms]	[Arms]		[Arms]	[Arms]	[Arms]	[Hz]	[S]	[S]
370	37	60	90	120	-	75	113	150	3	60	0.5
450-S	45	72	108	144		90	135	180	3	60	0.5
450	45	76	114	152		95	143	190	3	60	0.5
550	55	88	132	176		110	165	220	3	60	0.5
750-S	75	112	156	208		140	210	280	3	60	0.5
750	75	120	180	240		150	225	300	3	60	0.5
900	90	145	217	290		180	270	360	3	60	0.5
1100	110	168	252	302		210	315	378	3	60	0.5
1300	130	200	300	360		250	375	450	3	60	0.5
1600	160	240	360	432		300	450	540	3	60	0.5

The I2xT algorithm depends on the output frequency. At 0Hz frequency, the rated current reduction factor is 0.7 ... 0.9 according to sizes, as shown in table 3.3.3.1. For output frequencies ranging from 0Hz to F1, the overload times should be calculated using a linear interpolation of 0Hz and F1 values. F1 is the frequency shown in the table for each drive size.

The rated and overload currents and the corresponding overload and recovery times do not depend on the room temperature.

The I2xT algorithm manages two drive overload levels:

1. Slow overload (150% In for 60s every 300s)
2. Fast overload (200% In for 0.5s every 60s)

Current limit management :

When the drive delivers a current higher than the In value shown in table 3.3.3.1, I-slow-ovld% increases up to 100%. At this time the drive overload alarm (F009=11) and stop output.

I-slow-ovld% reaches 100% in 60s if the current delivered by the drive is 150% of In.

The drive can also deliver a maximum current of 200% of In. In this case, when the output current exceeds the 150% threshold, the I-fast-ovld% value is increased until 100% is reached in 0.5s, and alarmed

Chapter 4 - Installation Guidelines

4.1 Drive Mechanical Specification

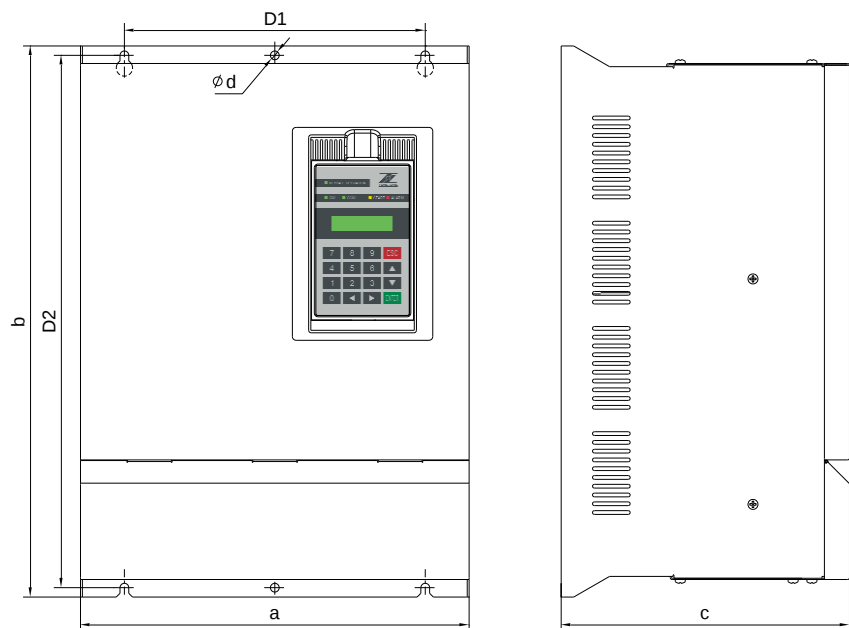


Table 4.1.1 Drive Mechanical Specification

S		030	040	055	075	110S	110	110H	150	185	220s	220	
T		030	040	055	075	010	011	013	015	018	022	025	
a	mm	150					210	230				310	
b	mm	330					330	360				440	
c	mm	150		200		190						230	
D1	mm	100					140	160				240	
D2	mm	318					315	345				425	
Φ d		M6											
M	kg	8		10			12	15			17	21	
S		300	370S	370	450S	450	550	750S	750	S900	1100	1300	1600
T		300	350	370	450	500	550	750	800	900	1100	1300	1600
a	mm	310		350		385			380			405	
b	mm	440				530			680			750	
c	mm	230				260			300			310	
D1	mm	240		280		300			300			315	
D2	mm	425		425		515			665			735	
Φ d		M6							M8				
M	kg	21		24		35			43		45	67	

4.2 Drive Installation

- Drive installation should avoid vibration , Control the vibration in $0.5G$ ($4.9m/S^2$) , prohibited under gravity and impact.
- Drive must be installed in power distribution cabinet , Avoid contact with corrosive, flammable gas, and prevent the conductive material, metal powder, oil mist, liquid into the internal.
- Installation environment temperature : $0-40\text{ }^{\circ}\text{C}$, good heat dissipation and ventilation conditions.

NOTE! Fastening screws should be re-tightened after a few days of operation.

The drives must be mounted in such a way that the free flow of air is ensured. The clearance to the device must be at least 120 mm (4.8 inches). A space of at least 50 mm (2 inches) must be

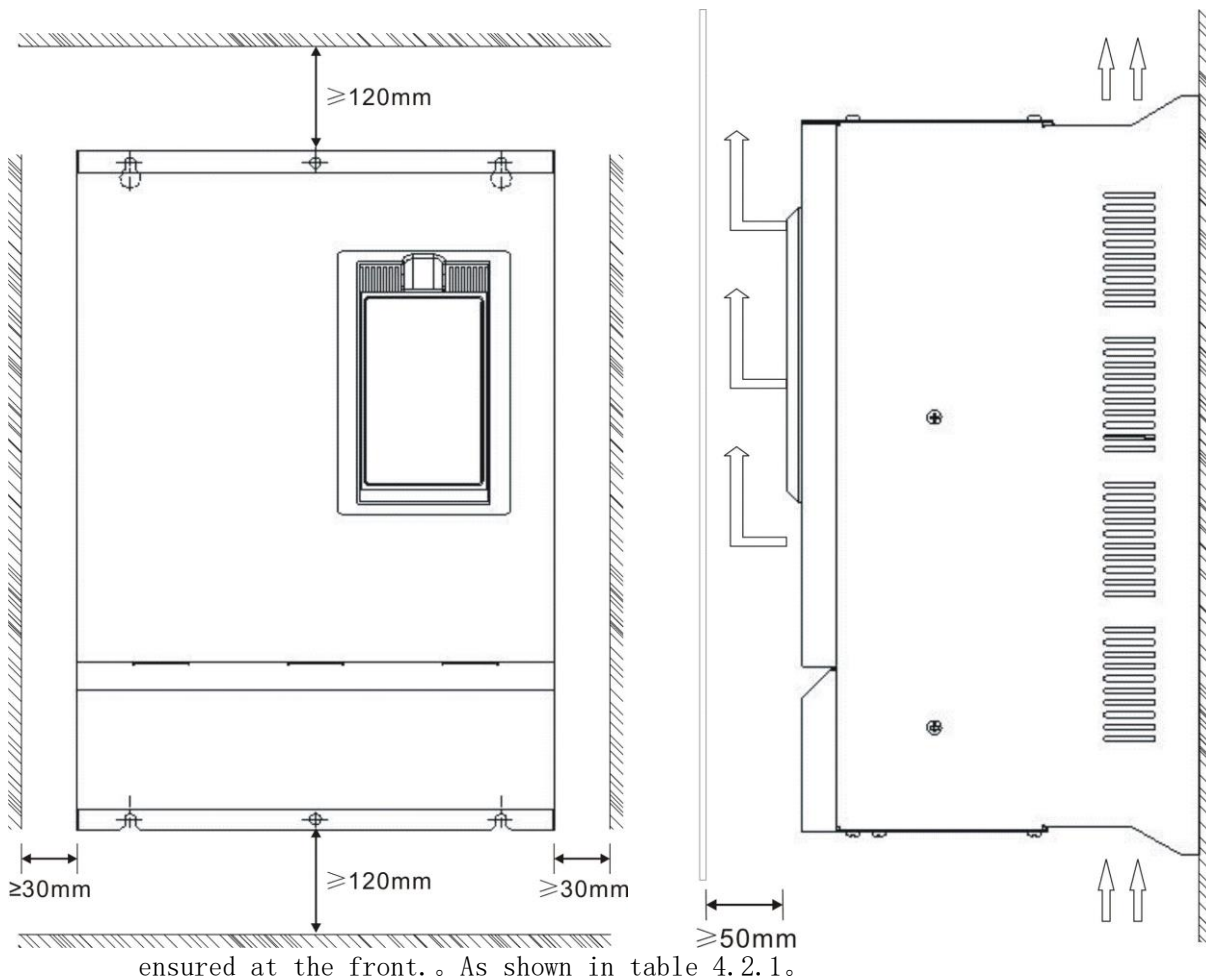


Table 4.2.1 drive installation diagram

4.3 Motor Installation

- Installation environment temperature : 0-40°C (ice-free), and need to be forced cooling. Humidity should be less than 90%RH, no condensation.
- Motor installation should avoid vibration , Control the vibration in 0.5G) (4.9m/S²) 。
- Do not violent disassemble coupling, or the encoder will be damaged
- Suggested the use of elastic coupling
- Motor cable not immersed in oil or water。

Chapter 5 – Wiring Procedure

5.1 Function of Leds On The Regulation Card

Table 5.1.1 Leds On The Regulation Card

name	color	function	descriptions
PWR	green	power	Led lit during the voltage +5V is present and at correct level;
RUN	green	running	Led flashing per second during CPU normal operation;
PWM	yellow	output	Led lit during IGBT modulation period;
RET	red	reset	Led lit during hardware reset;
ALARM	red	fault	The led flashing per second when the drive had common fault, The led lit when the drive had disable fault;
RS485	green	RS485 power	The led lit when RS485 interface is supplied

5.2 Jumpers On The Regulation Card

Table 5.2.1 Jumpers On The Regulation Card

name	function	default
S1	Connect the Analog and digital ground ;	ON
S2	Connect the 24V voltage ground to the earth;	ON
S5	Resolver and photoelectric encoder adaptation ON =photoelectric encoder OFF=resolver	OFF
S8	Analog 1 input type (J3-1 and J3-2) ON = 0~20 mA OFF= 0~10V	OFF
S4	Analog 2 input type (J3-3 and J3-4) ON = 0~20 mA OFF= 0~10V	OFF
S6	Analog 3 input type (J3-5 and J3-6) ON = 0~20 mA OFF= 0~10V	OFF
S11 S12 S13 S14	(J4) The selection of encoder signal OFF=signal of resolver and PTC ON = signal of photoelectric encoder	OFF
S3 S7	drive power self recognition ON = use OFF= no use	ON

5.3 Interfaces and Terminals Description

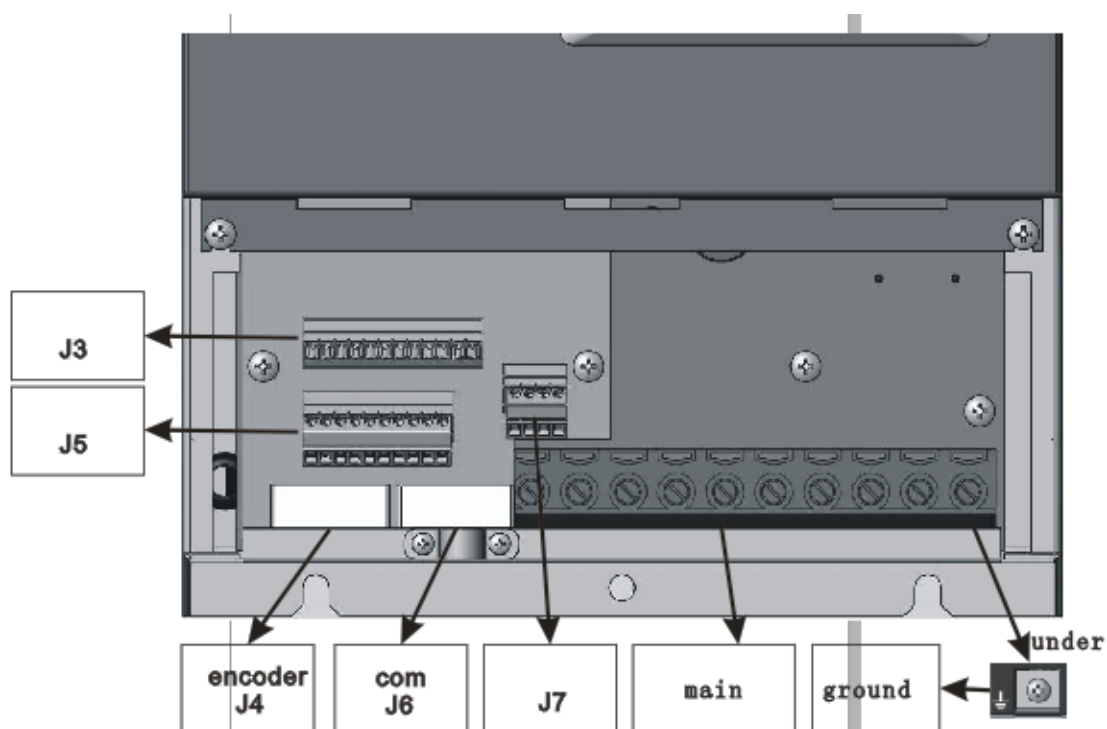


Table 5.3.1 Interfaces and Terminals diagram (7.5~22kW)

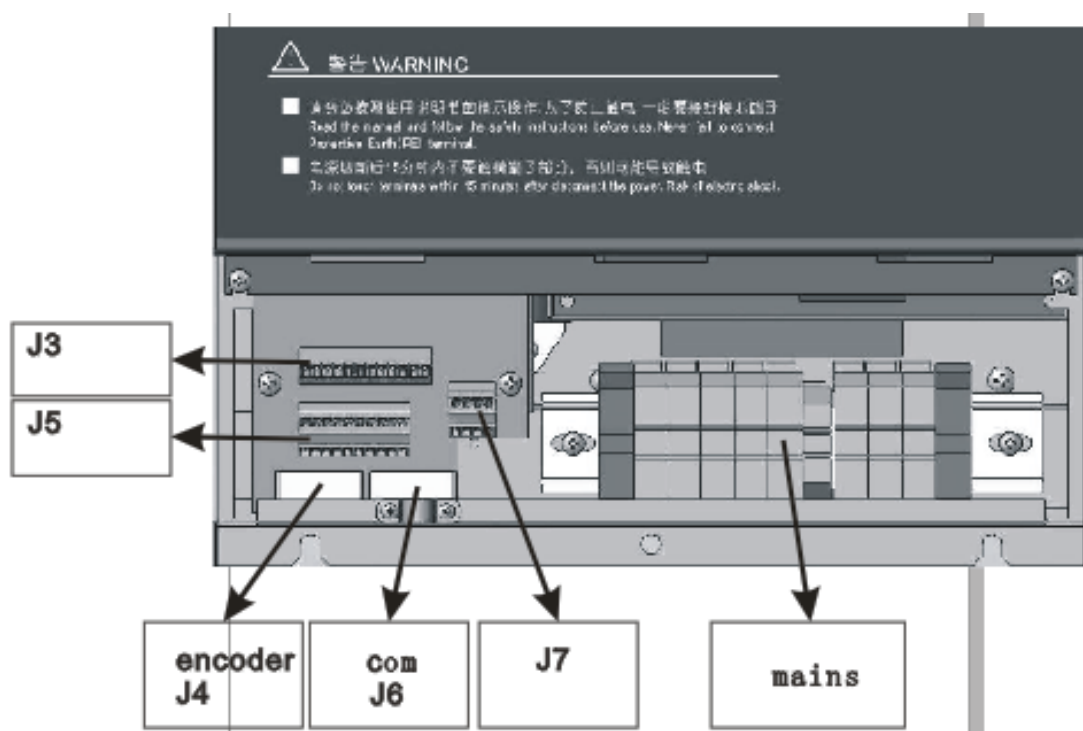


Table 5.3.2 Interfaces and Terminals diagram (30~300kW)

5.3.1 Mains Circuit Terminals

Table 5.3.1.1 Mains Circuit Terminals (7.5~18.5kW, drive ground see table 5.3.1)

Terminals	Identification	Detail	Max
	L1	Three phase AC line input	380V-15% 460V+15% 3 phase
	L2		
	L3		
	BR	Braking resistor (must be connect between BR and C)	
	C	DC link positive electrode	770VDC
	D	DC link negative electrode	
	U	Motor connection	0.98*U _{input}
	V		
	W		
	PE	Motor ground connection	

Table 5.3.1.2 Mains Circuit Terminals (22~55kW)

Terminals	Identification	Detail	Max
	PE1	Three phase AC line ground	
	L1	Three phase AC line input	380V-15% 460V+15% 3 phase
	L2		
	L3		
	C	DC link positive electrode	770VDC
	D	DC link negative electrode	
	BR	Braking resistor (must be connect between BR and C)	
	U	Motor connection	0.98*U _{input}
	V		
	W		
	PE2	Motor ground connection	

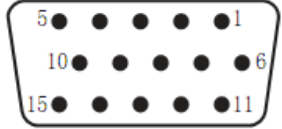
5.3.2 Control Circuit Terminals

Table 5.3.2.1 Control Circuit Terminals

J3 (12pin)	function	detail	max
	1	Analog input 1+	10V 0.25 mA (20 mA)
	2	Analog input 1-	
	3	Analog input 2+	
	4	Analog input 2-	
	5	Analog input 3+	
	6	Analog input 3-	
	7	Analog output +10V	+10V/10 mA
	8	Analog output -10V	-10V/10 mA
	9	Analog output reference point 0V	—
	10	Digital output 3	
	11	0V	—
	12	Digital output 4	
J5 (10pin)			
	13	Digital input: drive start	±30v 3.2 mA@15v 5 mA@24v 6.4 mA@30v
	14	Digital input: null	
	15	Digital input: external fault	
	16	Digital input: fault clearing	
	17	Digital input reference point for terminal 13, 14, 15, 16, 19, 20	—
	18	+24V DC supply output. Reference point: terminal 21	24V, 120 mA
	19	Digital input: null	±30v 3.2 mA@15v 5 mA@24v 6.4 mA@30
	20	Digital input: null	
	21	Reference point for 24V	
	22	24V DC supply input	—
J7 (4pin)			
	23	Digital output 1	250V AC 1A
	24	Relay	
	25	Digital output 2	250V 1A
	26	Relay	

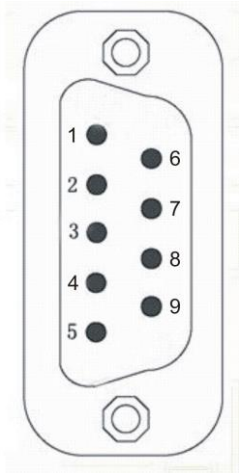
5.3.3 Encoder interface J4

Table 5.3.3.1 Encoder interface J4

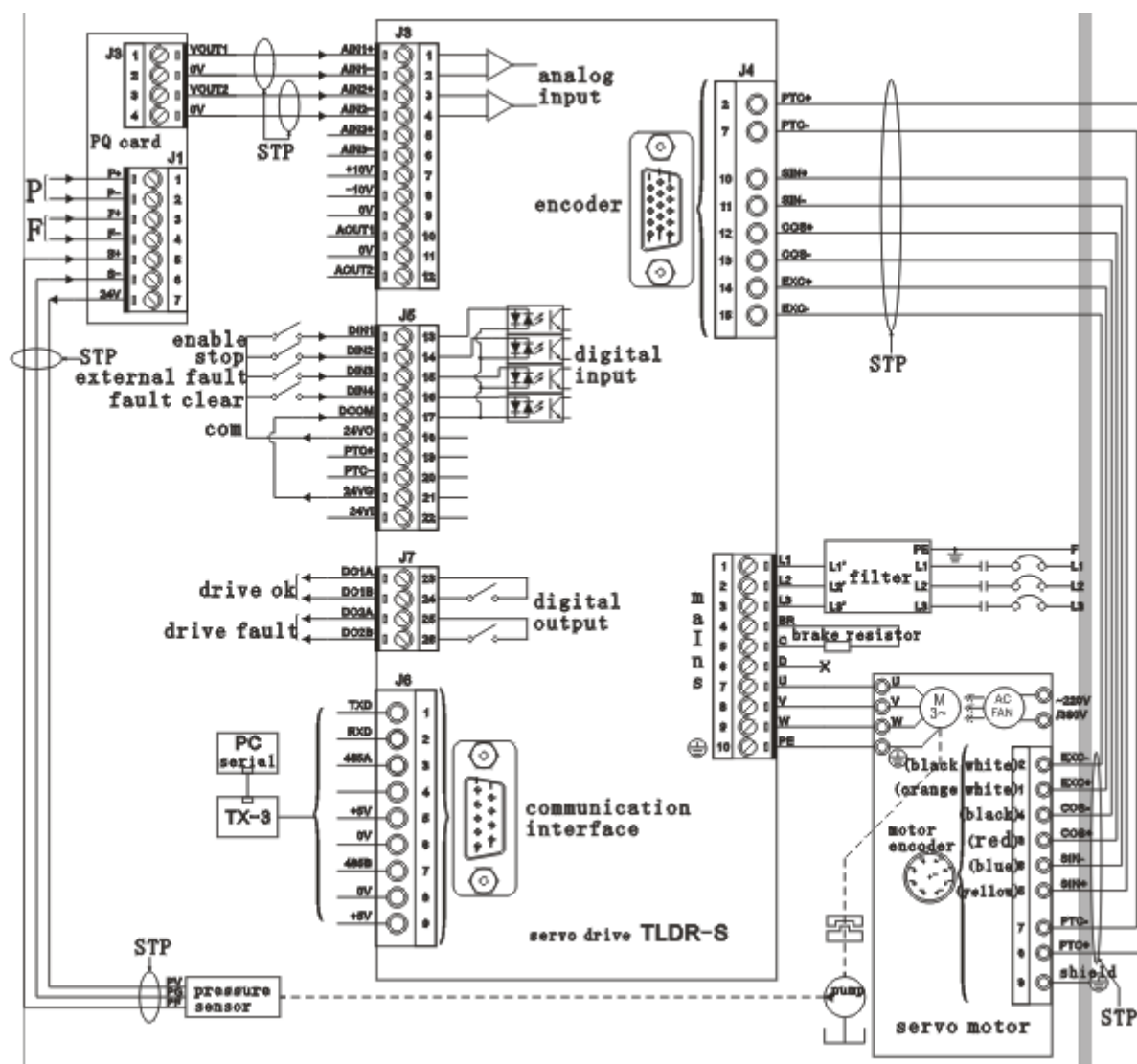
J4(DB15-F)	function		detail	I/O
	1	SD-	Absolute encoder SD-	I
	2	PTC+	Motor PTC+	I
	3			I
	4		-	I
	5	0V	0V	I
	6			I
	7	PTC-	Motor PTC-	I/O
	8	SD+	Absolute encoder SD+	I
	9	+5VE	+5V encoder supply voltage	0
	10	SIN+	Resolver SIN+	I
	11	SIN-	Resolver SIN-	I
	12	COS+	Resolver COS+	I
	13	COS-	Resolver COS-	I
	14	EXC+	Resolver EXC+	0
	15	EXC-	Resolver EXC-	0

5.3.4 Drive Communication Interface J6

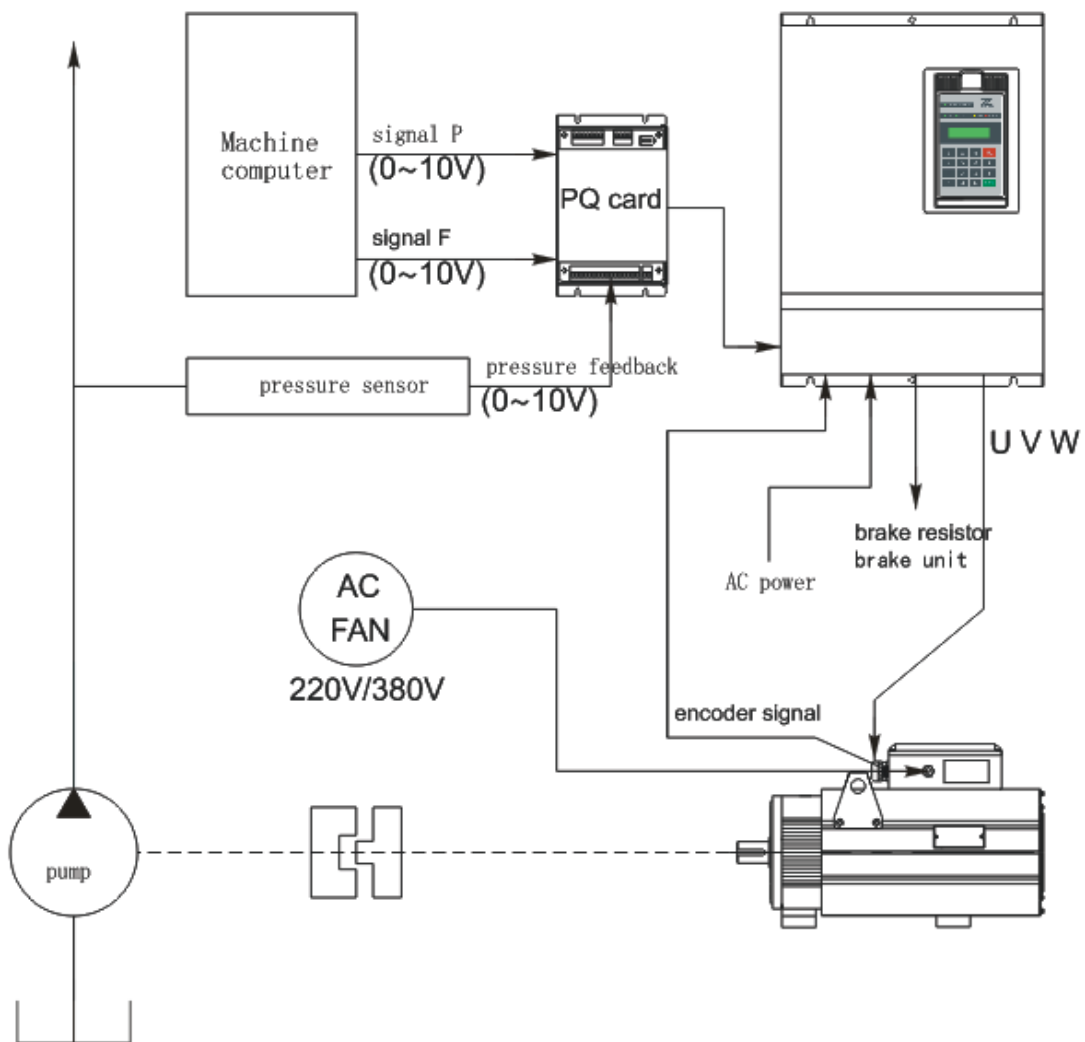
Table 5.3.4.1 Drive Communication Interface

J6(DB9-F)	function		detail	I/O
	1	TXD	TTL receive	I
	2	RXD	TTL transmit	0
	3	485A	RS-485 A	I/O
	4	CANH	CANH	-
	5	+5V	RS-485 +5V	0
	6	0V	RS-485 0V (ground for +5V)	0
	7	485B	RS-485 B	I/O
	8	CANL	CANL	0
	9	+5V	RS-485 +5V	0
	shell	shield	Signal shield	-

5.4 Wiring Diagram For Reference



5.5 Electrohydraulic Servo System Diagram



Chapter 6 – Keypad

6.1 outside view drawing

The keypad is made of a LCD display with two 16-digit lines, five LEDs and 17 function keys

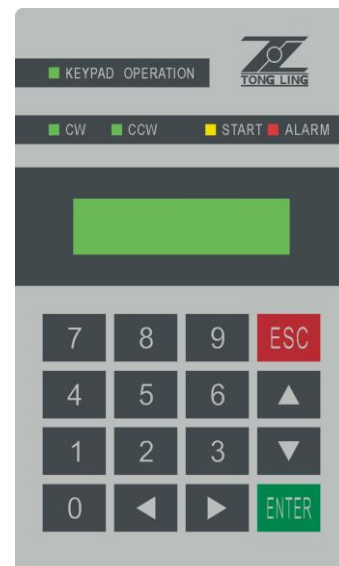
It is used:

- to display the speed, voltage, diagnostics etc. during the operation
- to set parameters and enter commands

6.2 led function

T There are 5 led on the keypad, function as shown in follow table:

name	color	Function description
 KEYPAD	green	Led lit when 5V voltage is present and
 START	yellow	Led lit during drive had output
 ALARM	red	Led flashed when drive alarmed
 CW	green	Led lit when motor rotate clockwise
 CCW	green	Led lit when motor rotates counterclockwise



6.3 Button Description

button	detail	function
	Up	Scroll up menu items
	Down	Scroll down menu items
	Right	Cursor right
	Left	cursor left
	quit/cancel/Al arm query	Used to go up one level in menu navigation; cancel and Alarm query
	Confirm key	Confirm operation/Write parameters/Enter lower level operation
	Digit	0 to 9 digit

In monitoring mode, operate the numeric key menu:

Shortcut keys	Parameter	Company	Shortcut keys	Parameter	Company
0	Feedback speed	rpm	5	F analog voltage 3	mv
1	Output current	A	6	Given speed	rmp
2	Bus voltage	V	7	Encoder angle	。
3	F analog voltage 1	mv	8	output voltage	V
4	F analog voltage 2	mv	9	Weak current	A

6.4.1 ALARMS

ALARM NUMBER:08
1:Undervoltage

The first row shows the fault number

The second row shows the fault code



or

ALARM NUMBER:08
3:IGBT DS

Press “” or “”, You can see all the fault

ESC

CLEAR ALARM
ENT->YES ESC->NO

Press ESC, it turns to fault clear interface

ENTER

Speed fdb
0 rpm

Press ENTER can clear fault, and it turns to parameter monitor interface if all the fault can be cleared

ALARM NUMBER:08
3:IGBT DS

otherwise, it returns to alarm interface

ENTER

Speed fdb
0 rpm

Then press ENTER, to get to parameter monitor interface

ESC

ALARM NUMBER:08
3:IGBT DS

Press ESC, it returns to alarm interface

6.4.2 Parameter Monitor

Speed fdb
0 rpm



or

Output current
0 A

Press “” or “”, to see different value of the parameters. Detail please see parameter table F005.

ENTER

Reload default
F000= 1

Press ENTER, get into parameter setting interface

6.4.3 Parameter Setting interface

Reload default
F000= 1

“F000” is the number of the parameter, “=1” is the value of the parameter



or

Reload default
F000= 1

press “left” or “right”, to move the cursor to the digital

which is needed modify.

6.4.3.1 Read the parameter of F080

Reload default
F000= 1



Reload default
F000= 1

press  move the cursor to second digital



Rated voltage
F080= 350

press “digital 8”, change “F000” into “F080”. “350” is the value of “F080”

6.4.3.2 Modify the value of F080 into 300

Rated voltage
F080= 350



Rated voltage
F080= 350

press “”, move cursor to the place the diagram shown



Rated voltage
F080= 350

press “”, move cursor to the place the diagram shown.



Rated voltage
F080= 300

press “digital 0”, change the value of “F080” into

300”



Rated voltage
F080= 300

press “ENTER” to conform



Speed fdb
0 rpm

Press “ESC”, to return to parameter monitor interface

Chapter 7 - Commissioning

Note: Do follow the following step of commissioning.

7.1 Set drive data

Generally default is ok

7.2 Set motor data

Select the corresponding motor code of our company through F177.

Third party motor, manually input the following data;

Motor data needed setting as shown in table 7.2.1 :

7.2.1 motor parameter

Parameter number	description	value
F080	Rated voltage (V)	See the nameplate of the motor
F081	Rated current (A)	See the nameplate of the motor
F082	Rated speed (rpm)	See the nameplate of the motor
F083	Pole pairs	See the nameplate of the motor
F084	Torque constant (Nm/A)	See the nameplate of the motor
F086	Phase resistance (Ω , 20°C)	See the nameplate of the motor
F087	Phase inductance (mH)	See the nameplate of the motor
F088	Rotor inertia ($\text{g} \cdot \text{m}^2$)	See the nameplate of the motor

Note!

- Rated voltage、rated current、rated speed、pole pairs、phase resistance and phase inductance must correct input;
- The EMF constant F085 will be automatically calculated when the parameter F084 correct input;
- Torque constant can be calculated by the following formula:

$$K_t = \frac{T_n}{I_n} \quad (T_n: \text{rated torque (Nm)}, I_n: \text{rated current (A)})$$

7.3 Encoder phasing

- 1, Disconnect the drive enable before the drive power supplied
- 2, Make sure the motor phase sequence wired correctly
- 3, Set the parameter F099 == 2:
- 4, Press enter 1 time when the START led and the CW led all gone out , then the parameter F099 turned to F099==0
- 5, motor phasing finished

NOTE!

- 1, Motor parameter had set correctly; 2, Make sure the motor phase sequence wired correctly

7.4 Operation Mode

F099 == 0

Chapter - 8 Parameters

- Default: D.Size decided by drive type
- access : R=read, W=write, Z is effective when the drive restart.
- Type: Int 16.
- Do not modify parameter of Reserved.

Table 8.1 Parameters

Number	Function[unit]	default	min	max	access(format)	remarks
PARAMETERS						
F000	F000=0, load default parameter	1	0	1	R/W/*(Int)	
F001	0 internal register 1 analog input 2 PID CTL	1	0	2	R/W/Z(Int)	
F002	Motor direction 0 anticlockwise(forward) 1 clockwise(reverse)	0	0	1	R/W(Int)	
F003	Motor speed [rpm]	0	0	0	R(Int)	
F004	Motor actual speed[rpm]	0	0	0	R(Int)	
F005	Parameter monitor	2	0	20	R(Int)	
	0=motor-position [Elc.deg]	0	0	0	R(Int)	
	1 motor speed reference, [rpm]	0	0	0	R(Int)	
	2 motor actual speed, [rpm]	0	0	0	R(Int)	
	3 drive output current, [A]	0	0	0	R(Int)	
	4 drive output voltage, [V]	0	0	0	R(Int)	
	5 drive-magnetizing current[A]	0	0	0	R(Int)	
	6 drive torque current, [A]	0	0	0	R(Int)	
	7 drive output torque, [Nm]	0	0	0	R(Int)	
	8 drive output frequency, [Hz]	0	0	0	R(Int)	
	9 drive output power, [kW]	0	0	0	R(Int)	
	10 drive DC link voltage, [V]	0	0	0	R(Int)	
	11 encoder position, [mech. deg]	0	0	0	R(Int)	
	12 drive heat sink temperature, [°C]	0	0	0	R(Int)	
	13 temperature of heat sink incoming air temperature, [°C]	0	0	0	R(Int)	
	14 regulation card temperature, [°C]	0	0	0	R(Int)	
	15 drive enable status	0	0	1	R(Int)	
	16 motor overload	0	0	0	R(Int)	

	accumulator, [%]					
	17 brake overload accumulator, [%]	0	0	0	R(Int)	
	18 drive overload accumulator, [%]	0	0	0	R(Int)	
	19 software type(FW version)	0	0	0	R(Int)	
	20 CPU run time, [h/m/s]	0	0	0	R(Int)	
	21 digital input status	0	0	1	R(Int)	
	22 drive slow overload	0	0	0	R/W(Int)	
	23 drive fast overload	0	0	0	R/W(Int)	
	24 analog input 1[mV]	0	0	0	R/W(Int)	
	25 analog input 2[mV]	0	0	0	R/W(Int)	
	26 analog input 3[mV]	0	0	0	R/W(Int)	
F006	Ctrl Mode 0=rotary table 1=Electro-hydraulic 2/6=Electric storage	1	0	6		
F008	Display of F005				R	
F009	alarms 1: under voltage 2: over voltage 3: IGBT desaturate 4 : IGBT instantaneous over current 5: current feedback loss 6 : IGBT module over temperature 7: motor over temperature 8: ambient over temperature 9: heat sink over temperature 10 : regulation card over temperature 11: drive overload 12: motor overload 13: braking unit overload 14: over speed 15: speed feedback loss 16: external fault 17: ground fault 18:can com err 19:max time 20:phasing err 0: no alarm	0	0	20	R(Int)	
F010	Alarm clear 0 prohibit clear 1 enable clear	0	0	1	Z(Int)	

F011	CAN Heart	10	0		R/W(Int)	reserved
F012	CAN ID	3	0		R/W(Int)	reserved
F014	485 adr	6	0			
F015	CAN Baut Rate 0=125K;1=250K;2=500k;3=800k 4=1000k;5=2000K	2	0	5		
F016	RS4855 Baut Rate 0=1200; 1=2400; 2=4800 3=9600; 4=19200; 5=38400 6=57600; 7=115200	7	0	7		
F017	CAN Master Offline Time	100				
FLUX						
F021	Enable CTL Select 0:terminal CTL 3:CAN Com CTL	0	0		R/Z(Int)	
F022	Max deflux current, [Arms]	8539	0	32767	R/Z(Int)	
F023		0			R/W(Int)	F023
F024	Output voltage filter time [ms]	10	1	500	R/W(Int)	F024
F025	Voltage proportional gain, [%]	50	0	32767	R/W(Int)	F025
F026	Voltage integral gain, [%]	2500	0	32767	R/W(Int)	F026
SPEED						
F028	Basic value of the speed Proportional gain, [A/rpm]	50	0	32767	R/W(Int)	
F029	Basic value of the speed Integral gain, [A/rpm/s]	800	0	32767	R/W(Int)	
F030	Proportional speed 1 regulator gain at high	10	0	100	R/W(Int)	
F031	Integral speed 1 regulator gain at high speed, [%]	10	0	100	R/W(Int)	
F032	Proportional speed 2 regulator gain at medium	10	0	100	R/W(Int)	
F033	Integral speed 2 regulator gain at medium speed, [%]	10	0	100	R/W(Int)	
F034	Proportional speed 3 regulator gain at low	10	0	100	R/W(Int)	
F035	Integral speed 3 regulator gain at low speed, [%]	10	0	100	R/W(Int)	

F036	Proportional speed 0 regulator gain at zero	15	0	100	R/W(Int)	
F037	Integral speed 0 regulator gain at zero speed. [%]	30	0	100	R/W(Int)	
F038	Number of encoder number	2500	0	5000	R/W/Z(Int)	reserved
F039	Encoder selection 0 resolver 2 Abs encoder	0	0	2	R/W/Z(Int)	set '0'
F040	Encoder reverse 0 norm 10 Direct read	0	0	10	R/W/Z(Int)	
F041	Drive PWM switch frequency on line 0 disable	0	0	1	R/W(Int)	reserved
F042	Ramp function 0 disable 1 enable	1	0	1	R/W(Int)	reserved
F043	Ramp type 0 line 1 S	1	0	1	R/W(Int)	reserved
F044	Reduction ratio	1	0			
F045	Internal speed , [rpm]	0	0	3000	R/W(Int)	
F050	Analog filtering function 0 disable 1 first-order filtering mode 2 The average value mode 3 The first-order filter self tuning, the average value of the input	3	0	3	R/W(Int)	
F051	Max speed of analog input2, [rpm]	300	0	3000	R/W(Int)	
F052	Full scale speed of analog input, [rpm]	2000	0	3000	R/W(Int)	Enable disconnect
F053	Analog input deadband threshold, [rpm]	5	0	F082	R/W(Int)	
F054	Zero speed threshold, [rpm]	30	0	F082	R/W(Int)	
F055	Max reference speed, [rpm]	3000	0	3000	R/W(Int)	
F056	Analog input 1 acceleration for ramp	300	1	F052	R/W(Int)	
F057	Analog input 1 deceleration for ramp	300	1	F052	R/W(Int)	
F058	Analog input 2 acceleration for ramp	300	1	F052	R/W(Int)	
F059	Analog input 2 deceleration for ramp	300	1	F052	R/W(Int)	

CURRENT						
F063	Basic value of the current Proportional gain, [A/rpm]	80	0	32767	R/W(Int)	
F064	Basic value of the current Integral gain, [A/rpm/s]	700	0	32767	R/W(Int)	
F065	The proportional regulator gain of the current, [%]	1	0	100	R/W(Int)	
F066	The integral regulator gain of the current, [%]	10	0	100	R/W(Int)	
F077	Ripple compensation of DC link 0 disable 1 enable	0	0	1	R/W(Int)	
F078	Filter of DC link voltage 0 disable 1 enable	0	0	1	R/W(Int)	
F079	Deflux loop output 0 Voltage loop output 1 Deflux loop output	1	0	1	R/W(Int)	
MOTOR DATA						
F080	Rated voltage, [V]	0	0	–	R/W/Z(Int)	× 1
F081	Rated current, [A]	0	0	–	R/W/Z(Int)	× 100
F082	Rated speed, [rpm]	0	0	–	R/W/Z(Int)	× 1
F083	Pole pairs	0	0	–	R/W/Z(Int)	× 1
F084	Torque constant, [Nm/A]	0	0	–	R/W/Z(Int)	× 1000
F085	EMF, [V/ k rpm]	0	0	–	R/W/Z(Int)	× 10
F086	Phase resistance, [ohm]	0	0	–	R/W/Z(Int)	× 100
F087	Ld [mH]	0	0	–	R/W/Z(Int)	× 100
F088	Rotor inertia, [g · m ²]	0	0	–	R/W/Z(Int)	× 10
F089	Lq (mH)	0	0	1	R/W/*(Int)	
F090	EMF Constant (V/krpm)	0				
DRIVE DATA						
F091	Main voltage 0 230V 1 380V 2 400V 3 415V 4 440V 5 460V/480V	2	0	5	R/W/Z/*(Int)	Reserved

F092	PWM switching frequency 0 4KHz 1 8KHz 2 12KHz 2 16KHz 4 3KHz 5 5KHz 5 6KHz 6 10KHz	1	0	7	R/W/Z/(Int)	
F093	RES Encoder pole pairs 1=1 4=4 2=2 5=5 3=3 6=6	1	0	6	R/W/Z(Int)	Reserved
F094	Ambient temperature 0 0~40 °C (32~104 °F) 1 0~50 °C (32~122 °F)	0	0	1	R/W/Z(Int)	Reserved

F095	Drive rated power					
	1 2.0kW					
	2 3.0kW					
	3 4.0kW					
	4 5.5kW					
	5 7.5kW					
	6 H7.5kW					
	7 11kW					
	8 15kW					
	9 18.5kW					
	10 22kW					
	11 30kW					
	12 37kW					
	13 45kW		1	27	R(Int)	
	14 55kW					
	15 75kW					
	16 90kW					
	17 110kW					
	18 132kW					
	19 160kW					
	20 200kW					
	21 250kW					
	22 22skW					
	23 45skW					
	24 75skW					
	25 110skW					
	26 30sKw					
	27 37sKw					
SELF AUTO TUNING						
F096		0	0	5	R/W/Z(Int)	
F097	encoder mechanical offset				R(Int)	
F098	The auxiliary parameter of encoder mechanical offset				R(Int)	
F099	Operation mode 0 Field oriented mode 1 motor self tuning 2 encoder phasing mode 4 PAR self tuning mode	0	0	3	R/W/Z(Int)	
F100	The minimum deviation of analog input 1	130	0	500	R/W/Z(Int)	
F101	The gain of analog input 1	5000	0	17000	R/W/Z(Int)	
F102	The minimum deviation of analog input 2	130	0	500	R/W/Z(Int)	
F103	The gain of analog input 2	5000	0	17000	R/W/Z(Int)	

F104	The minimum deviation of analog input 3	130	0	500	R/W/Z(Int)	
F105	The gain of analog input 3	5000	0	17000	R/W/Z(Int)	
SPECIAL PARAMETERS						
F110	Lowspeed overload frequency, [HZ]	3	0	7	R/W/Z(Int)	
F112	Overload mode 0 IT 1 I ² T 2 Interpolation I ² T	2	0	2	R/W/Z(Int)	F112
F113	Max output current default: 1.36*I (rated current) Max : overload current	Calc	0	Calc	R/W/Z(Int)	
MOTOR OVERLOAD						
F114	Motor overload control 0 disable 1 enable	0	0	1	R/W/Z(Int)	
F115	Utilization coefficient	1	–	–	R/W/Z(Int)	
F116	Motor overload factor	2	–	–	R/W/Z(Int)	
F117	Motor overload time, [s]	30	–	–	R/W/Z(Int)	
F118	Motor overload current, [A]	Calc	–	–	R/Z(Int)	
BRAKING RESISTOR						
F119	Braking unit 0 disable 1 internal braking resistor and internal braking unit 2 external braking resistor and internal braking unit	1	0	2	R/W/Z(Int)	
F120	Brake resistor value, [ohm]	D. Size	0	–	R/W/Z(Int)	
F121	Brake unit rated power, [kW]	D. Size	0	–	R/W/Z(Int)	
F122	Brake resistor overload	D. Size	0	–	R/W/Z(Int)	
F123	Brake resistor overload	D. Size	0	–	R/W/Z(Int)	
F124	Brake voltage threshold	750	380	790	R/W/Z(Int)	
Rotary table PAR						
F130	Top speed time(ms)	2500	0		R/W	
F131	Anticlockwise start speed(1rpm)		0		R/W	
F132	Anticlockwise end speed(1rpm)		0		R/W	
F133	Anticlockwise max speed(0.1rpm)		0		R/W	
F134	Anticlockwise platform		0		R/W	

	speed(0.1rpm)					
F135	Anticlockwise acc time(ms)	100	0		R/W	
F136	Anticlockwise platform time(ms)	50	0		R/W	
F137	Anticlockwise dec time(ms)		0		R/W	
F138	Anticlockwise total time(ms)		0		R/W	
F139	Anticlockwise total rounds(0.01round)		0		R/W	
F140	Low speed time(ms)	6500	0		R/W	
F141	Clockwise start speed(1rpm)		0		R/W	
F142	Clockwise end speed(1rpm)		0		R/W	
F143	Clockwise max speed(0.1rpm)		0		R/W	
F144	Clockwise platform speed(0.1rpm)		0		R/W	
F145	Clockwise acc time(ms)		0		R/W	
F146	Clockwise platform time(ms)		0		R/W	
F147	Clockwise dec time(ms)		0		R/W	
F148	Clockwise total time(ms)		0		R/W	
F149	Clockwise total rounds(0.01round)		0		R/W	
F150	Rapid dec	20	0		R/W	
F151	0=never keep 1=keep	1	0		R/W	
F152	120-120-240 mode:0=off 1=on	0	0		R/W	
F153	20=6 mode : Left in place Mul Pos	0	0		R/W	
F154	20=6 mode : Left in place Sig Pos	0	0		R/W	
F155	20=6 mode :Right in place Mul Pos	0	0		R/W	
F156	20=6 mode : Right in place Sig Pos	0	0		R/W	
F157	Placed output	2	0		R/W	
F158	Workstation	2	0		R/W	
F159	Stop mode: 0-stop 1 tight	1	0		R/W	
F160	Allow Error (left in place)	2000	0		R/W	
F161	Advance dec Enc	500	0		R/W	
F162	Allow Error right in place)	2000	0		R/W	
F163	Tight Current %	40	0		R/W	
F164	M/A Tight Current %	40	0		R/W	
F165			0		R/W	
F166	Keep time(ms)	500	0		R/W	
F167			0		R/W	
F168	T Platform Station 0=off,1=A 2=50	0	0		R/W	
F169			0		R/W	

F170	Plate Total rounds (0.01)	0	0		R/W	
F171	Speed control gear voltage	0	0		R/W	
F172	Mold adjust mode acc (ms)	8	0		R/W	
F173	Plate Speed Sel 1=L 2=M 3=H 5=MUL 11= 3-stage speed	11	0		R/W	
F174	Pos learning 2=left in place 3=right in place	1	0		R/W	
F175	Mold speed L	5	0		R/W	
F176	Mold speed H	15	0		R/W	

F177	DOWNLOAD motor parameters (Only for TLMO/WLMO-motor)					
	0 Manual input					
	1 TLMO-200-48B50B					
	2 TLMO-200-48B18C					
	3 TLMO-200-64B50C					
	4 TLMO-200-64B18C/19C					
	5 TLMO-200-64B20C					
	6 TLMO-200-80B18C/19C					
	7 TLMO-200-80B20C					
	8 TLMO-200-96B50B					
	9 TLMO-200-96B15C/16C					
	10 TLMO-200-96B18C					
	11 TLMO-200-96B20C					
	12 TLMO-200-11C18C/19C					
	13 TLMO-200-13C50C					
	14 TLMO-200-13C15C/16C					
	15 TLMO-200-13C18C					
	16 TLMO-200-13C20C					
	17 TLMO-263-16C50B					
	18 TLMO-263-16C15C					
	19 TLMO-263-16C18C/19C					
	20 TLMO-263-16C20C					
	21 TLMO-263-21C50B					
	22 TLMO-263-21C15C/16C					
	23 TLMO-263-21C20C	0	0	38	R/W/Z(Int)	
	24 TLMO-263-26C50B					
	25 TLMO-263-26C15C/17C					
	26 TLMO-263-26C20C					
	27 TLMO-263-31C16C/18C					
	28 TLMO-263-31C20C					
	29 TLMO-263-36C16C/18C					
	30 TLMO-263-36C20C					
	31 TLMO-263-41C16C/18C					
	32 TLMO-263-41C20C					
	33 TLMO-180-18B18C					
	34 TLMO-180-27B18C					
	35 TLMO-180-35B18C					
	36 TLMO-180-21B18C					
	37 TLMO-180-32B18C					
	38 TLMO-180-43B18C					
	39 TLMO-180-54B18C					
	40 WLMO-33Y-45C35B					
	41 WLMO-33Y-60C35B					
	42 WLMO-33Y-75C35B					
	43 WLMO-33Y-90C25B					
	44 WLMO-33Y-10D35B					
	45 WLMO-33Y-12D35B					
	46 WLMO-33Y-10D40B					
	48 WLMO-33Y-90C30B					

F177	49 WLMO-33W-90D30B					
	50 WLMO-33W-45C40B					
	51 WLMO-33W-60C40B					
	52 WLMO-33W-75C40B					
	53 WLMO-33W-90C40B					
	54 WLMO-33W-10D40B					
	55 WLMO-33W-12D40B					
	56 WLMO-33W-75C60B					
	57 WLMO-33W-90C60B					
	58 WLMO-33W-60C60B					
	59 WLMO-33W-10D60B					
	60 WLMO-42W-10D35B					
	61 WLMO-42W-12D35B					
	62 WLMO-42W-15D35B					
	63 WLMO-42W-18D35B					
	64 WLMO-42W-21D35B					
	65 WLMO-42W-24D35B					
	70 WLMO-52W-15D20B					
	71 WLMO-52W-20D20B					
	72 WLMO-52W-25D20B					
	73 WLMO-52W-30D20B					
	74 WLMO-52W-35D20B					
	75 WLMO-52W-40D20B					
	76 WLMO-52W-45D20B	0	0	38	R/W/Z(Int)	
	77 WLMO-52W-50D20B					
	80 WLMO-52W-15D25B					
	81 WLMO-52W-20D25B					
	82 WLMO-52W-25D25B					
	83 WLMO-52W-30D25B					
	84 WLMO-52W-35D25B					
	85 WLMO-52W-40D25B					
	86 WLMO-52W-45D25B					
	87 WLMO-52W-50D25B					
	90 WLMO-65W-48D15B					
	91 WLMO-65W-56D15B					
	92 WLMO-65W-64D15B					
	93 WLMO-65W-72D15B					
	94 WLMO-65W-80D15B					
	95 WLMO-65W-10E15B					
	101 WLMO-20F-57B50B					
	102 WLMO-20F-57B18C					
	103 WLMO-20F-64B50C					
	104 WLMO-20F-76B18C					
	105 WLMO-20F-76B15C					
	106 WLMO-20F-95B18C					
	107 WLMO-20F-95B15C					
	108 WLMO-20F-95C50B					

109	WLMO-20F-11C15C					
110	WLMO-20F-11C18C					
111	WLMO-20F-13C15C					
112	WLMO-20F-13C18C					
113	WLMO-20F-13C50C					
114	WLMO-20F-15C15C					
115	WLMO-20F-15C18C					
116	WLMO-20F-17C15C					
117	WLMO-26F-16C50B					
118	WLMO-26F-17C15C					
119	WLMO-26F-17C18C					
120	WLMO-26F-17C20C					
121	WLMO-26F-21C50B					
122	WLMO-26F-23C18C					
123	WLMO-26F-23C20C					
124	WLMO-26F-26C50B					
125	WLMO-26F-29C18C					
126	WLMO-26F-29C20C					
127	WLMO-26F-34C15C					
128	WLMO-26F-34C18C					
129	WLMO-26F-40C15C					
130	WLMO-26F-40C18C					
131	WLMO-26F-46C15C					
132	WLMO-26F-46C18C					
133	WLMO-26F-29C70C					
220	WLMO-22X-80C20B					
221	WLMO-22X-12D20B					
222	WLMO-22X-16D20B					
223	WLMO-22X-20D20B					
224	WLMO-22X-80C25B					
225	WLMO-22X-12D25B					
226	WLMO-22X-16C25B					
227	WLMO-22X-20D25B					
230	WLMO-25X-15D15B					
231	WLMO-25X-20D15B					
232	WLMO-25X-25D16B					
233	WLMO-25X-30D15B					
234	WLMO-25X-15D20B					
235	WLMO-25X-20D20B					
236	WLMO-25X-25D20B					
237	WLMO-25X-30D20B					
238	WLMO-25X-15D25B					
239	WLMO-25X-20D25B					
240	WLMO-25X-25D25B					
241	WLMO-25X-30D25B					
250	WLMO-35X-27D15B					
251	WLMO-35X-36D15B					

252	WLM0-35X-45D15B					
253	WLM0-35X-54D15B					
254	WLM0-35X-60D15B					
255	WLM0-35X-27D20B					
256	WLM0-35X-36D20B					
257	WLM0-35X-45D20B					
258	WLM0-35X-54D20B					
259	WLM0-35X-60D12B					
260	WLM0-35X-54D16B					
270	WLM0-45X-54D10B					
271	WLM0-45X-72D10B					
272	WLM0-45X-90D10B					
273	WLM0-45X-10E10B					
274	WLM0-45X-12E10B					
275	WLM0-45X-54D12B					
276	WLM0-45X-72D12B					
277	WLM0-45X-90D12B					
278	WLM0-45X-10E12B					
279	WLM0-45X-12E12B					
280	WLM0-45X-72D16B					
290	WLM0-55X-10E85A					
291	WLM0-55X-12E85A					
292	WLM0-55X-15E85A					
293	WLM0-55X-17E85A					
294	WLM0-55X-20E85A					
295	WLM0-55X-10E10B					
296	WLM0-55X-12E10B					
297	WLM0-55X-15E10B					
298	WLM0-55X-17E10B					
299	WLM0-55X-20E10B					
310	WLM0-55X-20E60A					
311	WLM0-55X-25E60A					
312	WLM0-55X-30E60A					
313	WLM0-55X-35E60A					
314	WLM0-55X-20E75A					
315	WLM0-55X-25E75A					
316	WLM0-55X-30E75A					
317	WLM0-55X-35E75A					
351	WLM0-33F-24C15C					
352	WLM0-33F-96C90B					
353	WLM0-33F-36C10C					
354	WLM0-33F-48C10C					
355	WLM0-33F-60C10C					
356	WLM0-33F-72C10C					
357	WLM0-33F-84C10C					
358	WLM0-33F-96C10C					
359	WLM0-33F-10D10C					

360	WLMO-33F-12D10C					
363	WLMO-33F-36C15C					
364	WLMO-33F-48C15C					
365	WLMO-33F-60C15C					
366	WLMO-33F-72C15C					
367	WLMO-33F-84C15C					
368	WLMO-33F-96C15C					
369	WLMO-33F-10D15C					
370	WLMO-33F-12D15C,					
373	WLMO-33F-36C18C					
374	WLMO-33F-48C18C					
377	WLMO-33F-84C18C					
378	WLMO-33F-96C18C					
379	WLMO-33F-10D18C					
456	WLMO-40F-96C10C					
457	WLMO-40F-10D10C					
458	WLMO-40F-12D10C					
459	WLMO-40F-14D10C					
460	WLMO-40F-16D10C					
466	WLMO-40F-96C15C					
467	WLMO-40F-10D15C					
468	WLMO-40F-12D15C					
469	WLMO-40F-14D15C					
470	WLMO-40F-16D15C					
553	WLMO-33W-45C10C					
554	WLMO-33W-60C10C					
555	WLMO-33W-75C10C					
556	WLMO-33W-90C10C					
557	WLMO-33W-10D10C					
558	WLMO-33W-12D10C					
563	WLMO-33W-45C15C					
564	WLMO-33W-60C15C					
565	WLMO-33W-75C15C					
566	WLMO-33W-90C15C					
567	WLMO-33W-10D15C					
568	WLMO-33W-12D15C					
573	WLMO-33W-45C18C					
574	WLMO-33W-60C18C					
575	WLMO-33W-75C18C					
576	WLMO-33W-90C18C					
577	WLMO-33W-10D18C					
578	WLMO-33W-12D18C					
633	WLMO-42W-10D10C					
634	WLMO-42W-12D10C					
635	WLMO-42W-15D10C,					
636	WLMO-42W-18D10C					
637	WLMO-42W-20D10C					
638	WLMO-42W-24D10C					
643	WLMO-42W-10D12C					
644	WLMO-42W-12D12C					
645	WLMO-42W-15D12C					

646 WLMO-42W-18D12C
647 WLMO-42W-21D12C
648 WLMO-42W-24D12C
653 WLMO-42W-10D15C
654 WLMO-42W-12D15C
655 WLMO-42W-15D15C
656 WLMO-42W-18D15C
657 WLMO-42W-21D15C
658 WLMO-42W-24D15C

F178	Renew drive max output current 0 Default(1.36*I rated) 1 manual modify value	0	0	1	R/W(Int)	
ALARM LOG						
F179	Alarm total number	0	Calc	Calc	R(Int)	
F180	Third alarm	0	Calc	Calc	R(Int)	
F181	Second alarm	0	Calc	Calc	R(Int)	
F182	Latest alarm	0	Calc	Calc	R(Int)	
F184	Alarm number	0	0	20	R(Int)	
F185	alarm bit0: under voltage bit1: over voltage bit2: IGBT desaturate bit3: IGBT instantaneous over current bit4: current feedback loss bit5 : IGBT module overtemperature bit6: motor overtemperature bit7: ambient overtemperature(above 18.5kW) bit8 : heat sink overtemperature bit9: regulation card overtemperature bit10: drive overload bit11: motor overload bit12: braking overload bit13: over speed bit14: speed feedback loss 0: no alarm 1: alarmed	0	0	32767	R(Int)	
F186	alarm bit0: external fault bit1: ground fault bit2 : under voltage repetitive bit3: max time bit4: parameter error 0: no alarm 1: alarmed	0	0	31	R(Int)	reserved

ADVANCE

F187	PID 0= Nor; 1= HC	1	0	1	R/W	
------	----------------------	---	---	---	-----	--

F188	Flux weakening Par	100	0	-	R/W	
F189	POS PID Allow err	30	0	-	R/W	
F190	TYPE-C 0=Off; 1= on	0	0	-	R/W	
F191	DB9 0= off; 1= on	0	0	-	R/W	
F192	Flux weakening Mode 0= Std; 1=Bet ; 2= Formula Method; 3= VM	3	0	-	R/W	
F193	Voltage weak magnetic opening ratio	75	0	-	R/W	
F194	Energy consumption H	0	0	-	R/W	
F195	Energy consumption L	0	0	-	R/W	
F196		0	0	1	R	
F197	M	0	0	-	R	
F198	H	0	0	-	R	
F199	D	0	0	-	R	
F200	Enable energy consumption 0= off; 10= 10min/per	0	0	-	R/W	

I/O FUNC

F201	IN1 State: 0= Force output; 2= Restore terminal control 1001--monitor	1001	0	-	R	
F202	IN2 State (As above)	1001	0	-	R	
F203	IN3 State (As above)	1001	0	-	R	
F204	IN4 State (As above)	1001	0	-	R	
F205	IN5 State (As above)	1001	0	-	R	
F206	IN6 State (As above)	1001	0	-	R	
F207	IN7 State (As above)	1001	0	-	R	
F208	ANA 1 Play as a digital input	1001	0	-	R	
F209	ANA 2 Play as a digital input	1001	0	-	R	
F210	ANA 3 Play as a digital input	1001	0	-	R	
F211	IN11 State GLTZ	1001	0	-	R	
F212	IN12 State 316TZ	1001	0	-	R	
F213	IN13 State 15V_ER	1001	0	-	R	
F214	IN14 State IGBT_OV_HEAT	1001	0	-	R	

F215-220	RESERVED	0	0	-	R	
F221	OUT1 State	1000	0	-	R	
F222	OUT2 State	1000	0	-	R	
F223	OUT3 State LD7	1000	0	-	R	
F224	OUT4 State LD8	1000	0	-	R	
USER PAR						
F267	RESERVED					
F268	First Password Set	0	0	-	R/W	
F269	First Run Time Set	0	0	-	R/W	
F270	First Total Run Time	0	0	-	R/W	
F271	Second Password Set	0	0	-	R/W	
F272	Second Run Time Set	0	0	-	R/W	
F273	Second Total Run Time	0	0	-	R/W	
F274	Third Password Set	0	0	-	R/W	
F275	Third Run Time Set	0	0	-	R/W	
F276	Third Total Run Time	0	0	-	R/W	
F277	Left Deviation Comp-Abs	20000	0	-	R/W	
F278	Right Deviation Comp-Abs	20000	0	-	R/W	
F279	RESERVED					
ALARM						
F280	Phasing err A20 : 0 disable 1 enable	1	0	1	R/W(Int)	
F281	Under Voltage A01 : 0 disable 1 enable	1	0	1	R/W(Int)	
F282	Over Voltage A02 : 0 disable 1 enable	1	0	1	R/W(Int)	
F283	IGBT DS A03 : 0 disable 1 enable	1	0	1	R/W(Int)	
F284	IGBT OC A04 : 0 disable 1 enable	1	0	1	R/W(Int)	
F285	Cur Fbk Loss A05 : 0 disable 1 enable	1	0	1	R/W(Int)	

F286	Module OT A06: 0 disable 1 enable	1	0	1	R/W(Int)	
F287	Motor OT A07: 0 disable 1 enable	1	0	1	R/W(Int)	
F288	Intake Air OT A08: 0 disable 1 enable	1	0	1	R/W(Int)	F285
F289	Heatsink OT A09 : 0 disable 1 enable	1	0	1	R/W(Int)	
F290	Regulation OT A10 : 0 disable 1 enable	1	0	1	R/W(Int)	
F291	Drive OL A11: 0 disable 1 enable	1	0	1	R/W(Int)	
F292	Motor OL A12: 0 disable 1 enable	1	0	1	R/W(Int)	
F293	Brake OL A13: 0 disable 1 enable	1	0	1	R/W(Int)	
F294	Over Speed A14: 0 disable 1 enable	1	0	1	R/W(Int)	
F295	Enc Fbk Loss A15: 0 disable 1 enable	1	0	1	R/W(Int)	
F296	Ext fault/Out Loss A16: 0 disable 1 enable Ext Fault 2 enable Out Loss	0	0	2	R/W(Int)	
F297	Ground fault A17: 0 disable 1 enable	1	0	1	R/W(Int)	
F298	Can Com err A18: 0 disable 1 enable	1	0	1	R/W(Int)	
F299	Phasing err A19: 0 disable 1 enable	1	0	1	R/W(Int)	

Rotary Table Advance PAR

F300	RESERVED					
	RESERVED					
	RESERVED					
F322	POS 3 Saved (Mul)	-	0	-	R/W	
F323	POS 3 Saved (Sig)	-	0	-	R/W	
F324	POS 4 Saved (Mul)	-	0	-	R/W	
F325	POS 4 Saved (Sig)	-	0	-	R/W	
Ctrl Func						
F408	F Motor Temperature	0	0	-	R/W	
F409	PQ Pressure Sensor Sel	0	0	-	R/W	
F410	PQ Preset mode Sel	0	0	-	R/W	
F411	PQ P	0	0	-	R/W	
F412	PQ F	0	0	-	R/W	
F413	PQ F fbk	0	0	-	R/W	
F414	Max Pressure =10V	140	0	-	R/W	
F415	Max F= 10V	100	0	-	R/W	
F416	Max P Fbk = 10V	250	0	-	R/W	
F417	Preset P Dead Zone	200	0	-	R/W	
F418	Preset F Dead Zone	200	0	-	R/W	
F419	Fbk P Dead Zone	200	0	-	R/W	
F420	First Point P Set	50	0	-	R/W	
F421	First Point F set%	10	0	-	R/W	
F422	Second Point P Set	75	0	-	R/W	
F423	Second Point F set%	30	0	-	R/W	
F424	Third Point P Set	100	0	-	R/W	
F425	Third Point F set%	50	0	-	R/W	
F426	Fourth Point P Set	150	0	-	R/W	
F427	Fourth Point F Set	70	0	-	R/W	
F428	Fifth Point P Set	150	0	-	R/W	
F429	Fifth Point F Set%	70	0	-	R/W	
F430	P Add	100	0	-	R/W	
F431	P Dec	100	0	-	R/W	
F432	F Add	100	0	-	R/W	
F433	F Dec	100	0	-	R/W	

F434	Pressure relief coefficient	100	0	-	R/W	
F435	P PI First Part	70	0	-	R/W	
F436	P PI Seond Part	25	0	-	R/W	
F437	P PI Third Part	120	0	-	R/W	
F438	P PI Fourth Part	120	0	-	R/W	
F439	PI First Part or IN2; PI Second Part or IN3	1300	0	-	R/W	
F440	I1	80	0	-	R/W	
F441	P2	1300	0	-	R/W	
F442	I2	80	0	-	R/W	
F443	P3	1300	0	-	R/W	
F444	I3	80	0	-	R/W	
F445	P4	1300	0	-	R/W	
F446	I4	80	0	-	R/W	
F447	PJ1	300	0	-	R/W	
F448	IJ1	80	0	-	R/W	
F449	PJ2	300	0	-	R/W	
F450	IJ2	80	0	-	R/W	
F451	PJ3	300	0	-	R/W	
F452	IJ3	80	0	-	R/W	
F453	PJ4	300	0	-	R/W	
F454	IJ4	80	0	-	R/W	
F455	PI Output Speed	0	0	-	R/W	
F456	Output Add Value	100	0	-	R/W	
F457	Output Dec Value	100	0	-	R/W	
F458	PI Algorithm Sel	2	0	-	R/W	
F459	Prevent overcharging and increase pressure	0	0	-	R/W	
F460	Prevent overcharging flow rate ratio	50	0	-	R/W	
F461	F1	75	0	-	R/W	
F462	F2	30	0	-	R/W	
F463	F3	15	0	-	R/W	
F464	KF	707	0	-	R/W	
F465	Pressure increase during mold opening/injection	60	0	-	R/W	
F466	During injection F1	120	0	-	R/W	
F467	During injection F2	70	0	-	R/W	

F468	During injection F3	25	0	-	R/W	
Par for F020=4						
F469	Clear Abs 0=Auto 8=Clear Sig 9=Clear Mul	0	0	-	R/W	
F470	Reserved					
F480	Reserved					
F481	Abs Mul Current Value	-	0	-	R/W	
F482	Abs Sig Current Value	-	0	-	R/W	
F483	Err Num	-	0	-	R/W	
F484	Gear Ratio	50	0	-	R/W	
F485	Work Station	8	0	-	R/W	
F486	Reserved					
F487	Reserved					
F488	Mul to 0 threshold value	20000	0	-	R/W	

Chapter - 9 Fault diagnosis

9.1 fault description

(A01)under voltage (F009=1)

Drive DC-link under voltage。

(A02)over voltage(F009=2)

Disconnect of braking resistor。

(A03)IGBT desaturate (F009=3)

IGBT desaturate, Short circuit on the motor winding or on the power bridge。

(A04)IGBT instantaneous over current(F009=4)

(A05)current feedback loss(F009=5)

Current feedback sensor failure。

(A06)IGBT module over temperature(F009=6)

(A07)motor over temperature(F009=7)

Over temperature on the motor winding or PTC sensor not connected to the drive.

(A08)ambient over temperature(F009=8)

Intake air temperature too high

(A09)heat sink over temperature(F009=9)

Drive thermal protection。

(A10)regulation card over temperature(F009=10)

Over temperature of the regulation board。

(A11)drive overload(F009=11)

Drive overload alarm

(A12)motor overload(F009=12)

motor overload alarm。

(A13)braking unit overload(F009=13)

Braking unit overload alarm

(A14)over speed(**F009=14**)

Over speed alarm。

(A15)speed feedback loss(**F009=15**)

Encoder feedback loss。

(A16)external fault(**F009=16**)

external fault

(A17)ground fault(**F009=17**)

ground fault

(A18)Can Com Err

(A19)Max time Err

(A20) Phasing err

9.2 Fault Diagnosis Chart

Fault code	Fault name	Drive status	possible reasons	Solution
A01	Under voltage	disable	·power failure ·the input voltage is not stable ·the input voltage lack-phase	·restart the drive ·Check input voltage ·all of above steps don't work please contact with sales offices
A02	Over voltage	disable	·deceleration time is too short ·the peak voltage is too high ·disconnect brake resistor	·Modify the deceleration time ·check the brake resistor
A03	power shortage(IDS)	disable	·internal fault ·Interference ·Device failure	·please contact with sales offices if restart does not work
A04	Over current(IOC)	disable	·Motor cable short circuit ·mismatching motor ·improper current gain	·check load ·check cable ·Check the motor specifications
A05	Current feedback loss(Curr fbk loss)	disable	·incorrect wiring of current transformer ·check terminal XTA ·current transformer fault	·check current transformer wiring
A06	ICBT module over temperature (Module OT)	disable	·IGBT module over temperature ·fans fault ·Overload current cycle is too long	·check fans
A07	Motor over temperature(Motor OT)	disable	·PTC sensor disconnect ·motor a long time overload	·reduce the motor load ·check the temperature circuit if the motor temperature is low
A08	Ambient over temperature(IAS OT)	disable	·High temperature of cooling air ·fans fault ·The cooling hole plugging	·check fans and cooling hole
A09	Heat sink over	disable	·IGBT module over	·check installation

	temperature (Heatsink OT)		temperature ·fans fault ·A heating body around ·Poor ventilation state	environment
A10	Regulation card over temperature(Regulation S OT)	disable	Ambient over temperature	·check ambient temperature ·check cooling system
A11	Drive overload	disable	·a long time overload ·mismatching motor	·check motor and drive specifications
A12	Motor overload	disable	·load is too large , ramp time is too short ·wrong setting of motor rated current	·reduce load and modify ramp time ·check motor specification
A13	Braking unit overload (BU overload)	disable	·mismatching brake voltage threshold ·wrong setting of brake resistor	·check braking resistor specification
A14	Over speed	disable	·Instructions speed too fast ·Speed deviation too large ·wrong over speed threshold ·encoder fault	·check encoder ·check internal over speed parameter
A15	Speed feedback loss (Spd fbk loss)	disable	·disconnect encoder ·incorrect encoder wiring	·check encoder
A16	External fault	disable	·external input fault	·check external fault circuit
A17	Ground fault	disable	·current transformer fault ·Motor cable insulation failure ·encoder fault	·check motor cable ·check encoder
A18	Can Com err	disable		·check com line
A19	Max Time	disable		
A20	Phasing Err	disable		

Appendix A - serial interface

A-1 Modbus RTU Protocol

A-2 Modbus Function

The following functions are implemented on the drive:

code	Function	description
03	Read holding registers	This function allows to require the value of 16-bit (word) registers containing Drive parameters.
06	Preset single register	This function allows to set the value of a single 16-bit register.

A-3 Modbus Example

The following functions are implemented:

03 Read Output register:

This function is used to read the parameters . It is possible to read 16-bits parameters

Read parameter example:

Read F045.

The following bytes should be sent through the RS-485 line by keypad:

06 03 00 2D 00 01 15 B4

With this meaning:

06 is the address of the drive, Each drive must have a unique address.

03 is the function number Read Output register.

00 2D is the register number corresponding to F045. This is 0x002D in hex,MSB first.

00 01 is the number of 16 bit registers to read.

15 B4 is the calculated CRC16 of the message.

The drive should answer in a similar way (temperature may be different):

06 03 02 03 E8 0D 3A

With this meaning:

06 is the address of the drive, Each drive must have a unique address.

03 is the function number Read Output register.

02 read the number of bytes 。

03 E8 is the function read the value of output registers。

0D 3A is the calculated CRC16 of the message。

06 Preset single register

This function sets single 16 bit parameter。

To set for example F045 to 8, send the following string:

06 06 00 2D 00 08 18 74

With this meaning:

06 is the address of the drive, Each drive must have a unique address。

06 is the function number preset single register。

00 2D is the register number corresponding to F045。 This is 0x002D in hex,MSB first。

00 08 is the value of corresponding register 。

18 74 is the calculated CRC16 of the message。

The drive will answer:

06 06 00 2D 00 08 18 74

Appendix B - Common Problem and Processing Method In Electrohydraulic Servo Systems

B-1 No pressure

- ✧ Drive disable, motor does not work
 - Check drive enable wiring
 - Check whether the drive alarmed
- ✧ U、V、W phase sequence problem
 - U、V、W any two interchange
 - Check F002、F040
- ✧ Drive did not receive speed signal, and PQ card no-output
 - Check computer output signal
 - check I/V card output signal wiring if it was reconstruction of machine
 - Check the wiring between the PQ card and the drive
 - Check the drive and PQ card shielding signal value
 - Wrong pressure sensor feedback

B-2 Pressure Is Too Small

- ✧ whether the system oil-way is correct
 - Whether the hydraulic oil tank is full , whether the T tank valves are open
 - Air existed in the oil-way ;
 - Check Safety relief valve and directional valve
 - Whether the system leak oil
- ✧ Check system signal wiring
 - **Reference to B-1**
 - Check parameter F100、F101、F102、F103
 - Check drive max speed、motor rated speed、pump output volume

B-3 System Interference

- ✧ Motor rotated in static status
 - Check the ground between motor and drive
 - Check the machine ground
 - 24V power supply of PQ card can not be shared with valve
 - modify F054 or PQ card parameter F007 if the Interference is small
 - strong electricity near by
- ✧ Earth leakage protection be triggered when working
 - The leakage protector is too small
 - Check earth ground

B-4 System Pressure Instability

- ✧ Check the signal of pressure ,flow .and pressure sensor feedback
- ✧ PID set of PQ card
 - Pressure overshoot , increase P
 - Distinguishing the PID parameter of injection and non injection
 - Distinguishing the PID parameter of each step pressure
- ✧ Check drive data
 - Check the PI value of different speed section,if speed is not stable
 - Check the time- delay,if it is because of slow response lead to overshoot
 - Check the input voltage ,if it is unstable when defluxing , and modify F079

B-5 System Vibration

- ✧ Caused by motor
 - Check motor cable
 - Check motor encoder wiring
 - Whether the motor and oil pump connection stability
- ✧ Caused by control circuit
 - Decrease PQ card P
 - Modify drive PI value
 - Check signal of pressure and flow , Pay special attention to the pressure and flow signal start and stop
 - Increase time-delay of given signal can reduce the vibration at start and stop.
 - Check drive signal wiring

B-6 Common Faults and Solutions

- ✧ Under voltage
 - set F078=1
 - Ste F091 into smaller value
 - Decrease the max speed if it allow
- ✧ Over current
 - increase the value of F056、F057、F058、F059, if the pressure do not overshoot
 - Set F077=0
 - Decrease the value of F063
- ✧ Overload
 - Check F112
 - Check the drive power
 - Check whether the pressure overshoot
 - Check Pressure release signal
- check system return oil-way