Preface

Thank you for purchasing the PLC of Tecorp technology co., Ltd.

Before using T2N series PLC, please read this manual carefully in order to use the products correctly.

This manual mainly describes specifications, features and usage of T2N series PLC, and there are PLC instructions set summaries for easy reference. For both the user program development environment usage and programming methods of this product,please refer to our company's "Auto-Shop programming software user's Guide "," T2N series PLC programming reference manual " and " T2N series communication manual".

This manual is subject to change without notice.

Main features of T2N series PLC:

➢ Building-in large program memory space without an external extension memory card, it can up to 24K steps.

➢ Large-capacity power-supply, it can directly provide power to user sensors, HMI, relays, etc.

➢ It provides high-speed，multi-channel and high frequency I/O ports ，as well as excellent operation and positioning control functions.

- ➢ Building-in two independent communication ports, and MODBUS master and slave communication protocols,

- ➢ Comprehensive encryption features to protect user's intellectual property rights.

- ➢ Supporting up to 128 programs and 21 sub-interrupt subroutines

- ➢ Fast user-program execution speed.

Safety Precautions

Before starting operation, please read the operation instructions and safety precautions in order to reduce accidents. The "DANGER, WARNING, CAUTION"in the product and product manuals, it does not mean all safety precautions that should be compliance with, only as additional safety precautions.Therefore, the personnel who are responsible for product installation must be strictly trained, strictly adhere to the relevant industry safety specifications and safety precautions in this manual,and follow the correct operation methods.

This manual classifies the safety precautions into two categories:

| ⚡ 🔥 DANGER | and | ⚠ CAUTION | .

| ⚡ 🔥 DANGER |
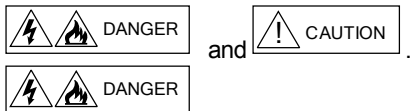
Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.

| ⚠ CAUTION |

Indicates that incorrect handling may cause the personal injury or property damage.All these are in the important content, please strictly adhere to them.

Keep this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

DESIGN PRECAUTIONS

⚠⚠ DANGER

Provide a safety circuit on the outside of the PLC so that the whole system operates to ensure the safety even when external power supply trouble or PLC failure occurs. To be considered in the design includes:

1) On the outside of the PLC, an emergency stop circuit, a protection circuit, an interlock circuit, or a positioning limit circuit may be necessary for preventing damage to the machine.

2) Ensure the safe operation of equipment, please design external protection circuit and safety mechanics for the PLC output signals.

3) When the PLC CPU detects the system abnormal, all outputs may be turned off. During the controller circuit failure, it may cause the output out of controlled. Design external circuits to ensure safe operations of the machine in such a case.

4) When some sort of error occurs in a relay or transistor of the output unit, output may be kept on or off.

5) PLC design is applied to the indoor electric environment, its power system-level should have

lightning protection device, make sure that they will not lightning imposed on the PLC power input-side or signal input, control output terminal, avoid damage the device.

INSTALLATION PRECAUTIONS

⚠ CAUTION

1) Do not use the PLC in the place of dust, oil smoke, conducting dust, corrosive gas, and combustible gas, exposure to the high temperature, dew, wind and rain, vibration and shock.Electric shock, fire, operator errors can also cause the product damage and deterioration.

2) When processing for screw holes and wiring, do not make the metal filings and wires falling into the controller ventilation hole, this may cause a fire, failure, and malfunction.

3) When the installation work of the new PLC is over, it needs to ensure that there is no foreign body on the face of ventilation, including dust-proof and so on, otherwise, it may cause poor heat dissipation during running, a fire, failure and malfunction.

4) Avoid charged state for wiring and pluging the cable plug, otherwise easily cause electric shock, or cause damage to the circuit.

5) The Installation and wiring should be fixed and reliable, poor contact may cause incorrect operation.

6) If there is serious interference, the communications and high-frequency signal cable should be shielded cables, to improve system anti-interference capacity.

WIRING PRECAUTIONS

⚡ 🔥 DANGER

1) Turn off all of the power supply externally before installation or wiring work in order to avoid electric shock or damage of product.

2) Make sure to attach the terminal cover offered as an accessory to the product before turning on the power or starting the operation after installation or wiring work.

3) When processing for screw holes and wiring, do not make the metal filings and wires falling into the controller ventilation hole, this may cause a fire, failure, and malfunction.

⚠ CAUTION
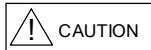
1) For the main unit terminal or the extension unit terminal，do not use external power supply. Do not wire vacant terminals externally.

2) For applications where serious interference, high-frequency signal input or output cable selection shielded cables should be to enhance the system of anti-interference capacity.

3) Please use the wire above 2mm2 to avoid connecting the grounding terminal at the same point as a heavy electrical system.

STARTUP AND MAINTENANCE PRECAUTIONS

| ⚡ 🔥 DANGER |

1) Do not touch any terminal while the PLC is power on.Doing so may cause electrical shock or malfunctions；

2) Before cleaning or retightening terminals, externally cut off all phases of the power supply.Failure to do so may expose you to shock hazard.

3) Please connect or remove the wire, the extension module and control unit wire after cutting off all power supply, otherwise it may cause failures and malfunctions.

4) For online modify, coercible output, RUN, STOP and so on, you should read the instruction manual, and operate the PLC after fully confirm its safety.

| ⚠ CAUTION |

➢ When handling extension card, be sure to cut off the power supply.

➢ Replace button batteries during power-off. The battery replacement should be charged by the electrical technicians who wear insulating gloves. Finish battery replacement within 30 seconds, otherwise it may cause data loss.

➢ Please follow the industrial wastes disposal for the waste products.

Preface

Contents

1

Product Information

Chapter 1 Product Information

1.1 Designation Rules

$$\underline{\text{T}}\text{2N-}\underline{\textbf{3232}}\ \underline{\textbf{MRAX}}$$
① ○ ③ ○ ⑤ ○ ○ ⑧

①   Product Information   T: Tecorp controller

②   Series No.   2N: The second generation controller

③   Input Point   32: 32 Points Input

④   Output Point   32：32 Points output

⑤   Module Classification   M：Main Module of Ganeral Purpose Controller

      P: Positioning controller   N: Network Controller   E: Extension Module

⑥   Output Type   R: Relay Output Type   T: Transistor Output Type

⑦   Power Supply Type

A；AC 220V Input，   Omitted Default:AC220V

B: AC110V Input   C: AC24V Input   D: DC24V

⑧   Special Function Identification

Such as high speed I/O function and analog function, etc.

1.2 Optional Parts Connection System

T2N series has extensive optional parts to choose from, the connection of the controller and optional parts is shown as figure 1-1.
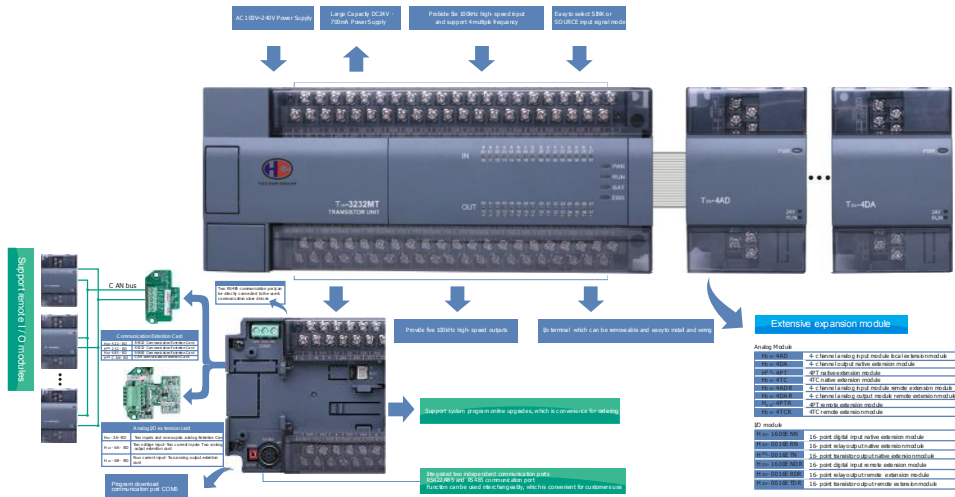
Fig.1-1 Optional Parts Connection of T2N

1.3 Basic Parameters

Table 1-1 Basic Parameters of T2N Series Main Module

Model	Total I/Os	I/O Fetures					
		Total I/Ps	Hi-speed I/Ps	Signal voltage	Total O/Ps	Hi-speed O/Ps	Output Type
T2N-1616MR	32	16	Six 100 kHz	DC24V	16	/	Relay
T2N-1616MT						Three 100 kHz	Transistor
T2N-2416MR	40	24	Two 100 kHz	DC24V	16	/	Relay
T2N-2416MT						Two 100 kHz	Transistor
T2N-3624MR	60	36	Two 100 kHz	DC24V	24	/	Relay
T2N-3624MT						Two 100 kHz	Transistor
T2N-3232MR	64	32	Six 100 kHz	DC24V	32	/	Relay
T2N-3232MT						Three 100 kHz	Transistor
T2N-3232MTQ						Five 100 kHz	Transistor
T2N-4040MR	80	32	Six 100 kHz	DC24V	40	/	Relay
T2N-4040MT						Three 100 kHz	Transistor
T2N-6464MR	128	64	Six 100 kHz	DC24V	64	/	Relay
T2N-6464MT						Three 100 kHz	Transistor

Caution: The total input points included the high speed input and port can be used as the general input.

1.4 General Specifications

Table 1-2 Ambient conditions specifications of operation, storage and transportation

Environmental parameter				Ambient condition	Transport ambient condition	Storage ambient condition
Type		**Parameter**	**Unit**			
Climatic-Condition	Ambient Temperature	Low Temperature	℃	−5	−40	−40
		High Temperature	℃	55	70	70
	Humidity	Relative Humidity	%	95 （30℃±2℃）	95 （40℃±2℃）	/
	Atmospheric Pressure	Low Pressure	kPa	70	70	70
		High Pressure	kPa	106	106	106
Mechanica-l Stress	Sine Vibration	Displacement	mm	3.5（5 to 9Hz）	/	/
		Acceleration	m/s^2	10 （9 to 150Hz）	/	/

Environmental parameter			Ambient condition	Transport ambient condition	Storage ambient condition
Type		Parameter	Unit			
	random vibration	Acceleration Spectral Density	m^2/s^3(dB/Oct)	/	5 to 20Hz：1.92dB 20 to 200Hz：$-$3dB	/
		Frequency Range	Hz	/	5 to 200	/
		Vibration Direction	/	/	X/Y/Z	/
	Shock	Type	/	/	Half-Sine	/
		Acceleration	m/s^2	/	180	/
	Dipping	Dipping Height	m	/	1	/

Tabel 1-3 Electrical Insulation Specification

	Name	Rated Value	Test Condition---*9
Insulation resistance	Insulation resistance between AC input and the housing	≥5×10^6Ω	Ambient temperature:25℃±5℃； Relative Humidity:90％（without condensing）; Test Voltage is 500VDC.

	Name	Rated Value	Test Condition---*9
	Insulation resistance between AC input and DC output	≥5×10^{6}Ω	Ambient temperature:25℃±5℃; Relative Humidity:90％ (without condensing); Test Voltage is 500VDC.
	Insulation resistance between DC output and housing	≥5×10^{6}Ω	Ambient temperature:25℃±5℃; Relative Humidity:90％ (without condensing); Test Voltage is 500VDC.
	Insulation resistance between AC output and housing	≥5×10^{6}Ω	Ambient temperature:25℃±5℃; Relative Humidity:90％ (without condensing); Test Voltage is 500VDC.
	Insulation resistance between AC output and DC output	≥5×10^{6}Ω	Ambient temperature:25℃±5℃; Relative Humidity:90％ (without condensing); Test Voltage is 500VDC.
	Insulation resistance between AC output and input	≥5×10^{6}Ω	Ambient temperature:25℃±5℃; Relative Humidity:90％ (without condensing) Test Voltage is 500VDC.
Insulation Strength	AC input and between housing	It should be able to withstand 50Hz, RMS is AC 2830V voltage or equivalent DC voltage 1 minute, no breakdown or flashover phenomenon; leakage current ≤ 5mA.	
	AC input against	It should be able to withstand 50Hz, RMS is AC 2830V voltage or	

	Name	Rated Value	Test Condition---*9
	user input against the output terminals	equivalent DC voltage 1 minute, no breakdown or flashover phenomenon; leakage current ≤ 5mA
	AC input against extended bus	It should be able to withstand 50Hz, RMS is AC 2830V voltage or equivalent DC voltage 1 minute, no breakdown or flashover phenomenon; leakage current ≤ 5mA
	User relay input against extended bus	It should be able to withstand 50Hz, RMS is AC 2830V voltage or equivalent DC voltage 1 minute, no breakdown or flashover phenomenon; leakage current ≤ 5mA
	User input against user relay output	It should be able to withstand 50Hz, RMS is AC 2830V voltage or equivalent DC voltage 1 minute, no breakdown or flashover phenomenon; leakage current ≤ 5mA
	Between the user relay output ports	It should be able to withstand 50Hz, RMS is AC 2830V voltage or equivalent DC voltage 1 minute, no breakdown or flashover phenomenon; leakage current ≤ 5mA
	Between the user relay output against transistor outputs	It should be able to withstand 50Hz, RMS is AC 2830V voltage or equivalent DC voltage 1 minute, no breakdown or flashover phenomenon; leakage current ≤ 5mA
	For the voltage and insulation of other circuits, according to the requirements of ultra-low voltage circuit to carry out the isolation design.		

Table 1-4 Electromagnetic compatibility

Item No.	Test item	Test standards	Basic standards	Performance criteria
1	Conducted interference	EN 61131-2:2003 Section, 8.2.3, Table 27 AC port,Class A Limits	SISPR 11:1997+A1:1999+A2:2002	Class A, Group 1
2	Radiated interference	EN 61131-2:2003 Section, 8.2.3, Table 27 AC port,Class A Limits	SISPR 11:1997+A1:1999+A2:2002	Class A, Group 1
3	ESD immunity	EN 61131-2:2003, Section 8.3.3, Table 30,external port, ±4kV Contact discharge, ±8kV Air discharge	EN 61000-4-2:2001	B
4	Radiated immunity	EN 61131-2:2003, Section 8.3.3, Table 30,external port, 10V/m	EN 61000-4-3:2002+A1:2002	A
5	Immunity of electrical fast transient	EN 61131-2:2003, Section 8.3.3, Table 30; DC:1kV	EN 61000-4-4:2004	B
6	Immunity of surge protective	EN 61131-2:2003 Section 8.3.3, Table31; AC:1kV(DM),2kV(CM); DC:0.5kV	EN 61000-4-5:2001	B

Item No.	Test item	Test standards	Basic standards	Performance criteria
7	Immunity of conduction interference	EN 61131-2:2003, Section 8.3.3, Table31 10V	EN 61000-4-6:2001	A
8	Immunity of power frequency magnetic field	EN 61131-2:2003, Section 8.3.3, Table 30,external port, 30A/m	EN 61000-4-8:2001	A
9	Immunity of voltage dip and interrupt	EN 61131-2:2003 Section 8.3.4, Table 33 Half cycle(10msec)	EN 61000-4-11:1994+A 1:2000	A
10	Noise immunity	1、The Common-mode of the power line has 2.5kV, differential-mode has 2.5kV; 2、The signal line with dual coupled is 2.5kV; 3、The signal line and power line with compositing and coupling is 2.2kV.	IEC 61800-3:2004 Noise	A

1.5 Performance Specification

Table 1-5 Performance Specification

Item		T2N Series	
Operation control mode		Circular scan mode and interrupting instruction	
I/O control mode		Batch processing method (when END instruction is executed), there is an I/O immediate refresh instruction	
Programming language		Ladder diagram(LD), instruction list(IL) and sequentialfunction chart(SFC)	
Max. storage capacity		24K steps,(including file registers, max. 24K)	
Instruction type	Basic sequence Control/ step-ladder diagram	27 Sequential control instructions, 2 step-ladder diagram instructions	
	Application Instruction	128	298
Operation speed	Basic Instruction	0.26μs/ instruction	
	Application Instruction	1 to hundreds of μs/ instruction	
Max I/O points	MaxInput points(expansion included)	X000-X377(Octal No.)	256 points
	MaxOutput	Y000-Y377 (Octal	256 points

Item			T2N Series
	points(expansion included)	No.)	
	I/O total points during extending	Octal No.	256 points
Auxiliary Relay(M)	General ※1	M0 to M499	500 points
	Latched ※2	M500 to M1023	524 points
	Latched ※3	M1024 to M3071	2048 points
	Special	M8000 to M8255	256 points
State Register(S)	Initial	S0 to S9	10 points
	General ※1	S10 to S499	490 points
	Latched ※2	S500 to S899	400 points
	Signal ※2	S900 to S999	100 points
Timer(T)	100 msec	T0 to T199	200 points(0.1 to 3276.7 sec)
	10 msec	T200 to T245	46 points (0.01 to 327.67 sec)
	Cumulative 1 msec※3	T246 to T249	4 points (0.001 to 32.767 sec.)
	Cumulative 100 msec ※3	T250 to T255	6 points (0.1 to 3276.7 sec.)
Counter(C)	One unidirectional 16 bit ※1	C0 to C99	100 points (0 to 32767 counting)

Item		T2N Series	
	One unidirectional 16 bit※2	C100 to C199	100 points (0 to 32767counting)
	Bidirectional 32 bit※1	C200 to C219	20 points(-2147483648 to +2147483647 counting)
	Bidirectional 32 bit ※2	C220 to C234	15 points(-2147483648 to +2147483647 counting)
	High-speed bi-directional 32 bit ※2	C235 to C255	21 points(-2147483648 to +2147483647 counting)
Data register	General 16 bit ※1	D0 to D199	200 points
	Latched 16 bit ※2	D200 to D511	312 points
	Latched 16 bit ※3	D512 to D7999	7488 points (Above D1000,take 500 points as the unit to set file registers)
	Special 16 bit	D8000 to D8255	256 points
	For use with index address 16 bit	V0 to V7，Z0 to Z7	16 points
Pointers	For branch use with	P0 to P127	128 points

Item		T2N Series	
Nestings	JAMP.CALL		
	Input Interrupt	I00□ to I50□	6 points
	Timer Interrupt	I6□□ to I8□□	3 points
	Counting Interrupt	I010 to I060	6 points
	Master Control	N0 to N7	8 points
Constants	Decimal (K)	16 bit: -32768 to +32767	32 bit: -2147483648 to +2147483647
	Hexadecimal(H)	16 bit: 0 to FFFF	32 bit: 0 to FFFFFFFF

※1、Data area without battery backup.It can be changed to be battery backup area via Parameter setup.

※2、Data area with battery backup. It can be changed to non-battery-backup area via parameter setup.

※3、Data area with battery backup.The feature can not be changed.

2

Mechanical Design Reference

Chapter 2 Mechanical Design Reference

Safety Precautions

⚠ CAUTION

- Please use the PLC according to the environment specification provided by this manual. Do not use the PLC in the place of dust, oil smoke, conducting dust, corrosive gas, and combustible gas, high temperature, dew, wind and rain, vibration and shock. All the Inappropriate places will cause electric shock, fire, malfunction and product damaged.

- When process for screw holes and wiring, do not make the metal filings and wires falling into the controller ventilation hole, this may cause a fire, failure, and malfunction. After finishing the installation work, remove the paper tape on ventilation hole of the PLC.

- The extended cables and extended cards should be correctly connected to the corresponding terminals.Avoid the malfunction due to the poor contact.

2.1 Mounting Dimension
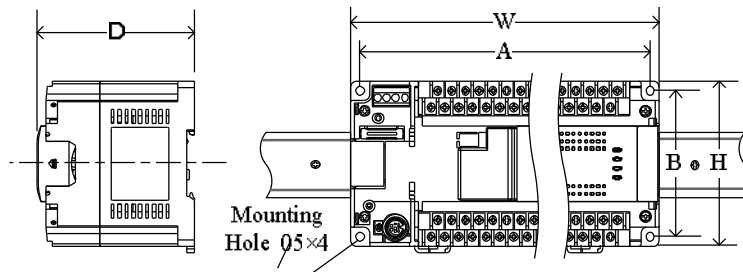
Fig.2-1 Schematic Diagram for Mounting Dimension

Table 2-1 Physical Dimension

Model	Total I/Os	Mounting Dimension		Dimension W×H×D（mm）
		A（mm）	B（mm）	
T2N-1616M_	32	160	80	170×90×88
T2N-2416M_	40	160	80	170×90×88
T2N-3624M_	60	210	80	220×90×88
T2N-3232M_	64	210	80	220×90×88
T2N-4040M_	80	275	80	285×90×88
T2N-6464M_	128	340	80	350×90×88

2.2 Mounting Position Requirements

➢ Do not remove the paper tape which can prevent the foreign objects from dropping into the unit during installation. When the installation is completed, remove the paper tape before power-on in order to prevent overheating.

➢ In order to prevent overheatinginside the unit, mount the unit in wall- hanging way, as shown in Figure 2-1. The top and bottom should both left more than 300 mm gap.

➢ Between the main PLC module and other devices or structures, remain more than 50mm gap. As far as possible away from the high voltage device and power device.

2.3 Fixed Method

➢ DIN rail fixed step

1、Fix the DIN rail on the backplane horizontally.

2、Pull out the DIN rail buckle at the bottom of the module.

3、Link the module onto the DIN, push the buckle back in position, then lock the module.

4、Finally fix the DIN-rail to two sides of the module so as to avoid sliding around.

➢ Adopt the screw fixed: it is recommended to use four M4 screw to fix in a shock occasion.

3

Electrical Design Reference

Chapter 3 Electrical Design Reference

Here is the main module input and output terminal blocks configuration of T2N series of PLC. PLC in the form of a relay output and a transistor output,share the sameterminal configuration correspondingly.

3.1 Product Structrue
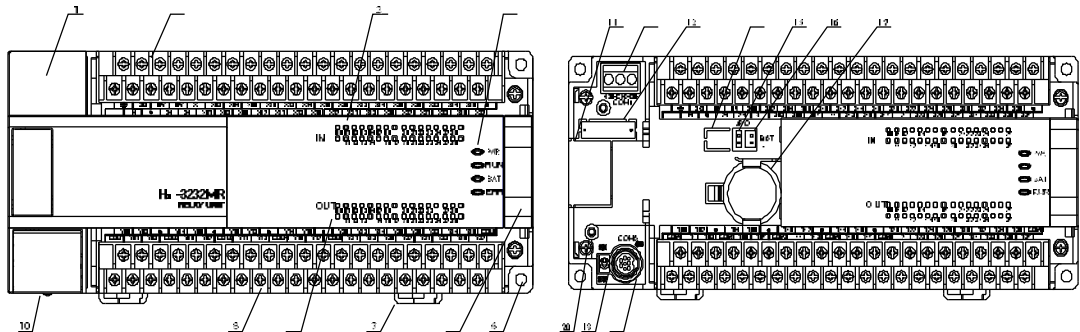
Fig. 3-1 Product Structural Diagram

Fig. 3-1 Component names and Function descriptions：

1. Cover plate
2. Power supply, auxiliary power supply and removable terminal for input signal
3. LEDs for indicating the input status
4. LEDs for indicating the input status
    PWR:Power LEDs ；
    RUN:Operating LEDs (Fashing during normal running)；
    BAT： LEDs for Battery low-voltage；
    ERR： Error LEDs
5. Mounting screw holes
6. Interface cover for extended module
    Buckle for two DIN rail mounting
7. LEDs for indicating output status
8. Removable terminal for input signal
9. Download port for user program
10. Special function adapter plate knock-down hole (It should be cut down before the installation of special function adapter board)

11. RS485 communication port terminals
12. Special function extended card and special function adapter board interface
13. System program download port (Do not operate for non-professional)
14. Switching jumper of COM0 communication port protocol (Mounting short block refers to COM0 for download, monitoring protocol, removing the short block indicates that the user can program COM0 to other protocols, as shown in the T2N series of PLC communication manual.
15. Battery socke（BAT）(the polarity can not be reversed)
16. Wafer Battery (Use manufaturer special Battery)
17. Special function extended card and special function adapter board fixed bolts.
18. RUN/STOP switch
19. User program download port（COM0）

3.2 Hardware Interface

3.2.1 Terminal Block Definition

3.2.1.1 Terminal block definition of T2N -1616MR，T2N -1616MT

⏚	●	S/S	0V	0V	X0	X2	X4	X6	X10	X12	X14	X16	●
L	N	●	S/S	24V	24V	X1	X3	X5	X7	X11	X13	X15	X17

Y0	Y1	Y2	●	Y4	●	Y6	●	Y10	Y12	●	Y14	Y16
COM0	COM1	COM2	Y3	COM3	Y5	COM4	Y7	COM5	Y11	Y13	COM6	Y15	Y17

3.2.1.2 Terminal block definition of T2N -1616MTQ

⏚	●	S/S	0V	0	X0	X2	X4	X6	X10	X12	X14	X16	●
L	N	●	S/S	24V	24	X1	X3	X5	X7	X11	X13	X15	X17

Y0	●	Y2	Y3	●	Y5	Y6	●	Y10	COM6	Y13	Y14	COM8	Y17
COM0	Y1	COM1	COM2	Y4	COM3	COM4	Y7	COM5	Y11	Y12	COM7	Y15	Y16

3.2.1.3 Terminal block definition of T2N -2416MR，T2N -2416MT

⏚	S/S	X1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27
L	N	X0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26

COM	Y0	Y1	Y2	●	Y4	Y6	●	Y10	Y12	●	Y14	Y16	●
24V	COM0	COM1	COM2	Y3	COM3	Y5	Y7	COM4	Y11	Y13	COM5	Y15	Y17

3.2.1.4 Terminal block definition of T2N -3624MR，T2N -3624MT

⏚	S/S	X1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37	X41	X43	●
L	N	X0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26	X30	X32	X34	X36	X40	X42	●

COM	Y0	Y1	Y2	●	Y4	Y6	●	Y10	Y12	●	Y14	Y16	●	Y20	Y22	●	Y24	Y26	●	●
24V	COM0	COM1	COM2	Y3	COM3	Y5	Y7	COM4	Y11	Y13	COM5	Y15	Y17	COM6	Y21	Y23	COM7	Y25	Y27	●

3.2.1.5 Terminal block definition of T2N -3232MR，T2N -3232MT

⏚	S/S	0V	0	V0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26	X30	X32	X34	X36	●
L	N	●	24V	24	Y1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37

Y0	Y2	●	Y4	Y6	●	Y10	Y12	●	Y14	Y16	●	Y20	Y22	Y24	Y26	Y30	Y32	Y34	Y36	COM6
COM1	Y1	Y3	COM2	Y5	Y7	COM3	Y11	Y13	COM4	Y15	Y17	COM5	Y21	Y23	Y25	Y27	Y31	Y33	Y35	Y37

3.2.1.6 Terminal block definition of T2N -3232MTQ

⏚	S/S	0V	0	V0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26	X30	X32	X34	X36	●
L	N	●	24V	24	V1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37

Y0	Y2	Y3	Y4	Y5	Y6	COM5	Y11	Y13	Y14	Y16	COM7	Y21	Y23	Y24	Y26	Y30	Y32	Y34	Y36	COM9
COM0	Y1	COM1	COM2	COM3	COM4	Y7	Y10	Y12	COM6	Y15	Y17	Y20	Y22	COM8	Y25	Y27	Y31	Y33	Y35	Y37

3.2.1.7 Terminal block definition of T2N -4040MR，T2N -4040MT

⏚	S/S	0V	0	Y0	X2	X4	X6	X10	X12	X14	X16	•	X20	X22	X24	X26	•	X30	X32	X34	X36	•	X40	X42	X44	X46	•
L	N	•	24V	24	Y1	X3	X5	X7	X11	X13	X15	X17	•	X21	X23	X25	X27	•	X31	X33	X35	X37	•	X41	X43	X45	X47

Y0	Y1	Y2	Y3	Y5	Y7	Y10	Y12	•	Y14	Y16	•	Y20	Y22	Y24	Y26	•	•	Y30	Y32	Y34	Y36	•	Y40	Y42	Y44	Y46	•
COM0	COM1	COM2	COM3	Y4	Y6	COM4	Y11	Y13	COM5	Y15	Y17	COM6	Y21	Y23	Y25	Y27	•	COM7	Y31	Y33	Y35	Y37	COM8	Y41	Y43	Y45	Y47

3.2.1.8 Terminal block definition of T2N -6464MR，T2N -6464MT

⏚	S/S	0V	0V	X0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26	X30	X32	X34	X36	X40	X42	X44	X46	X50	X52	X54	X56	X60	X62	X64	X66	X70	X72	X74	X76	•
L	N	•	24V	24V	X1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37	X41	X43	X45	X47	X51	X53	X55	X57	X61	X63	X65	X67	X71	X73	X75	X77

Y0	Y2	COM2	Y5	Y7	Y10	Y12	COM4	Y15	Y17	Y20	Y22	Y24	Y26	COM6	Y31	Y33	Y35	Y37	Y40	Y42	Y44	Y46	COM8	Y51	Y53	Y55	Y57	Y60	Y62	Y64	Y66	COM10	Y71	Y73	Y75	Y77
COM1	Y1	Y3	Y4	Y6	COM3	Y11	Y13	Y14	Y16	COM5	Y21	Y23	Y25	Y27	Y30	Y32	Y34	Y36	COM7	Y41	Y43	Y45	Y47	Y50	Y52	Y54	Y56	COM9	Y61	Y63	Y65	Y67	Y70	Y72	Y74	Y76

Terminal block specification: 22-14AWG wire.

When loosen the screw at two sides of, loosen both sides of the terminal screws alternately, pay attention not completely to one screw and then the other screw, just loosen the screw about half and then the other screw, two screws alternately until the whole screw are loosened, then you can gently raise up terminal head to finish the dismantling work of the terminal.

hen mounting terminals, put the terminal head into position, and then tighten a screw to confirm the screw will not fall off and then tighten the other screw, alternately tighten the screws on both sides until complete the process. Note that during the entire fixed process, insert two sides of the terminal as balance as possible, otherwise the terminals may damage by poor contact or short circuit.

3.2.2 Communication Interface Definition

The main PLC unit provides two communications ports,COM0 and COM1.COM0 has standard RS422 and RS485 modes,which is determined by JP0 jumper.If insert the jumper, it is just the mode for RS422.If the jumper is disconnected, it is the compatibility modes for RS485/422, the terminal interface is Mini-DIN8 socket.COM1 is RS485 type defaultly,the user can connect it with other device just via twisted-pair wires.
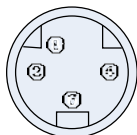
Fig.3-2 COM1Communication port
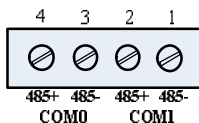
Fig. 3-3 COM0 Communication port

Table 3-1 COM0 port Definition

Pin No.	Signal	Description
1	RXD-	Receive negative data
2	RXD+	Receive positive data
3	GND	Grounding,no electrical connections for 9 and 10
4	TXD-/RXD-	External transmit negative data. It can receive negative data if it is RS485.
5	+5V	External power supply +5V, the same

Pin No.	Signal	Description
		with the internal logic +5V.
6	CCS	Communication direction control wire
7	TXD+/RXD+	External transmit positive data. It can receive negative data if it is RS485.
8	NC	Non-pin

There are two modes via the connection of COM0, PLC and computer or touch screen or other devices.

Mode 1 (connect JP0): The PLC side is RS422, the PC side is USB.So the PC is connected to the PLC COM0 port via the dedicated USB download cable, model T2N-USB-CAB. (See Figure 3-2)

Mode 2 (connect JP0): The PLC side is RS422, the PC side is RS232. The computer is connected to COM0 port via the dedicated serial port download cable and model T2N-232-CAB (See Figure 3-2).

COM1 (RS485 interface) is easy to to connect with other devices, user can be on-site wiring via twisted-pair wires, see Figure 3-3.

Note: COM1 ports are supported only half-duplex communication mode.

3.2.1　　Extension Interface

Extension Card Interface: see Figure 3-1 of the 13th section, Special Function Extended Card and Special Function Transfer Board Interface

Extension Module Interface: see Figure 3-1 of the 6th section, Extension Module Interface.

3.3 Power Supply Circuit Specification

Table 3-2 Power Supply Specification

Item		Unit	Min.Value	Typical Value	Max.Value	Remark
Rated operating voltage		Vac	100	220	240	Normal startup and operating range
Limit input voltage		Vac	85	/	264	Derating for usage When AC85 to100V and AC240 to 264V,see Figure 3-2.
Input current		A	/	/	1	AC 85V input,full-loading output
Input power		W/VA	/	/	50W/85VA	
Output voltage	5V/GND	V	4.75	5	5.25	Output1
	24VDD/GND	V	21.6	24	26.4	Output2
	24VCC/COM	V	21.6	24	26.4	Output3
Output current	5V/GND	mA	/	/	1100	The sum of capacity load is the internal
	24VDD/GND	mA	/	/	700	

Item		Unit	Min.Value	Typical Value	Max.Value	Remark
	24VCC/COM	mA	/	/	700	consumption and the expansion module. The sum of maximum output power shall be each full load . The cooling method is a natural cool.

Output3 in the above table is the sensor power supply, and it can also provide external power supply to the special function module. Output2 provides power supply to the main module and the relay of IO expansion module. Output1 provides power to all modules.During the system configuration, make sure that power supply demand is not exceed its maximum capacity.

For safety reasons, please derating use in the high-temperature environment.High temperature, high pressure, under-voltage and derating, carry out the system design follow the derating curves of Figure 3-4 for system.
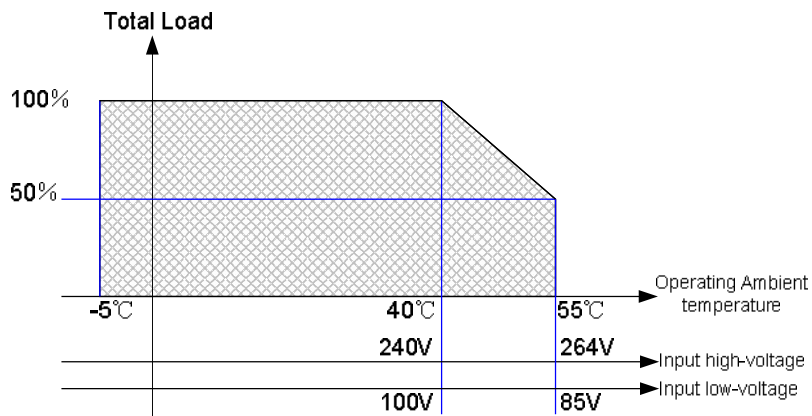
Figure 3-1 Derating Curves of Power Supply

PLC is designed to the indoor electrical environment application.Its external power supply should have lightning protection devices. The power input requires there is no lightning or the surge voltage shock, and the controller should not the equipments of surge voltage. Such as motors, contactors, inverters. Electricity should go through the isolation transformer then provide the power supply to controller.

3.4 Input Specifications

Here's the internal signal circuit and external wiring method of T2N series of PLC. Due to the different models, the terminal name location is different.

3.4.1 Input Specifications

Table 3-3 Input terminal Specifications

Item		High-speed inputs X0～X5	General inputs
Signal input mode		Sink/Source mode.It is sink input when S/S terminal and 24V are shorted connection,it is source when s/s terminal and COM are shorted connection.	
Electrical parameters	Detection voltage	DC24V	
	Input resistance	3.3k	4.3k
	Input :ON	Input current is more than 4.5mA	Input current is more than 3.5MA
	Input : OFF	Input current is less than 1.5mA	Input current is less than 1.5mA
Filter function	Digital Filter	X0 to X7 has digital filter function, the filter time can be set during the range of 0 to 60 msec.	
	Hardware Filter	The other I/O port is hardware filter except X0 to X7, the filter time is about 10 msec.	

Item	High-speed inputs X0~X5	General inputs
High-speed Function	X0 to X5 can realize the function with high-speed counting,interrupt and pluse capture,etc. The maximun frequency of the X0 to X1 port counting up to 100kHz. The maximun frequency of the X2 to X5 port counting up to 10kHz （The model of 40 points，60 points） The maximun frequency of the X2 to X5 port counting up to 100kHz (The model of 32 points,64points,80 points and 128 points)	
Common connection terminal	Only a common terminal：S/S	

Note: S/S connecting to 24V+ or COM determines the SINK or SOURCE input mode, the selection is effective to all the input points' signals in main unit.
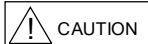
WIRING PRECAUTIONS
⚠ CAUTION
➢ Refer to AC power wiring of this manual, the AC power should connect to specific terminals. If the AC power connected to the DC input and output

WIRING PRECAUTIONS
terminals, it will burn PLC.

> ➢ For the main unit terminal or the extension unit terminal，do not use external power supply. Do not wire vacant terminals externally.

> ➢ Please use the wire above 2mm2 to avoid connecting the grounding terminal at the same point as a heavy electrical system.

> ➢ According to the different input methods, S / S terminal blocks are also different.

3.4.2 Internal equivalent circuit and external wiring

PLC has a built-in power supply (DC24V) to detect user Xi input state, the user only needs to ON/OFF(dry-contact switch) signal between Xi and COM, if a transistor output signal form the active sensor, it shoulde be OC output signal type.

PLC signal input and internal equivalent circuit is shown in the following figure, users circuit and PLC internal circuit to connect via the terminal blocks.Figure 3-5 shows the SINK input method, "S/S" " and "24V terminals are short connection.
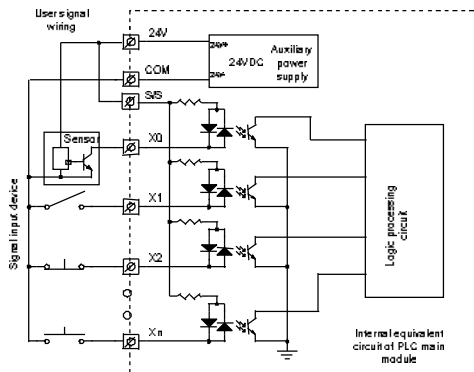
Fig 3-5. Sink Input Connection   Fig 3-6 Source Input Connection
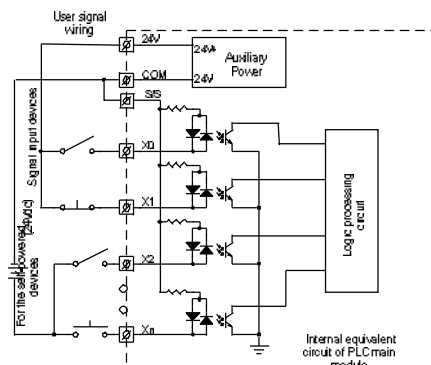
In some special applications, you may need to adopt SOURCE input methods, its equivalent input circuit shown in Figure 3-6, "S/S" terminal and the "COM" terminals are short circuit, while common terminal of all input signal is "24V".

3.5 Output Specifications and Internal Wiring

Output types of T2N Series PLC can be divided into relay-type and transistor-type; there is a large difference in operating parameters. Please choose the correct output type so as to avoid misuse and cause damage.

In order to protect the PLC output relay contacts,if driving inductive load in DC circuit(such as the relay coil), the user circuit must have a freewheeling diode, while driving inductive load in AC circuit, the user circuit should have a RC surge absorption   component,. On principle, the relay output should not be connected to a capacitive load. If necessary, make sure its impact of the surge current is smaller than the maximum current of the relay's specification.

The transistor output loading required to be less than the nominal current limit. If the output current of multiple transistor ports is greater than 100mA, they should be evenly arranged in the interval output ports, which will help the heating dissipation.

It is suggested that ON (conduction) state of the output ports do not exceed 70 percent of the total output ports at the same time.

3.5.1 Output Specifications

Table 3-4 Output Specifications

Item		Relay outputs	Transistor outputs
Circuit Voltage		Less than AC250V and DC30V	DC5V to DC24V
Circuit Insulation		Relay Mechanical Insulation	light coupling Insulation
LED		When the relay output contacts close, the LED light is on.	When the light coupling is drived,the LED light is on.
Leakage current during open circuit		None	Less than 0.1mA/DC30V
Min.load		2mA/DC5V	5mA（DC5V～DC24V）
Max. output current	resistive load	2A/1 point : 8A/4 points common port, 8A/8 points common port	0.5A/point; 0.8A/4 points; 1.6A/8 points
	Inductive load	AC220V，80VA	High speed port: 7.2W/DC24V; Others: 12W/DC24V
	Lamp Load	AC220V，100W	High speed port：0.9W/DC24V, Others：12W/DC24V
ON response delay		20 msec Max.	High speed output: 10μs Others: 0.5msec
OFF response delay		20 msec Max.	

Item	Relay outputs	Transistor outputs
High-speed output frequency	None	100kHz per channel(Max.)
Output common ports	Each group shared a common port, there is insulated gap between the groups	
Fuse protection	None	

3.5.2 Diagram for Internal Equivalent circuit

The following figure shows the internal equivalent circuit diagram of the relay output module, the output terminal is divided into several groups, each group is electrical isolation, and the contacts of different groups can connect with different power circuits.
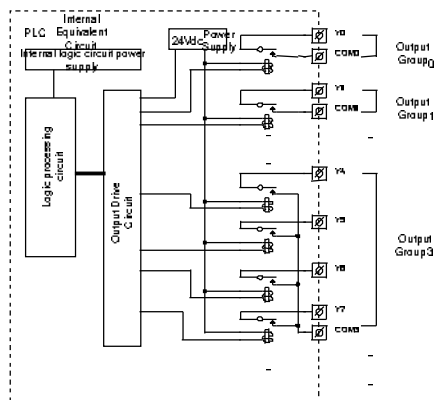
Fig3-7 Relay Output Equivalent circuit   Fig3-8 Transistor Output Internal Equivalent circuit
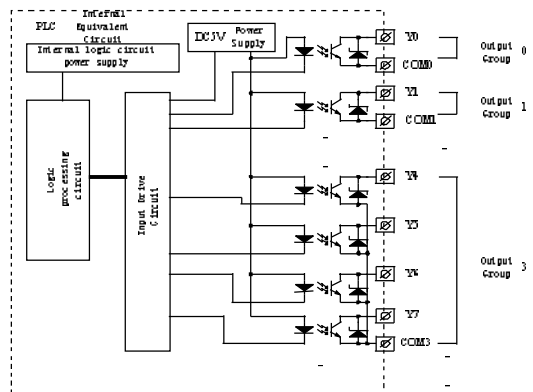
The internal equivalent circuit diagram of the transistor-output-type PLC as shown in Figure 3-8. In which we can see the output terminal is divided into several groups,   and groups are electrical isolated each other. The transistor output level can only be used for DC-DC24V load circuit.

For the inductive load in DC circuit, you should add a freewheeling diode, while the inductive load in AC circuit, add a RC component instead. as shown in Figure 3-9.
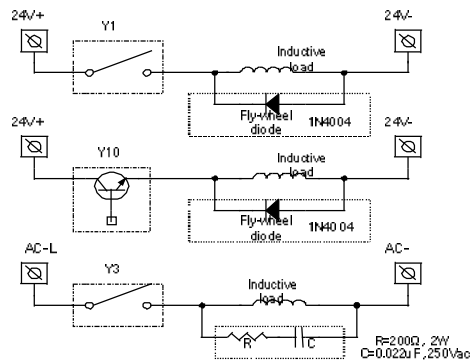
Fig 3-9 Diagram for Inductive Load Absorbing Circuit

3.6 Composition and Selection of Extension Device

3.6.1 Compositions of Extension Device

As shown below, expansion device includes: special function expansion module, I / O expansion modules, special function adapter, special function expansion card.
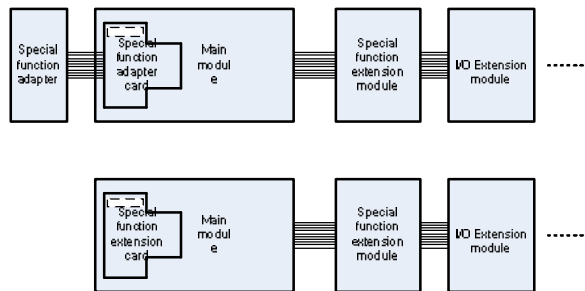
Fig.3-10 Diagram for compositions of extension device

Special fucntion expansion modules include: analog input modules, analog output modules, analog I/O modules, temperature detection modules, position control modules and network modules, etc.

I/O expansion modules include: Active IO extension module and passive IO extension module.whose difference is the former has power module inside.

Special function cards including: Analog extension card, RS232 communication extension card, and positioning function extension cards, etc.

3.6.2 Selection Method

When design anapplication system of T2N series PLC, we must consider the following points:

1. The sum of I/Os should be less than 256 for a main PLC system.

2. Power supply (see 3.3 for details)

The main modules and the active extension modules can provide DC24V and DC5V power supply to I/O expansion modules and special modules.But the total power demand of all of the expansion units should be restricted within the scope of power specification of the main module or the active expansion module respectively

3. For the main module of T2N series, the number of enternal special expansion modules does not exceed 8 units.

3.6.3 Power supply capacity and entention capacity

The main module and active expansion module provide power to extension modules, extension cards and adapters. The PLC unit logically support Max. 256 I/O points, 8 expansion modules.So the total power consumption and the amount of special extension modules shall meet the specifications..
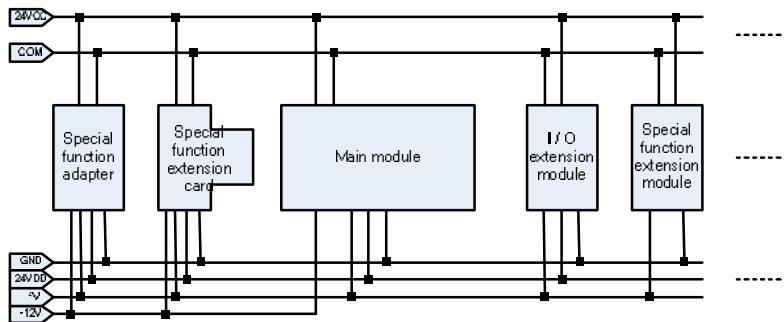
Fig 3-211 Diagram for Power supply of Extension Device

For the power capacity accounting, please note the following points.

➢   Each power supply should be independently accounted.

➢   The extension capacity may be limited by the unit of smaller power output.

For example:

After accounting, the 24VDD allow extending 6 extension modules, but the +5 V only allows extending eight extension modules, the system can only be extended up to 6 extension modules.

4

Programming Reference

Chapter 4 Programming Reference

This chapter describes the summary of PLC software components definition and instruction set.

4.1 Arrangement and Function of Components

Table 4-1 Function of Software Components

Auxiliary Relay M	M0 to M499 General 500 points, ※I	[M500 to M1023] Latched 524 points, ※2 Relay	[M1024 to M3071] Latched 2048 points, ※3	M8000 ～ M8255 Special 256 points,
State	S0 to S499 Initial 500 points ※1 S0 to S9	[S500 to S899]400 points, Latched power failure※2		[S900 to S999] Alarmed 100 points, ※2
Timer	200 points，100 msec Subprogram：T192 to T199 T0～T199	T200 to T2456 points, 10 msec	[T246 to T249]4 points，1 msec retentive※3	[T250 to T255] 6 points，100 msec retentive ※3
16-bit up counter	General C0～C99 100 points，※1		Latched C100 to C199] 100points，※2	
32-bit counter	32 bit Reversible	32 bit high-speed counting Reversible Max.6 points		

		[C220 to C234] 15 points, Latched power failure ※2	[C235 to C245] 1 phase unidirectional counting input ※2	[C246 to C250] 1 phase and bidirectional counting input※2	[C251 to C255] 2 phase counting input※2
	C200 to C219 General 20points ※1				
Data register D，V，Z	D0 to D199 200 General points, ※1	[D200 to D511] Latched 312 points,※2	[D512 to D7999] 7488 Latched points,※3	[D8000 to D8255] Special 256 points	V7 to V0, Z7 to Z0 Index 16 points,
Nesting pointer	N0 to N7 8 points Master Control	P0 to P127 128 points Jump subprogram	I00* to I50* 6 points Input interrupt pointers	I6** to 8** 3 points Timer interrupt pointers	I010 to I060 6 points,counting interrupt pointers
Countants	Decimal K	16 bit -32,768 to 32,767			
	Hexadeci-mal H	16 bit 0 to FFFFH		32 bit -2,147,483,648 to 2,147,483,647 32 bit 0 to FFFFFFFFH	
	Floating Point	-		32 bit $1175×10^{-41}$ to $3402×10^{35}$	

The components within [] is the preservation area for the battery.

※1、Data area without battery backup.It can be changed to be battery backup area via Parameter setup.

※2、Data area with battery backup. It can be changed to non-battery-backup area via parameter setup.

※3、Data area with battery backup.The feature can not be changed.

4.2 Special Component Description

M8000 to M8255，D8000 to D8255 are defined as the special component types, their functions are described in the following table.

Table 4-2 Special Software Component Description

M Component	Description of M Component	D Component	Description of D Component
PLC Status			
M8000	During user program running,it is ON status	D8000	watchdog timer of user program running
M8001	M8000 status select reverse	D8001	Program version of single board,such as 24100 T2N=24,100

M Component	Description of M Component	D Component	Description of D Component
			version V1.00
M8002	The first cycle of the user program began to run is ON	D8002	Memory capacity 4K,8Kand 16 K,etc.
M8003	M8002 status select reverse	D8003	It is fixed to 0 X10 for the programmable controller internal memory
M8004	Anyone among M8060 to M8067 except M8062 is ON, and then the M8004 is enabled.	D8004	Error BCD value of M8060 to M8067, which normal value is 0.
M8005	On when the battery voltage is too low	D8005	The BCD current value of the battery voltage
M8006	On when low battery voltage occurs [Latched]	D8006	Low battery voltage detection value,

M Component	Description of M Component	D Component	Description of D Component
			the initial value is 2.6V
M8007	M8007 & M8008 begin to action after the AC loss power 5 msec, but the program continues to run within the D8008.	D8007	Save the action number, the unit will be zero when power faliure.
M8008	When power faliure during D8008 time and M8008 from ON → OFF, the user program does not run. M8000 is OFF.	D8008	The detection time period of AC power (default 10 msec)
M8009	On when extension unit 24V power faliure	D8009	Module No. of extension unit 24V power loss
Clock Devices			
M8010	Reserved	D8010	Current scan time, 0-step starting from the user program (0.1 msec)

M Component	Description of M Component	D Component	Description of D Component
M8011	Oscillates in 10 msec cycles	D8011	Minimum cycle/ scan time in units of 0.1 msec
M8012	Oscillates in 100 msec cycles	D8012	Maximum cycle/ scan time in units of 0.1 msec
M8013	Oscillates in 1 sec cycles	D8013	Seconds data for use with an RTC (0 - 59)
M8014	Oscillates in 1 min cycles	D8014	Minute data for use with an RTC (0-59)
M8015	RTC Stop and preset	D8015	Hour data for use with an RTC (0-23)
M8016	RTC replays stop	D8016	Day data for use with an RTC(1-31)
M8017	±30sec correction	D8017	Month data for

M Component	Description of M Component	D Component	Description of D Component
			use with an RTC (1-12)
M8018	Installation and Testing	D8018	Year data for use with an RTC(2000~2099)
M8019	Clock data has been set out of range	D8019	Weekday data for use with an RTC
Operation Flags			
M8020	Operation zero flag	D8020	Input filter constant 0~60 of X000 to X007 [Default 10 msec]
M8021	Operation borrow flag	D8021	Reserved
M8022	Operation carry flag	D8022	Reserved
M8023	Reserved	D8023	Reserved
M8024	BMOV instruction direction	D8024	Reserved
M8025	HSC instruction mode	D8025	Reserved
M8026	RAMP instruction mode	D8026	Reserved

M Component	Description of M Component	D Component	Description of D Component
M8027	PR mode	D8027	Reserved
M8028	Reserved	D8028	The same address with Z0
M8029	Instruction execution complete	D8029	The same address with V0
PLC Operation Mode			
M8030	Battery voltage is low but BATT.V LED not lit	D8030	Reserved
M8031	Non-latch memory all clear	D8031	Reserved
M8032	Latch memory all clear	D8032	Reserved
M8033	When ON Memory hold in 'stop' mode	D8033	Reserved
M8034	On when all the PLC output is OFF state	D8034	Reserved
M8035	Forced operation command 1	D8035	Reserved
M8036	Forced operation command 2	D8036	Reserved
M8037	Forced sptop command 1	D8037	Reserved
M8038	Communication setup flags	D8038	Reserved
M8039	Constant scan mode	D8039	Constant scan

M Component	Description of M Component	D Component	Description of D Component
			time default is 0 the unit msec
Step Ladder (STL) Flags			
M8040	STL transfer disable	D8040	Up to 8 active STL states, from the range S0 to S899, are stored in D8040 to D8047 in ascending numerical order. (Updated at END)
M8041	Transfer start	D8041	
M8042	A pulse output is given in response to a start input	D8042	
M8043	On during the last state of ZERO RETURN mode	D8043	
M8044	ON when the machine zero is detected	D8044	
M8045	Disables the 'all output reset' function when the operation mode is changed	D8045	
M8046	ON when STL monitoring has been enabled (M8047) and there is an active STL state	D8046	

M Component	Description of M Component	D Component	Description of D Component
M8047	When ON D8040 to D8047 are enabled for active STL step monitoring	D8047	
M8048	When M8049 is ON, anyone from S900~S999 is enabled.	D8048	Reserved
M8049	When ON D8049 is enabled for active Annunciator state monitoring	D8049	Stores the lowest currently active Annunciator from the range S900 to S999
Interrupt Control Flags		**Reserved**	
M8050	Drive I00□ Interrupt Disabled	D8050	Reserved
M8051	Drive I00□ Interrupt Disabled	D8051	Reserved
M8052	Drive I20□ Interrupt Disabled	D8052	Reserved
M8053	Drive I30□ Interrupt Disabled	D8053	Reserved
M8054	Drive I40□ Interrupt Disabled	D8054	Reserved
M8055	Drive I50□ Interrupt Disabled	D8055	Reserved

M Component	Description of M Component				D Component	Description of D Component
M8056	Drive I60□ Interrupt Disabled				D8056	Reserved
M8057	Drive I70□ Interrupt Disabled				D8057	Reserved
M8058	Drive I80□ Interrupt Disabled				D8058	Reserved
M8059	Drive counter Interrupt Disabled				D8059	Reserved
Error Detection Devices						
Components	Name	PROG. E LED	PLC STATUS			
M8060	I/O configuration error	OFF	RUN		D8060	The first I/O number of the unit or block causing the error -
M8061	PLC hardware error	Flash	STOP		D8061	Error code for hardware error
M8062	PLC communicatio	OFF	RUN		D8062	Error code for Communications

M Component	Description of M Component			D Component	Description of D Component
	n error				error
M8063	Parallel link/ ADP error	OFF	RU N	D8063	Error code for parallel link error
M8064	Parameter error	Flash	STO P	D8064	Error code identifying parameter error
M8065	Syntax error	Flash	STO P	D8065	Error code identifying syntax error
M8066	Program error	Flash	STO P	D8066	Error code identifying program construction error
M8067	Operation error	OFF	RU N	D8067	Error code identifying operation error

M Component	Description of M Component			D Component	Description of D Component
M8068	Operation error latch	OFF	RU N	D8068	Operation error step number latched
M8069	Reserved			D8069	Step numbers for found errors corresponding to flags M8065 to M8067
Link And Special Operation Devices					
M8070	Driven when the PLC is a master station in a parallel link application			D8070	Parallel link watchdog time - 500 msec
M8071	Driven when the PLC is a slave station in a parallel link application			D8071	Reserved
M8072	ON while the PLC is operating in a parallel link			D8072	Reserved
M8073	ON when M8070/ M8071 are incorrectly set during parallel link			D8073	Reserved

M Component	Description of M Component	D Component	Description of D Component
	operations		
Tracking Sampling			
M8074	Reserved	D8074	Remain number of tracking sampling
M8075	Tracking Sampling get ready to begin instruction	D8075	Tracking sampling No. setup(1~512)
M8076	Tracking sampling complete，then instruction execution start	D8076	Tracking sampling cycle
M8077	Tracking sampling while execution monitoring	D8077	Trigger Designation
M8078	Tracking sampling when execution complete monitoring	D8078	Components number setup of trigger condition
M8079	Sampling data tracking more than D8075	D8079	Tracking sampling data pointer

M Component	Description of M Component	D Component	Description of D Component
M8080	Reserved	D8080	Reserved
M8081	Reserved	D8081	Reserved
M8082	Reserved	D8082	Reserved
M8083	Reserved	D8083	Reserved
M8084	Reserved	D8084	Reserved
M8085	Reserved	D8085	Reserved
M8086	Reserved	D8086	Reserved
M8087	Reserved	D8087	Reserved
M8088	Reserved	D8088	Reserved
M8089	Reserved	D8089	Reserved
M8090	Reserved	D8090	Reserved
M8091	Reserved	D8091	Reserved
M8092	Reserved	D8092	Reserved
M8093	Reserved	D8093	Reserved
M8094	Reserved	D8094	Reserved
M8095	Reserved	D8095	Reserved
M8096	Reserved	D8096	Reserved
M8097	Reserved	D8097	Reserved
M8098	Reserved	D8098	Reserved

M Component	Description of M Component	D Component	Description of D Component
High-speed Ring Counter			
M8099	High speed ring counter operation	D8099	[0 to 32767] increased action ring-counter (0.1 msec)
Miscellaneous Devices			
M8100	Reserved	D8100	Reserved
M8101	Reserved	D8101	Single board program versions, such as version T2N = 24100 24100 V1.00
M8102	Reserved	D8102	PLC provides the program capacity to users.
M8103	Reserved	D8103	Reserved
M8104	Reserved	D8104	Reserved

M Component	Description of M Component	D Component	Description of D Component
M8105	Reserved	D8105	Reserved
M8106	Reserved	D8106	Reserved
M8107	Reserved	D8107	Reserved
M8108	Reserved	D8108	Reserved
M8109	Output refresh error	D8109	Output refresh error device number
COM0 Communication Link			
M8110	Reserved	D8110	Communications format, interface configuration setting with a default of zero
M8112	RS- Data transmission flag Instruction execution status	D8112	Amount of remaining data to be transmitted (Only to RS instruction)

M Component	Description of M Component	D Component	Description of D Component
M8113	Finished receiving data Communication error flag（MODBUS）	D8113	Amount of data already received (Only to RS instruction)
M8114	Receiving (Only to RS instruction)	D8114	Start character STX (Only to RS instruction)
M8115	Reserved	D8115	Termination characterETX (Only to RS instruction)
M8116	Reserved	D8116	Protocol setting, the interface configuration setting with a default of 0
M8117	Reserved	D8117	Computer link protocol access

M Component	Description of M Component	D Component	Description of D Component
			required data starting address
M8118	Reserved	D8118	Computer link protocol access required data sending
M8119	Overtime Judgement	D8119	Communication overtime judgement, the interface configuration settings with a default of 10（100 msec）
COM1 Communication Link			
M8120	Reserved	D8120	Communication format, the interface configuration

M Component	Description of M Component	D Component	Description of D Component
			with a default of 0
M8121	Sending and waiting	D8121	Station number settings,the interface configuration settings with a default of 1
M8122	Sending flags (RS Instruction) Instruction execution status	D8122	Amount of remaining data to be transmitted (Only to RS instruction)
M8123	Receiving complete flag (RS) Communication error flag （MODBUS）	D8123	Amount of data already received (Only to RS instruction)
M8124	Receiving (Only to RS instruction)	D8124	Start character STX (Only to RS

M Component	Description of M Component	D Component	Description of D Component
			instruction)
M8125	Reserved	D8125	Termination characterETX (Only to RS instruction)
M8126	Reserved	D8126	Communication format, the interface configuration with a default of 0
M8127	Reserved	D8127	Computer link protocol of data starting address
M8128	Reserved	D8128	Computer link protocol sending data amount
M8129	Overtime Judgement	D8129	Communication overtime judgement, the

M Component	Description of M Component	D Component	Description of D Component
			interface configuration settings with a default of 10（100 msec）
High Speed Zone Compare Table Comparison Flags			
M8130	Selects comparison tables to be used with the HSZ instruction	D8130	Special bit for high-speed model
M8131	Parallelled with M8130	D8131	HSZ & PLSY completion mark of comparison mode
M8132	Speed mode of HSZ&PLSY	D8132	HSZ & PLSY frequency control mode
M8133	Parallelled with M8132	D8133	
M8134	Reserved	D8134	Completion mark for HSZ & PLSY frequency control
M8135	Y0 speed-down time and pluse output can be change to be	D8135	

M Component	Description of M Component	D Component	Description of D Component
	enabled [ON]		mode
M8136	Y1 speed-down time and pluse output can be change to be enabled [ON]	D8136	The total number of
M8137	Y2 speed-down time and pluse output can be change to be enabled [ON]	D8137	Y000&Y001 output pulses
M8138	Y3 speed-down time and pluse output can be change to be enabled [ON]	D8138	Reserved
M8139	Y4 speed-down time and pluse output can be change to be enabled [ON]	D8139	Reserved
M8140	CLR signal output function of ZRN is enabled.	D8140	PLSY&PLSR output Y000 corresponding cumulative value for the pulse number
M8141	Reserved	D8141	

M Component	Description of M Component	D Component	Description of D Component
M8142	Reserved	D8142	PLSY&PLSR output Y001 corresponding cumulative value for the pulse number
M8143	Reserved	D8143	
M8144	Reserved	D8144	
M8145	Y000 pluse output stop	D8145	The offset speed when DRVI,DRVA execution
M8146	Y001 pluse output stop	D8146	Max.speed of DRVI,DRVA execution[Default 100,000]
M8147	Y000 pluse output monitor	D8147	
M8148	Y001 pluse output monitor	D8148	Speed-up and speed down time when DRVI,DRVA

M Component	Description of M Component	D Component	Description of D Component
			execution[Default 100]
M8149	Y002 pluse output monitor	D8149	Reserved
M8150	Y003 pluse output monitor	D8150	PLSY&PLSR
M8151	Y004 pluse output monitor	D8151	output Y002 corresponding cumulative value for the pulse number
M8152	Y002 pluse output stop	D8152	PLSY&PLSR
M8153	Y003 pluse output stop	D8153	output Y003 corresponding cumulative value for the pulse number
M8154	Y004 pluse output stop	D8154	PLSY&PLSR
M8155	Reserved	D8155	output Y004 corresponding cumulative value

M Component	Description of M Component	D Component	Description of D Component
			for the pulse number
M8156	Reserved	D8156	Clear definition of Y0 port signal (ZRN)[Defaut 5=Y005]
M8157	**Reserved**	D8157	Clear definition of Y1 port signal (ZRN)[Defaut 5=Y006]
Extended Function			
M8158	Reserved	D8158	Clear definition of Y2 port signal (ZRN)[Defaut 7=Y007]
M8159	Reserved	D8159	Clear definition of Y3 port signal (ZRN)[Defaut 8=Y010]

M Component	Description of M Component	D Component	Description of D Component
M8160	Selection of XCH operation to swap bytes in a single data word	D8160	Clear definition of Y3 port signal (ZRN)[Defaut 9=Y011]
M8161	Selection of 8 bit operations for applied instructions ASC, RS, ASCI, HEX, CCD	D8161	Reserved
M8162	High speed mode for parallel connection	D8162	Reserved
M8163	Reserved	D8163	Reserved
M8164	(FROM/TO)Move points variable mode	D8164	(FROM/TO) Move Mode
M8165	Reserved	D8165	When the PLSR, DRVI, DR VA are in execution, the speed-down time is determined by M8135 whether it is enabled. [Y0]

M Component	Description of M Component	D Component	Description of D Component
M8166	Reserved	D8166	When the PLSR, DRVI, DR VA are in execution, the speed-down time is determined by M8136 whether it is enabled. [Y0]
M8167	Selection of hexadecimal input mode for the HKY instruction	D8167	When the PLSR, DRVI, DR VA are in execution, the speed-down time is determined by M8137 whether it is enabled. [Y0]
M8168	(SMOV)HEX data processing function	D8168	When the PLSR, DRVI, DR VA are in execution, the speed-down time is determined by

M Component	Description of M Component	D Component	Description of D Component
			M8138 whether it is enabled. [Y0]
M8169	Reserved	D8169	When the PLSR, DRVI, DR VA are in execution, the speed-down time is determined by M8139 whether it is enabled. [Y0]
Pulse Catch		**Communication Link**	
M8170	X000 pulse catch	D8170	Reserved
M8171	X000 pulse catch	D8171	Reserved
M8172	X002 pulse catch	D8172	Reserved
M8173	X003 pulse catch	D8173	Station No. set the status
M8174	X004 pulse catch	D8174	Communication sub-station set the

M Component	Description of M Component	D Component	Description of D Component
			status
M8175	X005 pulse catch	D8175	Refesh the range to setting status
M8176	Reserved	D8176	Station No. set the status
M8177	Reserved	D8177	The No. of communication sub-station set the status
M8178	Reserved	D8178	Refesh the range to setting status
M8179	Reserved	D8179	Retry count setting
M8180	Reserved	D8180	Commnication overtime settup
Communication Link		Index Addressing	
M8181	Reserved	D8181	Reserved

M Component	Description of M Component	D Component	Description of D Component
M8182	Reserved	D8182	No.2/Z1 register contents
M8183	Data transfer master station error	D8183	No.3/V1 register contents
M8184	Data transfer slave station 1 error	D8184	No.4/Z register contents
M8185	Data transfer slave station 2 error	D8185	No.5/V2 register contents
M8186	Data transfer slave station 3 error	D8186	No.6/Z3 register contents
M8187	Data transfer slave station 4 error	D8187	No.7/V3 register contents
M8188	Data transfer slave station 5 error	D8188	No.8/Z4 register contents
M8189	Data transfer slave station 6 error	D8189	No.9/V4 register contents
M8190	Data transfer slave station 7 error	D8190	No.10/Z5 register contents
M8191	Data transferring	D8191	No.11/V5 register

M Component	Description of M Component	D Component	Description of D Component
			contents
M8192	Reserved	D8192	No.12/Z6 register contents
M8193	Reserved	D8193	No.13/V6 register contents
M8194	Reserved	D8194	No.14/Z7 register
M8195	C251 Double-frequency	D8195	No.15/V7 register
M8196	C252 Double-frequency	D8196	Reserved
M8197	C253 Double-frequency	D8197	Reserved
M8198	C254 Double-frequency	D8198	Reserved
M8199	C255 Double-frequency	D8199	Reserved
	Up/Down Counter Control		Communication Link
M8200	C200 control	D8200	Reserved
M8201	C201 control	D8201	Currently connection scan time
M8202	C202 control	D8202	Max. connection scan time
M8203	C203 control	D8203	Master station

M Component	Description of M Component	D Component	Description of D Component
			communication error number
M8204	C204 control	D8204	Slave station communication error number
M8205	C205 control	D8205	Slave station 2 communication error number
M8206	C206 control	D8206	Slave station 3 communication error number
M8207	C207 control	D8207	Slave station 4 communication error number
M8208	C208 control	D8208	Slave station 5 communication error number
M8209	C209 control	D8209	Slave station 5 communication

M Component	Description of M Component	D Component	Description of D Component
			error number
M8210	C210 control	D8210	Slave station 7 communication error number
M8211	C211 control	D8211	Master station communication error code
M8212	C212 control	D8212	Slave station 1 communication error code
M8213	C213 control	D8213	Slave station 2 communication error code
M8214	C214 control	D8214	Slave station 3 communication error code
M8215	C215 control	D8215	Slave station 4 communication error code

M Component	Description of M Component	D Component	Description of D Component
M8216	C216 control	D8216	Slave station 5 communication error code
M8217	C217 control	D8217	Slave station 6 communication error code
M8218	C218 control	D8218	Slave station 7 communication error code
M8219	C219 control	D8219	Reserved
M8220	C220 control	D8220	Reserved
M8221	C22 control	D8221	Reserved
M8222	C222 control	D8222	Reserved
M8223	C223 control	D8223	Reserved
M8224	C224 control	D8224	Reserved
M8225	C225 control	D8225	Reserved
M8226	C226 control	D8226	Reserved
M8227	C227control	D8227	Reserved
M8228	C228 control	D8228	Reserved

M Component	Description of M Component	D Component	Description of D Component
M8229	C229 control	D8229	Reserved
M8230	C230 control	D8230	Reserved
M8231	C231 control	D8231	Reserved
M8232	C232 control	D8232	Reserved
M8233	C233 control	D8233	Reserved
M8234	C234 control	D8234	Reserved
M8235	C235 control	D8235	Reserved
M8236	C236 control	D8236	Reserved
M8237	C237 control	D8237	Reserved
M8238	C238 control	D8238	Reserved
M8239	C239 control	D8239	Reserved
M8240	C240 control	D8240	Reserved
M8241	C241 control	D8241	Reserved
M8242	C242 control	D8242	Reserved
M8243	C243 control	D8243	Reserved
M8244	C244 control	D8244	Reserved
M8245	C245 control	D8245	Reserved
M8246	C246 state	D8246	Reserved
M8247	C247 state	D8247	Reserved

M Component	Description of M Component	D Component	Description of D Component
M8248	C248 state	D8248	Reserved
M8249	C249 state	D8249	Reserved
M8250	C250 state	D8250	Reserved
M8251	C251 state	D8251	Reserved
M8252	C252 state	D8252	Reserved
M8253	C253 state	D8253	Reserved
M8254	C254 state	D8254	Reserved
M8255	C255 state	D8255	Reserved

4.3 PLC Instruction Tables

4.3.1 Basic Sequence Instruction

Type and function of T2N PLC basic sequence instructions is shown below:

Table 4-3 Type and function of basic sequence instructions

Type	Mnemonic	Function
Basic Sequence Instruction	LD	Select
	LDI	Reversed
	LDP	Initial logical operation -Rising edge pulse
	LDF	Initial logical operation Falling / trailing edge pulse
	AND	Serial connection of NO (normally open) contacts
	ANI	Serial connection of NC (normally closed) contacts
	ANDP	Serial connection of Rising edge pulse
	ANDF	Serial connection of Falling / trailing edge pulse
	OR	Parallel connection of NO (normally open)

Type	Mnemonic	Function
		contacts
	ORI	Parallel connection of NC (normally closed) contacts
	ORP	Parallel connection of Rising edge pulse
	ORF	Parallel connection of Falling / trailing edge pulse
	ANB	Serial connection of multiple parallel circuits
	ORB	Parallel connection of multiple contact circuits
	OUT	Output coil-drive instruction
	SET	Set action to save the coil instruction
	RST	Reset coil action to coil instruction
	PLS	Pluse rise detection coil instruction
	PLF	Pluse falling detection coil instruction
	MC	Master control public serial contact points with the coil public instructions
	MCR	Public serial contact points of master control reset remove instructions
	MPS	Stores the current result of the internal PLC

Type	Mnemonic	Function
		operations
	MRD	Reads the current result of the internal PLC operations
	MPP	Pops (recalls and removes) the currently stored result
	INV	Reverse
	NOP	No operation
	END	End

4.3.2 Applied instructions:

Table 4-4 Type and function of applied instructions

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
Program Flow	00	CJ	Conditional jump	–	○	
	01	CALL	Call Subroutine	–	○	
	02	SRET	Subroutine Return	–	–	
	03	IRET	Interrupt Return	–	–	
	04	EI	Enable Interrupt	–	–	

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
	05	DI	Disable Interrupt	–	–	
	06	FEND	First End	–	–	
	07	WDT	Watchdog Timer	–	○	
	08	FOR	Start of a For/Next Loop	–	–	
	09	NEXT	End a For/Next Loop	–	–	
Move And Compare	10	CMP	Compare	○	○	
	11	ZCP	Zone Compare	○	○	
	12	MOV	Move	○	○	
	13	SMOV	Shift Move	–	○	
	14	CML	Compliment	○	○	
	15	BMOV	Block Move	–	○	
	16	FMOV	Fill Move	○	○	
	17	XCH	Exchange	○	○	
	18	BCD	Binary Coded Decimal	○	○	
	19	BIN	Binary	○	○	

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
Arithmetic And Logical Operations	20	ADD	Addition	○	○	
	21	SUB	Subtraction	○	○	
	22	MUL	Multiplication	○	○	
	23	DIV	Division	○	○	
	24	INC	Increment	○	○	
	25	DEC	Decrement	○	○	
	26	WAND	Word AND	○	○	
	27	WOR	Word OR	○	○	
	28	WXOR	Word Exclusive OR	○	○	
	29	NEG	Negation	○	○	
Rotation And Shift	30	ROR	Rotation Right	○	○	
	31	ROL	Rotation Left	○	○	
	32	RCR	Rotation Right with Carry	○	○	
	33	RCL	Rotation Left with Carry	○	○	
	34	SFTR	Shift Right	○	○	

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
	35	SFTL	Shift Left	-	○	
	36	WSFR	Word Shift Right	-	○	
	37	WSFL	Word Shift Left	-	○	
	38	SFWR	Shift Register Write	-	○	
	39	SFRD	Shift Register Read	-	○	
Data Operation	40	ZRST	Zone Reset	-	○	
	41	DECO	Decode	-	○	
	42	ENCO	Encode	-	○	
	43	SUM	The Sum Of Active Bits	○	○	
	44	BON	Check Specified Bit Status	○	○	
	45	MEAN	Mean	○	○	
	46	ANS	(Timed) Annunciator Set	-	-	
	47	ANR	Annunciator Reset	-	○	

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
	48	SOR	Square Root	○	○	
	49	FLT	Float, (Floating Point)	○	○	
High Speed Processing	50	REF	Refresh	-	○	
	51	REFE	Refresh and filter adjust	-	○	
	52	MTR	Input matrix	-	-	
	53	HSCS	High speed counter set	○	-	
	54	HSCR	High speed counter reset	○	-	
	55	HSZ	High speed counter zone compare	○	-	
	56	SPD	Speed detect	-	-	
	57	PLSY	Pulse Y output	○	-	
	58	PWM	Pulse width modulation	-	-	

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
	59	PLSR	Ramp Pulse output	○	-	
Handy Instructions	60	IST	Initial State	-	-	
	61	SER	Search	○	○	
	62	ABSD	Absolute Drum	○	–	
	63	INCD	Incremental Drum		–	
	64	TIMR	Teaching Timer	–	–	
	65	STMR	Special Timer - Definable	–	–	
	66	ALT	Alternate State	–	–	
	67	RAMP	Ramp – Variable Value	–	–	
	68	ROTC	Rotary Table Control	–	–	
	69	SORT	Sort Data	–	–	
External FX I/O Devices	70	TKY	Ten Key Input	○	–	
	71	HKY	Hexadecimal Input	○	–	

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
	72	DSW	Digital Switch (Thumbwheel input)	–	–	
	73	SEGD	Seven Segment Decoder	–	○	
	74	SEGL	Seven Segment With Latch	–	–	
	75	ARWS	Arrow Switch	–	–	
	76	ASC	ASCII Code	–	–	
	77	PR	'Print' To A Display	–	–	
	78	FROM	Read From A Special Function Block	○	○	
	79	TO	Write To A Special Function Block	○	○	
External FX	80	RS	RS Communications	-	-	

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
Serial Devices	81	PRUN	Parallel Run	○	○	
	82	ASCI	Hexadecimal to ASCII	-	○	
	83	HEX	ASCII to Hexadecimal	-	○	
	84	CCD	Check Code	-	○	
	85		Not Available			
	86		Not Available			
	87		Not Available			
	88	PID	PID Control Loop	-	-	
	89		Not Available			
Floating Point	110	ECMP	Float Compare	○	○	
	111	EZCP	Float Zone Compare	○	○	
	118	EBCD	Float to Scientific	○	○	
	119	EBIN	Scientific to Float	○	○	
	120	EADD	Float Add	○	○	
	121	ESUB	Float Subtract	○	○	

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
	122	EMUL	Float Multiplication	○	○	
	123	EDIV	Float Division	○	○	
	127	ESOR	Float Square Root	○	○	
	129	INT	Float to Integer	○	○	
	130	SIN	Sine	○	○	
	131	COS	Cosine	○	○	
	132	TAN	Tangent	○	○	
	147	SWAP	Float to Scientific	○	○	
Positioning Instruction	155	ABS	Data Read	○	-	Only to D instruction
	156	ZRN	Zero point return	○	-	
	157	PLSV	Variable Pulse Output	○	-	
	158	DRVI	Relative Position Control	○	-	

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
	159	DRVA	Absolute Position Control	○	-	
Real Time Clock Operation	160	TCMP	Time Compare	-	○	
	161	TZCP	Time Zone Compare	-	○	
	162	TADD	Time Addition	-	○	
	163	TSUB	Time Subtraction	-	○	
	166	TRD	Time Read	-	○	
	167	TWR	Time Write	-	○	
	168					
	169	HOUR	Hour Meter	○	-	
	170	GRY	Decimal to Gray Code	○	○	
	171	GBIN	Gray Code to Decimal	○	○	
Contact Compar	224	LD=	(S1)=(S2)	○	–	
	225	LD>	(S1)>(S2)	○	–	
	226	LD<	(S1)<(S2)	○	–	

Type	FNC NO.	Mnemonic	Function	D Instruction	P Instruction	Remark
e	228	LD<>	(S1)≠(S2)	○	−	
	229	LD<=	(S1)≤(S2)	○	−	
	230	LD>=	(S1)≥(S2)	○	−	
	232	AND=	(S1)=(S2)	○	−	
	233	AND>	(S1)>(S2)	○	−	
	234	AND<	(S1)<(S2)	○	−	
	236	AND<>	(S1)≠(S2)	○	−	
	237	AND<=	(S1)≤(S2)	○	−	
	238	AND>=	(S1)≥(S2)	○	−	
	240	OR=	(S1)=(S2)	○	−	
	241	OR>	(S1)>(S2)	○	−	
	242	OR<	(S1)<(S2)	○	−	
	244	OR<>	(S1)≠(S2)	○	−	
	245	OR<=	(S1)≤(S2)	○	−	
	246	OR>=	(S1)≥(S2)	○	−	

○：Available

−：Not Available

4.4 Processing of internal high-speed counter

When input X000 to X007, you should follow the number of each high-speed counter and refer to the table below, and it can not be re-use among the high-speed counter.In addition, you can use the high-speed counter input terminals for general input without the use for high-speed counter.

Table 4-5 High Speed Counter

Input	1 phase Counter Input										
	C235	C236	C237	C238	C239	C240	C241	C242	C243	C244	C245
X000	U/D						U/D			U/D	
X001		U/D					R			R	
X002			U/D					U/D			U/D
X003				U/D				R			R
X004					U/D				U/D		
X005						U/D			R		
X006										S	
X007											S

Input	1 phase double-counter input					A phase/ B phase counter				
	C246	C247	C248	C249	C250	C251	C252	C253	C254	C255
X000	U	U		U		A	A		A	
X001	D	D		D		B	B		B	
X002		R		R			R		R	
X003			U		U			A		A
X004			D		D			B		B
X005			R		R			R		R
X006				S					S	
X007					S					S

U： Up counter input

D： Down counter input

A： A phase counter input

B： B phase counter input

R： Reset counter (input)

S： Start counter (input)

The input X000 to X007 can not be re-use in multiple counters or high speed instruction,or high speed

interruption.For example, when use C235、C236、C241、 C246、C247、C249、C252、C254, or I00*、I10* interruption , both the input X000 and X001 will be occupied, . the SPD instruction also use the X000 and X001,more than one usage of it may cause an error.

When use the high-speed counter, the filiter constants of the corresponding input number can automatically changed to be the high-speed write.

All the high-speed inpout can adopt the hardware counter, no restrictions with the total input frequency.

When the A/B input 4 times frequency, the high-speed input frequency can be decrease to 25 kHz and 5kH.

4.5 Error code

Special data register D8060 ~ D8067, the stored content and error code are shown in the table below.

Table 4-6 Error code

Error Detection	Error Number	Associated Meaning	Action
I/O Structure Error	1020	It has not install the I/O start component number of 1020,1=output X(0=output Y),020= component No.	It has not install the input relay, the output relay number were incorporated into the program. PLC can continue to run, please modify it if it is the

Error Detection	Error Number	Associated Meaning	Action
			programmer.
M8061(D8061) PLC Hardware Error	0000	No error	Check whether the connection of the extension cables is correct.
	6101	RAM error	
	6102	Operation circuit error	
	6103	I/O bus error (M8069 = ON)	
	6104	Extension unit 24V failure (M8069=ON)	
	6105	Watch Dog Timer error	Program execution time has exceeded the WDT time value set in D8000
M8062(D8062) **PC/HPP communications error**	0000	No error	Check the cable connection between the programming device and PLC.
	6201	Parity/ overrun/ framing error	
	6202	Communications character error	
	6202	Communication data sum check error	
	6203	Data format error	
	6204	Command error	
Serial	0000	No error	Check whether the power

Error Detection	Error Number	Associated Meaning	Action
communication errors	6301	Parity/ overrun/ framing error	supply of the programmable controllers are ON.Check the connection between adapters and controllers, as well as the connection between adapters is correct.
	6302	Communications character error	
	6303	Comms data sum check error	
	6304	Comms data format error	
	6305	Command error	
	6306	Watchdog timer error	
	6307~ 6311	None	
	6312	Parallel link character error	
	6313	Parallel link data sum check error	
	6314	Parallel link data format error	
	6330	MODBUS slave station address setup error	Check whether it is properly connected; Check whether the communication format is matching each other; Check whether the
	6331	Data frame length error	
	6332	Address error	
	6333	CRC check error	
	6334	Disabled command code	

Error Detection	Error Number	Associated Meaning	Action
	6335	Receive overtime	communication protocols is matching each other;
	6336	Data error	
	6337	Buffer Overflow	Check whether it is pow-on, COM0 can be the freeport when power-on.Only can be used for the monitoring or download ports when power-off. Check JP0 jumper is inserted, COM0 can only serve as the free RS485 port when the jumper is off, if JP0 is connected, COM0 can be the monitor or download port, and is RS422 mode.
	6338	Frame Error	
	6340	MODBUS slave station address setup error	COM1 communication error, please check the communication cable of COM1
	6341	Data frame length error	

Error Detection	Error Number	Associated Meaning	Action
	6342	Address error	of is connected properly. Check whether the communication formats are matching each other.
	6343	CRC check error	
	6344	Disabled command code	
	6345	Receive overtime	
	6346	Data error	
	6347	Buffer Overflow	
	6348	Frame Error	
M8064(D8064) **Parameter error**	0000	No error	STOP the PLC, select the parameter mode, set the correct data
	6401	Program sum check error	
	6402	Memory capacity setting error	
	6403	Latched device area setting error	
	6404	Comment area setting error	
	6405	File register area setting error	
M8065(D8065) **Syntax error**	0000	No error	During programming, each instruction is checked as it is entered. If a syntax error is detected, re-enter the
	6503	1) No setting value following either a timer or a counter coil	

Error Detection	Error Number	Associated Meaning	Action
		2) Insufficient number of operands for an applied instruction	instruction correctly
	6504	□Labeling repeat	
	6505	Component number range exceeds its limits	
	6506	Use an undefined instruction	
	6507	Label number (P) definition error	
	6508	Interrupt input (I) definition error	
	6511	Interrupt input and high-speed counter input repeat	
M8066(D8066) **Circuit error**	0000	No error	A circuit error occurs if a combination of instructions is incorrect or badly specified. Select programming mode and correct the identified error.
	6605	1) A single STL branch drives 9 or more ~~parallel circuits~~ 2) MC/ MCR or (I)nterrupts are designated	

Error Detection	Error Number	Associated Meaning	Action
		within an STL state 3) RET has not been designated or is designated out of an STL state	
	6606	1) No (P)ointer/ (I)nterrupt 2) No SRET/ IRET 3) An (I)nterrupt/ SRET or IRET has been designated within the main body of the program 4) STL/ RET/ MC or MCR have been designated within either a subroutine or an interrupt routine	
	6607	1) Unauthorized use of FOR - NEXT. 6 or more levels have been	

Error Detection	Error Number	Associated Meaning	Action
		designated 2) The following instructions have been designated within a FOR -NEXT loop: STL/ RET/ MC/ MCR/ IRET/ SRET/ FEND or END	
	6608	1) Unauthorized MC/ MCR relationship 2) Missing MCR N0 3) SRET/ IRET or an (I)nterrupt has been designated within an MC/ MCR block	
	6618	STL/ RET/ MC or MCR programmed within either a subroutine or an interrupt	

Error Detection	Error Number	Associated Meaning	Action
		routine	
	6619	Invalid instruction programmed within a FOR - NEXT loop: STL/ RET/ MC/ MCR/ I/ IRET	
	6620	FOR - NEXT nesting exceeded	
	6621	Unmatched number of FOR and NEXT instructions	
	6622	NEXT instruction not found	
	6623	MC instruction not found	
	6624	MCR instruction not found	
	6625	A single STL branch drives 9 or more parallel circuits	
	6626	MC,MCR,I,SRET,IRET Invalid instruction programmed	

within an
STL - RET block:

Error Detection	Error Number	Associated Meaning	Action
		MC/ MCR/ I/ IRET/ SRET	
	6627	RET instruction not found	
	6628	I/ SRET/ IRET incorrectly programmed within main program body	
	6629	P or I label not found	
	6630	SRET or IRET not found	
	6631	SRET programmed in invalid location	
	6632	FEND programmed in invalid location	
	6635	High-speed and high-speed output use hardware port exceeds its limits.	
M8067 (D8067) **PID Operation error**	0000	No error	Check if the error occur during the operation process is correct, as well as program modifications or application instructions.Even if the syntax
	6701	1) No jump destination for CJ or CALL instructions 2) A label is designated in a	

Error Detection	Error Number	Associated Meaning	Action
		block that comes after the END instruction 3) An independent label is designated in a FOR-NEXT loop or a subroutine	and the circuit is no error.Although T200Z is not wrong, the results of Z = 100,and T = 300, so that the component number then overflow.
	6702	6 or more CALL instructions have been nested together	
	6704	6 or more FOR - NEXT loops have been nested together	
	6705	An incompatible device has been specified as an operand for an applied instruction	
	6706	A device has been specified outside of	

Error Detection	Error Number	Associated Meaning	Action	
		the allowable range for an applied instruction operand		
	6707	A file register has been accessed which is outside of the users specified range		
	6708	FROM/ TO instruction error		
	6709	Other error, i.e. missing IRE/ SRET, unauthorized FOR - NEXT relationship		
	6730	（TS=0）Sampling time TS	PID operation stop	The control parameter setting value and the PID operation data error. Please check the
	6732	Input filter value 〔a<0 or 100<a)		
	6733	（KP<0) Proportional gain KP		
	6734	Integral time constant TI		
	6735	〔KD<0 or 201<KD) Derivative gain KD		
	6736	(TD<0)		

Error Detection	Error Number	Associated Meaning	Action	
		Derivative time constant TD		parameters.
	6740	Sampling time TS is less than the program scan time.	Take the operation data as the MAX. value, then continue to operation.	
	6742	Current value ؚ exceeds its limits($\triangle$PV<32768 or <$\triangle$PV)		
	6743	Calculated error ؚ exceeds its limits (EV<-32768 or 32767<EV）		
	6744	Integral result exceeds its limits		
	6745	Derivative gain over, or differential value exceeds allowable range		
	6746	Derivative result exceeds its limits		
	6747	Total PID result exceeds its limits		
	6760			

4.6 Error Code Storage

Check T2N error according to the followings, write the former error code into the special data register D8060 ~ D8067.

Table 4-7 Error Code Storage Register

Error Item	Power OFF→ON	ON→STOP→RUN	Others
M8060 I/O configuration error	Check	Check	RUN
M8061 PLC hardware error	Check	-	RUN
M8062 communication Error PC/HPP	-	-	During PP receives the signal
M8063 Parallel link/ ADP error	-	-	When paired stations signal is received
M8064 Parameter error M8065 Syntax error	Check	Check	(STOP) When the program is changed

Error Item	Power OFF→ON	ON→STOP→RUN	Others
M8066 Circuit error			(PLC in STOP) and when a program is transferred (PLC in STOP)
M8087 Operation error M8088 Operation error latch	-	-	(RUN)

For D8060 ~ D8067, store each error content, the same error items occur error many times. When remove the reason of errors, the error code is still stored. Zero is stored without error.

5

Commissioning and Maintenance

Chapter 5 Commissioning and Maintenance

This chapter describes the inspection items from the T2N PLC installation to operation.

5.1 Installation and Maintenance Precaution

⚡⚠ DANGER

- ➤ Please do not touch the power terminals so as avoid the electric shock and malfunction.

- ➤ Terminal cleaning and fixing shall be carried out upon the power off. There will be a danger of electric shock if conduct this operation during power on.

- ➤ Please correctly connect the batteries. Do not charge, decompose, heat, put into the fire, etc so as to avoid the rupture, fire and other accidents.

- ➤ For the change in the running program, please carry out the forced output, RUN, STOP and other operations after you're familiar with the manual and safety confirmation. Avoid machine damaged caused by the malfunction.

⚠ CAUTION

- ➤ When handling extension cards or extension modules, be sure to cut off the power supply. It may damage the device if handling extension cards or extension module during power-on.

- ➤ Please do not decompose and reform the machine. Otherwise it may easily cause failure,

malfunction, and fires, etc.For the relative Matters, please contact our company service center or repaired station.

➢ Handling the extension cables should be carried out after the power off.Avoid the failure and malfunction.

5.2 Inspections before Power-on

System inspections before power-on:

➢ Check the voltage level of the power input line is consistent with rated input of the PLC model, check power supply is connected in the correct terminal block, AC220V AC power supply terminals should be L、N. While 24V DC power supply terminals is⊕ DC24V Θ respectively, do not confound with the + 24V and the COM Terminal to ensure that it is correct.

➢ Check and insure the user signal input lines connected to the PLC input terminals, and the signal characteristics are consistent with the electrical specifications.

➢ Check and insure the output terminals.If the output circuit has different voltage level, please note that different levels should be arranged in different output groups, then avoid short circuit and device damaged.

➢ Carefully check the ground line and its specifications, and make sure it is consistent with the specifications.

➢ Make sure there are no foreign objects falling inside the PLC and the shell channel easily heating.

- ➢ Check and insure the batteries are plugged in.

- ➢ For the use of host computer or a human-machine interface (HMI), communication signal cable need to be connected correctly.

5.3 Power-on Operation

- ➢ Connect the PLC power supply, the PWR light of the PLC should be on.

- ➢ Start Auto-Shop software on the PC, download the user program to the PLC.

- ➢ The download check is completed, press the small switch to the RUN position, RUN light should be flashing, and if the ERR light is on, it indicats that the user program or system is error, please refer to instructions in the "Programming Reference Manual" to remove errors until it is correct.

- ➢ Close the PLC power supply of the external system to carry out the system debugging.

5.4 Routine Maintenance

Routine maintenance check should pay attention to the following aspects:

- ➢ Make sure the working environment of PLC controller is clean, avoid foreign objects and dust falling into the machine.

- ➢ Keep good heat radiation and air ventilation.

- ➢ All wiring connections and terminal blocks should be fixed firmly and in good condition.

Observe the BAT indicator of the PLC to understand the capacity of the backup battery status. When the BAT indicator lights, it indicates that the battery capacity has been inadequate, then replace the dedicated batteries as soon as possible.Replacing the battery should be conducted by a professional electrical operators and need it is conducted under the conditions of power-off. Please replace the battery within 30 seconds, otherwise it may cause backup datas and real-time clock datas loss.

Warranty Agreement

1. The warranty period of the product is 18 months (refer to the barcode on the equipment body). During the warranty period, if the product fails or is damaged under the condition of normal use by following the instruction, Our Company will be responsible for free maintenance.

2. Within the warranty period, maintenance will be charged for the damages caused by the following reasons:

   a. The damage caused by improper use or repair/modification without prior permission;

   b. The damage caused by fire, flood, abnormal voltage, other disasters and second disaster;

   c. The hardware damage caused by dropping or transportation upon the procurement.

   d. The damage caused by the improper operation;

   e. The damage or failure caused by the trouble out of the equipment (e.g. external device)

3. If there is any failure or damage to the product, please correctly fill out the Product Warranty Card in detail.

4. The maintenance fee is charged according to the newly adjusted Maintenance Price List by our company.

5. In general, the warranty card will not be re-issued. Please keep the card and present it to the maintenance personnel when asking for maintenance.

6. If there is any problem during the service, please contact the agent of our company or our company directly.

7. This agreement shall be interpreted by Shenzhen Tecorp Technology Co., Ltd.

Tecorp Technology Co., Ltd.

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Product Warranty Card

Customer information	Add. of unit:		
	Name of unit: P.C.:		Contact person:
			Tel.:
Product information	Product model:		
	Body barcode (Attach here):		
	Name of agent:		
Failure information	(Maintenance time and content): Maintenance personnel:		