CHANGDA TONG
SCIENCE & TECHNOLOGY

T- FX3U

T-FX3U

Product
manual

Tianjin Changdatong Technology Co., LTD

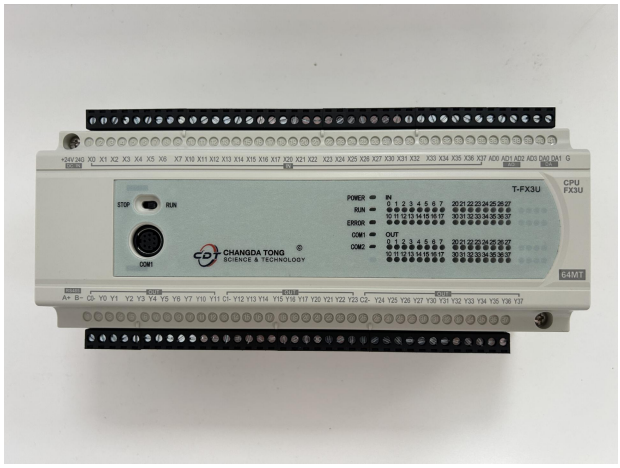
Founded in 2016, Tianjin Changdatong Technology Co., Ltd. is an innovative technology-based enterprise, integrating R&D, production, sales and service. The main products are programmable controllers, data acquisition modules, switches, industrial touch screens and big data platforms.

At present, the products have reached strategic cooperation with the world's top 500 enterprises and have been applied in many metallurgical enterprises. It is the first domestic enterprise to apply programmable controllers, data acquisition modules, switches, and industrial touch screens in the main process sections of metallurgy.

The company's vision and mission is to "become the backbone of the domestic independent industrial control product field".

Its market positioning is "to be a leading brand of completely independent domestic industrial control products, with the best cost-effective products".

T-FX3U controller



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PLC T-FX3U

- GX Developer and GX Works2 software can be used to program, read, download, verify, diagnose and monitor programs; Ethernet function please use GX Works2 Version 1.493P or later, circular port internal RS232 communication

Technical specification

一. PLC Features:

1：GX Developer and GX Works2 software can be used to program, read, download, verify, diagnose and monitor programs; Ethernet function please use GX Works2 Version 1.493P or later, circular port internal RS232 communication, refer to the following general touch screen connection line sequence

2： Supports a maximum of 8 AD channels and 2 DA channels, and the analog capacity is 12 bits (depending on the model).

3： Support three communication ports, all three support programming port protocol, can be used when using (according to the specific model) :

The first way (COM1) only supports the programming port protocol, the baud rate is 9600, 19200, 38400, 57600, 115200 programming software automatic identification, Mitsubishi software download select what baud rate, connect the touch screen can choose the baud rate;

The second way (COM2) supports the programming port protocol, RS, RS2 protocolless communication, MODBUS-RTU master-slave station protocol, and the baud rate is

9600, 19200, 38400, 57600, 115200 parameters are set in register D8400;

The third way (COM3) supports the programming port protocol, RS, RS2 protocolless communication, MODBUS-RTU master-slave station protocol, and the baud rate is

9600, 19200, 38400, 57600, 115200 parameters are set in register D8420;

Supports the serial port setting of the default baud rate of the FX protocol: 9600, 19200, 38400, 57600, and 115200.

4： Support external interrupt function; Support pulse capture function, support X0-X5 a total of 6, the highest response frequency of 10KHZ)

5： Support super password Settings: Set the password to select 8 bits, the password is 12345678, the program will not read, but can read the software component data, modify the password program will be cleared; The programming software cannot modify the PLC clock after the password is set.

7: When the RUN switch is switched to RUN, the RUN running light is steady on; When you pull out STOP, the RUN indicator is off.

8: Detect a fault, minor fault: ERR light blinks; Serious failure: the ERR light is long on (depending on whether the model has an ERR light);

9: Support PLSV instruction through the special relay to set whether the acceleration and deceleration mark: M8338(ON acceleration and deceleration, OFF does not support acceleration and deceleration);

10: Support the use of D register bit components: Dn.b;

11: Support the use of index register format: constant: KnZn, HnZn, bit: KnX(YMTC)Zn, word: D(TC)nZn;

12: Support 4-8 axis high-speed output function, 2-8 axis PWM enhancement function;

13: ladder diagram supports the maximum number of program steps: 32000 steps;

14: Support ENET Ethernet functions (programming, downloading, monitoring), support ENET network port MODBUS-TCP server (from); MODBUS-UDP

Client/server side (master/slave); Support common touch screen, configuration software read and write access, support multiple hosts. (Specific according to the model)

二、Component range (R expansion register not supported)

Input X	X0~X377	256-point	Hardware: X0 to X77 64 points
Output Y	Y0~Y377	256-point	Hardware: Y0 to Y77 64 points
Auxiliary relay M	M0~M499	500-point	General use
	M500~M1023	524-point	Keep in use[mutable]
	M1024~M7679	6656-point	Keep in use[mutable]
	M8000~M8511	512-point	Special purpose
Status relay S	S0~S9	10-point	Initialize the state (usually [mutable])
	S10~S499	490-point	General use[variable]
	S500~S899	400-point	retention[variable]
	S900~S999	100-point	Signal alarm (hold [variable])
	S1000~S4095	3096-point	retention[fixed]
Timer T	T0~T199	200-point	100ms
	T200~T245	46-point	10ms
	T246~T249	4-point	1ms cumulative
	T250~T255	6-point	100ms cumulative
	T256~T511	256-point	1ms
Counter C	C0~C99	100-point	General use increment count (16 bits)[variable]
	C100~C199	100-point	Hold increment count (16 bits)[variable]
	C200~C219	20-point	General two-way (32-bit)
	C220~C234	15-point	Hold both directions (32-bit)
	C235~C255	20-point	Hold high speed reader (32-bit)
Register D.V.Z	D0~D199	200-point	General use (16-bit)[variable]
	D200~D511	312-point	Hold (16-bit)[variable]
	D512~D7999	7488-point	Hold (16-bit)[fixed]
	D8000~D8511	512-point	Special use (16 bits)
	V0~V7 Z0~Z7	16-point	Index (16 bit)
Nested Pointers Nested Pointers	N0~N7	8-point	For main control
	P0~P4095	4096-point	JUMP, CALL branch
	I0 □□~I5 □□	6-point	Input interrupt
	I6 □□~I8 □□	3-point	Timer interrupt
	I010~I060	6-point	Counter interrupt
constant	K (Decimal number)	16-bit -32768~32767	32-bit -2147483648~2147483647
	H (hexadecimal)	16-bit 0~FFFF	32-bit 0~FFFFFFFF
	E (Real number - floating point number)		
Ladder diagram program capacity	0-32000 steps		

三、Supported instruction:

1 Basic instructions (all supported):

LD LDI LDP LDF AND ANI ANDP ANDF ANDB OR ORI ORP ORF ORB MPS MRD MPP MC MCR INV PLS PLF OUT SET RST NOP MEP MEF END STL (Supports a maximum of eight branches) RET

2 Application instructions:

class	Work number	Instructions	function	Note of note
Program flow path	00	CJ	Conditional jump	
	01	CALL	call subroutine	
	02	SRET	subroutine return	
	03	IRET	return from interrupt	
	04	EI	Open interrupt	
	05	DI	Power off	
	06	FEND	End of main program	
	07	WDT	The watchdog timer refreshes	
	08	FOR	Start of loop	
	09	NEXT	End of loop	
Send and compare	10	CMP	compare	
	11	ZCP	Interval comparison	
	12	MOV	teleport	
	13	SMOV	Bit transfer	
	14	CML	Fetch and reverse transmission	
	15	BMOV	Send together	
	16	FMOV	multicast	
	17	XCH	exchange	
	18	BCD	BCD conversion	
	19	BIN	BIN conversion	
Four logic calculation	20	ADD	BIN addition	
	21	SUB	BIN subtraction	
	22	MUL	BIN multiplication	
	23	DIV	BIN division	
	24	INC	BIN plus 1	
	25	DEC	BIN minus 1	
	26	WAND	Logic words and	
	27	WOR	Logical word or	
	28	WXOR	Logical XOR	
	29	NEG	Complement code	
Loop shift	30	ROR	Turn right	
	31	ROL	Turn left	
	32	RCR	Right turn with carry	
	33	RCL	Left turn with carry	
	34	SFTR	Bit right shift	
	35	SFTL	Bit left shift	
	36	WSFR	Word right shift	
	37	WSFL	Word left shift	
	38	SFWR	Shift write	
	39	SFRD	Shift readout	

class	Work number	Instructions	function	Note of note
Data processing	40	ZRST	Interval reset	
	41	DECO	decoding	
	42	ENCO	Encoding	
	43	SUM	Number of bits ON	
	44	BON	ON position judgment	
	45	MEAN	Average value	
	46	ANS	Signal alarm set	
	47	ANR	Signal alarm reset	
	48	SQR	Square root operation	
	49	FLT	Bin-integer - binary floating-point conversion	
High speed processing	50	REF	Input-output refresh	
	51	REFF	Input refresh (with filter setting)	NO
	52	MTR	Matrix input	NO
	53	HSCS	Compare sets	
	54	HSCR	Compare reset	
	55	HSZ	Interval comparison	
	56	SPD	Density of pulse	
	57	PLSY	Pulse output output	
	58	PWM	Pulse modulation	
	59	PLSR	Acceleration and deceleration pulse output	
Fang gave the order	60	IST	Initialize NO	
	61	SER	Data retrieval	
	62	ABSD	CAM control in absolute mode	
	63	INCD	CAM control relative mode	
	64	TIMR	Teaching timer	
	65	STMR	Special timer	
	66	ALT	Alternate output	
	67	RAMP	Ramp signal	
	68	ROTC	Rotary table control	NO
	69	SORT	Data sorting	
peripheral command indicator I/O	70	TKY	Numeric key input	NO
	71	HKY	16 key input	NO
	72	DSW	Digital type switch	NO
	73	SEGD	7 segments of decoding	
	74	SEGL	Seven segments of the code displayed in time	NO
	75	ARWS	Arrow switch	NO
	76	ASC	ASCII input	NO
	77	PR	ASCII printing	NO
	78	FROM	Ethernet readout	
	79	TO	Ethernet write	

class	Work number	Instructions	Feature	Note of note
Peripheral SER	80	RS	Serial data transmission	
	81	PRUN	8-bit data transfer	
	82	ASCI	HEX-ASCII conversion	
	83	HEX	ASCII-HEX conversion	
	84	CCD	Check code	
	85	VRRD	Potentiometer read	NO
	86	VRSC	Potentiometer the degree	NO
	87	RS2	Serial data transfer 2	
	88	PID	PID operation	
	89	-		
Data transfer 2	100	-		
	101			
	102	ZPUSH	Batch saving of index registers	
	103	ZP0P	Index register recovery	
	104			
	105			
	106			
	107			
	108			
	109			
Number of floating points	110	ECMP	Binary floating-point comparison	
	111	EZCP	Binary float range comparison	
	112	EMOV	Binary floating point data transfer	
	113			
	114			
	115			
	116			
	117	ESTR	Binary floating-point to string conversion	
	118	EBCD	2-10 floating-point conversion	
	119	EBIN	Decimal to binary floating-point conversion	
	120	EADD	Binary floating-point addition	
	121	ESUB	Binary floating-point subtraction	
	122	EMUL	Binary floating-point multiplication	
	123	EDIV	Binary floating-point division	
	124	EXP	Binary floating-point exponential arithmetic	
	125	LOGE	Binary floating-point numbers natural logarithm operation	
	126	LOG10	Binary floating-point numbers are often logarithmically operated	
	127	ESQR	The root of a binary floating-point number	
	128	ENEG	Binary floating-point numbers sign flipping	
	129	INT	Binary floating-point to BIN conversion	

class	Work number	Instructions	Features	Note of note
Number of floating points	130	SIN	Floating-point S IN operation	
	131	COS	Floating-point cosine operation	
	132	TAN	Floating-point TAN arithmetic	
	133	ASIN	Sine -1 is a binary floating-point number	
	134	ACOS	COS-1 for binary floating-point numbers	
	135	ATAN	Binary floating-point numbers TAN-1	
	136	RAD	2-ary floating-point angle-radians conversion	
	137	DEG	2-ary floating-point radian-angle conversion	
	138	-		
	139	-		
Data Processing 2	140	WSUM	Calculate the total value of the data	
	141	WTOB	Separation of data in byte units	
	142	BTOW	A combination of data in bytes	
	143	UNI	4-bit combination of 16-bit data	
	144	DIS	4-bit separation of 16-bit data	
	145			
	146			
	147	SWAP	Upper and lower bytes are swapped	
	148			
	149	SORT2	Data sorting 2	
Positioning control	150	DSZR	Regression of the origin with DOG search	
	151	DVIT	Interrupt location	NO
	152	TBL	Table setting Location	NO
	153			
	154			
	155	ABS	Now the value is read out	NO
	156	ZRN	Origin regression	
	157	PLSV	Variable pulse output	
	158	DRVI	Relative positioning	
	159	DRVA	Absolute positioning	
Time clock operation	160	TCMP	Clock data comparison	
	161	TZCP	Clock data interval comparison	
	162	TADD	Clock data addition	
	163	TSUB	Clock data subtraction	
	164	HTOS	Second conversion of hour, minute, and second data	
	165	STOH	Second data [hour, minute, second] conversion	
	166	TRD	Clock data readout	
	167	TWR	Clock data writing	
	168			
	169	HOUR	Timer timer	

class	Work number	Instructions	Feature	Note of note
Outer perimeter is provided	170	GRY	Grey code transform	
	171	GBIN	Inverse Gray code transformation	
	172			
	173			
	174			
	175			
	176	RD3A	Analog module readout	*
	177	WR3A	Write analog module	*
	178			
	179			
It is ordered	180			
	181			
	182	COMRD	Read out the annotation data of the software component	NO
	183			
	184	RND	Generate random numbers	
	185			
	186	DUTY	Generate timing pulse	
	187			
	188	CRC	CRC operation	
	189	HCMOV	High-speed counter transfer	
Data block processing	190			
	191			
	192	BK+	The addition operation of data blocks	
	193	BK-	Subtraction of data blocks	
	194	BKCMP=	Comparison of data blocks (S1)=(S2)	
	195	BKCMP>	Comparison of data blocks (S1)>(S2)	
	196	BKCMP<	Comparison of data blocks (S1)<(S2)	
	197	BKCMP<>	Comparison of data blocks (S1)<>(S2)	
	198	KCMP<=	B Comparison of data blocks (S1)<=(S2)	
	199	BKCMP>=	Comparison of data blocks (S1)>=(S2)	
Character string control	200	STR	BIN→ String conversion	NO
	201	VAL	Conversion of string →BIN	NO
	202	$+	String association	NO
	203	LEN	The length of the string is detected	NO
	204	RIGHT	Start at the right side of the string	NO
	205	LEFT	Fetch from the left side of the string	NO
	206	MIDR	Retrieves any of the strings	NO
	207	MIDW	Any substitution in a string	NO
	208	INSTR	String retrieval	NO
	209	$MOV	String transfer	NO

class	Work number	Instructions	Feature	Note of note
Data Processing 3	210	FDEL	The data of the data table is deleted	
	211	FINS	Data insertion in a data table	
	212	POP	Read the incoming data	
	213	SFR	16 bit data n bit right shift (with carry)	
	214	SFL	16 bit data n bit left shift (with carry)	
	215			
	216			
	217			
	218			
	219			
Contact ratio is indicated	220			
	221			
	222			
	223			
	224	LD=	(S1)=(S2)	
	225	LD>	(S1)>(S2)	
	226	LD<	(S1)<(S2)	
	227			
	228	LD<>	(S1)≠(S2)	
	229	LD<=	(S1)<=(S2)	
	230	LD>=	(S1)>=(S2)	
	231			
	232	AND=	(S1)=(S2)	
	233	AND>	(S1)>(S2)	
	234	AND<	(S1)<(S2)	
	235			
	236	AND<>	(S1)≠(S2)	
	237	AND<=	(S1)<=(S2)	
	238	AND>=	(S1)>=(S2)	
	239			
	240	ORD=	(S1)=(S2)	
	241	ORD>	(S1)>(S2)	
	242	ORD<	(S1)<(S2)	
	243			
	244	ORD<>	(S1)≠(S2)	
	245	ORD<=	(S1)<=(S2)	
	246	ORD>=	(S1)>=(S2)	
	247			
	248			
	249			

class	Work number	Instructions	Feature	Note of note
Data table processing	250			
	251			
	252			
	253			
	254			
	255			
	256	LIMIT	Upper and lower limit control	
	257	BAND	Dead time control	
	258	ZONE	Area control	
	259	SCL	Fixed coordinates (coordinates of different points)	
	260	DAB IN	Decimal ASCII→BIN conversion	NO
	261	BINDA	BIN→ Decimal ASCII conversion	NO
	262			
	263			
	264			
	265			
	266			
	267			
	268			
	269	SCL2	Coordinate 2(X/Y) coordinate data	
The outer part is equipped with communication signal	270	IVCK	Inverter operation monitoring	NO
	271	IVDR	Inverter operation control	NO
	272	IVRD	Read the parameters of the frequency converter	NO
	273	IVWR	The parameters of the frequency converter are written	NO
	274	IVBWR	The parameters of the inverter are written in batches	NO
	275	IVMC	Multiple commands of the frequency converter	NO
	276	ADPRW	MODBUS read and write	
Data transmission	277			
	278	RBFM	BFM split readout	NO
	279	WBFM	BFM split write	NO
High speed processing 2	280	HSCT	Tabular comparison of high-speed counters	NO
	281			
	282			
	283			
	284			
	285			
	286			
	287			
	288			
	289			

class	Work number	Instructions	Feature	Note of note
Expand file register control	290	LOADR	Read out the extension file register	NO
	291	SAVER	Write to the extended file register in batches	NO
	292	IN ITR	Initialization of the extension register	NO
	293	LOGR	Log in to the extension register	NO
	294	RWER	Delete/write to extended file registers	NO
	295	IN ITER	Initialization of the extended file register	NO
	296			
	297			
	298			
	299			
FX3UCFADP专用	300	FLCRT	Document production and confirmation	NO
	301	FLDEL	File deletion ·CF card formatting	NO
	302	FLWR	Writing data	NO
	303	FLRD	Readout of data	NO
	304	FLCMD	Action fingers to FX 3U -CF-ADP	NO
	305	FLSTRD	Readout of the status of FX 3U -CF-ADP	NO
	306			
	307			
	308			
	309			

Note:

Support 32-bit instruction, support P instruction; NO- Indicates that the instruction is not supported yet. There is no Ethernet version analog input:

M8000 ———— [RD3A M1 M2 S]

1. M1: Specifies analog input channel number (K0 for AD0, K1 for AD1).

2. M2: Analog input range upper and lower limit D register, M2 is the upper range, M2+1 is the lower range, M2+2 is the filter coefficient (0-128), M2, M2+1, M2+2 can only specify the D register, the upper and lower ranges are 0, AD data range is 0-4095;

3. S: Specify the data collected by AD port, D register can be set freely;

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Example: if you bought a 0-660 degree 0-10V transmitter

When the transmitter voltage output is 5V, the D10 value is 3300, which represents a temperature of 330 degrees. No Ethernet version analog output:

M8000———— [WR3A M1 M2 S]

1. M1: Specifies analog output channel number (K0 for DA0, K1 for DA1).

2. M2: Analog output range upper and lower limit D register, M2 is the upper range, M2+1 is the lower range, only D register can be specified, the upper and lower ranges are 0, DA data range is 0-4095;

3. S: Specify the DA port output data, can set D register freely;

☰ Function description of special relays and registers

Special relay

M8000: Run the monitoring contact

M8001: Run to monitor the anti-contact

M8002: Initialize the pulse contact

M8003: Initialize the pulse counter contact

M8004: Error indicating contact

M8008: Power down detection (0N when power down and OFF after power down)

M8011: 10 ms clock pulse

M8012: 100 ms clock pulse

M8013: 1 second clock pulse

M8014: 1 minute clock pulse

M8015: Setting the clock

M8016: Clock display stop

M8017: The clock is corrected plus or minus 30 seconds

M8018: There is a real time clock flag

M8019: Clock error flag

M8020: Zero position mark

M8021: Borrow flag

M8022: Carry bit flag

M8029: Instruction end of execution flag

M8031: Non-latched data cleaning

M8032: Latch data clearing

M8034: Disable all output

M8039: Constant scan mode

M8040: Transfers are prohibited by STL

M8046: STL actions

M8047: STL monitoring is effective

M8048: S900-S999 has ON status

M8049: Signal alarm is valid

M8050: I0 Mouth interruption is forbidden

M8051: I1 Mouth interruption is prohibited

M8052: I2 Mouth interruption is prohibited

M8053: I3 Mouth interruption is forbidden

M8054: I4 Mouth interruption is prohibited

M8055: I5 Mouth interruption is prohibited

M8059: I010,I020, I030,I040,I050,I060 Count interrupt forbidden

M8129: Serial port 1 communication timeout flag

M8139: HSCS, HSCR, HSZ, HSCT high-speed counter comparison commands in execution

M8149: CAN communication timeout flag

M8150: CAN allows the work flag

Special registers

D8000: Monitor timer Settings (default 200)

D8008: Power down detection time (set value: 1-100, default 10ms)

D8010: Scan time Current value (0.1ms)

D8011: Minimum scan time (0.1ms)

D8012: Maximum scan time (0.1ms)

D8013: RTC clock seconds D8014: RTC clock minutes

D8015: RTC clock time D8016: RTC clock day

D8017: RTC clock month D8018: RTC clock year

D8019: RTC clock week

D8020: X0-X17 filter coefficient (set value: 0-60ms, default 10)

D8021: Filter coefficients X20-X77 (Settings: 1-60ms, default 10)

D8028: Z0 address register content D8029: V0 address register content

D8030: Sample data of opening analog quantity 0*(specific according to the model)

D8031: Sample data of opening analog quantity 1*(specific according to the model)

D8032: Open analog sampling data 2*(specific according to the model)

D8033: Sample data of open analog quantity 3*(specific according to the model)

D8034: Sample data of opening analog quantity 4*(specific according to the model)

D8035: Open sample data of analog quantity 5*(specific according to the model)

D8036: Open sample data of analog quantity 6*(specific according to the model)

D8037: Open sample data of analog quantity 7*(specific according to the model)

D8038: Open analog sampling data 8*(specific according to the model)

D8039: Constant scan time (unit: 1ms, default 0)

D8040: 1st active STL state D8041:2nd active STL state

D8042: 3rd active STL state D8043:4th active STL state

D8044: 5th active STL state D8045:6th active STL state

D8046: 7th active STL state D8047:8th active STL state

D8048: D8049: Minimum active STL state

D8112: Analog DAC0 output data (0~4095)*(specific according to the model)

D8113: Analog DAC1 output data (0~4095)*(specific according to the model)

D8139: Number of instructions in execution of HSCS, HSCR, HSZ, HSCT instructions (cannot be greater than 4)

D8140: Y00 Pulse output count register (for PLSY and PLSR)

D8142: Y01 Pulse Output count Register (for PLSY and PLSR)

D8144:Y02 Pulse Output count Register (for PLSY and PLSR)

D8146: Y03 Pulse Output Count Register (for PLSY and PLSR)

D8149: CAN Master/Slave communication timeout (1=1ms)

D8150: Host/Slave station number (0~32)

D8151: Number of slaves (1-32, default: 8)

D8152: Number of shared registers (1-32, default: 8)

D8153: CAN communication baud rate (20K~1000K, default: 250K)

D8156: DSZR, ZRN instructions specify Y04 to clear the signal element

M8152: User interrupts input instruction Y4

M8153: User interrupts input instruction Y5

M8154: User interrupts input instruction Y6

M8155: User interrupts input instruction Y7

M8161: 16-bit / 8-bit switch flag

M8168: SMOV Indicates the HEX processing function

M8170: X0 Pulse capture

M8171: X1 pulse capture

M8172: X2 pulse capture

M8173: X3 pulse capture

M8174: X4 pulse capture

M8175: X5 pulse capture

M8196: C251 C252 C254 double frequency marker

M8197: C253 C255 double frequency flag

M8198: C251 C252 C254 4 octave mark

M8199: C253 C255 4X mark

The counting direction of M8200: M8234: C200-C234 is set. The counting direction of M8235-M8345: C235-C245 is set. The counting direction flag of M8246-M8255: C246-C255 is set

M8329: Command execution ends abnormally

M8330: Output of DUTY(FNC 186) instruction timing clock 1

M8331: Output of DUTY(FNC 186) instruction timing clock 2

M8332: Output of DUTY(FNC 186) instruction timing clock 3

M8333: Output of DUTY(FNC 186) instruction timing clock 4

M8334: Output of DUTY(FNC 186) instruction timing clock 5

M8336: The interrupt input specified function is valid

M8338: PLSV command acceleration and deceleration action

M8340-M8349: High speed output Y0 function

M8350-M8359: High speed output Y1 function

M8360-M8369: High speed output Y2 function

M8370-M8379: High speed output Y3 function

M8440-M8449: High speed output Y4 function

M8450-M8459: High speed output Y5 function

M8470-M8479: High speed output Y6 function

M8480-M8489: High speed output Y7 function

M8401: RS instruction is being sent

M8402: RS command sending

M8403: RS instruction receiving flag

M8404:

M8409: Communication timeout flag

M8401: Channel 1- MODBUS communication

M8421: Channel 2- MODBUS communication

M8402: Error occurred in channel 1- MODBUS communication

M8422: Error occurred in channel 2- MODBUS communication

D8157: DSZR, ZRN instructions specify Y05 clear signal elements
D8158: DSZR, ZRN instructions specify Y06 clear signal elements
D8159: DSZR, ZRN instructions specify Y07 clear signal elements
D8170: Y04 pulse output count register
D8172: Y05 pulse output count register
D8174: Y06 pulse output count register
D8176: Y07 pulse output count register
D8182: Z1 index register contents
D8183: V1 index register contents
D8184: Z2 index register contents
D8185: V2 index register contents
D8186: Z3 index register contents
D8187:V3 index register contents
D8188: Z4 index register contents
D8189: V4 index register contents
D8190: Z5 index register contents
D8191: V5 index register contents
D8192: Z6 index register contents
D8193: V6 index register contents
D8194: Z7 index register contents
D8195: V7 index register contents
D8310: Random number (32 bits)
D8330: The DUTY instruction timing clock outputs a counter for the number of scans
D8331: The DUTY instruction timing clock outputs a counter of 2 scans
D8332: The DUTY instruction timing clock outputs a counter of 3 scans
D8333: DUTY timer outputs a counter of 4 scans
D8334: The DUTY instruction timing clock outputs a counter of 5 scans
D8336: DV IT interrupts input specifying Y0-Y3
D8337: DV IT interrupts input specifying Y4-Y7
D8340-D8349: High speed output Y0 register
D8350-D8359: High speed output Y1 register
D8360-D8369: High speed output Y2 register
D8370-D8379: High speed output Y3 register
D8400: COM2 communication format Settings
D8402: RS instruction sends the remaining number of data
D8403: indicates the number of RS commands received
D8409: RS/MODBUS master communication timeout (1=10ms, default 500)
D8400: COM2 communication format Settings
D8420: COM3 communication format Settings
D8401: COM2 Master/slave protocol D8421: COM3 master/slave protocol
D8402: COM2 communication error code
D8422: COM3 communication error code
D8403: COM2 error details

D8423: COM3 error details

M8403: COM2 MODBUS communication error latch M8423: COM3 MODBUS communication error latch M8408: Retry occurred in COM2 M8428: Retry occurred in COM3 M8409: COM2 timeout occurred M8429: COM3 timeout occurred M8410: COM2/COM3 switch using ADPRW instruction M8404: ENET ready M8406: Time setting T ENET function being executed M8411: Execution time setting M8492: IP address save area write requirements M8493: End of IP address save area write M8494: IP address save area write error M8495: IP address save area clearance requirements M8496: IP address save area clear end ENET function M8497: IP address save area clearing error M8498: Change IP address function in operation flag bit M8460: User interrupt input instruction Y00 M8461: User interrupt input instruction Y01 M8462: User interrupt input instruction Y02 M8463: User interrupt input instruction Y03 M8464: DSZR, ZRN instruction Y00 clear signal specified valid M8465: DSZR, ZRN instruction Y01 clear signal specified valid M8466: DSZR, ZRN instruction Y02 clear signal specified valid M8467: DSZR, ZRN instruction Y03 clear signal specified valid	D8404: COM2 communication error step D8424: COM3 communication error step D8407: COM2 communication step number D8427: COM3 communication step number D8408: COM2 Current retry times D8428: indicates the current retry times of COM3 D8409: The response of the COM2 slave station timed out D8429: COM3 Response from the slave station timed out D8410: COM2 send delay D8431: COM3 send delay D8412: COM2 retry times D8432: COM3 retry times D8414: indicates the ID of the COM2 slave station D8434: indicates the ID of the COM3 slave station D8419: COM2 action mode display D8439: COM3 action mode display D8405: indicates the connection status of the Ethernet port D8406: Saves the Ethernet adapter status D8411: Time setting function action result D8415: indicates the MAC address of this site D8416: indicates the MAC address of this site D8417: indicates the MAC address of this site D8418: Error code for the Ethernet adapter D8470: IP address (low) D8471: IP address (high) D8472: Subnet mask (low) D8473: Subnet mask (high level) D8474: Default router IP address (low) D8475: Default router IP address (high) D8492: IP Address Settings (low) D8493: IP Address Settings (high level) D8494: Subnet mask Settings (low) D8495: Subnet Mask Settings (high level) D8496: Default router IP address Settings (low) D8497: Default router IP address Settings (high level) D8498: IP address save area error code D8440-D8449: Y04 register High-speed output D8450-D8459: Y05 register high-speed output D8470-D8479: Y06 register high-speed output D8480-D8489: Y07 register high-speed output D8464: DSZR, ZRN instructions specify Y00 clear signal elements D8465: DSZR, ZRN instructions specify Y01 clear signal elements D8466: DSZR, ZRN instructions specify Y02 clear signal elements D8467: DSZR, ZRN instructions specify Y03 clear signal elements

Y0, Y1, Y2, Y3, Y4, Y5 maximum output frequency 180KHz, Y6, Y7 maximum output frequency 100KHz, can be output at the same time; Y0-Y7 both support enhanced PWM instruction;

Special M Scarlet No								Purpose	attributes	Supported Directives
Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7			
M8029								Instruction end of execution flag bit	R	PLSY/PLSR/DSZR/ DVIT/ZRN/DRVI/ DRVA 等
M8329								Instruction exception end flag bit		PLSY/PLSR/DSZR/ DVIT/ZRN/PLSV/ DRVI/DRVA
M8336								Interrupt input specified function valid	R/W	DVIT
M8338								PLSV commands acceleration and deceleration actions are valid		PLSV
M8340	M8350	M8360	M8370	M8440	M8450	M8470	M8480	Pulse output flag bit	R	PLSY/PLSR/DSZR/ DVIT/ZRN/PLSV/ DRVI/DRVA
M8341	M8351	M8361	M8371	M8441	M8451	M8471	M8481	Reset signal output function valid *1	R/W	DSZR/ZRN
M8342	M8352	M8362	M8372	M8442	M8452	M8472	M8482	The origin regression direction is specified		DSZR
M8343	M8353	M8363	M8373	M8443	M8453	M8473	M8483	Limit of forward rotation		PLSY/PLSR/DSZR/ DVIT/ZRN/PLSV/ DRVI/DRVA
M8344	M8354	M8364	M8374	M8444	M8454	M8474	M8484	Limit of reversal		
M8345	M8355	M8365	M8375	M8445	M8455	M8475	M8485	The near point signal logic is reversed		DSZR
M8346	M8356	M8366	M8376	M8446	M8456	M8476	M8486	Zero signal logic reversal		
M8347	M8357	M8367	M8377	M8447	M8457	M8477	M8487	Interrupt signal logic reversal		DVIT
M8348	M8358	M8368	M8378	M8448	M8458	M8478	M8488	Locate the flag bit in the instruction driver	R	PLSY/PWM/PLSR/ DSZR/DVIT/ZRN/ PLSV/DRVI/DRVA
M8349	M8359	M8369	M8379	M8449	M8459	M8479	M8489	Pulse stop command	R/W	PLSY/PLSR/DSZR/ DVIT/ZRN/PLSV/ DRVI/DRVA
M8460	M8461	M8462	M8463	M8152	M8153	M8154	M8155	The user interrupts the input instruction		DVIT
M8464	M8465	M8466	M8467	M8156	M8157	M8158	M8159	Reset signal soft component specified function valid		DSZR/ZRN

Clear signal When the specified function of the software component is invalid, clear signal Y0-Y10, Y1-Y11, Y2-Y12, Y3-Y13, Y4-Y14, Y5-Y15, Y6-Y16, Y7-Y17 R: read-only; R/W: read/write;

Special D register No								Purpose	Data bit	Default values	Supported Directives
Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7				
D8336				D8337				Interrupt input specified	16 bit	0	DVIT
D8340	D8350	D8360	D8370	D8440	D8450	D8470	D8480	Current position register	32 bit	0	DSZR/DVIT/ ZRN/DSZR/ PLSV/DRVI/ DRVA
D8341	D8351	D8361	D8371	D8441	D8451	D8471	D8481				
D8342	D8352	D8362	D8372	D8442	D8452	D8472	D8482	Base velocity	16bit	0	
D8343	D8353	D8363	D8373	D8443	D8453	D8473	D8483	Base velocity Maximum speed	32 bit	100000	
D8344	D8354	D8364	D8374	D8444	D8454	D8474	D8484				
D8345	D8355	D8365	D8375	D8445	D8455	D8475	D8485	Speed of crawling	16 bit	1000	DSZR
D8346	D8356	D8366	D8376	D8446	D8456	D8476	D8486	Velocity of return to the origin	32 bit	50000	
D8347	D8357	D8367	D8377	D8447	D8457	D8477	D8487				
D8348	D8358	D8368	D8378	D8448	D8458	D8478	D8488	Speedup time	16 bit	100	DSZR/DVIT/ ZRN/PLSV*1/ DRVI/DRVA
D8349	D8359	D8369	D8379	D8449	D8459	D8479	D8489	Deceleration time	16 bit	100	
D8464	D8465	D8466	D8467	D8156	D8157	D8158	D8159	Reset signal soft element specified	16 bit	0	DSZR/ZRN
D8140	D8142	D8144	D8146	D8170	D8172	D8174	D8176	Pulse current value register	32 bit	0	PLSY/PLSR*2
D8141	D8143	D8145	D8147	D8171	D8173	D8175	D8177				

1: need to put the M8338 ON, PLSV acceleration and deceleration function is effective;
2: Note that when PLSY and PLSR instructions are used, the corresponding registers D8140, D8142, D8144, D8146, D8170, D8172, D8174, D8176 are accumulated by the pulses sent;

四、 Use of high-speed counters:

1: C251 C252 C254 (AB phase) Maximum response frequency: 100KHz default 10K;

2: C253 C255 (AB phase) Maximum response frequency: 100KHz default 10K;

3: C235 C241 C244 C238 (single phase) maximum response frequency: 100KHz default 10K;

4: Other high-speed counter maximum response frequency: 10KHz;

5: The high-speed counter of AB phase can be set 2 times frequency and 4 times frequency (the setting is only valid in the OUT drive cycle) :

When M8196-ON, C251 C252 C254 count pulse 2 times frequency;

When M8197-ON, C253 C255 count pulse 2 times frequency;

When M8198-ON, C251 C252 C254 count pulse 4 times frequency;

When M8199-ON, C253 C255 count pulse 4 times frequency;

Example: if you use a phase AB encoder, it turns one turn is 1024 pulse input, if the frequency is not set, then adjust the counter count 1024, if the frequency is set 2 times, then turn one turn counter count 2048; If set 4 times the frequency, then turn the counter count 4096;

Instructions:

	1相1计数输入											1相2计数输入					2相2计数输入				
	C235	C236	C237	C238	C239	C240	C241	C242	C243	C244	C245	C246	C247	C248	C249	C250	C251	C252	C253	C254	C236
X000	U/D						U/D			U/D		U	U		U		A	A		A	
X001		U/D					R			R		D	D		D		B	B		B	
X002			U/D					U/D			U/D		R		R			R		R	
X003				U/D				R	U/D		R			U		U			A		A
X004					U/D				R					D		D			B		B
X005						U/D								R		R			R		R
X006										S					S					S	
X007											S					S					S

1：X0-X1 single-phase input maximum frequency 100KHz default 10K; AB phase input maximum frequency 100KHz default 10K;
2：X2-X5 Max input frequency 10KHz
3：The high-speed counter of the AB phase can be set to double frequency and four times frequency：

When M8196-ON, C251 C252 C254 count pulse 2 times frequency;

When M8197-ON, C253 C255 count pulse 2 times frequency;

When M8198-ON, C251 C252 C254 count pulse 4 times frequency;

When M8199-ON, C253 C255 count pulse 4 times frequency;

Example: IF you use a phase AB encoder, it is a turn of 1024 pulse input, if not set octave, then adjust

Counter count 1024 (T-FX3U can set 4 times frequency), if set 2 times frequency, that turn

One turn counter counts 2,048; If you set 4 times the frequency, then turn the counter to count 4096;

6 ： Instructions for using DHSCS, DHSCR, and DHSZ instructions:

Three high-speed comparison instructions, the number of simultaneous drive: 4 times (more than 4 times 6705);

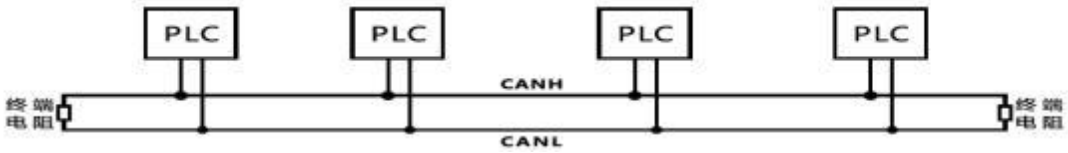
When using hardware high-speed counter comparison, the response frequency does not change :DHSCS and DHSCR perform real-time comparison, but DHSZ hardware interval comparison is not real-time, but about 5us comparison.

When using hardware high-speed counter, as long as DHSCS, DHSCR, DHSZ are driven, the comparison results will be output.

When using software high-speed counters, the comparison is performed only when there is an input to the high-speed counter.

五 CAN Communication Description

1. The CAN function can set 1 host, up to 32 slave machines (setting range: 1~32), each station can share up to 32 registers (setting range: 1~32);
2. The baud rate of CAN function can be set: 20K, 50K, 80K, 100K, 125K, 200K, 250K, 400K, 500K, 600K, 800K, 1000K (if the baud rate is not supported, it will automatically default to 250K);
3. The designated registers of the host machine and all slave machines are shared with each other, and the maximum number of registers can be shared by each station. See (Master and Slave Shared Address Table)
4. There is duplicate fault detection of master/slave address, and corresponding error fault code, see the attached fault description.



5. Register and relay description

Master station

The M8150-CAN is allowed to work

M8149- Communication timeout flag (CAN can not communicate or timeout flag, after the flag ON, you need to manually turn OFF in the program) D8149- Communication timeout parameter (1=1ms, default 50ms) D8150- Host Settings (0= host)

D8151- Number of slaves (1-32, default 8) D8152- Number of shared registers (1-32, default 8)

D8153- Baud Rate (20K~1000K, default 250K)

D8196- Slave without communication (1~16) D8197- Slave without communication (17~32)

D8198- Slave Summary with no Communication (1~16) D8199- Slave Summary with no Communication (17~32)

D8200- Maximum time to successfully communicate with slave (1=1ms)

Slave station

The M8150-CAN is allowed to work

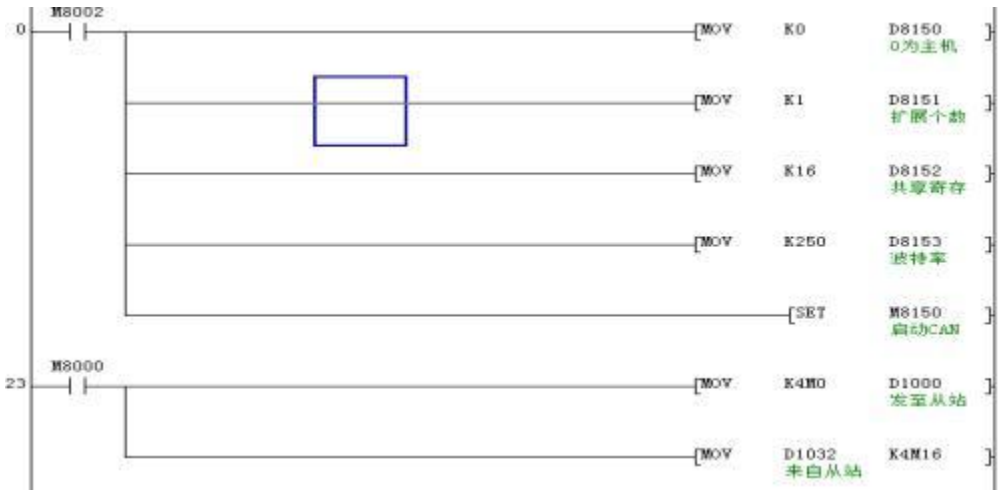
M8149- Communication timeout flag (CAN can not communicate or timeout flag, after the flag ON, you need to manually turn OFF in the program) D8149- Communication timeout parameter (1=1ms, default 60ms) D8150- Slave address setting (1~32)

D8152- Number of shared registers (1~32, default 8) D8153- Baud rate (20K~1000K, default 250K) D8196- Slaves that cannot communicate (1~16) D8197- Slaves that cannot communicate (17~32)

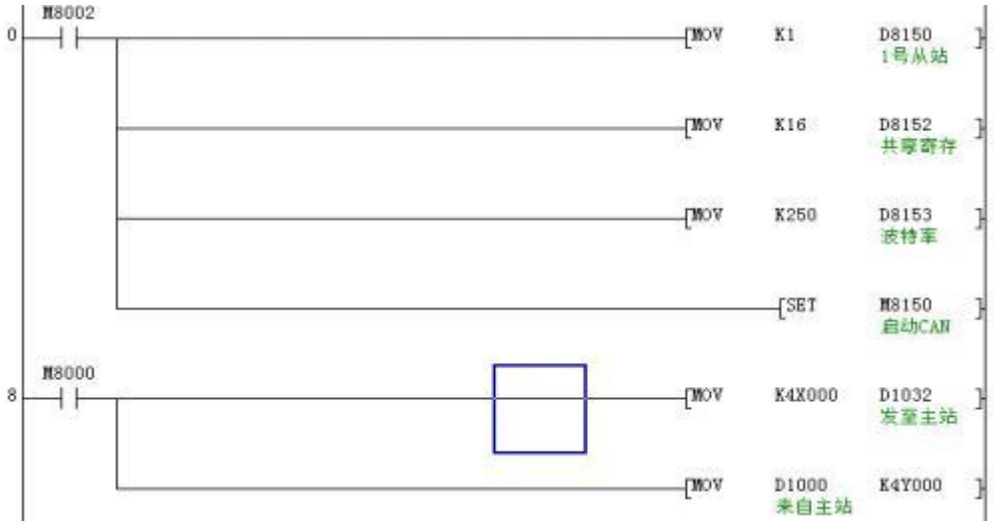
D8198- Slave Summary with no Communication (1~16) D8199- Slave Summary with no Communication (17~32)

D8200- Maximum time to successfully communicate with host (1=1ms)

6. CAN program example



Above is a master program, below is a slave program



7. A list of registers shared between master and slave machines

0	D1000	D1031	Host shared register
1	D1032	D1063	1# machine shared register
2	D1064	D1095	2# machine shared register
3	D1096	D1127	3# machine shared register
4	D1128	D1159	4# machine shared register
5	D1160	D1191	5# machine shared register
6	D1192	D1123	6# machine shared register
7	D1224	D1255	7# machine shared register
8	D1256	D1287	8# machine shared register
9	D1288	D1319	9# machine shared register
10	D1320	D1351	10# machine shared register
11	D1352	D1383	11# machine shared register
12	D1384	D1415	12# machine shared register
13	D1416	D1447	13# machine shared register
14	D1448	D1479	14# machine shared register
15	D1480	D1511	15# machine shared register
16	D1512	D1543	16# machine shared register

17	D1544	D1575	15# machine shared register
18	D1576	D1607	15# machine shared register
19	D1608	D1639	15# machine shared register
20	D1640	D1671	15# machine shared register
21	D1672	D1703	15# machine shared register
22	D1704	D1735	15# machine shared register
23	D1736	D1767	15# machine shared register
24	D1768	D1799	15# machine shared register
25	D1800	D1831	15# machine shared register
26	D1832	D1863	15# machine shared register
27	D1864	D1895	15# machine shared register
28	D1896	D1927	15# machine shared register
29	D1928	D1959	15# machine shared register
30	D1960	D1991	15# machine shared register
31	D1992	D2023	15# machine shared register
32	D2024	D2055	15# machine shared register

The start address of the register corresponding to the above machine number is fixed, and the end address is determined by D8152 (such as D8152=2, there are only two shared registers of the master and slave machine, the master station D1000-D1001, and the No. 1 machine D1032-D1033).

8. CAN communicate speed and distance

Baud rate	Distance (m)	Minimum wire diameter (mm)	Maximum number of access points
1000Kbps	30	0.3	18
500Kbps	80	0.3	32
250Kbps	150	0.3	63
125Kbps	300	0.5	63
100Kbps	500	0.5	63
50Kbps	1000	0.7	63

9．CAN communication precautions

CAN related register parameters, after setting the need to disconnect the power to execute according to the new data (if the program to set the parameters, please after the PLC run, disconnect once, power again, then CAN start or start according to the new parameters);

CAN communication cable must use twisted pair, wire diameter should not be too small to ensure sufficient transmission distance and anti-interference ability, should not use parallel cables. Communication cable and power cable should be laid separately, not parallel with the power cable, if the frequency converter interference can be serious, separate through the pipe cable. The beginning and end of the bus should be connected to the terminal resistor (short circuit on the closing board).

六、 CAN communication precautions:

1. Serial port 1 supports only the programming port protocol and is automatically identified by the programming software with baud rates of 9600, 19200, 38400, 57600, and 115200
2. Serial ports 2 and 3 are powered on using the FX programming port protocol by default.
3. Serial port 2 and 3 support switching between Mitsubishi FX programming port protocol and MODBUS-RTU protocol;
4. The communication parameters of serial port 2 are set in D8400, and those of serial port 3 are set in D8420. The MODBUS command ADPRW can be switched between serial port 2 and serial port 3.
5. There is a corresponding error fault detection, see the attached fault description
6. The maximum length of ADPRW read and write data is 520. If the length exceeds 6343 or 6363, the fault is reported.
7. If the MODBUS RTU master station function is not enabled and the ADPRW command is used, the fault 6706 is reported.

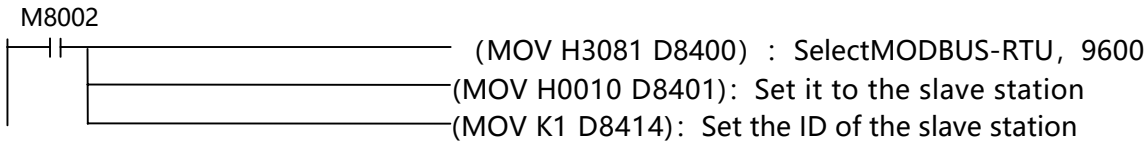
The configuration diagram of D8400/D8420 is as follows:

Bit number	Name	Content	
		0(bit=OFF)	1(bit=ON)
b0	Data length	7 Bit *1	8 Bit
b1 b2	parity	b2 b1 (0 0)- No inspection (0 1)- 奇数(ODD) (1 1)- 偶数(EVEN)	
b3	Stop bit	1 Bit	2 Bit
b4 b5 b6 b7	rate	b7 b6 b5 b4 (0 0 1 1):300 (0 1 0 0):600 (0 1 0 1):1200 (0 1 1 0):2400 (0 1 1 1):4800	b7 b6 b5 b4 (1 0 0 0):9600 (1 0 0 1):19200 (1 0 1 0):38400 (1 0 1 1):57600 (1 1 0 1):115200
b8	Disable		
b9	Disable		
b10	Disable		
b11	Disable		
b12 b13 b14	Communication protocol	b14 b13 b12 (0 0 0): FX programming port protocol (0 0 1): There is no protocol communication in RS (0 1 0): RS2 has no protocol communication (0 1 1): MODBUS protocol (D8401 sets master and slave stations)	
b15	Disable		

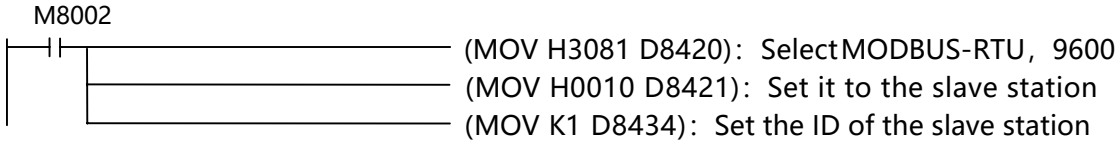
*1: When the data bit is 7 bits, parity can not be selected - no test (6304 fault);
*FX programming port protocol: data length 7, stop bit 1, parity EVEN fixed, speed can be set;
*MODBUS RTU protocol: data length, stop bit, parity, rate can be set;
*RS instruction: data length, parity, stop bit, rate can be set;
*RS2 instruction: data length, parity, stop bit, rate can be set;

8. Example Set the secondary MODBUS station

1： Set serial port 2 to MODBUS-RTU, slave station, baud rate 9600/N/8/1 as follows：



2： Set serial port 3 to MODBUS-RTU, slave station, and baud rate 9600/N/8/1 as follows：



3：Set the serial port to FX programming port protocol, just pull the PLC operation switch to STOP, or change the D8400 to 0 and then let the PLC run;

4： The MODBUS protocol address is compared with the PLC soft component as shown below：

Bit element

MODBUS software component		FX3u/FX3uc soft components
Input (readout only)	Coil (read/write)	
0x0000～0x1DFF	0x0000～0x1DFF	M0～M7679
0x1E00～0x1FFF	0x1E00～0x1FFF	M8000～M8511
0x2000～0x2FFF	0x2000～0x2FFF	S0～S4095
0x3000～0x31FF	0x3000～0x31FF	TS0～TS511
0x3200～0x32FF	0x3200～0x32FF	CS0～CS255
0x3300～0x33FF	0x3300～0x33FF	Y0～Y377
0x3400～0x34FF	-	X0～X377

Word element

MODBUS software component		FX3u/FX3uc soft components
Input (readout only)	Coil(read/write)	
0x0000～0x1F3F	0x0000～0x1F3F	D0～D7999
0x1F40～0x213F	0x1F40～0x213F	D8000～D8511
0x2140～0xA13F	0x2140～0xA13F	R0～R32767
0xA140～0xA33F	0xA140～0xA33F	TN0～TN511
0xA340～0xA407	0xA340～0xA407	CN0～CN199
0xA408～0xA477	0xA408～0xA477	CN200～CN255*1
0xA478～0xA657	0xA478～0xA657	M0～M7679
0xA658～0xA677	0xA658～0xA677	M8000～M8511
0xA678～0xA777	0xA678～0xA777	S0～S4095
0xA778～0xA797	0xA778～0xA797	TS0～TS511
0xA798～0xA7A7	0xA798～0xA7A7	CS0～CS255
0xA7A8～0xA7B7	0xA7A8～0xA7B7	Y0～Y377
0xA7B8～0xA7C7	-	X0～X377

*1. CN200～255It's a 32-bit counter

MODBUS commands are supported:
Bit read commands 1(H1), 2(H2) X, Y, M, S, T, C, special M
Bit write command 5(H5) Y, M, S, T, C, special M
Register read commands 3(H3), 4(H4) X, Y, M, S, T, C, special M D, T, C, special D
Register write command 6(H6) Y, M, S, T, C, special M D, T, C, special D
Register bulk write command 16 (H10) Y, M, S, T, C, special M D, T, C, special D
** Using register reads, a register reads 16 bits of component state;
** Use registers to write bits. A register write affects the state of 16 bit elements;

8. MODBUS main station

1： Serial port 2, 3 power on default is FX programming port protocol;

2： Serial port 2 and 3 support switching between Mitsubishi FX programming port protocol and MODBUS-RTU protocol;

3： The communication parameters of serial port 2 are set in D8400, and the communication parameters of serial port 3 are set in D8420, supporting ADPRW to switch between serial port 2 and serial port 3;

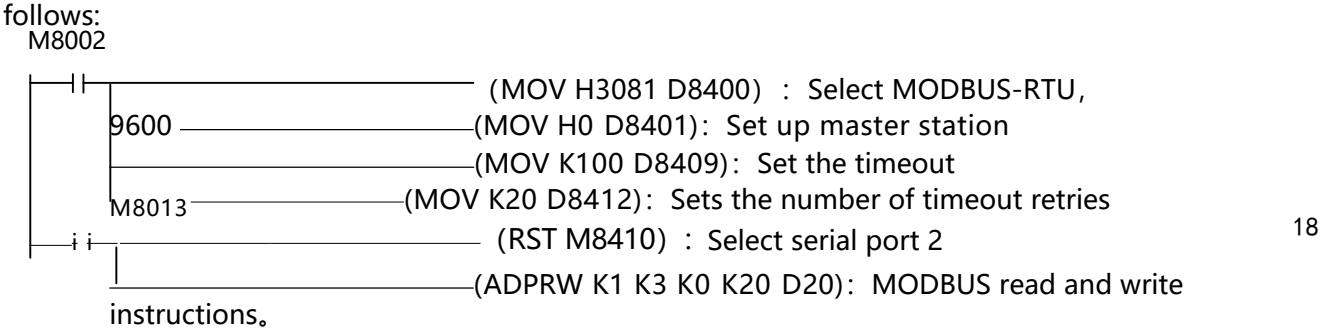
4： For the corresponding error fault detection, see the fault description in the master manual

5： If you need to use the corresponding serial port function, please first open the corresponding serial port function on the parameter setting software;

6： The maximum length of ADPRW read and write data is 520, exceeding 6343 or 6363 fault;

7： If the parameter does not enable MODBUS RTU master station function, use ADPRW instruction, report 6706 fault;

For example: set serial port 2 to MODBUS-RTU protocol, master station, baud rate 9600/N/8/1 as follows:



Instructions: K1: slave station number; K3: MODBUS function code; K0: MODBUS register number; K20: the number of registers read; D20: Placed in and after the PLC register D20.

9、The special relays used in MODBUS are listed below.

channel 1	channel 2	name	Effective station	Details	R/W
M8410		Channel 2/3 is switched with ADPRW instruction	Master station	OFF: COM2 uses the ADPRW instruction ON: COM3 uses the ADPRW instruction	R/W
M8029		End of instruction execution	Master station	OFF: The instruction is not in execution or the instruction has not completed execution ON: The instruction has been executed	R
M8401	M8421	MODBUS communication	Master station	Set to ON in MODBUS communication, from the beginning of instruction execution to the end of command execution flag ON.	R
M8402	M8422	An error has occurred in MODBUS communication	Master/slave station	Set to ON when a MODBUS communication error occurs.	R
M8403	M8423	MODBUS communication error latch	Master/slave station	Set to ON in case of MODBUS communication error.	R
M8408	M8428	Retry occurs	Master station	When the slave fails to respond on time, it will send a retry message to the master The period is set to ON.	R
M8409	M8429	Timeout occurred	Master station	The occurrence response timeout is set to ON.	R

10 、The special registers used in MODBUS are listed below

Channel 1	Channel 2	Name	Effective station	Details	R/W
D8400	D8420	Communication format setting	Master/slave station	Set the communication format. Note: See the table for details	R/W
D8401	D8421	Protocol	Master/slave station	H 0: MODBUS master station; H10: MODBUS slave station	R/W
D8402	D8422	Communication error code	Master/slave station	The latest error code that has occurred in MODBUS communication is stored.	R
D8403	D8423	Error Details	Master/slave station	The details of the latest error are stored.	R
D8404	D8424	Step in which a communication error occurred	Master station	The step number of the first ADPRW instruction in which the error occurred is stored.	R

D8407	D8427	Communicatio n step number	Master station	The step number of the ADPRW instruction in MODBUS communication is stored. (0 is stored when the instruction is not executed.) The step number of the last ADPRW instruction to be executed is maintained.	R
D8408	D8428	Current retry times	Master station	When a communication retry is performed because the slave response times out, the current number of retries is saved.	R
D8409	D8429	Slave station response timed out	Master station	After the master sends the request, if the slave does not respond within the set time, the master will send the text again, or judge the timeout error according to the set number of retries (D8412, D8432), and then terminate the processing of the instruction. Setting range :0 ~ 32767, 1=10ms, 0 hours 3 seconds is a timeout.	R/W
D8410	D8431	Transmission delay	Master/slave station	The delay refers to the delay after the data is received before the data is returned. Setting range :0 to 16382 [ms], default: 10ms	R/W
D8412	D8432	Retry times	Master station	If the slave does not respond within the time set in the slave response timeout, the master sends the text until the set number of retries is reached, and the instruction processing is terminated due to a timeout error. Setting range :0 ~ 20 [Times] When setting a value above 20, the number of retries is 20.	R/W
D8414	D8434	Slave station number	Slave station	Store the slave station number. Setting range :1 ~ 247	R/W
D8063	D8063	Serial communication error code	Master/slave station	When a communication error occurs, an error code corresponding to the error occurring in MODBUS communication is stored.	R
D8419	D8439	Action mode display	Master/slave station	0-FX programming port communication 4-RS instruction 5-RS2 instruction 19- MODBUS communication master station 29- MODBUS communication slave	R

The component functions of RS instructions are as follows:

Elements of RS instruction		Elements of RS2 instruction	
M8401	RS instructions are being sent	M8421	RS2 instructions are being sent
M8402	RS command sending	M8422	RS2 instruction sending
M8403	RS instruction receiving flag	M8423	RS2 instruction receiving flag
M8404		M8424	
M8409	Communication timeout flag	M8429	Communication timeout flag
M8161	8-bit processing mode (ON-8 bit,OFF-16 bit)		
D8400	Communication parameters and protocol selection	D8420	Communication parameters and protocol selection
D8402	RS instruction sends data remainder	D8422	RS2 instruction sends data remainder
D8403	RS Indicates the number of received commands	D8423	Number of RS2 instructions received
D8409	RS instruction receiving timeout setting (1=10ms, default 50=500ms)	D8429	RS2 instruction receiving timeout Settings (1=10ms, default 50=500ms)
D8419	Sign that communication is being performed	D8439	Sign that communication is being performed

** The maximum data sent and received by RS instruction is 520 (overshoot 6343/6363);
** The maximum data sent and received for RS2 instruction is 520 (over 6706);

七. T-FX3U-ENET Ethernet communication function

1. By default, three ports are open for MELSOFT-TCP connection mode, three ports are open for MODBUS-TCP server function, one port supports MODUS UDP server function, and one port supports MODUS UDP client function.

2. GX Works2 programming software -Diagnosis -Ethernet diagnostic function cannot be used, Ethernet parameters do not support GX Works2 Settings

3. Register and relay description:

1: The special relays used in ENET are as follows

Relay number	Name	Details	R/W
M8404	ENET is ready	Ethernet chip detection is normally ON.	R
M8406	Time setting is being performed	The Ethernet adapter is ON during execution time setting.	R
M8411	Execution time Settings	After ON, the Ethernet adapter performs the time setting.	R/W
M8492	The IP address holds the region write requirements	When set to ON, the IP address Settings stored in D8492-D8497 are written into the IP address saving area in the basic unit.	R/W
M8493	IP address save area is finished writing	When the write is complete, it is set to ON. It is also set to ON when a write fails. IP Address Protection	R

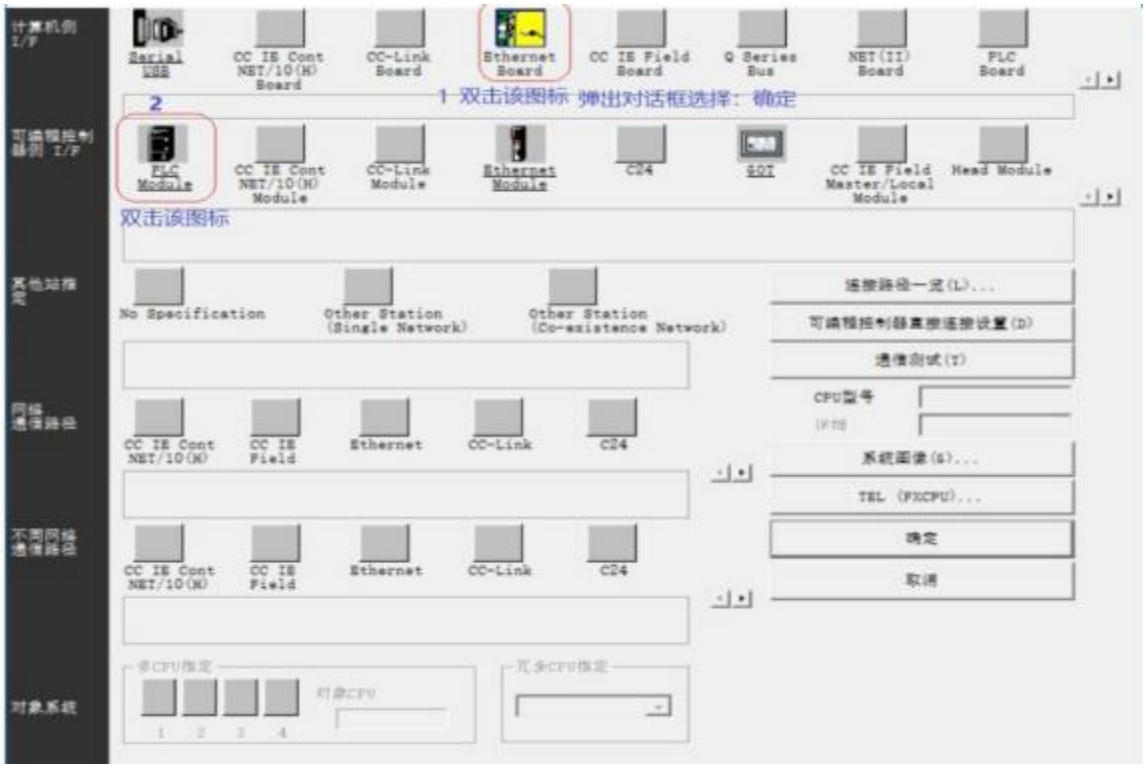
		The memory area write requirement M8492 is set to OFF after changing from ON to OFF.	
M8494	IP address save area write error	When the write fails, it is set to ON. The address save area write requirement M8492 will be set to OFF after changing from ON to OFF.	R
M8495	IP address save area clearance requirements	When set to ON, the contents of the IP address storage area are cleared.	R/W
M8496	The IP address storage area is cleared	When the cleanup is complete, it is set to ON. It is also set to ON when clearing fails. M8495 is set to OFF after the address save area cleanup requires it to change from ON to OFF.	R
M8497	IP address save area to clear errors	It is set to ON when clearing fails. M8495 will be set to OFF after the address save area cleanup requires it to change from ON to OFF.	R
M8498	The change IP address function is in operation	When the IP address stored in the IP address saving area is valid, it is set to ON.	R

2: The special registers used in ENET are listed below

The register number	Name	Details	R/W
D8405	Connection status of an Ethernet port	Saves the Ethernet port connection status of the Ethernet adapter. b10: Connection state 0: The hub or object device is not connected or disconnected 1: In connection with a hub or object device b14: Data transfer speed 0: Running at 10BASE-T 1: Running on 100BASE-TX	R
D8406	Save the Ethernet adapter state	b0:INIT 1:The initialization process ends normally, b2:100M/10M 1:100Mbps,0:10Mbps/When not linked b3:ERR. 1:Set abnormal display,0: Set normal display b4:COM.ERR. 1:Abnormal communication display,0: normal communication display b5: 1:Initialization handling exception ended,0:- b7: 1:Link signal ON,0:Link signal OFF b8～b15:Port numbers 0-7 1: successful initialization, 0: failed initialization,	R
D8411	Save time setting function action results	0: Not executed 1. Success -1: Failure	R
D8415	MAC address of this site	Save the MAC address (all three words).	R
D8418	Error code for the Ethernet adapter	Save the error code detected in the Ethernet adapter refer to the table below	R
D8436	MODBUS UDP destination IP address (low bit)	Set UDP protocol communication destination IP address low	R/W
D8437	MODBUS UDP destination IP address (high bit)	Set UDP protocol communication destination IP address high	R/W
D8438	MODBUS UDP destination port address	MODBUS/TCP, UDP protocol selection, set UDP protocol communication destination port address (select TCP protocol when 0, non-0 is UDP protocol port address)	R/W
D8380	IP address (low key)	The low bit of an IP address.	R
D8381	IP address (high byte)	The high bit of an IP address.	R
D8382	Subnet mask (low level)	The lower part of the subnet mask.	R
D8383	Subnet mask (high bit)	The high bit portion of the subnet mask.	R
D8384	Default router IP address (low key)	The lower part of the default router IP address.	R
D8385	Default router IP address (high bit)	The high bit portion of the default router IP address.	R
D8492	IP address setting (low)	The lower part of the IP address set point.	R/W
D8493	IP address setting (high bit)	The high bit portion of the IP address setpoint.	R/W
D8494	Subnet mask Settings (low)	The lower part of the subnet mask set point.	R/W
D8495	Subnet mask Settings (high bit)	The high bit portion of the subnet mask set point.	R/W
D8496	Default router IP address Settings (low)	The lower part of the default router IP address set value.	R/W
D8497	Default router IP address Settings (high bit)	The high bit portion of the default router IP address set point.	R/W
D8498	The IP address holds the region error code	When ENET fails to rewrite with parameters, save the error code. Refer to the table below for details.	R

4. GX Works2 programming software is connected through Ethernet

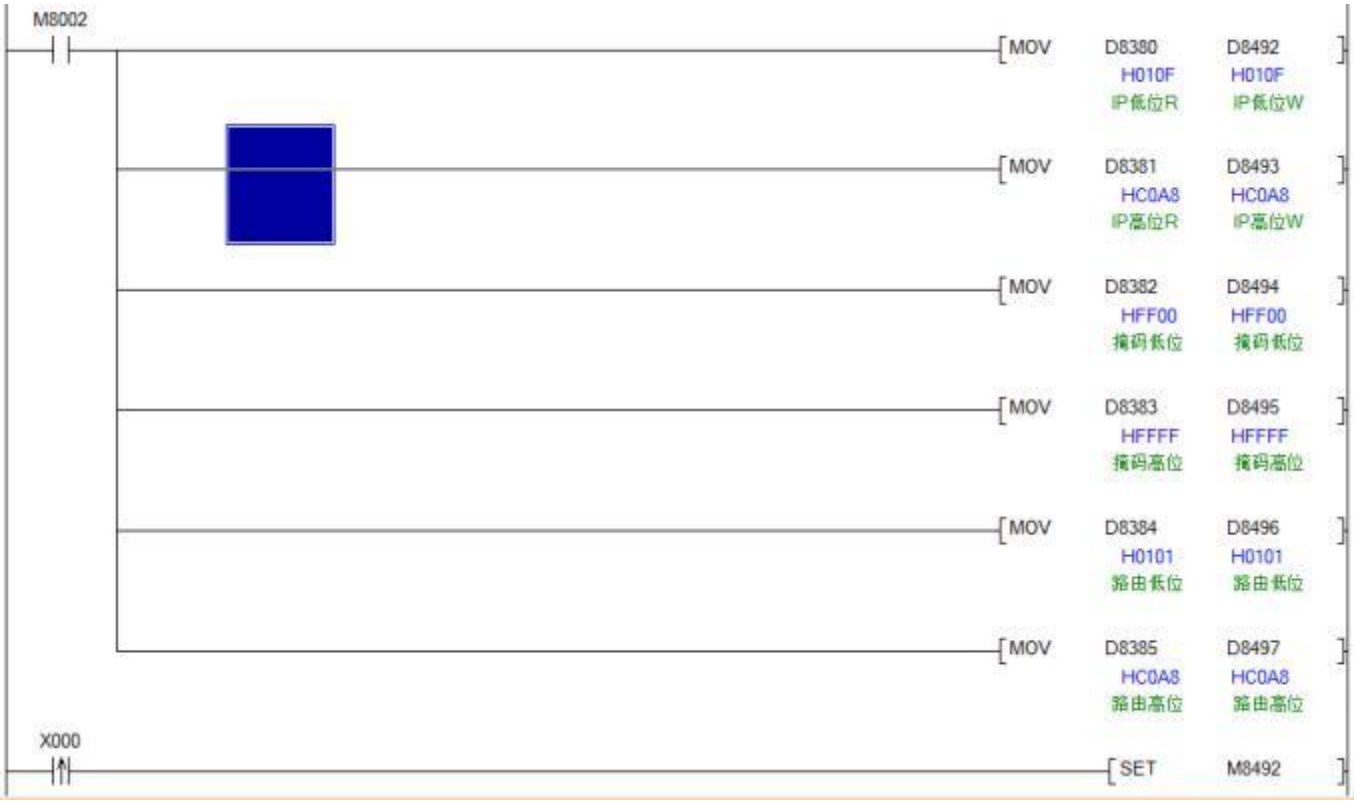
1: Open GX Works2 software, select T-FX3U, select the connection target, and click Ethernet Board;



2: Then double-click the PLC Module to pop up the CPU module detailed Settings: select the connection through the hub, input the IP address of the PLC, and click OK;

So you can use programming software to operate the PLC as with the serial port;

3: How to change the IP address

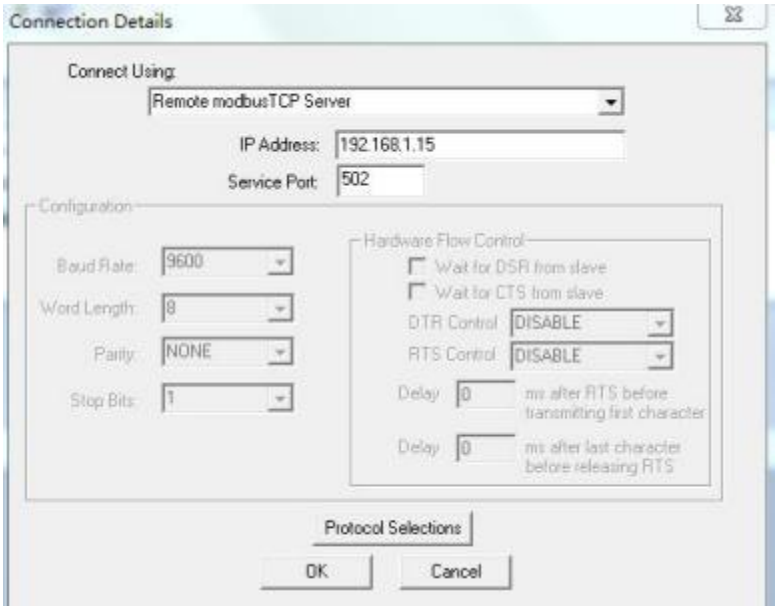


As shown above, change the values of D8492-D8497 (high and low octs of hexadecimal) and set M8492 to 1 to power up the new IP address. The IP address and the router IP must be in the same network segment when setting the IP address, otherwise the setting is invalid.

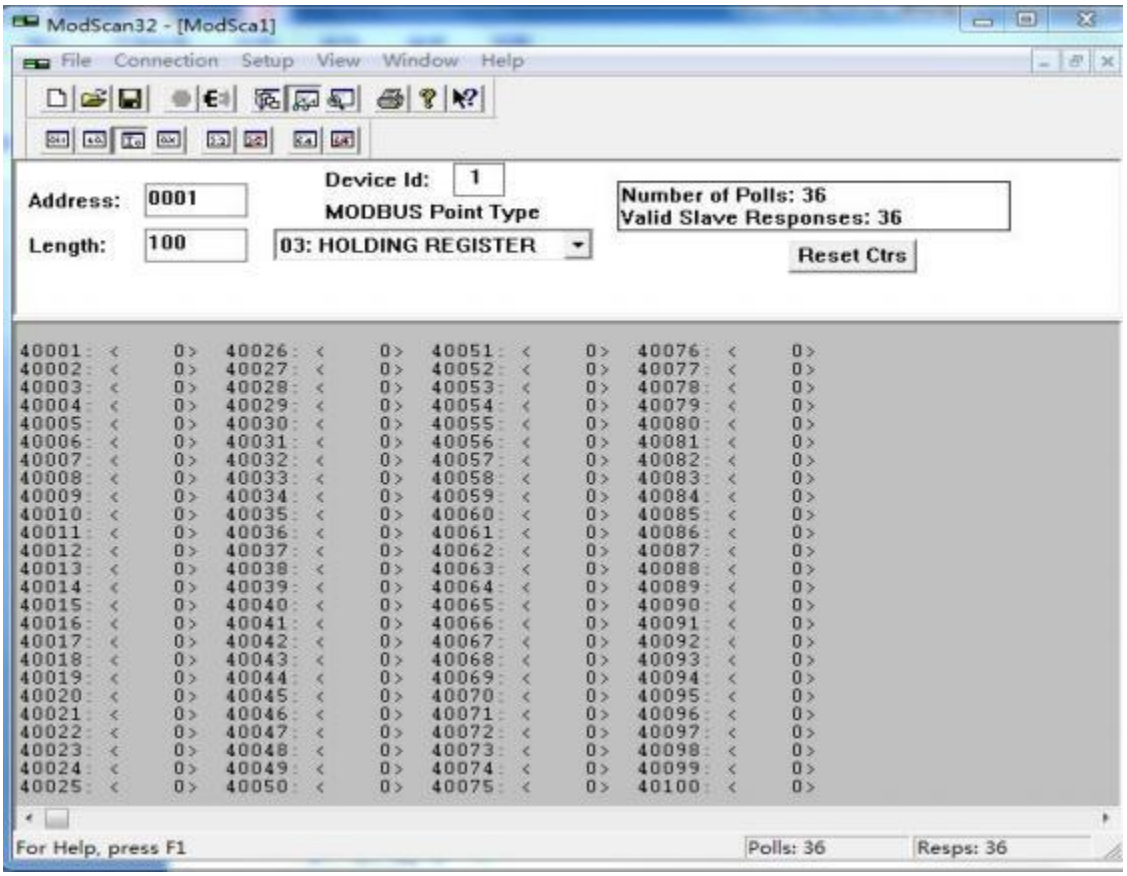
5. Application on the MODBUS TCP server side

PLC can communicate with the host computer through MODBUS-TCP. The host computer can be configuration software, touch screen, or application programs written by users with advanced voice, such as MODSCAN32 software and PLC communication through MODBUS-TCP

The first step is to set the IP address, port 502



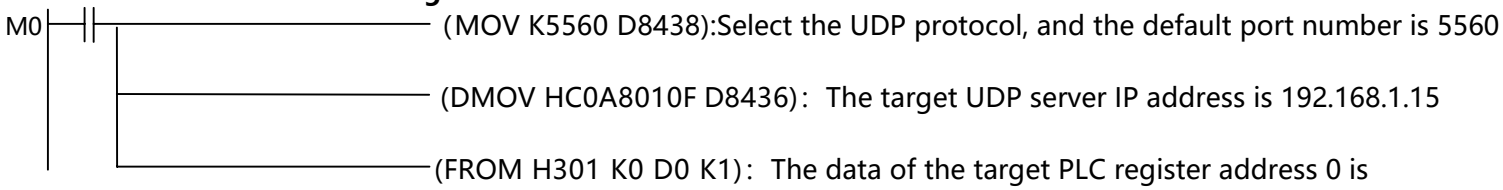
Step 2: Set the register type, number



The register mapping refers to the MODBUS register mapping table

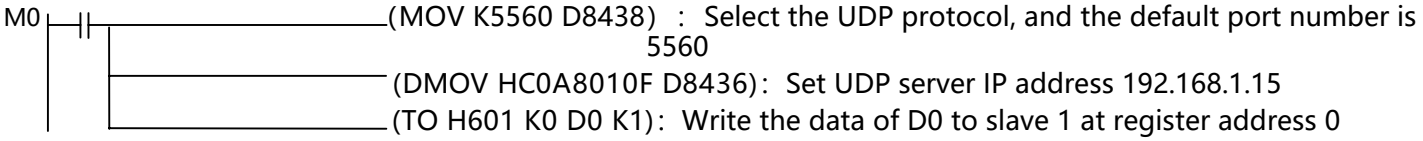
6. Application of MODBUS UDP client

1: The master reads the usage instructions of the slave data



H301- Command 3 (read register instruction), slave address 1
K0 -- slave component address; See MODBUS register mapping table for address data.
D0 -- save the slave data register;
K1 - Read data length (1-255)

2: Instructions for master to write slave data:



H601- Low 8 bits for slave address, high 8 bits for MODBUS function code; Such as: H601- command 6 (read register instruction), slave address 1 K0 - slave component address; See MODBUS register mapping table for address data.
D0 - writes to slave data register;
K1 - the length of the data written When using commands 5 (write bit) and 6 (write register), the length is 1 no matter what number is set. When using H10 (K16) to write multi-bit register, the data length is (1~255);
Special notes:

a: FROM and TO can be used multiple times in the program. When multiple instructions are executed at the same time, the system will communicate in turn. If the communication is out of time, record the fault code and execute the next communication instruction.

b: Maximum data length of FROM/TO instruction: bits (1~255), registers (1~255);

c: When the 05 instruction is used TO set the slave station element, such as: TO H501 K4000 D0 K1 -- Set the M0 state of the 1 slave station, if D0 equals 0, the slave station M0 is OFF; When D0 is nonzero, slave M0 is ON;

7. Ethernet error code (D8418)

Error code	Error content	The solution
753	The Ethernet adapter IP address is incorrectly set	Change the IP address. The level is set to A/B/C
761	When specifying the default router IP address, the subnet mask field is set outside the allowable range (allowable range :192.0.0.0-255.255.255.252).	Modify the subnet mask
763	When specifying the default router IP address, the default router IP address is set to an incorrect value	Change the IP address. The level is set to A/B/C.
764	When specifying the default router IP address, the Ethernet adapter IP address and the default router IP address do not belong to the same network address	Change the IP address. The level is set to A/B/C
850	Failed to receive response from SNTP server Verify that the SNTP server is connected to the network.	Change the IP address.
911	An acknowledgement device movement occurs during TCP/IP communication when a reception error occurs Do. Packets are sometimes congested in the line and are sent after an arbitrary time.	Confirm that the link cable is loose.
1000	MODBUS client FROM/TO instruction length range error	Verify that the read write length of the instruction is within range
1001	MODBUS client FROM/TO uses unsupported commands	Use a supported command
1002	The protocol selected by the MODBUS client FROM/TO is not the same as that of the parameters	Modify the protocol consistency of the FROM/TO instruction or Ethernet parameters (D8438-0=TCP protocol, not 0 is UDP protocol)
1003	MODBUS client motherboard is not connected to the server	Make sure the Ethernet IP, port and other parameters are consistent and correct
1004	The MODBUS client receives a timeout	Confirm that the parameters and connections are normal
1005	MODBUS client FROM/TO instruction slave address range error	Please select the correct range of slave address, TCP protocol address 1-7, UDP protocol address 1-247.
1006	The data command or address received by MODBUS client FROM/TO instruction is inconsistent	Possible interference or packet congestion
1007	The MODBUS client FROM/TO instruction receives inconsistent with the transmission flag sent	Possible interference or packet congestion

8. Error writing to the IP address save area (D8498)

Error code	Error content	The solution
100	The values D8492-D8497 are outside the specified range	Please change the content of the set value.
400	The write requirement changed from OFF to ON at the same time as the clear requirement	Please confirm whether the write request and the clear request are fromOFF becomes ON

9. IP address setting range

According to the input format (decimal number/hexadecimal number) set the IP address of the site. Setting range: 0.0.0.1 ~ 223.255.255.254 (decimal) 00.00.00.01 ~ DF.FF.FF.FE(hexadecimal) Set the Ethernet adapter of this station and the communication device to the same level and subnet address.

Sets the subnet mask type

Set THE subnet mask according to the input format (decimal/hexadecimal).

Setting range: 192.0.0.0 ~ 255.255.255.252(base 10)

C0.00.00.00 ~ FF.FF.FF.FC(hexadecimal)

八. Error and fault detection

category	Error code	Error content	Solution
PLC hardware error M8061(D8061) Stop of run	0000	Nothing abnormal	
	6101	Power down data inspection error	The power supply voltage may be too low, power down to maintain capacitor damage
	6102	External FLASH detection error	FLASH corruption
	6103	External FLASH ID error	FLASH corruption
	6105	Monitor action (internal watchdog action)	Increase the set point or check procedure of D8000
	6106	Logic error	Contact the manufacturer
Error in serial port /CAN/ENET M8063(D8063) Run continue	0000	Nothing abnormal	
	6306	Received data timeout	Check communication lines
	6307	-	
	6308	D8400 baud rate out of range	
	6309	D8400 selects 7-bit data and cannot select no test	The test selection value is incorrect
	6310	Use RS, RS2 instructions but D8400 is not turned on	
	6314	D8420 Baud rate out of range	
	6315	D8420 selects 7-bit data and cannot select no test	
	6340	MODBUS master is not enabled on D8400	Serial port 1
	6341	MODBUS ADPRW slave address error	
	6342	MODBUS ADPRW function code error	
	6343	MODBUS ADPRW instruction length error	
	6344	MODBUS received data validation error	
	6345	The station number and command for receiving data are incorrect	
	6346	Received data timeout	
	6360	D8420 does not enable MODBUS master	Serial port 2
	6361	MODBUS ADPRW slave address error	
	6362	MODBUS ADPRW function code error	
	6363	MODBUS ADPRW instruction length error	
	6364	MODBUS received data validation error	
	6365	The station number and command for receiving data are incorrect	
	6366	Received data timeout	
	6380	Initialization failure	CAN
	6381	The returned slave ID does not match the read ID	
	6382	Receive length error	
	6383	The received data is incomplete	
	6384	The slaves have the same ID	
	6385	Received data timeout	
	6386	The hosts have the same ID	
	6390	Ethernet parameter checking error	ENET Ethernet
	6391	Port initialization failed (see D8406.b8-b15)	
	6392	Ethernet communication timeout	
	6393	IP address conflict	
	6399	Faulty (see D8418 for details)	

	6368	MODBUS TCP server/client function is not enabled or Ethernet function is not enabled	
	6399	ENET faulty (see D8418 for details)	
Parameter error M8064(D8064) Stop of run	0000	Nothing abnormal	
	6401	Error in program and number check	1. Malicious modification or download of the program is not completed; 2, CPU internal program FLASH damage;
	6409	IO function parameters and number test error	IO function parameters download incomplete or FLASH corruption
	6411	Use RD3A/WR3A instructions	This function is not enabled in this model

Syntax errors M8065(D8065) Stop of run	0000	Nothing abnormal	
	6504	Pn or In or high-speed counter label duplication;	
	6505	Component range out of range	
	6506	Unsupported instructions are used	
	6507	Incorrect label used (P63 used)	
	6510	The number size of MC is wrong	
Loop error M8066(D8066) Stop of run	0000	Nothing abnormal	
	6603	The MPS was used more than 12 times	
	6605	1. The number of continuous use of STL is more than 9 times	
		2, the occurrence of RET without using STL	
	6606	1, the main program has I (interrupt) IRET SRET	
		2, there is no IRET SRET in the program	
	6609	Other	
	6614	Less MPS	
	6615	Less MPP	
	6619	FOR~NEXT There are I MC MCR IRET STL RST	
	6623	No MC instruction	
	6625	1. Initialization step out of range (S0-S9)	
		2, the number of STL Sn used is greater than 2	
		3, the STL Sn Sn range is larger than S899	
	6626	There are MC, MCR, SRET, I (interrupt), and IRET in STL	
	6627	There is no RET instruction after STL	
	6630	The CALL SRET relation is incorrect	
Arithmetic error M8067(D8067) Run continue	0000	Nothing abnormal	
	6701	1, CALL, CJ do not have no object	
	6706	Instruction element address or element value range exceeds	
	6710	SFWR (P) instruction element 1 is the same as element 2	
	6711	Analog AD input range setting error	
	6712	Analog DA output range or data setting error	

When there is an error, please use the PLC programming software GX Developer and Diagnosis-PLC diagnosis function on the menu of GX Works2 software to view the PLC error code and program step, and the error code is shown in the special register address.

If you need to reset the ERR lamp, after troubleshooting:

1. Pull the RUN switch to STOP and then pull back to RUN;
2, the main board after the power off ERR lamp and then send electricity;

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