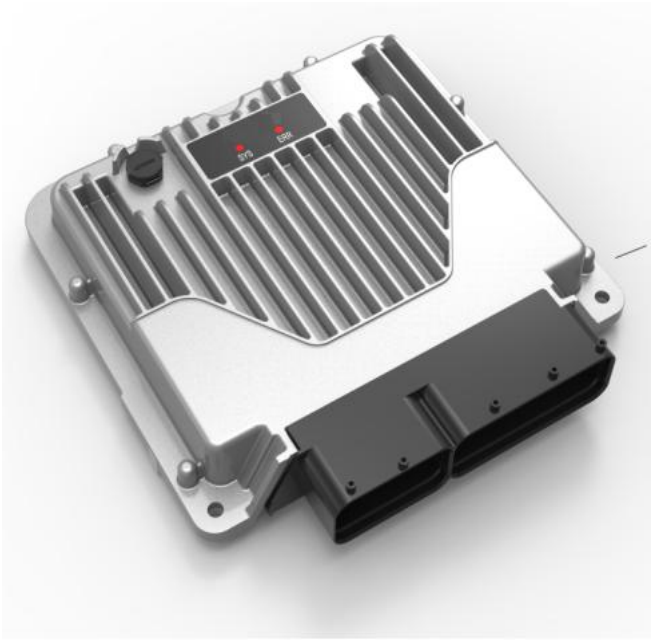
Control System

IMCT7547D



User Manual

Version: Ev4

Document number: 0000168124

Contents

Contents

VERSION OVERVIEW

Version	Date	Release	**Editor**	**Description**
Av1	2019/8/29	N	dyj	Initial Release
Av2	2019/11/5	N	dyj	Add wiring schematic
Av3	2019/11/26	Y	dyj	Modify the outline drawing, add the port diagnostic function, and modify the wiring schematic diagram
Bv1	2020/2/11	N	ldw	recension
Bv2	2020/2/11	Y	ldw	Revise the Statement Description
Cv1	2020/2/21	N	ldw	recension
Cv2	2020/2/21	N	ldw	Revise port parameters and product features
Cv3	2020/2/26	N	ldw	Modify the port detailed parameters and schematic
Cv4	2020/3/11	N	ldw	Modify pin definitions and product briefs
Cv5	2020/3/18	N	zdb	Modify the product code description
Cv6	2020/3/27	N	zdb	Add parameter configuration instructions and product installation over-provisioning
Cv7	2020/3/30	N	zdb	Revise port parameters, modify burn instructions, add port definition serial numbers, and correct status INDICATOR descriptions
Cv8	2020/4/3	Y	zdb	Modify the description of the technical data
Dv1	2020/4/22	N	zdb	recension
Dv2	2020/4/22	Y	zdb	Change the CAN_P to CAN_H and the CAN_N to CAN_L
Ev1	2020/5/27	N	zdb	recension
Ev2	2020/8/25	N	zdb	Add CAN mode to connect the controller, software configuration instructions add device file installation, library file installation, writing controller, IO device configuration, etc., modify the 2M RAM controller order number, and add the plug-in installation diagram
Ev3	2020/12/15	N	zdb	Revise to the plug-in manifest
Ev4	2021/2/24	Y	zdb	Revised port detail parameters

1. Safety instructions

1.1. Copyright

The copyright of this Manual belongs to Xuzhou MooK. According to the Copyright Law, this manual may not be reproduced in any way without the prior written permission of Xuzhou MooK. The Company shall not be liable for any patent infringement resulting from the use of the information contained in this manual.

When making any reproduction of this manual, please comply with copyright laws.

1.2. Preface

For accuracy, this manual has been validated and reviewed. The instructions and descriptions contained in this manual are accurate for the IMCT7547D controller at the time of publication. However, future IMCT7547D controllers and their manuals are subject to change without notice. Xuzhou MOOK does not assume any responsibility for damages caused directly or indirectly due to errors, omissions or discrepancies between the product and the manual.

1.3. Marking of notices

Icon	Meaning	Detailed instructions
	DANGEROUS	It can be predicted to cause unavoidable serious injury, death or property damage
	WARNING	May result in unavoidable serious injury, death or property damage
	NOTE	This may result in minor injuries and losses
	INSTRUCTION	Non-safety-related usage guidance and information
	ANNOTATION	Additional instructions or usage recommendations

2. Introduction

2.1. Overview

The IMCT7547D controller is designed for use under harsh conditions (e.g. extended temperature range, strong vibrations, intense electromagnetic fields etc.). It is suitable for direct installationon mobile machines used under harsh conditions. The input and output channels and their parameters are especially designed to meet these requirements. Integrated hardware and software functions (operating system, firmware etc.) offer a high degree of protection for personnel and machine.

The IMCT7547D controller complies with the IEC 61131 international standard. The aluminium housing is robust and reliable, with excellent thermal conductivity and protection class IP66/67, which is suitable for a variety of harsh industrial environments.

2.2. Product features

- Cast aluminum housing , AMP 154 PIN waterproof connector;
- Low power mode , 380mA@12V, 290mA@24V;
- 300M Hz multi-core processor, faster processing perfomence;
- Nonvolatile storage record operating condition information , easy to trace operation data;
- 122 IO ,4 channels CAN, Have rich control and communication ports
- Fault diagnosis ,such as short-circuit and open- circuit detection
- Parameter checksum and backup , avoid the dangerous working condition under illegal parameter;
- Based on the design and simulation of FloEFD and RAM Command, reasonable layout, more reasonable heat dissipation, and more stable operation in high temperature environment;
- Flexible I/O port, Can be configured by software.

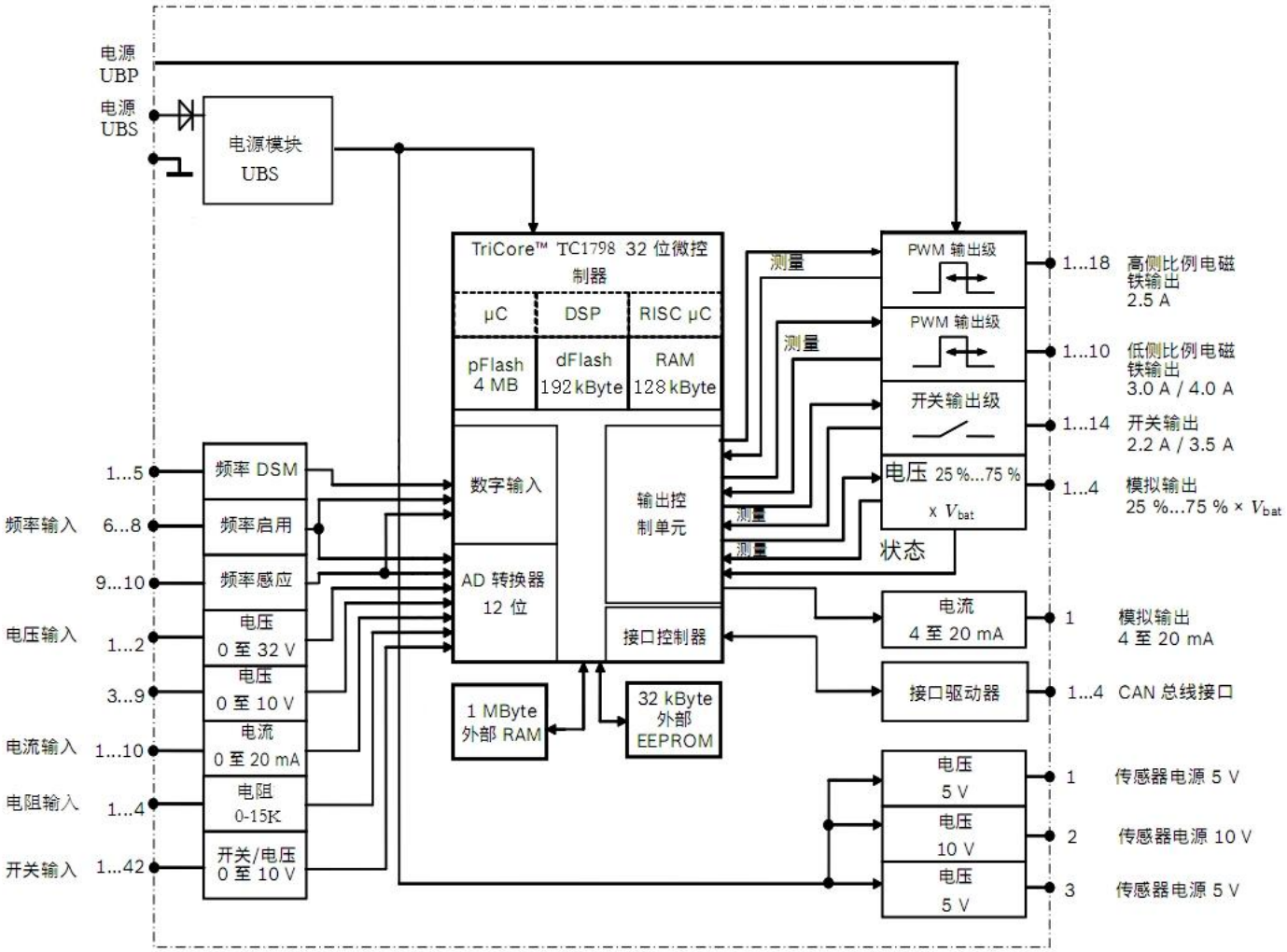
2.3. Technical Data

Technical parameters	
Supply Voltage	8~36V DC , Rated 24V
Operating temperature	-40 up to +85 °C / -40 up to +185 °F
Storage temperature	-40 up to +85 °C / -40 up to +185 °F
Quiescent current	<290mA@24V
Processor	32Bit 300MHz
RAM	1MB RAM or 2MB RAM optional
Flash	1MB RAM:768KB 2MB RAM：1MB
FRAM	32KB FRAM
Status LED	2
Protection Class EN 60529	IP66/67
Test standards	
Low temperature	**Implementation standard: GB/T2423.01/IEC60068-2-1** -40 °C low temperature start test, 10 times, start normal

	-40 °C low temperature working test 16h -40 °C low temperature storage test 72h
High temperature	**Implementation standard: GB/T2423.02/IEC60068-2-2** +85°C high temperature full load working test 16h +85°C high temperature storage test 72h
Temperature shock	**Implementation standard: GB/T2423.22/IEC60068-2-14** Low temperature -40 °C, high temperature 85 °C, high and low temperature conversion time 3min, the number of cycles 10 times
Temperature and humidity cycle	**Implementation standard: GB/T2423.34/IEC60068-2-38** High temperature 65±2 °C, 93±3%; room temperature 25±2 °C, 93±3%; low temperature -10 °C, 24h For one cycle, ten cycles are performed
Vibration	**Implementation standard: GB/T2423.10/IEC60068-2-6 sinusoidal vibration** Vibration (sinusoidal) 30Hz, 4g, vertical 4h, horizontal left and right, front and back 2h, a total of 8h **Implementation standard: GB/T2423.56/IEC60068-2-64 random vibration** 10Hz~20Hz amplitude 3mm 20Hz~2000Hz, peak acceleration 50m/s2, Sweep the frequency 1 oct/min, according to the number of times in the up and down direction, front and back direction, left and right directions of the frequency sweep twice, lasting 24h
Shock	**Implementation standard: GB/T2423.5/IEC60068-2-27** 100g/11ms, half sine wave, three axial 100 times each axially
Drop	**Implementation standard: GB/T2423.8/IEC60068-2-32** Shipping status (packed in bubble bags), drop height 1000mm, 2 times
Salt spray resistance	**Implementation standard: GB/T2423.17/IEC60068-2-11** In the 35 °C, 5% sodium chloride salt spray environment, the 96h test is carried out without electricity, and the shell, connectors and other parts have no rust after the test, and the test voltage works normally
EMC	**IN 61000-6-2:2005;EN 61000-6-4: 2011;** **ISO7637 immunity; ISO11452 immunity; ISO16750 immunity**

	**WARNING** When the equipment is going to be welded, unplug all the controller's connectors!

2.4. block diagram


电源
UBP
电源
UBS
电源模块
UBS
TriCore™ TC1798 32 位微控制器
µC
DSP
RISC µC
pFlash
4 MB
dFlash
192 kByte
RAM
128 kByte
数字输入
AD 转换器
12 位
输出控制单元
接口控制器
1 MByte
外部 RAM
32 kByte
外部
EEPROM
测量
测量
测量
测量
PWM 输出级
PWM 输出级
开关输出级
电压 25 %...75 %
x V_{bat}
状态
电流
4 至 20 mA
接口驱动器
电压
5 V
电压
10 V
电压
5 V
1...18 高侧比例电磁铁输出
2.5 A
1...10 低侧比例电磁铁输出
3.0 A / 4.0 A
1...14 开关输出
2.2 A / 3.5 A
1...4 模拟输出
25 %...75 % × V_{bat}
1 模拟输出
4 至 20 mA
1...4 CAN 总线接口
1 传感器电源 5 V
2 传感器电源 10 V
3 传感器电源 5 V
1...5 频率 DSM
频率输入 6...8 频率启用
9...10 频率感应
电压输入 1...2 电压
0 至 32 V
3...9 电压
0 至 10 V
电流输入 1...10 电流
0 至 20 mA
电阻输入 1...4 电阻
0-15K
开关输入 1...42 开关/电压
0 至 10 V

2.5. Order number

serial No.	Order number	product name	Product model	remark
1	225636	controller	IMCT7547D	1MB SRAM
2	230205	controller	IMCT7547D	2MB SRAM

2.6. Product code description

IMC T7547 D

Product code
IMC: Controller

Platform code
T: 32-bit Tricore platform

Enter the number of ports
75: 75 input ports

The number of output ports
47: 47 output ports

Security schema code
D: diagnostic function

3. I/O Types

3.1. Overriew

To enhance application flexibility, the IMCT7547D controller has an AMP 154 - pin waterproof connector with a great variety of I/O Types.

I/O Types overall are:

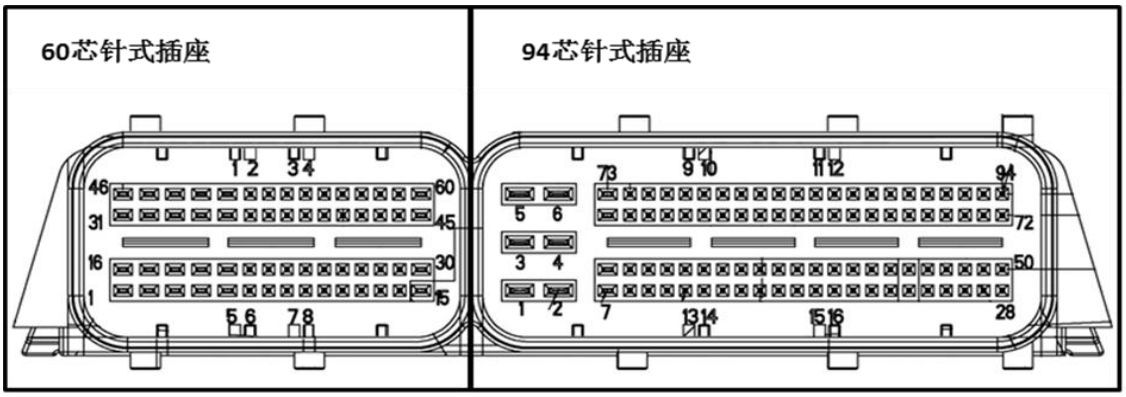
- Reusable and Configurable
- Diagnostics capable

I/O Type	Number of ports	Function	Use as (I/O Type)
DIH / DIL / VI	42	**DIH**	DI DIAG Positive Logic with DIAG
		DIL	DI DIAG Negative Logic with DIAG
		VI	0~10V Analog Voltage Input with DIAG
VI / DIH	7	**VI**	0~10V Analog Voltage Input with DIAG
		DIH	DI Positive Logic with DIAG
VI / DIH	2	**VI**	AI 0~36V Input with DIAG
		DIH	DI DIAG Positive Logic
CI/ VI / DIH	10	**CI**	0~25 mA current Input;
		VI	AI 0~10V Input with DIAG
		DIH	DI DIAG Positive Logic with DIAG
RI / VI / DIL	4	**RI**	AI 10 Ω~2000Ω Input with DIAG
		VI	AI 0~5V Input with DIAG
		DIL	DI DIAG Negative Logic with DIAG
PI / DIL	8	**PI**	1Hz~10000Hz digital inputs Input
		DIL	DI DIAG Negative Logic
PI / DIH / AI	2	**PI**	1Hz~10000Hz digital inputs Input
		DIH	DI DIAG Positive Logic
		VI	AI 0~36V Input with DIAG
Output port	**The number of ports**	**Function**	Use as (I/O Type)
AO C / AO V DIAG	1	**AO C**	4mA~20mA analog output signal with DIAG
		AO V	0.1V~5V analog output signal with DIAG
AO V DIAG	4	**AO V**	0 to 90% UBP analog output signal with DIAG
PWM / DOH DIAG	18	**PWM**	2.5A High-Side PWM outputs with current control with DIAG
		DOH	High-Side Digital Output
PWM / DOL DIAG	8	**PWM**	3A Low -Side PWM outputs with current control, 50~1000Hz
		DOL	Low-Side Digital Output
PWM / DOL	2	**PWM**	4A Low -Side PWM outputs with current control, 50~1000Hz

		DOL	Low-Side Digital Output
DOH	10	**DOH**	2.2A High-Side Digital Output
DOH	4	**DOH**	3.5A High-Side Digital Output

3.2. Connector and Pins

Figure on the current page shows the connector of IMCT7547D, which has 154 pins and which is divided into two segments.



Main connector

3.2.1. Connector 1 (60 pin)

Connector Pin No	Port Pin No.	Port Function	Main Function	Alternative Function 1	Alternative Function 2
1	P101	PGND	Power ground		
2	P102	PGND	Power ground		
3	P103	PGND	Power ground		
4	P104	+5V OUT	5V reference supply		
5	P105	+10V OUT	10V reference supply		
6	P106	AO1	Analog output, 0~90% UBP		
7	P107	AO2	Analog output 0~90% UBP		
8	P108	+5V OUT	5V reference supply		
9	P109	AI1	AI 0~36V	DIH	
10	P110	AI2	AI 0~36V	DIH	
11	P111	AI3	AI 0~10V	DIH	
12	P112	AO3	AO, 0~90% UBP		
13	P113	PWM18	HS PWM 2.5A	HS DO 2.5A	
14	P114	PWM3	HS PWM 2.5A	HS DO 2.5A	
15	P115	PWM4	HS PWM 2.5A	HS DO 2.5A	
16	P116	PGND	Power ground		
17	P117	CAN2_L	CAN 2 Low		
18	P118	CAN2_H	CAN 2 High		
19	P119	AI4	AI 0~10V	DIH	
20	P120	AI5	AI 0~10V	DIH	
21	P121	AI6	AI 0~10V	DIH	
22	P122	AI7	AI 0~10V	DIH	
23	P123	AI8	AI 0~10V	DIH	
24	P124	AI9	AI 0~10V	DIH t	
25	P125	AI10	AI 0~25 mA	AI 0~10V	DIH
26	P126	AI11	AI 0~25 mA	AI 0~10V	DIH
27	P127	AI12	AI 0~25 mA	AI 0~10V	DIH
28	P128	AI13	AI 0~25 mA	AI 0~10V	DIH

29	P129	AI14	AI 0~25 mA	AI 0~10V	DIH Digital Input
30	P130	PWM22	LS PWM 3A	LS DO 3A	
31	P131	AO4	AO 0~90% UBP		
32	P132	AO5	AO 4~20mA	AO 0~5V	
33	P133	AI15	AI 0~25 mA	AI 0~10V	DIH
34	P134	AI16	AI 0~25 mA	AI 0~10V	DIH
35	P135	AI17	AI 0~25 mA	AI 0~10V	DIH
36	P136	AI18	AI 0~25 mA	AI 0~10V	DIH
37	P137	AI19	AI 0~25 mA	AI 0~10V	DIH
38	P138	AI20	AI 0~50K	AI 0~5V	DIL
39	P139	AI21	AI 0~50K	AI 0~5V	DIL
40	P140	AI22	AI 0~50K	AI 0~5V	DIL
41	P141	AI23	AI 0~50K	AI 0~5V	DIL
42	P142	RXD	RS232 RXD		
43	P143	TXD	RS232 TXD		
44	P144	PWM5	HS PWM 2.5A	HS DO 2.5A	
45	P145	PWM6	HS PWM 2.5A	HS DO 2.5A	
46	P146	AGND	Analog Ground		
47	P147	PWM7	HS PWM 2.5A	HS DO 2.5A	
48	P148	PWM8	HS PWM 2.5A	HS DO 2.5A	
49	P149	PWM9	HS PWM 2.5A	HS DO 2.5A	
50	P150	PWM10	HS PWM 2.5A	HS DO 2.5A	
51	P151	PWM11	HS PWM 2.5A	HS DO 2.5A	
52	P152	PWM12	HS PWM 2.5A	HS DO 2.5A	
53	P153	PWM13	HS PWM 2.5A	HS DO 2.5A	
54	P154	PWM14	HS PWM 2.5A	HS DO 2.5A	
55	P155	PWM15	HS PWM 2.5A	HS DO 2.5A	
56	P156	PWM16	HS PWM 2.5A	HS DO 2.5A	
57	P157	PI7	Pulse input, 1Hz~15KHz	DIL	
58	P158	PI8	Pulse input, 1Hz~15KHz	DIL	
59	P159	AGND	Analog Ground		
60	P160	PWM17	HS PWM 2.5A	HS DO 2.5A	

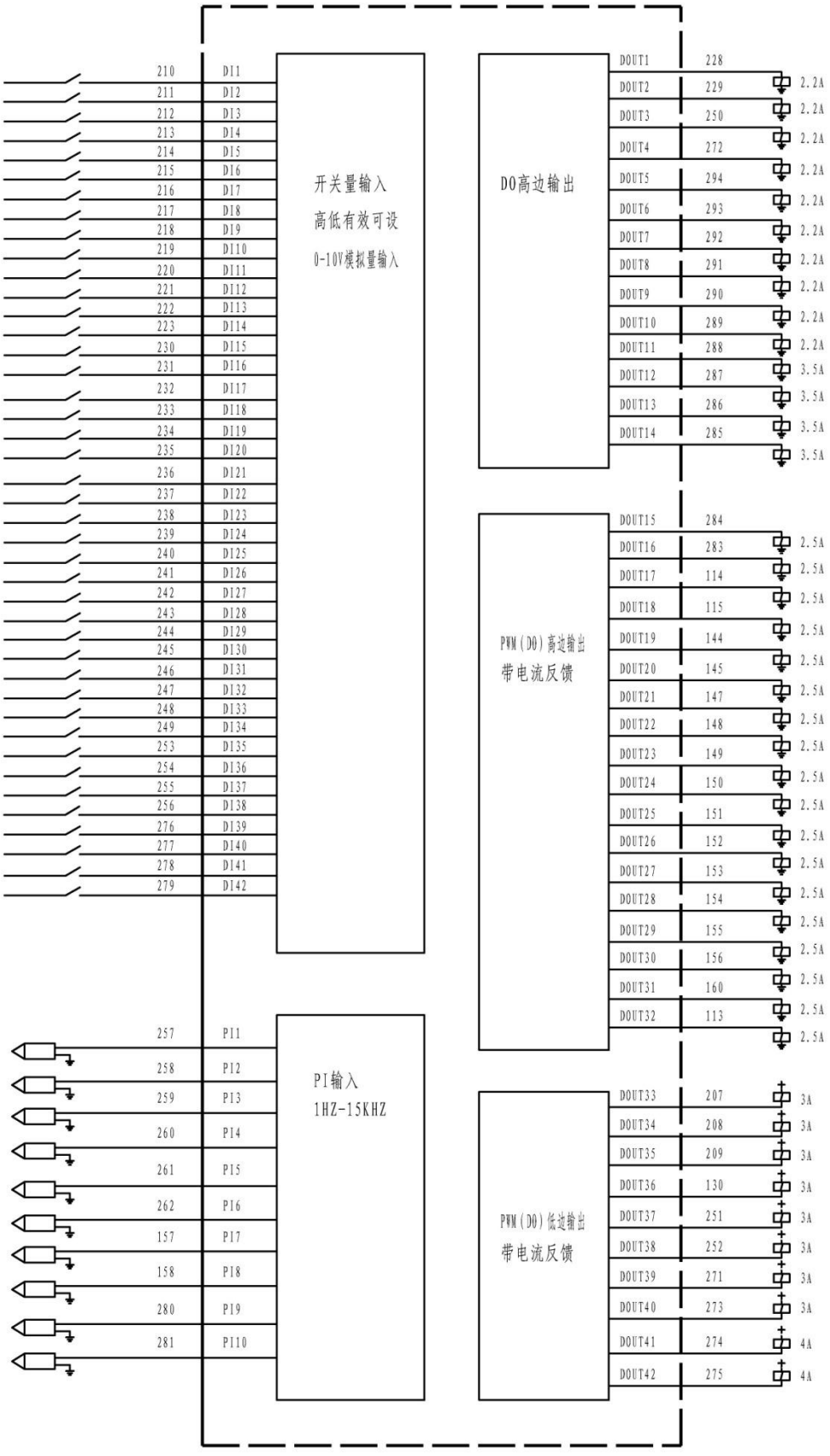
3.2.2. Connector 2 (90 pin)

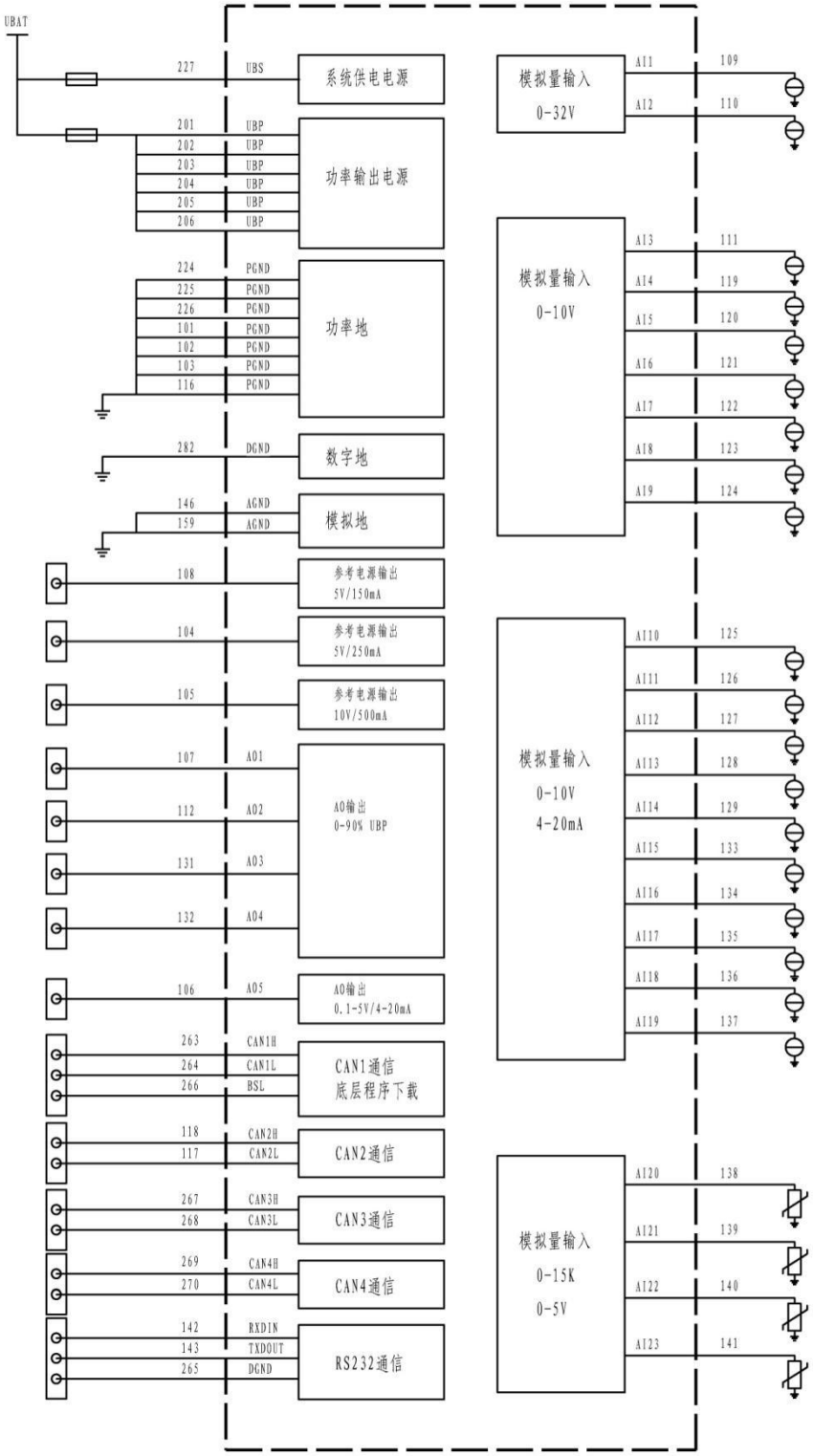
Connector Pin No	Port Pin No.	Port Function	Main Function	Alternative Function 1	Alternative Function 2
1	P201	UBP	Power supply, max 5A		
2	P202	UBP	Power supply, max 5A		
3	P203	UBP	Power supply, max 5A		
4	P204	UBP	Power supply, max 5A		
5	P205	UBP	Power supply, max 5A		
6	P206	UBP	Power supply, max 5A		
7	P207	PWM19	LS PWM 3A	DOL 3A	
8	P208	PWM20	LS PWM 3A	DOL 3A	
9	P209	PWM21	LS PWM 3A	DOL 3A	
10	P210	DI1	DIH, 0~36V	DIL,0~36V	AI 0~10V
11	P211	DI2	DIH, 0~36V;	DIL,0~36V	AI 0~10V
12	P212	DI3	DIH, 0~36V;	DIL,0~36V	AI 0~10V
13	P213	DI4	DIH, 0~36V;	DIL,0~36V	AI 0~10V
14	P214	DI5	DIH, 0~36V;	DIL,0~36V	AI 0~10V
15	P215	DI6	DIH, 0~36V;	DIL,0~36V	AI 0~10V
16	P216	DI7	DIH, 0~36V;	DIL,0~36V	AI 0~10V
17	P217	DI8	DIH, 0~36V;	DIL,0~36V	AI 0~10V
18	P218	DI9	DIH, 0~36V;	DIL,0~36V	AI 0~10V

19	P219	DI10	DIH, 0~36V;	DIL,0~36V	AI 0~10V
20	P220	DI11	DIH, 0~36V;	DIL,0~36V	AI 0~10V
21	P221	DI12	DIH, 0~36V;	DIL,0~36V	AI 0~10V
22	P222	DI13	DIH, 0~36V;	DIL,0~36V	AI 0~10V
23	P223	DI14	DIH, 0~36V;	DIL,0~36V	AI 0~10V
24	P224	PGND	Power Ground		
25	P225	PGND	Power Ground		
26	P226	PGND	Power Ground		
27	P227	UBS	System supply, max 5A		
28	P228	DO1	HS DO 2.2A		
29	P229	DO2	HS DO 2.2A		
30	P230	DI15	DIH, 0~36V;	DIL,0~36V	AI 0~10V
31	P231	DI16	DIH, 0~36V;	DIL,0~36V	AI 0~10V
32	P232	DI17	DIH, 0~36V;	DIL,0~36V	AI 0~10V
33	P233	DI18	DIH, 0~36V;	DIL,0~36V	AI 0~10V
34	P234	DI19	DIH, 0~36V;	DIL,0~36V	AI 0~10V
35	P235	DI20	DIH, 0~36V;	DIL,0~36V	AI 0~10V
36	P236	DI21	DIH, 0~36V;	DIL,0~36V	AI 0~10V
37	P237	DI22	DIH, 0~36V;	DIL,0~36V	AI 0~10V
38	P238	DI23	DIH, 0~36V;	DIL,0~36V	AI 0~10V
39	P239	DI24	DIH, 0~36V;	DIL,0~36V	AI 0~10V
40	P240	DI25	DIH, 0~36V;	DIL,0~36V	AI 0~10V
41	P241	DI26	DIH, 0~36V;	DIL,0~36V	AI 0~10V
42	P242	DI27	DIH, 0~36V;	DIL,0~36V	AI 0~10V
43	P243	DI28	DIH, 0~36V;	DIL,0~36V	AI 0~10V
44	P244	DI29	DIH, 0~36V;	DIL,0~36V	AI 0~10V
45	P245	DI30	DIH, 0~36V;	DIL,0~36V	AI 0~10V
46	P246	DI31	DIH, 0~36V;	DIL,0~36V	AI 0~10V
47	P247	DI32	DIH, 0~36V;	DIL,0~36V	AI 0~10V
48	P248	DI33	DIH, 0~36V;	DIL,0~36V	AI 0~10V
49	P249	DI34	DIH, 0~36V;	DIL,0~36V	AI 0~10V
50	P250	DO3	HS DO 2.2A		
51	P251	PWM23	LS PWM 3A	DOL 3A	
52	P252	PWM24	LS PWM 3A	DOL 3A	
53	P253	DI35	DIH, 0~36V;	DIL 0~36V	AI 0~10V
54	P254	DI36	DIH, 0~36V;	DIL 0~36V	AI 0~10V
55	P255	DI37	DIH, 0~36V;	DIL 0~36V	AI 0~10V
56	P256	DI38	DIH, 0~36V;	DIL 0~36V	AI 0~10V
57	P257	PI1	PI 1Hz~15KHz	DIH 0~36V	AI 0~36V
58	P258	PI2	PI 1Hz~15KHz	DIH 0~36V	AI 0~36V
59	P259	PI3	PI, 1HZ~15KHZ	DIL 0~36V	
60	P260	PI4	PI, 1HZ~15KHZ	DIL 0~36V	
61	P261	PI5	PI, 1HZ~15KHZ	DIL 0~36V	
62	P262	PI6	PI, 1HZ~15KHZ	DIL 0~36V	
63	P263	CAN1_H	CAN 1 Low		
64	P264	CAN1_L	CAN 1 High		
65	P265	DGND	Digital Ground		
66	P266	BSL	Bootloader select Line		
67	P267	CAN3_H	CAN 3 Low		
68	P268	CAN3_L	CAN 4 High		
69	P269	CAN4_H	CAN 4 Low		
70	P270	CAN4_L	CAN 4 High		
71	P271	PWM25	LS PWM 3A	DOL 3A	
72	P272	DO4	HS DO 2.2A		

73	P273	PWM26	LS PWM 3A	DOL 3A	
74	P274	PWM27	LS PWM 4A	DOL 4A	
75	P275	PWM28	LS PWM 4A	DOL 4A	
76	P276	DI39	DIH 0~36V;	DIL 0~36V	AI 0~10V
77	P277	DI40	DIH 0~36V;	DIL 0~36V	AI 0~10V
78	P278	DI41	DIH 0~36V;	DIL 0~36V	AI 0~10V
79	P279	DI42	DIH 0~36V;	DIL 0~36V	AI 0~10V
80	P280	PI9	PI, 1HZ~15KHZ	DIL 0~36V	
81	P281	PI10	PI, 1HZ~15KHZ	DIL 0~36V	
82	P282	DGND	Digital Ground		
83	P283	PWM2	HS PWM 2.5A	HS DO 2.5A	
84	P284	PWM1	HS PWM 2.5A	HS DO 2.5A	
85	P285	DO14	HS DO 3.5A		
86	P286	DO13	HS DO 3.5A		
87	P287	DO12	HS DO 3.5A		
88	P288	DO11	HS DO 3.5A		
89	P289	DO10	HS DO 2.2A		
90	P290	DO9	HS DO 2.2A		
91	P291	DO8	HS DO 2.2A		
92	P292	DO7	HS DO 2.2A		
93	P293	DO6	HS DO 2.2A		
94	P294	DO5	HS DO 2.2A		

3.3. Schematic Diagram





- Fuse Selection Instructions:

For cable harness protection, Please choose the right fuse according to the I/O usage! The controller has a rated output current of 30A, and a fuse of less than or equal to 30A should be selected. The fuse calculation formula is:

Fuse rated current = (Number of 2.5A PWM * 2.5A + Number of 3A PWM r * 3A + Number of 4A PWM * 4A + Number of 2.2A DO * 2.2A t + Number of 3.5A DO * 3.5A) ×K.

K is the current coefficient, the range: 1.5 ~ 2.5.

3.4. Mating Connector

3.4.1. Mating Connector 60-positions

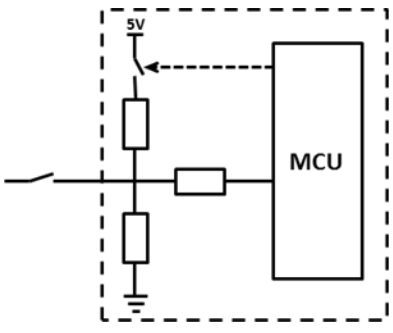
serial number	The management number	Description	quantity
1	510436	60-pin hole plug, 2209544-9	1
2	510430	60-pin outer shell, 2137753-1	1
3	510431	Secondary lock, 6-1355118-1	1
4	510437	Wrench, 2137752-1	1
5	509285	Hole terminal, 1241608-1	24
6	509284	Hole terminal, 968221-1	36

3.4.2. Mating Connector 96-positions

serial number	The management number	Description	quantity
1	510435	94-pin hole plug, 2209545-9	1
2	510434	94-pin outer shell, 2137755-1	1
3	510433	94-pin lock, 6-1355134-1	1
4	510432	94-pin lock, 6-1355135-1	1
5	510437	Wrench, 2137752-1	1
6	509284	Hole terminal, 1241394-1	6
7	509285	Hole terminal, 1241608-1	4
8	508984	Hole terminal, 968221-1	84
9	509289	Waterproof connector, 828905-1	6
10	509288	Blind blocking, 828922-1	up to 6

3.5. Specification of Inputs and Outputs

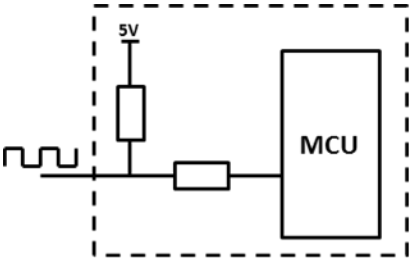
3.5.1. Digital input

DIH/DIL/VI	Functional description
Pin Position	94- Pin Connector : 210~223,230~249、253~256、276~279
DIH/DIL/VI Diagram	
Work mode	The inputs can be individually configured by software with a pull-up/pull-down resistor to adapt them to different sensor types, Them can be configured to 3 different operation modes individually by software. Function 1: DIH 0-36V , default . Integrated Pull-down resistor for PNP sensor Function 2: DIL 0-36V，Integrated Pull-up resistor for NPN sensor Function 3: AI 0-10V
Impedance	DIH/VI: 10.6K Ω resistance to Ground

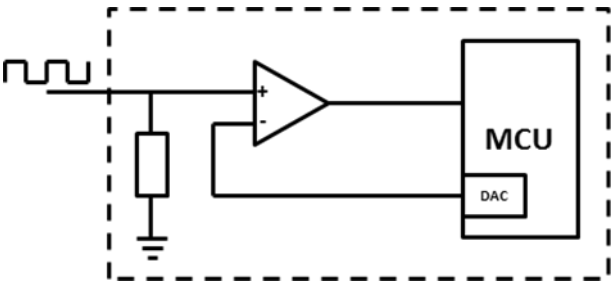
	DIL: 27K Ω resistance to power supply
Maximum voltage	36 V
Threshold Voltage	High level: Vin > 2 V Low level: Vin < 0.7 V
Voltage Tolerance	2000V，1.2/50us
I/O Diagnostics	When used as AI (0~10V), the following diagnostic functions are implemented: short circuit to ground: Vin < 0.5V normal operation: 0.5V~9.5V short circuit to the power supply.: Vin > 9.5V

3.5.2. Pulse input

1 PI/ DIL

PI/DIL	parameter
Pin Position	60- Pin Connector: 157, 158; 94- Pin Connector: 259~262, 280, 281
PI Diagram	
Work mode	The inputs can be configured to 2 different operation modes individually by software. Function 1: PI, default . Integrated Pull- up resistor Function 2: DIL, Integrated Pull-up resistor
Threshold voltage	High level: Vin > 4V Low level: Vin < 1 V It can be configured individually by software
impedance	67.5KΩ, Pull up to 5V
Frequency range	1Hz~10000Hz
Maximum voltage	36 V
Dual pulse input	PI3 and PI4 can be configured as a dual pulse input port; PI5 and PI6 can be configured as a dual pulse input port

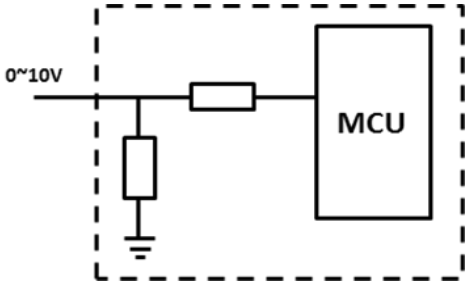
1 PI/DIH/VI

PI/DIH/VI	parameter
Pin Position	94- Pin Connector: 257, 258
PI/DIH/VI Diagram	
Work mode	The default is PI, which also can be reused as DIL or AI (0~36V) by software. The inputs can be configured to 3 different operation modes individually by software. Function 1: PI, Integrated Pull-down resistor , default

	Function 2: DIH 0-36V, Integrated Pull- down resistor Function 3: AI 0-36V
Threshold voltage	High level: Vin > 2 V Low level: Vin < 0.7 V Threshold voltage can be configured by software
impedance	37.8K Ω, Pull down to GND
Frequency range	1Hz~10000Hz
Maximum voltage	36 V
Port diagnostics	When used as AI (0~36V), the following diagnostic functions are implemented: short circuit to ground: Vin < 0.5V normal operation: 0.5V~9.5V short circuit to the power supply: Vin > 9.5V
Dual pulse input	PI1 and PI2 can be configured as a dual pulse input port

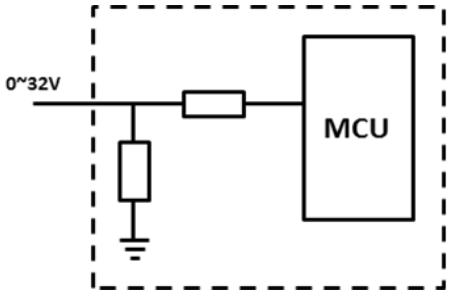
3.5.3. Analog Inputs

3 VI / DIH

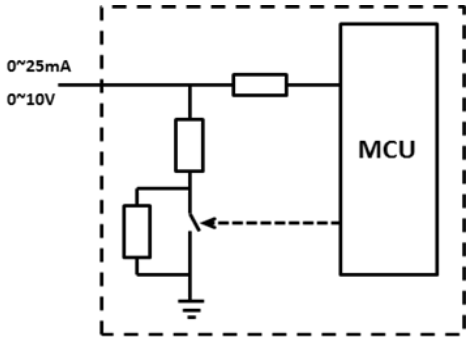
VI / DIH	**parameter**
Pin Position	60- Pin Connector: 111, 119~124
VI / DIH Diagram	
Work mode	Multipurpose analog inputs with 12-bit resolution, The inputs can be configured to 2 different operation modes individually by software. Function 1: VI 0-10V, Integrated Pull-down resistor , default Function 2: DIH, Integrated Pull- down resistor
Signal range	0~10V
Maximum voltage	36V
impedance	28.5KΩ
resolution	12bit
Threshold voltage	When used as DIH, Vin> 4V is judged to be valid, and the Threshold voltage also can be configured by software
Port diagnostics	When used as AI (0~10V), the following diagnostic functions are implemented: short circuit to ground: Vin < 0.5V normal operation: 0.5V~9.5V short circuit to the power supply.: Vin > 9.5V

3 VI(0~36V)/ DIH:

VI(0~36V)/ DIH	**parameter**
Pin Position	60- Pin Connector: 109, 110

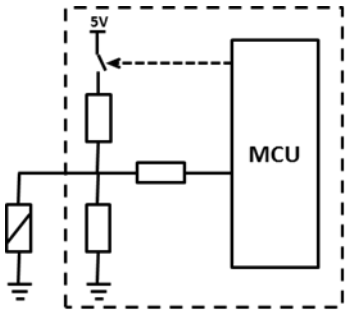
VI(0~36V) / DIH Diagram	
Work mode	The default is VI (0~36V), which can be reused as DIH by software.
Signal range	0~36V
Maximum voltage	36V
impedance	78.5KΩ
resolution	12bit
Threshold voltage	When used as DIH, Vin> 4V is judged to be valid, and It also can be configured by software
Port diagnostics	When used as AI (0~36V), Vin < 0.5V is short circuit to ground,so this port is mainly used to monitor the battery voltage.

- CI/VI/DIH:

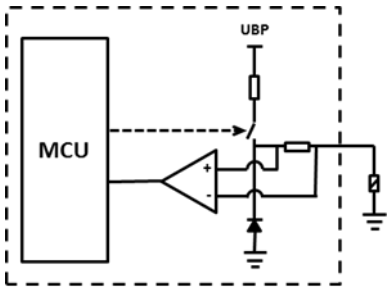
CI/VI/DIH	**parameter**
Pin Position	60-pin connector: 125~129,133~137
CI/VI/DIH Diagram	
Work mode	The default is CI (0-25mA), which can be reused as VI (0~10V) or DIH by software.
Signal range	0~25mA
Maximum voltage	36V
impedance	CI：200Ω；VI：100.2KΩ；DIH：100.2KΩ
resolution	12bit
Threshold voltage	When used as DIH, Vin> 4V is judged to be valid, and It also can be configured by software
Port diagnostics	When used as CI, the following diagnostic functions are implemented. Short circuit to ground: 0~4mA Normal work: 4~20mA Short circuit to power supply: 20~25mA
	When used as AI (0~10V), the following diagnostic functions are implemented. short circuit to ground: Vin < 0.5V normal operation: 0.5V~9.5V short circuit to the power supply.: Vin > 9.5V

- RI/VI/DIL:

RI/VI/DIL	**parameter**
Pin Position	60-pin connector : 138~141

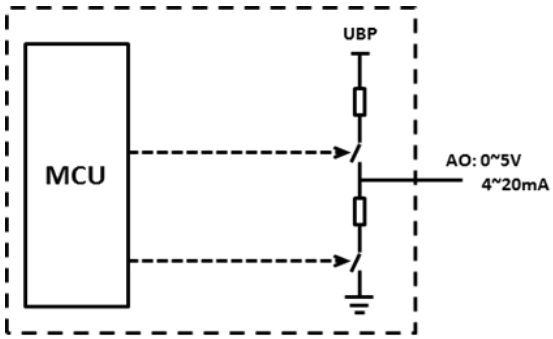
RI/VI/DIL Diagram	
Work mode	The default is RI, which can be reused as VI (0~5V) or DIH by software.
Signal range	0Ω~50KΩ
Maximum voltage	36V
impedance	RI: 499 Ω pull-up resistor, 100K Ω pull-down resistor VI: 100K Ω to the ground DIL: 499 Ω power supply
resolution	12bit
precision	0~2KΩ：±2%FS 2KΩ~15KΩ：±5%FS 15KΩ~50KΩ：±10%FS
Threshold voltage	When used as DIL, Vin < 2V is judged to be low, It also can be configured by software
Port diagnostics	When used as VI (0~5V), the following diagnostic are implemented. short circuit to ground: Vin < 0.5V normal operation: 0.5V~4.5V short circuit to the power supply.: Vin > 4.5V

3.5.4. Digital Output

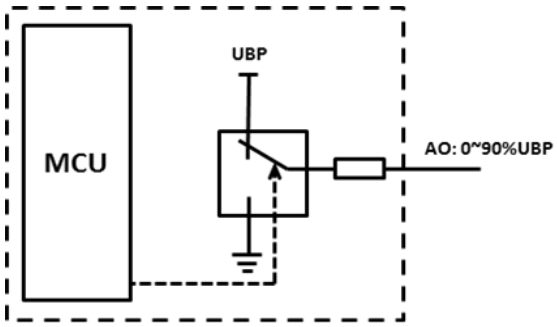
DOH	parameter
Pin Position	94- Pin Connector: 2.2A output: 228, 229, 250, 272, 289 ~ 294; 3.5A output: 285~288
DOH Diagram	
Drive Capability	2.2A output : 2.2A 3.5A output : 3.5A
Free-wheel diode	Internal intergration
Float voltage	< 10V , it can be pulled down to <0.5V by a less than 10K Ω resistance load
Voltage tolerance	600V，1.2/50uS
Port diagnostics	1. Short-circuit to ground 2. Short-circuit to power supply 3. load exceeding limit (3A, 30s) 4. Short-circuit.

- **Analog output**
- AO (4~20mA or 0~5V)：

AO	parameter

(4~20mA or 0~5V)	
Pin Position	60-pin connector: 132
AO Diagram	
Work mode	0.1V to 5V output voltage signal or 4mA to 20mA output current signal
Port diagnostics	1. Short circuit to power supply 2. Short circuit to ground 3. Output voltage deviation of more than 5%.

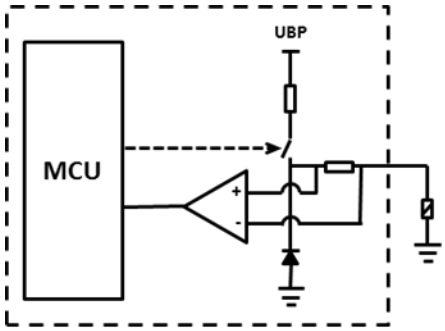
➢ AO（0~90%UBP）：

AO (0~90%UBP)	parameter
Pin Position	60-pin connector: 106, 107, 112, 131
AO Diagram	
Work mode	0~90% UBP output signal
Port diagnostics	1. Short circuit to power supply 2. Short circuit to ground 3. the output voltage deviates by more than 5%, because the output impedance of the module is 40KΩ with feedback circuit, so the driver load needs to be greater than 1M Ω

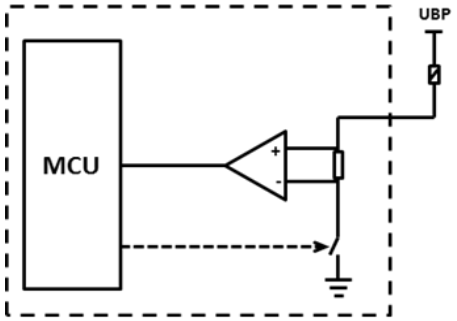
3.5.5. PWM

3 PWM 2.5A/DOH

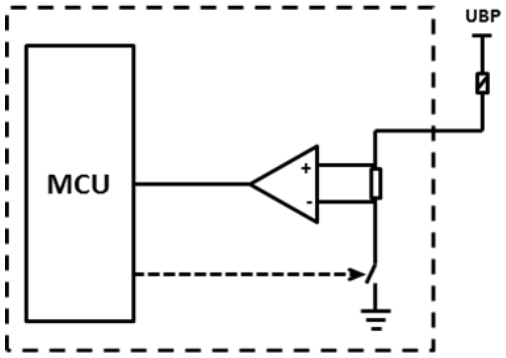
PWM 2.5A/DOH	parameter
Pin Position	60- Pin Connector: 113~115、144、145、147~156、160; 94- Pin Connector: 283, 284

PWM 2.5A/DOH Diagram	
Work mode	The default is PWM , which can be reused as DOH
Drive capability	2.5A
Current feedback range	50~2000mA
Duty cycle	0 ~ 100%, adjustable
Frequency range	50~1000Hz
Current sampling accuracy	1.5% FS
Float voltage	< 10V, it can be pulled down to <0.5V by a less than 10K Ω load
Port diagnostics	1. Short-circuit to ground 2. Short-circuit to power supply 3. load exceeding limit (2.5A, 30s)

3 PWM 3A/DOL

PWM 3A/DOL	parameter
Pin Position	60- Pin Connector: 130; 94- Pin Connector: 207~209, 251, 252, 271, 273
PWM 3A/ DOL Diagram	
Work mode	The default is PWM , which can be reused as DOL
Drive capability	3A
Current feedback range	50~2000mA
Duty cycle	0 ~ 100%, adjustable
Frequency range	50~1000Hz
Current sampling accuracy	1.5% FS
Float voltage	< 10V, it can be pulled down to <0.5V by a less than 10K Ω load
Port diagnostics	1. Short-circuit to ground 2. Short-circuit to power supply 3. load exceeding limit (3A, 30s) 4. Short-circuit.

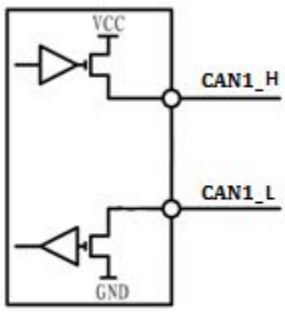
3 PWM 4A/DOL：

PWM 4A/DOL	parameter
Pin Position	94- Pin Connector: 274, 275
PWM 4A/ DOL Diagram	
Work mode	The default is PWM , which can be reused as DOL
Drive capability	4A
Current feedback range	50~2000mA
Duty cycle	0 ~ 100%, adjustable
Frequency range	50~1000Hz
Current sampling accuracy	1.5% FS
Float voltage	< 10V, it can be pulled down to <0.5V by a less than 10K Ω load
Port diagnostics	1. Short-circuit to ground 2. Short-circuit to power supply 3. load exceeding limit (4A, 30s) 4. Short-circuit.

3.6. Communication port

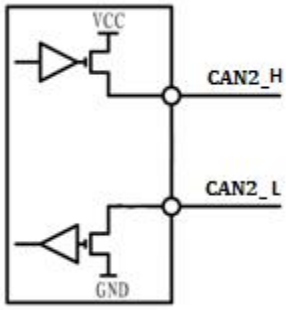
CAN is a bidirectional twisted pair bus. Needs termination with 120 Ω in 2-control units, whereas the others remain unterminated.
Termination must be fit at the ends of the bus line to prevent wave reflection. Termination is necessary to enter the recessive state.
Note: A common ground (chassis) or a proper ground connection is necessary for CAN operation. In case of connecting with an external device (e.g. PC with CAN-interface for downloading software)please make sure that the maximum voltage ratings are not violated when connecting to or disconnecting from the CAN bus.
The CAN interface is fully ISO 11898-2/-5 compliant.

3.6.1. CAN1

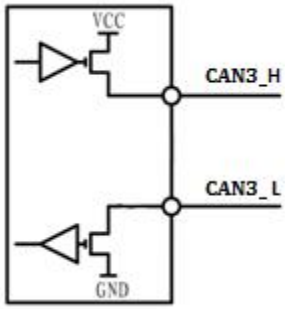
CAN1	parameter
Pin Position	94- Pin Connector: 263, 264
CAN Diagram	

Baud rate range	50K、100K、125K、250K、500K and up to 1Mbit/s.
default baud rate	250Kbit/s
Port protection	protection functions1:CAN Line short-circuit to UB protection functions2: CAN Line short-circuit to GND.
Terminal resistance	No built-in terminal resistance

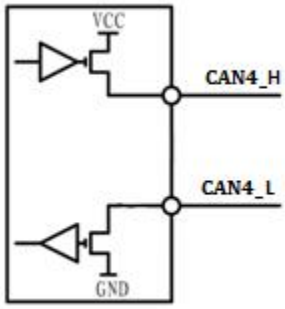
3.6.2. CAN2

CAN2	parameter
Pin Position	60-pin connector: 117, 118;
CAN Diagram	
Baud rate range	50K、100K、125K、250K、500K and up to 1Mbit/s.
default baud rate	250Kbit/s
Port protection	protection functions1:CAN Line short-circuit to UB protection functions2: CAN Line short-circuit to GND.
Terminal resistance	No built-in terminal resistance

3.6.3. CAN3

CAN3	parameter
Pin Position	94-pin connector: 267, 268
CAN Diagram	
Baud rate range	50K、100K、125K、250K、500K and up to 1Mbit/s.
default baud rate	250Kbit/s
Port protection	protection functions1:CAN Line short-circuit to UB protection functions2: CAN Line short-circuit to GND.
Terminal resistance	No built-in terminal resistance

3.6.4. CAN4

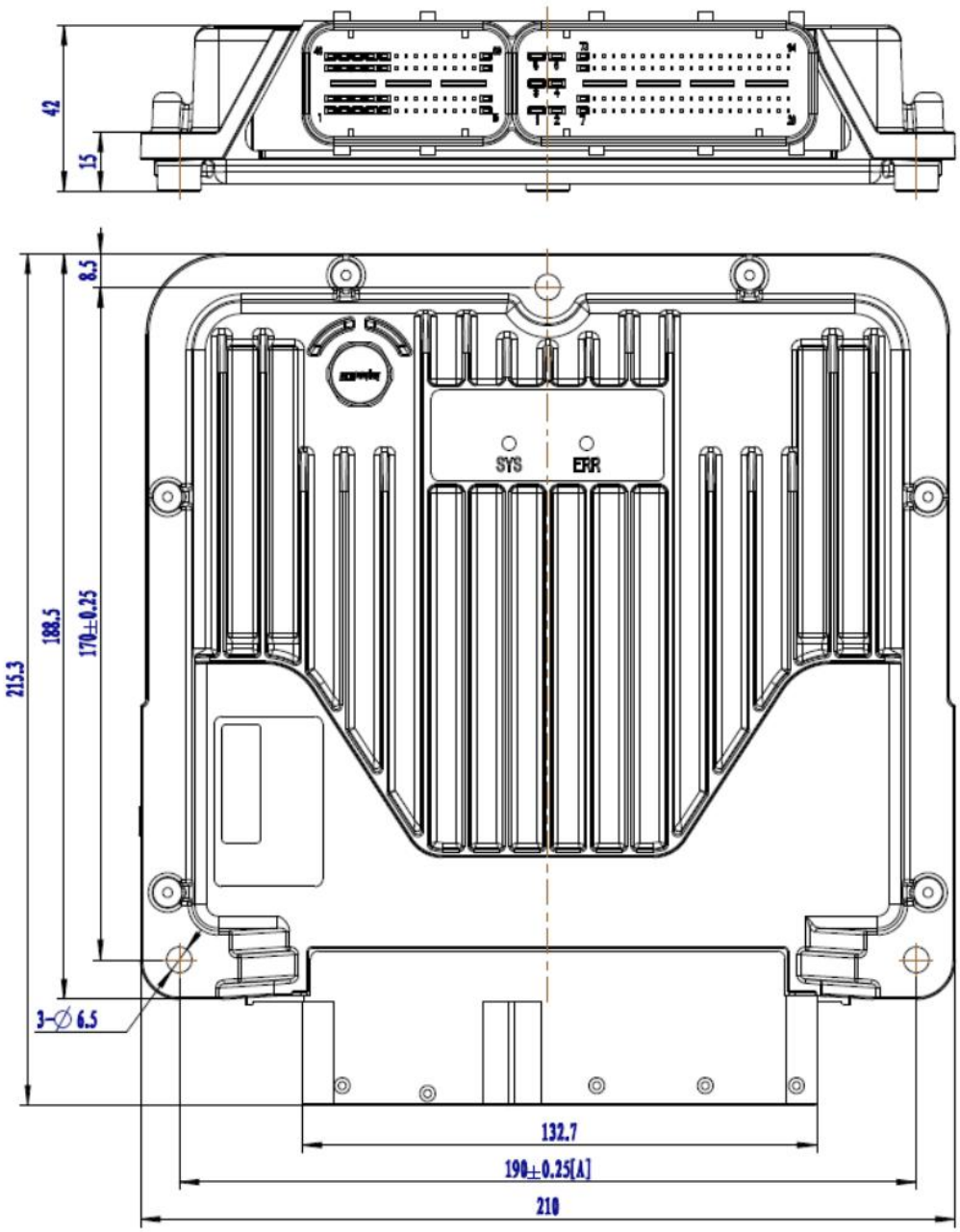
CAN4	parameter
Pin Position	94-pin connector : 269, 270
CAN Diagram	
Baud rate range	50K、100K、125K、250K、500K and up to 1Mbit/s.
default baud rate	250Kbit/s
Port protection	protection functions1:CAN Line short-circuit to UB protection functions2: CAN Line short-circuit to GND.
Terminal resistance	No built-in terminal resistance

4. Installation instructions

4.1. Pre-Installation Check

	**INSTRUCTION** Before installation, please check whether the power supply and wiring are completely corresponding, and whether the product status is intact and without bumps.

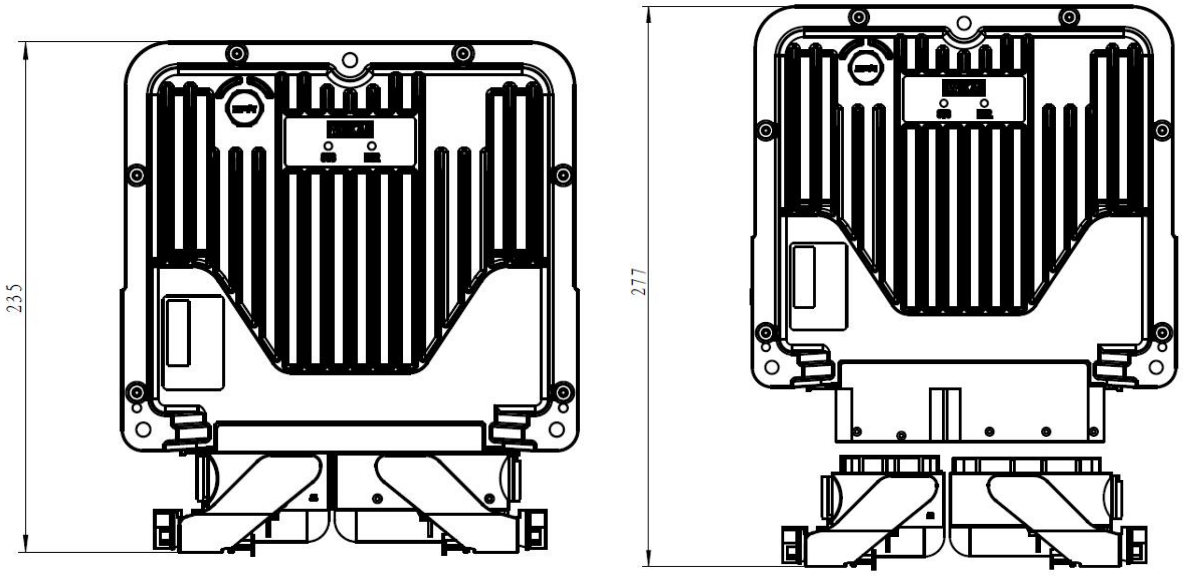
4.2. Physical Dimensions



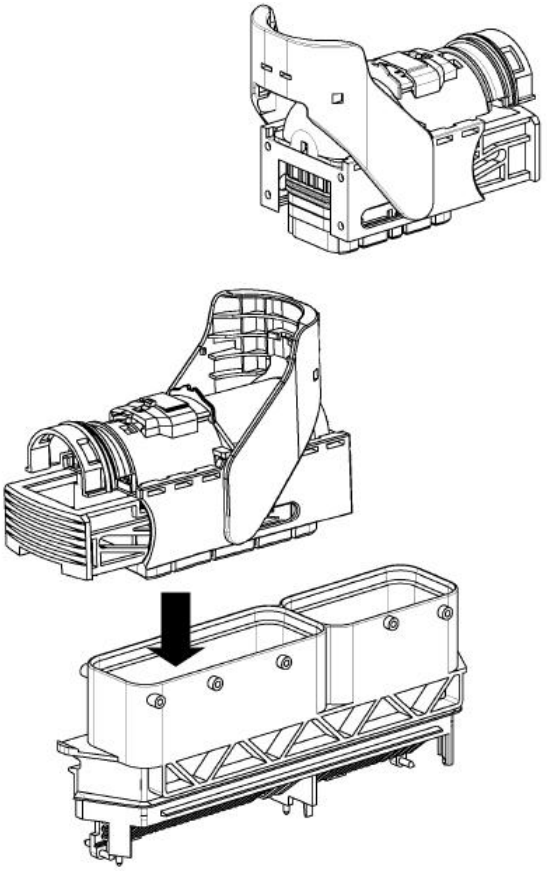
Dimensional view of the IMCT7547D housing

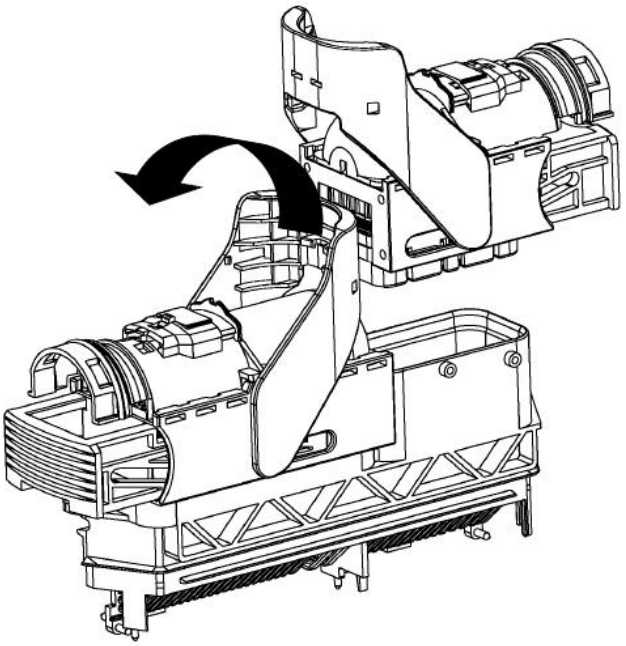
4.3. Mounting Option

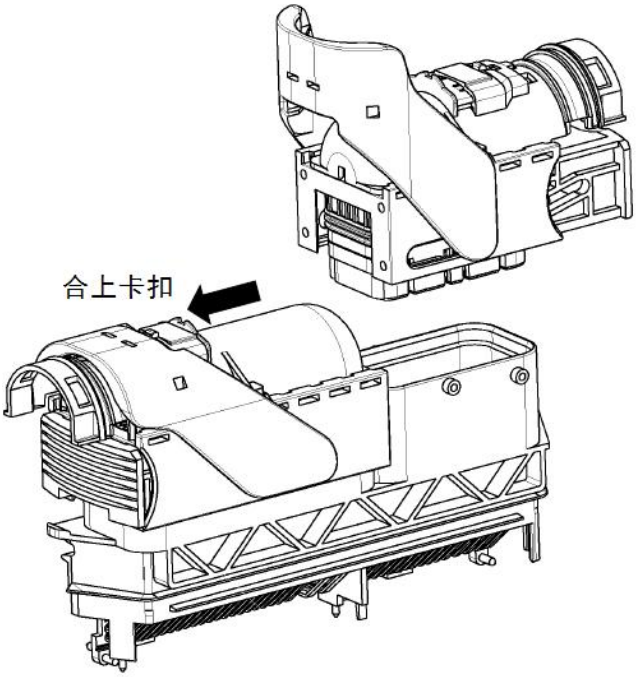
The IMCT7547D controller is mounted with three M6 bolts/screws. After connecting the mating connector, the overall length is 235mm, so it is recommended to reserve least 60mm of installation space at the controller interface for easy insertion:



Mounting Guideline







5. Configuration

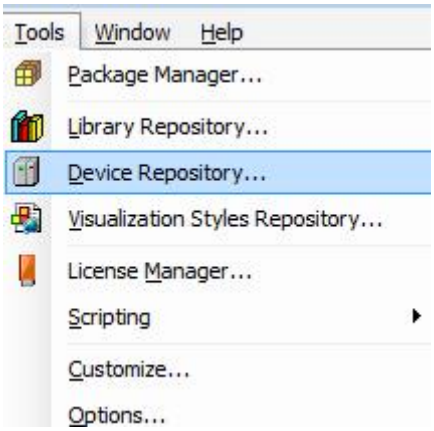
The software configuration of the IMCT7547D controller is completed in the CoDeSys software.

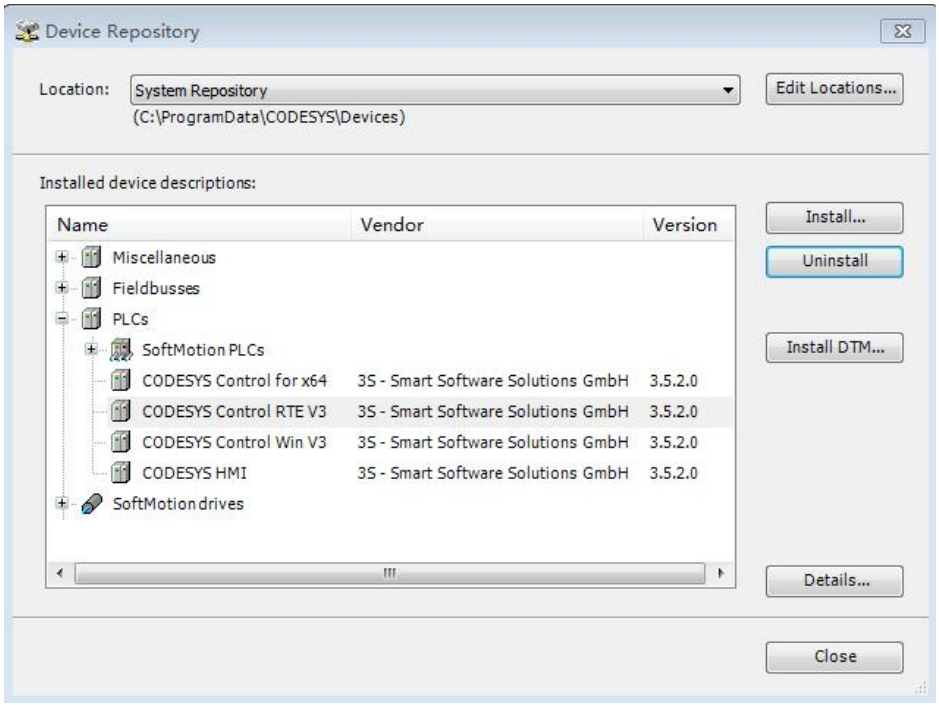
5.1. Device file install

The device file will sets some specific parameters of the controller system, and it must be installed in the CodeSys V3.5 SP12 or newer Versions. CodeSys V3.5 is the only programmable sofware supported.

5.1.1. Install the device files

Select Tools-> Device Repository to open the installation dialog:

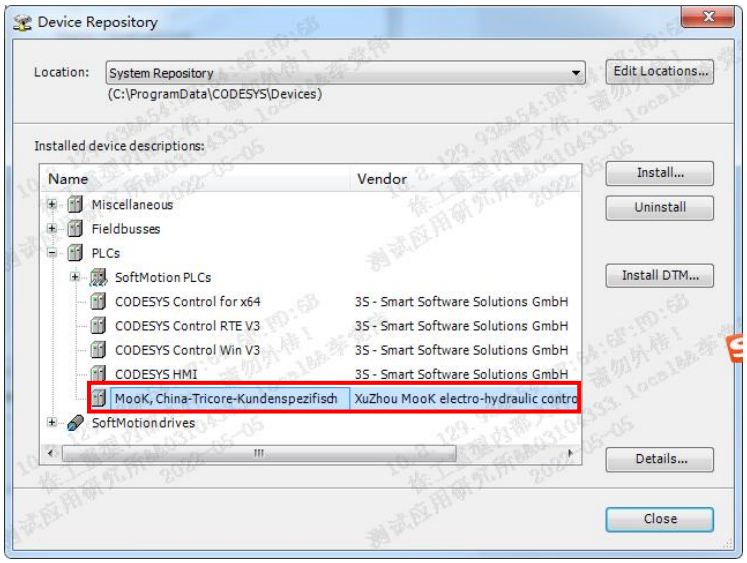




Click Install and select the device required file to install

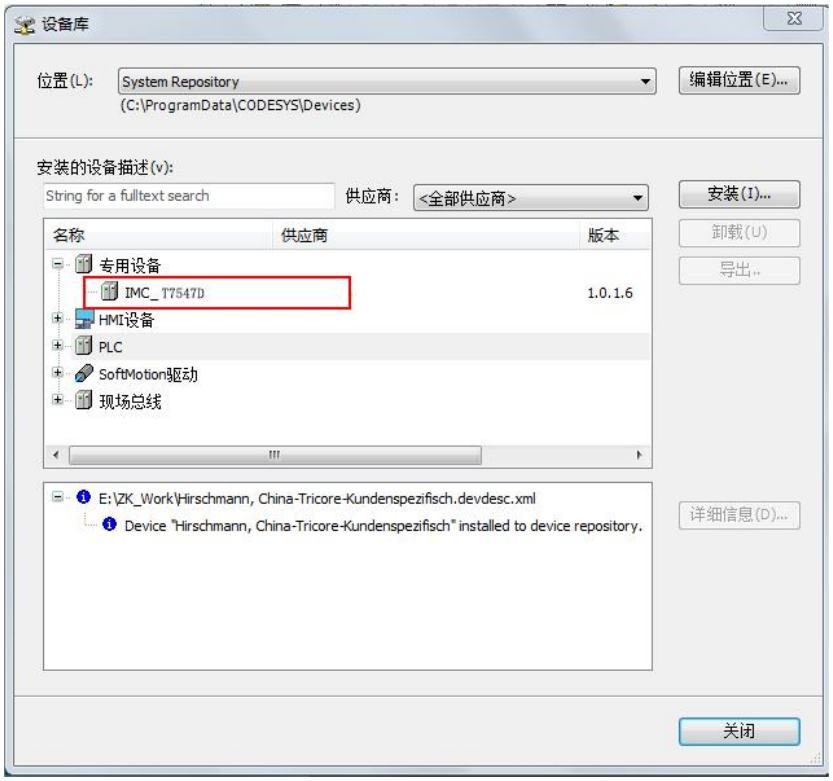
MooK, China-Tricore-Kundenspezifisch.devdesc.xml

After selecting the file, click "Open" to complete the installation, after installation, you can see the device just installed under the PLC list:



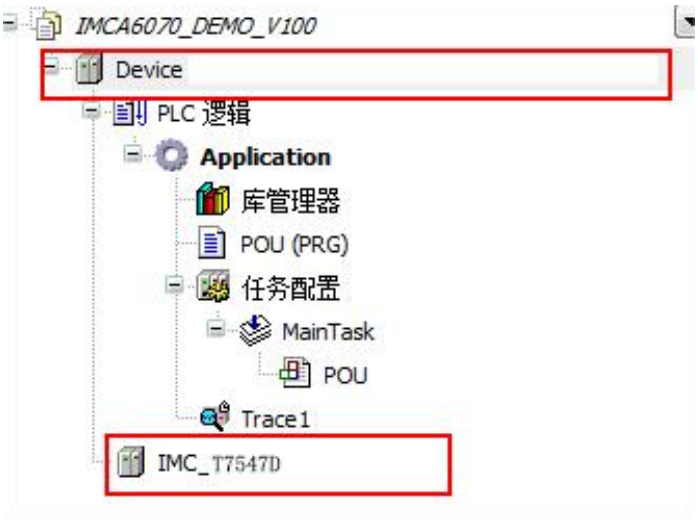
5.1.2. Install IO driver files

IO driver files are installed in the same way as device files installation. After the installation is complete, you can see the following information under the dedicated device:



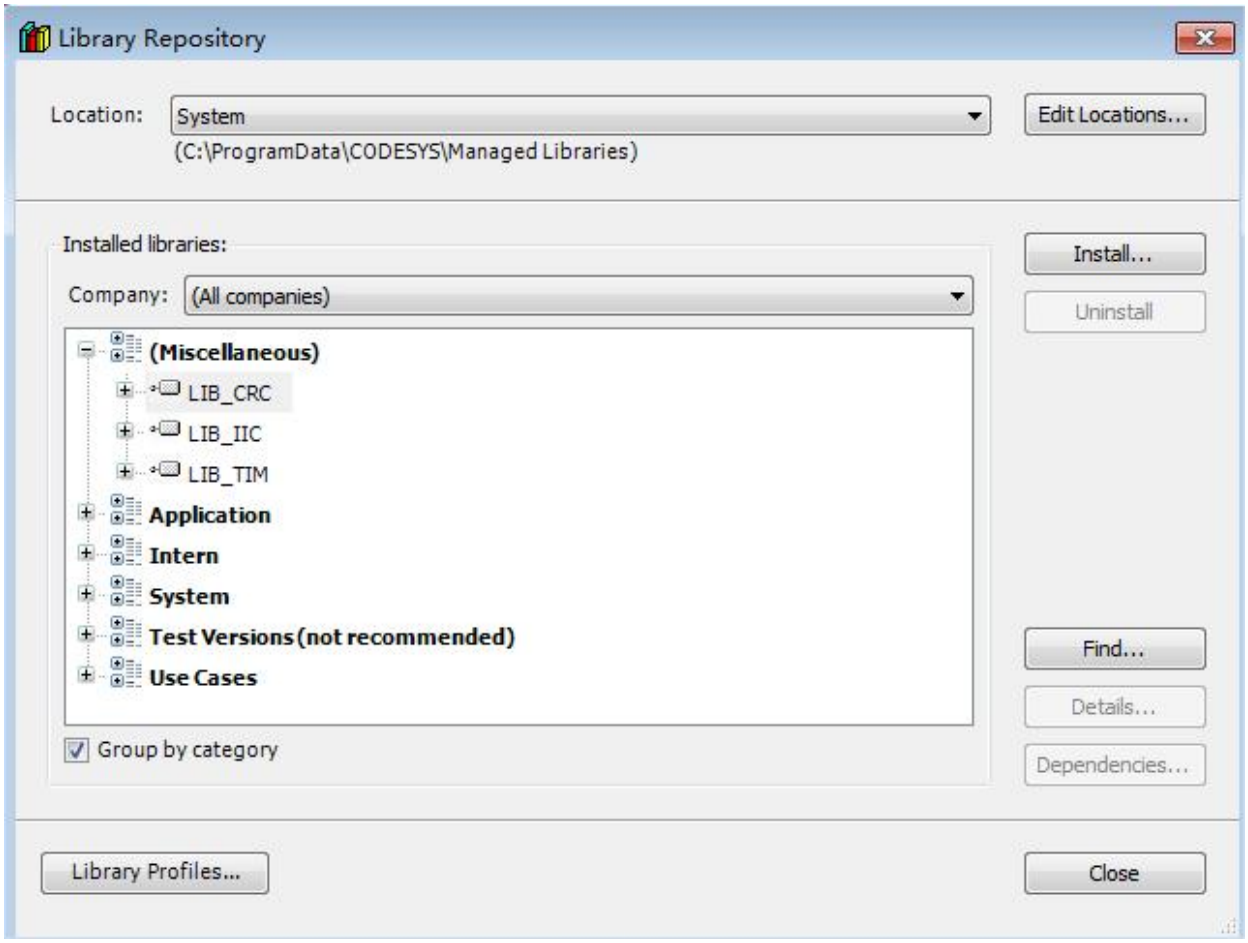
5.1.3. The installation is complete

The installation of the controller device and the IO driver device is complete, as shown in the following figure:

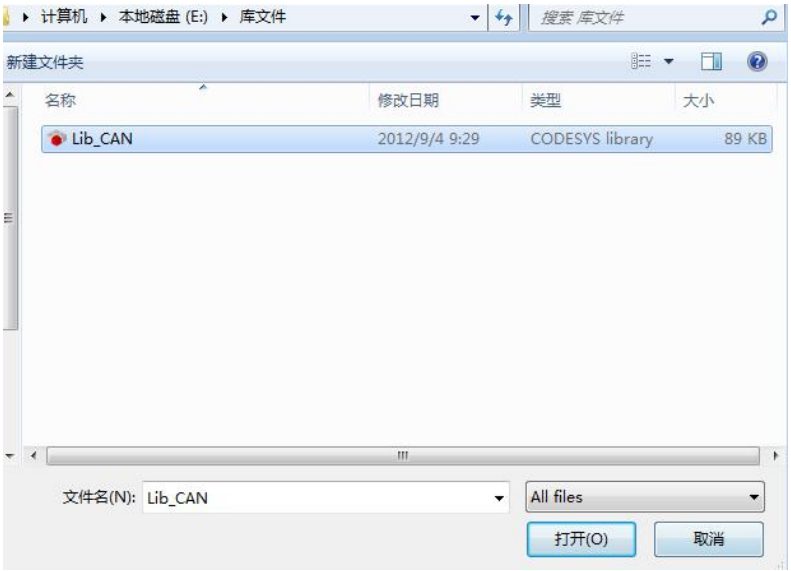


5.2. Library file installation

Select Tools-> Library Repository to open the library management dialog:



Click "Install" to select the library files that need to be installed:

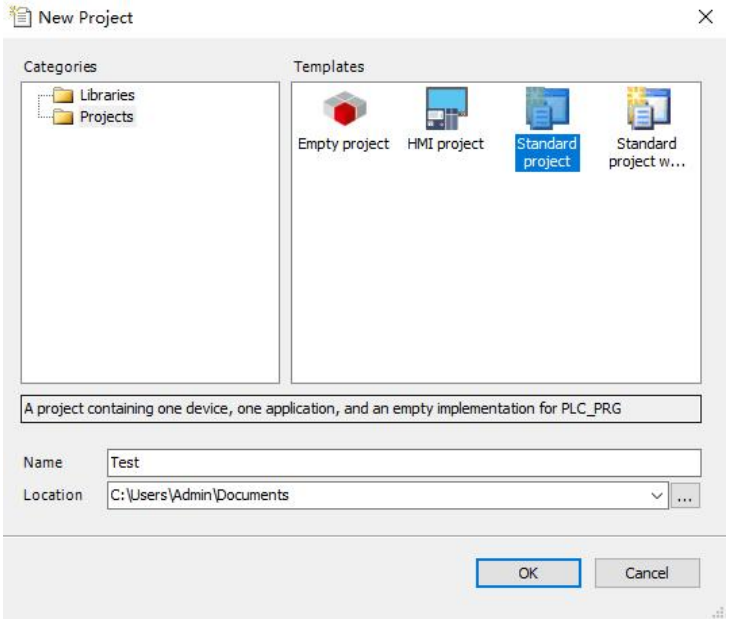


Click Open to complete the installation of the library file, as shown in the following:

5.3. Creating an Application

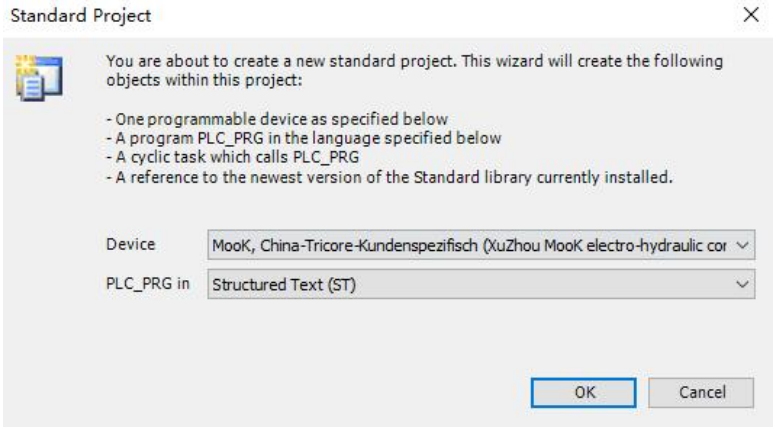
5.3.1. Create a project

Select file-> New project option:



5.3.2. Select Standard project

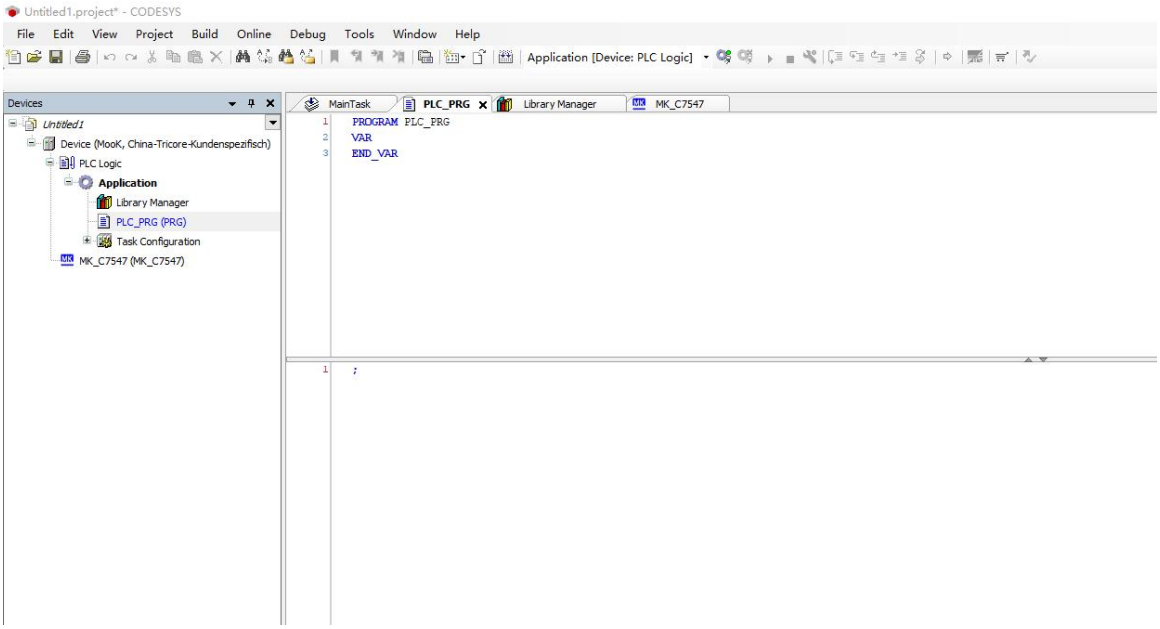
set the project name and path, and click OK. Select Controller Device:



	NOTE
	Device: Select the device to install, here is MooK, China-Tricore-Kundenspezifisch (this name may change depending on the design of the profile) ； PLC_PRG in: Select The programming mode, where Structured Text is selected.

5.3.3. Creation completed

Click OK to complete the creation of the new project, the window is as follows:



5.4. Communication settings

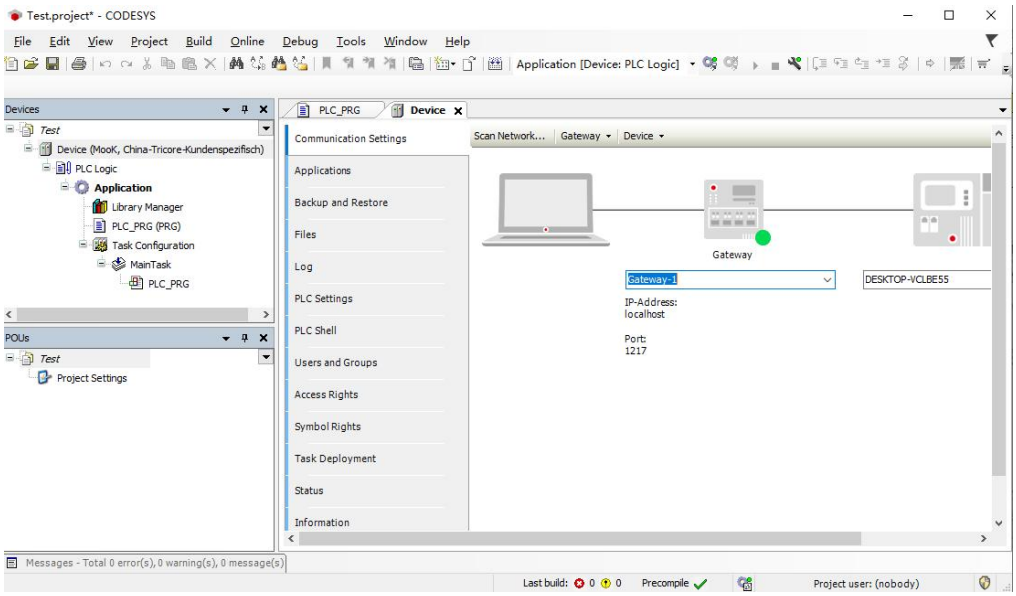
The IMCT7547D controller can be connected to a PC via the RS232 interface or the CAN bus.

5.4.1. RS232 mode

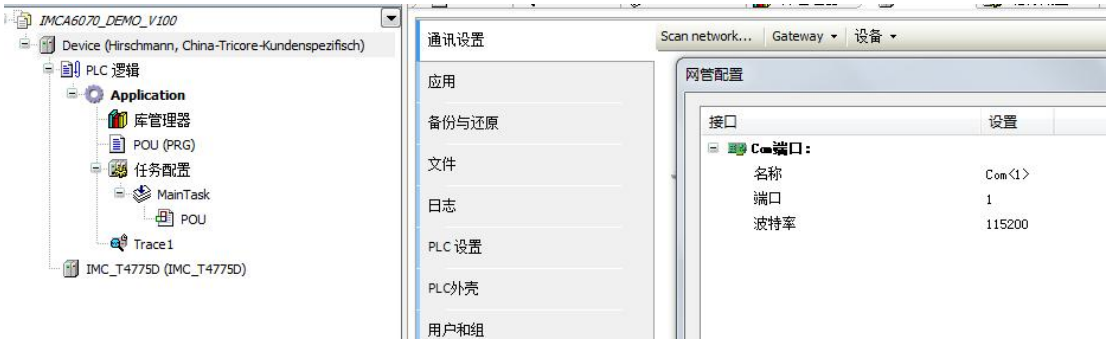
Double-click "Device" in the Device panel. The system automatically expands the configuration page for Device.

	NOTE
⚠	Codesys needs to configure Gateway to connect to the controller. This gateway only needs to be configured once for the same controller and connection port, and does not need to change with different projects.

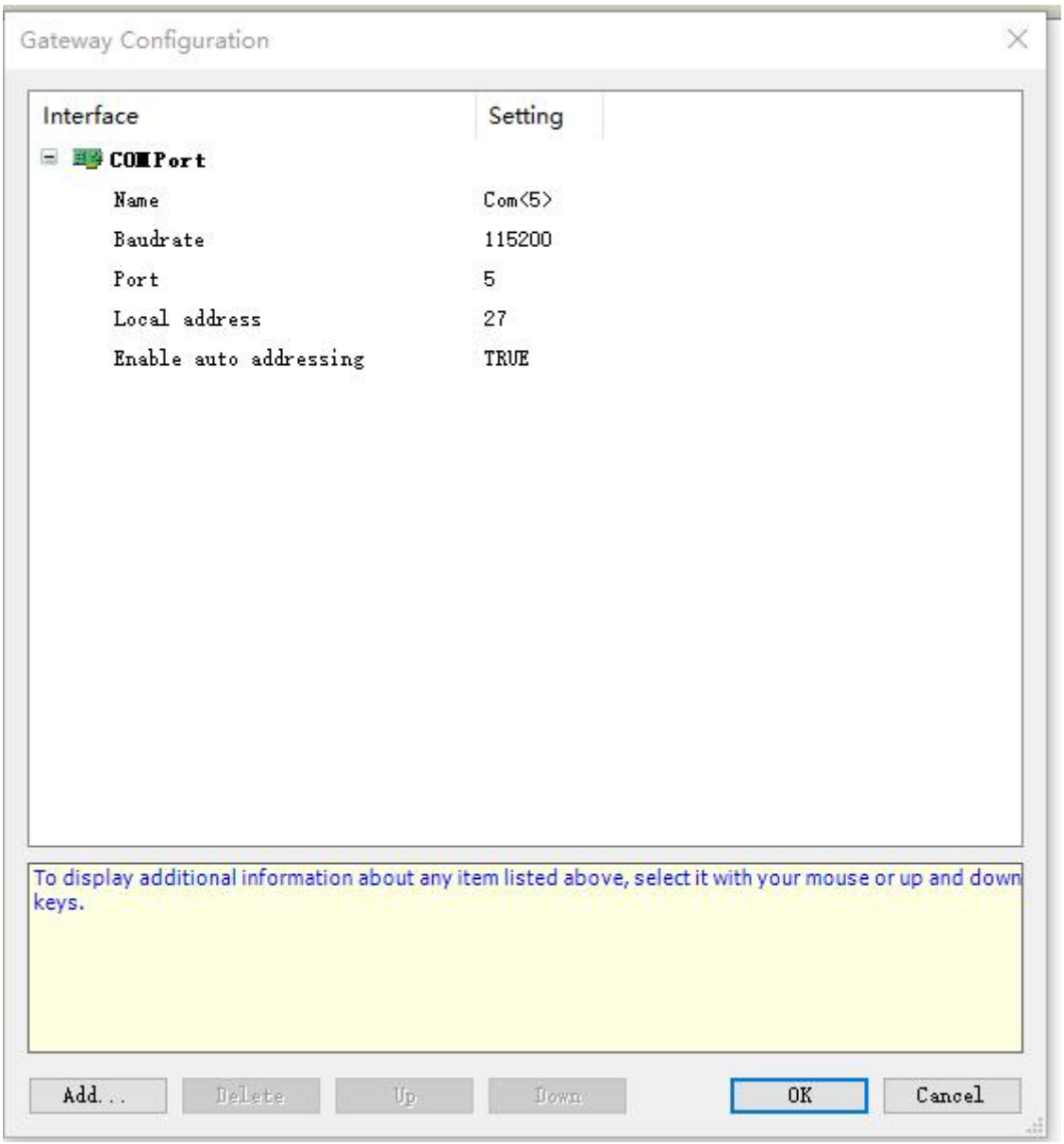
(1) Select communication settings interface:



(2) New Gateway:



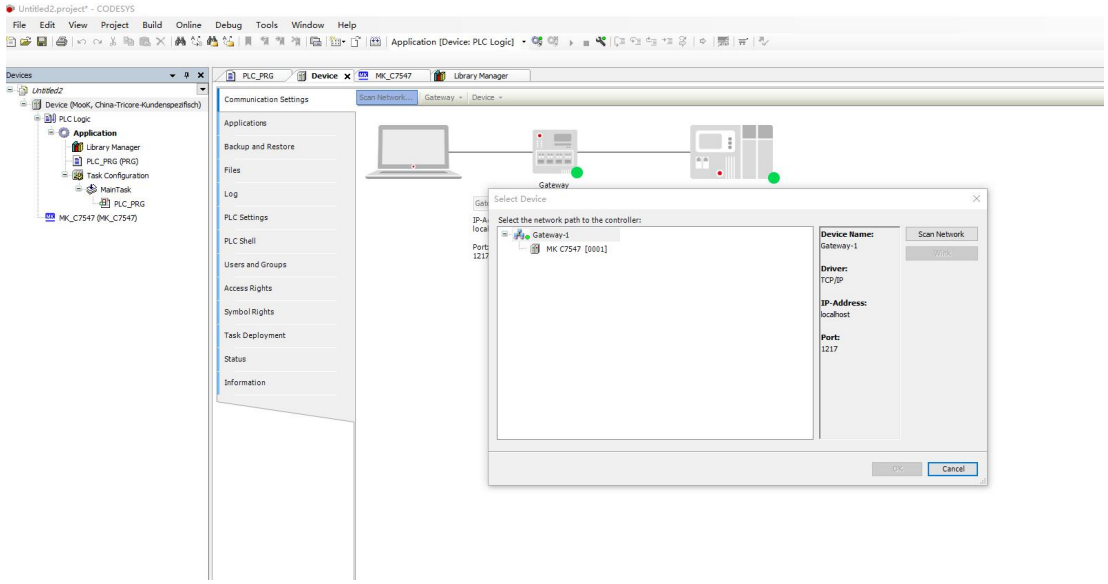
(3) Click OK:



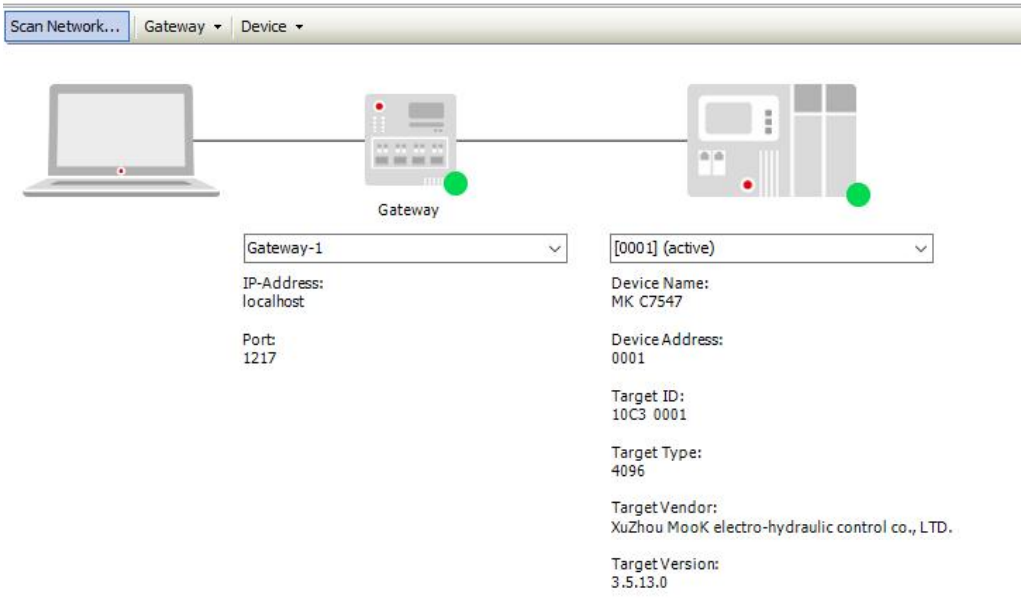
NOTE

Click OK to complete the configuration of the new Gateway. Click the Icon for CoDeSys Gateway in the tray area in the lower right corner of the desktop, select Stop Gateway, and then click Start Gateway, such as Gateway The configuration will not take effect until:

(4) Make sure that the controller is powered on and properly connected to the computer through the RS232 serial port cable. Double-click Gateway to scan the device, and the available controllers appear:



(5) Double-click this controller to set it as active. At this point, the controller is successfully connected.



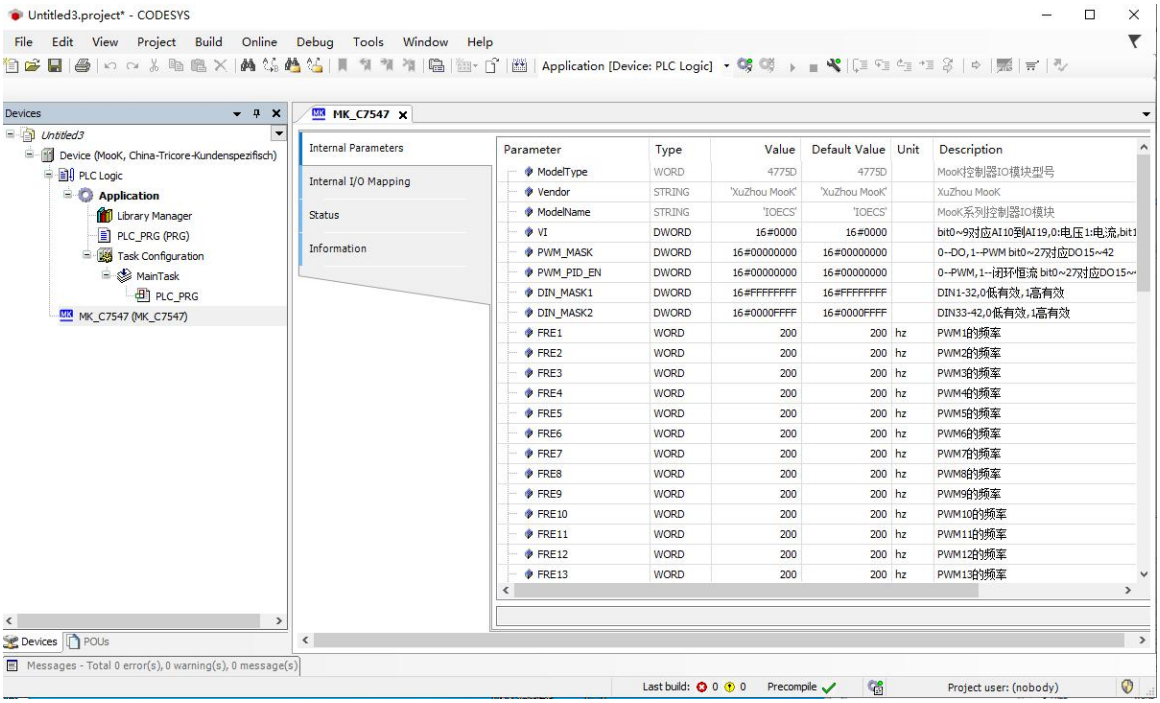
5.4.2. CAN mode

Before you connect to controller, you need to propare a PCAN (PEAK SYSTEM) and Gateway.cfg, The controller can only be connected by PCAN, Other CAN tool not be supported. You need to replace the RS 232's Gateway.cfg with support CAN's Gateway.cfg. CAN's Gateway.cfg locate in the CoDeSys installation disk C:\ProgramData\CODESYS\CODESYSGatewayV3\A82AAFC8 folder

	NOTE
⚠	Back up the Gateway .cfg file before opening it.

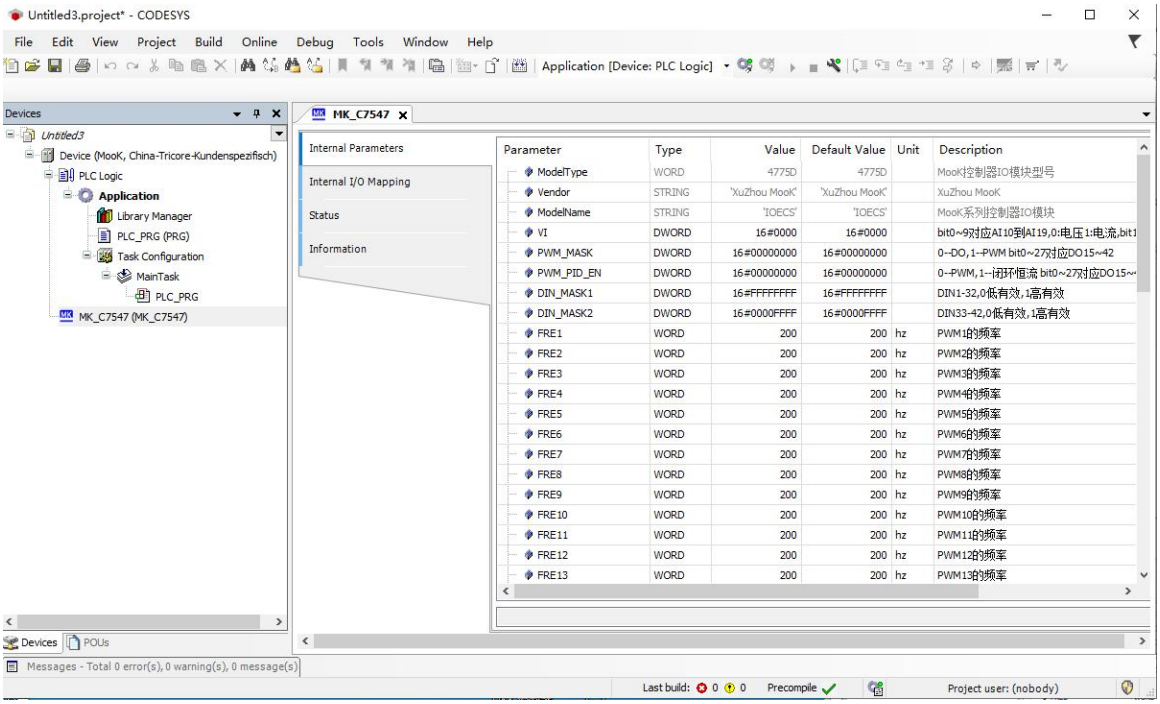
5.5. IO device configuration

Double-click the newly added IO device, and the system will automatically expand the configuration dialog of the IO device:



5.5.1. Internal Parameters

Configuration for input and output parameters that are valid at power-up of the controller and cannot be changed during operation:



➢ Parameters:

VI: bit0~9 corresponds to AI10 to AI19, 0: voltage; 1: current 。

Bit10~13 corresponds to AI20 to AI23, 0: voltage; 1: resistance.

PWM_MASK：bit0~27对应 PWM1~PWM28 ，0为 DO；1为 PWM。

DIN_MASK1: bit0~32 corresponds to DIN1~32,0: low effective; 1: high effective.

DIN_MASK2: bit0~8 corresponds to DIN33~42,0: low effective; 1: high effective.

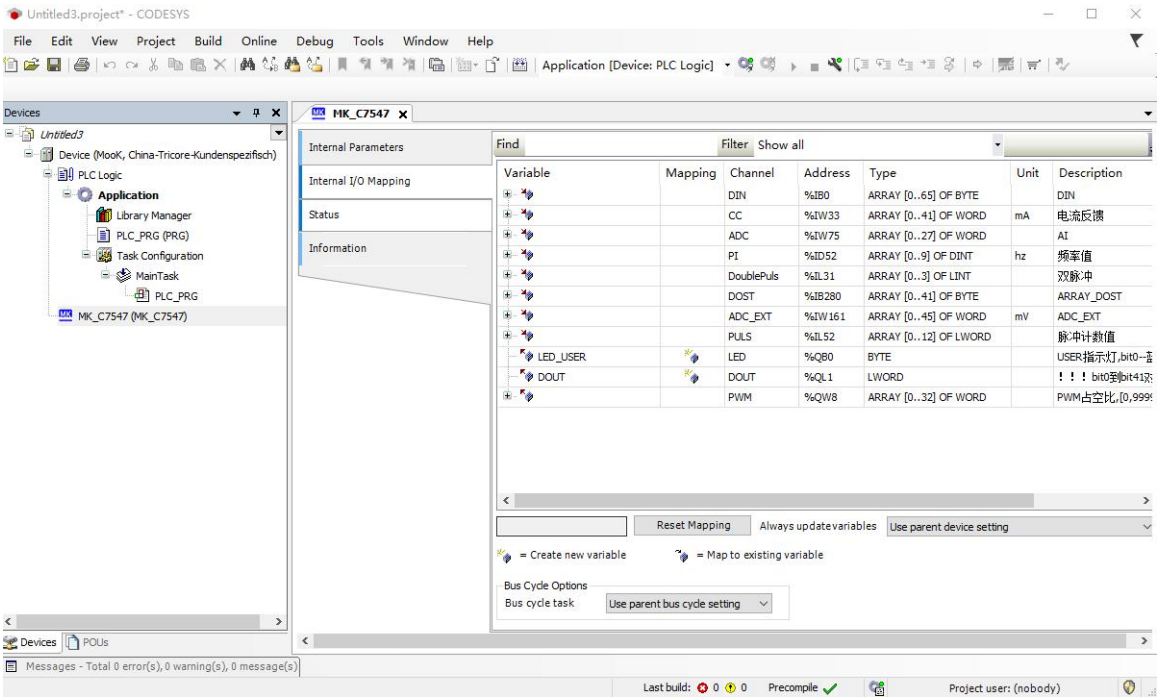
DO_STEN1: bit0~32 corresponds to DOST1~32 diagnosis, 0: off; 1: Open. **DO_STEN2**: bit0~8 corresponds to DOST33~42 diagnosis, 0: off; 1: Open.

PWM：FRE1~FRE16，FRE19~FRE25，REF28共28路。

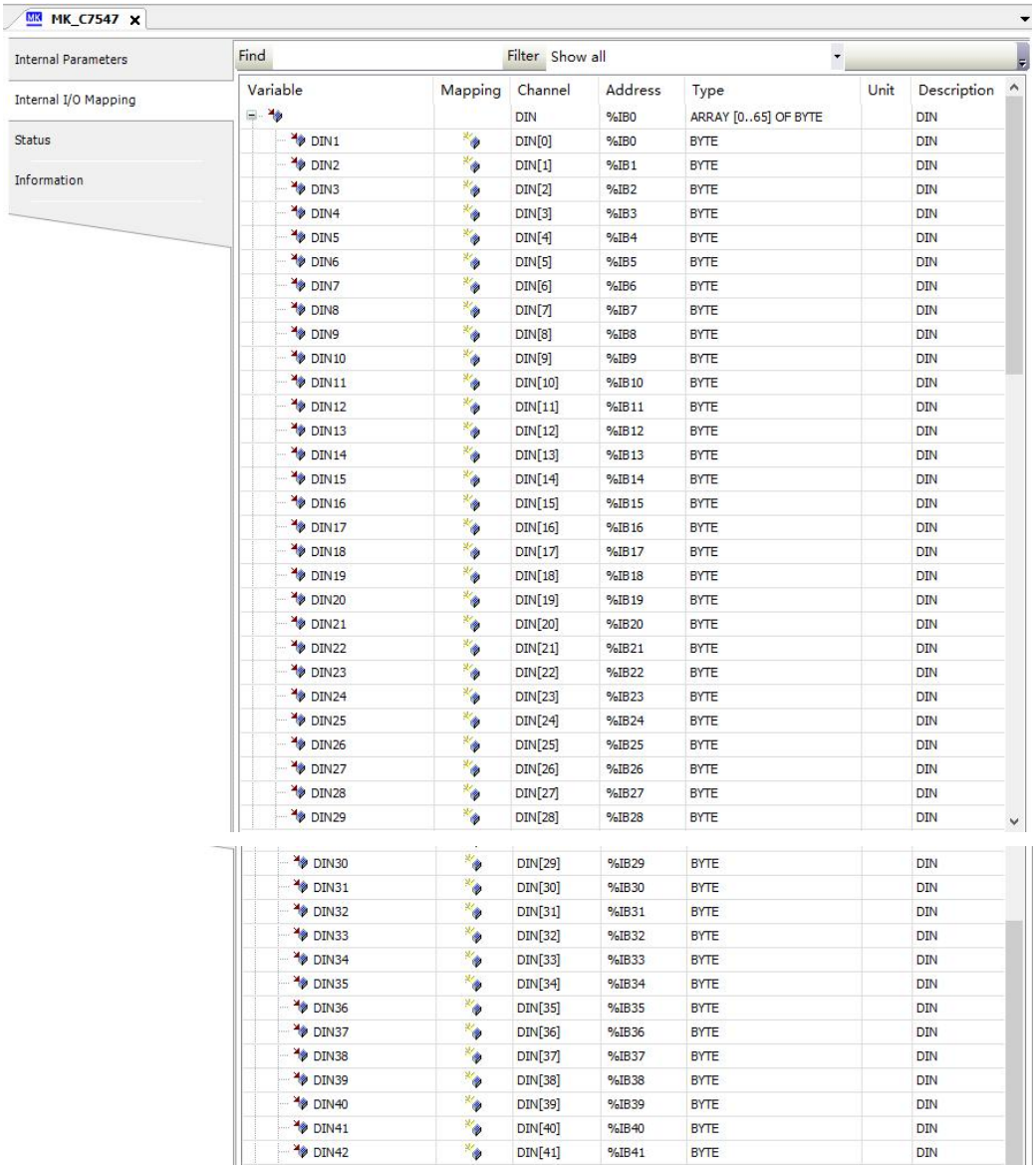
	ANNOTATION
	The default frequency of all PWM channels is 200Hz, which can be modified by the value of the corresponding Value column, where PWM16, 17, 18, The 22 frequencies are modified together, and the PWM25, 26, and 27 frequencies are modified together. For example, if you want to set the frequency of PWM7 to 100Hz, you need to change the Value column value of FRE7 to 100.

5.5.2. Internal I/O mapping

For input and output management of devices:



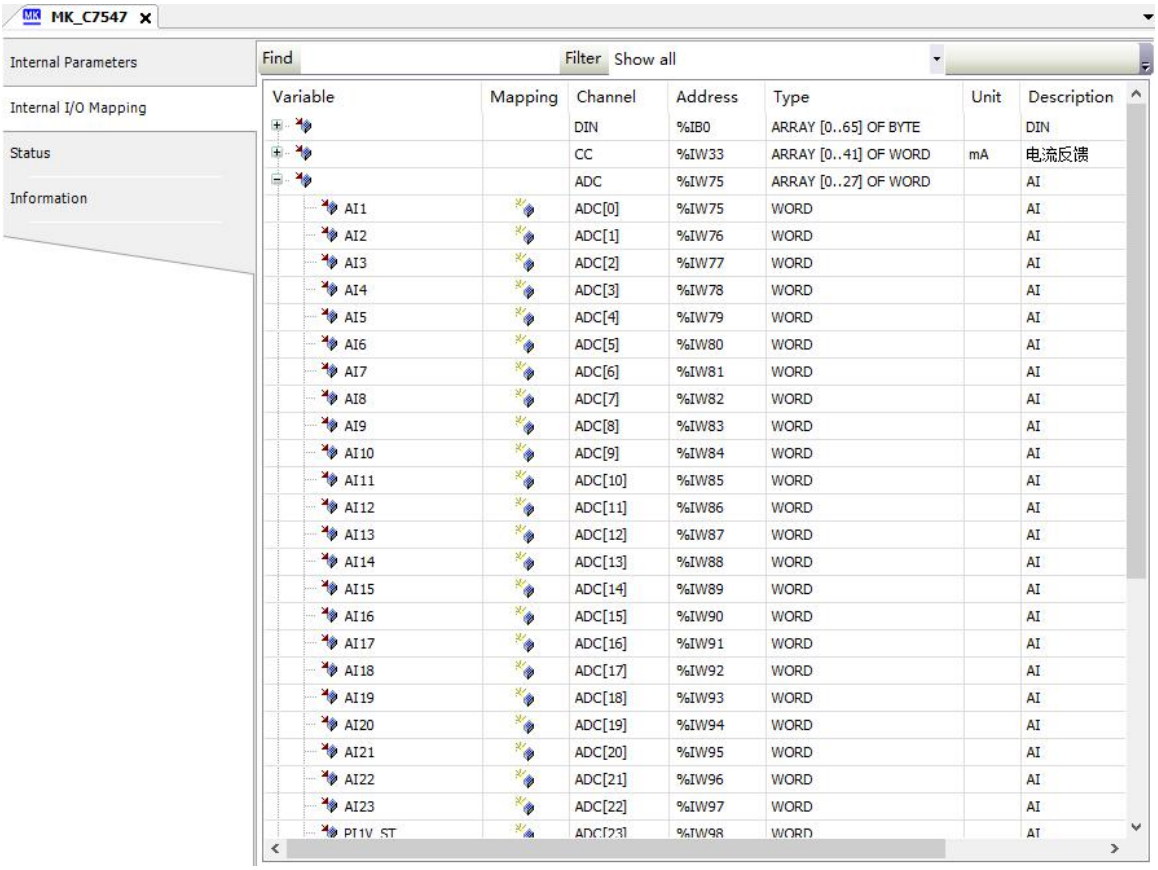
Digital input



	ANNOTATION
☞	The DIN port can be effective at the height of each port individually, and can also be used for port diagnostics.

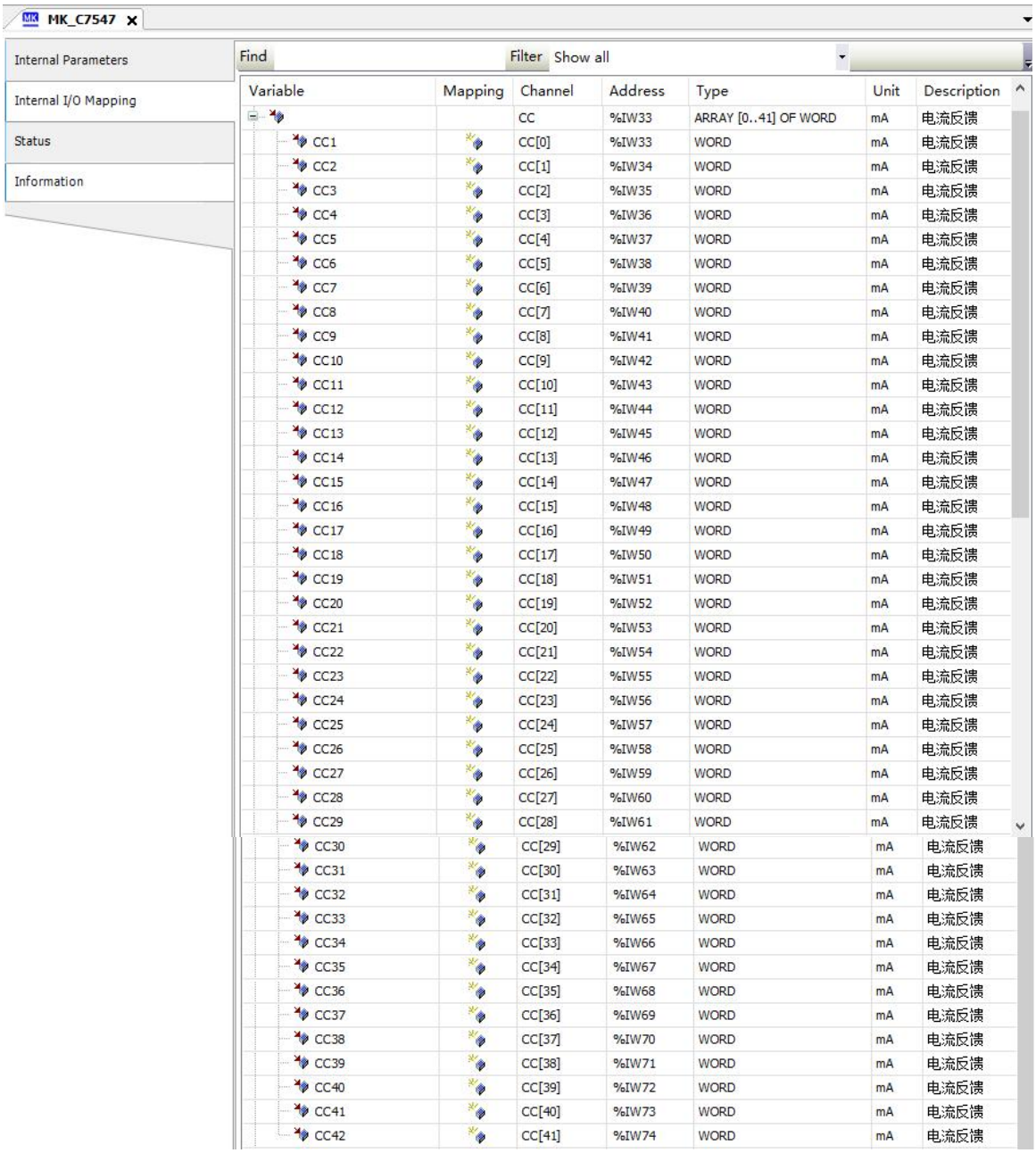
Analog input

Includes voltage, current, resistance three basic analog inputs, system voltage, 5V and 10V voltage input feedback:



	ANNOTATION
☞	AI port input, where AI1 and AI2 are 0~36V input, the unit is mv, AI3~AI9 Input is 0~10V, unit mv, AI10~AI19 is 0 ~10V and 4~20mA inputs, units depending on the configured mode (mV and mA), AI20 ~AI23 is 0~5V and resistive port input, the unit depends on the configuration mode (mV vs Ohm); PI1_ST and PI2_ST are PI1, 2 multiplexed as analog ports, 0~10V, unit mv; VUBP: System voltage feedback, unit mV; VOUT5_ST: 5V output feedback, unit mV; VOUT10_ST: 10V output feedback in mV.

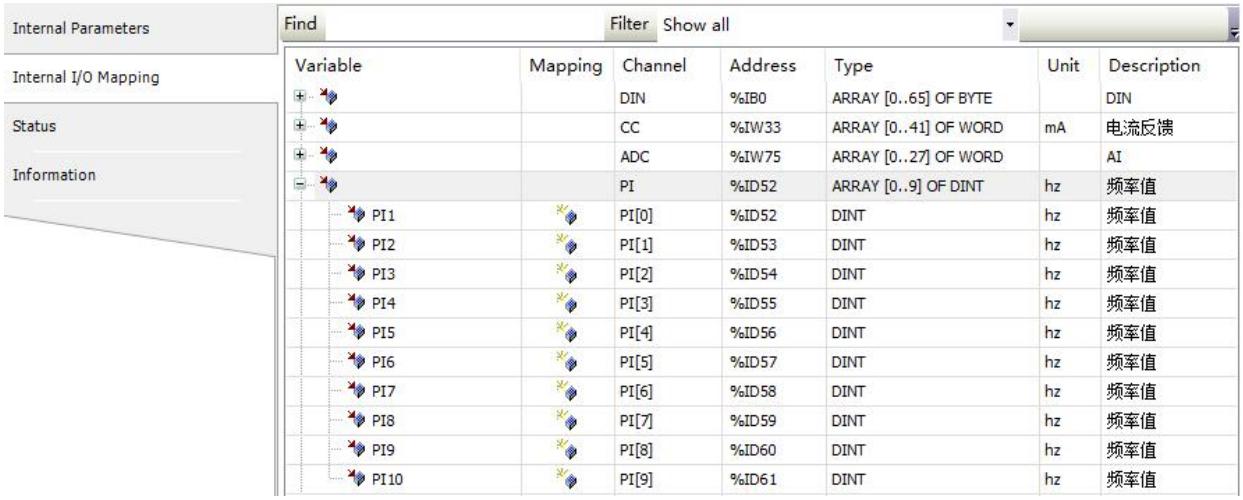
1 Current feedback



Variable	Mapping	Channel	Address	Type	Unit	Description
CC		CC	%IW33	ARRAY [0..41] OF WORD	mA	电流反馈
CC1		CC[0]	%IW33	WORD	mA	电流反馈
CC2		CC[1]	%IW34	WORD	mA	电流反馈
CC3		CC[2]	%IW35	WORD	mA	电流反馈
CC4		CC[3]	%IW36	WORD	mA	电流反馈
CC5		CC[4]	%IW37	WORD	mA	电流反馈
CC6		CC[5]	%IW38	WORD	mA	电流反馈
CC7		CC[6]	%IW39	WORD	mA	电流反馈
CC8		CC[7]	%IW40	WORD	mA	电流反馈
CC9		CC[8]	%IW41	WORD	mA	电流反馈
CC10		CC[9]	%IW42	WORD	mA	电流反馈
CC11		CC[10]	%IW43	WORD	mA	电流反馈
CC12		CC[11]	%IW44	WORD	mA	电流反馈
CC13		CC[12]	%IW45	WORD	mA	电流反馈
CC14		CC[13]	%IW46	WORD	mA	电流反馈
CC15		CC[14]	%IW47	WORD	mA	电流反馈
CC16		CC[15]	%IW48	WORD	mA	电流反馈
CC17		CC[16]	%IW49	WORD	mA	电流反馈
CC18		CC[17]	%IW50	WORD	mA	电流反馈
CC19		CC[18]	%IW51	WORD	mA	电流反馈
CC20		CC[19]	%IW52	WORD	mA	电流反馈
CC21		CC[20]	%IW53	WORD	mA	电流反馈
CC22		CC[21]	%IW54	WORD	mA	电流反馈
CC23		CC[22]	%IW55	WORD	mA	电流反馈
CC24		CC[23]	%IW56	WORD	mA	电流反馈
CC25		CC[24]	%IW57	WORD	mA	电流反馈
CC26		CC[25]	%IW58	WORD	mA	电流反馈
CC27		CC[26]	%IW59	WORD	mA	电流反馈
CC28		CC[27]	%IW60	WORD	mA	电流反馈
CC29		CC[28]	%IW61	WORD	mA	电流反馈
CC30		CC[29]	%IW62	WORD	mA	电流反馈
CC31		CC[30]	%IW63	WORD	mA	电流反馈
CC32		CC[31]	%IW64	WORD	mA	电流反馈
CC33		CC[32]	%IW65	WORD	mA	电流反馈
CC34		CC[33]	%IW66	WORD	mA	电流反馈
CC35		CC[34]	%IW67	WORD	mA	电流反馈
CC36		CC[35]	%IW68	WORD	mA	电流反馈
CC37		CC[36]	%IW69	WORD	mA	电流反馈
CC38		CC[37]	%IW70	WORD	mA	电流反馈
CC39		CC[38]	%IW71	WORD	mA	电流反馈
CC40		CC[39]	%IW72	WORD	mA	电流反馈
CC41		CC[40]	%IW73	WORD	mA	电流反馈
CC42		CC[41]	%IW74	WORD	mA	电流反馈

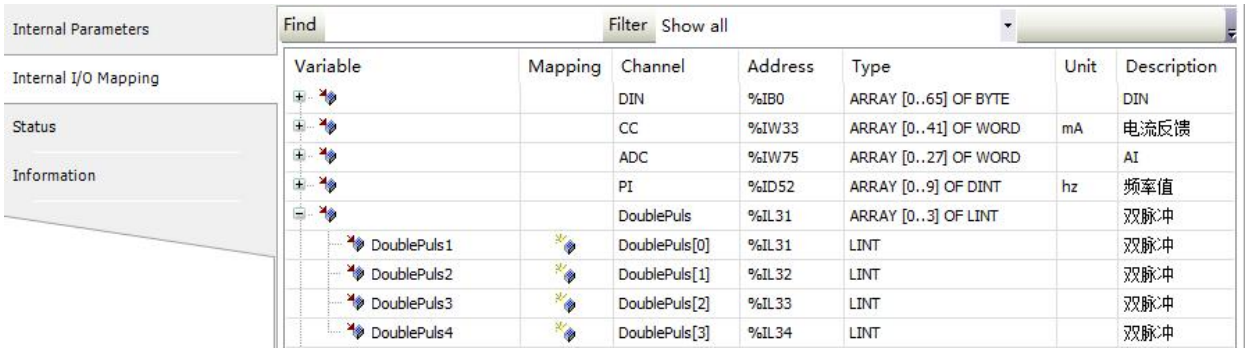
	ANNOTATION
	DO1~DO42 current feedback, unit mA, range 0~2500mA.

3 Frequency input



Variable	Mapping	Channel	Address	Type	Unit	Description
		DIN	%IB0	ARRAY [0..65] OF BYTE		DIN
		CC	%IW33	ARRAY [0..41] OF WORD	mA	电流反馈
		ADC	%IW75	ARRAY [0..27] OF WORD		AI
		PI	%ID52	ARRAY [0..9] OF DINT	hz	频率值
PI1		PI[0]	%ID52	DINT	hz	频率值
PI2		PI[1]	%ID53	DINT	hz	频率值
PI3		PI[2]	%ID54	DINT	hz	频率值
PI4		PI[3]	%ID55	DINT	hz	频率值
PI5		PI[4]	%ID56	DINT	hz	频率值
PI6		PI[5]	%ID57	DINT	hz	频率值
PI7		PI[6]	%ID58	DINT	hz	频率值
PI8		PI[7]	%ID59	DINT	hz	频率值
PI9		PI[8]	%ID60	DINT	hz	频率值
PI10		PI[9]	%ID61	DINT	hz	频率值

3 Double pulse and pulse count



Variable	Mapping	Channel	Address	Type	Unit	Description
		DIN	%IB0	ARRAY [0..65] OF BYTE		DIN
		CC	%IW33	ARRAY [0..41] OF WORD	mA	电流反馈
		ADC	%IW75	ARRAY [0..27] OF WORD		AI
		PI	%ID52	ARRAY [0..9] OF DINT	hz	频率值
		DoublePuls	%IL31	ARRAY [0..3] OF LINT		双脉冲
DoublePuls1		DoublePuls[0]	%IL31	LINT		双脉冲
DoublePuls2		DoublePuls[1]	%IL32	LINT		双脉冲
DoublePuls3		DoublePuls[2]	%IL33	LINT		双脉冲
DoublePuls4		DoublePuls[3]	%IL34	LINT		双脉冲

3 Digital output

DOUT		DOUT	%QL1	LWORD	0	！！！bit0到bit41对应(

	ANNOTATION
☞	DO1~DO42 output, bit0-bit41 corresponds to DO1~DO42, 1: output; 0 : Shutdown.

3 PWM

		PWM	%QW8	ARRAY [0..34] OF WORD			PWM占空比,[0,9999]
PWM1		PWM[0]	%QW8	WORD			PWM占空比,[0,9999]
PWM2		PWM[1]	%QW9	WORD			PWM占空比,[0,9999]
PWM3		PWM[2]	%QW10	WORD			PWM占空比,[0,9999]
PWM4		PWM[3]	%QW11	WORD			PWM占空比,[0,9999]
PWM5		PWM[4]	%QW12	WORD			PWM占空比,[0,9999]
PWM6		PWM[5]	%QW13	WORD			PWM占空比,[0,9999]
PWM7		PWM[6]	%QW14	WORD			PWM占空比,[0,9999]
PWM8		PWM[7]	%QW15	WORD			PWM占空比,[0,9999]
PWM9		PWM[8]	%QW16	WORD			PWM占空比,[0,9999]
PWM10		PWM[9]	%QW17	WORD			PWM占空比,[0,9999]
PWM11		PWM[10]	%QW18	WORD			PWM占空比,[0,9999]
PWM12		PWM[11]	%QW19	WORD			PWM占空比,[0,9999]
PWM13		PWM[12]	%QW20	WORD			PWM占空比,[0,9999]
PWM14		PWM[13]	%QW21	WORD			PWM占空比,[0,9999]
PWM15		PWM[14]	%QW22	WORD			PWM占空比,[0,9999]
PWM16		PWM[15]	%QW23	WORD			PWM占空比,[0,9999]
PWM17		PWM[16]	%QW24	WORD			PWM占空比,[0,9999]
PWM18		PWM[17]	%QW25	WORD			PWM占空比,[0,9999]
PWM19		PWM[18]	%QW26	WORD			PWM占空比,[0,9999]
PWM20		PWM[19]	%QW27	WORD			PWM占空比,[0,9999]
PWM21		PWM[20]	%QW28	WORD			PWM占空比,[0,9999]
PWM22		PWM[21]	%QW29	WORD			PWM占空比,[0,9999]
PWM23		PWM[22]	%QW30	WORD			PWM占空比,[0,9999]
PWM24		PWM[23]	%QW31	WORD			PWM占空比,[0,9999]
PWM25		PWM[24]	%QW32	WORD			PWM占空比,[0,9999]
PWM26		PWM[25]	%QW33	WORD			PWM占空比,[0,9999]
PWM27		PWM[26]	%QW34	WORD			PWM占空比,[0,9999]
PWM28		PWM[27]	%QW35	WORD			PWM占空比,[0,9999]
AO1		PWM[28]	%QW36	WORD			PWM占空比,[0,9999]
AO2		PWM[29]	%QW37	WORD			PWM占空比,[0,9999]
AO3		PWM[30]	%QW38	WORD			PWM占空比,[0,9999]
AO4		PWM[31]	%QW39	WORD			PWM占空比,[0,9999]
AO5		PWM[32]	%QW40	WORD			PWM占空比,[0,9999]
PI_REF1		PWM[33]	%QW41	WORD			PWM占空比,[0,9999]
PI_REF2		PWM[34]	%QW42	WORD			PWM占空比,[0,9999]

ANNOTATION

PWM1~PWM28: PWM type port output, range 0-9999;
AO1~AO4: Analog output, 0-90% UBP, range 0-9999;
AO5: Analog output, 4~20mA, or 0.1~5V, software switching, range 0~9999.

NOTE

To assign a value to PWM, set the duty cycle corresponding to PWM, [0,9999] corresponding to 0% to 99.99%!

4 User LED

LED_USER		LED	%QB0	BYTE		USER指示灯,bit0--蓝色,bit1-绿色,bit2-红色

3 ADC Expanded port

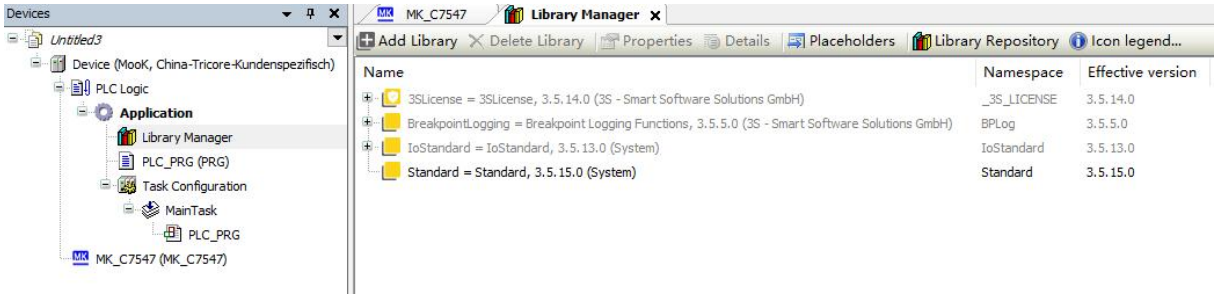
		ADC_EXT	%IW161	ARRAY [0..45] OF WORD	mV	ADC_EXT
DIN1_V		ADC_EXT[0]	%IW161	WORD	mV	ADC_EXT
DIN2_V		ADC_EXT[1]	%IW162	WORD	mV	ADC_EXT
DIN3_V		ADC_EXT[2]	%IW163	WORD	mV	ADC_EXT
DIN4_V		ADC_EXT[3]	%IW164	WORD	mV	ADC_EXT
DIN5_V		ADC_EXT[4]	%IW165	WORD	mV	ADC_EXT
DIN6_V		ADC_EXT[5]	%IW166	WORD	mV	ADC_EXT
DIN7_V		ADC_EXT[6]	%IW167	WORD	mV	ADC_EXT
DIN8_V		ADC_EXT[7]	%IW168	WORD	mV	ADC_EXT
DIN9_V		ADC_EXT[8]	%IW169	WORD	mV	ADC_EXT
DIN10_V		ADC_EXT[9]	%IW170	WORD	mV	ADC_EXT
DIN11_V		ADC_EXT[10]	%IW171	WORD	mV	ADC_EXT
DIN12_V		ADC_EXT[11]	%IW172	WORD	mV	ADC_EXT
DIN13_V		ADC_EXT[12]	%IW173	WORD	mV	ADC_EXT
DIN14_V		ADC_EXT[13]	%IW174	WORD	mV	ADC_EXT
DIN15_V		ADC_EXT[14]	%IW175	WORD	mV	ADC_EXT
DIN16_V		ADC_EXT[15]	%IW176	WORD	mV	ADC_EXT
DIN17_V		ADC_EXT[16]	%IW177	WORD	mV	ADC_EXT
DIN18_V		ADC_EXT[17]	%IW178	WORD	mV	ADC_EXT
DIN19_V		ADC_EXT[18]	%IW179	WORD	mV	ADC_EXT
DIN20_V		ADC_EXT[19]	%IW180	WORD	mV	ADC_EXT
DIN21_V		ADC_EXT[20]	%IW181	WORD	mV	ADC_EXT
DIN22_V		ADC_EXT[21]	%IW182	WORD	mV	ADC_EXT
DIN23_V		ADC_EXT[22]	%IW183	WORD	mV	ADC_EXT
DIN24_V		ADC_EXT[23]	%IW184	WORD	mV	ADC_EXT
DIN25_V		ADC_EXT[24]	%IW185	WORD	mV	ADC_EXT
DIN26_V		ADC_EXT[25]	%IW186	WORD	mV	ADC_EXT
DIN27_V		ADC_EXT[26]	%IW187	WORD	mV	ADC_EXT
DIN28_V		ADC_EXT[27]	%IW188	WORD	mV	ADC_EXT
DIN29_V		ADC_EXT[28]	%IW189	WORD	mV	ADC_EXT
DIN30_V		ADC_EXT[29]	%IW190	WORD	mV	ADC_EXT
DIN25_V		ADC_EXT[24]	%IW185	WORD	mV	ADC_EXT
DIN26_V		ADC_EXT[25]	%IW186	WORD	mV	ADC_EXT
DIN27_V		ADC_EXT[26]	%IW187	WORD	mV	ADC_EXT
DIN28_V		ADC_EXT[27]	%IW188	WORD	mV	ADC_EXT
DIN29_V		ADC_EXT[28]	%IW189	WORD	mV	ADC_EXT
DIN30_V		ADC_EXT[29]	%IW190	WORD	mV	ADC_EXT
DIN31_V		ADC_EXT[30]	%IW191	WORD	mV	ADC_EXT
DIN32_V		ADC_EXT[31]	%IW192	WORD	mV	ADC_EXT
DIN33_V		ADC_EXT[32]	%IW193	WORD	mV	ADC_EXT
DIN34_V		ADC_EXT[33]	%IW194	WORD	mV	ADC_EXT
DIN35_V		ADC_EXT[34]	%IW195	WORD	mV	ADC_EXT
DIN36_V		ADC_EXT[35]	%IW196	WORD	mV	ADC_EXT
DIN37_V		ADC_EXT[36]	%IW197	WORD	mV	ADC_EXT
DIN38_V		ADC_EXT[37]	%IW198	WORD	mV	ADC_EXT
DIN39_V		ADC_EXT[38]	%IW199	WORD	mV	ADC_EXT
DIN40_V		ADC_EXT[39]	%IW200	WORD	mV	ADC_EXT
DIN41_V		ADC_EXT[40]	%IW201	WORD	mV	ADC_EXT
DIN42_V		ADC_EXT[41]	%IW202	WORD	mV	ADC_EXT
AO_ST5		ADC_EXT[42]	%IW203	WORD	mV	ADC_EXT
VTEMP		ADC_EXT[43]	%IW204	WORD	mV	ADC_EXT
REF_PI1		ADC_EXT[44]	%IW205	WORD	mV	ADC_EXT
REF_PI2		ADC_EXT[45]	%IW206	WORD	mV	ADC_EXT

ANNOTATION

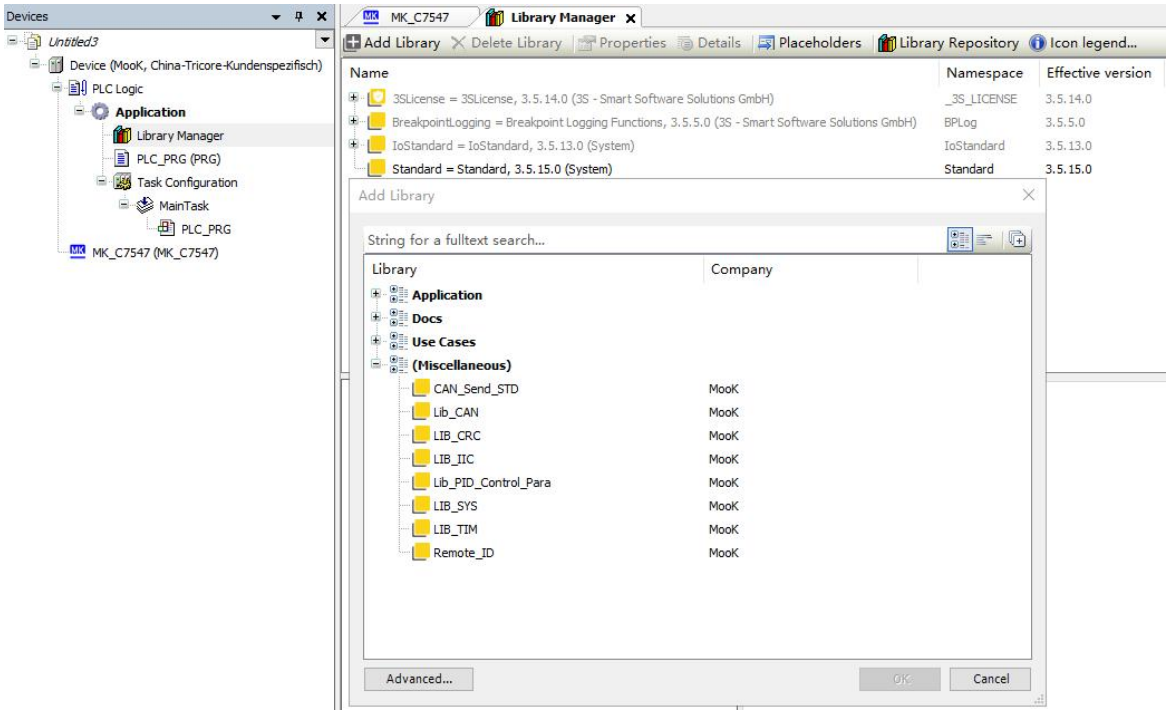
	DIN1_V to DIN42_V: Feedback voltage value in mV when the DIN port is multiplexed to an analog quantity. AO_ST1~AO_ST5: AO port feedback voltage value, unit mV; REF_PI1 and REF_PI2: PI threshold voltage feedback values.

5.5.3. Library functions add

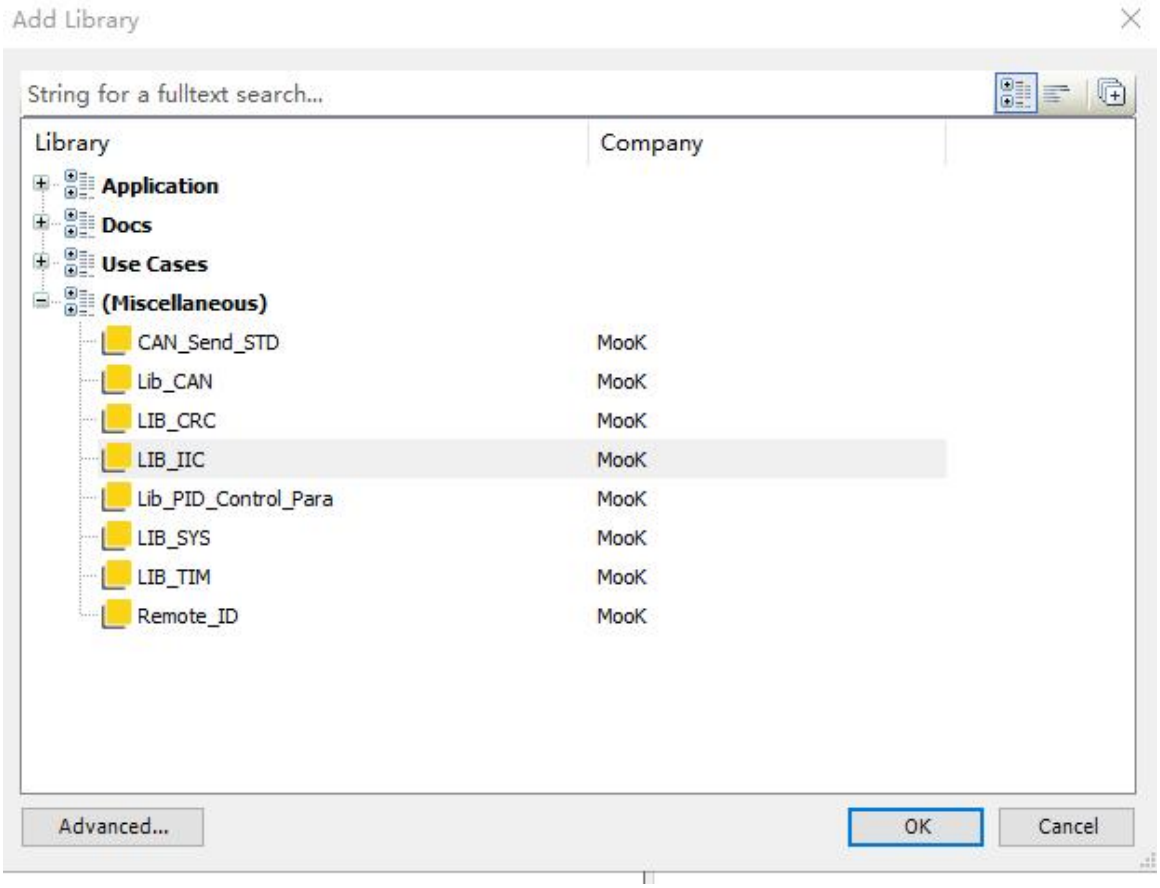
Double-click The Library Manger under Application to bring up the Library Manger dialog.



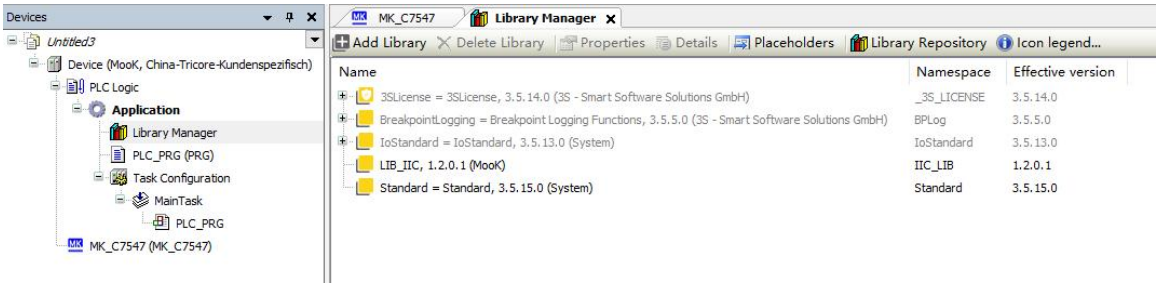
Click "Add Library" and the following dialog will appear.



Select the library you want to add and click the OK.



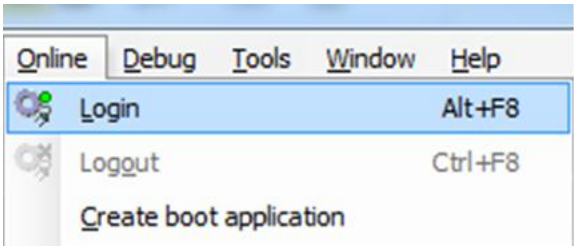
After the library is added, it is shown in the following figure.



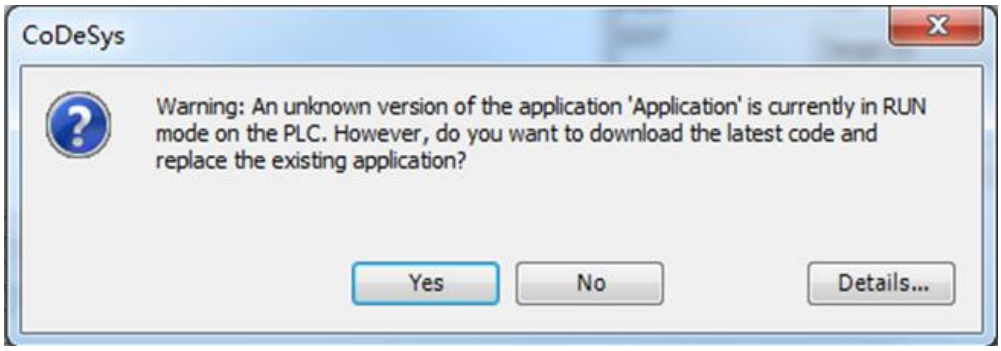
5.6. Run and debug

5.6.1. Login

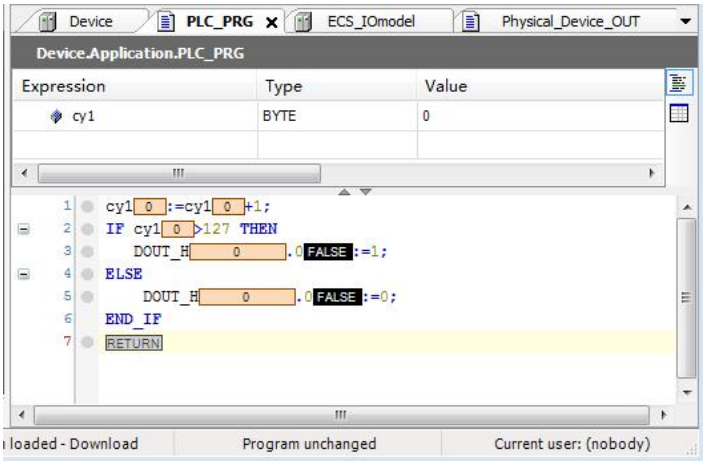
After the programming is compiled without errors, you can click Online-> Login (or press the shortcut key Alt+F8) to login:



At this point, CoDeSys will check the contents of the controller, if it not run, it will prompt that this is a new program, if it already run, it will prompt:



Click the "Yes" button to continue, after the download is completed, the system enters the Stop state by default:

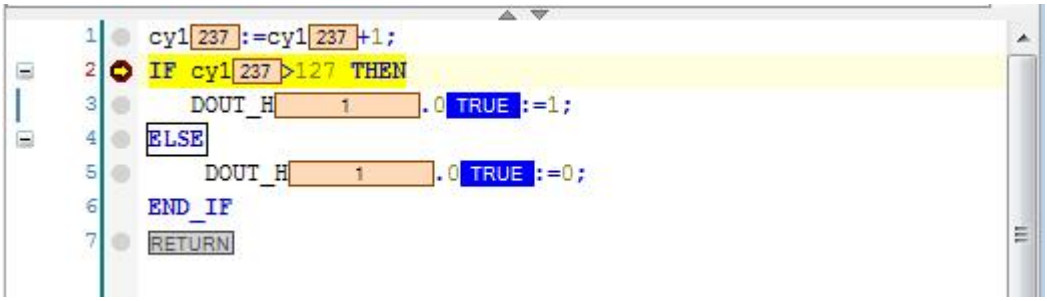


Click the menu Debug->start or press the shortcut F5 to run the program:

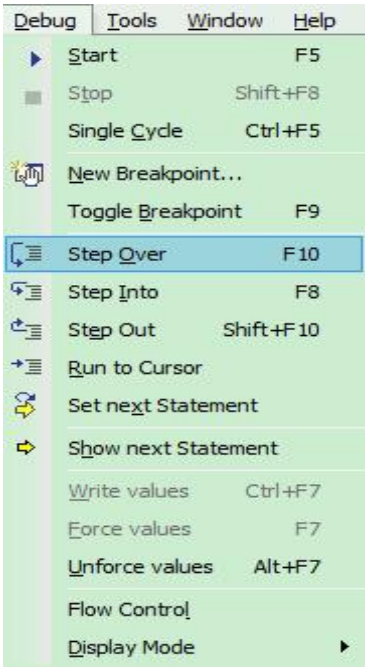
5.6.2. Breakpoint debugging

In order to debug the code while the program is running, we need to debug line by line, or stop in a certain line, then we need to use the CoDeSys breakpoint.

Click the menu Debug->Toggle Breakpint at the line of code where you want to set the breakpoint:

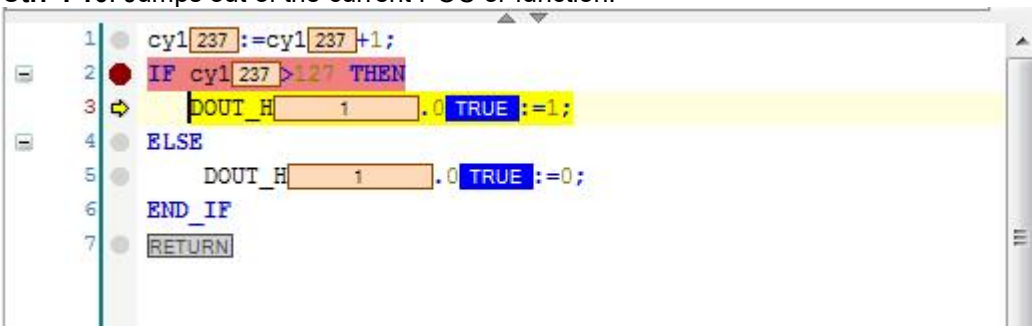


After the program is paused at the breakpoint, you can press shortcut keys such as F10, F8, Ctrl+F10 to debug.

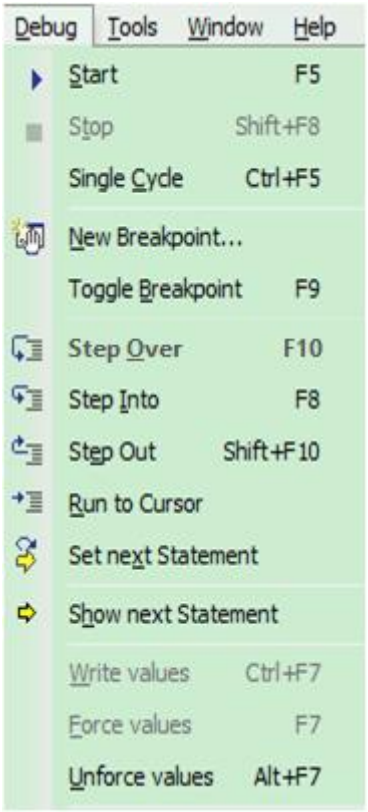


ANNOTATION

F10: step-by-step operation with POU or function as a unit
F8: step-by-step operation with POU or code line as a unit
Ctrl+F10: Jumps out of the current POU or function:



5.6.3. Force assignment

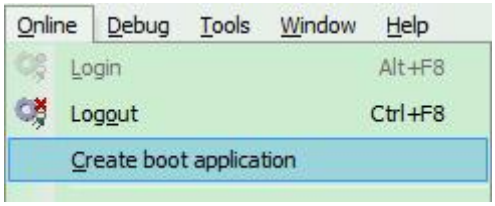


ANNOTATION

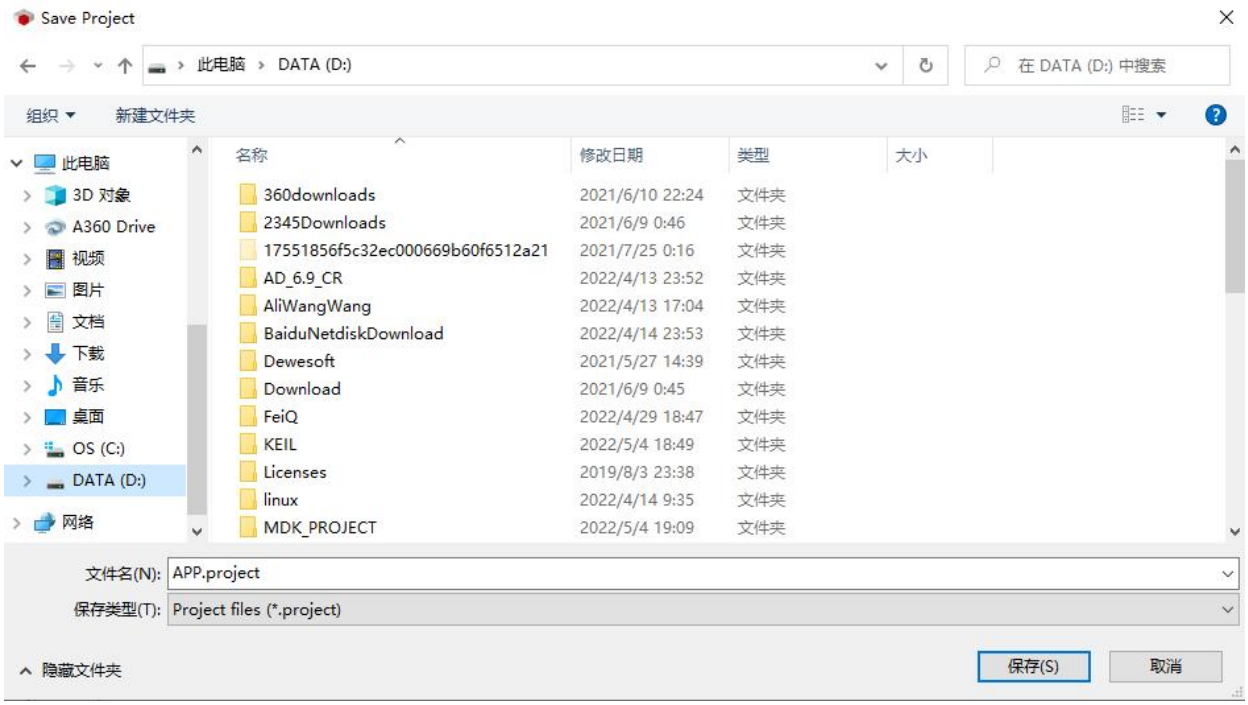
Write value(Ctrl+F7) and Force value(F7) functions are forced assignments, except that Write value can be changed by the control program the next time it is executed, Force value Refers to the value that is still mandatory at the next execution, and cannot be changed until it is released (Release force).

5.6.4. Save the application with the ".app"

Select "Online" and click "Create boot application":



Enter the file name, click "Save", the application is saved successfully.



6. Download

The IMCT7547D controller has a total of four CAN communication interfaces that can be restarted by shorting the BSL to ground , Download the application through the CAN1 port.

263	CAN1_H	CAN1, high signal
264	CAN1_L	CAN1, low signal

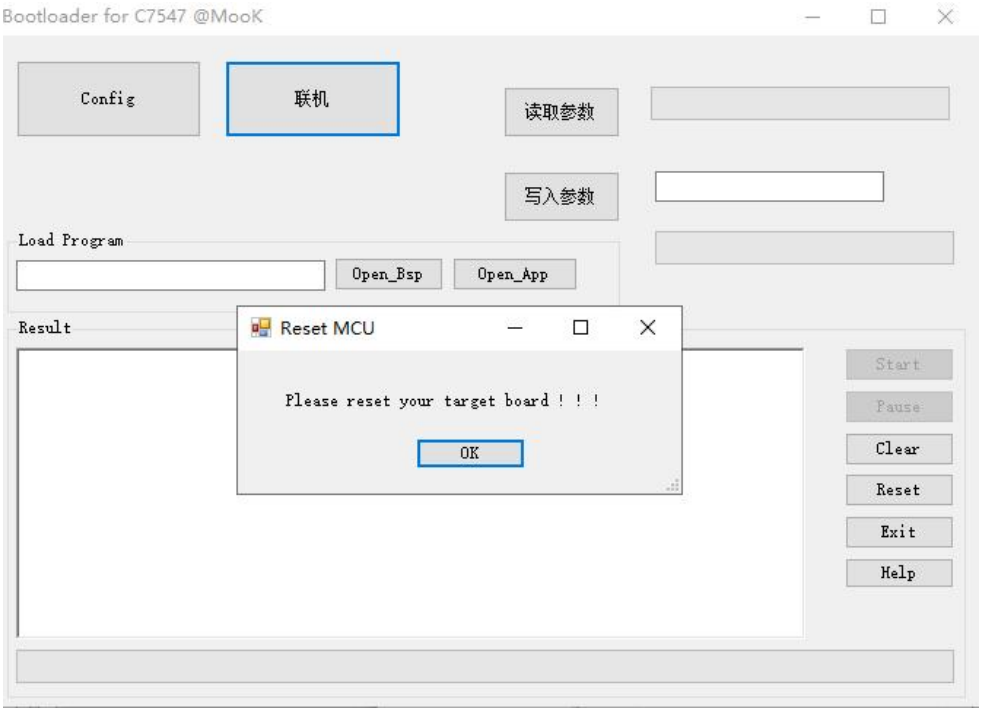
It is also possible to Download the application to the controller by logging without grounding the BSL port.

142	RXDIN	RS232 serial port reception
143	TXDOUT	RS232 serial port transmission

6.1. Download via BSL mode

This download method requires the controller to connect the computer through the CAN device and use the "MOOK IMC_T Tool V001" software. The specific Download method is as follows:

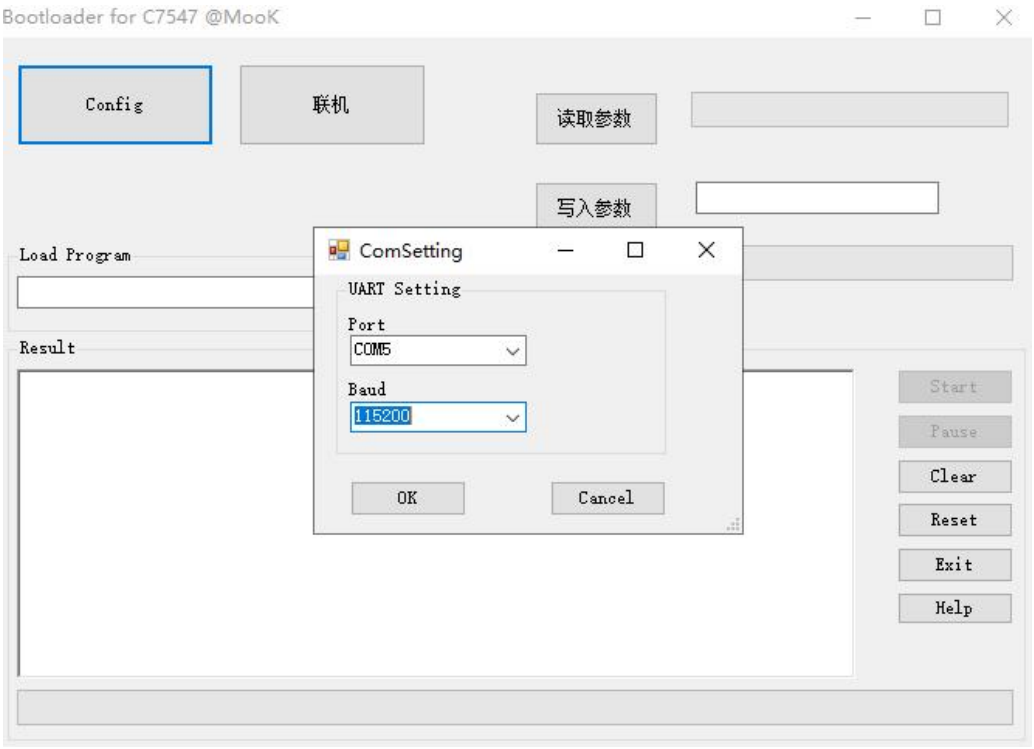
6.1.1. Set up online



⚠	**NOTE** The tool is available via a CAN device, and if the CAN device and CoDeSys are using the same device, then coDeSys gateways are required Turn it off first!

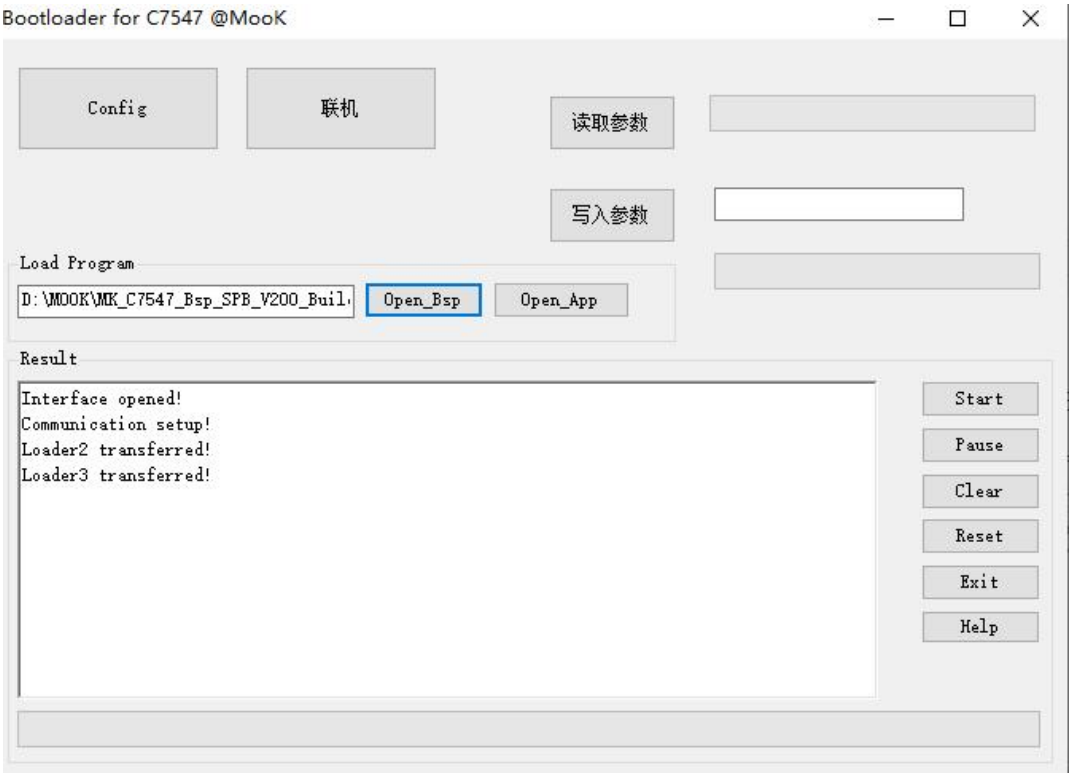
6.1.2. Set the baud rate

Set the baud rate used by Bootloader, the current system defaults to 500k.



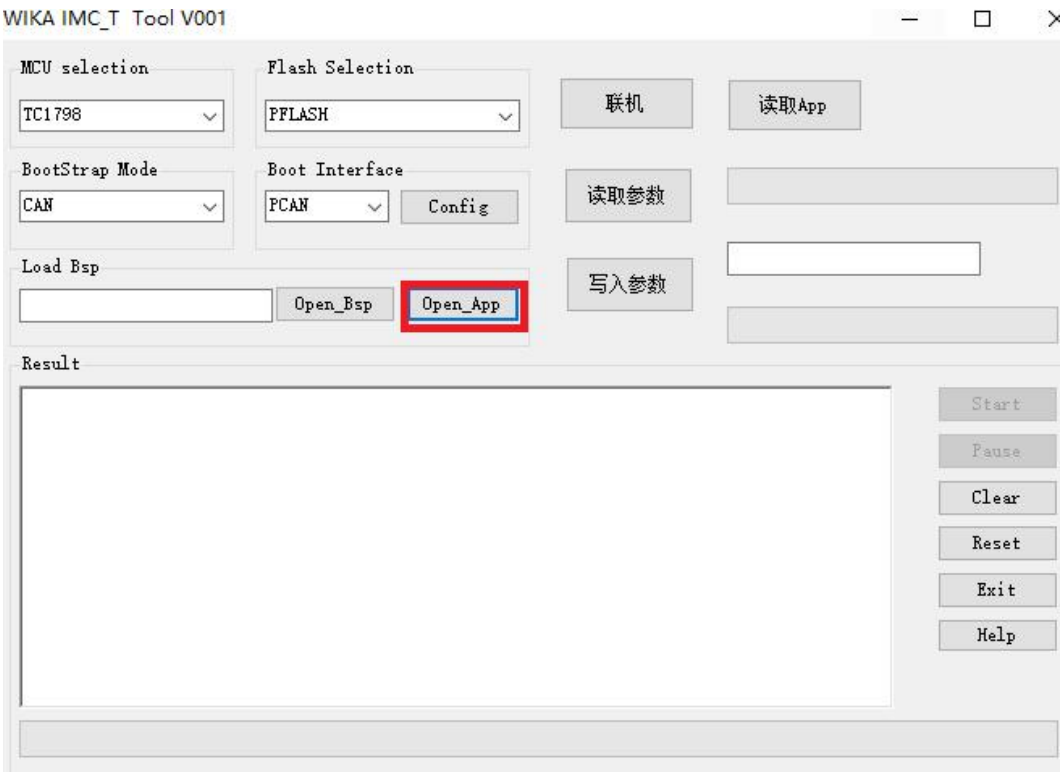
6.1.3. Connect

Short-circuit the BSL to ground and turn off the CodeSys Gateway before powering up, then power it on, After connecting, the system displays a success message in the information display area:



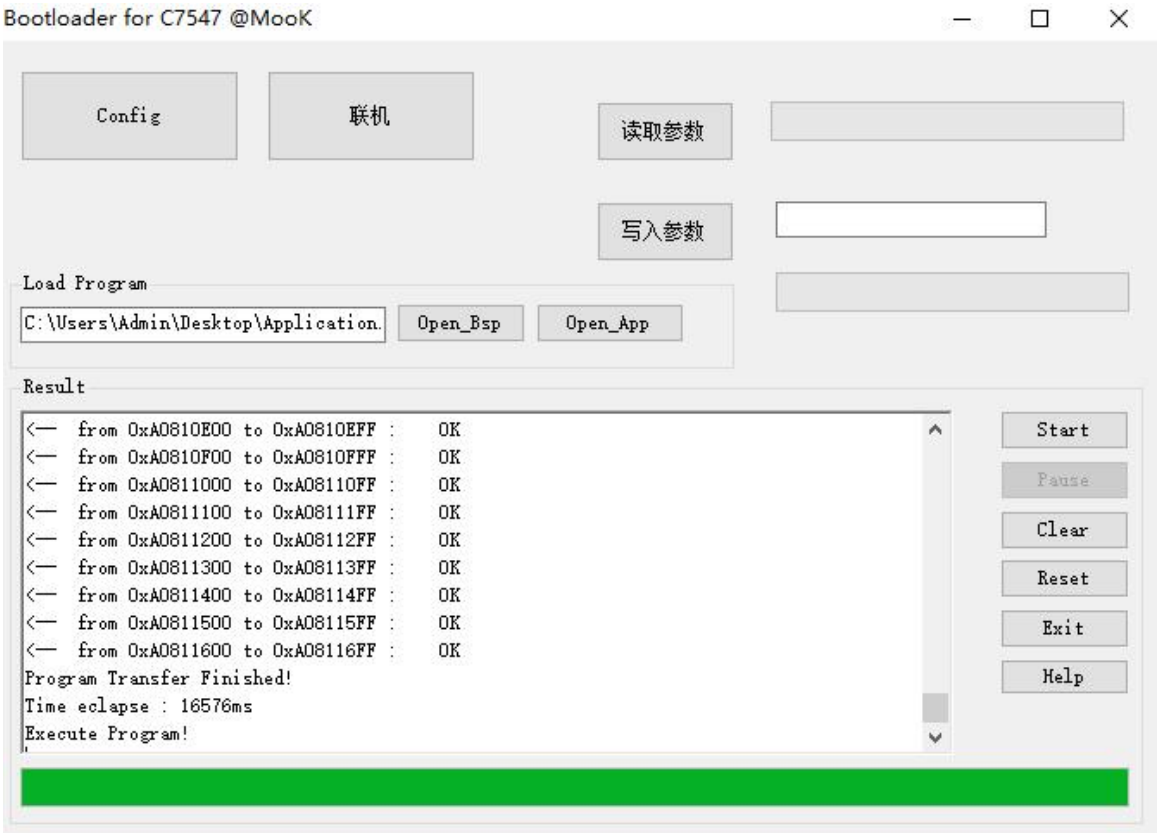
6.1.4. Flash the application

Click the "Open_App" button and select the app file you want to download:



Click Open and then click the start button and start downloading:

After successful download, the information area will prompt: "Successfully flashed":



6.2. Download the application via Login

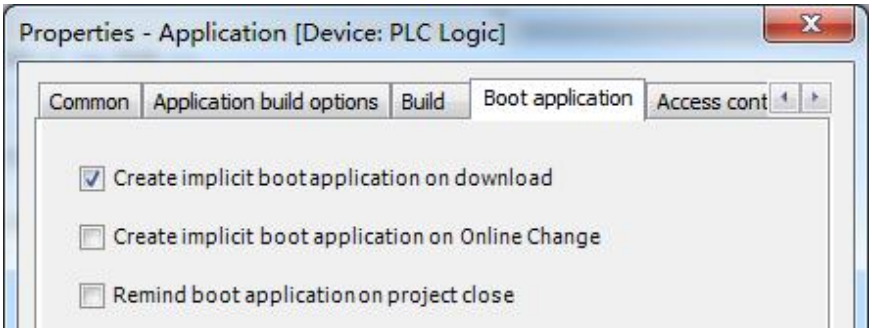
This flash method needs to be implemented through Codesys software, and flash is completed when login. Because it takes a long time to erase flash every time, this method is not recommended for code debug.

6.2.1. Select Properties

(1) Right-click Application while offline and select Properties.

6.2.2. boot application

(2) Check Create implicit boot application on download at the pop-up Boot application page



6.2.3. save the settings

(3) Click OK to save the settings.

6.2.4. Auto flash

(4) The application will be automatically written to the flash the next time the login is made.

	NOTE
⚠	Do not always use the "Login to the controller" operation during normal debugging, and should use this operation after the program debugging is basically free!

7. Troubleshooting

7.1. hardware failures and solutions

number	questions	solution
1	The port has no output when powered on	First check whether the power supply is normal, if the power supply is normal, please contact our service staff to communicate and solve.
2	The port does not collect a signal after power-on	First check whether the signal voltage is normal, if it is normal, please contact our service staff to communicate and solve.
3	CAN communication failure after power-on	First of all, check whether the external CAN cable is connected correctly, if the connection is normal, please contact our service staff to solve the problem.

7.2. Software failures and solutions

number	frequently asked questions	Workaround
1	CodeSys failed to come online	(1) Please confirm whether the CAN device or serial port driver has been installed; (2) Please confirm whether the CAN device or serial port is occupied, if it is occupied, close the application software and restart the Gateway; (3) Please replace the Gateway .cfg file under the correct path.
2	The controller stops running after loading the App program	Please confirm that there is no division or out-of-bounds in the application, if there is a PLC program will stop, and query the Device log for the error message "May be div 0 or Overflow".

7.3. Status LED description

- status LED indicates controller operating status:

LED status	description
All light off	No power is available
White light on	The controller is in Boot mode with BLS grounding or a control panic
Green light Flashing	The system is functioning normally
Red light Flashing	There is no App program
Blue light flashing	CAN1 port failure or warning

- The ERR indicator can be controlled by the customer according to their own requirement.