

SAVCH Programmable Logic Controller

Load Cell Module

User Manual & Application Case



Contents

Chapter 1 User Manual	1
1. Products receiving	1
2. Model description	1
3. Product model list & dimensions	1
4. Front / side view	2
5. Indicator Description	2
6. Power Supply Specification	3
7. Environmental Specifications for Product	3
8. Module Parameter Table	3
9. Load Cell Connections	3
10. Multiple-load-Cell Parallel Connections	4
11. Terminal connection diagram	4
12. Module parameter table (CR code means the corresponding Modbus register address)	5
13. Mounting and Installation	11
Chapter 2 Application Case	12
1. The Module is extended through the parallel port of the host	12
1.1 Load Cell Modules Power Supply	12
1.2 Load Cell Module Operation Procedure	12
1.3 Hardware Configuration	13
1.4 Weight 16-bit/32-bit display switching	13
1.5. Calibration methods and program examples	13
1.6 Read the current weight	16
1.7 Adjustment of stability and responsiveness of weighing value	16
1.8 Gross Weight and Net Weight	18
1.9 Automatic peeling 2DH (judged every 5S)	19
1.10 Weighing status	19
1.11 Standstill check function	19
1.12 Zero point detection function	20
1.13 Restore factory default parameters	20
2. Load cell module for remote IO	21
2.1 Load Cell Module power supply	21
2.2 Communication interface introduction	21
2.3 Communication protocol and default parameters	21
2.4 When Module is used for remote IO, Module communication parameter configuration method is introduced as follows:	21
2.5 Parameter configuration example: configuring the Module through programming software “remote Module tool”.	21
2.6 Examples of remote IO applications: reading Module real-time weight	23
2.7 Examples of remote IO applications: calibration	23

Chapter 1 User Manual

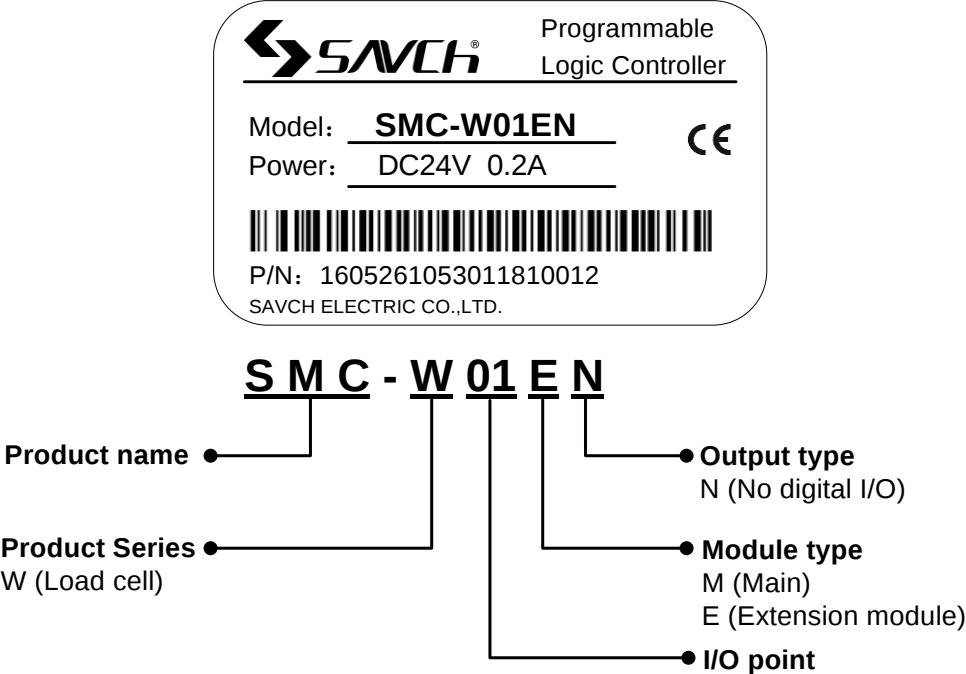
1.1 Products Receiving

All products have been performed with strict test and inspection. After receiving the product, the following checks shall be performed.

- To check that SAVCH product, an instruction manual is inside of the package
- To check whether model number correspond with model your purchase order.
- To check whether there are damaged parts during transportation and delivering. If there are, do not connect with power supply.

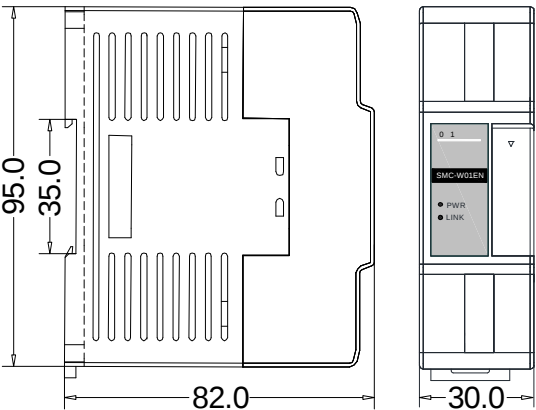
If any of the above checkpoints are not satisfactory, contact your SAVCH ELECTRIC representative for a quick resolution.

1.2 Model Description

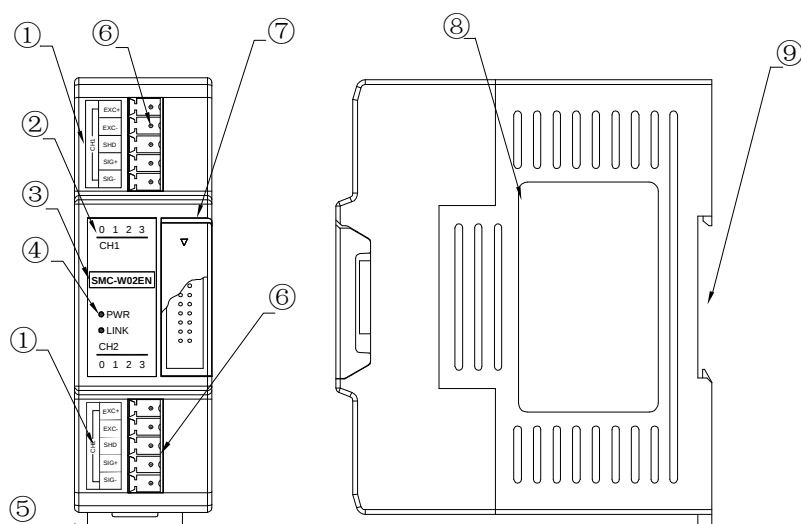


1.3 Product Model List & Dimensions

Model	Power Consumption	Dimension
SMC-W01EN	0.2 A	30×95×82mm
SMC-W02EN	0.3 A	



1.4 Front / side view



1. Terminal definition	6. Pluggable terminal
2. Weighing status indicator	7. Module expansion port
3. Model	8. Module nameplate
4. PWR:power indicator, LINK:Module communication indicator	9. 35mm DIN rail
5. DIN rail mounting slot	

1.5 Indicator Description

(1) PWR:Power indicator. Green, power is normal; No light - power is abnormal.

(2) 0:ON:gross weight; 1:ON:net weight;
2:ON:tare weight; 3:ON:calibration.

(3) LINK:Multi-status indicator .three colors (Red. Yellow. Green). As follows:

Reference processing mode	Module bus state	LINK indicator state
Normal	No communication of Module	No light
	MPU has identified the Module but no communication	Constant light in green
	Serial or parallel port in communication	Green jitter:indicator on 30ms and off 30ms
Parallel power supply insufficient, must connect to external power supply	Without serial or parallel port in communication	Yellow flicker:indicator on 0.5s and off 0.5s
	With serial or parallel port in communication	Yellow indicator off and jitter alternates:indicator off 0.5s and jitter 0.5s
Firmware upgrade failed, re-upgrade the Module firmware	Without serial or parallel port in communication	Red flicker:indicator on 0.5s and off 0.5s
	With serial or parallel port in communication	Red indicator off and jitter alternates:indicator off 0.5s and jitter 0.5s
Hardware failure	Without serial or parallel port in communication	Always on in red
	With serial or parallel port in communication	Red jitter quickly:indicator on 30ms and off 30ms

1.6 Power Supply Specification

Item	DC Power Supply
Power supply voltage	24VDC -15%~+20%
Power supply frequency	—
Instantaneous surge	MAX 20A 1.5ms @24VDC
Permit Power supply loss	10ms or less
Isolation Model	No Electrical isolation
Power Protection	DC input power polarity reverse, over voltage protection

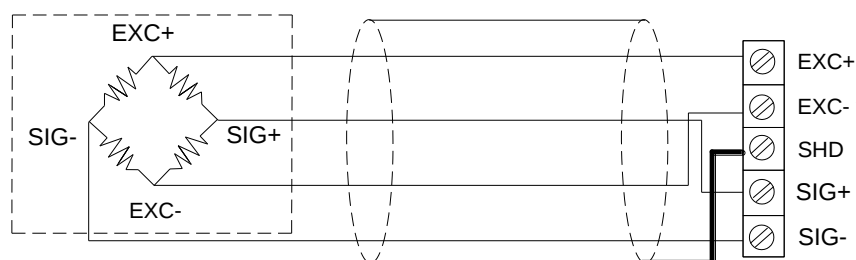
1.7 Environmental Specifications for Product

Item	Environment Specification
Temperature/humidity	Operating temperature:0~+55℃ Storage temperature:-25~+70℃ Humidity:5~95%RH, No condensation
Anti Vibration	10~57 HZ, amplitude=0.075mm, 57HZ~150HZ acceleration=1G, 10 times each for X-axis, Y-axis and Z-axis
Anti Shock	15G, duration=11ms, 6 times each for X-axis, Y-axis and Z-axis
Anti jamming	DC EFT:±2500V Surge:±1000V
Operating environment	Avoid dust, moisture, corrosion, electric shock and external shocks

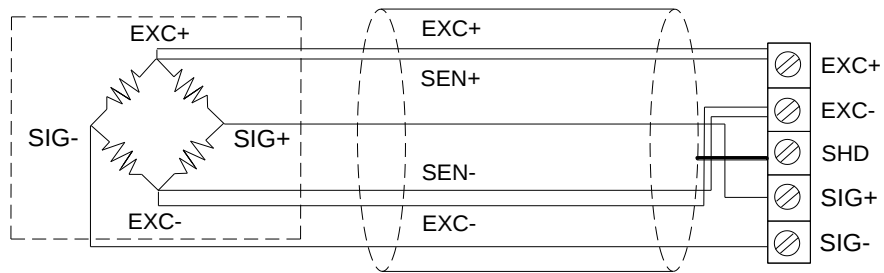
1.8 Module Parameter Table

Item	Specification
Power supply	24VDC±20%,0.2A
A/D conversion method	24Bits $\Delta \Sigma$
A/D conversion speed	6.25/12.5/25/50/100/200/500Hz
Internal resolution	24bits
linearity error	Static weighing≤ 0.02% FS
Excitation Voltage	5VDC ±5% , 125mA (it can connect with 4 load Cells each 350 Ω)
Sensor sensitivity	1mV/V~5 mV/V
Measurement pulse	0~2000Hz 24VDC
Load Cell form	4- line connection or 6-line connection load Cells
Maximum distance to connect the sensor	100 meters

1.9 Load Cell Connections

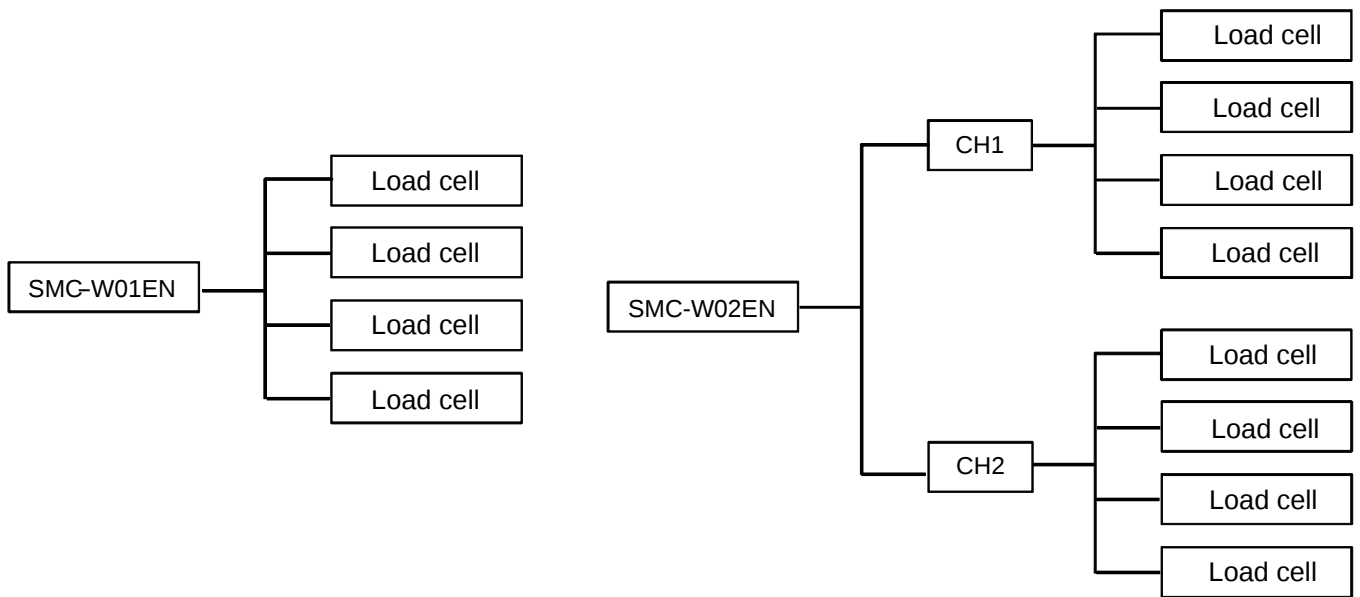


4-wire sensor and instrument connection

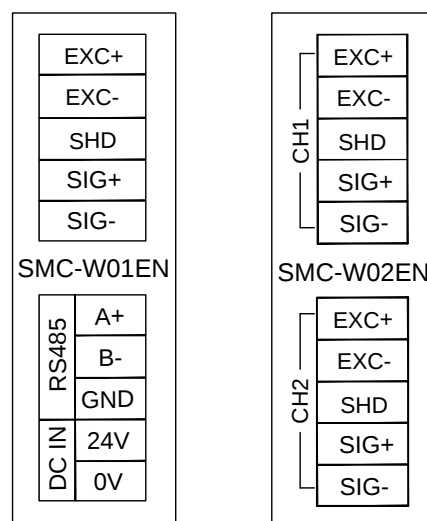


6-wire sensor and instrument connection

1.10 Multiple-Load-Cell Parallel Connections



1.11 Terminal Connection Diagram



1.12 Module Parameter Table (CR code means the corresponding Modbus register address)

Note:CR code is corresponding to the Modbus register address.

CR code(Hex) communication address	Function description	Property	Factory default	Remarks
00H	Low byte for Module code, Higher 3-bit of the High-Byte is ID number. Lower 5-bit of High-Byte is version number.	R	xxxx	
01H	Communication Address	R/W	1	Range:1~247
02H	Communication Protocol Low byte lower 4-bit: 0 - N,8, 2 For RTU 1 - E,8, 1 For RTU 2 - O 8, ,1 For RTU 3 - N,7, 2 For ASCII 4 - E,7, 1 For ASCII 5 - O,7, 1 For ASCII 6 - N,8, 1 For RTU Low byte higher 4-bit:0 – 2400 1 – 4800 2 - 9600 3 - 19200 4 - 38400 5 – 57600 6 - 115200	R/W	48 (19200, N,8, 2 RTU)	
03H	Module name	R/W		
04H	Module name	R/W		
05H	Module name	R/W		
06H	Module name	R/W		
07H	IP address, default 192.168.1.111	R/W	0x016F	
08H	IP address, default 192.168.1.111	R/W	0xC0A8	
09H	Month/date	R		
0AH	Year batch number	R		
0BH	High byte subnet mask(b3~b0,"1" means 255, "0" means 0, for example subnet mask 255.255.255.0 b3~b0=1110), low byte manufacturer code HW	R/W		Low byte code cannot be modified
0CH	Verification code	R		
0DH	Serial number low byte	R		
0EH	Serial number high byte	R		
0FH	Error Code 0:normal 1:illegal firmware identity 2:firmware incomplete 3:system data access exception 4:No external 24V power supply	R		
10H	Channel 1 average weight	R		
11H	Channel 1 status code bit0:No-load(zero point weight) bit1:exceed the upper limit of weight bit2:measurement value stable bit3~15:reserve	R		

CR code(Hex) communication address	Function description	Property	Factory default	Remarks
12H	Channel 1 real-time weight	R		
13H	Channel 1 uses 32-bit display flags: 0:16-bit weight display 1:32-bit weight display	R/W32	0	
14H~15H	Channel 1 Real-time Weight 32 Bit Value: 14H:32-bit low byte 15H:32-bit high byte	R	0	
16H~17H	The average weight of channel 1 is 32 bits: 16H:32-bit low byte 17H:32-bit high byte	R	0	
18H	Channel 1 Skin Weight Low Bytes	R/W	0	16 bits to 18H, 32 bits to 18H19H
19H	Channel 1 Skin Weight High Bytes	R/W	0	
1AH	Channel 1 Control Setting Bit 0:Reservation Bit 1:Gross/Net Weight Display, 0-Gross Weight, 1-Net Weight Bit2-15:Reservation	R/W	0	Switch the current display weight to rough weight or net weight, us the value of 19H to work as tare weight
1BH	Channel 1 sampling frequency 0-7.5Hz,1-15Hz,2-30Hz,3-60Hz,4-120Hz, 5-240Hz,6-480Hz,7-960Hz	R/W	3	range:0~7
1CH~1DH	Reserve	R		
1EH	Channel 1 average number of times	R/W	10	range:1~100
1FH	Channel 1 filter ratio	R/W	2	range:0~5
20H	Channel 1 stability examination times	R/W	5	range:0~500
21H	Channel 1 stability examination range	R/W	10	range:0~10000
22H	Channel 1 zero point tracking intensity 0 :close zero point tracking function Others:zero-point tracking intensity (absolute value)	R/W	0	Absolute value, range:0~200
23H	Channel 1 zero point detection range	R/W	10	Absolute value, range:0~10000
24H	Channel 1 upper limit of weight Set the upper limit value of weight, when measurement value is over the set value will record error code.	R/W	32767	
25H	Channel 1 Skin Weight Read (Settings) At 16-bit display, the current weight value (10H) is read as the weight value of the leather weight and stored at 18H. When 32-bit display, read CR16H and CR17H as skin weight Z value, and store them at 18H and 19H.	R/W	0	0:no operation 1:Read the weight value as the tare weight and store it at 18H and 19H. Others:Invalid

CR code(Hex) communication address	Function description	Property	Factory default	Remarks
26H	Channel 1 Calibration Weighing Instruction Supports Maximum 3-segment Calibration. Write value 1:Enter calibration mode and zero current average weight. Write value 2:End the calibration process. ----- User proofreading steps (16 bits): Step1:No weights on the weighing unit. Step2:CR26H write value 1, enter calibration mode. Step3:Paragraph 1. Calibration. Add a standard weight to the weighing unit and write the weight of the current chassis into CR27H. Step4:If you need to calibrate the second paragraph, add another standard weight to the weighing unit and write the weight on the current chassis to CR29H. If you don't need it, go to Step6. Step5:If you need to calibrate paragraph 3, add another standard weight to the weighing unit and write the weight on the current chassis into CR2BH. If you don't need it, go to Step6. Step 6:CR26H Writes value 2 to end the calibration process. ----- User calibration step (32 bits): Step1:No weights on the weighing unit. Step2:CR26H write value 1, enter calibration mode. Step3:Paragraph 1. Calibration. Add a standard weight to the weighing unit and write the weight on the current chassis into CR27H 28H. Step4:If the second calibration is needed, add another standard weight to the weighing unit and write the weight on the current chassis into CR29H 2AH. If not, go to Step6. Step5:If you need to calibrate paragraph 3, add another standard weight to the weighing unit and write the weight on the current chassis into CR2BH 2CH. If you don't need it, go to Step6. Step 6:CR26H Writes value 2 to end the calibration process	R/W	0	Before use, the weight adjustment should be completed step by step.
27H	Low bytes of base weight of weights in channel 1, paragraph 1	R/W	2000	

CR code(Hex) communication address	Function description	Property	Factory default	Remarks
28H	High bytes of base weight of weights in channel 1, paragraph 1	R/W	0	
29H	Low bytes of base weight of weights in channel 1, paragraph 2	R/W	0	
2AH	High bytes of base weight of weights in channel 1, paragraph 2	R/W	0	
2BH	Low bytes of base weight of weights in channel 1, paragraph 3	R/W	0	
2CH	High bytes of base weight of weights in channel 1, paragraph 3	R/W	0	
2DH	Automatic peeling range of channel 1	R/W	0	
2EH	Channel 1 Weight Upper Limit Low Bytes (32 Bit Display)	R/W	32767	
2FH	Channel 1 Weight Upper Limit High Bytes (32 Bit Display)	R/W	32767	
30H~4FH	Reserve	R	0	
50H	Channel 2 average weight	R		
51H	Channel 2 status code: bit0:no-load (zero point weight) bit1:exceed the weight upper limit bit2:stability of measurement value bit3~15:reserved	R		
52H	Channel 2 Real-time weight	R		
53H	Channel 2 uses 32-bit display flags: 0:16-bit weight display 1:32-bit weight display	R/W32		
54H~55H	Channel 2 Real-time Weight 32 Bit Value: 54H:32-bit low byte 55H:32-bit high byte	R		
56H~57H	The average weight of channel 2 is 32 bits: 56H:32-bit low byte 57H:32-bit high byte			
58H	Channel 2 Skin Weight Low Bytes	R/W	0	16 bits only use 58H, 32 bits use 58H 59H.
59H	Channel 2 Skin Weight High Bytes	R/W	0	
5AH	Channel 2 Control Setting Bit 0:Reservation Bit 1:Gross/Net Weight Display, 0-Gross Weight, 1-Net Weight Bit2-15:Reservation	R/W	0	Switch the current display weight to wool Weight or net weight, used in calculation the value of 58H and 59H as tare weight
5BH	Channel 2 sampling frequency 0-7.5Hz,1-15Hz,2-30Hz,3-60Hz,4-120Hz, 5-240Hz,6-480Hz,7-960Hz	R/W	3	range:0~7
5CH-5DH	Reserved	R		
5EH	Channel 2 average number of times	R/W	10	Range:1~100

CR code(Hex) communication address	Function description	Property	Factory default	Remarks
5FH	Channel 2 filter ratio	R/W	2	range:0~5
60H	Channel 2 standstill checking times	R/W	5	range:0~500
61H	Channel 2 standstill checking range	R/W	2	range:0~10000
62H	Channel 2 zero tracking intensity 0 :close zero tracking function others:show zero tracking intensity (absolute value)	R/W	0	Absolute value, range:0~200
63H	Channel 2 zero-point detection range	R/W	10	Absolute value, range:0~10000
64H	Channel 2 weight upper limit Set the upper limit value of weight, when measurement value is over the set value will record error code	R/W	32767	
65H	Channel 2 Skin Weight Read (Settings) When 16-bit display, read the current weight value (50H) as the weight value of the leather weight and store it at 58H. When 32-bit display, read CR56H and CR57H as skin weight Z value and store them at 58H and 59H.	R/W	0	0:no operation 1:Read the weight value as the tare weight and store it at 58H,59H. Others: Invalid
66H	Channel 1 Calibration Weighing Instruction Supports Maximum 3-segment Calibration. Write value 1:Enter calibration mode and zero current average weight. Write value 2:End the calibration process. ----- User proofreading steps (16 bits): Step1:No weights on the weighing unit Step2:CR66H write value 1, enter calibration mode. Step3:Paragraph 1. Calibration. Add a standard weight to the weighing unit and write the weight on the current chassis into CR67H. Step4:If you need to calibrate the second paragraph, add another standard weight to the weighing unit and write the weight on the current chassis to CR69H. If you don't need it, go to Step6. Step5:If you need to calibrate paragraph 3, add another standard weight to the weighing unit and write the weight on the current chassis into CR6BH. If you don't need it, go to Step6. Step 6:CR66H write value 2, end calibration process ----- User calibration step (32 bits):	R/W	0	Before use, the weight adjustment should be completed step by step.

CR code(Hex) communication address	Function description	Property	Factory default	Remarks
	Step1:No weights on the weighing unit Step2:CR66H write value 1, enter calibration mode. Step3:Paragraph 1:Calibration. Add a standard weight to the weighing unit and write the weight on the current chassis into CR67H 68H. Step4:If the second calibration is needed, add another standard weight to the weighing unit and write the weight on the current chassis into CR69H 6AH. If not, go to Step6. Step5:If the calibration of paragraph 3 is required, add another standard weight to the weighing unit and write the weight on the current chassis into CR6BH 6CH. If not, go to Step6. Step 6:CR66H write value 2, end calibration process			
67H	Low bytes of base weight of weights in channel 2, paragraph 1	R/W	2000	
68H	High bytes of base weight of weights in channel 2, paragraph 1	R/W	0	
69H	Low bytes of base weight of weights in channel 2, paragraph 2	R/W	0	
6AH	High bytes of base weight of weights in channel 2, paragraph 2	RW	0	
6BH	Low bytes of base weight of weights in channel 2, paragraph 3	RW	0	
6CH	High bytes of base weight of channel 2, paragraph 3	RW	0	
6DH	Automatic peeling range of channel 2	RW	0	
6EH	Channel 2 Weight Upper Limit Low Bytes (32Bit Display)	RW	32767	
6FH	Channel 2 Weight Upper Limit High Bytes (32Bit Display)	RW	32767	
70H-9EH	Reserved	R	0	
9FH	Restoring factory parameters of configurable CR	RW	1	The default value is 1 and 0 is written to the CR to restore the factory parameters of the configurable CR.

1.13 Mounting and Installation

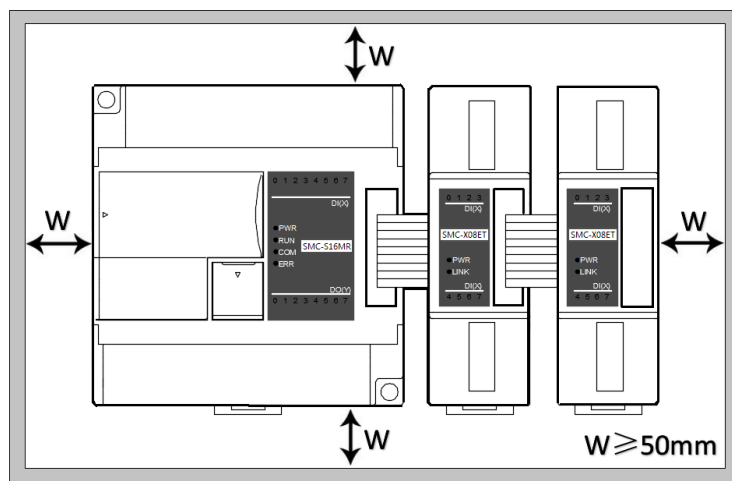
The PLC should be secured to an enclosed cabinet while mounting. For heat dissipation, make sure to provide a minimum clearance of 50mm between the unit and all sides of the cabinet.

Rail mounting: Use standard 35 mm rail.

Screw mounting: Each MPU or extension Module has two positioning screw holes, the diameter of the hole is 4.5mm. Please refer to the dimension figure for the location of the positioning holes and their spacing.

To avoid over temperature and for a better heat dissipation, do not mount PLC to a position near to the bottom/top of the cabinet. Do not mount PLC in vertical direction.

Extension Module wiring: Connections between extension Modules and connections between Module and MPU are achieved through bus. A extension cable will be configured to every extension Module, for the connection between two different Modules. Connection methods: turn the right side of extended interface (the last MPU or extension Module) over, plug the extension cable in the extended interface, then press down the cover of the extended interface to reset the interface, the extended interface at the right side of the Module will be reserved for extension of the next Module. Connect all extension Modules in turn in the same way.



Chapter 2 Application Case

(The sample program is SMC-W01EN and SMC-W02EN 1 channel program, the method of using 1, 2 channels is the same, as long as the CR number is changed to the corresponding value of the second channel.)

2.1 The Module is Extended Through the Parallel Port of the Host

2.1.1 Load cell modules power supply

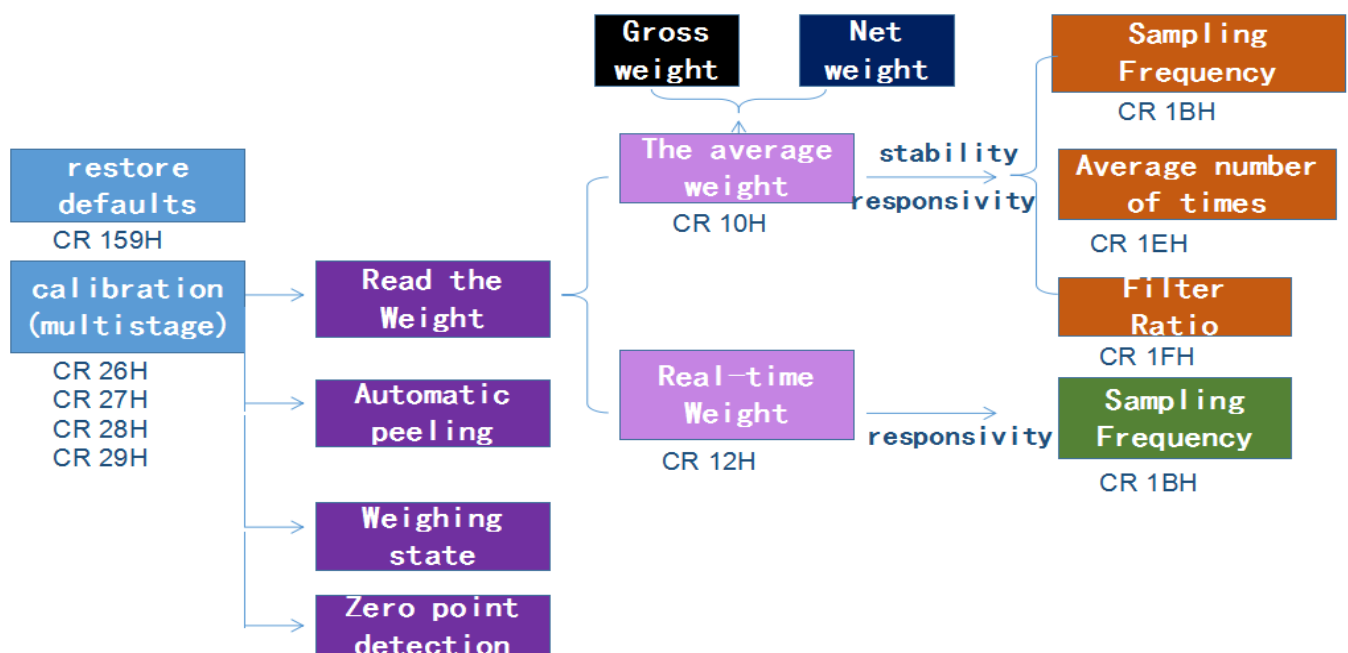
All expansion Modules of SAVCH do not require external power supply, can be directly powered by the parallel port of the host.

If the PLC is 24VDC power supply, the external switching power supply is supplied to the host, and the extensions are powered by the parallel port from the host plc. The Module power supply is essentially from the external switch power supply, so the Module needs no additional external power supply. If the expansion Module has insufficient power supply (the PWR light on the Module is not bright), the external switching power supply capacity is not enough. The correct approach is to enlarge the power supply of the external switch power.

If the host PLC is 220VAC power supply, the extension Modules are powered by the parallel port from the host plc, the expansion Module does not need to connect the external power supply; if the expansion Module is in insufficient power supply (the PWR lamp on the Module is not bright), the correct approach is to supply the power supply Module only by a single switch power supply. (This case happens when the number of expansion Modules is too big and external loads are too much).

SAVCH extension Module can be used as remote IO, so it will not be restricted by the number of system I/O points, and can be installed distributively, reducing cable wiring and solving the problem of interference caused by the long distance of traditional wiring. When Modules are used as remote IO, they need power to be supplied externally. The external power supply of the Module is optional with 24VDC and 220VAC.

2.1.2 Load cell module operation procedure



When we get the weighing Module.

The first step: Calibration. The weight can be read directly after calibration.

The second step: Read the weight. One is average weight and the other is real-time weight. We usually read average weight.

The third step: Adjust the stability and responsiveness of weighing. The above two factors affect the sampling frequency, average number and filtering rate. Therefore, we can adjust the above three parameters get proper stability and responsiveness .

The fourth step: In order to make the usage more convenient, we also provide the status-value for the load Cell Module, if the current status is like no-load, exceeding the upper limit, or value measurement with stability. We can achieve the automatic judgment control of weighing. At the same time, it also has the functions of gross weight setting, zero-point tracking, automatic tare-removing, and so on.

To introduce the weighing Module programming and practical use.

2.1.3 Hardware configuration

In this case, the host is N40S2T, with a load Cell Module, so the hardware configuration is as follows:

Index	Module type	X Component	Y Component	AI Component	AQ Component	Other	Description
0	SMC-M16MT(-e)	X0 - X7	Y0 - Y7			COM1-2 HSC0-3 PLS0-3	CPU module 8*DI 8*DO transistor AC220V pow
1	SMC-W01EN						1 channel weighing module, built-in RS485 con

2.1.4 Weight 16-bit/32-bit display switching

Module weight 16-bit display and 32-bit weight display are two modes. Take Channel One as an example, 16-bit/32-bit weight switching can be realized by CR13H, 16-bit display for 13H writing 0 and 32-bit display for writing 1. The program example is as follows.

//Network 1 Switch on 16 bits / 32 bits. Display 16-bit value when M20 is OFF or 32-bit value when M20 is ON.



2.1.5. Calibration methods and program examples

The weighing module supports three-stage calibration and can realize multi-range and one-time scale calibration. Taking Channel 1 as an example, the calibration steps are as follows:

User operation steps:

Step1:No weight is put on the weighing unit.

Step2:CR26H write value 1, enter the calibration mode;

Step3:In the first paragraph, a standard weight is added to the weighing unit, 16-bit scale writes the weight on the current chassis into CR27H, 32-bit scale writes into CR27H and CR28H, if no multi-stage calibration criteria are needed to Step6;

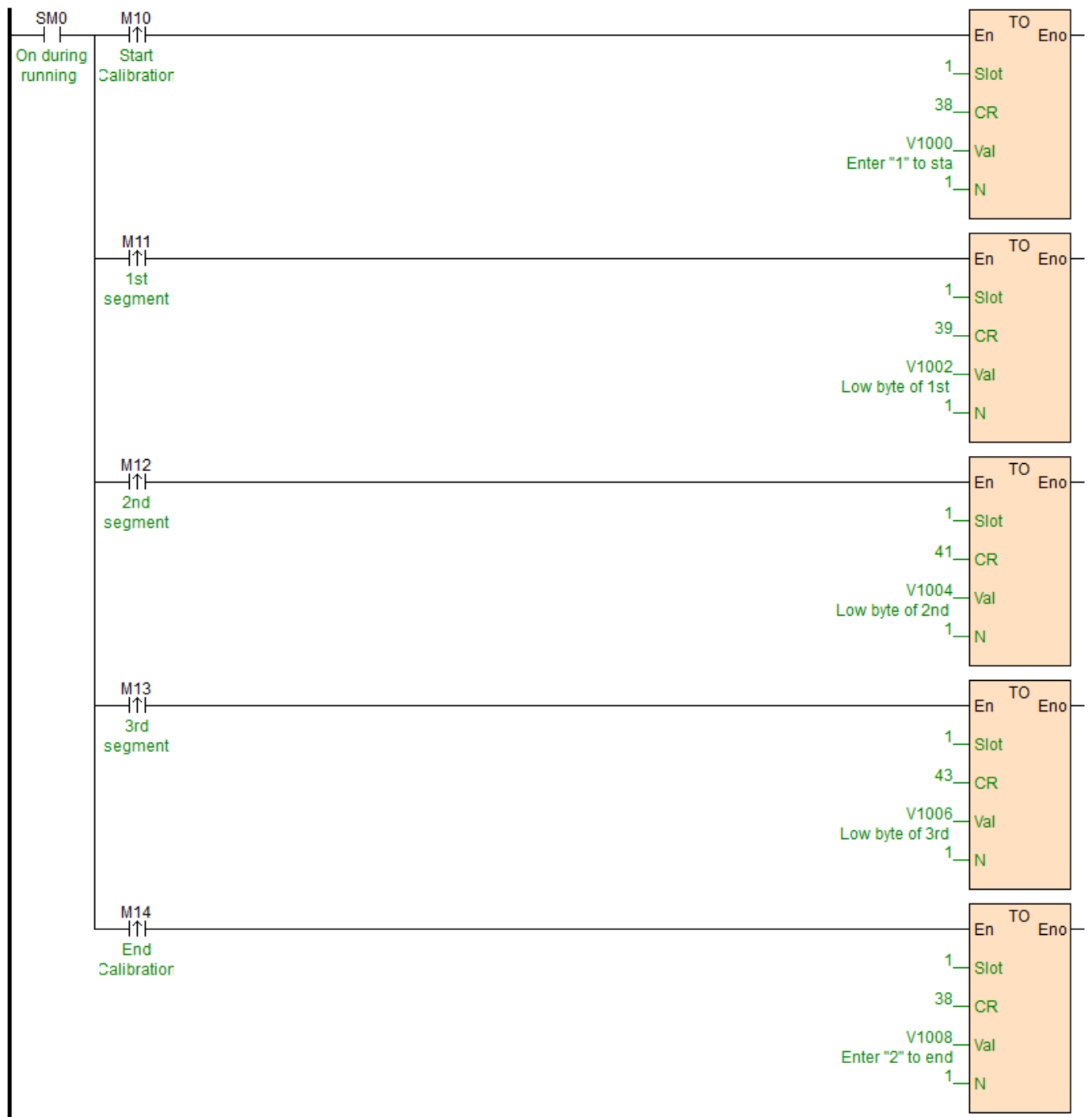
Step4:If the second calibration is needed, add another standard weight to the weighing unit, 16-bit scales will write the weight on the current chassis into CR29H, 32-bit scales will write into CR29H and CR2AH, if there is no need for multi-stage calibration criteria to Step6;

Step5:If you need the calibration in paragraph 3, add another standard weight to the weighing unit, 6-bit scales will write the weight on the current chassis into CR2BH, 32-bit scales will write into CR2BH and CR2CH, if not to Step6;

Step6:CR26H writes value 2 to end the calibration process.

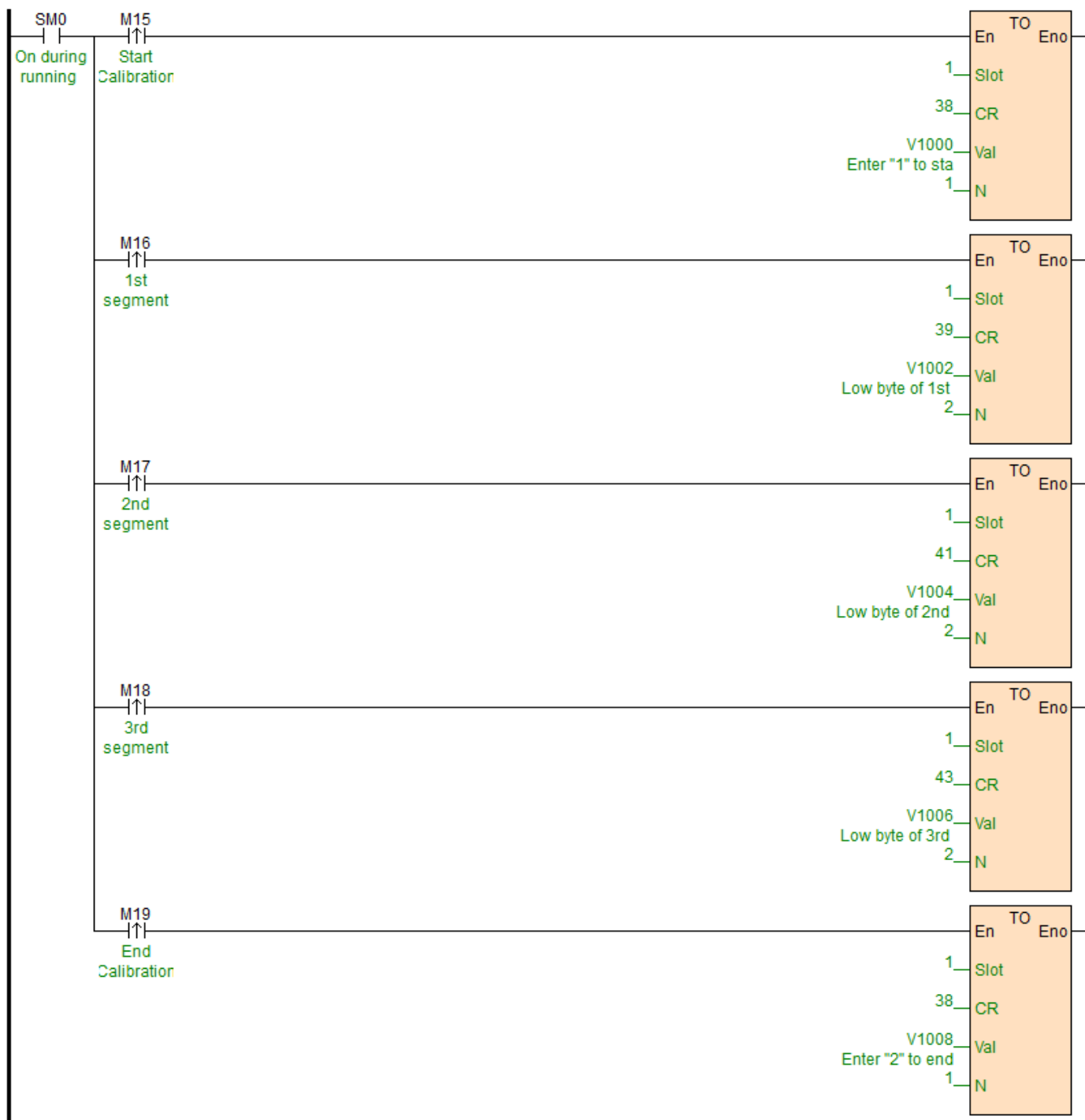
Examples of multi-section calibration procedures are as follows:

//Network 3 16bitsCalibration



An example of 32-bit multi-segment calibration program is as follows:

//Network 5 32bitsCalibration



2.1.6 Read the current weight

The weight read by module is divided into average weight and real-time weight. Usually we read average weight. The average weight CR of 16 bits is 10H, and the real-time weight CR of 16 bits is 12H.

The program example is shown below.

//Network 2 The readings of average weight and real-time weight (16 bits). The values will be shown in CR10 and CR12.



The average weight CR of 32 bits is 16-17 H, and the real-time weight CR of 32 bits is 14-15 H. The sample program is as follows.

//Network 3 The readings of average weight and real-time weight (32 bits). The value will be shown in CR16(low byte), CR17(high byte), CR14(low byte), CR15(high byte).



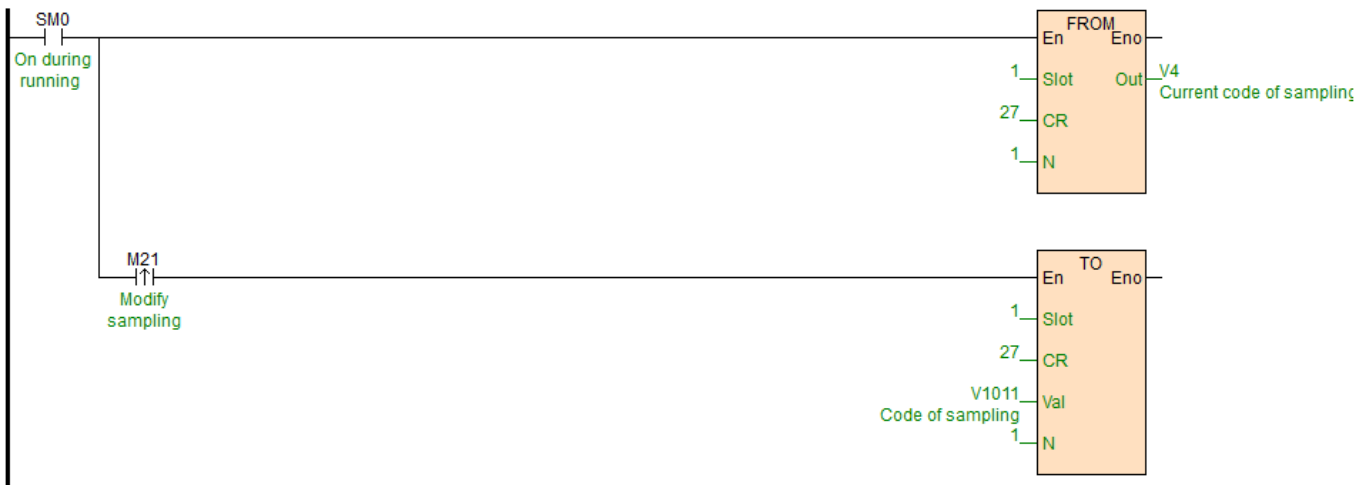
2.1.7 Adjustment of stability and responsiveness of weighing value

The stability and responsiveness of the weight read by the module will be adjusted according to different requirements in practical applications. The two factors that affect the stability and responsiveness of the module are sampling frequency, average number of times and filtering ratio. So we can adjust the above three parameters to achieve the adjustment of stability and responsiveness.

1BH: Sampling Frequency

Sampling frequency, that is, the number of sampling times in one second, such as 1BH = 3, that is, 60 times of weight in one second. The quicker the sampling times are, the faster the average calculation is, so the quicker the average and real-time weights of weighing are updated. But the stability decreases with the increase of sampling times.

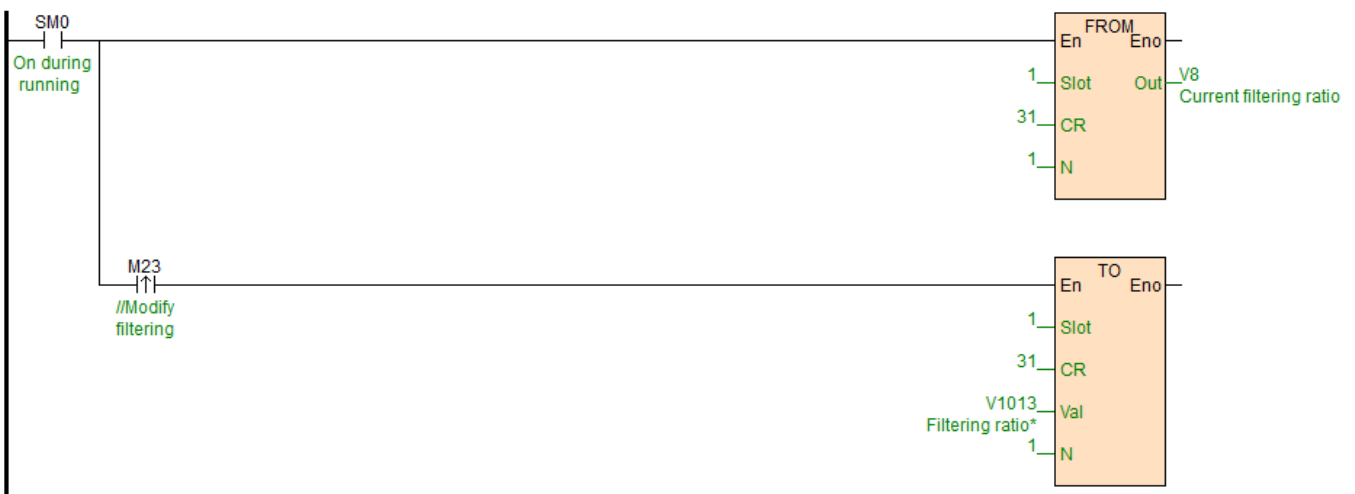
//Network 1 Sampling frequency 0 - 6.25Hz, 1 - 12.5 Hz, 2 - 25 Hz, 3 - 50 Hz, 4 - 100 Hz, 5 - 200 Hz, 6 - 500Hz, 7 - 1000Hz



1FH: Filtering Ratio

The larger the register value is, the larger the filtering ratio is, the more stable the average weight value (10H), but the delay will increase and the sensitivity will decrease. The function of filtering is to filter the abrupt change so that the average value of the filter can not be affected by the abrupt change. The filtering scale ranges from 10% to 50%. The default is 2, that is, 20%, assuming the average number of times is 10, then the system will arrange the 10 data collected from large to small, and the filtering ratio is 20%. That is to say, two data will be screened out, that is, one maximum value will be removed, another minimum value will be removed, and finally an average value will be obtained.

//Network 3 Filtering ratio: 0~5



1EH: Average Number

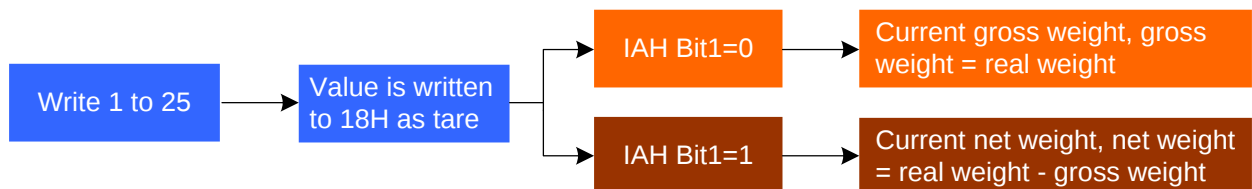
The larger the register value, the more the number of samples, the more accurate the average weight (10H), but the slower the update speed. The default is 10, that is, every 10 weight data collected, the average value is calculated once and the average weight is updated.

//Network 2 Average number : 1~100

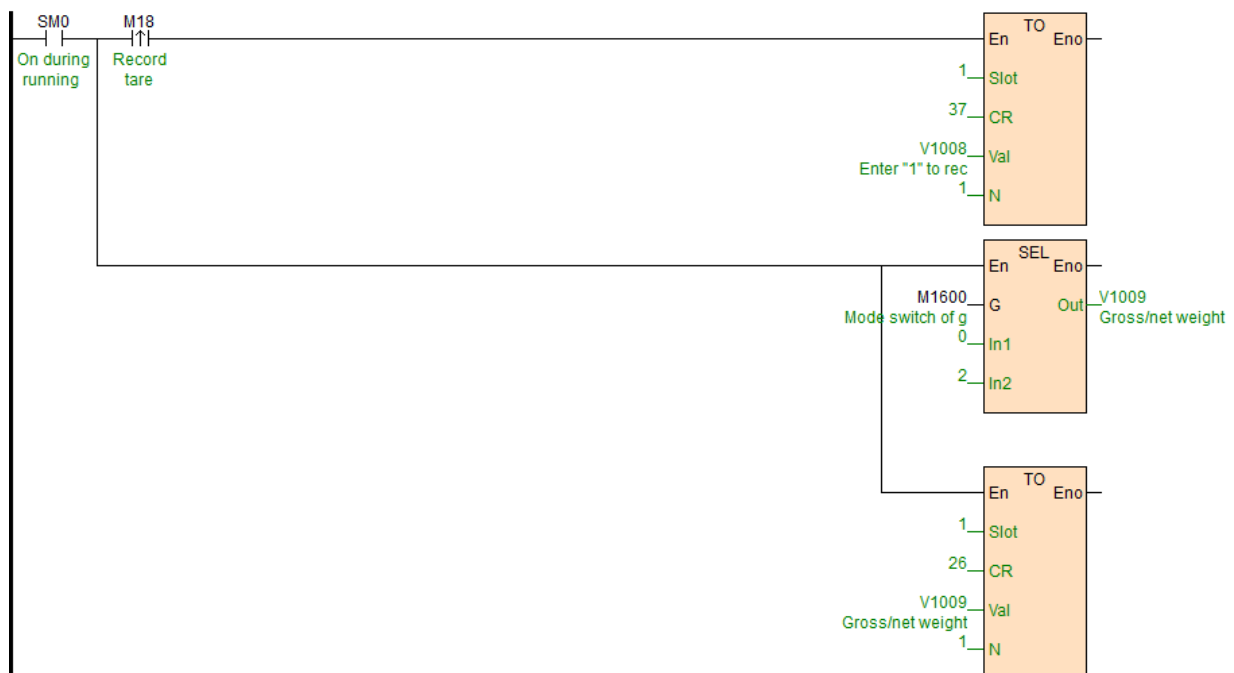


2.1.8 Gross weight and net weight

1. When the value of 25H is written to 1 and the weight value is 16-bit display, the current 16-bit weight value (10H) is read as the weight value of the leather weight, and the weight value is read as the weight value of the leather weight; when stored in 18H and the weight value is 32-bit display, the current 32-bit weight value (16H 17H) is read as the weight value of the leather weight, and stored in 18H and 19H.
2. 18H, 19H store the skin weight value.
3. Enable control settings. It is controlled by Bit1 bit of 1AH. Bit1 = 0 - Gross weight, Bit1 = 1 - net weight. Switching the current display weight to gross or net weight, the calculation uses the value of 18H (16 bits)/18H19H (32 bits) as the tare weight.



//Network 2



2.1.9 Automatic peeling 2DH (judged every 5S)

The weighing platform or equipment will cause dust or residue scattering during weighing process, which will cause the platform to peel automatically when the current weight is not zero without placing any weighing items. If the automatic peeling function is used, as long as the current weight is less than the set automatic peeling weight 2DH value, the weighing module will peel automatically the current value.

//Network 1 *****Automatic Peeling*****The default value is 0.



2.1.10 Weighing status

The module weighing block can also determine the status of the scale and record the special CR register 11H. The status code of 11H is as follows:

Bit0: When the bit is 1, it means that the weighing unit is in no-load state, and the judgment range of no-load is set on CR 23H.

Bit1: When this bit is 1, it means that the upper load of the weighing unit exceeds the set upper weight limit, and the upper weight limit CR is 24H.

Bit2: When this bit is 1, it means that the measurement of weighing unit reaches a stable state, and the range value of stability judgment and the number of checks are on 20H and 21H.

Each state can convert the value of register into place with wtob instruction for quick check.

//Network 2 Weighing status



2.1.11 Standstill check function

When the item is placed on the load Cell to measure weight, the standstill check function can be used to know whether the current measurement is stable.

if the amplitude of the measured value is within the checking range set by CR 21H, the relevant Bit of CR11H will be set to 1.

If the measured value exceeds the set range of standstill, the relevant stable-Bit of the CR 11H will be set to 0, until the standstill check number 20H is within the checking range, and the relevant stable-Bit of the CR 11H will be then set to 1.

For example, the measurement time is 10ms, the standstill check times is set to 10 times, the checking range is 1000, when the variation range exceeds 1000, the measurement value is unstable, that is, the relevant stable-Bit of CR 11H will be set to 0, when the 100ms (10*10ms) variation range is within the checking range 1000, the relevant stability-Bit will be reset to 1 again. It is recommended to judge the stability before controlling it.

2.1.12 Zero point detection function

Zero point tracking is related to address CR22H and CR23H.

Zero tracking density for CR 22H Channel 1. 0:close zero point tracking function; other values (absolute value) for zero tracking. Under normal circumstances, it shows 0 after calibration. Sometimes, however, there is a small fluctuation due to equipment jitter and other reasons. This fluctuation range is defined as 0 if it is in the tolerable range set by CR22H.

2.1.13 Restore factory default parameters

The default parameter to restore the factory is CR 9FH register. The CR will remain at 1 during normal operation. When the factory value is restored, write CR to CR[159], and then restore the factory value after re-powering.

//Network 3 Restore factory settings



Recoverable CR include:

1. 32-bit display [CR19/CR83] (0/16-bit display)
2. Skin weight [CR24 25/CR88 89] (0)
3. Gross/Net Weight Display [CR26/CR90] (0/Gross Weight)
4. Automatic peeling range [CR45/CR109] (0)
5. Sampling frequency [CR27/CR91] (2/30Hz)
6. Average number of times [CR30/CR94] (10)
7. Filtering Proportion [CR31/CR95] (2)
8. Number of stability checks [CR32/CR96] (5)
9. Stability check range [CR33/CR97] (2)
10. Zero Judgment Scope [CR35/CR99] (10)
11. Weight upper limit [CR36/CR100] (32767)
12. Zero tracking strength [CR34/CR98] (0)
13. Channel 1 and 2 base point weights 1 low byte [CR39/CR103] (2000)
14. Channel 1 and 2 base weight 1 high byte [CR40/CR104] (0)
15. Channel 1 and 2 base weight 2 high and low bytes [CR41 42/CR105 106] (0)
16. Channel 1 and 2 base weight 2 high and low bytes [CR43 44/CR107 108] (0)

2.2 Load Cell Module for Remote IO

SAVCH extension Module has a RS485 communication port (part models with additional Ethernet communication interface), which supports parallel bus (the parallel interface with PLC host by extending the extension bus) and the serial bus (using the RS485 communication port with the communication port of the PLC, the host plc using the communication instruction to control the remote Module). When you use the serial connection, then the remote IO Module is not limited by system IO points, and can be distributively installed.

It is very important for Distributed installation to collect or monitor a large number of discrete DI/DO or analog signals (temperature, humidity, pressure, air volume, flow, fan speed, valve opening and so on). The Distributed installation control and unrestricted expansion are easily realized, which greatly improves the control system. It reduces the wiring cost of all kinds of signals, and reduces the interference caused by the over-length of the analog signal line.

Next, we will introduce remote IO usage.

2.2.1 Load cell module power supply

When the module is used as remote IO, independent power supply is needed for the module. If the module is powered normally, the PWR indicator will light.

2.2.2 Communication interface introduction

SMC-W01EN has the RS485 interface.

2.2.3 Communication protocol and default parameters

RS485:

It supports standard Modbus RTU/ASCII protocol, and it can communicate with any third-party devices, such as PC scada, touch screen, text display and PLC, which support Modbus protocol.

Soft address:by programming software, the address set by remote tool, the address range 1-254, the default value is 1;

Baud rate:2400, 4800, 9600, 19200, 38400, 57600, 115200 optional;

Data format:N,8,2 RTU、 E,8,1 RTU、 O,8,1 RTU、 N,8, 1 RTU、 E,7,1 ASCII、 O,7,1 ASCII、 N,7,2 ASCII

RS485 default parameters:19200, N 82 RTU, station number 1.

2.2.4 When module is used for remote io, module communication parameter configuration method is introduced as follows:

There are three methods for remote IO parameter configuration:

- ① It can be configured by programming software tool remote Module (recommended).
- ② The Module can be connected to the host plc by parallel port and configured by hardware configuration and TO instruction.
- ③ The Module can be configured by MODW instruction through serial communication

2.2.5 Parameter configuration example: configuring the Module through programming software “remote Module tool”.

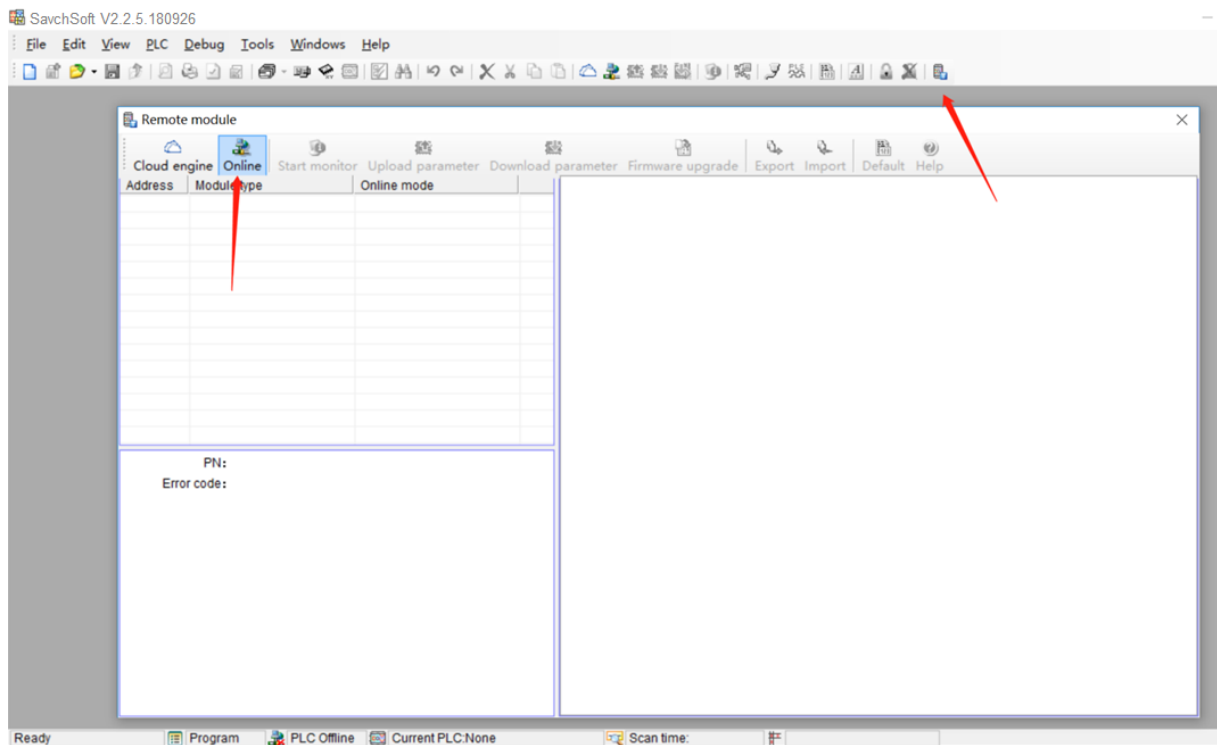
Hardware connection

- ① Through the RS485 (A+ B- terminal) connection:the computer with the serial port, can use 232 to 485 converter, if the PC with USB interface, you can use USB to 485 converter.

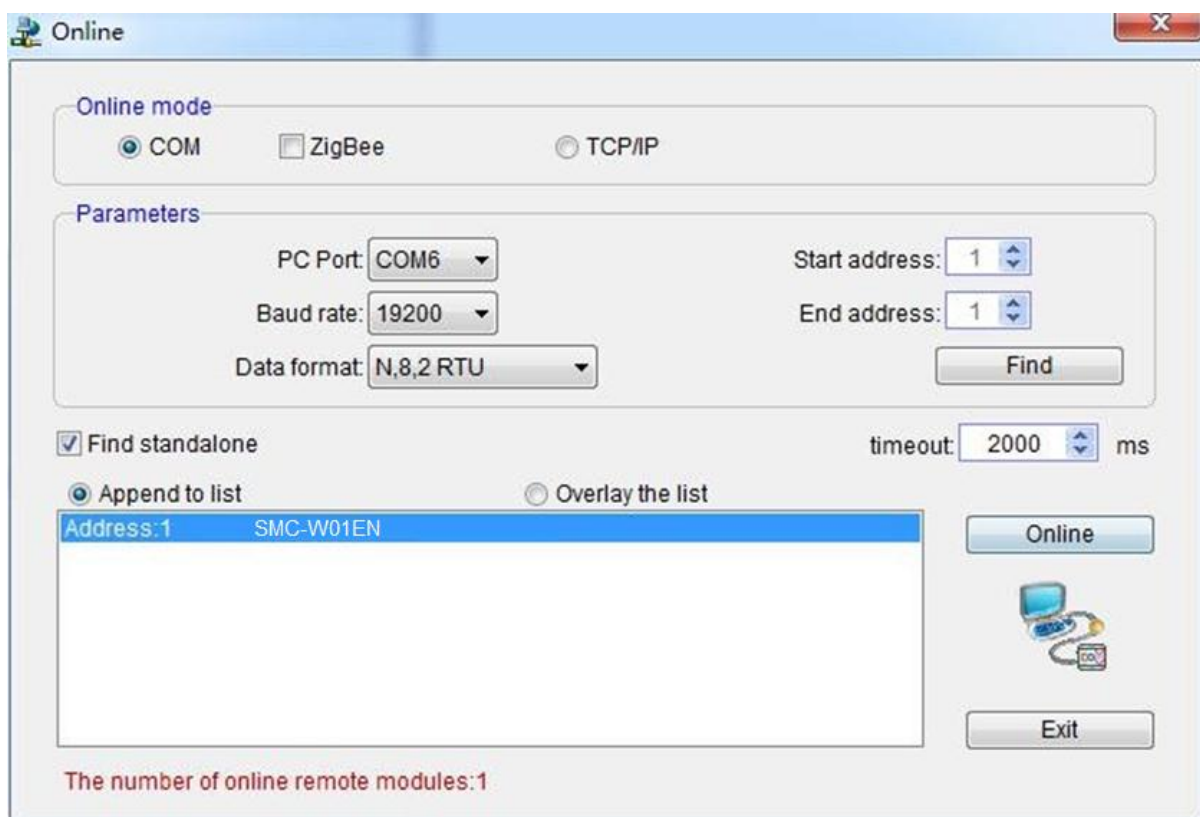
- ② Connect via Ethernet + communication interface: the Module can connect directly to the computer network port with standard network cable, or the computer and Module will be connected to the Ethernet switch.

Software operation steps

Click on the software menu bar - "remote Module":

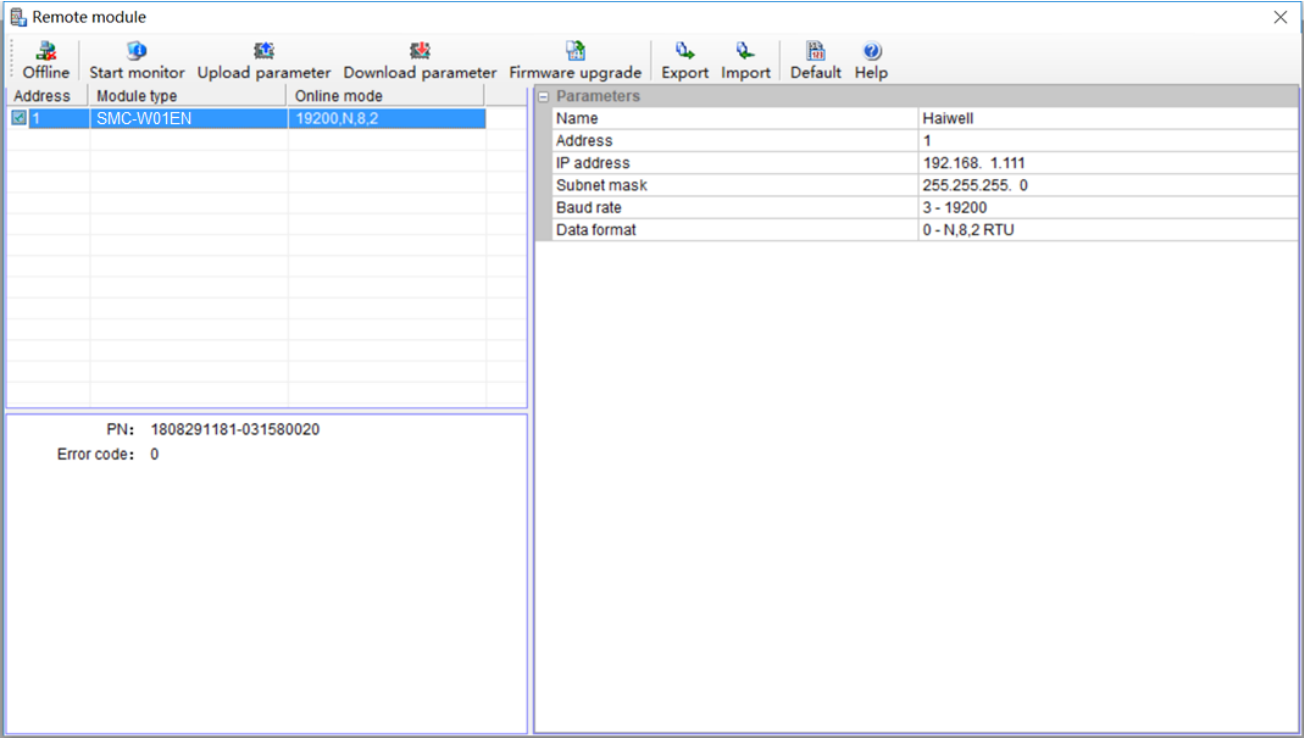


The default address of the Module is 1 with format 19200, N 82 RTU, and the online success is as follows:



If there is only one plc on the 485 port, then you can use "find standalone". If there are many, set the start address and stop address, so that all the machines on the 485 port can be found and the parameters are configured. Click exit to enter the configuration interface.

In the communication parameter area, we can change the Module's name, address, baud rate and data format and other communication parameters, and then download it after modification.



2.2.6 Examples of remote IO applications: reading Module real-time weight

- ① Hardware wiring:the 485 ports of the host PLC and the load Cell Module are connected by the shielded twisted cable and the A+ is connected by A+ and B- to B-. If PLC connects to multiple weighing Modules, it is necessary to connect by mode of “hand by hand”.
- ② Modbus address:from the CR parameter table above, we can see that the SMC-W01EN Module CR 12H means the real-time weight.
- ③ PLC program:this example SMC-W01EN communication is the default parameter:station number 1, baud rate 19200, data format N 82 RTU. PLC reads the 4 Channels values as follows:



2.2.7 Examples of remote IO applications: calibration

The weighing Module supports three segments of calibration, and can realize multi-scale calibration. Take Channel 1 as an example, the tutorial steps are as follows:

- Step1: No weight is put on the weighing unit.
- Step2: CR26H write value 1, enter the calibration mode;
- Step3: Paragraph 1 is calibrated by adding a standard weight to the weighing unit and writing the weight on the current chassis into CR27H.
- Step4: If the second calibration is needed, add another standard weight to the weighing unit, and write the weight on the current chassis into CR29H, otherwise Step6 will be executed.

Step5: If the calibration of paragraph 3 is required, add another standard weight to the weighing unit, and write the weight on the current chassis into CR2AH, otherwise Step6 will be executed.

Step6:CR26H writes value 2 to end the calibration process.

Examples of multi-segment calibration procedures are as follows:

//Network 2 ***** Calibration *****◦ Step1: No standard weights on the load cell ; Step2: Write "1" into CR26H to start calibration;



//Network 3 Step3: In the first segment of calibration, put a standard weight on the pan connected to the load cell module. The weight of the counterweight should be written into CR27H(16 bits) You could continue to step 6 if multiple segments of calibration are unnecessary.



//Network 4 Step4: Add one more standard counterweight on the pan if second segment of calibration is needed. The current weight should be written into CR29H(16 bits) Or you could continue to step 6.



//Network 5 Step5: Add another standard counterweight on the pan if third segment of calibration is needed. The current weight should be written into CR2BH(16 bits) /. Or you could continue to step 6.: Step6: Write "2" into CR26H to end calibration.



//Network 6 Step6: Write "2" into CR26H to end calibration.



Other parameters configuration and read are also read with MODR and MODW instructions.