P5-S+

INSTRUCTION MANUAL

CONTENTS

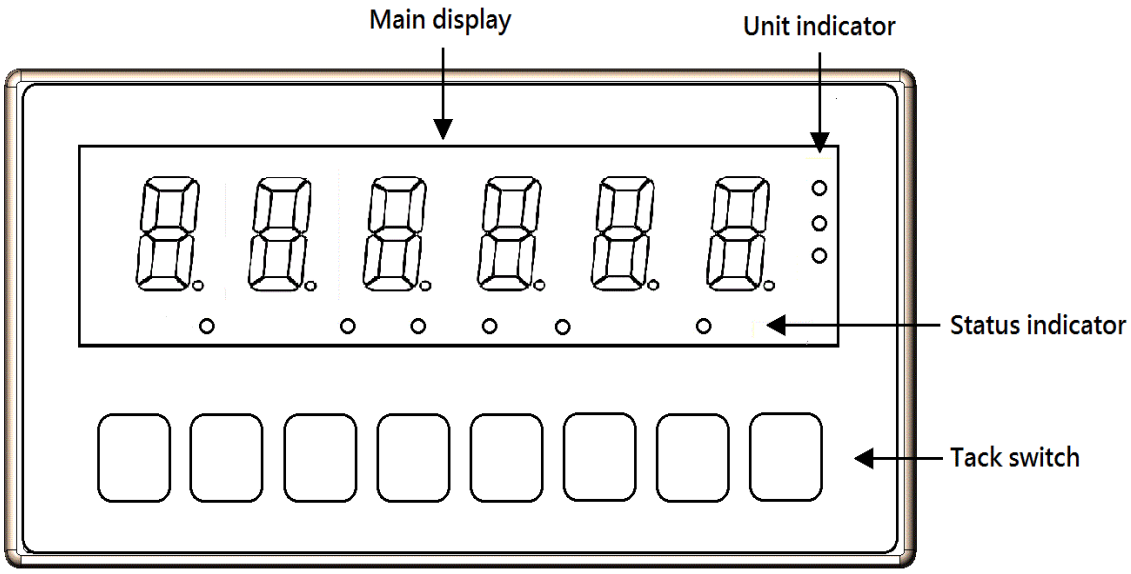
Ver. P5AP 0.3 May 2014

CHAPTER 1 SPECIFICATIONS

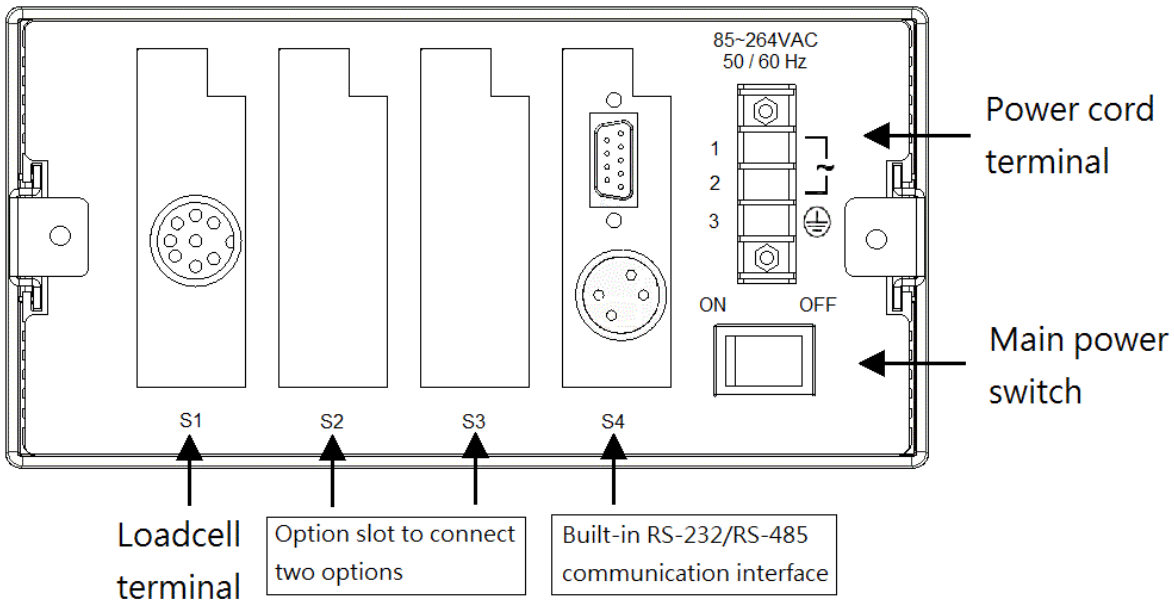
1-1 FEATURES

- **POWER SUPPLY UNIT**
  - Power supply：85 ~ 264 VAC / 50 or 60Hz (Stable power source)
  - Power Consumption：< 5W
- **A/D CONVERTER UNIT**
  - Input sensitivity ： ≧ 0.12 uV/d
  - Measurement Voltage： ± 3.5 mV/V
  - Load Cell Excitation： DC5V
  - Maximum loadcells：8 pieces in parallel with 350Ω loadcell
  - Internal resolution：1/1,000,000
  - Max sampling speed：80 times / sec
- **DIGITAL UNIT**
  - 6 digits，1.0”(25.4mm) high，bright red LED 7 segment display。
  - 9 pieces 3mm red LED state symbols。
  - 8 mechanical tack switchs
- **COMMUNICATION UNIT**
  - RS232 or RS485（2wire）
  - Support Modbus RTU transmission mode
  - Baudrate：2400 bps ～ 38400 bps
  - Current Loop、Data / Clock output support remote display
- **OPTIONS UNIT**
  - OP1 RS232 / RS485（2wire）/ Current Loop
  - OP2 Analog output（Current / Voltage output）
  - OP3 External Input / Relay Output（4I / 4O）
  - OP5 Parallel BCD Output
- **Standards and Certifications**
  - Emission
    EN61326-1 Class A、EN 55011 Class A、EN61000-3-2、EN61000-3-3
  - Immunity
    EN61326-1、EN61000-4-2、EN61000-4-3、EN61000-4-4、
    EN61000-4-5、EN61000-4-6、EN61000-4-8、EN61000-4-11
- **General**
  - Operation temperature：- 5 to 40℃、Humidity < 85% RH
  - Physical dimensiopns： 192 (W) x 96 (H) x 154 (D) mm (Maximum)
  - Weight：Approximately 1.5Kg

1-2 Front Panel

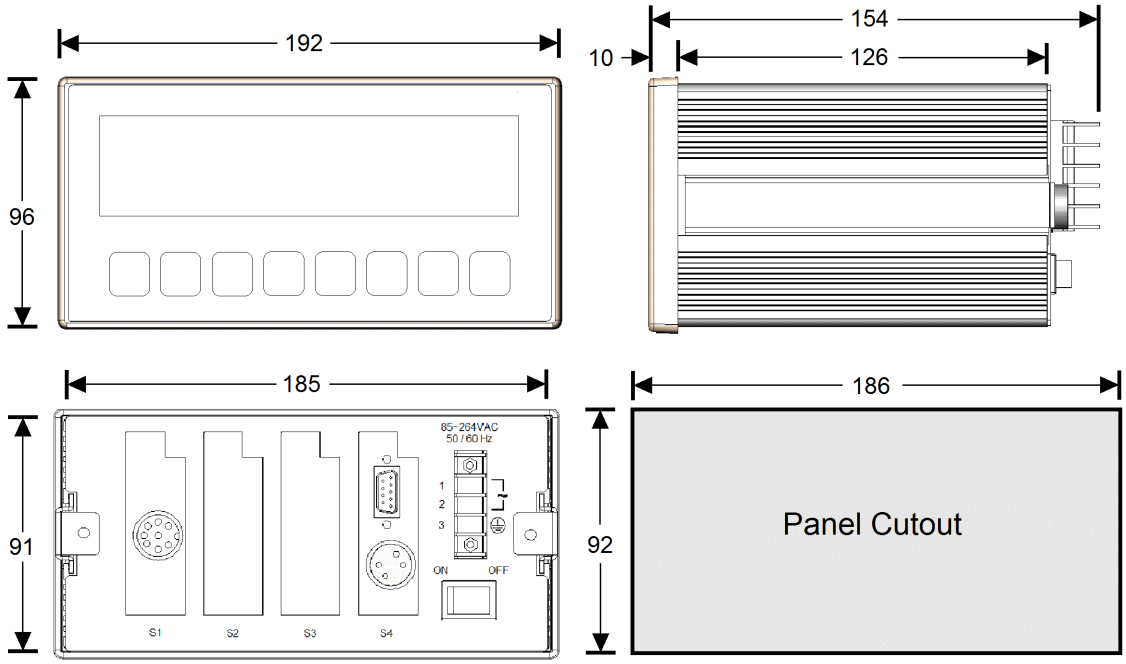


1-3 Rear Panel

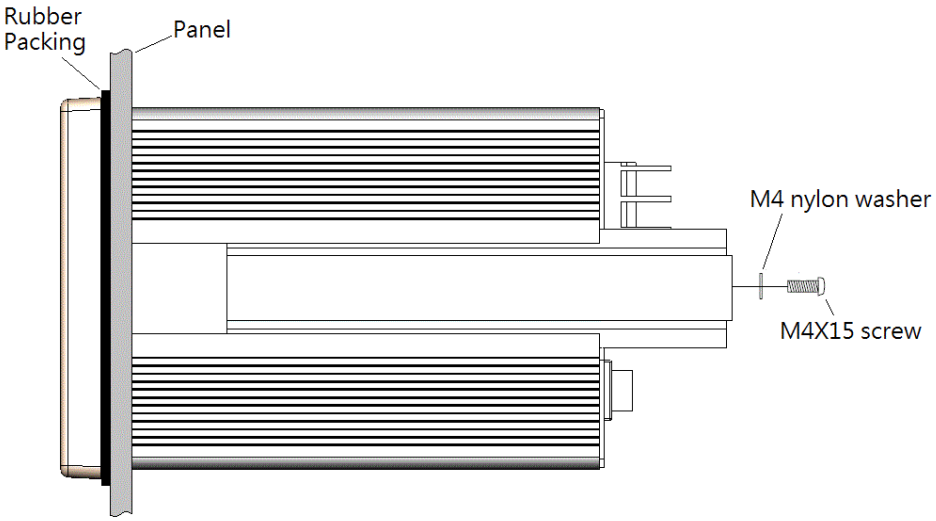


CHAPTER 2 INSTALLATION

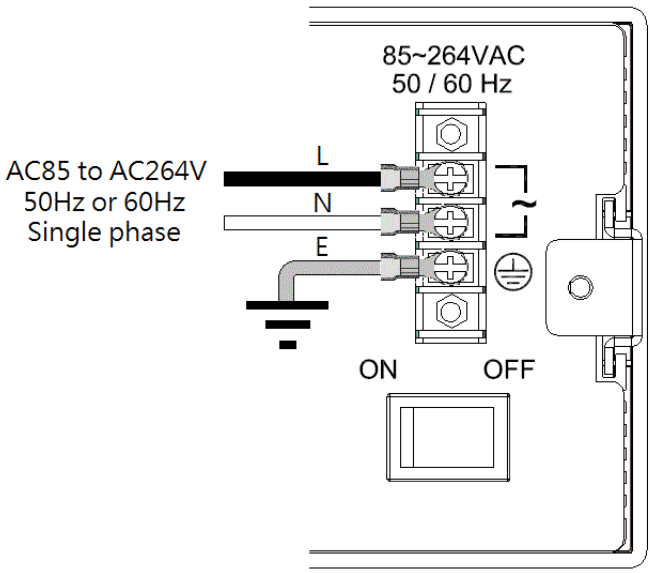
2-1 Dimensions



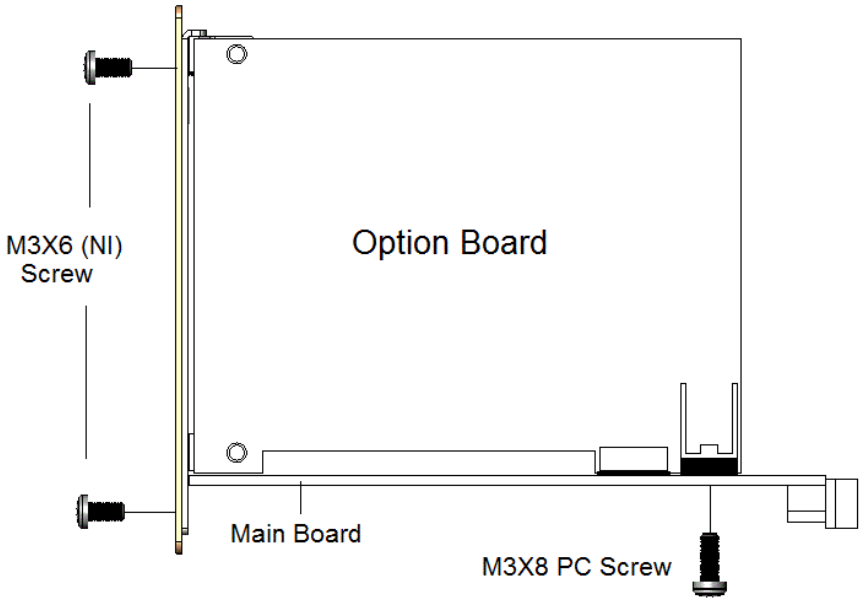
2-2 Mounting Indicator



2-3 Wiring Power Cord



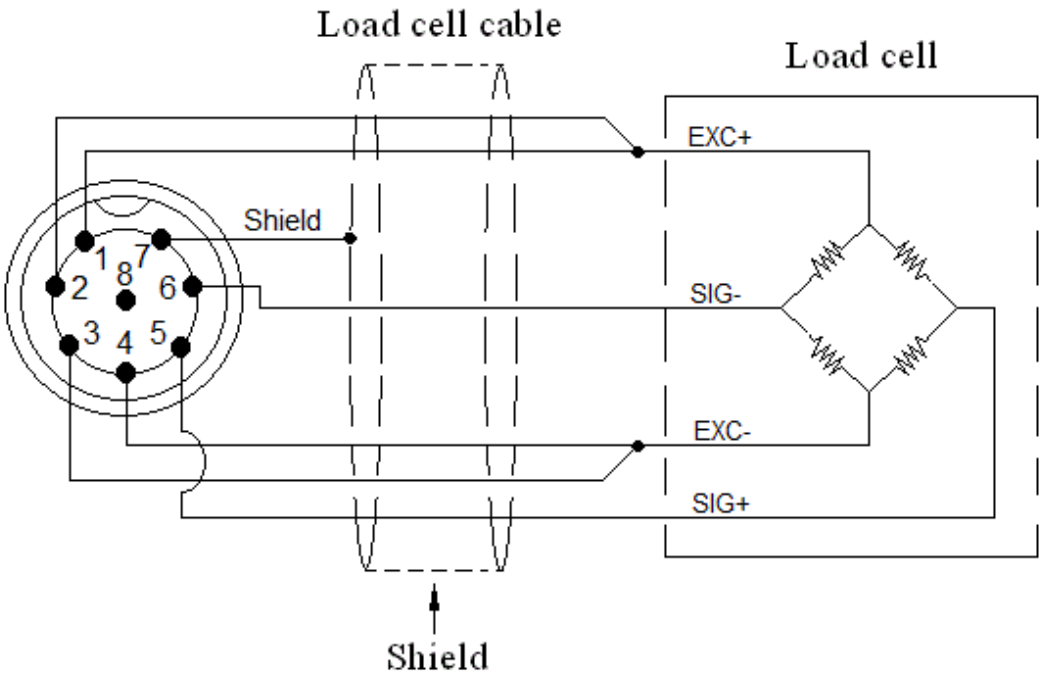
2-4 Installing Options



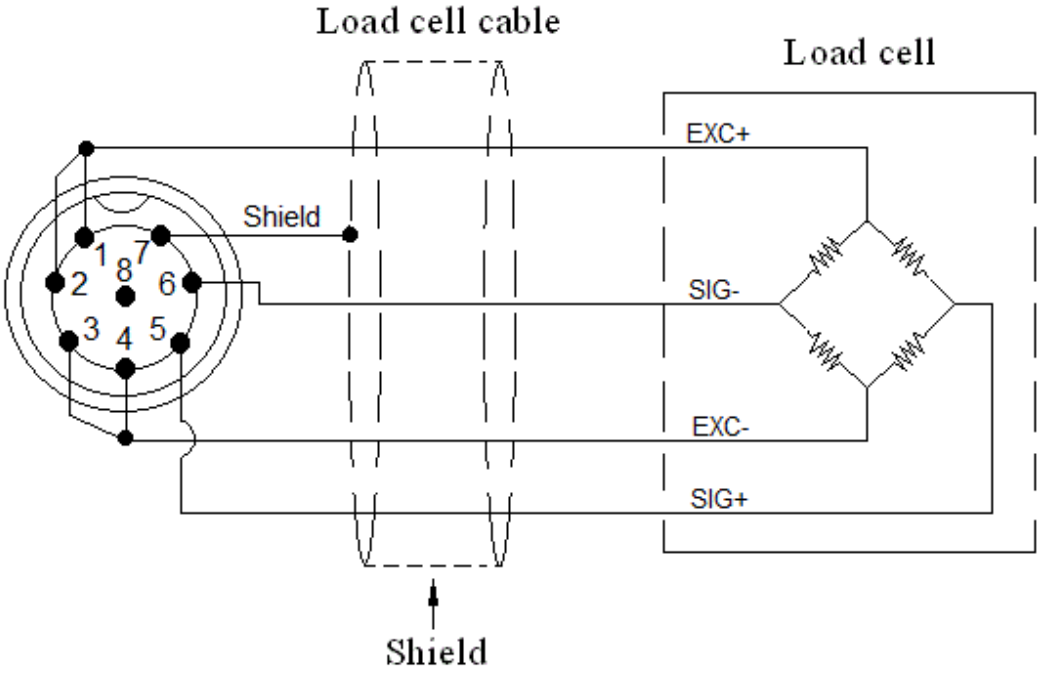
CHAPTER 3 CALIBRATION

3-1 Connecting Loadcell Cable

3-1-1 6 wire

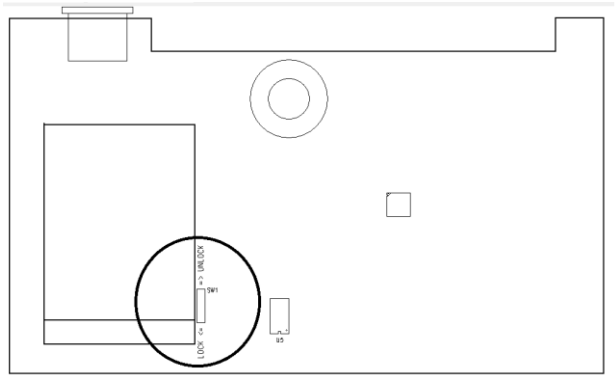


3-1-2 4 wire

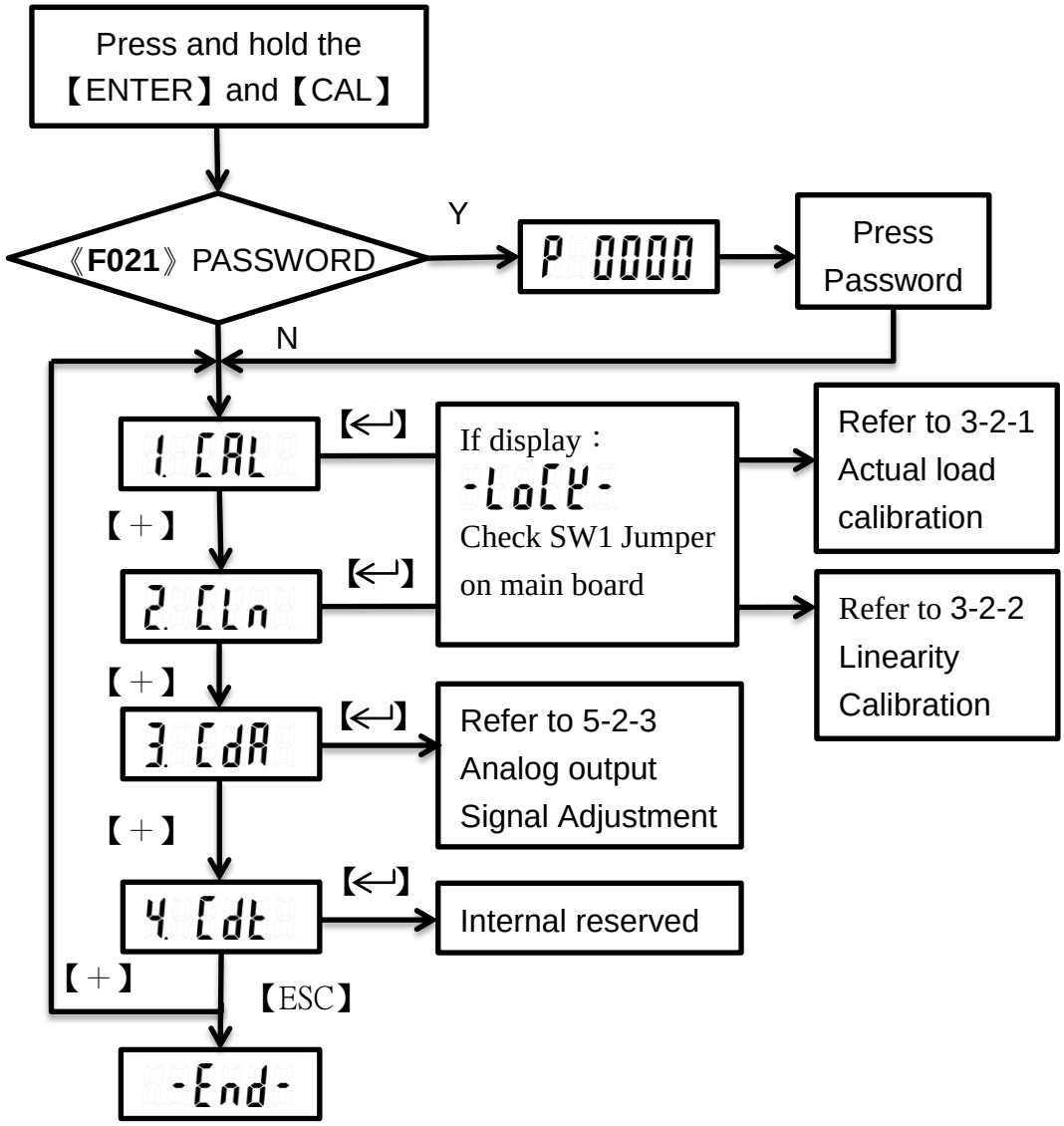


3-2 Calibration Mode

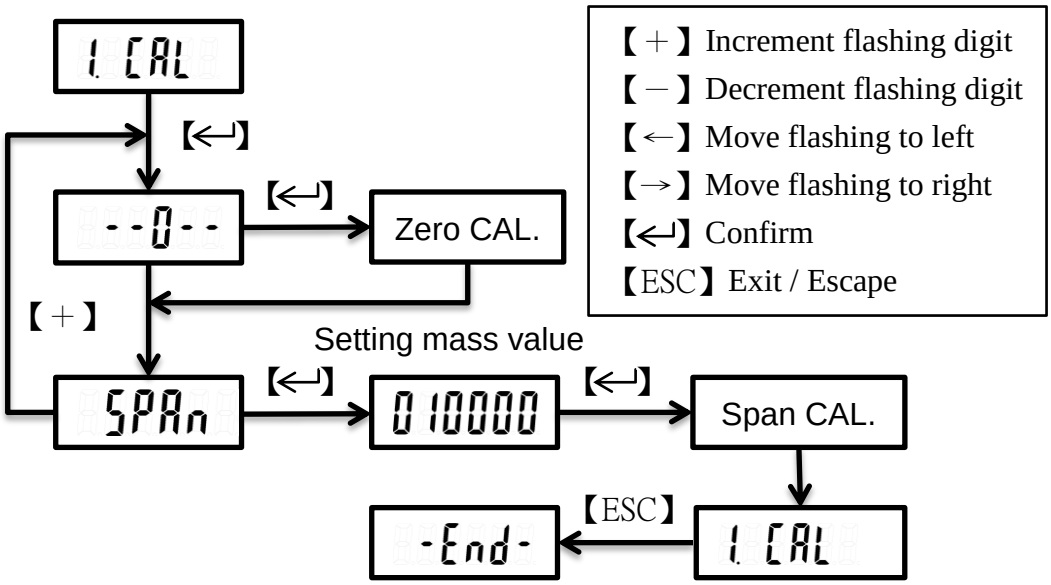
- When the SW1 JUMP on the main board is ”LOCK”，no calibration can be performed。(default UNLOCK)



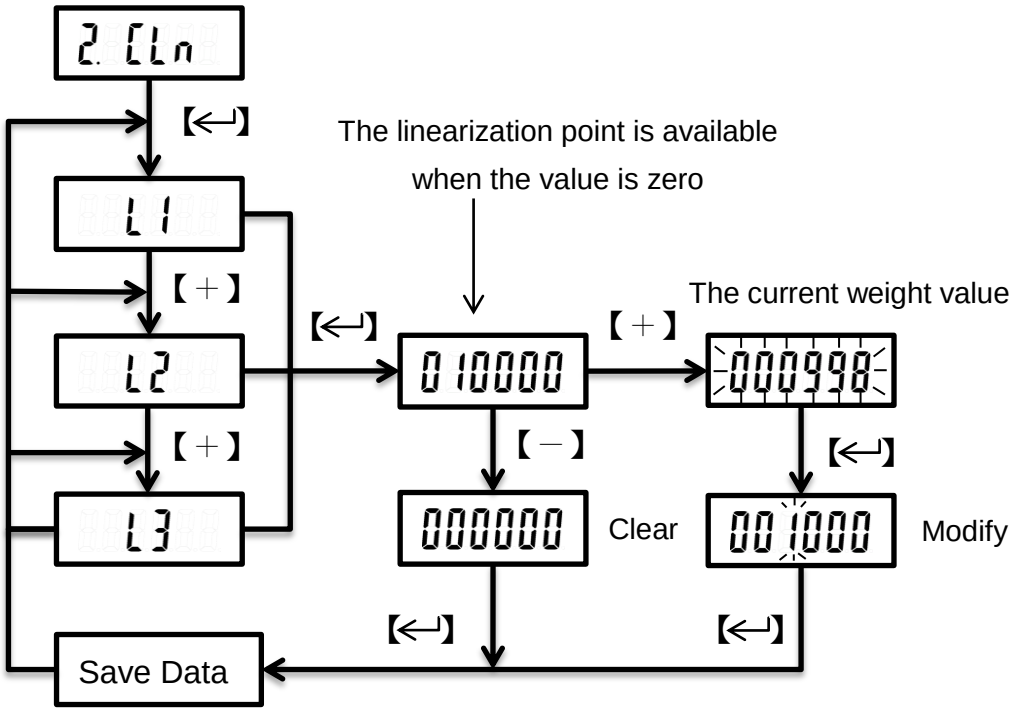
- Operation flowchart



3-2-1 Actual load calibration (Using a Mass)



3-2-2 Linearity Calibration



3-2-3 Modbus Calibration

1. Ensuring **Minimum Division**《**F003**》and **Calibration weigh** (41003~4) correct。
2. Zero calibration. With no weight placed on the system and then set the **Zero calibration** bit switch (01014) after the **Weight Stable** (00002) mark is turned on. Wait about one second to the next step。
3. Span calibration. Place the **Calibration weigh** (41003~4) on the system and then set the **Span calibration** bit switch (01015) after the **Weight Stable** (00002) mark is turned on. Wait about one second to the next step。
4. If the process is correct，and then set **save calibration value** bit switch (01016)，The indicator will auto reset。

3-3 Error Messages

1. **Err 0** Load cell output voltage is out of measuring range
2. **Err 1** **Calibration weigh** equivalent zero
3. **Err 2** The calibration weight is less than the zero weight
4. **Err 3** Sensitivity of the load cell is insufficient
5. **Err 4** A/D Converter error
6. **Err 5** linearization point confuse

CHAPTER 4 CHECK WEIGHING

4-1 Weighing Compare Mode

Parameter《F060》	Mode
0	Real-time compared
1	The weighing has been completed
2	External input signal trigger

4-2 Setting a setpoint

- With the【ENTER】key pressed and held，press the【F】key in normal mode，entering the setpoint mode，Using the【←】【→】【＋】【－】【ENTER】keys to select setpoint item and write data，When setting finish and use【ESC】key to store data and escape。

Display	SETPOINT NAME
	HI
	LO
	Zero Band

- Setting with the RS-232 / RS-485 (see 5-1-6 or 5-1-8)，The setting data will disappear when the indicator power off 。

4-3 Output condition

Output Terminal	Output Condition
LO	Net ＜ LO
OK	HI ＞ Net ≧ LO
HI	Net ≧ HI
Zero Band	Net ≦ Zero Band

4-4 Starting the compare mode

《F060》	Mode	Condition
0	Real-time compared	None
1	The weighing has been completed	1. Net ≦ Zero Band and stable 2. Net ＞ Zero Band and weight stable
2	External input signal trigger	1. Input signal trigger 2. Delay time《F061》 3. Compare

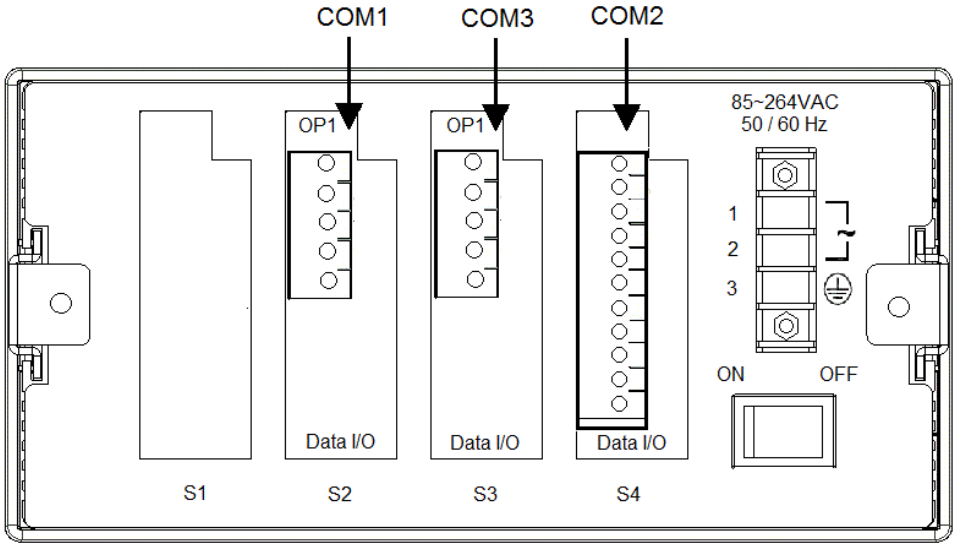
- The compare output signal（HI / OK / LO）will be turn off on next starting or you can clear output immediately with the input terminal。（Does not include Real-time compared mode）

CHAPTER 5 OPTIONS

5-1 Serial communication interface (Built-in、OP1)

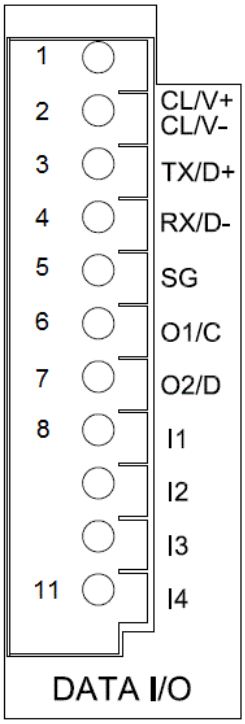
➢ Settings of parameter，please refer to the **7-4 (BI、OP1) Serial Communication Functions**。

5-1-1 COM Port Assignment



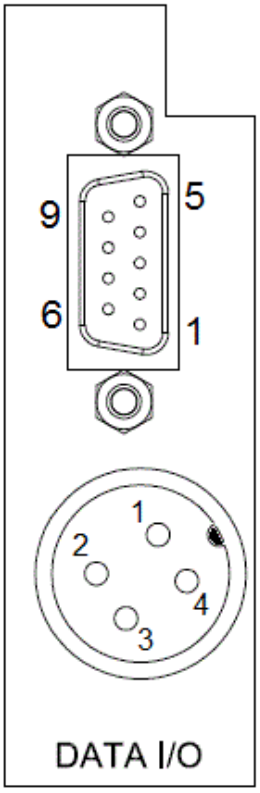
5-1-2 Built-in Interface Pin Assignment

1.1 Terminal Block



PIN	Function	PIN	Function
RS-232		RS-485	
3	TXD	3	D+
4	RXD	4	D-
5	SG	5	SG
Current Loop		DATA/CLOCK	
1	C.LOOP	5	SG
2	C.LOOP	6	CLOCK
INPUT		7	DATA
8	IN	11	+5V
5	SG		

1.2 D_SUB and BNC connector



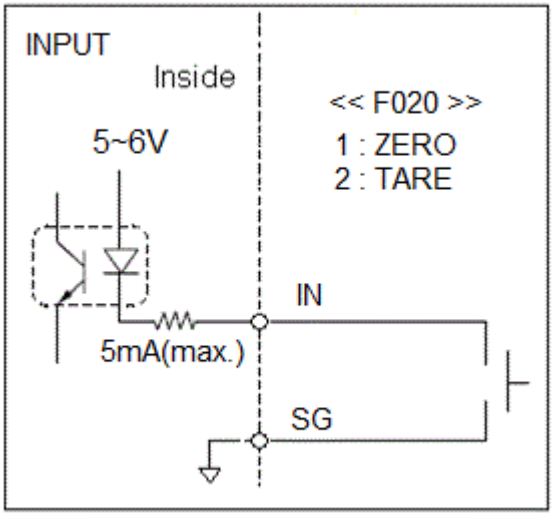
- DSUB_9P

PIN	Function	PIN	Function
RS-232		RS-485	
2	TXD	2	D+
3	RXD	3	D-
5	SG	5	SG
Current Loop		INPUT	
8	C.LOOP	1	IN
9	C.LOOP	5	SG

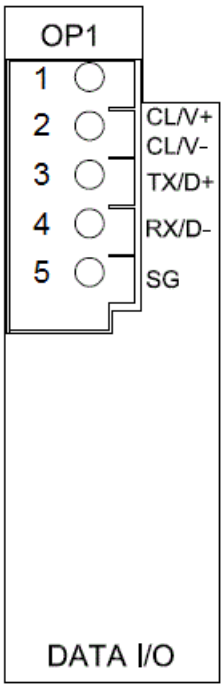
- BNC 4PIN

PIN	Function	PIN	Function
DATA / CLOCK			
1	+5V	2	DATA
3	CLOCK	4	GND

1.3 INPUT Equivalent Circuits



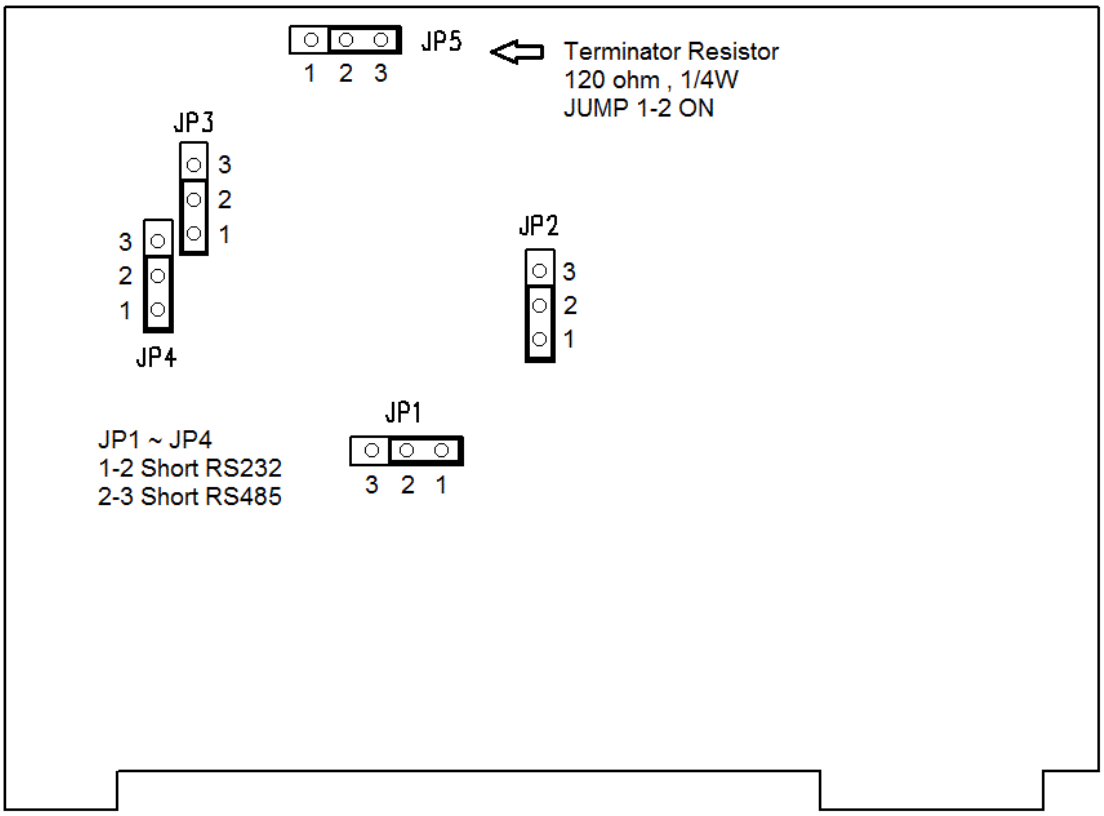
5-1-3 OP1 Pin Assignment



PIN	Function	PIN	Function
RS-232		RS-485	
3	TXD	3	D+
4	RXD	4	D-
5	SG	5	SG
Current Loop			
1	C.LOOP	2	C.LOOP

5-1-4 RS232/RS485 Jump description

- PCB Component side



5-1-5 Transmission Format

《Format 1 ／ FUNC109、119、129 = 0》

S	T	,	G	S	,	+	0	0	0	0	.	0	0	k	g	CR	LF

Header 1 Header 2 Weight Data (8 Digits) Unit Terminators

《Format 2 ／ FUNC109、119、129 = 1》

STX					0	.	0	0	K	G		CR	LF

Start Code Weight Data (8 Digits) Unit Status Terminators

《Format 3 ／ FUNC109、119、129 = 2》

S	T	,	G	S	,	+				0	.	0	0	,	k	g	CR	LF

Header 1 Header 2 Weight Data (8 Digits) Unit Terminators

《Format 4 ／ FUNC109、119、129 = 3》

S	T	,	G	S	,	+				0	.	0	0	k	g	CR	LF

Header 1 Header 2 Weight Data (8 Digits) Unit Terminators

Header 1

ST：Stable ／ US：Unstable ／ OL：Out of range

Header 2

GS：Gross value ／ NT：Net value ／ TR：Tare Value

Weight Data

7 figures and includes a decimal point，the sign is appended to the head。

Unit

kg、g、t

Terminators

CR、LF

5-1-6 Command Mode

1. Command format A

Device	Command
P5-X	command

A Command	Function
MZ、ZERO	Clears to zero
MT、TARE	Subtracts the tare
CZ	Clears Zero compensation
CT	Clears the tare
MG	Displays the gross
MN	Displays the net
NTGS	Gross / Net Switch

2. Command format B

Device	Command
P5-X	Data

B Command	Function
RW、READ	Reads the weight

3. Command format C

Device	Command & Data
P5-X	Command

C Command	Function
S0	Sets the HI setpoint
S1	Sets the LO setpoint
S2	Sets the ZeroBand setpoint

EX：Device → S0XXXXXX<CR><LF> (XXXXXX：0 ~999999)

P5-X → S0<CR><LF>

4. Error Messages

？，Command ：unknown command

5-1-7 “With address” mode

When the function F108、F118、F128 set to 0，do not use the address，So the P5-S received any lawful commands will be executed。When the function set to non-zero，P5-S on receiving the command will make sure address is correct，no problems then the commands will continue。Peripherals (PLC or Computer) control the P5-S，Place ’@’ and address code in that order before a command，Example：To request reading display weight from the address **@01** unit. @01RW<CR><LF>。

5-1-8 Modbus Address Table （Modbus RTU Slave Mode）

Data Registers					
Address	**Function**	**R/W**	**Address**	**Function**	**R/W**
40001~2	Display weight	R	40003~4	Gross weight	R
40005~6	Net weight	R	40007~8	Tare Value	R
410003~4	Calibration weigh	R/W	41011~12	Hi setpoint	R/W
41015~16	Lo setpoint	R/W	41019~20	ZeroBand setpoint	R/W
Bit I/O					
Address	**Function**	**R/W**	**Address**	**Function**	**R/W**
00001	Center Zero	R	00002	Weight Stable	R
00003	Overflow	R	00008	ZeroBand	R
00010	HI	R	00011	OK	R
00012	LO	R	00028	Calibration Err 1	R
00029	Calibration Err 2	R	00030	Calibration Err 3	R
01001	Zero	R/W	01002	Clear Zero Compensation	R/W
01003	Tare	R/W	01004	Clear Tare	R/W
01014	Zero Calibration	R/W	01015	Span Calibration	R/W
01016	Save calibration value	R/W			

R : Read only **R/W : Read / Write**

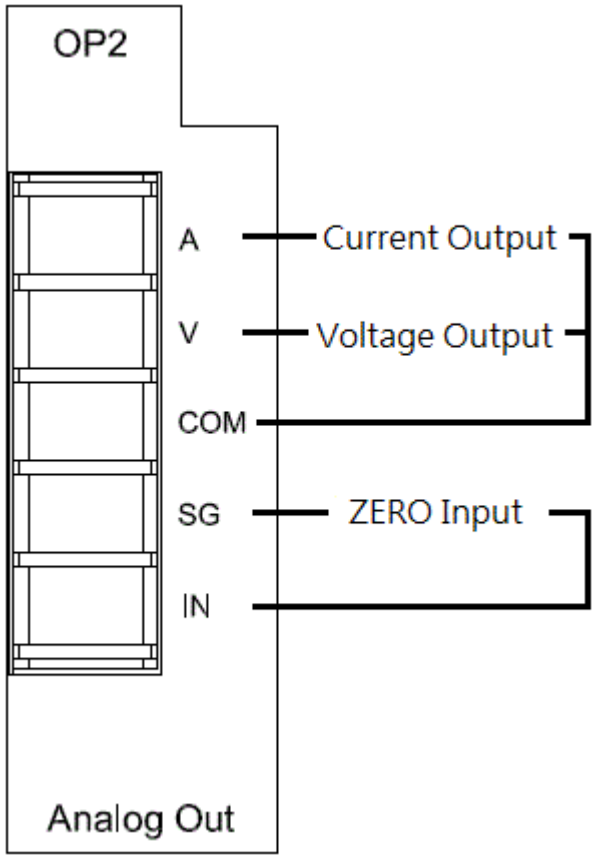
5-2 Analog Output Interface (OP2)

➢ Settings of parameter，please refer to the **7-5 OP2 Analog Output Functions**。

5-2-1 Specification

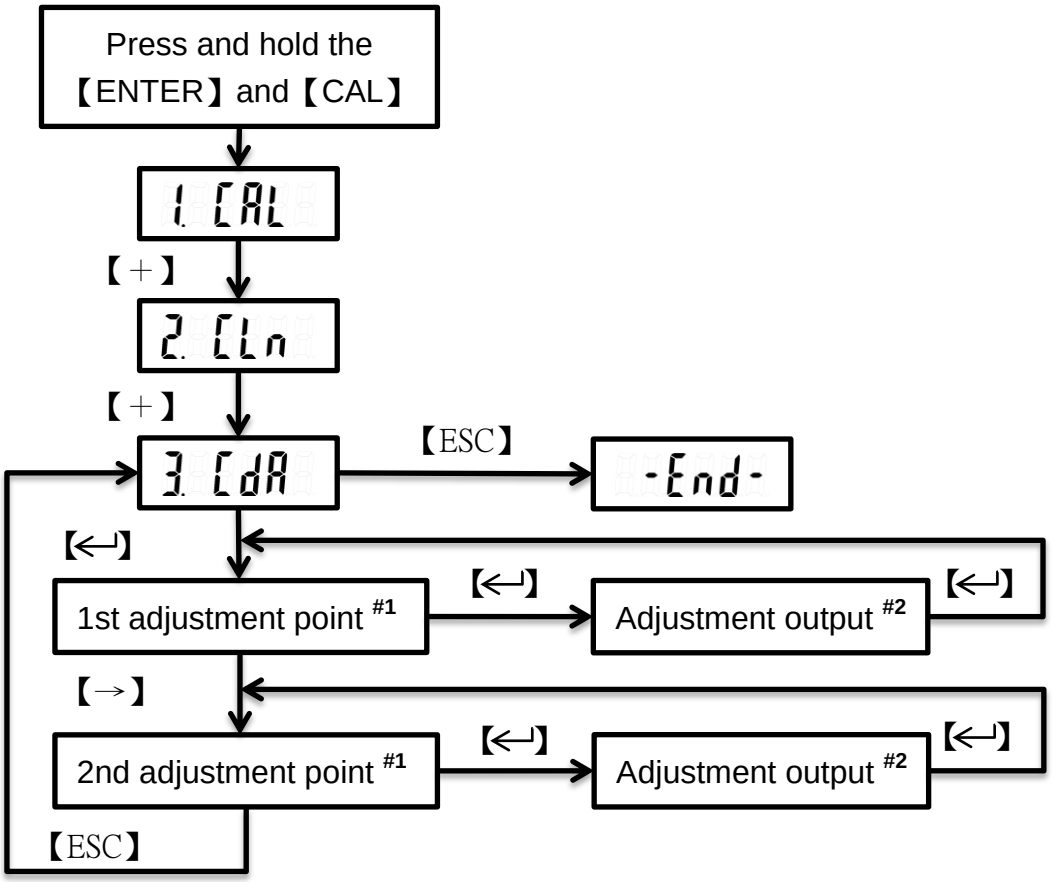
- Resolution：16 bits
- Current output：4 ~ 20mA
- Voltage output：0 ~ 5V / 0 ~ 10V / ±5V / ±10V
- Applicable current load resistance：0 ~ 600Ω

5-2-2 Pin Assignment



5-2-3 Output Signal Adjustment

- Please prepare a precision meter



#1：

Function	1st adjustment point		2nd adjustment point	
《F131》	**Display**	**Adjustment**	**Display**	**Adjustment**
0（4~20mA）	A 4.00	Current 4mA	A 20.00	Current 20mA
1（0~5V）	U 0.50	Voltage 0.5V	U 4.50	Voltage 4.5V
2（0~10V）	U 1.00	Voltage 1V	U 9.00	Voltage 9V
3（±5V）	U -4.00	Voltage -4V	U 4.00	Voltage 4V
4（±10V）	U -8.00	Voltage -8V	U 8.00	Voltage 8V

#2：In this step the screen will blink，using the【＋】、【－】keys to adjust output，When setting finish and use 【ENTER】key to store data escape。

5-3 External I/O Interface（OP3）

- Settings of parameter，please refer to the **7-2 OP3 External I/O Functions**。

5-3-1 Specification

- Output terminal

  Rated load ：250V AC / 3A，30V DC / 3A（Resistive load）

  Switching current：Max. 5A

  Switching capacity：Min. 100uA / 100mV DC

  Life：Min. $2X10^7$ times（no load）/ Min. 10^5 times（Resistive load）

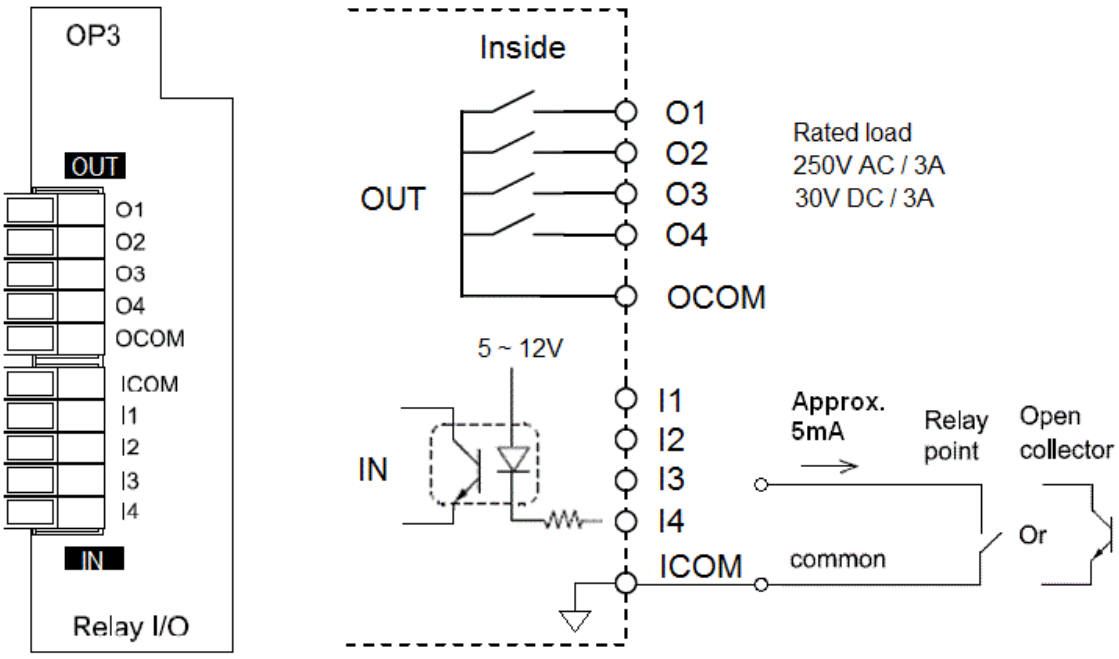
  Current at OCOM：10A DC

- Input terminal

  Input open voltage：5 ~ 12V

  Input drive current：4 ~ 5mA

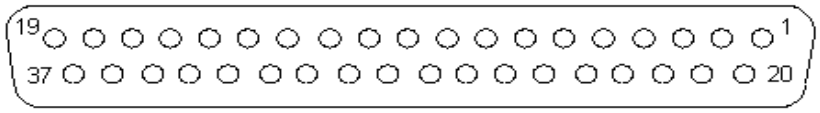
5-3-2 Pin Assignment



5-4 Parallel BCD Output（OP5）

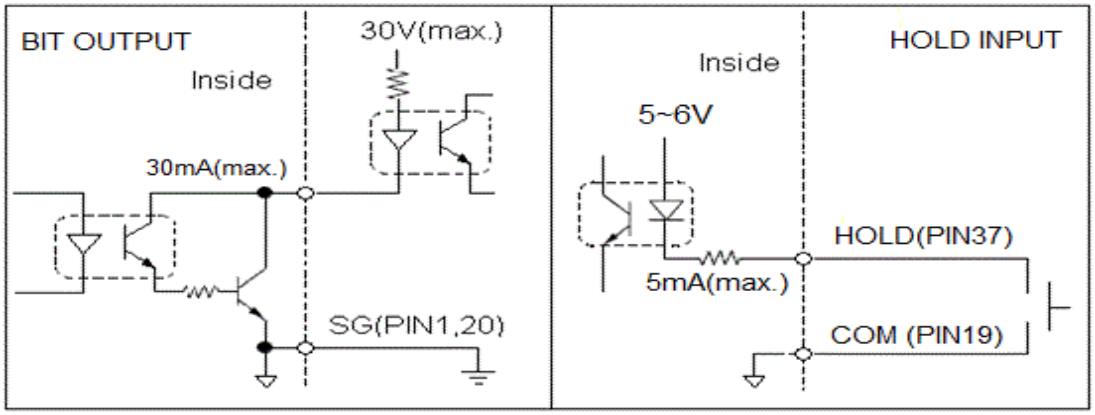
- Settings of parameter，please refer to the **7-6 OP5 Parallel BCD Output Functions**。

5-4-1 Pin Assignment and Equivalent Circuits



Rear view of option card

PIN	Signal	PIN	Signal
1	SG	20	SG
2	1X10^0	21	2X10^0
3	4X10^0	22	8X10^0
4	1X10^1	23	2X10^1
5	4X10^1	24	8X10^1
6	1X10^2	25	2X10^2
7	4X10^2	26	8X10^2
8	1X10^3	27	2X10^3
9	4X10^3	28	8X10^3
10	1X10^4	29	2X10^4
11	4X10^4	30	8X10^4
12	1X10^5	31	2X10^5
13	4X10^5	32	8X10^5
14	Gross（＋）／ Net（－）	33	Stable（＋）／Unstable（－）
15	Plus Wt.（＋）／Minus Wt.（－）	34	Decimal Point 1
16	Decimal Point 2	35	Decimal Point 3
17	Decimal Point 4	36	Over（＋）／Normal（－）
18	DATA READY	37	HOLD INPUT
19	COM		



CHAPTER 6 MAINTENANCE

6-1 Initialization Mode

- When the power is turned on and during the display down count。
- Press 【ZERO】key and【ENTER】key together，You will enter the initialization mode。
- Using【＋】or【－】keys select initialization item。

Display	Operation	Initial item
1. iALL	With the【ENTER】key pressed and held about 2 second.	All data initialization
2. iFnC		Function initialization
3. CLr		Clear zero compensation value, tare value.

6-2 Self-test Mode

- When the power is turned on and during the display down count。
- Press【ON / OFF】key and【ENTER】key together，You will enter the self-test mode。
- Using【＋】or【－】keys select test item。

Display	Test Item
1. dSP	7 segment LED and status LED
2. KEY	Key switch
3.L1oPA	SLOT S1–A/D Internal count
4.L2---	SLOT S2–Option
5.L3---	SLOT S3–Option
6.L4oP1	SLOT S4–Built-in Serial data I/O

6-3 Software version

- When the power is turned on and during the display down count。
- Press【ENTER】key，the screen will show software version。

CHAPTER 7 FUNCTION LIST

- With the【ENTER】key pressed and held，press the 【FUNC】key in normal mode，entering the function setting mode。
- Using the【＋】【－】【←】【→】【ENTER】 keys to select function item and write data。
- When setting finish and use【ESC】key to store data and escape。
- When the screen appears **Err F** said parameter value error。

7-1 General Functions

Func	Name	Default	Setting	
			Parameter	Description
001	Weighing Unit	2	0	None
			1	G
			2	Kg
			3	t
002	Decimal Point	0	0 / 0.0 / 0.00 / 0.000 / 0.0000	
003	Minimum Division	1	Minimum division for the weight value 1 / 2 / 5 /10 / 20 / 50	
004	Capacity	999999	－99999 ～ 999999	
005	Multi Range	0	Set 0： disable Break point：1～ Capacity	
006	Digital filter	1	0 ~ 2	weak ← → strong
007	Display Update Rate	1	0	20 times/sec
			1	10 times/sec
			2	5 times/sec
008	Zero Range	0	0 ~ 30	0：Full range 1～30：±1～±30%
009	Zero Tracking Time	1.0	0.0 ~ 9.9 s	Set 0.0 , disable zero tracking function
010	Zero Tracking Width	1.0	0.0 ~ 9.9 d	
011	Stable Detection Time	1.0	0.0 ~ 9.9 s	Set 0.0 , disable stable detection。Always stable
012	Stable Detection Range	1.0	0.0 ~ 9.9 d	
013	Display zero range	0	0 ~ 9 d	When the weight is in this range ±(Set value × Min. division) it displays “0”

Func	Name	Default	Setting	
			Parameter	Description
014	Key Locked [Z][T][N/G][F]	0000	0	Unlocked
			1	Locked
015	Auto zero after power on	0	0	Disable
			1	Enable
016	Memory the value of zero and tare before shutdown	1	0	Disable
			1	Enable
017	Tare and Zero function when the weight is unstable	1	0	Disable
			1	Enable
018	Tare function with negative gross weight	1	0	Disable
			1	Enable
019	Functions of [F] Key	0	0	None
			1	PRINT
			2	Clear Zero Compensation
			3	Clear Tare
020	Built-in Input	0	0	None
			1	ZERO
			2	TARE
021	Password	0000	~9999	‘0000' : Unused

7-2 OP3 External I/O Functions

Func	Name	Default	Setting Description	
051	Input 1	1	0：No capability 1：ZERO 2：TARE 3：Weighing compare trigger 4：Clear HI / OK / LO output signal 5：PRINT command for manual print 6：Clear Zero Compensation 7：Clear Tare	
052	Input 2	2		
053	Input 3	3		
054	Input 4	4		
055	Output 1	1	0：No capability 1：Zero Band 2：LO 3：OK 4：HI	
056	Output 2	2		
057	Output 3	3		
058	Output 4	4		
059	OUT4~1 Logic	0000	0	Positiv Logic
			1	Negative Logic

7-3 Check Weighing Functions

Func	Name	Default	Setting	
			Parameter	Description
060	Weighing Compare Mode	0	0	Real-time compared
			1	The weighing has been completed
			2	External input signal trigger
061	Trigger delay time	1.0	0.0 ~99.9 (sec)	Delay timer

7-4 (BI、OP1) Serial Communication Functions

FUNC			Name	Default	Setting		
Built-In	OP1	OP1			Parameter	Description	
COM2	COM3	COM1					
101	111	121	Data transfer mode	0	0	Stream	
					1	Command	
					2	Manual print	
					3	Auto print	
					4	Modbus RTU Mode	
102	112	122	Output data	0	0	Same as display	
					1	Gross value	
					2	Net value	
					3	Tare Value	
103	113	123	Baud rate	0	0	2400 bps	
					1	4800 bps	
					2	9600 bps	
					3[#1]	19200 bps	
					4[#1]	38400 bps	
104	114	124	Protocol	1	Mode	Normal	Modbus
					0	N、8、1	N、8、2
					1	E、7、1	E、8、1
					2	O、7、1	O、8、1
105	115	125	Transmit times	2	0	Unlimited	
					1	10 time/sec	
					2	5 time/sec	
					3	2 time/sec	
					4	1 time/sec	
106	116	126	Modbus response delay time	1	0~255	Setting value X 5mS	
107	117	127	Output when weight value is overflow or unstable (Stream mode)	0	0	Output	
					1	Does not output	

FUNC			Name	Default	Setting	
Built-In	OP1	OP1			Parameter	Description
COM2	COM3	COM1				
108	118	128	Address number	0	1 ~ 99	0 : Unused
109	119	129	Transmission Format	0	0	Format 1
					1	Format 2
					2	Format 3
					3	Format 4
110	—	—	DATA / CLOCK (Remote Display) Output data	1	0	Disable
					1	Same as display
					2	Gross value
					3	Net value
					4	Tare Value

#1：Only for OP1 interface

7-5 OP2 Analog Output Functions

Func	Name	Default	Setting	
			Parameter	Description
131	Output Mode	0	0	4 ~ 20mA
			1	0 ~ 5V
			2	0 ~ 10V
			3	－5V ~ ＋5V
			4	－10V ~ ＋10V
132	Output Data	0	0	Same as display
			1	Gross value
			2	Net value
133	Weight value of P1	0	0 ~ 999999	
134	Current/Voltage of P1	4.00	0.00 ~ 24.00mA / 0.00 ~ 10.00V	
135	Weight value of P2	10000	0 ~ 999999	
136	Current/Voltage of P2	20.00	0.00 ~ 24.00mA / 0.00 ~ 10.00V	

7-6 OP5 Parallel BCD Output Functions

Func	Name	Default	Setting	
			Parameter	Description
140	Output Data	0	0	Same as display
			1	Gross value
			2	Net value
141	Data transfer mode	0	0	Stream
			1	Auto print
			2	Manual print
142	Output Code	0	0	BCD Code
			1	HEX Code
143	O.L. Output Code	0	0	FFFFFF
			1	999999
144	Output Logic	0	0	Positiv Logic
			1	Negative Logic
145	Data Ready Output Logic	0	0	Positiv Logic
			1	Negative Logic
146	10^3 Remap	0	0	None
			1	10^0
			2	10^1
			3	10^2
147	10^4 Remap	0	0	None
			1	10^0
			2	10^1
			3	10^2
			4	10^3
148	10^5 Remap	0	0	None
			1	10^0
			2	10^1
			3	10^2
			4	10^3
			5	10^4

~ The End ~