



Model no.: GMT-P1

—PN/EIP

User's Manual

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Website: <http://www.gmweighing.com>

Product Performance Standards: GB/T 7724—2008



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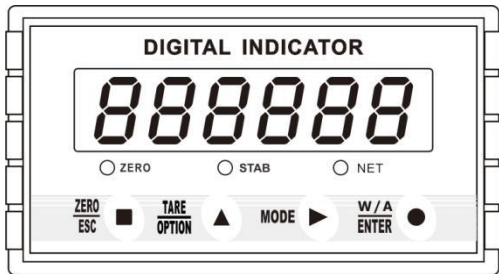
1 General Description

GMT-P1 digital indicator is specially designed for weight transmitting in industrial fields. Support PROFINET and Ethernet IP, GMT-P1 digital indicator is a small weight display which is specially designed and produced for the occasion of weight transmit industrial. The indicator has the features of compact size, stable performance, simple operation. Can be widely used in: cement mixing and asphalt mixture equipment, metallurgical blast furnace, converter and chemical industry, feed weight control and other occasions.

1.1 Functions and Characteristics

- Small volume, unique design, easy operation
- Applicable to all kinds of resistance strain gauge bridge load cell
- Front panel numerical calibration
- Multilevel of digital filter
- Automatic zero -tracking
- Automatically zero when powered on
- **PROFINET** fieldbus interface
- Support **Ethernet IP** communication, can access **Ethernet IP** network
- Weight display can be remotely calibrated (remote calibration ON/OFF turned on)

1.2 Front Panel



Main Display: 6 digits, for displaying weight and the information of parameters.

Status Indicator Lamp:

- **ZERO:** Light on when present weight is within $0 \pm 1/4d$. the state of I10.
- **STAB:** Light on when changes of weight values are within the range of motion detecting during motion detecting time.
- **NET:** Light on when indicator is in net weight status.

Keypad:



: Zero/Esc, exit from current operation or go previous. Long press the ZERO button to calibrate the ZERO point function. The calibration range of the ZERO point in the main interface is limited by the ZERO clearing range, and cannot exceed the zeroing range, but it is not limited by

TARE
OPTION



: Scroll optional values of parameter and to make flashing digit increase 1 while data inputting. Long press Tare key will proceed data transmission, and the light will be flicker, and update the F1.8 parameters



: Function selecting key, make flashing position move to the right digit when data inputting.

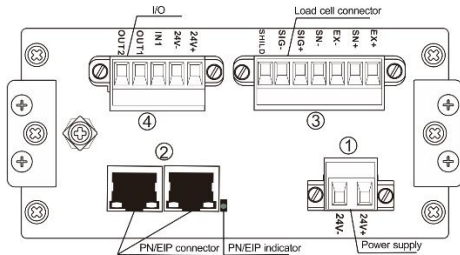
W/A
ENTER



: Confirming Key. Confirm setting parameters or calibration and input data.

Note: Under the status of gross weight, user could remove tare by pressing OPTION key, and if press Esc key in net weight mode, it will add tare weight, while it is zeroing under the status of net weight. It will show net weight value after tare, meanwhile the NET light is on.

1.3 Rear Panel



PN/EIP indicator, light on when bus communication

1.4 Technical Specifications

1.4.1 Common:

Power supply: **DC24V±5%**

Working temperature: **-10~40℃**

Max humidity: **90%R.H without dew**

Power consumption: **About 10W**

Dimension: **105×89×57 (mm)**

1.4.2 Analog:

Load cell power: **DC5V 200mA (MAX)**

Input impedance: **10MΩ**

Zero steady range: **0.00~12mV(Load cell 3mV/V)**

Input sensitivity: **0.01uV/d**

Input range: **0.00~15mV(Load cell 3mV/V)**

Transfer mode: **Sigma - Delta**

A/D conversion speed: **30, 60, 120, 240, 480, 960 times/sec**

Non-linearity: **0.01% F.S**

Gain drift: **10PPM/°C**

Display Precision: **1,000,000d**

1.4.3 Digital:

Weight display: **6 digits red high-brightness LED**

Minus display: **"-"**

Overload display: **"OFL"**

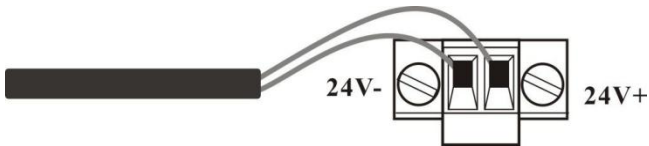
Decimal point: **5 kinds (optional)**

Function keys: **4 keys soniferous keypad**

2 Installation and Wiring

2.1 Connection of Power Supply

GMT-P1 digital indicator connects DC24V power supply as follows:



Power supply connection

2.2 Connection of Load Cell

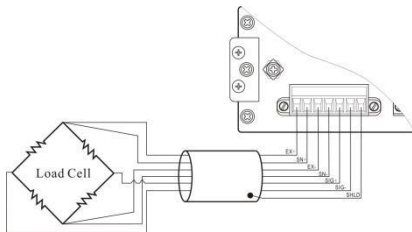
GMT-P1 digital indicator connects bridge type resistance strain gauge load cells by 6 wires or 4 wires as follows. When you use 4-wired load cells, you must bridge the SN+ with EX+ and bridge the SN- with EX-.

The signal definition of each port of the load cell connector is as follows:

EX+: Excitation+ **EX-**: Excitation- **SN+**: Sense+ **SN-**: Sense- **SIG+**: Signal+ **SIG-**: Signal-

6 wires	EX+	SN+	EX-	SN-	SIG+	SIG-	Shield
4 wires	EX+		EX-		SIG+	SIG-	Shield

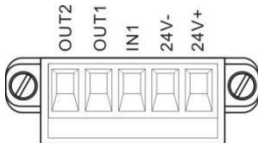
2.2.1 6 wires connection



Note:

1. As load cell output sensitive analog signal, please use shield cable to separate with other cables, especially AC power.
2. 4 wires connection is suitable for short distance and stable temperature or low precision field, otherwise use 6 wires connection.
3. For more load cells parallel connection, their sensitivity (mV/V) should be same.

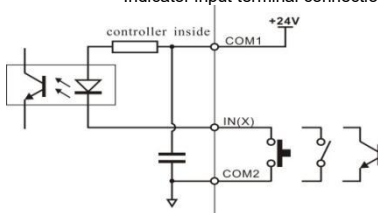
2.3 I/O terminals



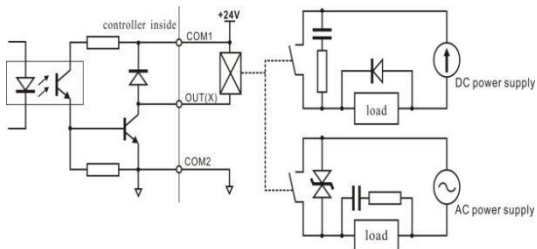
I/O tolerant definition as follows:

Output		Input	
OUT1	Stable	IN1	Reset all
OUT2	OFL		

Indicator input terminal connection:

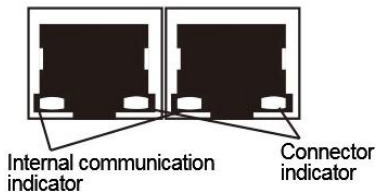


Indicator input terminal connection:



2.4 Profinet/Ethernet IP connection

GMT-P1 supports **PROFINET** and **Ethernet IP** communication, and provides two Ethernet ports. With the choice of two network ports, the network port has built-in switch, which is used to realize the cascading between multiple devices.



Internal communication indicator: Hardware connection is normal, the internal communication indicator is ON.


Connector indicator: cable connection is normal, connection light is flashing

3 Calibration

3.1 Instruction

- (1) Calibration procedure must be executed when a GMT-P1 indicator is put in use at the first time, the preset parameters may no longer meet the user's needs, and any part of the weighing system was changed. Position of decimal point, minimum division, maximum capacity, zero, and gain can be set and confirmed through calibration.

- (2) If you want to set only one parameter, please press  to save

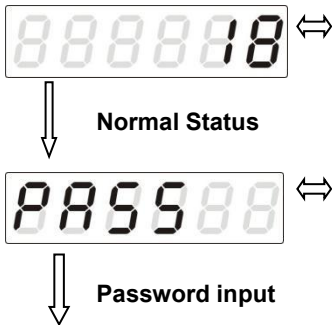
parameter's value and then press  to exit.



- (3) Please see section 3.7 for parameters' instruction.

(4) Please record each value in the blank table in section 3.4 during calibration for the emergency use in future.

(5) See chapter 9 for error alarm message that may be displayed during calibration.

3.2 Flow Chart of Calibration



1. Under this status, press  (twice), indicator will display **CAL**, then press  to enter password input.

2. After password is input, the indicator will display **CALON** for one second, then go to next step.



Decimal point



Min. division



Max. capacity



3. Press $\overset{\text{TARE}}{\text{OPTION}}$ ▲ to select a desired value for decimal point among **0**, **0.0**, **0.00**, **0.000** and **0.0000**, and then

press $\overset{\text{W/A}}{\text{ENTER}}$ ● to save it and enter next step. If there's no need to change the value,

press $\overset{\text{W/A}}{\text{ENTER}}$ ● directly to enter next step.



4. Press $\overset{\text{TARE}}{\text{OPTION}}$ ▲ to select a desired value for min. division among **1**, **2**, **5**, **10**, **20** and **50**, and then to save it and enter next step.

If there's no need to change the Min,division, then press $\overset{\text{W/A}}{\text{ENTER}}$ ● directly to enter next step.



5. Input max. capacity(\leq min. division \times 1000000), press $\overset{\text{W/A}}{\text{ENTER}}$ ● to save it and enter Millivolt value display interface.

If there's no need to change the max. capacity value, then press $\overset{\text{W/A}}{\text{ENTER}}$ ● directly to enter Millivolt display interface.



Millivolt value display



Zero calibration

6. Under this status, press $\frac{W/A}{ENTER}$ ● to enter zero calibration.

Display value near the output value in millivolt between **SIG+ / SIG-** of load cell.

See section **3.3** for details about this function.

7. Unloaded scale first, when **STAB** lamp is on,

press $\frac{W/A}{ENTER}$ ● to finish zero calibration.

If there's no need to calibrate zero,

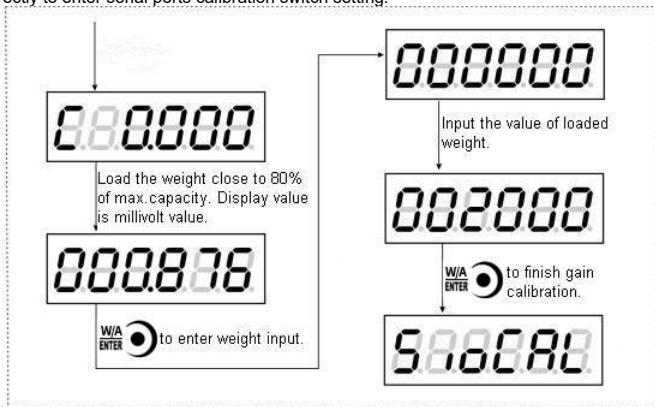
press $\frac{ZERO}{ESC}$ ■ directly to enter gain calibration.

8. The process of gain calibration is as follows. If there's no need to do gain calibration, press



directly to enter serial ports calibration switch setting.

Gain Calibration



Serial ports
calibration switch


Password setting



Normal status



9. Press $\frac{W/A}{ENTER}$ ● to enter remote calibration ON/OFF, press $\frac{TARE}{OPTION}$ ▲ to choose the switch position, press $\frac{W/A}{ENTER}$ ● to set password. If don't need to set switch position, then press $\frac{ZERO}{ESC}$ ◻ to enter password setting.

10. See section 7.2 for reference to set password. If there's no need to set password, press $\frac{ZERO}{ESC}$ ◻ directly to go back to normal status.

3.3 Millivolt Value Display

This function is mainly used for system test, position-error test for weighing mechanism and linearity test for load cell.

1. System Test

(1) If display data changes with loaded weight changes, it shows that connection of load cell is correct and weighing mechanism works well.

(2) If display value is OFL (or -OFL), it means that loaded weight on load cells is too large (or too small). Please unload the weight (or load more), if display value is still OFL (or -OFL), the possible reasons are as follows:


- a. There is something wrong with weighing mechanism, please check and clear.
- b. The connection of load cell is incorrect, please check and clear.
- c. Load cells may be damaged, please replace.

2. Position-error Test for Weighing Mechanism

Load a same weight on each corner of weighing mechanism and record displayed millivolt value respectively. If differences among these values are obvious, please adjust weighing mechanism.

3. Linearity Test for Load Cell

Load same weight for several times, and record displayed value every time. If one or two values are obviously much larger or smaller than any others, it means that the linearity of load cell is bad.

***NOTE:** Press  to zero every time before weight is loaded.

3.4 Calibration with Weights

In Chapter 3.2, steps 7 and 8 in the calibration flow chart are operation instructions of calibration zero point and calibration gain with weights

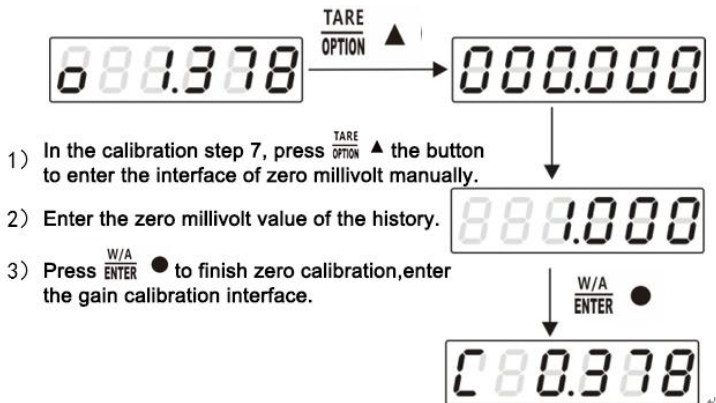
During calibration with weight, please record the zero millivolt value, gain millivolt value and the loaded weight value in the blank table below. If it is not convenient to load a weight to calibrate, these values can be used for calibration without weights.

	Zero millivolt value(mV)	Gain millivolt value(mV)	Loaded Weight	Date	Remarks
1					
2					
3					
4					
5					

3.5 No weight calibration

3.5.1 No weight zero Calibration

When the mechanism is calibrated with weights, the millivolt value corresponding to the empty balance should be recorded. Zero calibration is accomplished by manually entering historical values.



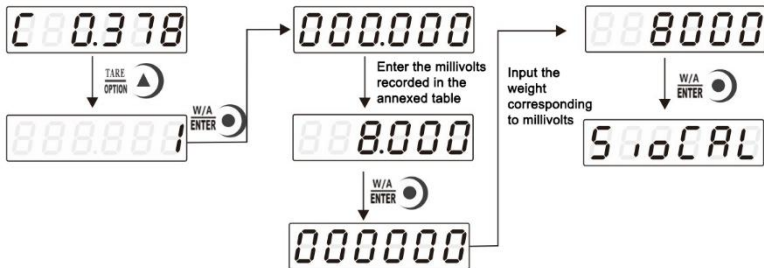
3.5.2 No weight gain Calibration

There are two methods for weighting - free calibration gain

- 1) Historical calibration: Gain calibration by entering historical record values
- 2) Theoretical calibration: Calibrate through sensor sensitivity and maximum range value of input mechanism (the sum of the average value of input sensitivity and

maximum range when multiple sensors are connected)

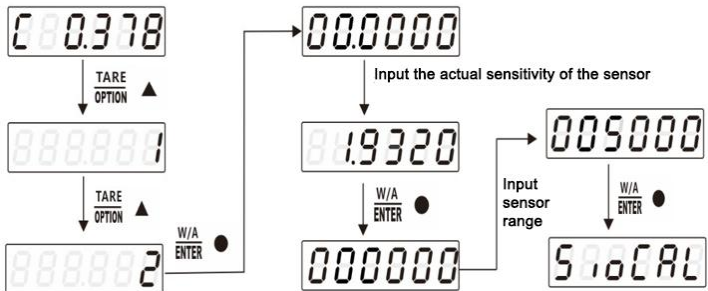
Historical gain calibration



- 1) In gain calibration interface, press **TARE OPTION** ▲, and the interface displays 1. Press **W/A ENTER** ● to enter the manual gain millivolt input interface and enter the historical millivolt value.

- 2) Press $\frac{W/A}{ENTER}$ ● save to enter the weight input interface and enter the weight value corresponding to the millivolt number.
- 3) Press $\frac{W/A}{ENTER}$ ● save to complete gain calibration and enter the serial port calibration switch.

Sensitivity and gain calibration range



- 1) In gain calibration interface, press twice $\frac{\text{TARE}}{\text{OPTION}}$ ▲ to enter and choose "2" press enter interface for manual input of sensor sensitivity and input the sensitivity of the actual sensor.
- 2) Press $\frac{\text{W/A}}{\text{ENTER}}$ ● , enter the maximum range input interface and input sensor range.
- 3) Press $\frac{\text{W/A}}{\text{ENTER}}$ ● , complete gain calibration and enter serial port calibration switch.

3.6 Calibration Switch for Communication Interface

When calibrate the transmitter through serial port(Rs,SP1 or Modbus), must set to "ON" status for the calibration switch for communication interface.

3.7 Explanation for Calibration Parameters

Symbol	Parameter	Types	Value of parameter	Default
Pt	Decimal Point	5	0 0.0 0.00 0.000 0.0000	0
1d	Min. Division	6	1 2 5 10 20 50	1
CP	Max. Capacity		≤Min. Division×100000	10000
t	Millivolt Value			

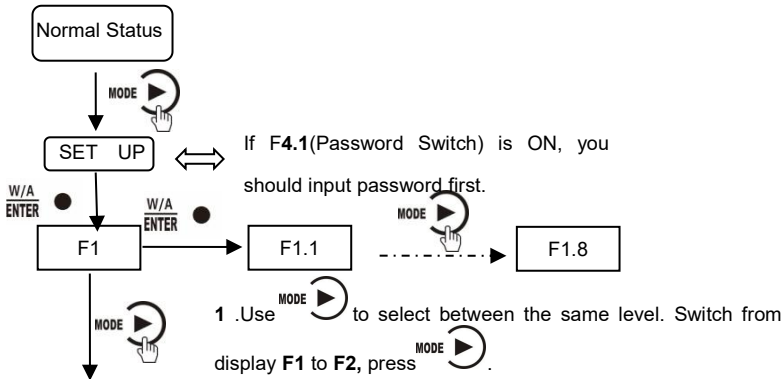
o	Zero			
C	Gain			
SIOCAL	Switch for Calibration via serial interface			OFF
PASS	Password Setting			00000

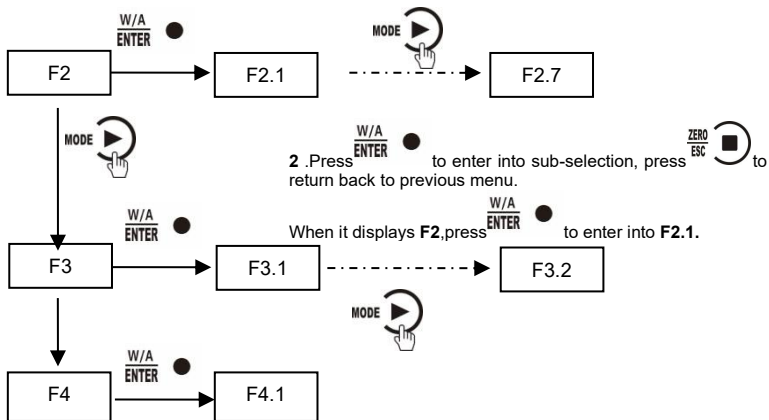
Log Table for Calibration Parameters

Parameter	Calibrated Value	Date	Remarks
Decimal Point			
Min. Division			
Max. Capacity			
Load cell sensitivity			
Password			

4 Working Parameters Setting

4.1 Flow Chart of Working Parameters Setting



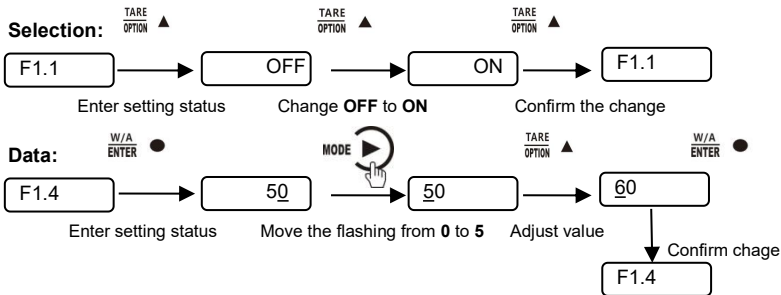


4.2 Parameter Setting Method

GMT-P1 has 2 kinds of working parameters: Selection type and data type. For

selection type parameters, press **TARE OPTION** ▲ to choose. For data type parameter in

parameter interface, press **MODE** ▶ to choose digit position, press **TARE OPTION** ▲ to choose value.



4.3 Descriptions of Operation Parameters

Code	Default	Description
------	---------	-------------

F1	Null	The first major term of working parameter.
F1.1	OFF	Switch for Auto-Zeroing when power-on, OFF: disabled ON: enabled
F1.2	0	Zero-tracking Range (0~9d optional) . This parameter is for automatic calibration, disabled when is set "0".
F1.3	0	Motion Detecting Range (0~9d optional) It is stable if the change is within range.
F1.4	50	Zeroing Range (00%~99% of Maximum capacity)
F1.5	5	Digital filtering parameter: (0-9 as optional) 0: without filtering 9: strongest digital filtering
F1.6	0	VF-Filter 0: without filtering 9: strongest digital filtering(0-9 as optional)
F1.7	0	A/D conversion rate: 120,480,960,15,30,60 as optional
F1.8	0	0 : NET indicating net weight ; 1 : NET indicating communication
F1.9	OFF	Parameter remote set ON/OFF If this parameter set to ON, Then work parameters and

		part of calibration parameters can be modified through the master station. If this parameter set to OFF, the modified parameters on the primary site do not take effect.
F1.10	GSD1/ EDS1	PN Parameters: GSD1 (standard), GSD2(compact) EIP Parameters: EDS1 (standard), EDS2(compact)
F1.11	ON	PN Parameters: The main interface LED represents: Heartbeat or Tare alarm. OFF: Tare alarm. ON: Heartbeat
F2	Null	The second major term of working parameter.
F2.1	01	Scale no., indicator no.
F2.2	38400	Baud rate of serial port:1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600
F2.3	Modbus-R TU	Serial ports communication mode: Modbus-RTU: MODBUS RTU mode; r-Cont:SP1 continuous mode; r-SP1: SP1 command mode; tt:TOLEDOcontinuous mode; Cb920: Cb920 continuous mode.

		rE-Cont:rE continuous mode; rE- rEAd:rEcommand mode;
F2.4	8-E-1	Data format: 7-E-1: 7 data bit, even parity check, 1 stop bit; 7-O-1: 7data bit, odd parity check, 1 stop bit; 8-E-1: 8 data bit, even parity check, 1 stop bit; 8-O-1: 8 data bit, odd parity check, 1 stop bit; 8-n-1: 8 data bits, no parity check, 1 stop bit; 8-n-2: 8 data bits, no parity check, 2 stop bits;
F2.5	HiLo	MODBUS dual-byte register storage turn, Hi Lo: High byte in the front, low byte at the back; Lo Hi: Low byte in the front, high byte at the back
F2.6	nONE	Cont mode automatic sending time interval
F2.7	0	tt(TOLEDO continuous mode) lf send the checksum. 0: not send, 1: send.
F3	Null	The third major term of working parameter.
F3.1	0-255	The first paragraph of IP, initial vale 192

F3.2	0-255	The second paragraph of IP, initial vale 168
F3.3	0-255	The third paragraph of IP, initial vale 1
F3.4	0-255	The fourth paragraph of IP, initial vale 1
F3.5	1-65534	Modbus-TCP communication port no., initial value 502
F3.6		Ethernet communication mode 0: b Tcp; 1: Cont
F4	Null	The fourth major term of working parameter.
F4.1	OFF	Parameters password setting switch.
F4.2	000000	Parameters password setting: Valid when F4.1 is ON
F5	Null	Parameter setting refer the 5 th term
F5.1	1.00000	Weight correction factor K, weight correction factor K = Expected weight/current weight range: 0-9.99999 When the weight is calibrated (gain) or the calibration parameter is reset, the value changes to the default value of 1.00000

4.4 Set point parameters

Code	Default	Description
P1-P4	Null	The first term of working parameters
PX.1	OFF	Change of state if need stable

PX.2	0.0	Change of state minimum duration
PX.3	P1.3=1 P2.3=5 P3.3=0 P4.3=0	Condition of validity: 0: forbid; 1: < Less than; when the weight is less than Fx. 4, the output is valid, otherwise it's invalid 2: <= Less than or equal to; when the weight is less than or equal to Fx. 4, the output is valid; otherwise, it is invalid. 3: == Equal; when the weight is equal to Fx. 4, the output is valid; otherwise, it is invalid 4: >=; Bigger than or equal to; when the weight is greater than Fx. 4, the output is valid, otherwise, it is invalid 5: > Bigger than; when the weight is greater than Fx. 4, the output is valid, otherwise, it is invalid 6: != not equal to; when the weight is not equal to Fx. 4, the output is valid, otherwise, it is invalid 7: _<>_ Outside the interval, When the weight is less than FX.4 or more than Fx. 5, the output is valid, otherwise, it is invalid 8: =<_>= In the interval, when the weight is bigger than or

		equal to Fx. 4 and less than or equal to Fx. 5, the output is valid, otherwise, it is invalid 9: external trigger. If it's IO, do 1 state change for 1 trigger, if it's command, then decide according to valid or invalid command.
PX.4	0	Set value 1; 0 ~ 999999 can be set
PX.5	0	Set value 2; 0 ~ 999999 can be set

Set point has **4** major terms which are user defined.

5 I/O Definition

5.1 I/O Definition

In the main display interface, press **MODE** ► 4 times to display iodEF in the indicator. In this interface, press ^{W/A}ENTER ● to enter the interface of custom setting of I/O module. If the password ON/OFF of working parameter F4.1 is set as ON, the password of working parameter needs to be entered before entering the custom setting of I/O module.

Operation steps of I/O module customization: After entering the interface of I/O module customization,

- 1) Press ^{W/A}ENTER ● to modify the definition of OUT1
- 2) Press ^{TARE}OPTION ▲ to select the meaning code of I/O module
- 3) Press ^{W/A}ENTER ● to confirm and return to the OUT1 interface

- 4) Press **MODE** ► to define the next I/O module, then press **MODE** ► to skip the current I/O module definition (keep the original definition) to set the next I/O module. The definition method is the same as the above three steps, which will not be repeated here. Press **ZERO** **ESC** ■ to exit when the setup is complete.

Output/Input code table:

Output		
Code	Definition	Description
O0	None	No definition
O1	Stable	Effective output in stable status.
O2	Overflow	Effective output when overflow.
O3	Sp1	Effective output when set point 1 status output.
O4	Sp2	Effective output when set point 2 status output.



O5	Sp3	Effective output when set point 3 status output.
O6	Sp4	Effective output when set point 4 status output.
Input		
Code	Definition	Description
I0	None	No definition
I1	Zeroing	Effective input for zeroing, pulse input signals
I2	Sp1	If this signal is valid, Sp1 status will be regarded as invalid. Output valid state when comparison condition turns to invalid, and be effective again.
I3	Sp2	If this signal is valid, Sp2 status will be regarded as invalid. Output valid state when comparison condition turns to invalid, and be effective again.
I4	Sp3	If this signal is valid, Sp3 status will be regarded as invalid. Output valid state when comparison condition turns to invalid, and be effective again.

I5	Sp4	If this signal is valid, Sp4 status will be regarded as invalid. Output valid state when comparison condition turns to invalid, and be effective again.
I6	Reset all	Reset all parameter value when this signal is valid.
I7	Tare/Add tare	Tare when the first valid signal. Add tare when second.
I8	Tare	Tare when the signal is valid.
I9	Add tare	Add tare when the signal is valid.
I10	I/O define	IO calibration lock, when I10 is defined, cannot be calibrated if the input is invalid.



5.2 I/O testing



Normal Status

Under weighing status, press **MODE**  (**5 times**), then display **TESTio**. press **W/A**  **ENTER** enter into I/O testing interface.



Press  **OUT1** status flash,
 press  **OUT2** status flash.



This interface shows: **IN1** input valid, **OUT1** output valid.

6 Communication

6.1 PROFINET Communication

GMT-P1 display has two PROFINET-IO bus connections, Port1 and Port2, and can be used as a PROFINET-IO slave station to connect to the PROFINET bus.

IP address of indicator can be set and viewed in Setup working parameters F2.1~F2.4; MAC address in F2.5~F2.10 to view.

6.1.1 I/O Status

GMT-P1 provides multi-byte, IO output in two modules, through which the master station can read and control the status of the weighing display.

6.1.1.1 GSD1

Module 1: Weight and status parameter (read register)

Weight offset	Parameter	Data type	Description
0	Weight display	DInt	Current display weight, integer
4	Weight status marker	Duint	D4-D15 Reserved
			D3: Weight marker

			D2 : ZERO , (weight is in 0+/-1/4d range)
			D1: Weight overflows bit
			D0: Weight stable marker
8	Gross weight	DInt	Gross weight (signal integer)
12	Net weight	DInt	Net weight (signal integer)
16	Tare weight	DInt	Tare weight (signal integer)
20	Current weight	Float	Current weight, floating-point type
24	Gross weight	Float	Gross weight, floating-point type
28	Net weight	Float	Net weight, floating-point type
32	Tare weight	Float	Tare weight, floating-point type
36	Preset point status area	Word	D5–D15 Reserved
			D3: Preset point 4 status area

			D2: Preset point 3 status area
			D1: Preset point 2 status area
			D0: Preset point 1 status area
38	Heartbeat communication	Word	The value of PN's communication heartbeat is always 1 after the connection is established, and the communication light is always on. After flashing the LED light, the communication light will blink at the frequency of 1Hz, and the value of communication heartbeat will also convert between 0 and 1 at the frequency of 1Hz

Module 2: Calibration parameter (read register)

Weight offset	Parameter	Data type	Description
---------------	-----------	-----------	-------------

Weight calibration				Read register
0	Weight ZERO calibration	DWord	Read absolute millivolts	
4	Weight gain calibration	DWord	Read relative millivolts	
No weight calibration				
8	No weight ZERO calibration	DWord	Read Zero calibration millivolt	
12	No weight gain calibration voltage value	DWord	Read gain calibration millivolt	
16	No weight gain calibration weight	DWord	Read gain calibration weight	
Theoretical value calibration				
20	Load cell sensitivity	DWord	Load cell sensitivity	

24	Load cell full range	DWord	Load cell full range
28	Weight correction factor	DWord	used to correct the weight value factor
Custom read			
32	Modbus read out value	DWord	Reads the value of a specific address
36	Modbus write status	Word	Write data return status 0: normal 1: register address is illegal 2: parameter error
38	Modbus read status	Word	Write data return status 0: normal 1: register

			address is illegal 2: parameter error	
--	--	--	--	--

Module 3: Calibration parameter (write register)

Weight offset	Parameter	Data type	Description	Write register
Weight calibration				
0	Weight ZERO calibration	DWord	Write 1 to automatically calibrate zero	
4	Weight gain calibration	DWord	Enter weight value	
No weight calibration				
8	No weight ZERO calibration	DWord	write Zero calibration millivolt	
12	No weight gain calibration voltage value	DWord	write gain calibration millivolt	

16	No weight gain calibration weight	DWord	write gain calibration weight
Theoretical value calibration			
20	Load cell sensitivity	DWord	Write load cell sensitivity
24	Load cell full range	DWord	Write load cell full range
Function operation			
28	Weight correction factor	DWord	used to correct the weight value factor
Function operation			
32	Function operation	Duint	D15: I/O module
			D14: parameter reset
			D13: calibration reset

			D12: all reset	
			D4-D11 reserved	
			D3: GS/NT	
			D2: clear tare	
			D1: tare	
			D0: zero	
Self-define write				
36	Modbus write operate address	DWord	Modbus write operate address	
40	Modbus write operate value	DWord	Modbus write operate value	
44	Modbus read operate value	DWord	Modbus read operate value	

6.1.1.2 GSD2

Weight offset	Parameter	Data type	Description
---------------	-----------	-----------	-------------

Weight, millivolt and state parameters (Read Only, address)			
0	Weight display	D Int	Current display weight, integer INPUT[0] : The highest byte of the current weight value INPUT[1] : The second highest byte of the current weight value INPUT[2] : The sub lowest byte of the current weight value INPUT[3] : The lowest byte of the current weight value
4	Weight status marker	Byte	D7 : If F1.11 for 0 tare alarm display, ERROR6 alarm state (when taring, current weight unstable) : 0invalid, 1valid; If F1.11 is displayed as 1 heartbeat packet, it switches between 0 and 1 at 1HZ frequency
			D6 : ERROR3 alarm state (when taring, current weight unstable) : 0 invalid, 1 valid

			<p>D5: ERROR2 alarm state (when zeroing, current weight over zeroing range) : 0 invalid, 1 valid</p> <p>D4: Gross/Net (0 Gross; 1Net)</p> <p>D3: Weight marker, 0 positive, 1 negative</p> <p>D2: ZERO, 0 Non zero, 1ZERO</p> <p>D1: weight display overflow state, 0 normal, 1 OFL</p> <p>D0: Weight stable marker, 0 :STAB, 1: UnSTAB</p>
5	Load cell millivolt	Dint	<p>read absolute millivolt</p> <p>INPUT[5]: The highest byte of the current millivolt</p> <p>INPUT[6]: The second highest byte of the current millivolt</p> <p>INPUT[7]: The sub lowest byte of the current millivolt</p> <p>INPUT[8]: The lowest byte of the current millivolt</p>

Function operate (write only, address)			
0	function parameter	Byte	D3-D7 reserved
			D2: clear tare (1 valid)
			D1: tare (1 valid)
			D0: zero (1 valid)

PN non-cyclic parameters list

Parameters	description
Power-Up Zero ON/OFF	range: 0-1, 0: OFF 1: ON; initial value: 0
Zero track range	range: 0-9; initial value: 0
Stable range	range: 0-9; initial value: 1
Zero range	range: 0-99; initial value: 50
Digital Filter	range: 0-9; initial value: 5
Defibrillate Filter Level	range: 0-9; initial value: 0
Decimal Point	range: 0-4; initial value: 0

Resolution	range: 1,2,5,10,20,50; initial value: 1
Full Scale	range: 1-Resolution*30000; initial value: 10000
Zeroing/tare password protect ON/OFF	range: 0-1, 0: OFF 1: ON; initial value: 1

6.1.2 modbus read write operate address sheet

Register address	means	description	Read/write
0000-0001	Current absolute millivolts	Read current absolute millivolts	Read Only
0002-0003	ZERO calibration millivolts	Read ZERO calibration millivolts	
0004-0005	Current relative ZERO millivolts	Read current relative ZERO millivolts	
0006-0007	gain calibration millivolts	Read gain calibration millivolts	
0008-0009	gain calibration weight	Read gain calibration weight	
0010-0011	load cell sensitivity	Read load cell sensitivity	

0012-0013	load cell full range	Read load cell full range	
0014-0015	Weight Correction coefficient	Read weight Correction coefficient	
0016-0017	Transmit weight state data to PN	D4~D15: reserved D3: tare weight UnSTAB D2: Zeroing UnSTAB D1: zeroing over range D0: net/gross weight	Read Only
0018~0019	reserved		
0020	Power-Up Zero ON/OFF	Power-Up Zero ON/OFF (0: OFF; 1: ON)	read /write (Note: remote edit ON/OFF when1 can write)
0021	Zeroing range	ZERO track range (0-9d)	
0022	ZERO track range	Stable range (0-9d)	
0023	Stable range	Zeroing range (0%-99%)	
0024	Digital Filter	digital filter parameter (0-9)	
0025	Defibrillate Filter	defibrillate filter parameter	

	Level	(0-9)	
0026	AD sample frequency	AD sample frequency: 0:15time/s 1:30time/s 2:60time/s 3: 120 time/s 4:480time/s 5:960time/s	
0027	communication light ON/OFF	NET light ON/OFF; 0: NET/gross; 1: communication indicate	
0028	remote edit ON/OFF	When turn ON, The parameters can be set through the communication port. Otherwise Read Only.	Read Only
0029	remote calibration ON/OFF	When turn ON, Calibration parameters can be set through the communication port. Otherwise Read Only.	Read/write (Note: remote edit ON/OFF when1 can

			write)
0030	Decimal Point	Decimal Point address (0:0byte; 1:1byte; 2:2byte; 3:3byte; 4:4byte)	Read/writ e (Note: remote calibratio n ON/OFF when1 can write)
0031	Division value	Resolution value (1/ 2/ 5/ 10/ 20/ 50)	
0032-0033	Full Scale	write range (Full Scale \leq Resolution \times 100000)	
0034~0039	reserved		
0040	File version	1 : standard, 2 : compact	Read/writ e
0041	Shift ON/OFF	PN communication weight state byte No.7 byte heart beat and tare alarm unstable shift ON/OFF 0: tare alarm display 1: heart beat display	

0041~0049	reserved		Read/write (Note: remote edit ON/OFF when1 Canwrite)
0050	Reserved 1 if stable	0: No; 1: Yes	
0051	Reserved 1 mini duration time	0-999 : 0-99.9s	
0052	Reserved 1 valid condition		
0053-0054	Reserved 1 value1		
0055-0056	Reserved 1 value2		
0057	Reserved 2 if stable	0: No; 1: Yes	
0058	Reserved 2 mini duration time	0-999 : 0-99.9s	
0059	Reserved 2 valid condition		
0060-0061	Reserved 2value1		
0062-0063	Reserved 2value2		

0064	Reserved 3 if stable	0: No; 1: Yes	
0065	Reserved 3 mini duration time	0-999 : 0-99.9s	
0066	Reserved 3 valid condition		
0067-0068	Reserved 3value1		
0069-0070	Reserved 3value2		
0071	Reserved4 if stable	0: No; 1: Yes	
0072	Reserved 4 mini duration time	0-999 : 0-99.9s	
0073	Reserved 4 valid condition		
0074-0075	Reserved4value1		
0076-0011	Reserved4value2		
0078	IO output 1	I/O module output define	

0079	IO output 2	I/O module output define	
0080	IO output 1	I/O module output define	
0080~0089	reserved		
0090	IP1	Ethernet IP address	Read/write(Note: PN mode do not support modify; only in EIP mode support modify, valid only after modify need re-power
0091	IP2		
0092	IP3		
0093	IP4		

			up)
0093~8999	reserved		
9000~9003	Communication version ID and compilation time		

6.1.3 Indicator Description file GSD

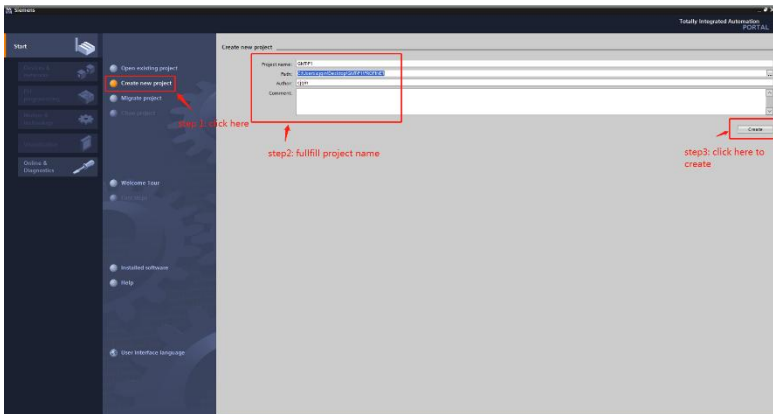
GMT-P1 description file and connection method can download at

www.gmweighing.com

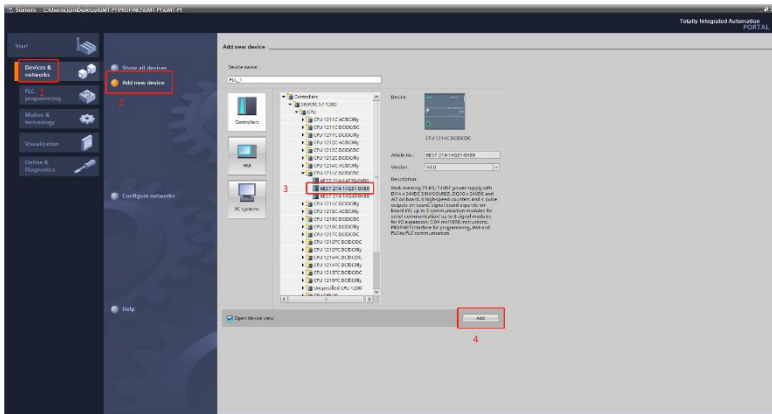
6.1.4 Profinet master configuration GMT-P1

Taking Siemens 1200 as the master station as an example, GMT-P1 is briefly configured as the slave station.

- 1) Open the Botu management software and create a new project



- 2) Click "Add New Device" on the left and select "Controller" to select the model to use the corresponding PLC



- 3) Double-click the PLC device in the left "Local Module", and select " Manage general station description files (GSD)" from the menu bar.

When installing the GSD file, may asked to close the project view. Please save

4) Configuration network. Switch to Network View, find GMT-P1 Device,

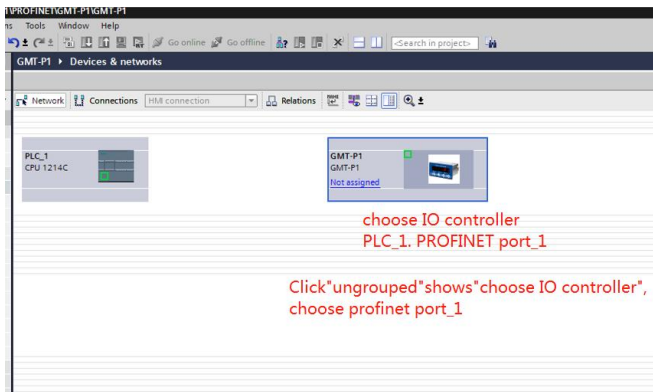
double-click add Device to connect the indicator to the PLC.

The screenshot displays the SIMATIC Manager 'Devices & Networks' configuration window. The interface includes a left-hand navigation tree, a central workspace, and a right-hand 'Options' panel.

Key annotations and steps shown:

- Network view:** A red box highlights the 'Network view' tab in the top right of the workspace.
- Device configuration:** A red box highlights 'Device configuration' in the left-hand tree.
- Double-click, enter interface:** A red box highlights the 'GMT P1' device icon in the workspace, with a red arrow pointing to it and the text 'double click, enter interface'.
- Find GMT-P1, double click to add device:** A red box highlights the 'GMT-P1' entry in the 'Hardware catalog' on the right, with a red arrow pointing to it and the text 'Find GMT-P1, double click to add device'.

The workspace shows a 'PLC' (CPU 1214C) and a 'GMT P1' (Digital Indicator) connected to a 'Network' (17-4300-master_1).



choose IO controller
 PLC_1. PROFINET port_1

Click "ungrouped" shows "choose IO controller",
 choose profinet port_1

- 5) Set the IP address and name. In the device view, double-click the PLC module/double-click the network port to Settings

The screenshot shows the SIMATIC Manager interface for configuring a PLC. The central workspace displays a rack diagram with a PLC module selected. The Properties window is open to the 'Interface networked with' tab, showing the 'Ethernet address' section. The 'IP address' field is highlighted with a red box, and the 'PROFINET' section is also highlighted with a red box.

Under the device view, double-click the PLC mode/ double click the Ethernet

Choose Ethernet address

Full in the IP address assigned to PLC. after the assignment, the IP address of the indicator will automatically be in the same network segment with PLC.

Add the name assigned to indicator PS. the device name, not the IP address, is the most unique identifier of the PROFINET device.

- 6) Assign device names. Device view as below, right-click and select assign device Name.

Assign PROFINET device name.

Configured PROFINET device

PROFINET device name: gmt-p1-1 1

Device type: GMT-P1

Online access

Type of the PG/PC interface: PNIE 2

PG/PC interface: Realtek PCIe GbE Family Controller 2

Device filter

Only show devices of the same type

Only show devices with bad parameter settings

Only show devices without names

Accessible devices in the network:

IP address	MAC address	Device	PROFINET device name	Status
0.0.0.0	BC-66-41-90-27-11	GMT-PONE1	gmt-p1-1	<input checked="" type="checkbox"/> OK

5

Update list Assign name

3 4

Online status information:

i Search completed. 1 of 11 devices were found.

✓ The PROFINET device name "gmt-p1-1" was successfully assigned to MAC address "BC-66-41-90-27-11".

Close

- 7) Configure indicator parameters and operate them. In the Device view, click "Ungrouped Device → Parameter Modify Interface _1 → Property" on the left.

Note:

- ✧ The remote calibration ON/OFF is required to be ON to modify the calibration parameters.
- ✧ After modifying the parameters, need to recompile and download to PLC, the parameters take effect.

Para Modify Interface_1 [Para Modify Interface]

General IO tags System constants Texts

General

Module parameter. **User can set below parameters**

I/O addresses **Model Select**

Hardware iden... **Select Module parameter**

Select the module need modified: Don't modify any modules

Basic Parameter configure

Please Select the param you want to modify: Don't modify any param

Auto Clear Zero Range When Powerup: 0

Clear Zero Range: 50

Trace to zero range: 0

Sentenced to stabilizing range: 0

Digital filtering Level: 5

Steady state filtering range: 0

AD sampling frequency: AD sampling frequency:120

Net indicator led: 0

remote calculator switch: 0

Weight Parameter configure

Please Select the param you want to modify: Don't modify any param

Deciml: Deciml: 0

Division: Division: 1

Full_scale: 10000

SetPoint1 Parameter configure

< ||| > < ||| >

OK Cancel

- 8) IO loop data operation. In the device view, view the IO address assigned to the module by the PLC. Assign I address and Q address according to IO status table. Modify corresponding parameter values by monitoring table.

After assigning the addresses needed to view and operate, go online, and then click "Monitor" to see the changes in these values.

	Name	Data type	Address	Retain	Access...	Write...	Visibl...	Monitor value
1	present weight	Dint	%D68	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-4970
2	weight status	UDInt	%D72	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	9
3	Gross	Dint	%D76	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-4970
4	Net	Dint	%D80	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-4970
5	Tare	Dint	%D84	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0
6	COMHeartbeat	UInt	%W104	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
7	LC mVIV	UDInt	%D128	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20000
8	LC Capacity	UDInt	%D132	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	100000
9	<Add new>			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Click here to add tag

Here is the name assigned to each address in the PN protocol address table.

- 9) Compile, download and online. After downloading, switch to online, open the monitoring table, you can view and modify the parameters of the indicator.

The screenshot displays the Siemens TIA Portal software interface. The title bar shows the project path: `C:\Users\jqin\Desktop\GMT-P1\PROFINET\GMT-P1\GMT-P1`. The menu bar includes Project, Edit, View, Insert, Online, Options, Tools, Window, and Help. The toolbar contains various icons, with the 'Compile' icon (a blue square with a white 'C') highlighted by a red box and labeled 'Click compile'. The 'Download' icon (a blue square with a white 'D') is also highlighted by a red box and labeled 'Click download'. The Project tree on the left shows the hierarchy: GMFP1 > Devices & networks > PLC_1 [CPU 1214C DC/DC]. The main workspace shows a rack diagram with slots 103, 102, 101, 1, 2, 3, 4, 5, and 6. Slot 1 is occupied by a PLC device, which is highlighted with a red box and labeled 'Click PLC or other device, the compiler button will turn from dark to bright'. The device's status is shown as 'ONLINE'.

6.2 Ethernet-IP communication

You can set and view the **IP** address of the indicator in the second major item of the parameter. After setting, it will take effect only after re-powering. You can also view the **MAC** address.

6.2.1 IO status

GMT-P1 provides multi-byte **IO**, through these I/O enable the master station to read and control the status of the weighing display

6.2.1.1 EDS1

Module 1: weight, calibration and status parameters (read register)

Weight offset	Parameter	Data type	Description
0	Weight display	DInt	Current display weight, integer
4	Weight status marker	Duint	D4-D31 Reserved
			D3: Weight marker
			D2: ZERO, (weight is in

			0+/-1/4d range)
			D1: Weight overflows bit
			D0: Weight stable marker
8	Gross weight	DInt	Gross weight (signal integer)
12	Net weight	DInt	Net weight (signal integer)
16	Tare weight	DInt	Tare weight (signal integer)
20	Current weight	Float	Current weight, floating-point type
24	Gross weight	Float	Gross weight, floating-point type
28	Net weight	Float	Net weight, floating-point type
32	Tare weight	Float	Tare weight, floating-point type
36	Preset point status area	Word	D4–D15 Reserved
			D3: Preset point 4 status area

			D2: Preset point 3 status area
			D1: Preset point 2 status area
			D0: Preset point 1 status area
38	Heartbeat communication	Word	The communication light flashes at 1 Hz, and the communication heartbeat switches between 0 and 1 at 1 Hz
weight calibration			
40	weight zero calibration	DWord	Read absolute millivolts
44	weight gain calibration	DWord	Read relative millivolts
No weight calibration			
48	No weight zero calibration	DWord	Read zero calibration millivolt
52	No weight gain calibration voltage value	DWord	Read gain calibration voltage value
56	No weight gain calibration	DWord	Read gain calibration weight

	weight value		
Theoretical value calibration			
60	Load cell sensitivity	DWord	load cell sensitivity
64	Load cell full range	DWord	load cell full range
68	Weight correction factor	DWord	used to correct the weight value factor
Self-defined read			
72	Modbus read value	DWord	read specific address value
74	Modbus write status	Word	Modbus state of the write operation
76	Modbus read status	Word	Modbus state of the read operation

Module 2: calibration and operation parameters (write register)

Weight calibration

0	Weight ZERO calibration	DWord	Write 1 auto zeroing
4	Weight gain calibration	DWord	Write weight value
No weight calibration			
8	No weight ZERO calibration	DWord	Write Zero millivolt
12	No weight gain calibration voltage value	DWord	Write gain millivolt
16	No weight gain calibration weight	DWord	Write gain weight
Theoretical value calibration			
20	Load cell sensitivity	DWord	Write load cell sensitivity
24	Load cell full range	DWord	Write load cell full range
Theoretical value calibration			
28	Weight correction factor	DWord	used to correct the weight value factor

Function operation			
32	Function operation	Duint	D15: I/O module reset
			D14: Parameter reset
			D13: Calibration reset
			D12: Reset all
			D4- D11: Reserved
			D3: GS/NT
			D2: Clear tare
			D1: Tare
			D0: Zero
36	Modbus write operation address	DWord	Modbus write operation address
40	Modbus write operation value	Word	Modbus write operation value

44	Modbus read operation address	Word	Modbus read operation address
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6.2.1.2 EDS2

Weight offset	Parameter	Data type	Description
0	Weight display	DInt	Current display weight, integer
2	Weight status marker	Duint	D4-D31: Reserved
			D03: Weight marker
			D02 : ZERO , (weight is in 0+/-1/4d range)
			D01: Weight overflows bit
			D00: Weight stable marker
4	absolute millivolts (Read Only)	DWord	Read absolute millivolts

6	read value	DWord	Get the value by writing the address to read
8	Write state	Word	Write the returned status of data. 0: no error. 1: Register address is invalid 2: data error
9	Communication heartbeat	Word	Value of the COMMUNICATION heartbeat of the PN After the connection is established, the value of the communication heartbeat is converted from 0 to 1 at the frequency of 1 Hz
function operate			
0	Function parameter (can write)	Duint	D15: I/O module reset
			D14: parameter reset
			D13: calibration reset
			D12: All reset

			D4-D11reserved
			D3: Gross/net
			D2: clear tare
			D1: tare
			D0: Zeroing
2	Write value address	DWord	Modbus write operate address , refer 6.1.2
4	Write value	DWord	Modbus write operate value , refer 6.1.2
6	read address	DWord	Modbusread operate address , refer 6.1.2

EIP Non-cyclic parameters list

parameters		description	
Power-Up Zero ON/OFF	range: 0-1;	initial value: 0 ;	0: OFF; 1: ON

Zero track range	range: 0-9; initial value: 0
Stable range	range: 0-9; initial value: 1
Zeroing range	range: 0-99; initial value: 50
Digital Filter	range: 0-9; initial value: 5
Defibrillate Filter Level	range: 0-9; initial value: 0
Decimal Point	range: 0-4; initial value: 0
Resolution value	range: 1,2,5,10,20,50; initial value: 1
Full Scale	range: 1-Resolution*30000; initial value: 10000

6.2.2 Device description file ESD





GMT-P1 device description file and connection method can down load at www.gmweighing.com

7 Password Input and Setting Reset

7.1 Password Input

- (1) Indicator calibration and working parameters setting default password: **000000**.
- (2) User can set password in parameters when **F3.1** is "ON".
- (3) When display is "PASS", need to input correct password to enter parameters.

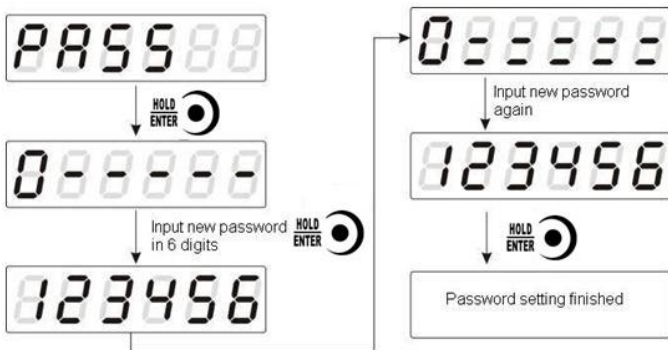
Note:

- (1) When input password, if first time wrong, it will go to the second chance for password input (display from  turn to ).
- (2) If second input wrong, it will enter into interface for inputting password the third time
(Display change from  to .
- (3) If Input wrong for three times, main display show "Error4" and self-lock, but user can operate when power on again.

7.2 Password Setting

- (1) User can set password in parameters when **F3.1** is "ON".

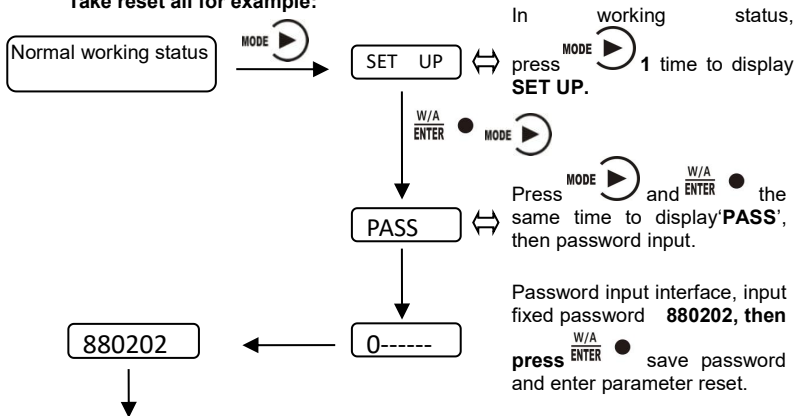
- (2) User must input same new password twice in setting password, If not same, main display show "**Error**" one second and return to **PASS** again.

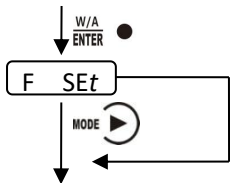


7.3 Factory Reset

Note: Factory reset is only for special technicians, which will reset all of parameters and will maybe cause not working.

Take reset all for example:





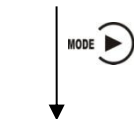
1) In **F SET** interface, press $\frac{W/A}{ENTER}$ to reset working parameters, enter into reset calibration parameters interface.

2) In **F SET** interface, press MODE , not to make working parameter reset, enter into calibration para. Reset interface.

F CAL

1) In **F CAL** interface, press $\frac{W/A}{ENTER}$ to reset calibration para., enter into reset all interface.

2) In **F CAL** interface, press MODE , not to make calibration para. reset, enter into reset all interface.



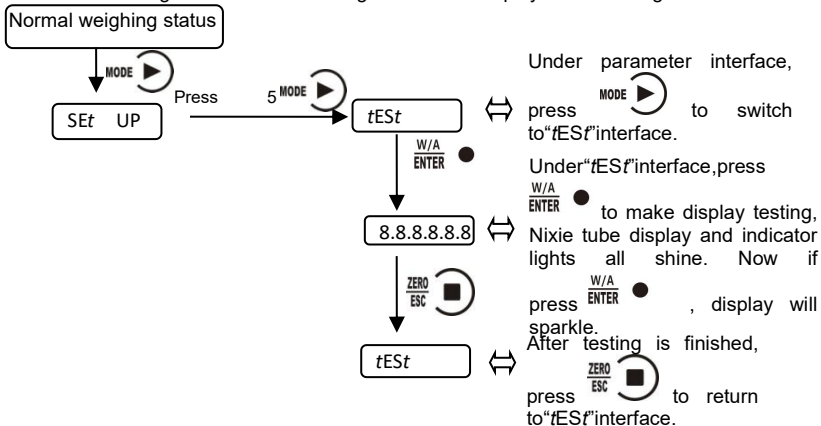
F ALL

1) In **F ALL** interface, press $\frac{W/A}{ENTER}$ to make reset all of the parameters (including working para., calibration para., I/O etc..)

Note: In all reset interfaces, press $\frac{ZERO}{ESC}$ to exit and return to weighing interface.

8 Display Testing

The following flow chart is to test lights on main-display and status lights.



9 Errors and Alarm Messages

Error ① Input error.

② wrong data beyond parameter range.

Error 2 The present weight value is out of zeroing range.

Error 3 Scale platform is not stable when zeroing.

Error 4 Input wrong password more than 3 times.

Error 5 Overlimit when tare.

Error 6 Weight value is not stable when tare.

OFL Weighing value is positive overflow.

-OFL Weighing value is negative overflow.

10. Indicator model user-defined function

Long press MODE to display "LOGO" and enter the setting interface. Press ZERO to return to the setting menu

After saving, the next boot will show the newly edited model number.(ModbusTCP does not add a write function.)Add files such as "LogoSetupThread. C "and" logosetuthread. H ".

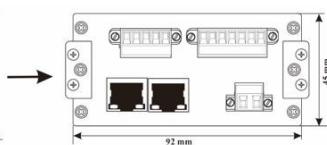
Displays character comparison table

a	b	c	d	e	f	g	h	i	j	k	l	m
A	b	C	d	E	F	G	H	,	J	K	L	m
n	o	p	q	r	s	t	u	v	w	x	y	z
n	o	P	q	r	S	t	U	v	w	x	y	Z

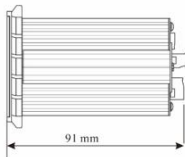
11 Dimension of Indicator



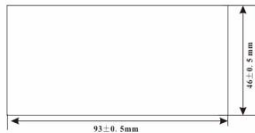
Dimension of front panel
(mm) : 105×57



Dimension of rear panel
(mm) : 92×45



Dimension of profile
(mm) : 91



Mounting hole size
(mm) : 93×46