DADISICK®

User manual for GFL-F series laser ranging sensors

⚠ Warn

- The light source of this product uses visible semiconductor lasers. It is prohibited to directly or indirectly reflect the laser beam from the reflecting object into the eye. If the laser beam enters the eyes, it may pose a risk of blindness.
- This product does not have an explosion-proof structure. Prohibit use in flammable, explosive gas or explosive liquid environments.
- Do not disassemble or modify this product as it is not designed to automatically turn off laser emission when the body is opened. If the client disassembles or modifies this product without authorization, it may cause personal injury, fire, or electric shock hazards.
- The use of controls, adjustments, or operational procedures beyond those specified here may result in hazardous radiation leaks.

⚠ Reminded

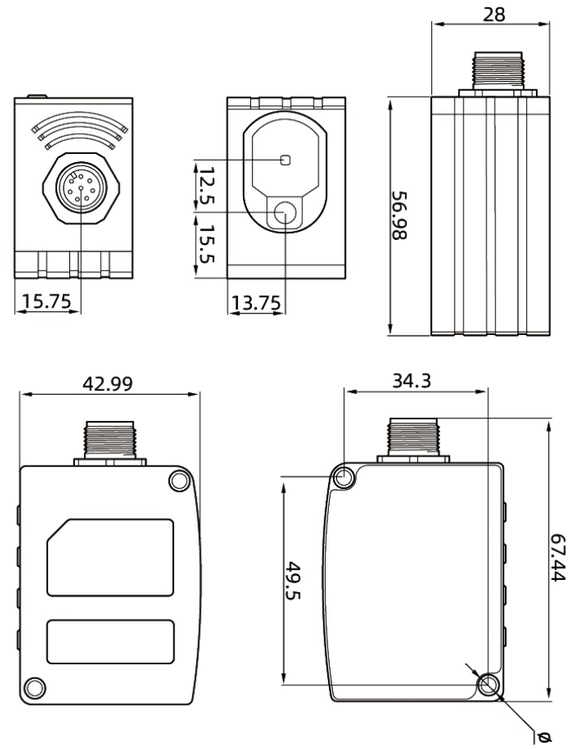
- It is very dangerous to wire, connect/disconnect interfaces when the power is turned on. Please make sure to turn off the power before operation.
- Installation in the following locations may cause malfunctions:

1. A place covered with dust or steam;
2. Places where corrosive gases can be generated;
3. A place that will directly receive splashed water or oil;
4. Places subjected to severe vibration or impact.

- This product is not suitable for outdoor use.
- Do not use this sensor in an unstable state shortly after the power is turned on (approximately 15 minutes of warm-up time)
- If it is necessary to use a switching power regulator, please ground the grounding terminal. Do not connect to high-voltage cables or power lines. Operation failure will lead to induction or damage faults, as each product has differences, so there may be slight differences in the detection characteristics of the workpiece.
- Do not use this product in water.
- Please do not disassemble, repair, or modify this product without authorization, as it may cause electric shock, fire, or injury to the human body.
- Wipe off dust on the transmitting or receiving components to maintain proper detection. Avoid direct impact of external objects on this product.
- Operate within the rated range.

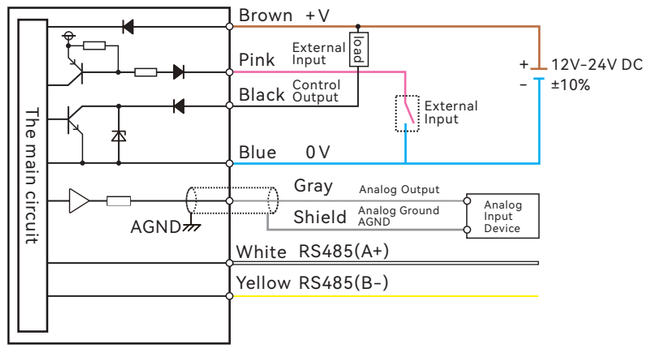
⚠ This product cannot be used as a safety device to protect the human body.

Dimensions

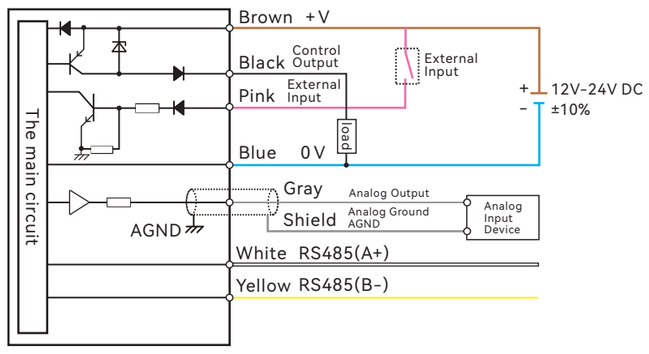


Wiring method

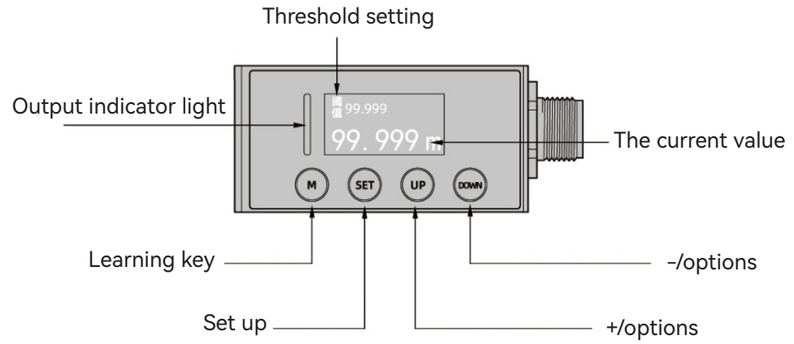
NPN+Analog+RS485



PNP+Analog+RS485



Display and Buttons



Technical Parameters

Item	Model		
NPN+analog+485	**GFL-F100NM-485**	**GFL-F200NM-485**	**GFL-F500NM-485**
PNP+analog+485	**GFL-F100PM-485**	**GFL-F200PM-485**	**GFL-F500PM-485**
Measure distance	0.1-1m	0.1-2m	0.1-5m

Item	Model		
NPN+analog+485	**GFL-FM10NM-485**	**GFL-FM20NM-485**	**GFL-FM50NM-485**
PNP+analog+485	**GFL-FM10PM-485**	**GFL-FM20PM-485**	**GFL-FM50PM-485**
Measure distance	0.1-10m	0.1-20m	0.1-50m

Resolution	1mm
Measurement error	+(2mm+d*1/10,000)★
Laser type	Red semiconductor laser Class II laser 655+10nm<1mW
Voltage	12V-24VDC+10% pulsation P-P10%
Current consumption	≤50mA @24V
Control output	NPN or PNP open drain output Open drain collector transistor output Maximum current:50mA Applied voltage: less than 30V DC Residual voltage: less than 1.5V Leakage current: less than 0.1mA
Output action	Normally open/normally closed can be switched
Short circuit protection	Automatic recovery type
Analog voltage output	Output range: 0-5V (alarm: 5.2V) Output impedance: 100Ω
Analog current output	Output range: 4-20mA (alarm: 0mA) Output impedance: 300Ω max
Reaction time	50-200ms
External input	NPN contactless input
Protective structure	IP67
Operating temperature	-10C~+45℃ (be careful not to condense or freeze)
Storage temperature	-20℃~+60℃
Working humidity	35%~85%RH
Use ambient illumination	Incandescent lamp: light receiving surface illumination below 3000lux
Use elevation	Below 2000m
Cable	With 8-core composite cable 2m
Material	Aluminum parts
Quality	About 150g

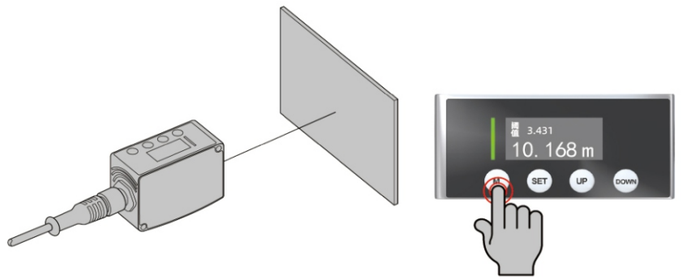
★: Indicates the measurement distance. In harsh environments, such as when the sunlight is too strong, the ambient temperature fluctuates too much, and the reflective surface is dark, the measurement results will have larger errors. In this case, the use of a target reflective plate will be better.

Product function settings

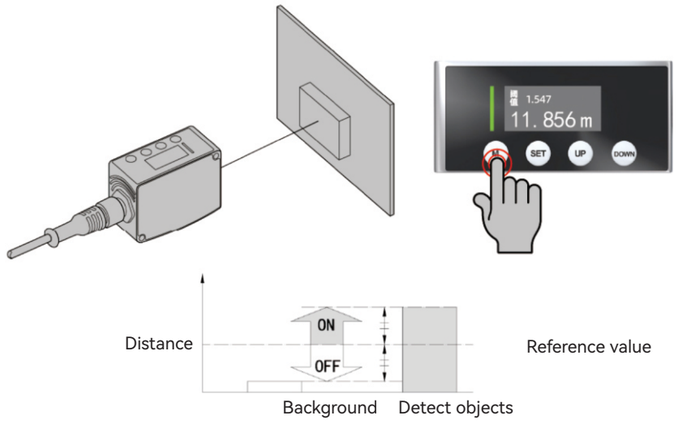
A 2-point teaching

Basic guidance methods.

① In the absence of objects, press the "M" key.



② When there is an object, press the "M" key.

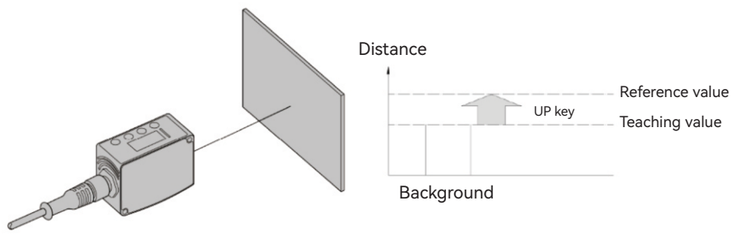


③ Calibration completed. (When the difference between the two teachings is small, the display return difference is too small, and you need to increase the difference and teach again)

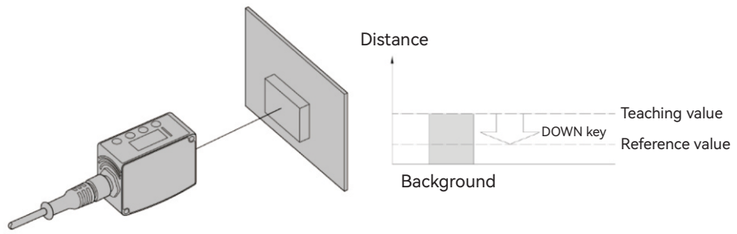
B limited instruction

It is very convenient to use this teaching method when there are small objects and backgrounds.

a. When the background is the basis



b. When the detection object is used as the reference



① Press the "M" key when there is a background object or when there is a detection object.

② When the background object is used as the reference, press the "▲" key to set the reference value in the sensor.

The value set in the detected object after pressing the "▼" key when the detected object is used as the reference.

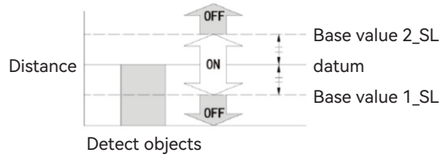
③Complete calibration.

C 1 point of teaching (window comparison mode)

For the distance from the reference plane of the detection object, the method of setting the upper limit value and the lower limit value is implemented without performing one-point teaching. Use this function when making judgments within the upper and lower limits.

When implementing 1-point teaching (window comparison mode),please set to [1-point teaching (window comparison mode)] in the detection output setting of PRO mode in advance.

For the setting method, please refer to “⑫PRO Mode Operation Instructions”



① When there is a detection object, press the "M" key twice.

② Teaching completed.

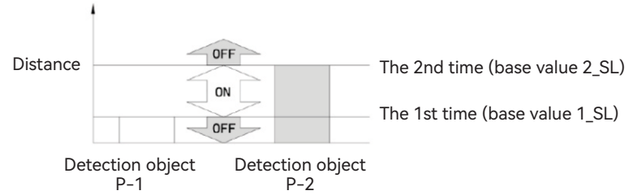
D 2-point teaching (window comparison mode)

Perform 2-point teaching to set the reference value range.

When implementing 2-point teaching (window comparison mode), please set the detection output setting in PRO mode to [2-point teaching (window comparison mode)] in advance.

For the setting method, please refer to "⑫PRO Mode Operation Instructions".

When performing teaching, please use a detection object (P-1, P-2) with a certain distance.



① In the state where the detection object P-1 is present, press the "M" key (the first time).

② In the state where the detection object P-2 is present, press the "M" key (the second time).

③ Calibration completed.

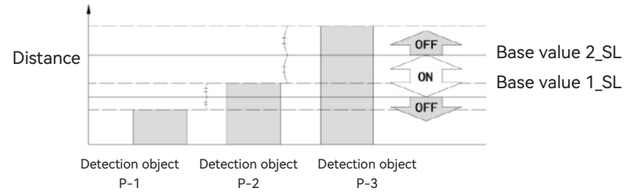
E 3-point teaching (window comparison mode)

Execute 3 points (P-1, P-2, P-3) teaching, as shown in the figure below, set the reference value 1_SL between the first and second times;

This method sets the reference value 2_SL between the second and third times and sets the reference value range.

When executing 3-point teaching (window comparison mode), please set to [3-point teaching (window comparison mode)] in the menu detection output setting in advance.

After teaching, P-1, P-2, and P-3 will be automatically arranged in order from smallest to largest.



① In the state where the detection object P-1 is present, press the "M" key (the first time)

② In the state where the detection object P-2 is present, press the "M" key (the second time)

③ In the state where detection object P-3 is present, press the "M" key (3rd time)

④ Calibration completed.

Threshold fine tuning function

Normal detection mode:

Press the "▲" key or "▼" key to directly change the threshold.

Window comparison mode:

Press the "▲" key or "▼" key to directly change the threshold.

Press the "" key and the "▼" key at the same time to switch between threshold 1 and threshold 2.

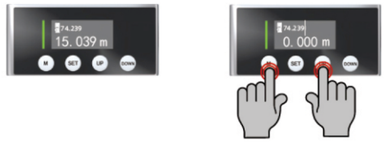
Zeroing function

Note: Zero adjustment requires the display mode to be set to inversion or offset mode before operation.

The zero adjustment function refers to the function of forcibly "zeroing" the measured value. When setting zero, there is a vertical line on the screen, as shown below:

Press the "M" key and the "▲" key at the same time to adjust the zero setting;

Press the "M" key and the "▲" key at the same time to cancel the zero adjustment.



Key locking function

Press the "M" key and the "▼" key at the same time to lock the key
Press the "M" key and the "▼" key at the same time to unlock the key

Menu settings

Press and hold the "M" key for 3 seconds in the distance display interface to enter the menu setting mode.
In the menu setting mode, press and hold "M" for 3 seconds to exit the menu setting mode.
In the menu setting mode, stop pressing any button for 20 seconds to automatically exit the menu setting mode.
After entering the menu setting mode, press the "▲" key or "▼" key to switch the menu up and down.
Short press the "M" key to enter the corresponding menu item.

(1) Working mode: high precision, standard

(2) NO and NC: Press the "M" key to enter, NO and NC.

(3) Detection output: normal mode, 1-point guidance, 2-point guidance, 3-point guidance.

(4) Analog selection: 0-5V, 4-20mA.

(5) Response difference: only valid for switch output,
the distance at which the switch is disconnected can be adjusted.

(6) External input: When the corresponding function is selected, the pink line shorts the negative pole of the power supply once (more than 30ms) to trigger once;
Zero adjustment: Clear the current value to zero (valid only when the display mode is offset or reverse);
Teaching: Can be used as pressing the "M" key once;
Stop measurement: The sensor stops continuous measurement and stops emitting laser;

(7) Output timing: output delay, delayed output, single output, output extension, no timing.
The default 5ms is not adjustable.

(8) Display mode: standard (actual distance), reverse (the center point of the measuring range is 0 point, the direction of approaching the sensor is positive, and vice versa), offset (the farthest point of the measuring range is 0 point, the direction of approaching the sensor increases the distance).

(9) Keep: The default is keep off, you can use the up and down keys to select keep on. That is, when the current detection value reaches the maximum or minimum, the output voltage or current can be maintained. [A common application is to maintain 0 or 5v after exceeding the range].

(10) Sleep screen selection: timed screen sleep, always on.

(11) Address: value range 1-255 (only version 485 has sub-menu)

(12)Baud rate: 9600/19200/38400/57600/115200/256000 optional.

(13)Measurement reference: front reference (the front end of the fuselage is taken as the 0 o'clock position), rear reference (the rear end of the fuselage is taken as the 0 o'clock position)

(14)Distance correction: The distance deviation can be manually set to correct the overall distance error.

(15)Reset: After selecting and confirming the reset, press the M key to display "Restored to factory settings", which means the reset is successful;

(16)Language: Provides two language options: "Simplified Chinese" and "English".

Product warranty

When ordering our products by referring to product samples, if there are no special instructions mentioned in quotations, contracts, specifications, etc., the following warranty contents, disclaimers, fitness for purpose conditions, etc. shall apply.
Please be sure to confirm the following before placing your order.

1. Shelf life

The shelf life is one year, starting from the date the product is shipped to the location designated by the purchaser.

2. Guarantee scope

If the purchased product fails due to our company's responsibility within the above warranty period, our company will be responsible for repairing the product free of charge.
However, when the failure is caused by the following reasons, it is not covered by the guarantee:
1) Failure caused by use under conditions, environments, and usage methods other than those stated in the company's product manual;
2) Failure not caused by the company;
3) Failures caused by modifications and repairs not performed by our company;
4) Use other than the usage methods described by our company;
5) After the goods are shipped, problems may arise due to unforeseen scientific issues;
6) Other failures caused by factors other than our company, such as natural disasters and disasters.
At the same time, the above guarantee only refers to the company's product itself, and damage caused by the failure of the company's product is excluded from the scope of the guarantee.

3. Limitation of liability

1) Our company does not assume any responsibility for special losses, indirect losses, and other related losses (equipment damage, loss of opportunities, loss of profits) caused by our products.
2) When using programmable equipment, our company does not assume any responsibility due to programming performed by non-company personnel or the consequences thereof.

4. Suitable for use and conditions

1) Our company's products are designed and produced for general products in general industries. Therefore, our company's products must not be used in the following applications and are not suitable for their use. If you need to use it in the following situations, please discuss with our company's sales staff to confirm the product specifications, and choose products with a certain margin for rated performance. At the same time, you should consider various safety countermeasures to reduce the risk even if a malfunction occurs. to a minimum safety loop, etc.
Facilities that have a serious impact on life and property, such as atomic energy control equipment, incineration equipment, railway, aviation, and vehicle equipment, medical equipment, entertainment equipment, safety devices, and equipment that must comply with special regulations of administrative agencies and individual industries.
Public utilities such as gas, tap water, electricity supply systems, 24-hour continuous operation systems and other equipment that require high reliability.
Systems, equipment, and devices that may endanger people and property.
Outdoor use under similar or comparable conditions.
2) When users use our company's products in situations closely related to personal and property safety, they should clearly understand the dangers of the entire system, adopt special redundant designs to ensure safety, and follow the instructions of our company's products in the system. For the applicable purpose, complete the supporting power distribution settings, etc.
3) Please be sure to comply with all usage precautions and usage prohibitions to avoid incorrect use and damage caused by third parties.

5. Service scope

Our company's product prices do not include service fees such as technician dispatch fees. If you have any needs in this regard, please contact us for negotiation.

GFL-F series MODBUS protocol

Communication specifications

Communication Mode	RS485
Synchronization Method	asynchronous
Baud	9.6/19.2/38.4/57.6/115.2/256kbps
Data length	8-bit
Stop bit	1-bit
Parity check	nothing

04H instruction (read input register)				
1. Communication frame format				
1byte	1byte	2byte	2byte	2byte
Address code	Function code	Register Address	Number of registers N	CRC code
2. Response frame format				
1byte	1byte	1byte	2N byte	2byte
Address code	Function code	Bytes 2N	Register value	CRC code
3. Error Frame Format				
1byte	1byte	1byte	2byte	
Address code	Error Code	Exception Code	CRC code	

Communication example (obtaining distance)

- Dispatch orders

01 04 00 00 00 02 71 CB

Address code	Function code	Register Address	Number of registers N	CRC
01	04	0000	0002	71CB

- Feedback information

01 04 04 00 01 19 36 21 C2

Address code	Function code	Bytes	Register Value- Distance Value	Check digit
01	04	04	00 01 19 36	21 C2

Where 00 01 19 36 is distance information, unit: um, converted to Decimal, distance: 71990um=71.990mm

Communication example (default Baud is 9600)

- Dispatch orders

01 10 00 0E 00 02 04 00 00 25 80 69 13

Address code	Function code	Register Address	Number of registers	Bytes	Register value	CRC
0x01	0x10	0x000E	0x0002	0x04	0x00002580	0x6913

CRC

- Feedback information

01 10 00 0E 00 02 20 0B

Address code	Function code	Register Address	Number of registers	CRC
0x01	0x10	0x000E	0x0002	0x200B

Note: The sensor address code can be set in the function menu, and after the address code is changed, the CRC also needs to be changed at the same time.

10H instruction (writing multiple holding registers)						
1. Communication frame format						
1byte	1byte	2byte	2byte	1byte	N*2 byte	2byte
Address code	Function code	Register Address	Number of registers N	Bytes 2N	Register value	CRC code
2. Response frame format						
1byte	1byte	2byte	2byte	2byte		
Address code	Function code	Register Address	Number of registers N	CRC code		
3. Error Frame Format						
1byte	1byte	1byte	2byte			
Address code	Error code	Exception code	CRC code			

Read data						
Address code	Function code	Register Address	Number of registers N	CRC	Sending code	Function Description
0x01	0x04	0x0000	0x0002	0x71CB		Acquisition - Distance
0x01	0x04	0x0001	0x0001	0x600A		Acquisition - Working Mode
0x01	0x04	0x0002	0x0001	0x900A		Acquiring - NO and NC
0x01	0x04	0x0003	0x0001	0xC1CA		Get - Detect Output
0x01	0x04	0x0004	0x0002	0x300A		Acquire - Tolerance
0x01	0x04	0x0005	0x0001	0x21CB		Get - External Input
0x01	0x04	0x0006	0x0001	0xD1CB		Acquire Output Timing
0x01	0x04	0x0007	0x0001	0x800B		Get Output Timing Time
0x01	0x04	0x0008	0x0001	0xB008		Get - Display Mode
0x01	0x04	0x0009	0x0001	0xE1C8		Get Keep
0x01	0x04	0x000A	0x0001	0x11C8		Acquisition - Screen Selection
0x01	0x04	0x000B	0x0002	0x0009		Obtain zero adjustment value
0x01	0x04	0x000C	0x0002	0xB1C8		Acquisition - Threshold 1
0x01	0x04	0x000D	0x0002	0xE008		Acquisition - Threshold 2
0x01	0x04	0x000E	0x0002	0x1008		Acquire - Baud

In response to						
Address code	Function code	Bytes 2N	Register value	CRC	Response code	Response description
0x01	0x04	0x04				Distance
0x01	0x04	0x02	0x0000	0xB930		High precision Standard
			0x0001	0x78F0		
			0x0002	0x38F1		High speed
0x01	0x04	0x02	0x0000	0xB930		Normally open
			0x0001	0x78F0		Normally closed
0x01	0x04	0x02	0x0000	0xB930		Usually detected
			0x0001	0x78F0		A little instruction
			0x0002	0x38F1		Two point teaching
			0x0003	0xF931		Three point teaching
0x01	0x04	0x04				Stress difference
0x01	0x04	0x02	0x0000	0xB930		Zeroing
			0x0001	0x78F0		Teach
			0x0002	0x38F1		Stop laser
0x01	0x04	0x02	0x0000	0xB930		Untimed
			0x0001	0x78F0		Output extension
			0x0002	0x38F1		Delayed output
			0x0003	0xF931		Single output
0x01	0x04	0x02				Timing time
0x01	0x04	0x02	0x0000	0xB930		Routine
			0x0001	0x78F0		Reversal
			0x0002	0x38F1		Deviation
0x01	0x04	0x02	0x0000	0xB930		Keep open
			0x0001	0x78F0		Keep Off
0x01	0x04	0x02	0x0000	0xB930		Timed breathing screen
			0x0001	0x78F0		Chang Liang
0x01	0x04	0x04				Zeroing value
0x01	0x04	0x04				Threshold 1
0x01	0x04	0x04				Threshold 2
0x01	0x04	0x04	0x000012C0			4800
			0x00002580			9600
			0x00009600			38400
			0x0001C200	0xFB24		115200
			0x0003E800			256000

Operating functions								
Address code	Function code	Register Address	Number of registers	Bytes	Register value	CRC	Sending code	Function settings
0x01	0x10	0x0000	0x0001	0x02	0x0000	0xA650		Discontinuous output
					0x0001	0x6790		Continuous output
0x01	0x10	0x0001	0x0001	0x02	0x0000	0xA781		High precision
					0x0001	0x6641		Standard
					0x0002	0x2640		High speed
0x01	0x10	0x0002	0x0001	0x02	0x0000	0xA7B2		Normally open Normally closed
					0x0001	0x6672		Usually detected
0x01	0x10	0x0003	0x0001	0x02	0x0000	0xA663		A little instruction Two point teaching
					0x0001	0x67A3		Three point teaching
					0x0002	0x27A2		Stress difference Zeroing
					0x0003	0xE662		Teach Stop laser
0x01	0x10	0x0004	0x0002	0x04				Untimed
0x01	0x10	0x0005	0x0001	0x02	0x0000	0xA605		Output extension Delayed output
					0x0001	0x67C5		Single output
					0x0002	0x27C4		Timing time Routine
0x01	0x10	0x0006	0x0001	0x02	0x0000	0xA636		Reversal Deviation
					0x0001	0x67F6		
					0x0002	0x27F7		
					0x0003	0xE637		
0x01	0x10	0x0007	0x0001	0x02				
0x01	0x10	0x0008	0x0001	0x02	0x0000	0xA718		
					0x0001	0x66D8		
					0x0002	0x26D9		
0x01	0x10	0x0009	0x0001	0x02	0x0000	0xA6C9		Keep open
					0x0001	0x6709		Keep off
0x01	0x10	0x000A	0x0001	0x02	0x0000	0xA6FA		Timed breathing screen
					0x0001	0x673A		Chang liang
0x01	0x10	0x000B	0x0001	0x02	0x0001	0x66EB		Zero adjustment - current measured value
0x01	0x10	0x000C	0x0002	0x04				Threshold - input threshold
0x01	0x10	0x000D	0x0002	0x04				Threshold - input threshold
0x01	0x10	0x000E	0x0002	0x04	0x000012C0	0x7ED3		4800
					0x00002580	0x6913		9600
					0x00009600	0x1D83		38400
					0x0001C200	0x7283		115200
					0x0003E800	0xCC23		256000
0x01	0x10	0x000F	0x0001	0x02	0x0000	0xA6AF		Reset

In response to				
Address code	Function code	Register Address	Number of registers	CRC
0x01	0x10	0x0000	0x0001	0x01C9
0x01	0x10	0x0001	0x0001	0x5009
0x01	0x10	0x0002	0x0001	0xA009
0x01	0x10	0x0003	0x0001	0xF1C9
0x01	0x10	0x0004	0x0002	0x4008
0x01	0x10	0x0005	0x0001	0x11C8
0x01	0x10	0x0006	0x0001	0xE1C8
0x01	0x10	0x0007	0x0001	0xB008
0x01	0x10	0x0008	0x0001	0x800B
0x01	0x10	0x0009	0x0001	0xD1CB
0x01	0x10	0x000A	0x0001	0x21CB
0x01	0x10	0x000B	0x0001	0x700B
0x01	0x10	0x000C	0x0002	0x81CB
0x01	0x10	0x000D	0x0002	0xD00B
0x01	0x10	0x000E	0x0002	0x200B
0x01	0x10	0x000F	0x0001	0x31CA