

OMRON

Model **K3GN**
Digital Panel Meter

UK/USA **INSTRUCTION MANUAL**

Thank you for purchasing this OMRON product. Please read this instruction sheet and thoroughly familiarize yourself with the functions and characteristics of the product before use. Please retain this sheet for future reference.

OMRON Corporation

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Refer to the Cat. No. N102 K3GN User's Manual for details.

Definition of Precautionary Information

- Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

WARNING

Do not touch the terminals while power is being supplied. Electrical shock may result. Also, do not touch the terminals with a screwdriver while power is being supplied. Electrical shock may result via the screwdriver.

Do not allow pieces of metal or wire clippings to enter the product. Electrical shock, fire, or malfunction may result.

CAUTION

Do not attempt to disassemble, repair, or alter the product. Electrical shock, fire, or malfunction may result.

Do not use the product where flammable or combustion gasses are present.

The service life of the output relays depends on the switching capacity and switching conditions. Consider the actual application conditions and use the product within the rated load and electrical service life.

Always maintain the load within ratings. Damage or burning may result if the ratings are exceeded.

Always maintain the power supply voltage within specifications. Damage or risk of fire may result if the specifications are exceeded.

Perform correct setting of the product according to the application. Failure to do so may cause unexpected operation, resulting in damage to the unit or injury.

This product is not a safety device. Product failure may prevent operation of comparative outputs. Take safety measures, such as installing a separate monitoring system, to ensure safety or to prevent serious accidents caused by such failure, thus ensuring safety.

Tighten the terminal screws securely. The recommended tightening torque is 0.5 N·m. Loose screws may result in product failure or malfunction.

General Precautions

Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms. Also, consult our local representative before using the product under the following conditions.

- Conditions or environments not described in this manual or the User's Manual.
- Applications in nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, and safety equipment.
- Other systems, machines, or equipment that may have a serious influence on lives and property, particularly applications requiring safety.

Safety Precautions

Observe the following precautions to ensure safety.

- (1) Do not connect anything to unused terminals.
- (2) Be sure to check each terminal for correct number and polarity before connection. Incorrect or reverse connection may damage or burn out internal components of the product.
- (3) Do not use the product in the locations subject to the following.
 - Dust or explosive gasses (e.g., sulfuric gas or ammonia gas).
 - Condensation or icing as a result of high humidity.
 - Outdoors or in direct sunlight.
 - Splashing liquid or oil atmosphere.
 - Direct radiant heat from heating equipment.
 Extreme changes in temperature
- (4) Do not block heat dissipation around the product, i.e., allow sufficient space for heat dissipation. Do not block the ventilation holes on the back of the product.
- (5) Do not use paint thinner for cleaning. Use commercially available alcohol.
- (6) Use power supply meeting the power supply specifications of the K3GN. Be sure that the rated voltage is achieved within 2 s after turning ON the power.
- (7) Use the K3GN within the specified temperature and humidity ranges. When installing the K3GN in a panel, be sure that the temperature around the K3GN (not the temperature around the panel) does not exceed 55°C. If the K3GN is subject to radiant heat, be sure that the temperature of the surface of the K3GN exposed to the radiant heat does not exceed 55°C by providing a fan or other heat removal method.
- (8) Store the K3GN within the specified temperature and humidity ranges.
- (9) Do not lay heavy objects on the product during use or storage. Doing so may deform or deteriorate the product.
- (10) Conduct aging for 15 minutes min. after power is ON for correct measurement.

Specifications

Supply voltage 24VDC

Operating voltage range 85% to 110% of the rated voltage

Power consumption 2.5W max. (at max. DC load with all indicators lit.)

Ambient temperature Operating: -10°C to 55°C (with no icing or condensation)

Ambient humidity Operating: 25% to 85% (with no condensation)

Ambient temperature Storage: -25°C to 65°C (with no icing or condensation)

Altitude 2,000m max.

Weight Approx. 100g (Digital Panel Meter only)

Installation environment Installation category II, contamination degree 2 (according to IEC61010-1)

Input impedance Voltage range: 1MΩ min. Current range: 60Ω max.

Input range 4 to 20mA (2 to 22mA) or 1 to 5V (0.5 to 5.5V)

±5V (-5.5 to +5.5V) or ±10V (-11 to +11V)

Max. input rating +30mA (4 to 20mA)

+13.5V (1 to 5V, ±5V) or ±26V (±10V)

Pulse frequency Switchable between 30 Hz and 5 kHz

Accuracy 4 to 20mA: ±0.1% FS ±1 digit at 23°C±3°C

1 to 5V: ±0.1% FS ±1 digit at 23°C±3°C

±5V: ±0.1% FS ±1 digit at 23°C±5°C

±10V: ±0.1% FS ±1 digit at 23°C±5°C

Displayable range -19999 to 99999

Control outputs Relay outputs: 2 outputs, OUT1 and OUT2

Transistor outputs: 3 outputs, PASS, OUT1, and OUT2

Communication function RS-485

Output ratings Transistor outputs: 24VDC max., 50mA max.

Relay outputs: 1A max. at 30VDC

Installation

Dimensions

Package Contents

- Digital Panel Meter
- Watertight packing (1)
- Adapter (1)
- Instruction Manual

Mounting

Separate mounting

Gang mounting

Unit: mm

- Insert the product in a square cutout, insert the adapter from the back, and push the product into the cutout as far as possible. Use screws to secure the product. To make the product waterproof, insert the watertight packing in the proper direction. Note that the packing is direction-sensitive.
- When gang-mounting the products, be sure that the ambient temperature does not exceed the specifications.
- Mount to a panel that is 1 to 5 mm thick. Mounting the product to a thinner panel will reduce the resistance to shock and vibration and may result in a malfunction of the product.

Terminal Arrangement

Models with communications terminals

Models with relay outputs

Models with NPN transistor outputs

Models with PNP transistor outputs

Models with NPN inputs

Models with PNP inputs

Analog input

Terminal No.	Name	Description	Applicable models
①-②	Operation power	Connect the operation power supply	All models
③-②	Event input or pulse input	Operates as follows depending on parameter setting: · Holds process value. · Calibrate the process value to zero and clear the forced-zero function. · Pulse input.	K3GN - ND - _ DC24V K3GN - PD - _ DC24V
④⑥-⑤	Analog input	Connect the voltage or current analog input.	All models
⑦-⑧	Communications	RS-485 communications terminals	K3GN - _ D - _ FLK DC24V
⑨⑩-⑫	Comparative outputs	Outputs Relay or Transistor outputs. There is also a PASS output for models with transistor outputs.	K3GN - _ DC - _ DC24V K3GN - NDT1 - _ DC24V K3GN - PDT2 - _ DC24V

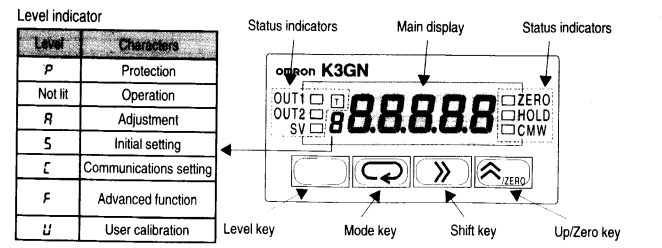
Precautions

Noise Prevention

1. Install the K3GN as far away as possible from devices that generate strong, high-frequency fields (high-frequency welders or other high-frequency machines) and devices that generate surge.
2. Attach surge absorbers or noise filters to nearby devices that generate noise (particularly motors, transformers, solenoids, magnetic contactors, and other devices that have a high inductance component).
3. To prevent inductive noise, separate the terminal block wiring for the K3GN from high-voltage or high-current power lines. Do not place K3GN wire together with or run it in parallel with power lines. Use of separate wiring ducts or shielded cables can also be effective.
4. When using a noise filter on the power supply, check that the filter is suitable for the supply voltage and current ratings, and then attach the noise filter as close as possible to the K3GN.
5. If placed near the product, radios, TVs, or other wireless devices may suffer reception interference.

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Nomenclature



Name	Functions	
Main display	Displays process values, parameters, and set values.	
Status indicators	OUT1	Lit when output 1 is ON.
	OUT2	Lit when output 2 is ON.
	SV	Lit when a set value is being displayed or changed.
	T	Lit when the teaching functions is enabled and flashes when the K3GN is in teaching operation. Lit when a calibration value is being displayed during user calibration. Flashes while reading a calibration value.
	ZERO	Lit when the forced-zero function is activated.
Level indicator	HOLD	Lit when HOLD input is ON.
	CMW	Lit when both reading and writing for communications are possible. Unit when writing is prohibited. Reading is possible even when this indicator is not lit.
	Level indicator	Displays the current level, which K3GN is in.
Level key	Used to change the level.	
Mode key	Used to allow the Main Display to indicate parameters sequentially.	
Shift key	Used to confirm the set value for the displayed parameter or to enable that set value to be changed. When changing a set value this key is used to move along the digits.	
Up/Zero key	Used to change a set value when changing is enabled. Used to set or clear a forced-zero function when a measurement value is being displayed.	

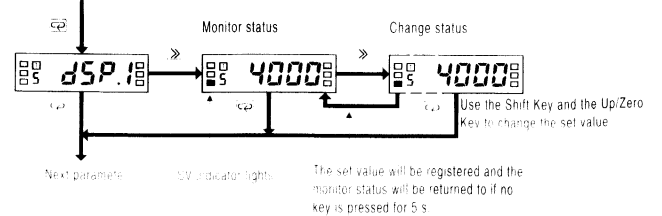
Operations

"Level" refers to a grouping of parameters. The K3GN has seven levels of parameters. The Mode Key is used to change between parameters.

- Changing to Operation Level**
K3GN will enter to the Operation Level when power is turned ON.
- Changing to Protection Level**
The main display will start flashing if the Level and Mode Keys are pressed together in Operation Level. If these keys are pressed for 5 s, Protection Level will be entered. The time required to change to Protection. Level can be set as a parameter. Press the Level and Mode Keys together for 1 s to return to Operation Level.
- Changing to Adjustment Level**
Adjustment Level will be entered if the Level Key is pressed and released in Operation Level. Press the Level to return to Operation Level.
- Changing to Initial Setting Level**
The main display will start flashing if the Level Key is pressed for 1 s in Operation Level. If the Level Key is pressed for 2 s, Initial Setting Level will be entered. Press the Level Key together for 1 s to return to Operation Level.
- Communications Setting Level**
Communications Setting Level will be entered if the Level Key is pressed and released in Initial Setting Level. Press the Level Key to return to Initial Setting Level.
- Advanced Function Setting Level**
Manipulate the parameters in the Initial Setting Level as shown below to enter Advanced Function Level. Password: -0169
- Calibration Level**
Refer to the Cat. No. N102 User's Manual for information on Calibration Level.

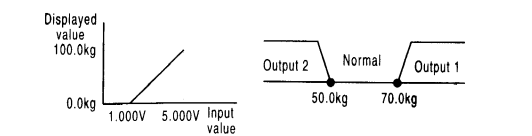
Changing Settings

The set value will be displayed if the Shift Key is pressed while a parameter is being displayed (monitor status). Press the Shift Key again to enable changing the setting of the parameter (change status). If the Mode Key is pressed, the setting will be registered and the next parameter will be displayed.



Application as a Process Meter

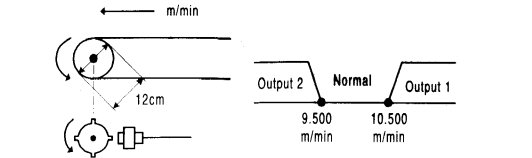
The initial settings required when using the K3GN as a process meter are explained below using the following example.
< Setting Example >
Inputs in the range 1 to 5 V are scaled to the range 0 to 100.0 kg and displayed. If the measurement value goes over 70.0 kg, output 1 turns ON. If the measurement value goes below 50.0 kg, output 2 turns ON.



- ### Initial Setting Procedure
- Check the wiring and supply power.**
 - Set analog input as the input type.**
 - When a measurement value is displayed (operation level), move to the initial setting level by pressing the level key for 3 s min.
 - Set parameter [ANP] to [AN].
 - Set the analog range to 1 to 5 V.**
 - Set parameter [RANG] to [1-5].
 - Set the scaling values.**
 - Set parameter [CNP.1] to [1000].
 - Set parameter [dSP.1] to [0].
 - Set parameter [CNP.2] to [5000].
 - Set parameter [dSP.2] to [1000].
 - Set the position of the decimal point.**
 - Set parameter [dP] to [00000].
 - Set operating action for OUT1 set value and OUT2 set value.**
 - Set parameter [OUT.1] to [HL].
 - Set parameter [OUT.2] to [L].
 - Set OUT1 set value to 70.0 and OUT2 set value to 50.0.**
 - When an initial setting level parameter is displayed, press the level key for 1 s min. to return to the operation level.
 - Set parameter [OUT.1] to [70.0].
 - Set parameter [OUT.2] to [50.0].
 - Start actual operation.**

Application as a Tachometer

The initial settings required when using the K3GN as a tachometer are explained below using the following example.
< Setting Example >
The speed of a conveyor belt is displayed in m/min units. For every revolution of the shaft, 4 pulses are output. The diameter of the axis of rotation is 12 cm. If rotational speed goes over 10,500 m/min, output 1 turns ON. If the speed value goes below 9,500 m/min output 2 turns ON.



Deciding the Scaling value

Rotational speed (m/min) = π × Diameter (m) × rotational speed (rpm)
Revolution per minute (rpm) = Input frequency (Hz) ÷ Number of pulses per revolution × 60

Applying the appropriate values to these equations:
Speed (m/min) = 5.654866... × Input frequency (Hz)

Multiply this coefficient by 1,000 to display the 3 digits to the right of the decimal point.
Speed (m/min) = 5654.866... × Input frequency (Hz)

To limit inaccuracies due to scaling, select a round number for the scaling input number that will give a display value of as many digits as possible. In this example, scaling is performed so that an input value of 10 gives a Displayed value of 56549.



Error Indicators

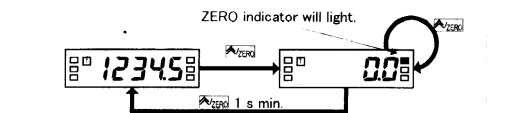
Indicator	Main display	Error contents
Not lit	E 111	Internal memory error
5	E 111	Non-volatile memory error
Not lit	5Err (flashing)	Input error
Not lit	99999 (flashing)	Outside displayable range
Not lit	-99999 (flashing)	Outside displayable range

Initial Setting Procedure

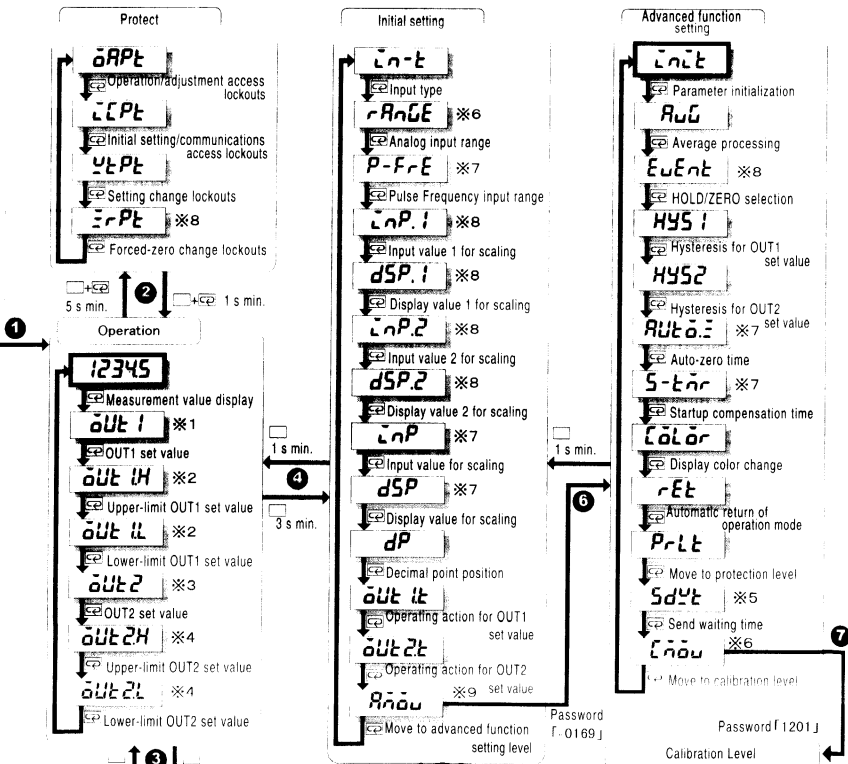
- Check the wiring and supply power.**
- Set pulse input as the input type.**
 - When a measurement value is displayed (operation level), move to the initial setting level by pressing the level key for 3 s min.
 - Set parameter [ANP] to [PULSE].
- Set the pulse frequency to 30 Hz.**
 - The input pulse frequency for the application is approximately 2 Hz and so can be assumed not to exceed 30 Hz. Set parameter [P-FRE] to [30].
- Set the scaling values.**
 - Set parameter [CNP.1] to [1000].
 - Set parameter [dSP.1] to [56549].
- Set the decimal point.**
 - Set parameter [dP] to [00000].
- Set operating action for OUT1 set value to upper limit and set the OUT2 set value to lower limit.**
 - Set parameter [OUT.1] to [HL].
 - Set parameter [OUT.2] to [L].
- Set OUT1 set value to 10,500 and OUT2 set value to 9,500.**
 - When an initial setting level parameter is displayed, press the level key for 1 s min. to return to the operation level.
 - Set parameter [OUT.1] to [10500].
 - Set parameter [OUT.2] to [9500].
- Start actual operation.**

Forced Zero

If the Up/Zero Key is pressed when the present value is being displayed, the ZERO indicator will light and the present value will be calibrated to zero. Press the Up/Zero Key for at least 1 s to release the forced zero.



Parameters

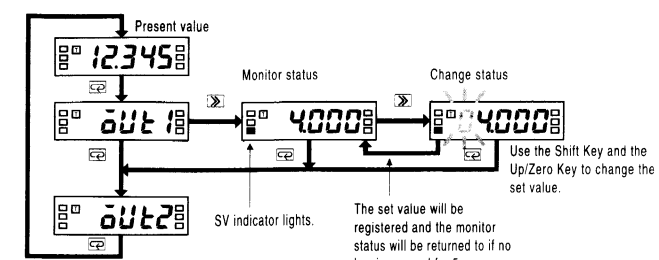


- ### Notes
- ※1 Displayed when operating action for OUT1 set value is set to upper limit or lower limit.
 - ※2 Displayed when operating action for OUT2 set value is set to upper and lower limits.
 - ※3 Displayed when operating action for OUT2 set value is set to upper and lower limits.
 - ※4 Displayed when the input type is set to analog.
 - ※5 Displayed when the input type is set to pulses.
 - ※6 Displayed when the input type is set to analog or remote.
 - ※7 Displayed when the input type is set to analog or remote.
 - ※8 Displayed when the instal setting/communications access lockouts is set to 0.

Parameter	Display	Setting range	Initial value	Description
Operation/adjustment access lockouts	APPE	0~2	0	0: All functions enabled 1: Change to Adjustment Level disabled. 2: Same as setting of 1, plus set value display disabled.
Initial setting/communications access lockouts	CCPE	0~2	1	0: All functions enabled 1: Change to Advanced Function Setting Level disabled. 2: Same as setting of 1, plus change to Initial Setting and Communications Setting Levels disabled.
Setting change lockouts	CCPE	OFF/ON	OFF	OFF: Set value changes via keys enabled. ON: Set value changes via keys disabled.
Forced-zero change lockouts	CCPE	OFF/ON	OFF	OFF: Forced-zero via keys enabled. ON: Forced-zero via keys disabled. When input type is set as analog.
OUT1 set value	OUT.1	-9999~99999	99999	Output 1 Set Value Used when the operating action for OUT1 set value is set to upper limit or lower limit.
Upper-limit OUT1 set value	OUT.1H	-9999~99999	99999	Output 1 High Set Value Used when the operating action for OUT1 set value is set to upper and lower limits.
Lower-limit OUT1 set value	OUT.1L	-9999~99999	-99999	Output 1 Low Set Value Used when the operating action for OUT1 set value is set to upper and lower limits.
OUT2 set value	OUT.2	-9999~99999	-99999	Output 2 Set Value Used when the operating action for OUT2 set value is set to upper limit or lower limit.
Upper-limit OUT2 set value	OUT.2H	-9999~99999	99999	Output 2 High Set Value Used when the operating action for OUT2 set value is set to upper and lower limits.
Lower-limit OUT2 set value	OUT.2L	-9999~99999	-99999	Output 2 Low Set Value Used when operating action for OUT2 set value is set to upper and lower limits.
Input type	ANP	ANALOG/PULSE/REMOTE	ANALOG	ANALOG: Operation as a process meter PULSE: Operation as a tachometer REMOTE: Operation as a digital data display
Analog input range	RANG	4-20/1-5/5-10	4-20	4-20: 4 to 20 mA range 1-5: 1 to 5 V range 5-10: ±5 V range ±10: ±10 V range Set when the input type is set to analog.
Pulse Frequency input range	P-FRE	30/50	50	Upper limit of pulse frequency. Set when the input type is set to pulse. (Unit: Hz)
Input value 1 for scaling	CNP.1	-9999~99999	400	Scaling value when the input type is set to analog or remote. Input value corresponding to display 1 value.
Display value 1 for scaling	dSP.1	-9999~99999	400	Display value for input 1.
Input value 2 for scaling	CNP.2	-9999~99999	2000	Input value for display 2.
Display value 2 for scaling	dSP.2	-9999~99999	2000	Display value for input 2.
Input value for scaling	CNP	-9999~99999	5000	Scaling value when the input type is set to pulse. Input value corresponding to the display value.
Display value for scaling	dSP	-9999~99999	5000	Display value corresponding to input value.

Set Value Confirmation

If the Level Key is pressed when the present value is being displayed, the set value parameter will be displayed. If the Shift Key is then pressed, the set value will be displayed. Press the Mode Key a few times to return to the present value display after confirming the set value.

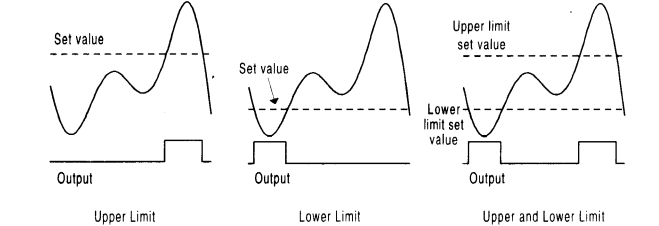


Operating action

Any of the following three actions can be used for outputs 1 and 2.

- Upper limit alarm: The OUT1/2 turns ON if the measurement value exceeds the set value.
- Lower limit alarms: The OUT1/2 turns ON if the measurement value goes below the set value.
- Upper and lower limit alarms: The OUT1/2 turns ON if the measurement value goes below or exceeds the set values.

There is also a PASS output for models with transistor outputs. The PASS output turns ON with both OUT1 and OUT2 are OFF.



Parameter	Display	Setting range	Initial value	Description
Decimal point position	dP	00000/00000/00000/00000/00000	00000	Position to display decimal point.
Operating action for OUT1 set value	OUT.1A	HL/L0/HL-L0	HL	Operation for outputs Hi: Upper limit alarm Lo: Lower limit alarm
Operating action for OUT2 set value	OUT.2A	HL/L0/HL-L0	L0	Hi-Lo: Upper and lower limit alarm
Move to advanced function setting level	RAN0	-99999~99999	0	Used to enter Advanced Function Setting Level. Password: -0169
Communication unit no.	U-no	0~99	1	Communications unit number
Baud rate	bPS	12/24/48/96/192	96	Baud rate
Word length	LEN	7/8	7	Word length
Stop bits	Sbct	1/2	2	Stop bits
Parity bits	Prty	none/EuE/odd	EuE	Parity
Parameter initialization	CANt	OFF/ON	OFF	All parameters will be returned to the initial settings when this parameter is set to ON (parameter all clear).
Average processing	AVG	OFF/2/4/8	OFF	Number of times for averaging
HOLD/ZERO selection	EuEn	H0Ld/ZEro	H0Ld	Function of terminal 3 HOLD: Hold input for measurement value ZERO: Forced-zero input Set when the input type is set to analog or remote
Hysteresis for OUT1 set value	HYS1	0~9999	1	Hysteresis for output 1
Hysteresis for OUT2 set value	HYS2	0~9999	1	Hysteresis for output 2
Auto-zero time	AVZ0	00~199	199	Time to automatically return the display to 0 when input pulses are not received. Unit: s Set when the input type is set to pulse.
Startup compensation time	S-tAr	00~999	00	Time from turning ON power until measurements are begun. Unit: s Set when the input type is set to pulse.
Display color change	ColOr	Grn-r/Grn/red-G/rEd	Grn-r	Display color setting GRN-R: Normally green, red when output is ON GRN: Always green RED-G: Normally red, green when output is ON RED: Always red
Automatic return of operation mode	-Et	0~99	10	Time to automatically return to present value display when keys are not input in Operation or Adjustment Level. Unit: s
Move to protection level	P-rct	0~19	5	Time required to change from Operation Level to Protection Level. Unit: s
Send waiting time	SdWt	0~99	20	Wait time for returning a response when a command is received from a host. Unit: ms
Move to calibration level	CAN0	-9999~99999	0	Wait time for returning a response when a command is received from a host. Unit: ms