LCD Multi Panelmeter

LM series

INSTRUCTION MANUAL

HANYOUNGNUX

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Thank you for purchasing Hanyoung Nux products. Please read the instruction manual carefully before using this product, and use the product correctly. Also, please keep this instruction manual where you can view it any time.

MF0601KE221205

Safety information

Please read the safety information carefully before the use, and use the product correctly.
The alerts declared in the manual are classified into Danger, Warning and Caution according to their importance

⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or properties damage

⚠ DANGER

- The input/output terminals are subject to electric shock risk. Never let the input/output terminals come in contact with your body or conductive substances.

⚠ WARNING

- This product does not contain an electric switch or fuse, so the user needs to install a separate electric switch or fuse externally.(Fuse rating: 250 V 0.5 A)
- To prevent defection or malfunction of this product, supply proper power voltage in accordance with the rating.
- To prevent electric shock or malfunction of product, do not supply the power until the wiring is completed.
- Since this product is not designed with explosion-protective structure, do not use it any place with flammable or explosive gas.
- Do not decompose, modify, revise or repair this product.
  This may be a cause of malfunction, electric shock or fire.
- Reassemble this product while the power is OFF. Otherwise, it may be a cause of malfunction or electric shock
- If you use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
- Due to the danger of electric shock, use this product installed onto a panel while an electric current is applied.
- Do not use this product at any place with corrosive(especially noxious gas or ammonia) or flammable gas.
- Do not use this product at any place with direct vibration or impact.
- Do not use this product at any place with liquid, oil, medical substances, dust, salt or iron contents. (Use at Pollution level 1 or 2)
- Do not polish this product with substances such as alcohol or benzene.
- Do not use this product at any place with a large inductive difficulty or occurring static electricity or magnetic noise.
- Do not use this product at any place with possible thermal accumulation due to direct sunlight or heat radiation.
- Install this product at place under 2,000m in altitude.
- When the product gets wet, the inspection is essential because there is a danger of electric leakage or fire.
- If there is excessive noise from the power supply, using insulating transformer or noise filter is recommended. The noise filter must be attached to a panel which is already connected to a ground and the wire between the filter output and power supply terminal must be as short as possible.
- If puttig power cables closely together then It is effective against noise.
- Do not connect anything to the unused terminals.
- After checking the polarity of terminal, connect wires at the correct position.
- When this product is connected to a panel, use a circuit breaker or switch approved with IEC947−1 or IEC947−3.
- Install the circuit breaker or switch at near place for convenient use.
- Write down on a label that if the circuit breaker or switch is operating then the power will be disconnected since the circuit breaker or switch is installed.
- For the continuous and safe use of this product, the periodical maintenance is recommended.
- Some parts of this product have limited life span, and others are changed by their usage.
- The warranty period for this product including parts is one year if this product is properly used.

⚠ CAUTION

- The contents of this manual may be changed without prior notification.
- Before using the product you purchased, make sure that it is exactly what you ordered.
- Make sure that there is no damage or abnormality of the product during delivery.

Suffix Code

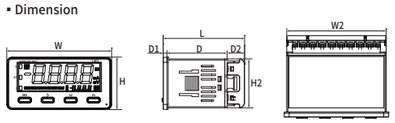
Model	Code								Description
LM	□	-	□	□	-	□	□	-	LCD Multi Panelmeter
Appearance	3								96(W) X 48(H) mm
	6								72(W) X 36(H) mm
Displayable Digit		4							4 Digit indication
Input Specification			DV						DC voltage
			DA						DC current
			AV						AC voltage
			AA						Alternating current
Output specifications				N					Non only (Indication option output)
				R					1-stage contact output *LM6 only (For LM6-RC/RT, 1-stage contact output fixed.)
				3R					3-stage contact output
				3N					3-stage NPN open collector output
				3P					3-stage PNP open collector output
Optional output					-				Non option output
					C				RS-485 output (MODBUS-RTU)
					T				Transmission output (4 - 20 mA ⎓)
Power supply voltage						A			100 – 240 V ∿ 50/60 Hz

Specifications

Model	LM3/6-DV	LM3/6-DA	LM3/6-AV	LM3/6-AA
Size	•LM3 : 96(W) X 48(H) X 68(D) mm •LM6 : 72(W) X 36(H) X 81(D) mm			
Power	100 – 240 V ∿ 50/60 Hz			
Power Consumption	•LM3-N: 6 VA or less •LM3-3NC/3PC: 9 VA or less •LM6-3N/3P: 5 VA or less	•LM3-3R/3RC: 10 VA or less •LM3-3NT/3PT: 10 VA or less •LM6-RC: 6 VA or less	•LM3-3RT: 11 VA or less •LM6-N: 5 VA or less •LM6-RT: 7 VA or less	•LM6-3R: 7 VA or less
Input signal	DC voltage	DC current	AC voltage / frequency	AC current / frequency
Input range	500 V / 100 V 50 V / 10 V 5 V / 1 V 200 mV / 50 mV	5 A / 2 A 500 mA / 200 mA 50 mA / 4 - 20 mA 5 mA / 2 mA	500 V / 250 V 110 V / 50 V 20 V / 10 V 2 V / 1 V	5 A / 2 A 500 mA / 200 mA 50 mA / 20 mA
AC measurement method	AVG / RMS selective measurement			
Input sampling cycle	50 ms			
Input sampling method	OVER sampling method using continuous approximation A / D converter			
Maximum allowable input	F.S. of each input range 110 %			
Frequency measurement range	0.2 ~ 9999 Hz (Frequency measurement range depends on the decimal point position)			
Display	• Negative-LCD • 4 digit 2 rows • PV (White) • SV (Green)			
Character size	•LM3 : 17.6 X 10.6 mm •LM6 : 7.0 X 11.5 mm			
Maximum display	−9999 ~ 9999			
Display degree	• [23 °C ± 5 °C] - F.S. ± 0.1 % rdg ± 2 digit • [23 °C ± 5 °C, 5 A] - F.S. ± 0.3 % rdg ± 3 digit • [50 °C ~ -10 °C] - F.S. ± 0.5 % rdg ±3 digit	• [23 °C ± 5 °C] - F.S. ± 0.3 % rdg ±3 digit • [23 °C ± 5 °C, frequency] – F.S. ± 0.1 % rdg ± 2 digit • [50 °C ~ -10 °C] - F.S. ± 0.5 % rdg ± 3 digit		
Control output	• Contact output : 3 stage, SPST (1a), 250 V ∿ 5 A • Solid state output: 3-stage, NPN or PNP open collector, 12 - 24 V ⎓ 50mA or less			
Relay life time	• Electrical (about 100,000 times, 250 V ∿ 5 A) • Mechanical (about 5 million times)			
Optional output	• Transmission output (4-20 mA) • RS-485 output			
External input	• HOLD/ZERO Optional input • Non-voltage input • Short circuit impedance: 300 Ω or less • Residual voltage: 1 V or less • Impedance when open: 100 kΩ or more			
Communication	• Communication protocol : Modbus-RTU • Communication method : RS-485 (2-wire half duplex) • Communication speed : 2400 / 4800 / 9600 / 19200 / 38400 bps			
Insulation Resistance	100 MΩ or more (500 V ⎓ Mega standard, between conductive terminal and case)			
Withstand voltage	2000 V ∿ 60 Hz 1 minute (between conductive terminal and case)			
Noise	± 2 kV(Between operation power terminals, Pulse width = 1 us, Square wave noise by noise simulator)			
Vibration resistance	10 ~ 55 Hz, Single amplitude 0.5 ㎜, 3-axis angular, 2 hours			
Approval	CE KC cULus			
Protection structure	• IP66 (front) • Terminal block protection cover applied			
Ambient temperature and humidity	-10 ~ 50 °C, 35 ~ 85 % RH			
Storage temperature	-20 ~ 65 °C			

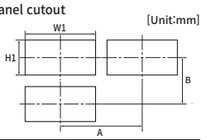
Dimension & Panel cutout

▪ Dimension



▪ Panel cutout

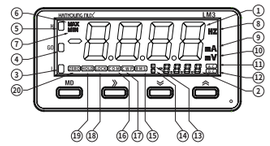
[Unit:㎜]



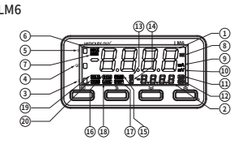
Classification	Product dimensions (Protective cover)								Panel cutout			
Type	W	H	D	D1	D2	L	W2	H2	W1	H1	A	B
LM3	96.0	48.0	55	3.5	16.1	74.6	91.0	44.8	91.5	45.5	121.5	70.5
LM6	72.0	36.0	68	3.5	16.1	87.6	66.0	30.5	66.5	32.0	96.5	57.0

Part names and functions

▪ LM3



▪ LM6



NO		Function
1	PV Display	Operation mode: Measured value / maximum value / minimum value Display Function mode: Parameter display
2	SV Display	Operation mode: Set in function mode Input range display Function mode: Parameter setting value display Setting mode: Upper / lower limit comparison value display (Only for output model)
3	LOW output lamp	Lights up when the lower limit output is operating
4	GO output lamp	Lights up during GO output operation
5	HIGH output lamp	Lights up during high limit output operation
6	MAX lamp	Lights up when the PV display is in the maximum value display mode
7	MIN lamp	Lights up when the PV display is in the minimum value display mode
8	HZ lamp	Lights up when the PV display is in the frequency measurement mode (Displayed on AV / AA models only)
9	A / mA lamp	Lights up when PV display is in current measurement mode
10	V / mV lamp	Lights up when PV display is in voltage measurement mode
11	AC lamp	Lights up when the model is AV / AA model
12	DC lamp	Lights up when the model model is DV / DA model
13	H lamp	Lights up when SV display is in the upper limit comparison value display mode
14	L lamp	Lights up when SV display is in the lower limit comparison value display mode
15	RMS lamp	Lights up in RMS measurement mode (AV / AA models only)
16	COM lamp	Lights up when model model is communication model
17	CWP lamp	Lights up when communication write prohibition is set
18	LOCK lamp	Lights up when locked
19	HOLD lamp	Lights up when external HOLD signal is applied
20	ZERO lamp	Lights up when external ZERO signal is applied

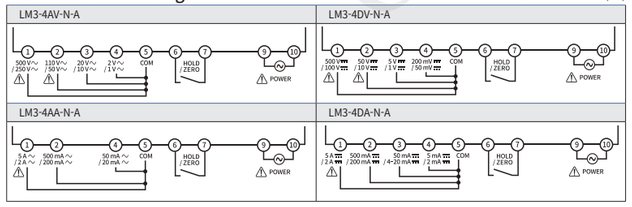
Front-key functions and names

Name	Function
MODE MD	• In operation mode, MD press key for more than 3 seconds to enter function mode • In operation mode, when SV display window is in input range display mode, MD press key, H lamp is turned on and the SV display window is converted to the upper limit comparison value. • In operation mode, when SV display window is in upper limit comparison value display mode, MD press key, L lamp lights up and the SV display window is converted to the lower limit comparison value. • In operation mode, when SV display window is in lower limit comparison value display mode, MD press key, L lamp goes out and the SV display window is converted to the input range value set in the parameter. • If the model is not an output model or O−MD is OFF, the SV display window is fixed with the input range value set in the parameter.
SHIFT »	• In the operation mode, when the SV display window is in the upper limit comparison value display mode, » press the key to enter the upper limit comparison value setting mode. • In operation mode, when SV display window is in the lower limit comparison value display mode, » press the key to enter the lower limit comparison value setting mode. • Pressing the » key in the upper limit comparison value setting mode moves the digit of the upper limit comparison value. • Pressing the » key in the lower limit comparison value setting mode moves the digit of the lower limit comparison value. • The setting range of the upper limit comparison value and lower limit comparison value depends on the decimal point position set in the parameter. can be set as '9.999 ~ − 9.999 / 99.99 ~ − 99.99 / 999.9 ~ − 999.9 / 9999 ~ − 9999"
ZERO / DOWN ˅	• Pressing the ˅ key in the upper limit comparison value setting mode decreases the upper limit comparison value in the SV display window. • Pressing the ˅ key in the lower limit comparison value setting mode decreases the lower limit comparison value in the SV display window. • In operation mode, ˅ key is pressed for more than 1 second, the current measured value is forcibly corrected and stored automatically in the parameter ZERO.(However, when parameter K−ZO is selected as 'ON') • Pressing the ˅ key in the maximum value display mode resets the maximum and minimum values. • Pressing the ˅ key in the minimum value display mode resets the maximum and minimum values.
PEAK / UP ˄	• When the ˄ key is pressed in the operation mode, the PV display window changes to the maximum value display mode. • When the ˄ key is pressed in the maximum value display mode, the PV display window changes to the minimum value display mode. • ˄ key is pressed in the minimum value display mode, PV display window is converted to operation mode. • Pressing the ˄ key in the upper limit comparison value setting mode increases the upper limit comparison value of the SV display window. • Pressing the ˄ key in the lower limit comparison value setting mode increases the lower limit comparison value of the SV display window. • If parameter D.TMR is '0', there is no display conversion between PV display window's maximum value display mode and minimum value display mode

Connection diagram

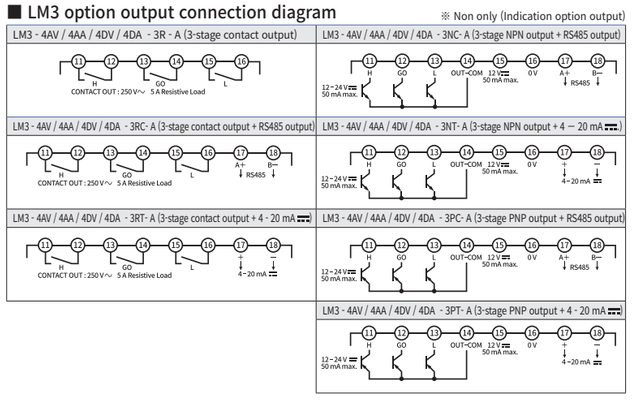
■ LM3 connection diagram

∿: Alternating Current (AC)
⎓: Direct Current (DC)



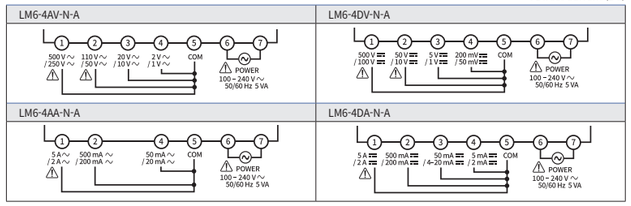
■ LM3 option output connection diagram

※ Non only (Indication option output)



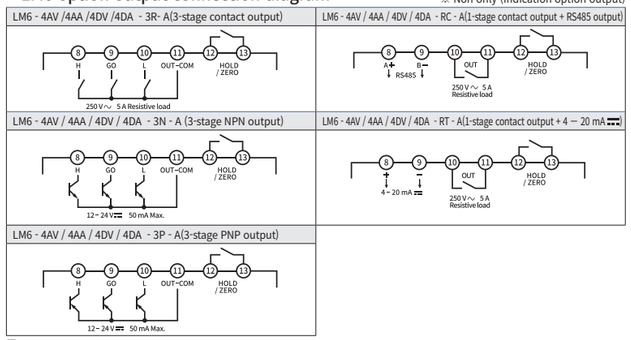
■ LM6 connection diagram

∿: Alternating Current (AC)
⎓: Direct Current (DC)



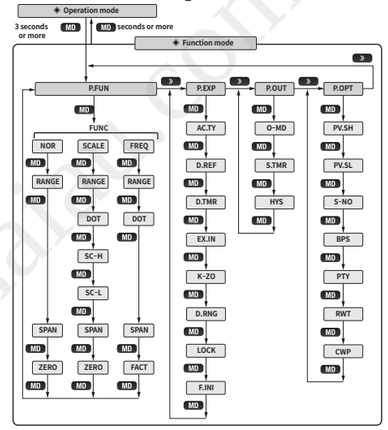
■ LM6 option output connection diagram

※ Non only (Indication option output)



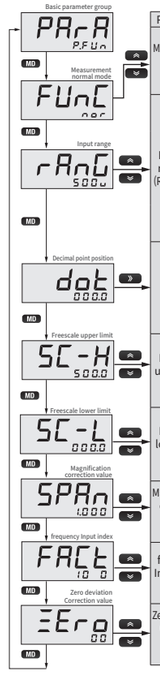
Function mode

■ Function Mode Configuration



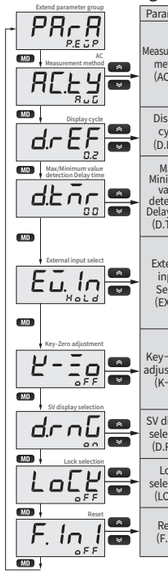
- The function mode consists of 4 parameter groups: P.FUN / P.EXP / P.OUT / P.OPT.
- P.FUN is a group of general function setting parameters.
- P.EXP is an extended function setting parameter group.
- P.OUT is a group of output function setting parameters related to the output model.
- P.OPT is a group of optional function setting parameters related to transmission output and communication output models.
- Press the MD key for more than 3 seconds in the operation mode to enter the function mode.
- In function mode, if MD key is pressed for more than 3 seconds, all parameter values are saved and operation mode is restored.
- FREQ is displayed only on AC models (when FREQ is selected, AC.TY / EX.IN / K−ZO is not displayed)
- AC.TY displayed on AC models only (AVG / RMS selected)
- P.OUT is displayed only on the output model (if O−MD is OFF, S.TMR / HYS is not displayed)
- P.OPT is displayed only in transmission output and communication output models
- PV.SH/PV.SL is displayed only in transmission output model
- S−NO / BPS / PTY / RWT / CWP are displayed only in communication output model

■ P.FUN Parameter group



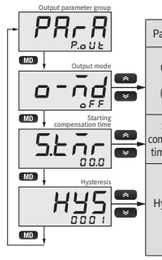
Parameter		Setting range	Default
Measurement mode (FUNC)		• Select measurement mode. (Basic/scale/frequency) • Frequency measurement mode is only displayed on AV / AA models. nor ↔ SCAL ↔ FrEQ (NOR ↔ SCAL ↔ FREQ)	NOR
Input range (RANGE)	DV	• 500u ↔ 100u ↔ 50u ↔ 10u ↔ 5u ↔ 1u ↔ 02u ↔ 50nu (500 V ↔ 100 V ↔ 50 V ↔ 10 V ↔ 5 V ↔ 1 V ↔ 0.2 V ↔ 50 mV)	500 V
	DA	• 5A ↔ 2A ↔ 05A ↔ 02A ↔ 50nA ↔ 1-20 ↔ 5nA ↔ 2nA (5 A ↔ 2 A ↔ 0.5 A ↔ 0.2 A ↔ 50 mA ↔ 4 - 20 mA ↔ 5 mA ↔ 2 mA)	5 A
	AV	• 500u ↔ 250u ↔ 100u ↔ 50u ↔ 20u ↔ 10u ↔ 2u ↔ 1u (500 V ↔ 250 V ↔ 110 V ↔ 50 V ↔ 20 V ↔ 10 V ↔ 2 V ↔ 1 V)	500 V
	AA	• 5A ↔ 2A ↔ 05A ↔ 02A ↔ 50nA ↔ 20nA (5 A ↔ 2 A ↔ 0.5 A ↔ 0.2 A ↔ 50 mA ↔ 20 mA)	5 A
Decimal point position (DOT)		• In the scale measurement mode, select the decimal point position of the measured value. • In frequency measurement mode, set the measurement range to the decimal point position. • The initial value of the decimal point position in the frequency measurement mode is'0000'. 0000 ↔ 000.0 ↔ 00.00 ↔ 0.000.0 (0000 ↔ 0.000 ↔ 00.00 ↔ 000.0)	DV, AV : 000.0 DA, AA : 0.000
Freescale upper limit (SC-H)		• Set the upper limit of the prescale for displaying the scale of the measured value. • The decimal point position of the prescale upper limit value changes according to the input range and decimal point position. 9999 ~ -9999 (999.9 ~ -999.9)	DV, AV : 500.0 DA, AA : 5.000
Freescale lower limit (SC-L)		• Set the lower limit of the prescale for the scale display of the measured value. • The decimal point position of the prescale lower limit value changes according to the input range and decimal point position. 9999 ~ -9999 (999.9 ~ -999.9)	DV, AV : 000.0 DA, AA : 0.000
Magnification correction value (SPAN)		• Set the magnification adjustment value to correct the slope of the measured value. 5000 ~ 0.100 (5.000 ~ 0.100)	1.000
frequency Input index (FACT)		• Set the exponential value for SPAN, which is the magnification correction value of the measurement frequency. 10 1 ~ 10-2 (10^1 ~ 10^{-2})	10^0
Zero deviation Correction value (ZERO)		• Set the zero−deviation correction value to compensate the offset deviation of the measured value. 99 ~ -99 (99 ~ -99)	0

■ P.EXP Parameter group



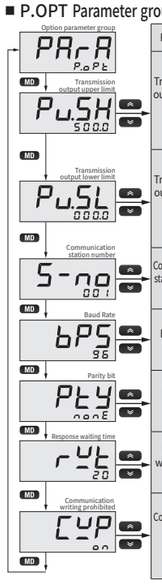
Parameter	Setting range	Default
Measurement method (AC.TY)	• Select the AC input measurement method. • AVG (Average value measurement), RMS (Effective value measurement) • Displayed on AV/AA models only. (※ Not displayed when frequency measurement mode is selected.) AvG ↔ rmS (AVG ↔ RMS)	AVG
Display cycle (D.REF)	• Select the display period where the measured value is displayed. S ↔ 2 ↔ 1 ↔ 05 ↔ 02 ↔ 0.1 (5 S ↔ 2 S ↔ 1 S ↔ 0.5 S ↔ 0.2 S ↔ 0.1 S)	0.2 S
Max/ Minimum value detection Delay time (D.TMR)	• Set the detection delay time for the maximum and minimum values of the measured value. • If the detection delay time is '0 S', the maximum and minimum values in the operation mode are Is not displayed. 99 ~ 00 (99 S ~ 0 S)	0 S
External input Select (EX.IN)	• When HOLD is selected, the external HOLD input terminal operates with the display value HOLD function. • When ZERO is selected, the external ZERO input terminal operates with the zero adjustment function. • It is not displayed when frequency measurement mode isselected on AV / AA models. HoLd ↔ ZEro (HOLD ↔ ZERO)	HOLD
Key−Zero adjustment (K−ZO)	• When "ON" is selected for the key−zero adjustment, the ˅ key operates with the zero−adjustment function. • It is not displayed when frequency measurement mode is selected on AV / AA models. on ↔ oFF (ON ↔ OFF)	OFF
SV display selection (D.RNG)	• When D.RNG is set to 'OFF', the SV display is not displayed. on ↔ oFF (ON ↔ OFF)	ON
Lock selection (LOCK)	• Select Front Panel Key Lock and Parameter Lock. oFF ↔ KEY ↔ PAr ↔ K-P ↔ oUt ↔ oPt (OFF ↔ KEY ↔ PAR ↔ K-P ↔ OUT ↔ OPT)	OFF
Reset (F.INI)	• When F.INI is selected as'ON', all parameters are reset to the factory defaults. on ↔ oFF (ON ↔ OFF)	OFF

■ P.OUT Parameter group (Displayed only on output models)



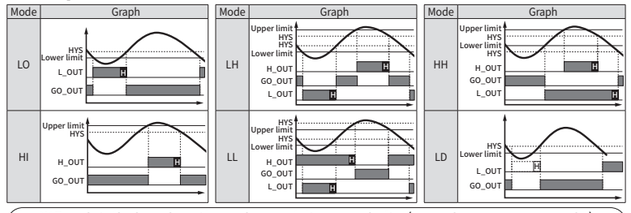
Parameter	Setting range	Initial value
Output mode (O-MD)	• When the measurement mode, input range, and magnification range correction values are changed, O−MD is automatically changed to'OFF'. oFF ↔ o-Lo ↔ o-HI ↔ o-LH ↔ o-LL ↔ o-HH ↔ o-Ld (OFF ↔ O-LO ↔ O-HI ↔ O-LH ↔ O-LL ↔ O-HH ↔ O-LD)	OFF
Starting compensation time (S.TMR)	• If O-MD is'OFF', it is not displayed. 999 ~ 000 (99.9 S ~ 0.0 S)	0.0 S
Hysteresis (HYS)	• If O-MD is'OFF', it is not displayed. • The hysteresis setting value can be set up to 10% of the maximum display value. • The decimal point position of hysteresis changes according to the input range and decimal point position. 0500 ~ 000.1 (50.0 ~ 0.1)	DV, AV : 000.1 DA, AA : 0.001

■ P.OPT Parameter group (Displayed only in transmission output model and communication output model.)



Parameter	Setting range	Initial value
Transmission output upper limit (PV.SH)	• Set the upper limit to which the transmission output 20 mA is output. (※ Displayed only in the transmission output model.) • The upper limit of the transmission output scale should be set larger than the lower limit. • The decimal point position of the upper limit of the transmission output scale changes according to the input range and the decimal point position. 9999 ~ -9999 (999.9 ~ −999.8)	DV, AV : 500.0 DA, AA : 5.000
Transmission output lower limit (PV.SL)	• Set the lower limit to which the transmission output 4 mA is output. (※ Displayed only in transmission output model.) • The lower limit of the transmission output scale should be set lower than the upper limit. • The decimal point position of the lower limit of the transmission output scale changes according to the input range and the decimal point position. 9998 ~ -9999 (999.8 ~ −999.9)	DV, AV : 000.0 DA, AA : 0.000
Communication station number (S−NO)	• Set communication station number. (※ Displayed only in communication output model.) 001 ~ 127 (001 ~ 127)	001
Baud Rate (BPS)	• Select communication speed. (※ Displayed only in communication output model.) 384 ↔ 192 ↔ 96 ↔ 48 ↔ 24 (38400 ↔ 19200 ↔ 9600 ↔ 4800 ↔ 2400 bps)	9600
Parity bit (PTY)	• Select communication parity bit. (※ Displayed only in communication output model.) nonE ↔ odd ↔ EuEn (NONE ↔ ODD ↔ EVEN)	NONE
Response waiting time (RWT)	• Set the waiting time for communication response. (※ Displayed only in communication output model.) 05 ~ 99 (5 ms ~ 99 ms)	20ms
Communication writing prohibited (CWP)	• Select write communication prohibited. (※ Displayed only in communication output model.) • If the communication write protection is'ON', the setting value cannot be changed by communication. on ↔ oFF (ON ↔ OFF)	ON

Output mode



※For detailed explanation, please visit our website (www.hanyoungnux.co.kr)
Please refer to the communication and user manual in the archive.

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