

User's Manual

Supmea

Paperless Recorder

R9600

Preface

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Chapter 1



OVERVIEW

- , , , , ,
- 18 , 4 Relay , 24Vdc(150mA) ,
- USB , RS485
- 32 Cortex-M4 ,
- " , , " 3가
- , , , , ,
- , , , , , ,

1.1

Table1-1 The main parameters

	3.5 TFT color LCD 320 * 250
	: 96mm×96mm×96mm : 92mm×92mm
	1.5mm~6.0mm
	0.37kg
	(176~264)VAC, 47~63Hz / 24Vdc
	48M bytes Flash
USB	U disk support (standard USB2.0 communication interface)
	20VA
	(10~85)%RH (No condensation)
	(0~50)°C
	temperature (-20~60)°C , Relative humidity (5~95)%RH(No condensation) Altitude: <2000m, Except for special specifications

1.2

Table1-2 DC voltage / current input

Type	(%FS)
(1~5)V	±0.1
(4~20)mA	±0.2

Table1-3 thermalcouple output (not include cold end error)

Type	(°C)	(°C)
B	600 ~ 1800	±2.4
E	-200 ~ 1000	±2.4
J	-200 ~ 1200	±2.4
K	-200 ~ -100	±3.3

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	-100 ~ 1300	±2.0
S	-50 ~ 100	±3.7
	100 ~ 300	±2.0
	300 ~ 1600	±1.5
T	-200 ~ -100	±1.9
	-100 ~ 380	±1.6
R	-50 ~ 100	±3.7
	100 ~ 300	±2.0
	300 ~ 1600	±1.5
N	-200 ~ 1300	±3.0

Tble1-4 RTD input

Type	(°C)	(°C)
Cu50	-50 ~ 140	±1.0
Pt100	-200 ~ 800	±1.0

NOTE: PT1000 RTD 가 .

1.3

Table 1-5 The alarm output

Type	Scale range	Contact types	Contact capacity	Response cycle
The alarm output	0/1	Normally open contacts	2A /250VAC	1 second

1.4

Table 1-6 Other parameters

	3.15A/250VAC, Hard-fusing type
	150mA, 24 VDC.
	가 .
Relay	Relay * 4ea, 2A / 250VAC Normal open
	1channel RS485 communication interface
	Using Modbus communication protocol
	1s

Chapter2

OVERVIEW

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table2-1.

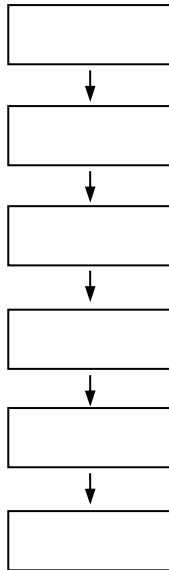


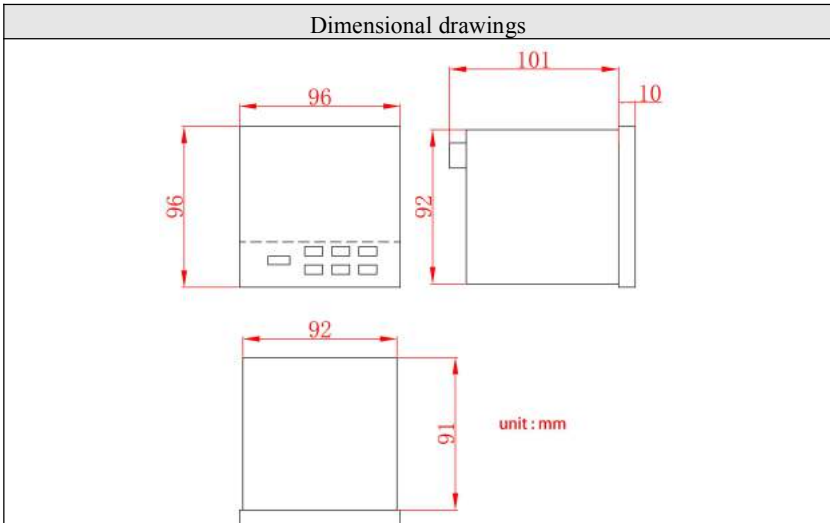
Figure 2-1

2.1

가

2.2

- ㄱ
- ㄱ : 0~50
- ㄱ : 10~85%RH ()
- ㄱ :
- ㄱ :
- ㄱ : , 가 , 가 ,
- ㄱ : , ,
- ㄱ : /



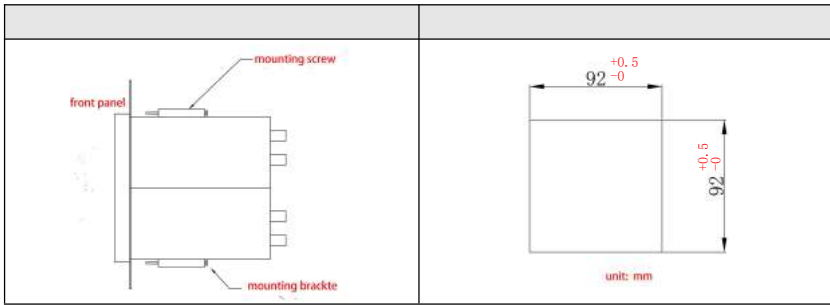


Figure 2-2

2.3

2.3.1

2-3

2-1

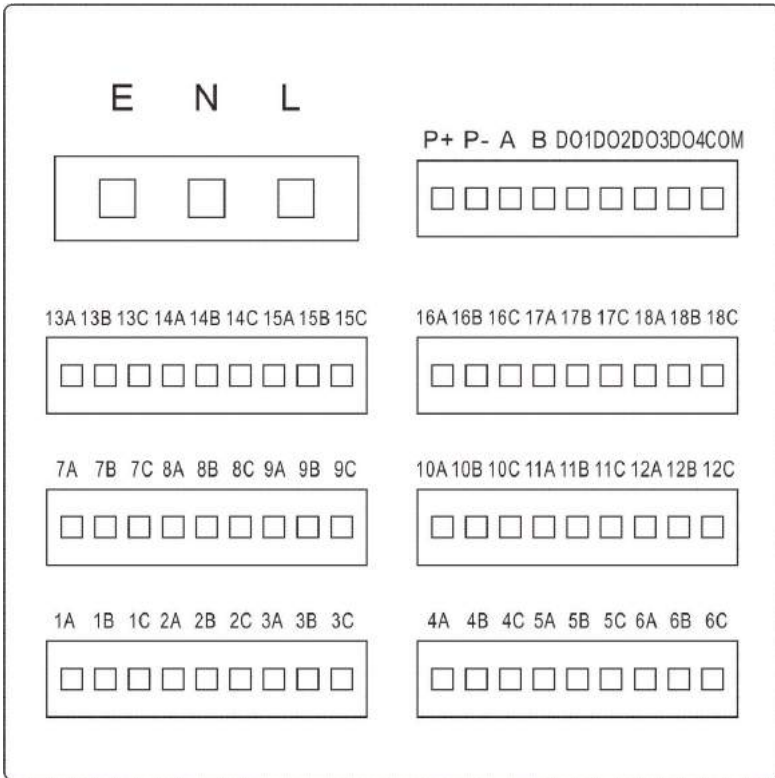





Figure2-3

Table2-1 Specific instructions of each terminal

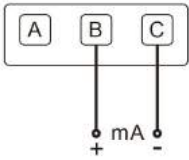
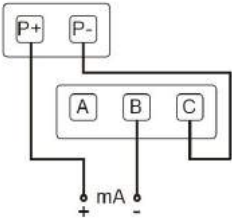
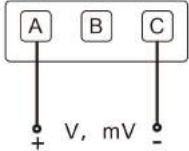
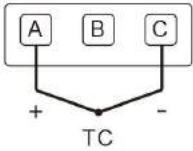
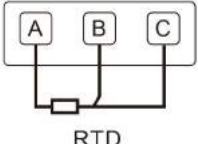
 、N、L	 、N、L	AC : L,N , E:  DC : N =24V "-" / L =24V"+"
(:)		
1A, 1B, 1C	universal input	analog output channel 1
2A, 2B, 2C	universal input	analog output channel 2
3A, 3B, 3C	universal input	analog output channel 3
4A, 4B, 4C	universal input	analog output channel 4
5A, 5B, 5C	universal input	analog output channel 5
6A, 6B, 6C	universal input	analog output channel 6

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Table2-1 Specific instructions of each terminal

7A, 7B, 7C	universal input	analog output channel 7
8A, 8B, 8C	universal input	analog output channel 8
9A, 9B, 9C	universal input	analog output channel 9
10A, 10B, 10C	universal input	analog output channel10
11A, 11B, 11C	universal input	analog output channel11
12A, 12B, 12C	universal input	analog output channel12
13A, 13B, 13C	universal input	analog output channel13
14A, 14B, 14C	universal input	analog output channel14
15A, 15B, 15C	universal input	analog output channel15
16A, 16B, 16C	universal input	analog output channel16
17A, 17B, 17C	universal input	analog output channel17
18A, 18B, 18C	universal input	analog output channel18
485		
A	485+	communication port RS-485
B	485-	communication port RS-485
Relay		
P+	/	24V+
P-	/	24V-
Relay		
DO1	Relays	Alarm output Channel 1
DO2	Relays	Alarm output Channel 2
DO3	Relays	Alarm output Channel 3
DO4	Relays	Alarm output Channel 4
G		Alarm Commons

2.3.2

<p>mA input ()</p> 	<p>mA input ()</p> 
<p>V/mV input</p>	<p>TC input</p>
	
<p>RTD input</p>	
	

Chapter 3



Figure 3-1

3.1

└ LCD :

└ :




Button n	Name of button	Button	Name of button

3.2



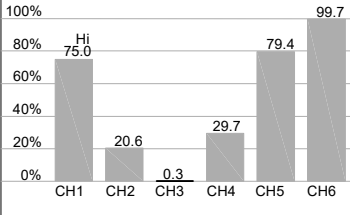





3.2.1

	<p>:</p> <p>USB : USB</p> <p>/ :</p>
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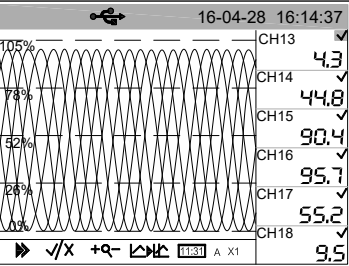
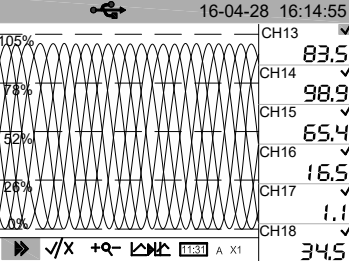
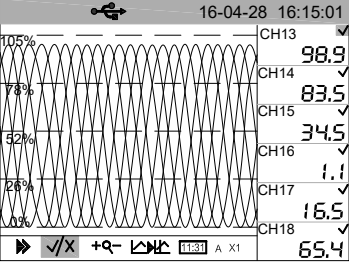
Paperless Recorder

 16-03-07 16:00:37		
CH1	HH CH2	CH3
99.7	65.4	16.5
CH4	CH5	CH6
1.1	34.5	83.5
 16-03-07 16:00:42		
CH1	HI HH CH2	
90.4	39.6	
CH3	CH4	
2.5	12.8	
CH5	CH6	
60.4	97.6	
(mA, V,)		
 16-03-07 19:27:13		
CH1	CH2	
4.692 mA	6.055 mA	
CH3	CH4	
13.663 mA	19.608 mA	
CH5	CH6	
17.945 mA	10.337 mA	
		mA, V,

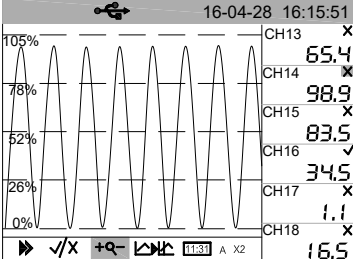
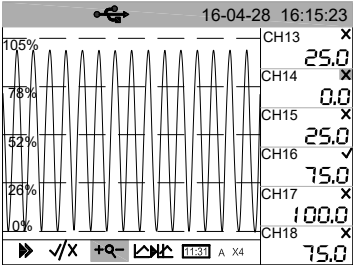
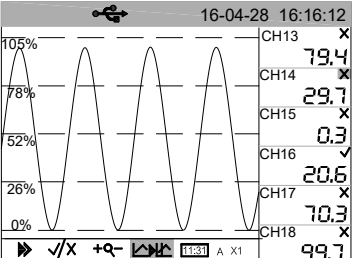
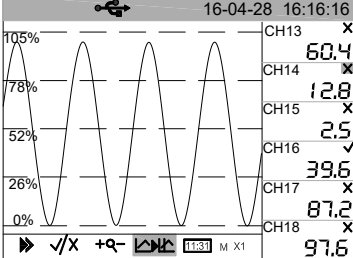
Paperless Recorder

()																													
  16-03-07 16:00:46 																													
()																													
  16-03-07 19:27:18 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>CH</th> <th>Value</th> <th>Lo</th> <th>LL</th> </tr> </thead> <tbody> <tr> <td>CH1</td> <td>0.3</td> <td></td> <td></td> </tr> <tr> <td>CH2</td> <td>34.5</td> <td></td> <td></td> </tr> <tr> <td>CH3</td> <td>83.5</td> <td></td> <td></td> </tr> <tr> <td>CH4</td> <td>98.9</td> <td></td> <td></td> </tr> <tr> <td>CH5</td> <td>65.4</td> <td></td> <td></td> </tr> <tr> <td>CH6</td> <td>16.5</td> <td></td> <td></td> </tr> </tbody> </table>	CH	Value	Lo	LL	CH1	0.3			CH2	34.5			CH3	83.5			CH4	98.9			CH5	65.4			CH6	16.5			
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CH5	65.4																												
CH6	16.5																												
()																													
  16-03-07 16:00:50 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO</th> <th>Time</th> <th>Logs</th> </tr> </thead> <tbody> <tr> <td>0002</td> <td>16-03-07 11:14:08</td> <td>Save CFG</td> </tr> <tr> <td>0001</td> <td>16-03-07 11:10:49</td> <td>Save CFG</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO	Time	Logs	0002	16-03-07 11:14:08	Save CFG	0001	16-03-07 11:10:49	Save CFG																				
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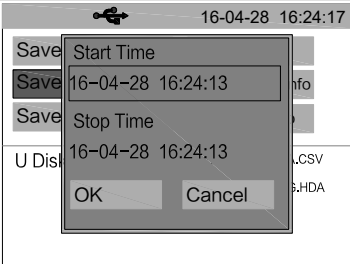
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 <p>16-04-28 16:15:51</p> <table border="1"> <tr><td>CH13</td><td>X</td><td>65.4</td></tr> <tr><td>CH14</td><td>X</td><td>98.9</td></tr> <tr><td>CH15</td><td>X</td><td>83.5</td></tr> <tr><td>CH16</td><td>✓</td><td>34.5</td></tr> <tr><td>CH17</td><td>X</td><td>1.1</td></tr> <tr><td>CH18</td><td>X</td><td>16.5</td></tr> </table> <p>11:31 A X2</p>	CH13	X	65.4	CH14	X	98.9	CH15	X	83.5	CH16	✓	34.5	CH17	X	1.1	CH18	X	16.5	
CH13	X	65.4																	
CH14	X	98.9																	
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CH16	✓	34.5																	
CH17	X	1.1																	
CH18	X	16.5																	
<p>x2</p>  <p>16-04-28 16:15:23</p> <table border="1"> <tr><td>CH13</td><td>X</td><td>25.0</td></tr> <tr><td>CH14</td><td>X</td><td>0.0</td></tr> <tr><td>CH15</td><td>X</td><td>25.0</td></tr> <tr><td>CH16</td><td>✓</td><td>75.0</td></tr> <tr><td>CH17</td><td>X</td><td>100.0</td></tr> <tr><td>CH18</td><td>X</td><td>75.0</td></tr> </table> <p>11:31 A X4</p>	CH13	X	25.0	CH14	X	0.0	CH15	X	25.0	CH16	✓	75.0	CH17	X	100.0	CH18	X	75.0	
CH13	X	25.0																	
CH14	X	0.0																	
CH15	X	25.0																	
CH16	✓	75.0																	
CH17	X	100.0																	
CH18	X	75.0																	
-3																			
 <p>16-04-28 16:16:12</p> <table border="1"> <tr><td>CH13</td><td>X</td><td>79.4</td></tr> <tr><td>CH14</td><td>X</td><td>29.7</td></tr> <tr><td>CH15</td><td>X</td><td>0.3</td></tr> <tr><td>CH16</td><td>✓</td><td>20.6</td></tr> <tr><td>CH17</td><td>X</td><td>70.3</td></tr> <tr><td>CH18</td><td>X</td><td>99.7</td></tr> </table> <p>11:31 A X1</p>	CH13	X	79.4	CH14	X	29.7	CH15	X	0.3	CH16	✓	20.6	CH17	X	70.3	CH18	X	99.7	/
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CH14	X	29.7																	
CH15	X	0.3																	
CH16	✓	20.6																	
CH17	X	70.3																	
CH18	X	99.7																	
Manual mode prompt "A"																			
 <p>16-04-28 16:16:16</p> <table border="1"> <tr><td>CH13</td><td>X</td><td>60.4</td></tr> <tr><td>CH14</td><td>X</td><td>12.8</td></tr> <tr><td>CH15</td><td>X</td><td>2.5</td></tr> <tr><td>CH16</td><td>✓</td><td>39.6</td></tr> <tr><td>CH17</td><td>X</td><td>87.2</td></tr> <tr><td>CH18</td><td>X</td><td>97.6</td></tr> </table> <p>11:31 M X1</p>	CH13	X	60.4	CH14	X	12.8	CH15	X	2.5	CH16	✓	39.6	CH17	X	87.2	CH18	X	97.6	
CH13	X	60.4																	
CH14	X	12.8																	
CH15	X	2.5																	
CH16	✓	39.6																	
CH17	X	87.2																	
CH18	X	97.6																	
Manual mode prompt "M"																			

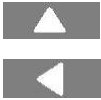
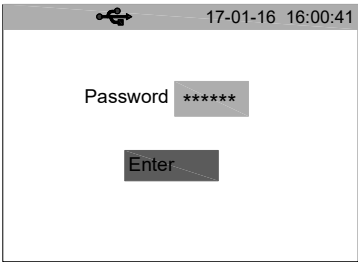
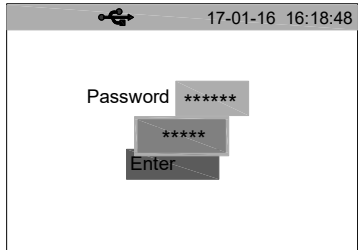
Paperless Recorder

<p style="text-align: center;">-4</p>	
<p style="text-align: center;">-5</p>	<p>OK</p> <p>OK</p>
<p style="text-align: center;">(USB)</p>	<p>USB가</p> <p>USB</p> <p>Save ALL HDA :</p> <p>Save Part HDA :</p> <p>Save all CSV : CSV</p> <p>Save alm info :</p> <p>Save Power info :</p>

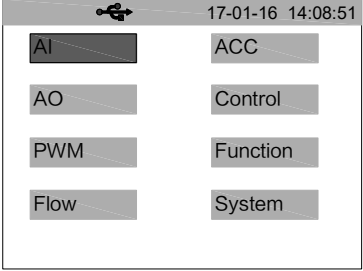
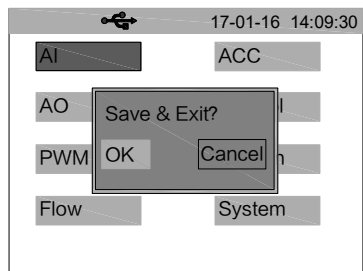
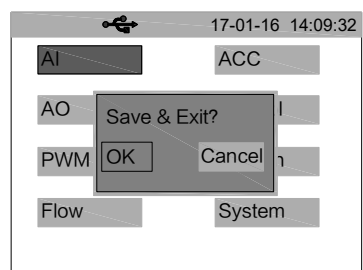
Paperless Recorder

(USB)	
	HDA

3.2.2

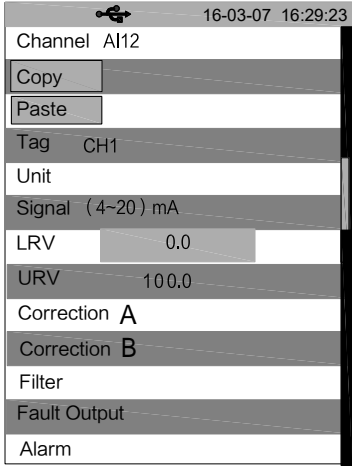
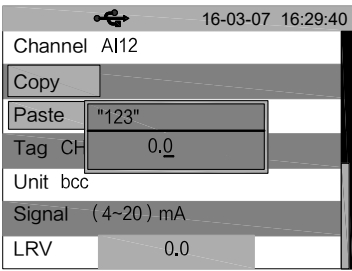
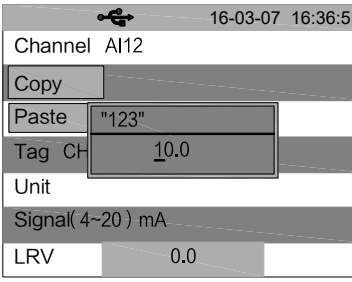
Steps	Operation	Screen
1	2	
2	/ Enter "000000"	
3		

3.2.3

Steps	Operation	Screen
1		
2	가	
3	<p>"OK"</p> <p>"Cancel"</p>	

3.2.4

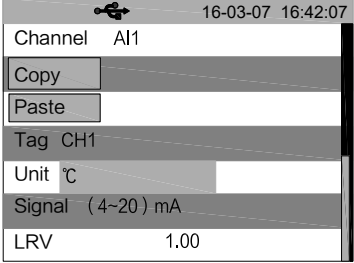
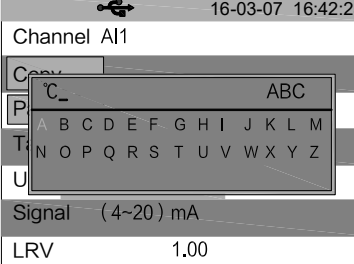
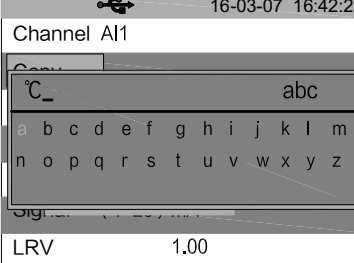
3.2.4.1 Input (AI)

Steps	Operation	Screen
1	<p>* /</p> <p>Channel : Copy : Paste : Tag : Unit : Signal : LRV : URV : Correction A : (Factor) Correction B : (Offset) Filter : Fault Output : Alarm :</p>	
2	<p>/</p>	
3	<p>/</p>	

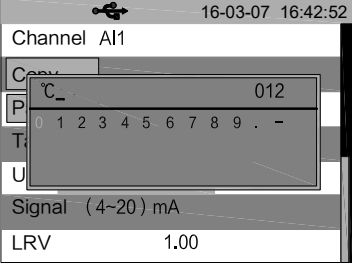
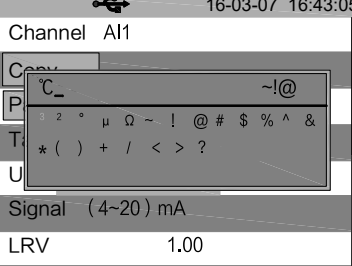
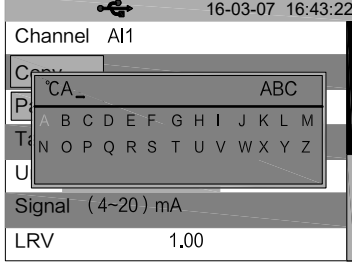
Paperless Recorder

<p>4</p> <p>"OK"</p> <p>" "</p>		<p>16-03-07 16:40:05</p> <p>Channel AI1</p> <p>Copy</p> <p>Paste " "</p> <p>Tag CH 10.0</p> <p>Unit</p> <p>Signal(4~20) mA</p> <p>LRV 0.0</p>
<p>5</p> <p>/</p>		<p>16-03-07 16:40:30</p> <p>Channel AI1</p> <p>Copy</p> <p>Paste " "</p> <p>Tag CH 1.00</p> <p>Unit</p> <p>Signal(4~20) mA</p> <p>LRV 0.0</p>
<p>6</p> <p>"OK"</p> <p>" "</p>		<p>16-03-07 16:41:28</p> <p>Channel AI1</p> <p>Copy</p> <p>Paste</p> <p>Tag CH1</p> <p>Unit</p> <p>Signal (4~20) mA</p> <p>LRV 1.00</p>

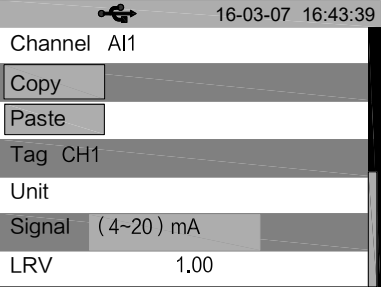
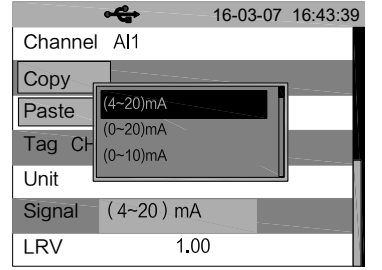
3.2.4.2 Input

Steps	Operation	Screen
1	"Unit" "OK"	 <p>16-03-07 16:42:07</p> <p>Channel A1</p> <p>Copy</p> <p>Paste</p> <p>Tag CH1</p> <p>Unit °C</p> <p>Signal (4-20) mA</p> <p>LRV 1.00</p>
2	" "	 <p>16-03-07 16:42:25</p> <p>Channel A1</p> <p>Copy</p> <p>Paste</p> <p>Tag CH1</p> <p>Unit °C</p> <p>Signal (4-20) mA</p> <p>LRV 1.00</p>
		 <p>16-03-07 16:42:25</p> <p>Channel A1</p> <p>Copy</p> <p>Paste</p> <p>Tag CH1</p> <p>Unit °C</p> <p>Signal (4-20) mA</p> <p>LRV 1.00</p>

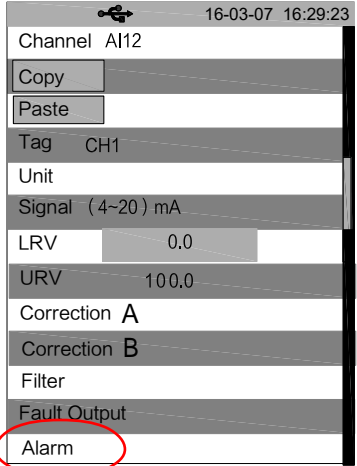
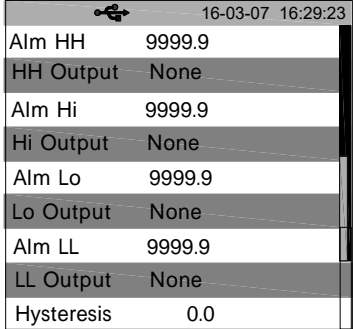
Paperless Recorder

		
		
3	/ "OK" " "	

3.2.4.3 Input

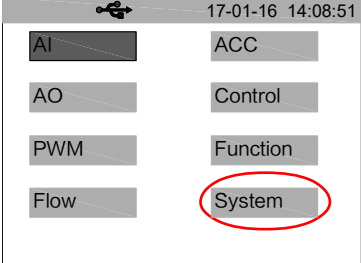
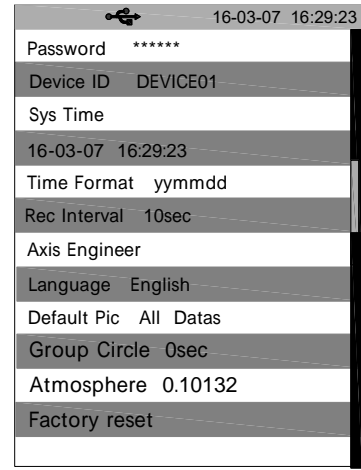
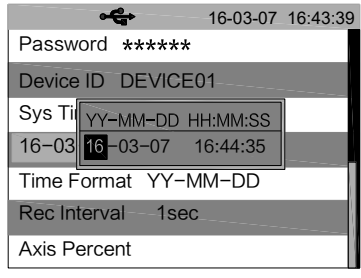
Steps	Operation	Screen
1	"Signal" "OK"	
2	/ "OK"	

3.2.4.3-1 Alarm

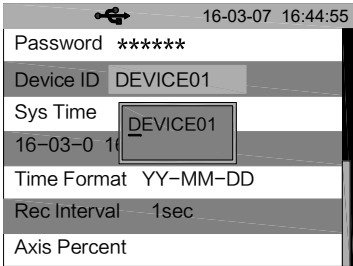
Steps	Operation	Screen
1	"Alram" "OK"	 <p>16-03-07 16:29:23</p> <p>Channel AI12</p> <p>Copy</p> <p>Paste</p> <p>Tag CH1</p> <p>Unit</p> <p>Signal (4~20) mA</p> <p>LRV 0.0</p> <p>URV 100.0</p> <p>Correction A</p> <p>Correction B</p> <p>Filter</p> <p>Fault Output</p> <p>Alarm</p>
2	Alm HH : 2 HH Output : 1~4 Alm Hi : 1 Hi Output : 1~4 Alm Lo : 1 Lo Output : 1~4 Alm LL : 2 LL Output : 1~4 Hysteresis :	 <p>16-03-07 16:29:23</p> <p>Alm HH 9999.9</p> <p>HH Output None</p> <p>Alm Hi 9999.9</p> <p>Hi Output None</p> <p>Alm Lo 9999.9</p> <p>Lo Output None</p> <p>Alm LL 9999.9</p> <p>LL Output None</p> <p>Hysteresis 0.0</p>

3.2.4.4

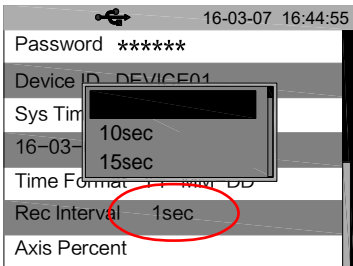
/

Steps	Operation	Screen
1	"System"	
	Password : Device ID : Sys time : / Time format : Rec Interval : Language : Default Pic : Group Circle : Atmosphere : (MPa) Factory reset :	
	"Sys time" "OK" / /	

3.2.4.5

Steps	Operation	Screen
1	"Device ID" "OK" /	 <p>The screenshot shows the main menu of the Paperless Recorder. At the top, the date and time are 16-03-07 16:44:55. Below that is a password field with six asterisks. The 'Device ID' is set to 'DEVICE01'. The 'Sys Time' is '16-03-07 16:44:55'. The 'Time Format' is 'YY-MM-DD'. The 'Rec Interval' is '1sec'. The 'Axis Percent' is also visible.</p>

3.2.4.6

Steps	Operation	Screen
1	"Rec Interval" "OK" / "OK"	 <p>The screenshot shows the 'Rec Interval' menu. The 'Rec Interval' is currently set to '1sec' and is circled in red. A selection menu is open over it, showing options for '10sec' and '15sec'. The background menu items are partially obscured by the selection box.</p>

Chapter 4

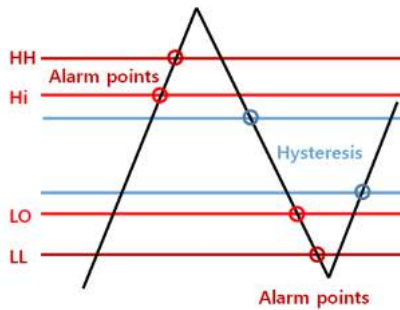
OVERVIEW

4.1

configuration Item	Function Description	Parameter range
		AI1~AI18
		Custom string's length is 8
		Custom string's length is 8
		(4~20) mA、(0~20) mA、(0~10) mA、PT100、Cu50、(1~5) V、(0~10) V、(0~5) V、B、E、J、K、S、T、R、N
		-99999~99999
		-99999~99999
A (Factor)	$Y=AX+B$	-99999~99999
B (Offset)	$Y=AX+B$	-99999~99999
		0s, 1s, 2s, 5s, 10s, 15s
		-99999~99999

configuration Item	Function Description	Parameter range
Alm HH	2	-.99999~.99999
HH Output	1~4	None、DO1、DO2、DO3、DO4
Alm Hi	1	-.99999~.99999
Hi Output	1~4	None、DO1、DO2、DO3、DO4
Alm Lo	1	-.99999~.99999
Lo Output	1~4	None、DO1、DO2、DO3、DO4
Alm LL	2	-.99999~.99999
LL Output	1~4	None、DO1、DO2、DO3、DO4
Hysteresis		-.99999~.99999

Note : 가



4.2

4.2.1

Host

configuration Item	Function Description	Parameter range
	Modbus Device Address	1~254
		1200,9600,57600,115200
		No parity, odd parity, even parity
		1234,2143,3412,4321

4.2.2 USB

USB , USB
가 .

configuration Item	Function Description	File format
Save Historical record		
Save ALL HDA		HDA (.HDA)
Save Part HDA		HDA (.HDA)
Save all CSV	CSV	Text (.csv)
Save alm info		Text (.csv)
Save Power info		Text (.csv)
Save ACC info	()	Text (.csv)
Save Log info		Text (.csv)
Save CFG		CFG (.cfg)
	USB : USB USB	

USB () .

:

File	Subdirectory	File name
	/History	H161009A.csv/ H161009A.hda
	/Info	A161009A.csv
	/Info	B161009A.csv
	/Info	P161009A.csv
	/Info	L161009A.csv

Note:

H,A,B,P,L
A~ Z , 23

4.2.3

configuration Item	Function Description	

4.3

Configuration item	Function Description	Parameter range
		000000~999999
		8 가
		YY-MM-DD, DD-MM-YY, MM-DD-YY
		1s, 2s, 5s, 10s, 15s, 30s, 1s, 2s, 5s, 10s, 30s, 60s
		Front Panel ,digital display screen, history screen
		0s、5s、10s、30s
(MPa)	(MPa)	-999999~999999

Appendix 1 : A Modbus

Modbus :

Number	Parameter	Types of parameter	Starting address of register (decimal)	The number of register
1	No.1 channel analog input	Floating point type	1	2 registers
2	No.2 channel analog input	Floating point type	3	2 registers
3	No.3 channel analog input	Floating point type	5	2 registers
4	No.4 channel analog input	Floating point type	7	2 registers
5	No.5 channel analog input	Floating point type	9	2 registers
6	No.6 channel analog input	Floating point type	11	2 registers
7	No.7 channel analog input	Floating point type	13	2 registers
8	No.8 channel analog input	Floating point type	15	2 registers
9	No.9 channel analog input	Floating point type	17	2 registers
10	No.10 channel analog input	Floating point type	19	2 registers
11	No.11 channel analog input	Floating point type	21	2 registers
12	No.12 channel analog input	Floating point type	23	2 registers
13	No.13 channel analog input	Floating point type	25	2 registers
14	No.14 channel analog input	Floating point type	27	2 registers
15	No.15 channel analog input	Floating point type	29	2 registers
16	No.16 channel analog input	Floating point type	31	2 registers
17	No.17 channel analog input	Floating point type	33	2 registers
18	No.18 channel analog input	Floating point type	35	2 registers

Communication Example:

Example 1: Real-time value of analog input 2

State :

Explanations : 06 03 00 03 00 02 35 BC

06: instruments address (Configuration can be changed)

03: 03 order to Modbus

00 03: Address 3 of register

00 02: The number of registers is 2

35 BC: CRC Verify

Returned data: 06 03 04 42 C6 6F F5 95 01

Explanations:

06: Instruments address

03: 03 order to Modbus

04: Four bytes of returned date

42 C6 6F F5: Floating point(F4321, configuration can be modified), It represents 100.0

95 01 : CRC Verify

Supmea

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