

TM7.0



Touch LCD Monitor Manual

Touch LCD Monitor Manual for Booster Pump System



- Easy to check up on the status of the booster pump system
- Easy to operate
- Visually Appealing
- User Friendly

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Features & Function

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CHAPTER 1

Features & Function

1. Features
2. Specification
3. Function
4. Main Screen
5. Icon

1. Features



1. Full Color Display
2. Touch Screen
3. Easy to set up the pressure
4. Icon: History of Run/ Alarm/ Various Information
5. Language: KOR/ ENG/ CHN
6. RS485: Intergrated communication
7. UX & GUI
8. USB Port: Firmware upgrade

2. Specification

- 7" TFT LCD
- Touch Screen
- RS-485 PORT: 2ea
- CAN PORT : 1ea
- Run/ Alarm contact
- Power: 220~440V
- Temperature & Humidity: Under -10~40℃ / 90%
- USB PORT

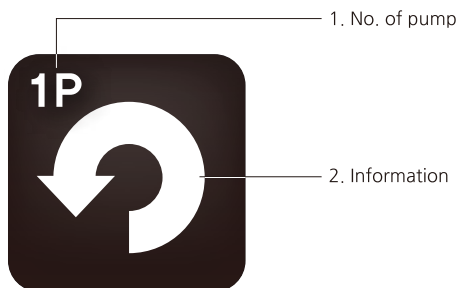
3. Function

Main Function	Contents
LCD TOUCH SCREEN	Displays various information through large LCD
DISPLAY	Easy to operate by Icons on the screen
Language	Korean/English/Chinese
Schedule Operation	Different pressure setup is available (timely/weekly/monthly)
Run History	Records and displays the operation history
Alarm	Records and displays the alarm history
External contact	Monitoring the drive from external place is available
Other function	Contents
CAN	Supports CAN comm.
RS-485	Supports CAN RS-485

4. MAIN SCREEN



5. ICON



Information

Check up on the information of each pumps by Icons

ICON	Info.	Contents	Unit
	Ratio	Current operation ratio	%
	Power	Current power consumption	kWh
	Accumulated Power	Current power accumulation	mWh
	Current	Current value	A
	Frequency	Current operatin frequency	Hz
	Output Power	Current output power	V

CHAPTER 2

Set up & Run History

1. Pressure/ Main Screen
2. Set up
3. Status
4. Run History
5. Alarm & Trip
6. Touch Reset

1. Pressure / Main Screen

Set up the pressure.



1. Press the set value



2. Input the setting pressure on the keypad.



3. Press the "Enter" key

2. Set up



1. Press the "Set Up" button



2. "Set up" page shall appear on the screen

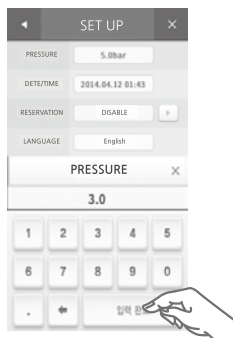
1) Alteration

Change the setting pressure accordingly to your requirements.

Changes of the pressure setting can also be made on the main screen(Refer to page 6)



1. Press the current setting pressure.

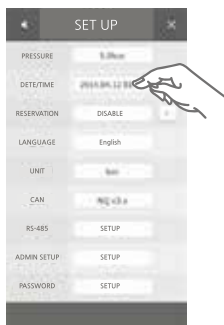


2. Input the new pressure setting via keypad and touch the "Enter"

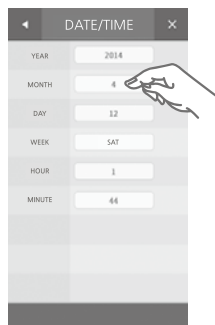
2) Date and time

Set up the current date and time.

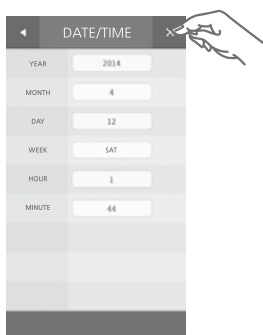
Run & Alarm history is based on the setting date and time



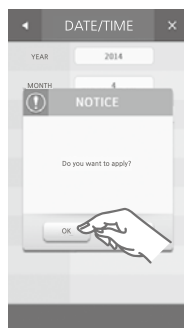
1. Press the "Date and Time"



2. Set up the current Date and Time



3. Press the "X" button.



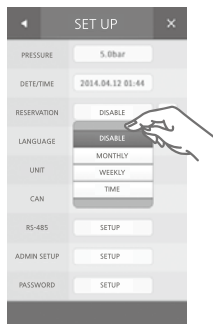
4. Press the "OK" button on the pop-up page

3) Schedule Operation

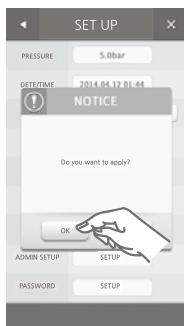
Monthly, Weekly, Timely operation under different pressure is available.



1. Press the set up key



2. Choose the method of schedule operation.

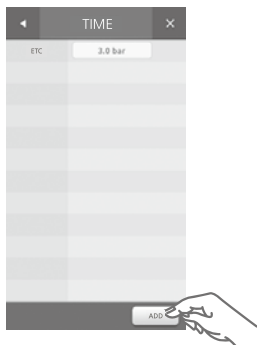


3. Press the "OK" button on the Pop-up page.

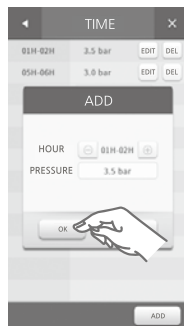


4. Move to the details by "►" button

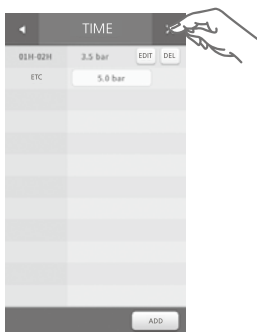
3) Schedule Operation



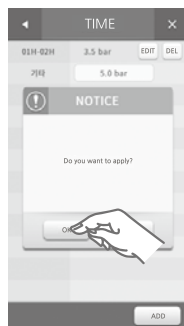
5. Press the "Add" button



6. Set up the value and Press the "OK" button.



7. Press the "X" button after checking the setting value.
Setting value can be delete and change by "Alteration" & "Delete" button.



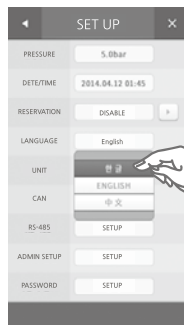
8. Press the "OK" button on the pop-up page

4) Language

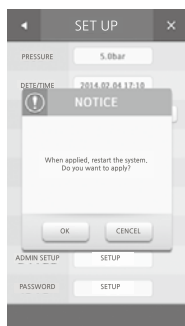
Korean/English/Chinese



1. Press the set up key.



2. Choose the language of your choice.



3. Press the "OK" button on the "Rebooting" pop-up page.



4. Language of the user's choice will be applied once the system has rebooted.

5) Unit

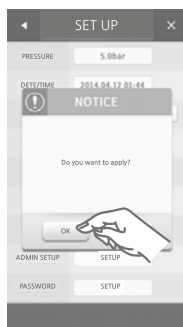
Set up the unit of pressure.



1. Press the setting unit.



2. Choose the unit

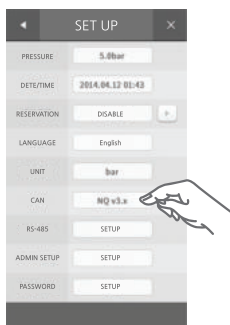


3. Press the "OK" button on the pop-up page.

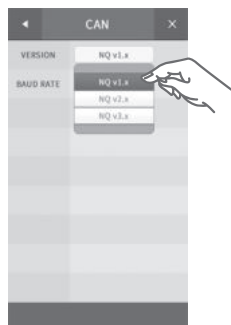
6) CAN Communication

Set up the speed and method of CAN communication.
Please follow the factory setting value which is optimized.

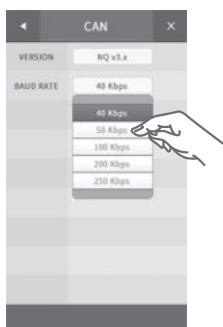
※ It is set up for multi-drive control when each drive has different version



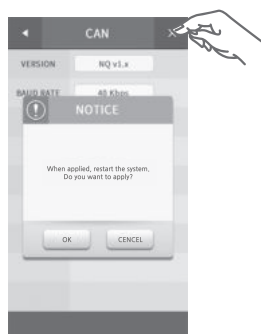
1. Press the setting value.



2. Check the Drive version



3. Choose the speed.

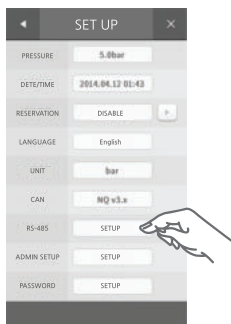


4. Press the "X" button after checking the setting value
Press the "OK" button on the pop-up page.

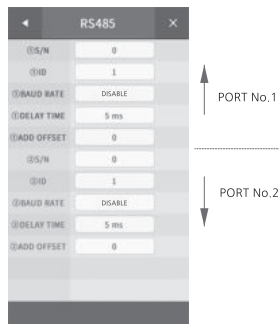
7) RS485

Set up the value of RS485 communication for external device connection.

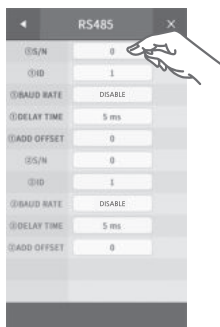
* RS485 Port: 2ea



1. Press the setting value.



2. There are 2 ports of RS485 (No. ① & No. ②)



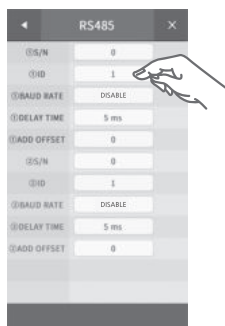
3. Touch the "S/N"



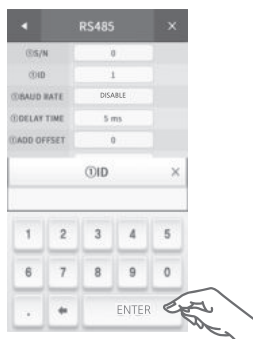
4. Set up the "S/N"

* Input the same "S/N" as same S/N of internet modem (Option).

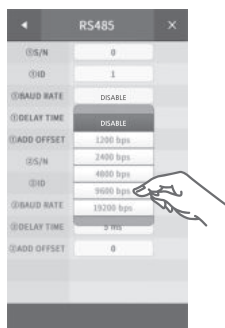
7) RS485



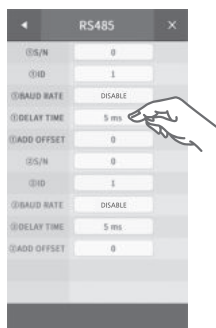
5. Touch the "ID".
* ID should same with external device ID.



6. Put into the "ID" and touch the "Enter".

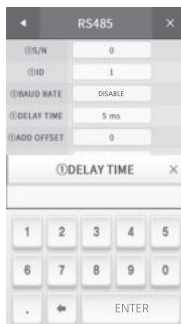


7. Set up the speed of RS485 communication. (Recommend Speed:9,600bps)

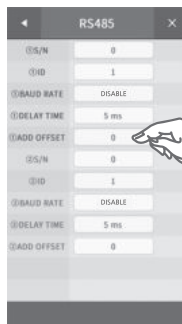


8. Touch the "DELAY TIME"

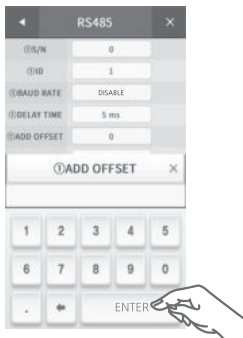
7) RS485



9. Put into the value and press the "Enter"(Available: 1~9999ms)



10. Press the "ADD. OFFSET"



11. Put into the value and thouch the "Enter".
*Correct & correspond the ADD range balance of external device and RS485.
(Available: 0~65535)



12. Press the "X" button after checking the setting value.
Press the "OK" button on the pop-up page.

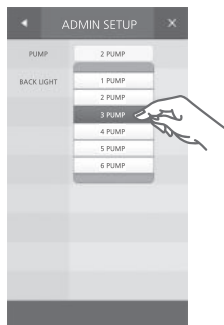
8) Manager

Set up the number of booster system pumps and LCD Back-lighting maintenance time.

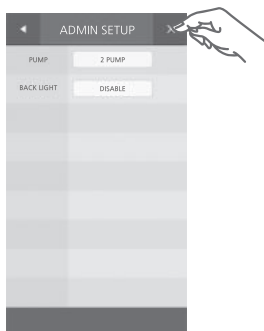
8-1) Number of Booster System Pumps



1. Press the setting value.



2. Input number of Booster System Pumps.



3. Press the "X" button



4. Press the "OK" button on the pop-up page.
Setting number of pump would be applied after the rebooting.

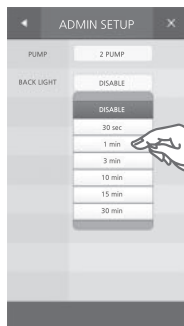
8) Manager

8-2) LCD Back-light maintenance time

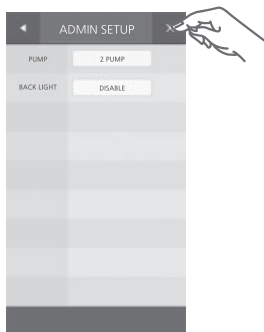
Set up the LCD Back-light maintenance time. While the "Sleep Mode" the LCD Back-light will automatically turn off.



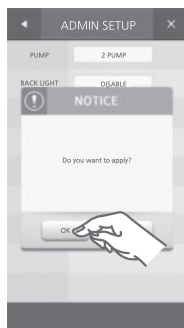
1. Press the setting value.



2. Choose the maintenance time.



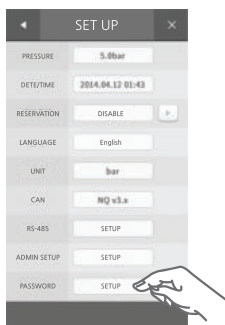
3. Press the "X" button



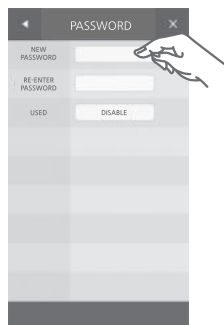
4. Press the "OK" button on the pop-up page.

9) Password

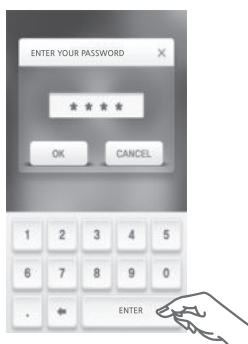
Setting up the password



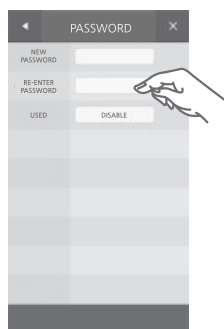
1. Press the setting value.



2. Press the new password.

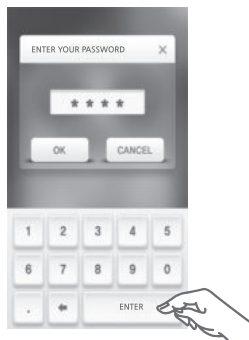


3. Input the 4 digits of password of your choice and touch the "Enter"

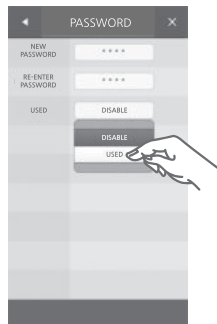


4. Press to confirm password.

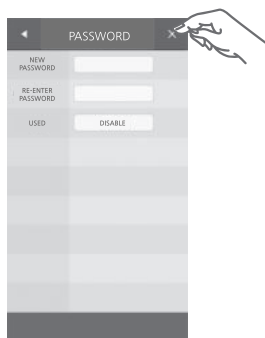
9) Password



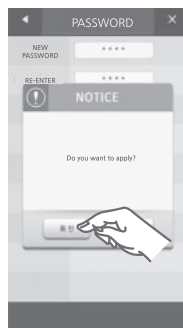
5. Re-input the 4 digits of password and press the "Enter"



6. Choose the "Yes" or "No" .



7. Press the "X" button



8. Press the "OK" button on the pop-up page.

3. Status

Check up the current status of booster pump system



1. Press the "Status" button.

SHOW ALL VALUE ✕

	PUMP 1	PUMP 2	PUMP 3
OR (%)	100	-	-
Freq (Hz)	60.0	-	-
Cur (A)	0.0	-	-
DC V (V)	529	-	-
Power (W)	0.0	-	-
Accu (kWh)	0.0	-	-
Accu (kWh)	0	-	-

2. Check up the current status of pumps.

4. Run/ Alarm/ Trip History

Check up the Run/ Alarm/ Trip History of booster pump system



1. Press the "Run History" button.

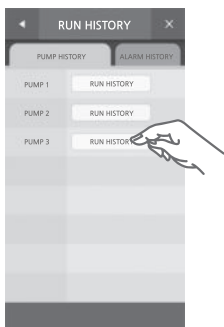
← RUN HISTORY ✕

	PUMP HISTORY	ALARM HISTORY
PUMP 1	RUN HISTORY	
PUMP 2	RUN HISTORY	
PUMP 3	RUN HISTORY	

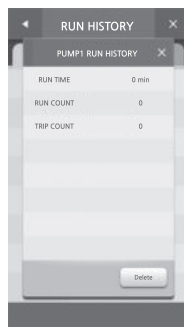
2. Move to "Run History" page.

1) Run History

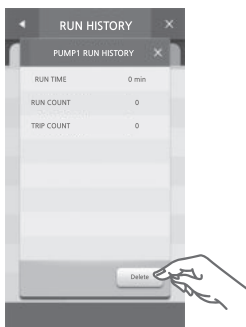
Check up the Run History of booster pump system.



1. Press the "Run History" of each pumps



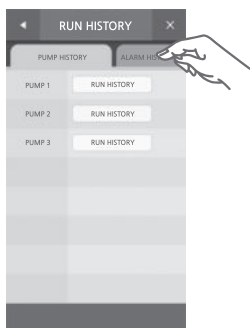
2. Check up the "Run History"



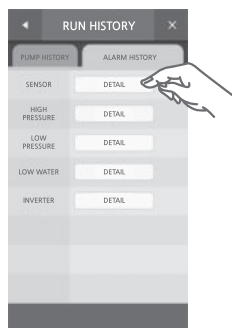
3. It is available to delete the "Run History" that touch the "Delete" button.

2) Alarm/ Trip History

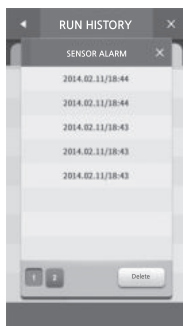
Check up the Alarm/ Trip history of Sensor errors, High-pressure, Low-pressure, Low Water Level and more. Ten of the latest Alarm/Trip history are saved within the TM 7.0 system.



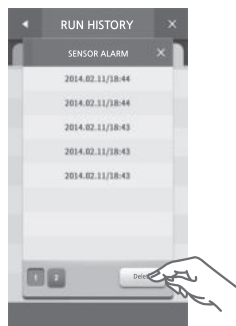
1. Touch the "Alarm/ Trip History" on the "Run History" page.



2. Choose the Alarm/ Trip errors of your choice.



3. Check up the "Alarm/ Trip History".



3. "Alarm/ Trip History" can be deleted by simply pressing the "Delete" button.

5. Alarm

When the system is not fully functioning, alarm messages should appear on the top of the screen. Alarm Messages include; High Pressure, Low Pressure, issue with pressure sensor, Low Water Level, Issue with the inverter. When two or more simultaneous alarm is raised, alarm messages will indicate in a sequential order. Alarm messages will automatically terminate once the system and the drive is inspected.



[Alarm Page]

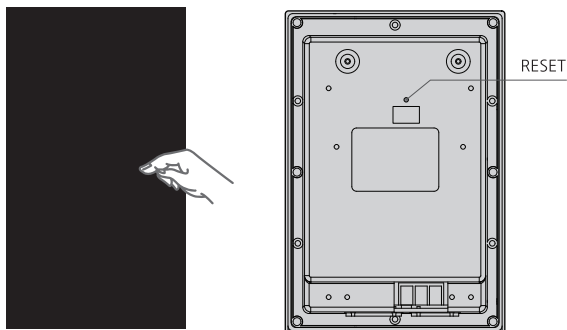
Warning messages that are sequential



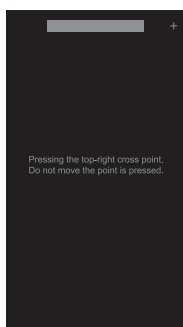
[2 alarm messages that are occurring simultaneous on the main screen]

6. Touch Reset

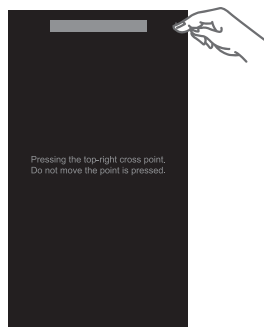
Guidelines when margin of errors occur with the touch points and the movement points.



1. On the back of the screen, press and hold the reset switch either with a ballpoint pen, or by using the driver to reboot or hold the power switch to suspend the power and then reboot. (Note: the screen has to be touch during this process)

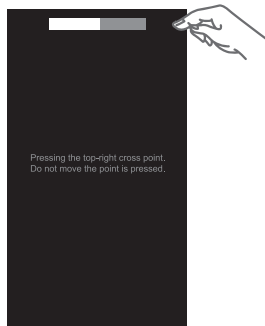


2. Once the rebooting process has been completed, the above screen shall appear.

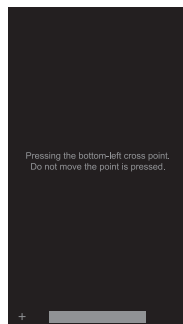


3. Please gently press and hold the + icon on the top right hand corner and wait

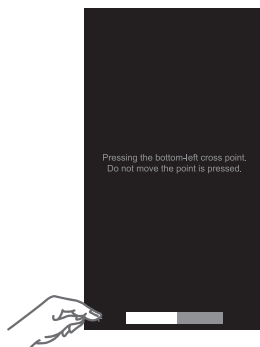
6. Touch Reset



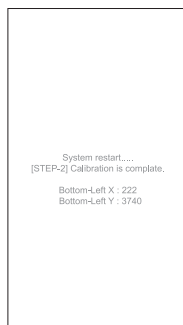
3. Press and Hold unto the + icon until the gauge is completed downloaded



3. Once the screen starts blinking, an + icon should appear on the bottom left corner of the screen



3. As previous, press and hold unto the + icon until the gauge is completely downloaded.



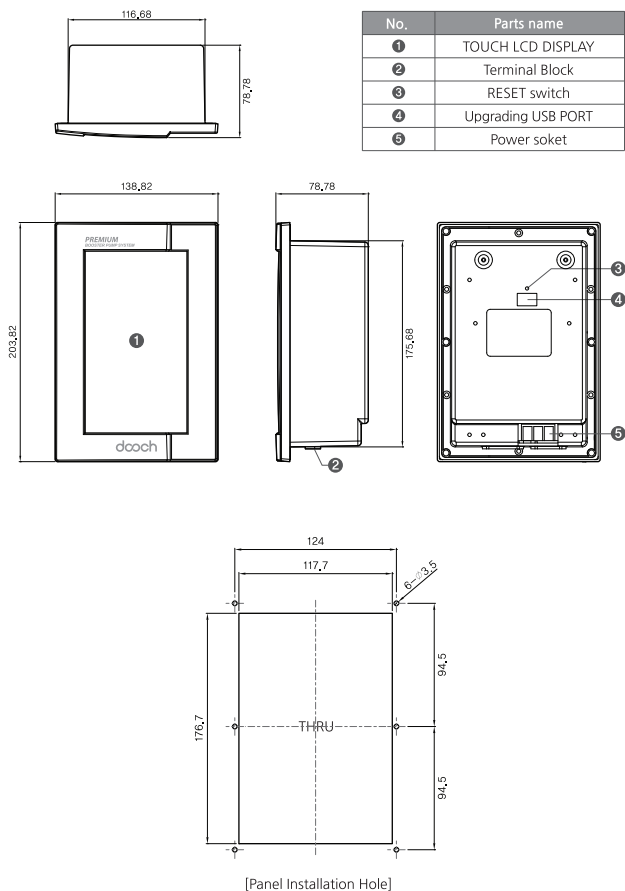
4. Once the screen starts blinking again, it will automatically reboot and make the necessary corrections.

CHAPTER 3

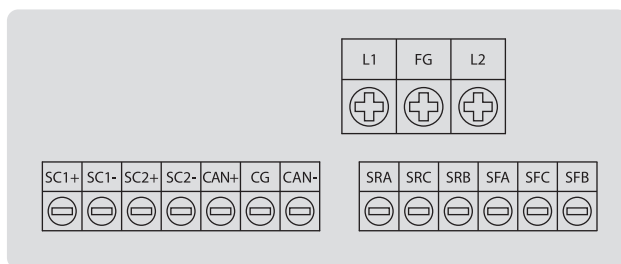
Appendix

1. External Dimension and Parts
2. Description of Terminal
3. RS-485 Comm. Protocol

1. External Dimension and Parts



2. Terminal Block Description



L1	AC 208~440V 50/60Hz
FG	
L2	

SC1+	RS 485 High Low for Comm. 1
SC1-	RS 485 Low Low for Comm. 1
SC2+	RS 485 High Low for Comm. 2
SC2-	RS 485 Low Comm. for Comm. 2
CAN+	High Terminal for CAN signal
CG	Common power ground terminal
CAN-	Low Terminal for CAN Signal
SRA	System Operation Relay A
SRC	Common System operation relay terminal
SRB	System operation Relay B
SFA	System Error Relay A
SFC	Common System Error Relay terminal
SFB	System Error Relay B

3. RS-485 Comm. Protocol

Comm. Specification

Index.	Specification
Comm. Speed	Choose Among 1200/2400/4800/9600/19200 bps
Control Procedure	Asynchronous Comm.
Comm. System	8 bit
Character System	1 bit
Stop bit	8 bit
Error check (CRC16)	1 byte
Parity Check	None

Comm. Protocol- ModBus-RTU Protocol

User's Support Function code

Code	Name
0x03	Read Hold Register
0x06	Preset Single Register

Read

- Query (Setting Pressure Read)

Start	Slave ID		Function		start Add Hi		start Add Lo		No Hi		No Lo		CRC				END
3.5byte time	x	x	0	3	2	0	0	2	0	0	0	1	x	x	x	x	3.5byte time

- response

Start	Slave ID		Function		byte Count		Data Hi		Data Lo		CRC				END	
3.5byte time	x	x	0	3	0	2	0	0	3	7	x	x	x	x	3.5byte time	Hex

Single White

- Query (Setting Pressure 5.5bar Writing)

Start	Slave ID		Function		Add Hi		Add Lo		Data Hi		Data Lo		CRC				END	
3.5byte time	x	x	0	6	2	0	0	2	0	0	3	7	x	x	x	x	3.5byte time	Hex

- response

Start	Slave ID		Function		Add Hi		Add Lo		Data Hi		Data Lo		CRC				END
3.5byte time	x	x	0	6	2	0	0	2	0	0	3	7	x	x	x	x	3.5byte time

3. RS-485 Comm. Protocol

Communication-related settings

RS-485 Setting (Refer to page 15) - Slave ID- Slave ID

- BAUD RATE

- DELAY TIME

- ADD Offset

Failure diagnosis- Communication link not connected

Checklist	
LCD connectivity check	Refer to page 24
LCD and RS485 check availability settings	Refer to page 15 Check Communication 1 setting
Check LCD speed setting	Refer to page 15 Baud Rate Check
Check LCD Slave ID	The protocol of the LCD Slave ID Slave ID and should match
Check Comm. on Master	
Check program's data format	

3. RS-485 Comm. Protocol

Address (hexadecimal)	Parameter	Scale	Unit	R/W	Description
0×2000	Program Version	0.01		R	0~65535
0×2001	System operation condition			R	0: STOP 1: READY (inverter EN and output zero) 2: RUN (inverter EN and output non zero) 3: Fault (System Fault)
0×2002	Pressure Setting	0.01	bar	R/W	0~10000
0×2003	Discharge Pressure	0.01	bar	R	0~10000
0×2004	Operation(STOP) Inverter			R	Bit Allocation Bit 0: 1 time Bit 1: 2 time Bit 2: 3 time Bit 3: 4 time Bit 4: 5 time Bit 5: 6 time
0×2005	Operation(Ready) Inverter			R	Bit Allocation Bit 0: 1 time Bit 1: 2 time Bit 2: 3 time Bit 3: 4 time Bit 4: 5 time Bit 5: 6 time
0×2006	Operation(Run) Inverter			R	Bit Allocation Bit 0: 1 time Bit 1: 2 time Bit 2: 3 time Bit 3: 4 time Bit 4: 5 time Bit 5: 6 time
0×2007	System fault				Bit Allocation Trip description Bit 0: Sensor Bit 1: high pressure Bit 2: low pressure Bit 3: water level
0×2006	Operation(Ready) Inverter			R	Bit Allocation Bit 0: 1 time Bit 1: 2 time Bit 2: 3 time Bit 3: 4 time Bit 4: 5 time Bit 5: 6 time

3. RS-485 Comm. Protocol

Address (hexadecimal)	Parameter	Scale	Unit	R/W	Value
0×2010	Output Rate: Inverter 1	0.1	%	R	0~1000
0×2011	Output Rate: Inverter 2	0.1	%	R	0~1000
0×2012	Output Rate: Inverter 3	0.1	%	R	0~1000
0×2013	Output Rate: Inverter 4	0.1	%	R	0~1000
0×2014	Output Rate: Inverter 5	0.1	%	R	0~1000
0×2015	Output Rate: Inverter 6	0.1	%	R	0~1000
0×2016	Total count: Inverter 1 Run	1	time	R	0~65535
0×2017	Total count: Inverter 2 Run	1	time	R	0~65535
0×2018	Total count: Inverter 3 Run	1	time	R	0~65535
0×2019	Total count: Inverter 4 Run	1	time	R	0~65535
0×201A	Total count: Inverter 5 Run	1	time	R	0~65535
0×201B	Total count: Inverter 6 Run	1	time	R	0~65535
0×201C	Operation hour: Inverter 1	1	hour	R	0~65535
0×201D	Operation hour: Inverter 2	1	hour	R	0~65535
0×201E	Operation hour: Inverter 3	1	hour	R	0~65535
0×201F	Operation hour: Inverter 4	1	hour	R	0~65535
0×2020	Operation hour: Inverter 5	1	hour	R	0~65535
0×2021	Operation hour: Inverter 6	1	hour	R	0~65535
0×2022	Trip count: Inverter 1	1	time	R	0~65535
0×2023	Trip count: Inverter 2	1	time	R	0~65535
0×2024	Trip count: Inverter 3	1	time	R	0~65535
0×2025	Trip count: Inverter 4	1	time	R	0~65535
0×2026	Trip count: Inverter 5	1	time	R	0~65535

3. RS-485 Comm. Protocol

Address (hexadecimal)	Parameter	Scale	Unit	R/W	Value
0x2027	Trip count: Inverter 6	1	time	R	0~65535
0x2100 ~ 0x2127	Trip Inverter No.	1	No.	R	1~6
	Inverter Trip History 1~10: year	1	year	R	0~99
	Inverter Trip History 1~10 : month/date	1	month /date	R	Low byte date : 1~31 High byte Month : 1~12
	Inverter Trip History 1~10 : hour/Min.	1	hour /min	R	Low byte Min. : 0~59 High byte hour : 1~23
0x2128	Total count: High pressure	1	time	R	0~65535
0x2129 ~ 0x2146	High Pressure History 1~10 : year	1	year	R	0~99
	High Pressure History 1~10 : month/date	1	month /date	R	Low byte date : 1~31 High byte Month : 1~12
	High Pressure History 1~10 : hour/Min.	1	hour /min	R	Low byte Min. : 0~59 High byte hour : 1~23
0x201D	Total count: Low Pressure	1	time	R	0~65535
0x2148 ~ 0x2165	Low Pressure History 1~10 : year	1	year	R	0~99
	Low Pressure History 1~10 : month/date	1	month /date	R	Low byte date : 1~31 High byte Month : 1~12
	Low Pressure History 1~10 : hour/Min.	1	hour /min	R	Low byte Min. : 0~59 High byte hour : 1~23
0x2166	Total count: Low Water Trip	1	time	R	0~65535
0x2167 ~ 0x2184	Low Water Trip History 1~10 : year	1	year	R	0~99
	Low Water Trip History 1~10 : month/date	1	month /date	R	Low byte date : 1~31 High byte Month : 1~12
	Low Water Trip History 1~10 : hour/Min.	1	hour /min	R	Low byte Min. : 0~59 High byte hour : 1~23

3. RS-485 Comm. Protocol

Address (hexadecimal)	Parameter	Scale	Unit	R/W	Value
0×2185	Total count for Sensor Fail	1	time	R	0~65535
0×2186 ~ 0×21A3	History of Sensor Fail 1~10: Year	1	year	R	0~99
	History of Sensor Fail 1~10 : Month/Date	1	Month/ Date	R	Low byte date : 1~31 High byte Month : 1~12
	History of Sensor Fail 1~10 : Hour/Min.	1	Hour /Min.	R	Low byte Min. : 0~59 High byte Hour : 1~23

3. RS-485 Comm. Protocol

* Available from or above Drive SW version 1.3x

* CAN setting should be V1.3x

Address (hexadecimal)	Description	Scale	Unit	R/W	Value
0x2028	Output Frequency of Inverter 1	0.1	Hz	R	0~600
0x2029	Output Frequency of Inverter 2	0.1	Hz	R	0~600
0x202A	Output Frequency of Inverter 3	0.1	Hz	R	0~600
0x202B	Output Frequency of Inverter 4	0.1	Hz	R	0~600
0x202C	Output Frequency of Inverter 5	0.1	Hz	R	0~600
0x202D	Output Frequency of Inverter 6	0.1	Hz	R	0~600
0x202E	Output Current of Inverter 1	0.1	A	R	0~1000
0x202F	Output Current of Inverter 1	0.1	A	R	0~1000
0x2030	Output Current of Inverter 3	0.1	A	R	0~1000
0x2031	Output Current of Inverter 4	0.1	A	R	0~1000
0x2032	Output Current of Inverter 5	0.1	A	R	0~1000
0x2033	Output Current of Inverter 6	0.1	A	R	0~1000
0x2034	DC Link Voltage of Inverter 1	1	V	R	0~9999
0x2035	DC Link Voltage of Inverter 2	1	V	R	0~9999
0x2036	DC Link Voltage of Inverter 3	1	V	R	0~9999
0x2037	DC Link Voltage of Inverter 4	1	V	R	0~9999
0x2038	DC Link Voltage of Inverter 5	1	V	R	0~9999
0x2039	DC Link Voltage of Inverter 6	1	V	R	0~9999
0x203A	Output Power of Inverter 1	0.1	kW	R	0~10000
0x203B	Output Power of Inverter 2	0.1	kW	R	0~10000
0x203C	Output Power of Inverter 3	0.1	kW	R	0~10000

3. RS-485 Comm. Protocol

Address (hexadecimal)	Parameter	Scale	Unit	R/W	Value
0×203D	Output Power of Inverter 4	0.1	kW	R	0~10000
0×203E	Output Power of Inverter 5	0.1	kW	R	0~10000
0×203F	Output Power of Inverter 6	0.1	kW	R	0~10000
0×2040	Inverter 1 Watt-Hour (MWh)	1	MWh	R	0~10000
0×2041	Inverter 2 Watt-Hour (MWh)	1	MWh	R	0~10000
0×2042	Inverter 3 Watt-Hour (MWh)	1	MWh	R	0~10000
0×2043	Inverter 4 Watt-Hour (MWh)	1	MWh	R	0~10000
0×2044	Inverter 5 Watt-Hour (MWh)	1	MWh	R	0~10000
0×2045	Inverter 6 Watt-Hour (MWh)	1	MWh	R	0~10000
0×2046	Inverter 1 Watt-Hour (kWh)	0.1	kWh	R	0~10000
0×2047	Inverter 2 Watt-Hour (kWh)	0.1	kWh	R	0~10000
0×2048	Inverter 3 Watt-Hour (kWh)	0.1	kWh	R	0~10000
0×2049	Inverter 4 Watt-Hour (kWh)	0.1	kWh	R	0~10000
0×204A	Inverter 5 Watt-Hour (kWh)	0.1	kWh	R	0~10000
0×204B	Inverter 6 Watt-Hour (kWh)	0.1	kWh	R	0~10000

Warranty

Dooch guarantee the quality of the product authorized and passed all the required QC procedure. Warranty periods and warranty services are varied in accordance with the region where the customers purchase our product.

The warranty period applies from the date of purchase by the first customer and is transferable only between end-users. The warranty covers manufacturing defects only.

Product	Touch Color LCD Monitor	Warranty	1 year
Model	TM 7.0	Date from	
Place		Agent	

The liability of Dooch Co., Ltd. (or its appointed maintenance agent) is limited to The cost of repair and/or replacement of the product under warranty.

The warranty is invalidated if the defect is caused (howsoever) by misuse, neglect, and tampering or incorrect adjustment.

It is invalidated if unauthorized persons carry out any alterations and/or repairs.

Also, the warranty is invalidated in the following cases:

- For repair due to incorrect installation by customer's discretion
- For repair to any product where the serial number has been removed

To obtain technical assistance or to book a service/repair to your product under warranty, please contact our customer care centre.

To assist our customer service team, please have your model number, serial number and date of purchase ready when calling.

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* please contact your local agent for more information.