JDA 日煬科技有限公司
JD Auspice Co., Ltd.

User Manual
central inverter pidBos®03 Recovery System

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pidBos®

PV+   PV+   BK   AC

Warning: Before installing the **pidBos®03**, please ensure there is no voltage bothon DC side and AC side,When disconnecting the DC side in working state, the capacitor still has electricity. It will take 2 minutes to let the capacitor discharge

Precautions

● Installation person and user must be qualified electricians or people who have received professional training.

● **pidBos®03** is a special high voltage device, and its DC voltage is 1000V, AC voltage is 110V/240V. Please dispose the product following yourlocal laws and regulations.

● When installing the **pidBos®03**, please make sure grounding line is well connected to avoid person injury.

● You could contact JDA if there is any question about the **pidBos®03**.

Warning and Symbols

There are some warnings and symbols in this document.

⚡	Indicates that a high voltageis used here. Touching the part causes a possibly electric shock. If physical contact is required by your work, start work only after you make sure that no voltage is here.
⚠	Danger: Danger indicates a hazardous situation which, if not avoided, could cause serious injury or death.
⚠	Warning:Warning indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
⚠	Caution: Notice indicates a hazardous situation which, if not avoided, could result in equipment working abnormally or property loss.
ⓘ	Instruction:Instruction indicates important supplementary information or provides skills or tips that can be used to help you solve a problem or save your time.

Abbreviations

There are some abbreviations in this document.

Abbreviation	Designation
AC	Alternating Current
DC	Direct Current
PV	Photovoltaic
L	Live Wire
N	Null Wire
PE	Ground Wire
SV	Voltage of the DC side of the inverter
OV	Output voltage of **pidBos®03**

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Contents

1. General

1.1 pidBos®03 introduction

More and more problems appear in the application of solar power plant. One problem is power dropping which is perhaps caused by PID,the voltage, current and FF of the module dropped seriously.

pidBos®03 produced by JDA could be used to recover the dropped parameter of the PV modules to improve the yield of the power plant. It could be easily installed at the DC side of the inverter, asin figure 1.
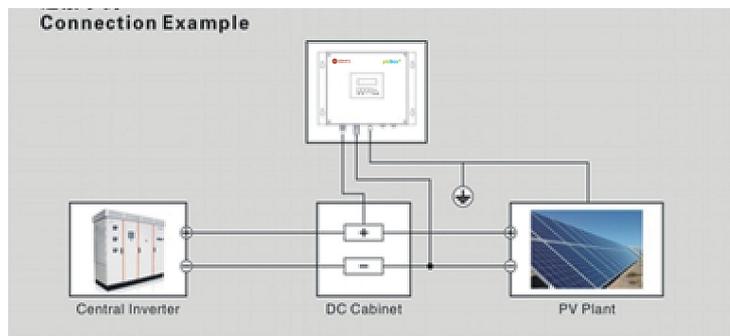
Figure 1. JDA connection sketch

1.2 Using Scope

The manual is suit for the **pidBos®03** product produced by JDA. It mainly includes **pidBos®** components and structure, installation introduction, operation introduction and so on.

2. Structure and Components

2.1Unpacking

2.1.1Deliverables

Upon receiving the product, please confirm that the components are included and have not been damaged in transportation. If any damage or shortage be found, please contact JDA.

No.	Components	Quantity	Diagram
1	**pidBos®03**	1	

No.	Components	Quantity	Diagram
2	PV+ male connector	1	
	PV+ male connector	1	
3	PV- female connector	1	TL-CABLE01
	PV- female connector	1	
4	AC power cable(2m)	1	1---L 2---N 3---PE
5	Ground cable(2m)	1	
6	BK cable (2m)	1	
7	RS-485 plug(Optional)	1	1---A+ 2---B- 3---GND

ⓘ If possible, please keep the package aside to move the product.

2.2Structure
2.2.1Dimension(Figure 2)
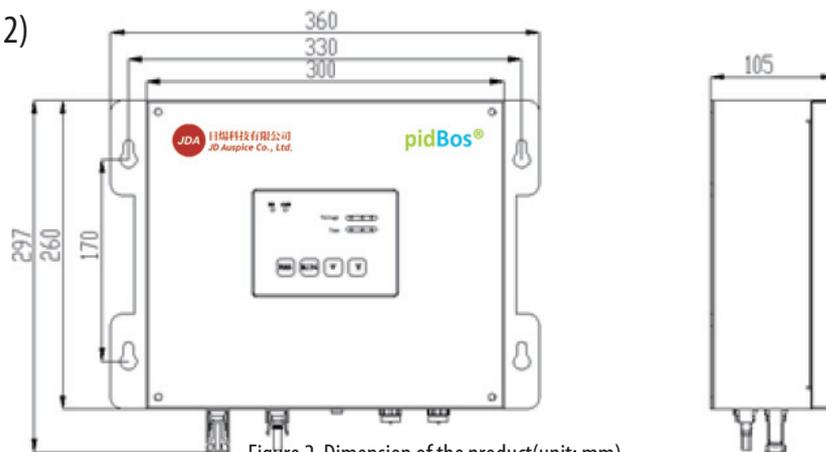
Figure 2. Dimension of the product(unit: mm)

2.2. 2 Front view(Figure 3)
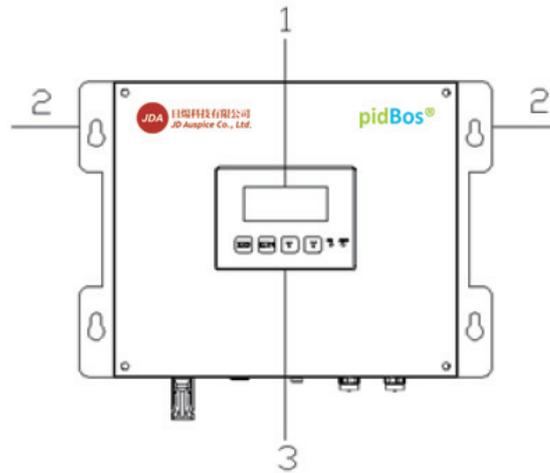
Figure 3. Front view

Item	Name	Description
1	Screen	Display the parameter and working state
2	Hanger	Fixing the device.
3	Operation Panel	Setting the parameter, Displaying the state, voltage and running time information.

2.2.3 Bottom view(Figure 4)
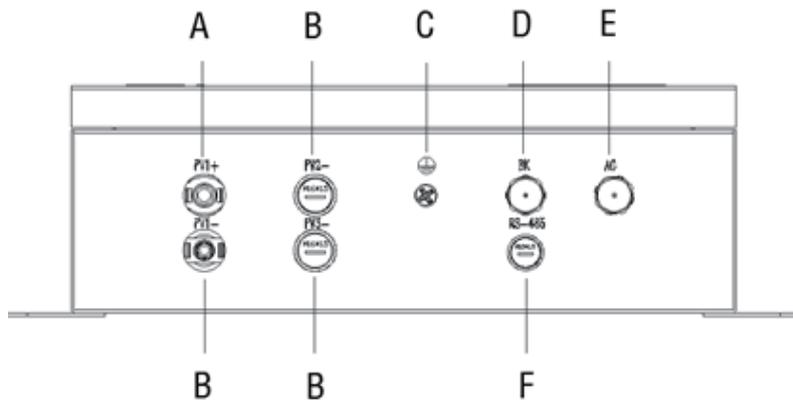
Figure 4. Bottom view

Item	Name	Description
A	PV1+female connecto	To be connected with PV+ of the inverter
B	PV1-male connector	To be connected with PV- of the inverter. PV2- and PV3- are Spare holes.
C	ground post	To be connected with ground cable connector
D	BK plug(optional)	To be connected with insulation inspect model of the inverter.
E	AC power plug	To be connected with AC power
F	RS-485 connector(optional)	To be connected with RS-485 cable

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3. Installation

3.1 Instruments and materials maybe used

Jackhammer (for Ø8m drill)	Expansion Screws	Ratchet Crimping Plier
	M6×85	
Wire Stripper	Needle-Nose Plier	Tape Measure
Solder iron (30W)	Solder wire	Communication
Voltmeter	Power cable (3*0.5mm^2)	PV cable (4mm^2)
BK cable (2*0.5mm^2)	Ground cable (4mm^2)	Cross
Adjustable wrench	Inner hexagon spanner	Special wrench for MC4 connector
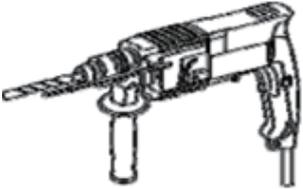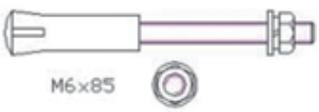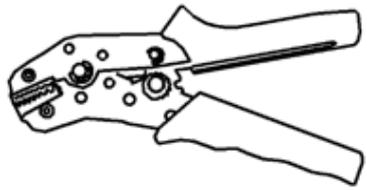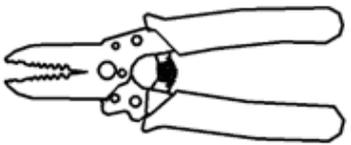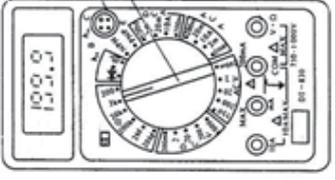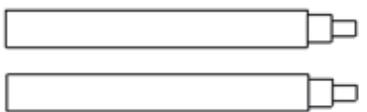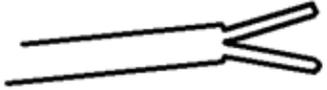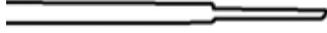
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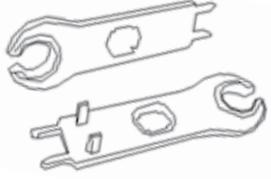
3.2 Precautions for installation

⚠ The ambient temperature range should be -25℃～65℃.

⚠ The ambient humidity should be less than 95%.
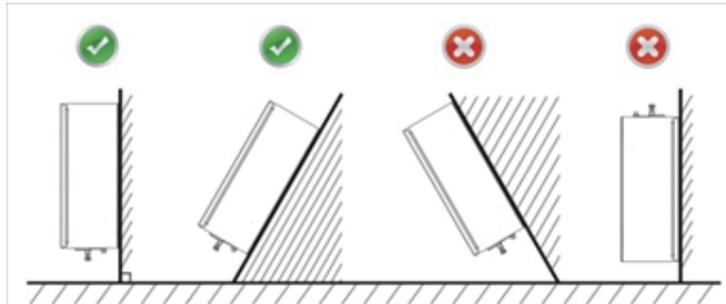
Figure 5.Permitted and prohibited mounting angle

⚠ The mounting surface should be flat.

⚠ The connection area should point downwards.

⚠ The angle between mounting wall and vertical line of the earth should be less than 30° (Figure 5)

⚠ The mounting position is prohibited to be in inflammable and explosive atmosphere.

⚠ There should be no gas pipes behind the mounting points.

⚠ There should be no hard objects possibly to hit the product.

⚠ There should be enough clearances around the product as figure 6. There should be at least 100mm, 100mm, 100 mm,300 mm, and 300 mm away from the top, left side, right side, bottom, and front respectively.

⚠ There should be enough clearances around the product as figure 6. There should be at least 100mm, 100mm, 100 mm, 300 mm, and 300 mm away from the top, left side, right side, bottom, and front respectively.

⚠ The mounting wall should be solidenough.

⚠ The suggested insulation resistance of solar system should be larger than 3.3KΩ.

⚠ The suggested installed position should avoid sun, rain, snow etc. The reference sketch is as figure 7.
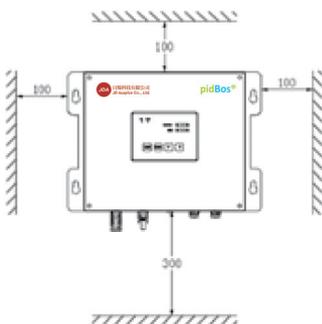
Figure 6.Recommended spaces around the product (mm)

Figure 7. Reference sketch of the installed position

3.3 Mounting (Figure 8)

· Determine the holes positions.
· Mark the position of the drill holes and drill the holes.
· Insert the expansion screws into the holes.
· Screw the setscrew to fix the product.

⚠ Check that the product is fixed firmly on the wall.
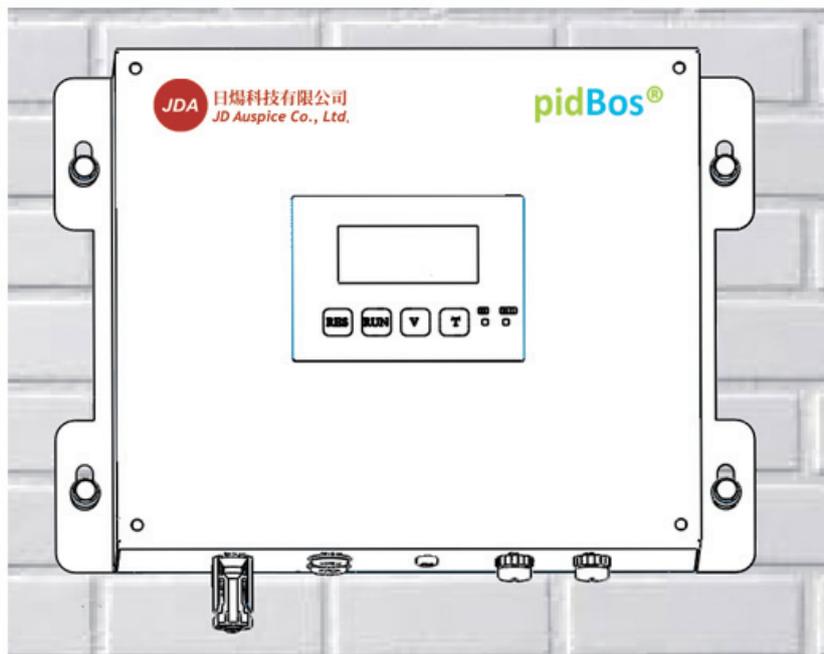
Figure 8. Mounting sketch (Take wall installation as example)

3.4 Connecting the cables

⚠ The product must be powered off during the follow connecting operation.

⚠ Connect the AC power cable after the ground cable and PV cables have been connected. When disconnecting the cables, disconnect AC power cable firstly.

Cables connecting order :

a) Connect ground cable;
b) Connect BK cable(optional);
c) Connect PV cables;

⚠ PV+ connection must be prior to PV-.

d) Connect AC power.

3.4.1 Connecting ground cable

Fix one terminal of the ground cable on the grounding point of solar system. Fix the other terminal on the ground post of **pidBos®03** (Figure 9).
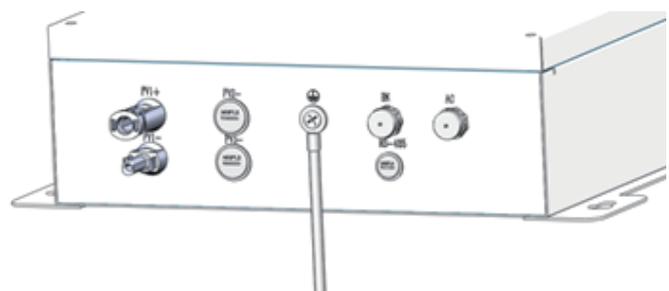
Figure 9. Ground cable connecting sketch

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3.4.2 Connecting BK cable

(i) The BK cable should be used for the inverter with the function of inspecting insulation resistor of DC side at night time.

Connect one terminal of the BK cable with the insulation inspect module of the inverter. Connect the other socket terminal with the plug on the inverter(Figure 10).
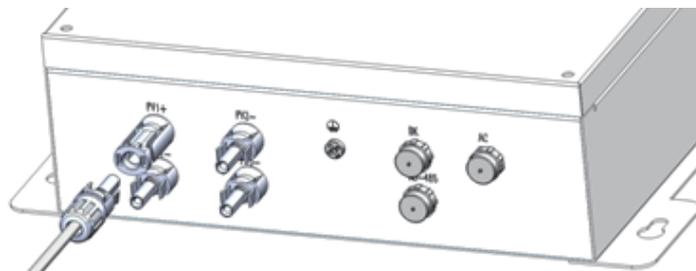
Figure10.BK cableconnecting sketch

3.4.3 Connecting PV+ cable

Connect one terminal of the PV+ cable with DC+ of the inverter. Connect the other terminal of PV+ cable with PV1+ female connector of **pidBos®03** (Figure 11).

Figure11. PV+ connecting sketch

3.4.4 Connecting PV- cable

Connect one terminal of PV- cable with DC- of inverter. Connect the other terminal of the PV- cable with PV1- male connector (Figure 12).
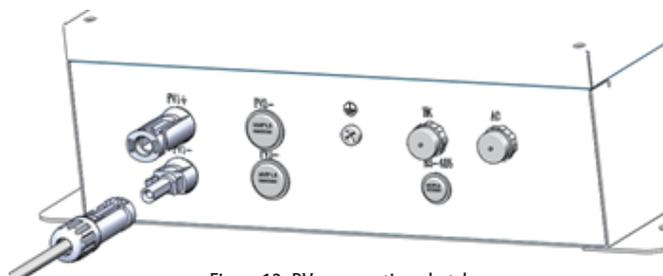
Figure12. PV- connecting sketch

3.4.5 Connecting the AC power cable

Connect one terminal of AC power cable with single phase power(100-240VAC). Connect the other socket terminal with the plug on the **pidBos®03** (Figure 13). The white round mark on the plug and socket should be corresponded(Figure 14).
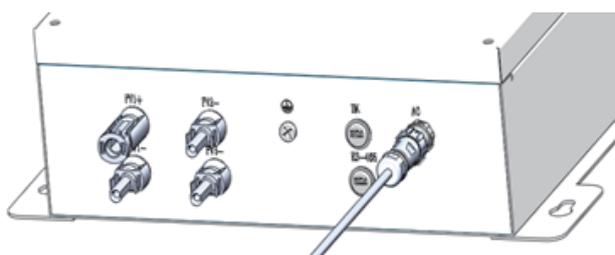
Figure 13.AC connecting sketch
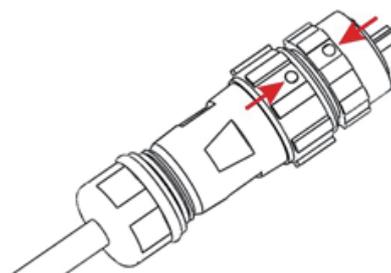
Figure 14. White round mark

10

4.0 perating Instructions

4.1 Panel Introduction

4.1.1 Screen

There is a screen, 4 buttons and 2 lights on the panel, as in figure 15. They are actual OV value, OV set value, SV value, running time, clock point and working mode on the screen.

Item	Description
A	Actual output voltage value(OV)
B	Working mode
C	Output voltage setting value
D	PV system voltage value(SV)
E	Clock point, twinkling once every second
F	Running time
G	RES button
H	RUN button
I	V button
J	T button
K	Running light(Green)
L	Alarm light(Red)
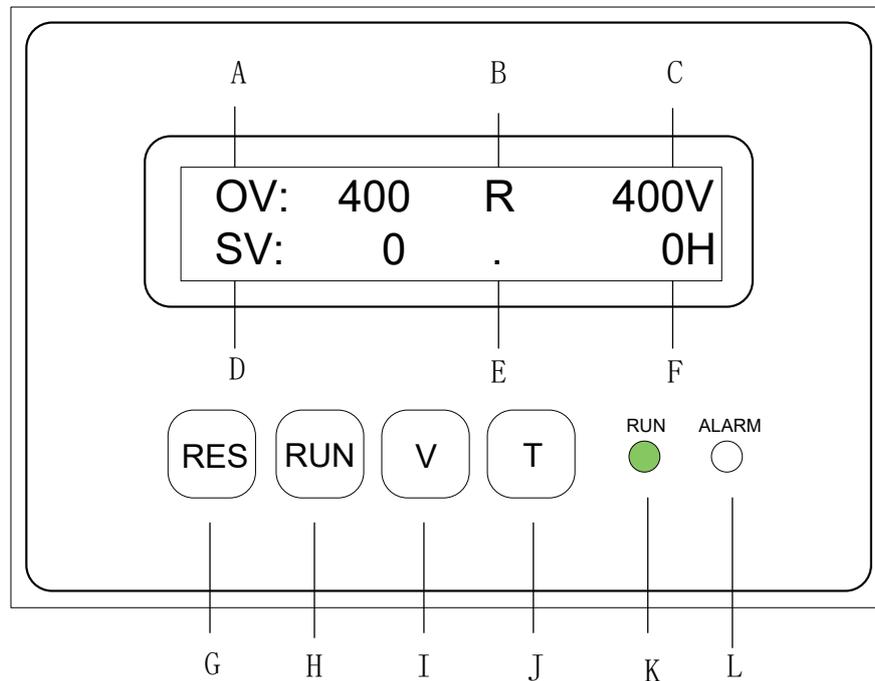
Figure 14. Operating panel

4.1.2 Working mode

There are 4 kinds of working modes: R (Running state), S (Stopping state), A (Standby state) and alarm state, as in the table below.

Working mode	Symbol	Description
Running state	R	Running light (RUN) is on
Stopping state	S	Both running light (RUN)and alarm light (Alarm) are off
Standby state	A	Running light(RUN) is twinkling
Alarm state	see 4.2.2.2 part	Alarm light (Alarm) is on

4.2 Setting and Operating Instruction

4.2.1Parameter Setting

ⓘ The parameter can only be set at stopping state. Press "RUN" button to switch running state to stopping state.

4.2.1.1 Local Date and Time calibrating and Display

At stopping state, press "T" button for 5 seconds, the screen enters date and time display edit interface, as in figure 16. Calibrate date and time in this interface. Press "T" button, the blinking cursor appears. Press "V" button to edit the value. And press "RUN" button to move editing position. After setting all the values, press "RUN" button to finish editing and the blinking cursor disappears. Press "T" button for 2 seconds to return to main interface.
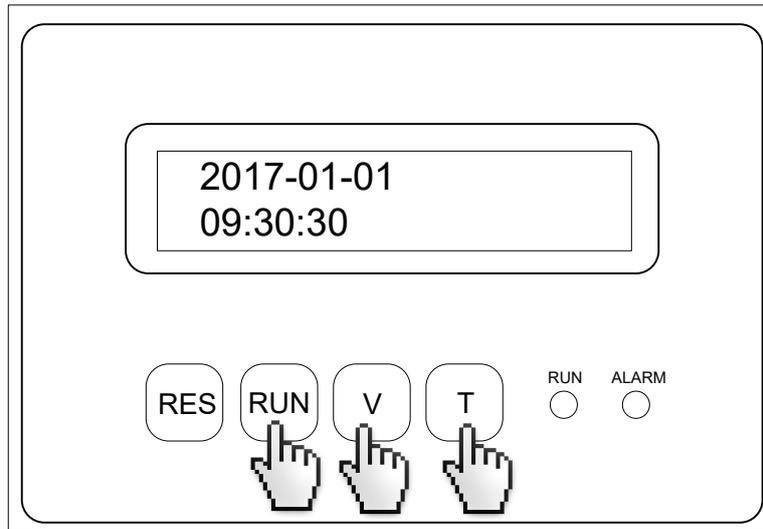
Figure 16

⚠ The mounting surface should be flat.

4.2.1.2 Voltage Setting and Display

a) Output voltage setting

At stopping state, press "V" button to enter the output voltage editing interface. When Pressing "V" button, 0V set value could variety between 0V and 400V-1000V. The value would add 100V with the frequency of every pressing between 400V and 1000V, as in figure 16.

⚠ Please make sure that "output voltage + stop voltage ≤ the max voltage of inverter".
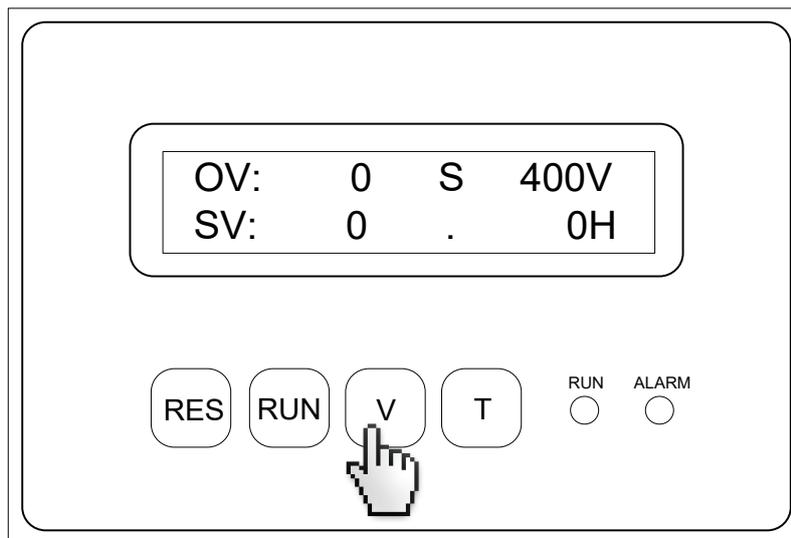
b) Start voltage and stop voltage setting

ⓘ ON means start voltage, OFF means stop voltage. They are the module voltage value controlling the start and stop of **pidBos®03**.

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At stopping state, press "T" button for 5 seconds, the screen enters date and time display edit interface, as in figure 16. Calibrate date and time in this interface. Press "T" button, the blinking cursor appears. Press "V" button to edit the value. And press "RUN" button to move editing position. After setting all the values, press "RUN" button to finish editing and the blinking cursor disappears. Press "T" button for 2 seconds to return to main interface.

⚠ Please make sure that "output voltage + stop voltage≤ the max voltage of inverter".
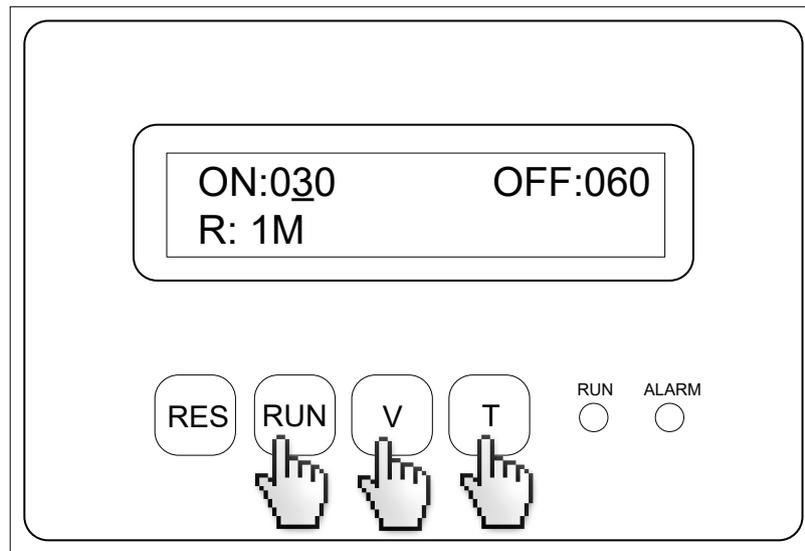
Figure 18

The least start voltage is 10V, and the largest start voltage is 200V. For each pressing "V" button, the value would add 10V. When reaching the largest 200V, the value returns to 10V.

ⓘ Only the start voltagecould be set and the stop voltage is 30V larger.

⚠ Normally, the start voltage should be set 30V. If there are some light like streetlight which make the PV voltage is higher than 30V at night time, start voltage value should be set larger.

4.2.1.3 Time Setting and Display

a) Running time setting

At stopping state, press "T" button to enter running time edit interface. Press "V" button to set the value. For each pressing "V" button, the value would add 1h. The running time would variety in a circle between 0h and 13h. Press "RUN" button to make sure and end editing, as in figure 19.

ⓘ When the time is 0H, time control function is shielded and **pidBos®03** only controlled by start voltage and stop voltage.

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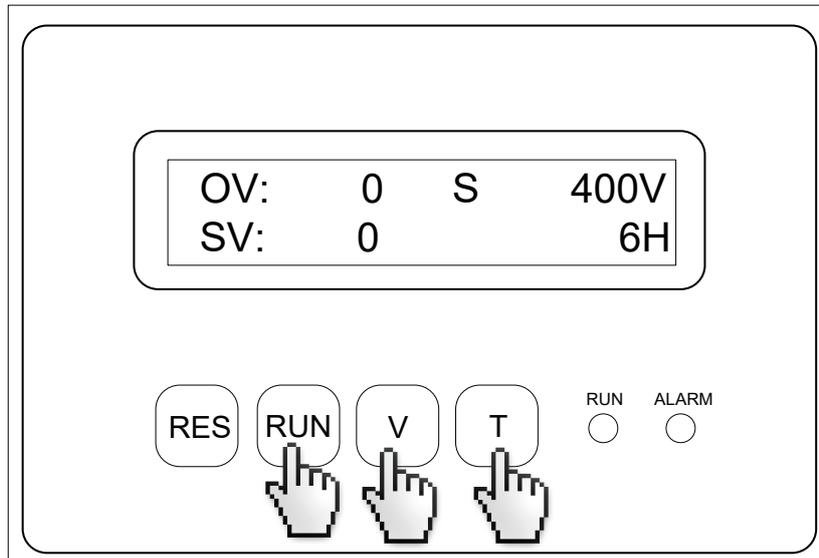
Figure 19

b) Start time setting

At stopping state, press "T" button for 2 seconds to enter start time edit interface, as in figure 20. The screen displays START T: 17:00. First, press "T" button. The blinking cursor appears. Press "V" button to set the value. The value would variety 1h with the frequency of every pressing. Only hour value can be set. After setting all the value, Press "RUN" button to finish editing and the blinking cursor disappears. Then Press "T" button for 2 seconds to return to main interface.
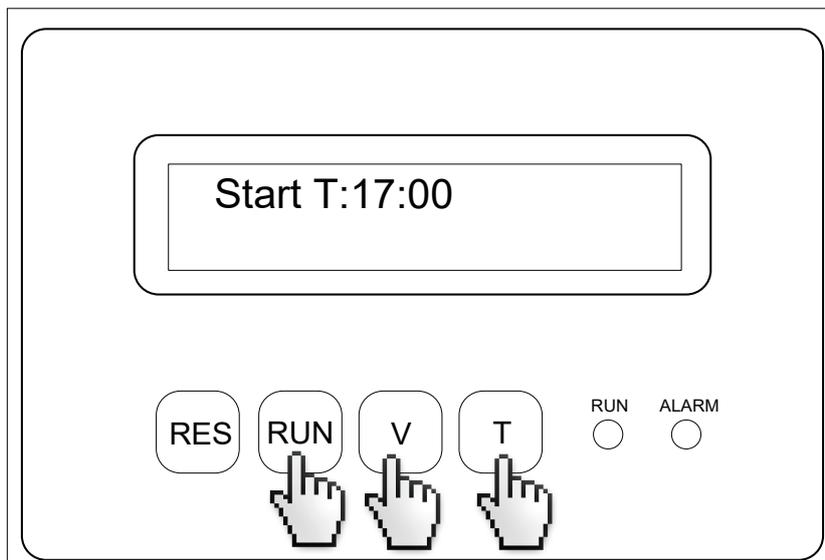
Figure 20

4.2.2 Operating

4.2.2.1 Start

a) Check whether the cables are rightly connected.

b) Connect the power cable, **pidBos®03** would start automatically, then press "RUN" to stop running.

c) Set current data and time.

d) Set output voltage.

e) Set start voltage.

f) Set running time.

g) Set start time.

h) Press "RUN" button.

ⓘ The screen will turn off 30s later. Press "RES" button to turn on the screen.

⚠ The factory parameter is: Local date and time is Beijing time; Output voltage is 600V; Start voltage is 30V; Running time is 0H; Start time is 20:00.

4.2.2.2 Alarm display and elimination

a) Under voltage alarm

When the under voltage alarm happens, the alarm light would turn on. Screen displays "Under Voltage", as in figure 21. **pidBos®03** would stop working. Press "RES" button to eliminate alarm or alarm would eliminate automatically at 17:00 everyday.
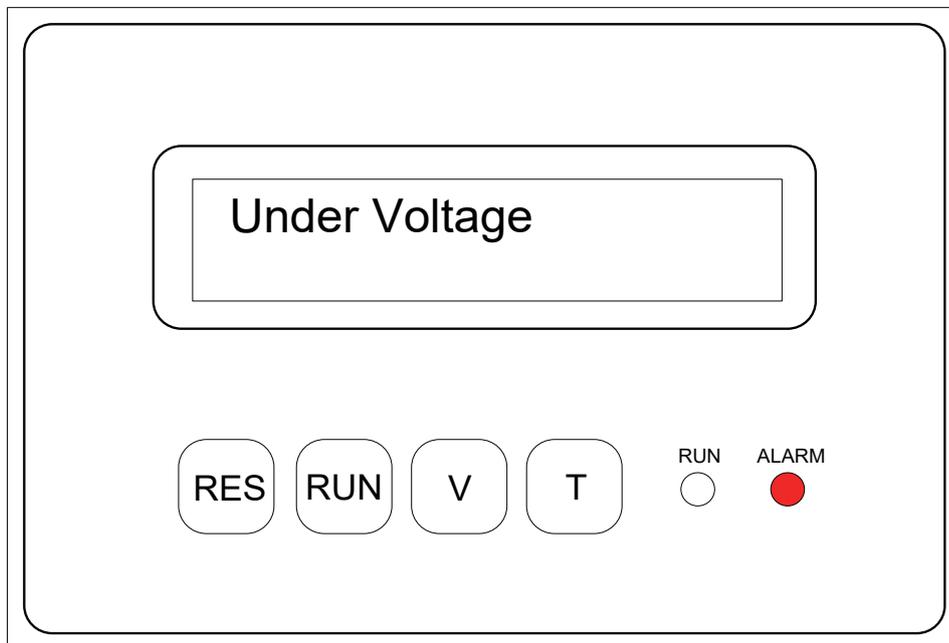
Figure 21

b) Over current alarm

When the over current alarm happens, the alarm light would turn on. Screen displays "Over Current", as in figure 22. **pidBos®03** would stop working. Press "RES" button to eliminate alarm or alarm would eliminate automatically at 17:00 everyday.
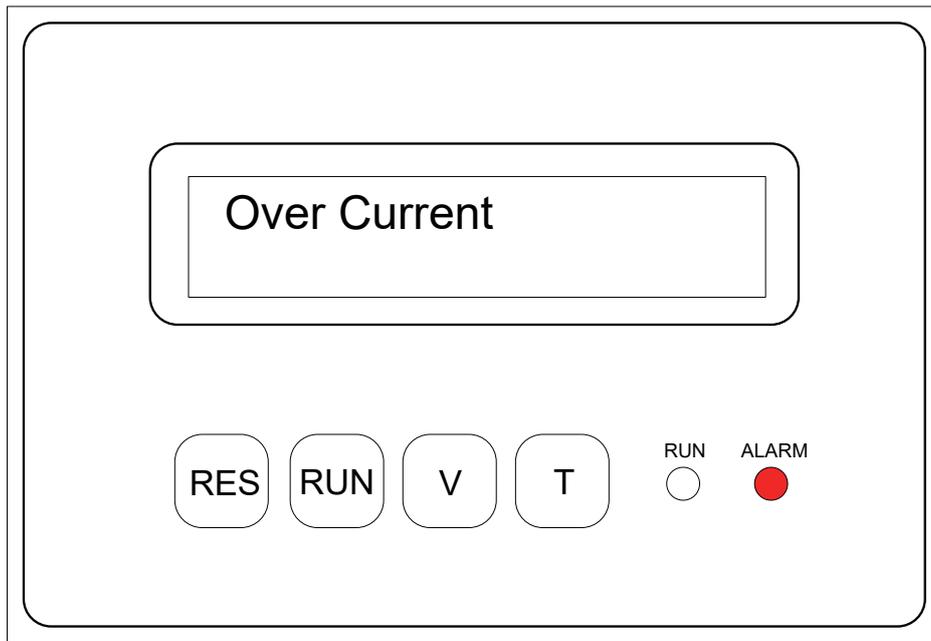
Figure 22

⚠ If the fault is temporary, **pidBos®03** could start automatically and there may be no alarm the second day. If the fault is permanent, there should be alarm every day. Professional technician should go to the site to check and resolve the faulty according to "Fault information table (Page 17)".

4.2.2.3 Default Setting and Software Version

a) Resume default setting

At stopping state, press "RES" button for 2 seconds. Screen displays "Default Set OK"(Figure 23). It indicates that resume default setting successfully. Press "T" button for 2 seconds to return to main interface.
The data default setting is:

⚠ After default setting, all the parameter should be set again, or **pidBos®03** may not work normally.
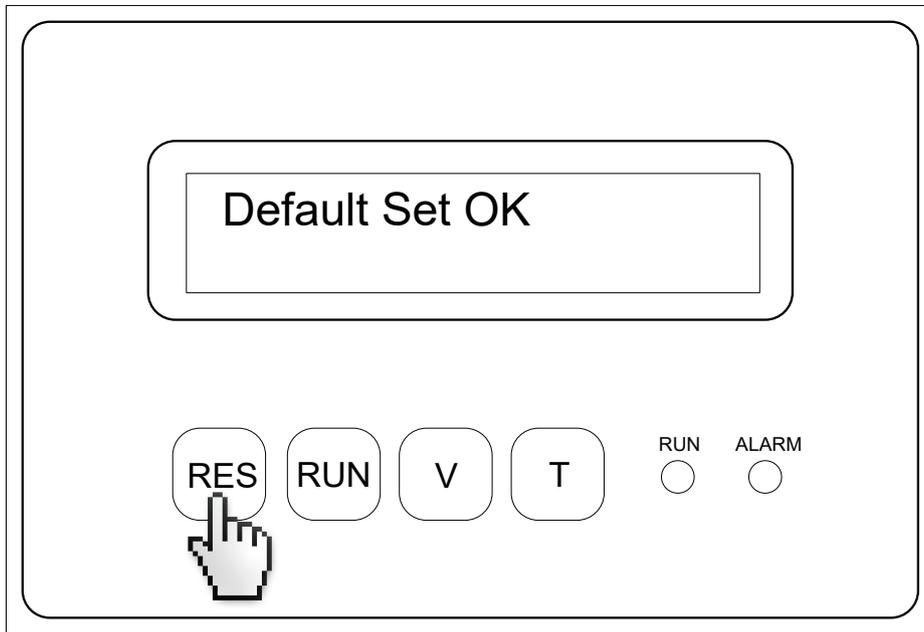
Figure 23

b) Check the software version

At stopping state, press "RES" button for 5 seconds. The screen will display software version, as in figure 24. Press "T" button for 2 seconds to return to main interface.
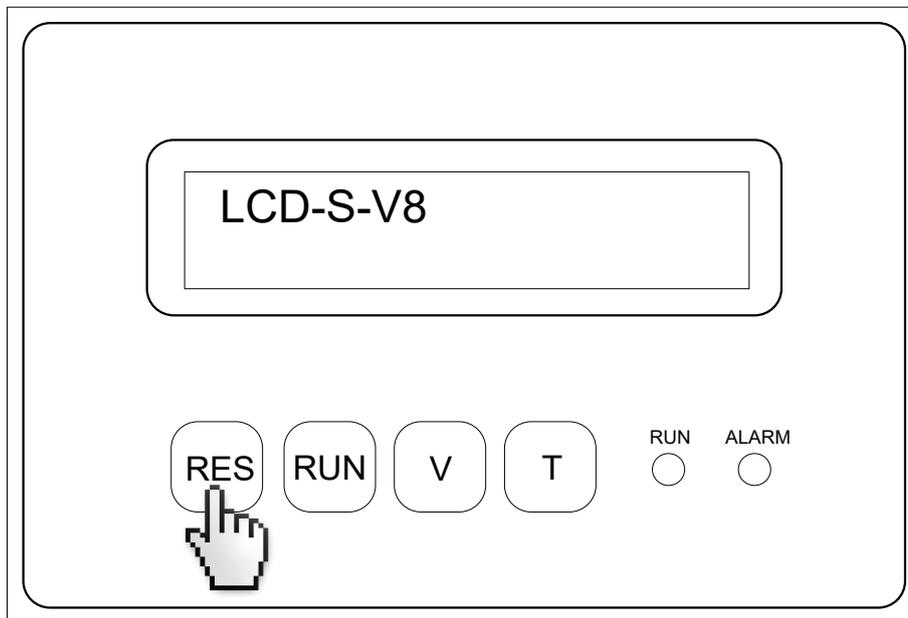
Figure 24

4.3 Control Instruction

4.3.1 Running time control and SV control

a) Set running time as 0H. When the SV is lower than start voltage, **pidBos®03** would start running; when the SV is higher than stop voltage, **pidBos®03** would stop running.

b) Set any running time except for 0h. When it is the start time and SV is lower than start voltage, **pidBos®03** starts running. After finishing running time or SV is higher than stop voltage, **pidBos®03** would stop running automatically.

4.4 Inspection running state

During the **pidBos®03** running, randomly select 1pcs PV panel and disconnect positive connector or negative connector with nearby panel. Inspect the voltage between electric circuit in the connector and the frame. The voltage should be almost the same as the OV value(Figure 25).
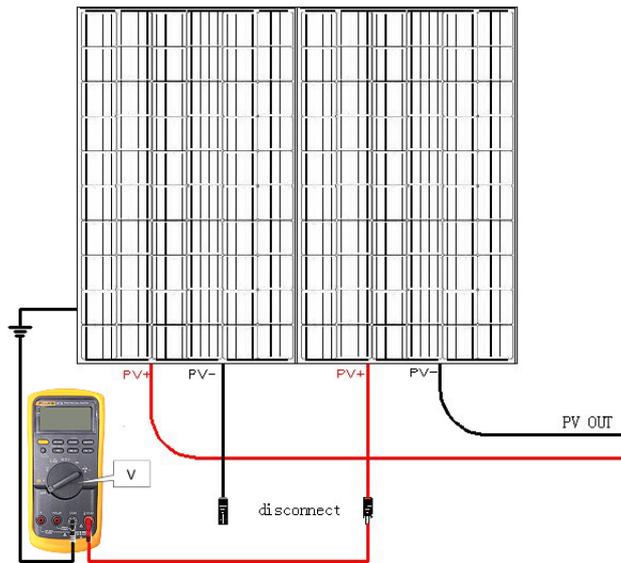
5. Faulty information table

Faulty	Description	Possible reason	Solve method
Under voltage alarm	Alarm light turn on, screen displays "Under Voltage", **pidBos®03** stops working.	Control problem. **pidBos®03** could not effectively control the OV.	Resume default setting
		The drift of voltage detective system is too high.	Resume default setting
		OV cable maybe short circuit.	Check the circuit
		The PV system insulation resistance is too low.	Check the PV system
Over current alarm	Alarm light turn on, screen displays "Over Current", **pidBos®03** stops working.	The PV system insulation resistance is too low.	Check the PV system
		Fuse broken	Replace the Fuse on the PCB
Time control invalid	Second point twinkle lower than 1 HZ	Influenced by electromagnetic field or clock fault	Resume default setting
Other Fault			Contact the manufacturer

6. Technical datasheet

Item		pidBos® 03
General Data	No. of Inverters Connecting with	1
	Operating Temperature(°C)	-25～65
	Operating Humidity(%RH)	≤95
	Dimension(mm)	360*260*105
	Weight(kg)	≤6.0
	Certification	CE
	Maximum operating altitude above MSL(m)	4000
Control Method	Control method	Clock/Module voltage
	Display	LCD
	Operating	Button
DC Output	Output voltage range(V)	400～1000
	Voltage resolution(V)	1
	Rated current(mA)	60
	Rated power(W)	30
	Permit Insulating Resistance(KΩ)	≥3.3
AC Input	Input Voltage(V)	100～240
	Frequency(Hz)	50/60
	Input ground cable	No demand
SV inspection	Voltage inspection Range(V)	0～1000
	Inspection Resolution(V)	1
	IP class	IP65
	Communication(Optional)	RS-485

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