Digital Pressure Sensor with solenoido Valve Control
MVS-202 series

INSTRUCTION MANUAL

CONVUM IO-Link MVS-202-M001E-C

CONVUM Ltd.

URL http://convum.co.jp
E-mail faq@convum.co.jp

For your safety ,please read the follwing before use.

⚠ WARNING

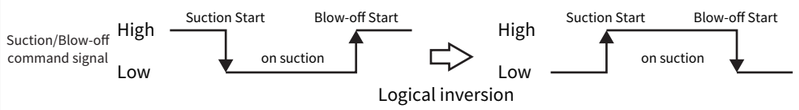
●Operating environment
This product is not explosion-proof rated. Do not use in locations with explosive, flammable gas or in corrosive gas atmosphere.

⚠ CAUTION

●Use a power supply voltage of 24 VDC ± 10% for this product.
Connecting a voltage or AC power supply over this range will cause a failure such as burning.
※(Control) solenoid valve should also be DC24V specification
●Strong interference from high-voltage lines, power lines, etc. may cause malfunctions, route away from these area. Also take interference countermeasures where necessary.
●This product is IP40 rating. However, please take measures to prevent liquid or dust (fine particulate matter) from entering the body.
●The output(OUT)method and Suction/Blow-off command input method of this product can be changed by program. Change the program before wiring or separate them from the control target to avoid accidental malfunction when changing.
●When using with IO-Link specifications, the wiring cable length between this unit and the master device must be within 20m.

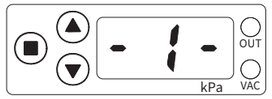
Suction/Blow-off command signal timing chart(Example for sink input : Source input is opposite)

The suction operation starts when Suction/Blow-off command signal ON.
Keep the ON condition during suction. Blow-off is carried out when the signal Changes to OFF.
It is also invert logic of a Suction/Blow-off command signal.



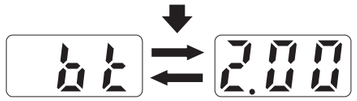
During active suction, Green LED is lit .

1.Setting method of Suction mode and timer setting



Press the ■ key once and wait for 3 seconds after release.

Select a suction mode with the ▲or▼key and set it with the ■ key.



Select a desired value for "**bt**" with the ▲or▼key and set it with the ■ key.

Select a desired value for "**t1**" with the ▲or▼key and set it with the ■ key.

Select a desired value for "**t2**" with the ▲or▼key and set it with the ■ key.

●Suction mode
Please refer to below-mentioned「Suction mode」
oP1 : Suction mode1 (Suction and holdin)
oP2 : Suction mode2 (Vacuum solenoid valve one time operation)
oP3 : Suction mode3 (Vacuum solenoid valve command singnal linked)

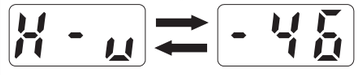
1.「Blow-off time」:**Bt**
This sets a time during which to keep the blow-off solenoid valve ON in response to the blow-off command signal. It can be set between 0.00 and 9.99 seconds. Beyond 9.99 seconds, "**At**" (automatic) is displayed. If "**At**" is set, Blow-off solenoid valve turns off synchronously with the activation (ON) of OUT signal at the time of blow-off. ("**bt**" is common to all suction modes.)

2.「Delay time」:**t1**
Set the delay time from when the vaccum level at suction reaches the set value(**H-v**) and OUT signal turns ON until the vaccum solenoid valve turns off.
It can be set between 0.00 to 9.99 seconds.
("**t1**" can be set when the suction mode is「**oP1**」or「**oP2**」.)

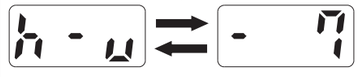
3.「Delay time」:**t2**
This sets a delay time from the detection of blow-off command signal is detected intil the blow-off solenoid valve turns (ON).
It can be set between 0.00 to 9.99 seconds.
("**t2**" is common to all suction modes.)

2.Setting method of Suction/Blow-off confirmation output(OUT)setting

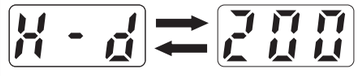
Press the ■ key twice and wait for 3 seconds after having released.



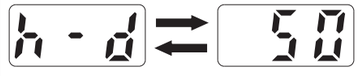
Use the ▲▼ keys to change the "**H-v**" value at which the output turns ON during suction, using the ■ key to set.



Select a desired value for hysteresis range "**h-v**" during suction, using the ▲▼ key and set it with the ■ key. Note 3)

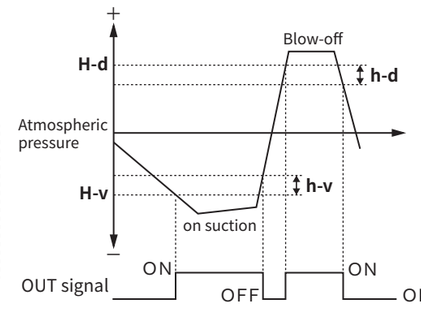


Select a desired value for "**H-d**" at which to drive on OUTsignal output during blow-off, using the ▲,▼key and set it with the ■key. Note 1)



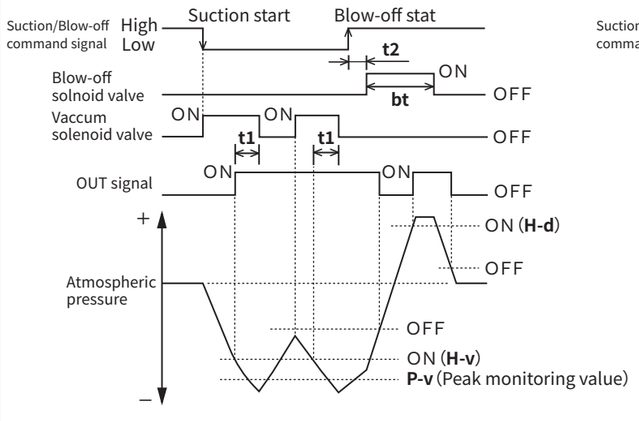
Select a desired value for hysteresis range "**h-d**"during blow-off, using the ▲,▼key and set it with the ■key. Note 2) Note 3)

Note 1) With "**H-d**" set at OFF no outputs signal during blow-off.
Note 2) With "**H-d**" set at OFF, **h-d** cannot be set.
Note 3) Hysteresis range "**h-v**" and "**h-d**" should be more than「1」, can not set「0」for prevention from chattering



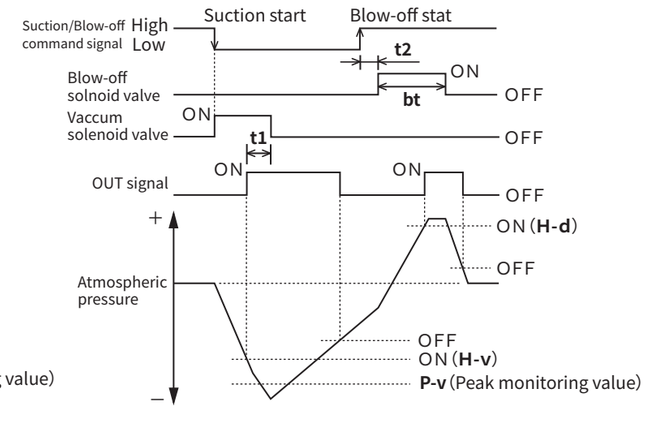
oP1 : Suction mode 1 (Mode of save the air consumption)

The vacuum solenoid valve is turned ON by the suction command signal and suction begins. When the degree of vacuum reaches the set value and OUT1 is turned ON, the vacuum solenoid valve is turned OFF after t1. If the degree of vacuum subsequently decreases, the vacuum solenoid valve is turned ON again just before the OFF point of OUT1, and the vacuum is maintained. (From then on, ON/OFF is repeated.) The vacuum solenoid valve is turned OFF by the release command signal, and the release solenoid valve is turned ON after t2. The release solenoid valve is turned ON for bt.



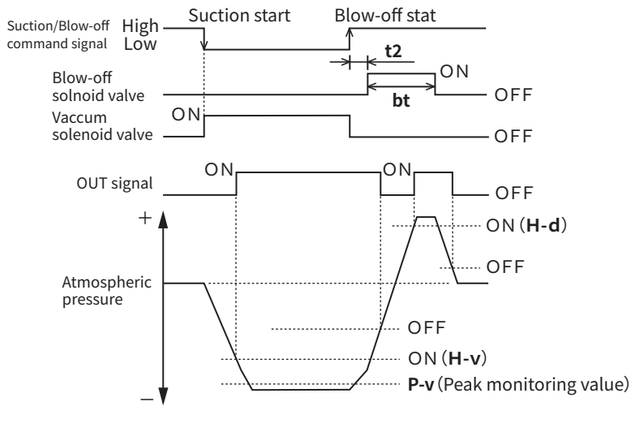
oP2 : Suction mode 2 (Vacuum solenoid valve one time operation)

The vacuum solenoid valve turns ON once in response to the suction command signal, and suction begins. When the degree of vacuum reaches the set value and OUT1 turns ON, the vacuum solenoid valve turns OFF after t1, and will not turn ON again until the next suction command signal. After the release command signal turns ON, the release solenoid valve turns ON for bt after t2.



oP3 : Suction mode 3 (Vacuum solenoid valve command signal)

The vacuum solenoid valve turns ON in response to the suction command signal and begins suction. Regardless of whether OUT1 is ON or OFF, the vacuum solenoid valve will remain ON as long as the suction command signal is ON. OUT1 turns ON when the vacuum level reaches the set value. The vacuum solenoid valve is turned OFF in response to the release command signal, and the release solenoid valve starts operating after t2 and remains ON for bt.



▲ and ▼ key operations

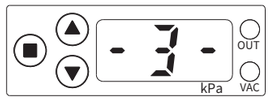
Pressing the ▲ key displays the maximum pressure value sampled during sensor operation, blinking 7 times, and then returns to the original display.

7 times flashing

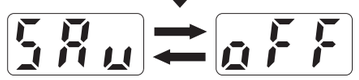
Pressing the ▼ key displays the minimum pressure value sampled during sensor operation, blinking 7 times, and then returns to the original display.

7 times flashing

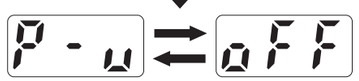
3.How to set screen saving mode, peak monitoring, Suction/Blow-off reach time, and display rotation



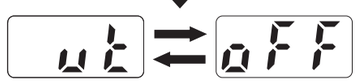
Press the ■ key three times and wait for 3 seconds after having released it.



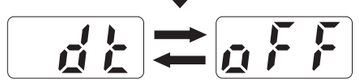
Select the screen saving mode between ON and OFF using the ▲▼ key and set it with the ■key.



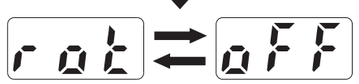
Select a desired value for monitoring peak value "**P-v**" using the ▲▼ key and set it with the ■ key.



Select a desired value for suction reach time"**vt**" using the ▲▼ key and set it with the ■ key.



Select a desired value for blow-off reach time "**dt**" using the ▲▼ key and set it with the ■ key.



Select a ON / OFF of display rotation using the ▲▼key and set it with the ■ key.

1. "Energy saving mode" When set to ON, if no key is pressed for 10 seconds, the 7-segment LED display is turned off to reduce current consumption. Pressing any key will redisplay it.

2. "Peak monitoring value" P-v Monitors the degree of vacuum during suction. If suction starts and the set peak value (P-v value) is not exceeded, "ALP" flashes to warn of a decrease in vacuum due to pad deterioration, etc. Pressing any key clears the warning display. The P-v setting value can be set within the range of H-v and the lower limit of the negative pressure range. If set to OFF, peak monitoring is not performed.

3. "Suction arrival time" vt If the output (OUT) does not turn ON within the time set by vt from when the vacuum solenoid valve is turned ON, "ALv" flashes to warn of an abnormal suction.

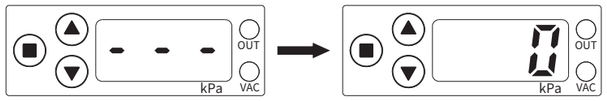
4. "Breakdown arrival time" dt If the output (OUT) does not turn ON within the time set by dt from when the break solenoid valve is turned ON, "ALd" flashes to warn of a drop in the break pressure.

   The setting range for vt and dt is from 0.00 (OFF) to 9.99 seconds. If set to OFF, the warning function will not operate. The "ALv" and "ALd" displays are automatically cleared with a new adsorption/breakdown command. They are also cleared by pressing any key.

5. "Display inversion" rot If ON is selected and set, the 7-segment LED display will be inverted 180 degrees. If set to OFF, the display will return to normal.

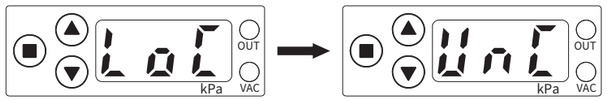
4.Setting method of Zero resetting

This should be done under atmospheric pressure within± 3% of F.S.



To set the supply pressure to within ±0% F.S. hold the ■ key for more than 3 seconds. If the displayed value is "0", the zero reset was successful.

5.(Setting method of) Key input lock/release setting



Press the ▼ key while the ■ key is pressed."**LoC**" flashes and is displayed. No more single key-input can be made after this.

Press the ▼ key while the ■ key is pressed."**UnC**" is displayed to release the security lock.

6.How to set output OUT, output form of solenoid valve and command input form setting

Press the ▲ key while the ■ key is held.

Select the type of output OUT "**n.o.**" or "**n.c.**" with ▲▼ key and set with the ■keys.

Select the operation mode of the vacuum solenoid valve with the ▲▼ keys and set with the ■keys. Note 3)

Select the operating form of vacuum solenoid valve "**n.o.**" or "**n.c.**" with ▲▼ key and set with the ■keys.Note 4)

Select the operating form of Blow-off solenoid valve "**n.o.**" or "**n.c.**" with ▲▼ key and set with the ■keys.

Select an actuation method desired logic of a suction/blow-off command signal with the ▲▼key and set it with the ■key.

Select the output type "**NPN**" or "**PNP**" with ▲▼ key and set with the ■keys.

Select the command type of suction/blow-off with ▲▼ key and set with the ■keys.

Press the ▲ or ▼ key to switch units, then press the ■ key.

dispay	Output mode of OUT
n.o.	Normal Open
n.c.	Normal Close

dispay	Type of OUT
nPn	NPN open collector output
PnP	PNP open collector output

dispay	Suction/Blow-off command signal
Hi	Suction start at HIGH to LOW
Lo	Suction start at LOW to HIGH

dispay	Suction/blow-off command signal input type
S in	Turns on when input terminal is connected to 0V
Sou	Turns on when input terminal is connected to +24V

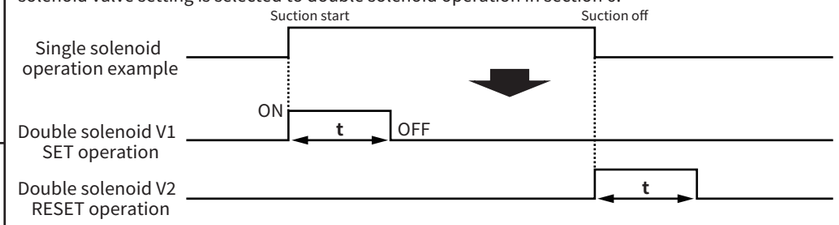
dispay	Unit	dispay	Unit
PA	kPa	bA	BAR
kg	kgf/cm²	PS	PSI

Note 1) Setting the operation mode of the vacuum solenoid valve:
- If the vacuum solenoid valve is a single solenoid, set it to "Sng".
- If the vacuum solenoid valve is a double solenoid, set it to "dbL".

Note 2) Setting the operation mode of the vacuum solenoid valve:
- If the solenoid valve is normally closed, set it to "n.o.".
- If the solenoid valve is normally open, set it to "n.c.".

7.Double solenoid operation

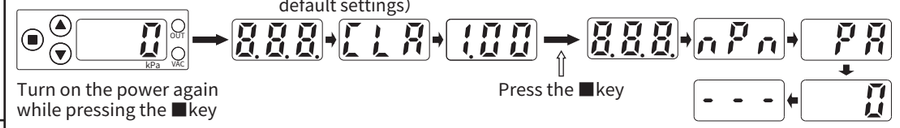
The following figure shows the control of the solenoid valve when (the operation method of) the vacuum solenoid valve setting is selected to double solenoid operation in section 6.



The energization time "**t**" of each solenoid valve of the double solenoid is fixed at 500 ms.

8.Initial parameter setting

(Set the setting items 1 to 3, 5, and 6 in the operation procedure to the factory default settings)



Turn on the power again while pressing the ■key

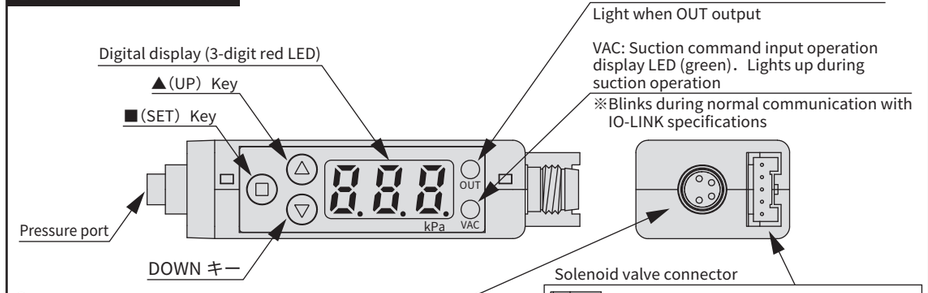
Press the ■key

(※Recommend to record each set data, because the set data cannot be reproduced by returning to the initial value by this operation.)

9.Alarm list

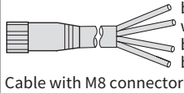
display	Alarm contents	state	How to deal with it
CE1	OUT overcurrent	Output current exceeding 230 mA	Check the load
Err	Zero reset error	At zero reset, pressure exceeds atmospheric pressure ± 3% F.S	Please operate at atmospheric pressure
Er1	System error	Internal failure	Please contact us
FFF	Positive pressure range full	Supply positive pressure exceeds 500kPa	
-FF	Negative pressure range full	Vacuum pressure exceeds -101kPa	

10.Names and functions



●M8 connector

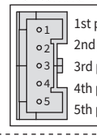
1st pin: + 24V
2nd pin: Suction/Blow-off command input
(At IO-LINK specification: N.C)
3rd pin: 0V
4th pin: Output (OUT)
(At IO-LINK specification: C/Q signal)



brown：+24 V
white：Suction/Blow-off command input
blue：0 V
black：Output (OUT)

Cable with M8 connector 2m

Solenoid valve connector



1st pin: Vacuum generation potential valve V2, Note A)
2nd pin: + 24V common
3rd pin: Vacuum generation solenoid valve V1, Note B)
4th pin: + 24V common
5th pin: Blow-off solenoid valve

Note A) Wiring to RESET solenoid valve for double solenoid specification
Note B) Wire to the single solenoid for vacuum operation. Or wire to the solenoid valve for SET for double solenoid.
Specification of connector for solenoid valve
1. Housing model: PAP-05V-S (5-pin) Maker:JST
2. Contact model: BPHD-002T-P0.5 Maker:JST

11.Model and specifications

MVS-202-E-C
①②

①Control specifications

E	Standard specification
I	IO-LINK specification

Note) Standard specifications cannot be used for IO-LINK specifications.

②Attached connector

C	2m cable with M8 connector
X	Without cable

Item	Specification
Applicable fluid	Non-flammable and non-corrosive gas
Pressure range	-101～500kPa
Display resolution	1kPa
Over all accuracy	± 1.5% F.S. Or less
Output response time	2.5 ms or less
Output specifications※	NPN or PNP open collector output 1 point. Load current: Rated 200mAdc
Suction/Blow-off command input※	Sink/Source switchable
Power-supply voltage	DC24V±10%
Degree of protection	IP40

※For details, refer to「6. How to set output OUT, solenoid valve output type and command input」.

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MVS-202 series

INSTRUCTION MANUAL

CONVUM IO-Link MVS-202-M001E-C

CONVUM Ltd.

URL http://convum.co.jp
E-mail faq@convum.co.jp

Please download the IO-Link configuration file (IODD) from our website https:/convum.co.jp
(The above QR code can be used)

12.Communication specifications

Model name	MVS-202-I-□
Transmission speed	COM3（230.4kbps）
Minimum cycle time	3mS
Process data length	10byte
Vendor ID	974
Device ID	0x000002
IO-Link revision	1.1

13.Process data

●PD（IN）

	bit							
	7	6	5	4	3	2	1	0
PD0	-	-	-	-	-	S2	S1	S0
PD1	Alarm status							
PD2	SN	Upper 7 Bit of peak pressure value						
PD3	Lower 8 Bit of peak pressure value							
PD4	SN	Upper 7 Bit of bottom pressure value						
PD5	Lower 8 Bit of bottom pressure value							
PD6	SN	Upper 7 Bit of pressure value						
PD7	Lower 8 Bit of pressure value							

S0：Output OUT status 1:ON 0:OFF
S1：Vacuum solenoid valve status 1:ON 0:OFF
S2：Blow-off solenoid valve status 1:ON 0:OFF

●PD（OUT）

	bit							
	7	6	5	4	3	2	1	0
PD0	-	-	-	-	S6	S5	S4	S3
PD1	Alarm release							

S3：Suction/Blow-off command
S4：Display zero reset
S5：Vacuum solenoid valve operation ON/OFF
S6：Blow-off solenoid valve operation ON/OFF

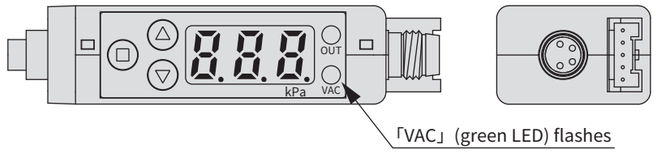
14.Service data

Index	Items	R/W	Data length (byte)	Data type	Initial value	Unit	Details
2	System commands	W	1	Uinteger	0x00		
12	Device access lock	R/W	2	Record	0x0000		
16	Vendor name	R	12	String	"Myotoku Ltd."		
17	Vendor text	R	19	String	www.convum.co.jp/en		
18	Product name	R	6	String	"CONVUM"		
19	Product ID	R	7	String	"MVS-202"		
20	Product text	R	6	String	"CONVUM"		
22	Hardware version	R	3	String	"1.0"		
23	Firmware version	R	3	String	"1.0"		
24	Application tag	R/W	32	String			
37	Detailed device status	R	18	Array of OctetString3			
40	Process data input	R	8	OctetString	00 00 00 00 00 00 00 00		
41	Process data output	R	2	OctetString	00 00		
64	Suction mode	R/W	1	Uinteger	0（oP1）		oP1/oP2/oP3（0/1/2）
65	Suction/Blow-off command input edge	R/W	1	Uinteger	0（High⇒Low）		High⇒Low/Low⇒High（0/1）
66	Vacuum solenoid valve operation delay time t1	R/W	4	Float32	0.30	s	0.00～9.99 2 decimal places
67	Blow-off solenoid valve operation time bt	R/W	4	Float32	2.00	s	0.00～9.99 2 decimal places
68	Blow-off solenoid valve operation delay time t2	R/W	4	Float32	0.00	s	0.00～9.99 2 decimal places
69	Suction/Blow-off command input type	R/W	1	Uinteger	0（Sinking）	s	Sinking/Sourcing（0/1）
70	Output ON set value in vacuum (situation)	R/W	2	Integer	-46	kPa	-101～0
71	Hysteresis output OFF value in vacuum (situation)	R/W	2	Integer	-7	kPa	-101～0
72	Output ON set value in blow-off (situation)	R/W	2	Integer	200	kPa	0～500
73	Hysteresis output OFF value in blow-off (situation)	R/W	2	Integer	50	kPa	0～500
74	Output OUT type specifications	R/W	1	Uinteger	0（NPN）		NPN/PNP（0/1）
75	Output OUT form	R/W	1	Uinteger	0（N.O）		N.O/N.C（0/1）
76	Vacuum solenoid valve type	R/W	1	Uinteger	0（Singl solenoid）		Single Solenid/Double Solenid （0/1）
77	Vacuum solenoid valve form	R/W	1	Uinteger	0（N.O）		N.O/N.C（0/1）
78	Blow-off solenoid valve form	R/W	1	Uinteger	0（N.O）		N.O/N.C（0/1）
79	Security lock ON / OFF	R/W	1	Uinteger	0（OFF）		OFF/ON（0/1）
85	Low vacuum (level) alarm ON / OFF	R/W	1	Uinteger	0（OFF）		OFF/ON（0/1）
86	Low vacuum (level) alarm set value	R/W	2	Integer	-80	kPa	-101～0
87	Vacuum (level) arrival time alarm ON / OFF	R/W	1	Uinteger	0（OFF）		OFF/ON（0/1）
88	Vacuum (level) arrival time alarm set value	R/W	4	Float32	2.00	s	0.00～9.99 2 decimal places
89	Blow-off (level) arrival time alarm ON / OFF	R/W	1	Uinteger	0（OFF）		OFF/ON（0/1）
90	Blow-off (level) arrival time alarm set value	R/W	4	Float32	2.00	s	0.00～9.99 2 decimal places
94	Screen saving mode ON / OFF	R/W	1	Uinteger	0（OFF）		OFF/ON（0/1）
100	Auto (operation/actuation) mode for(of) blow-off solenoid valve ON / OFF	R/W	1	Uinteger	0（OFF）		OFF/ON（0/1）**bt**=**At** set
101	Blow-off confirmation output ON / OFF	R/W	1	Uinteger	0（OFF）		OFF/ON（0/1）
102	Display rotate mode	R/W	1	Uinteger	0（OFF）		OFF/ON（0/1）

15.Eventdata

display	Error code	Items	Details	Level
FFF	6144	Positive pressure range over	Positive pressure value exceeds rated value	Caution
-FF	6145	Negative pressure range over	Vacuum pressure value exceeds rated value	Caution
Err	6148	Zero reset error	Zero reset pressure is out of specified value	Error
ALP	6151	Low vacuum (level) alarm	Drop down of vacuum level	Caution
ALw	6152	Vacuum (level) arrival time alarm	Not reached suction pressure level within the set time	Caution
ALd	6153	Blow-off time reached alarm	Not reached blow-off pressure (level) within the set time	Caution
CE1	6154	Output OUT overcurrent alarm	Output load current over rating	Caution
Er1	6156	System error	Memory read/write error	Error

Green LED of「VAC」flashes during communication with master device If not blinking, communication error (disconnection, communication error)Check the connector connection (etc.)



16.Enable unit switching function

Turn on the power while pressing the ■ and ▼ keys.