OM-EN-EB3EP-3.10HP
April 1, 2021

EcoBooster®

Operation Manual

Type EB3EP

HP Simplified edition (Excluding wiring and terminal layout diagram)

FUJI BC ENGINEERING

Contents

FOR YOUR SAFETY

⚠WARNING Improper use of the equipment may cause serious injury or death.

⚠CAUTION Improper use of the equipment may cause injury or material damages.

⚠WARNING

- ●EcoBooster is the device for Micro lubrication system to cut metals. Do not use for other purposes.
- ●When flammable oil such as volatile oil is used, it may catch a fire.
- ●Air pressure should be less than 0.7MPa. When it was over 0.7 MPa, it may damage tubing and other devices.
- ●Do not expose to a material, such as strong acid, strong alkali, corrosive gas. They may damage tubing and other devices.

⚠CAUTION

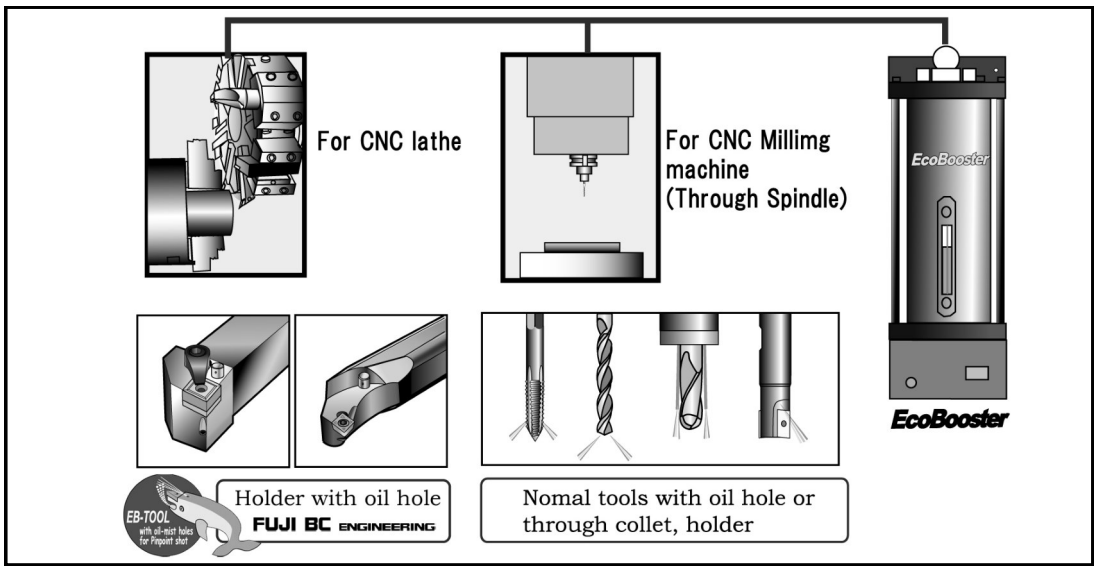
- ●Use Bluebe LB-1, LB-7, or LB-10 type oil. When other oil is used, it may damage the device.
- ●Do not fill the oil over H line. Drain the overflow oil from the drain valve.

Background Information
EcoBooster has been specifically designed to dispense controlled amount of Bluebe oil for variety of machining applications. Use of non-genuine oil in the system may result in damage to the unit.

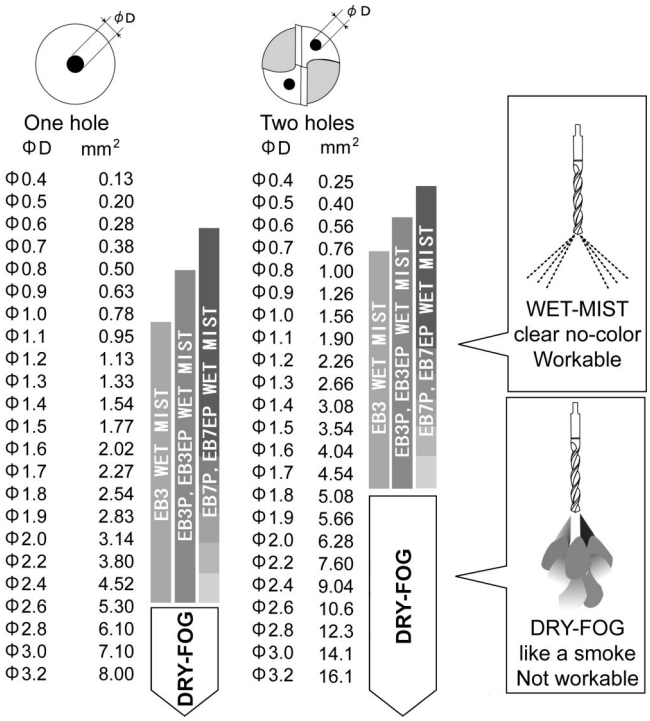
SPECIFICATION

○ Maximum working pressure	0.7 MPa
○ Working pressure range	0.4 ～ 0.7 MPa
○ Tank capacity	1,200mL
○ Oil consumption	2 ～ 20 mL/hour（Depend on use condition）
○ Pump strokes	1 Hz (recommendation)～ 3 Hz (Max)
○ Mounting	M6 (2 holes)
○ Mist outlet	1 place (Φ12 tube connector)
○ For input connect	OIL DETECTOR (in Tank) INNER PRESSURE CONTROL SWITCH (2 outputs)
○ For output connect	AIR ACCELERATION SOLENOID VALVE MIST AIR SUPPLY SOLENOID VALVE PUMP DRIVE SOLENOID VALVE
○ Dry weight	8kg

RECOMMENDED TOOLS



Cutting tool / Holder	Total cross section area
Gap(sukima) through	0.5 mm² < Total cross sectional area < 5.0 mm²
Collett through nozzle	
Drill with oil hole	
Tap with oil hole	
Milling tool with oil hole	
Bluebe ***EB-TOOL***	Optimized for *EcoBooster*

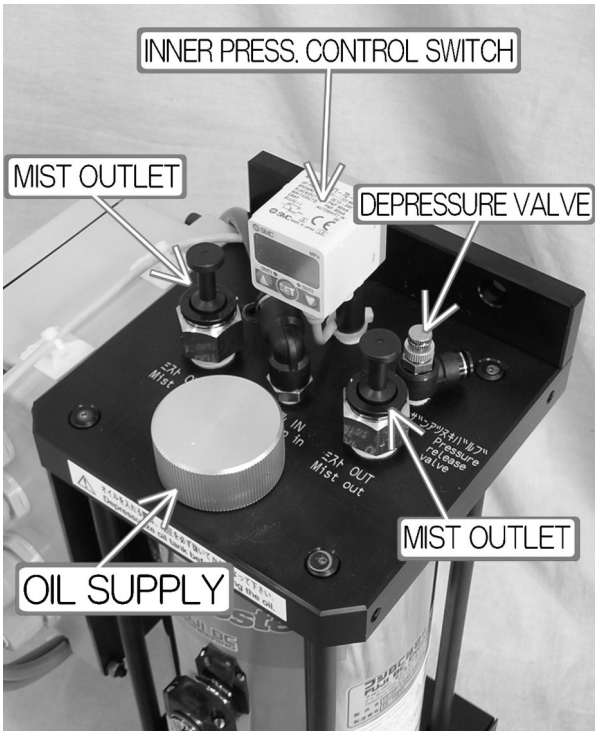


Recommended oil hole diameter

Dry mist does not adhere to the inside of piping or spindle but it must be liquefied at the cutting point. Oil hole diameter need to be between 0.5mm² to 5mm² in diameter to obtain the workable condition of EB3EP.

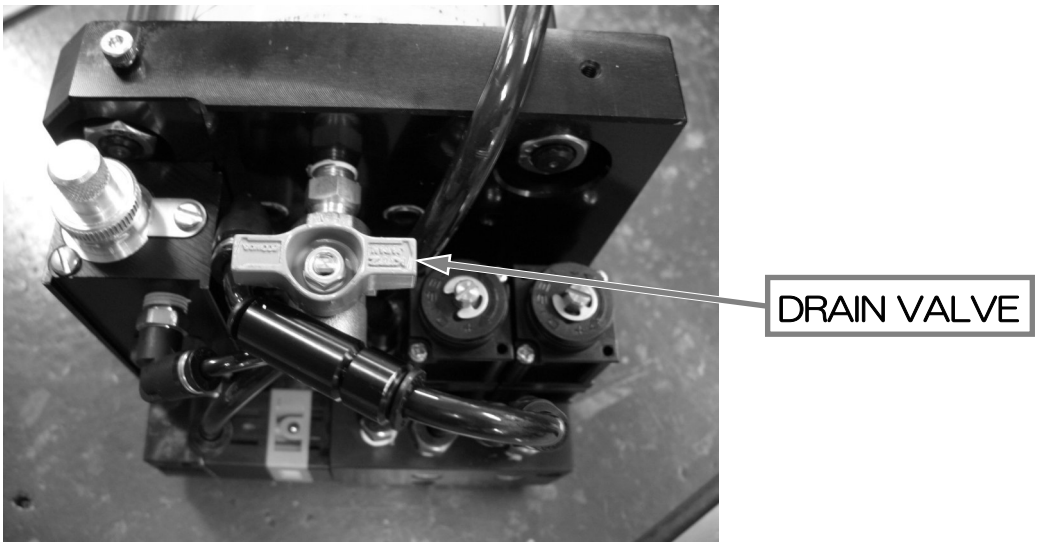
HOW TO USE

PROCEDURE TO FILL THE OIL



⚠CAUTION
Depressurize oil tank (EB body) before filling the oil by the DEPRESSURE VALVE.

1.Please make sure EcoBooster is NOT working before filling lubricant.
2.Release remained pressure in tank to unfasten depressure valve by rotating clockwise.
3.Open reservoir cap. Make sure to prevent any dust from being inside.
4.Supply lubricant to tank.
*Depressure valve is opened as air vent.
*DO NOT fill lubricant over H level. If lubricant oversupplied, please drain it from drain valve.
5.Close depressure valve to rotate counterclockwise.
6.Close reservoir cap.



Air Control

EcoBooster generates dry mist in the chamber with the difference of air pressure.

a) Mist air
When the solenoid valve for controlling mist air line is ON, it always supplies constant amount of dry mist (micro lubricant droplets).
Inner pressure control switch control the solenoid valve ON/OFF. See the "Inner Pressure Switch setting" at page 8.

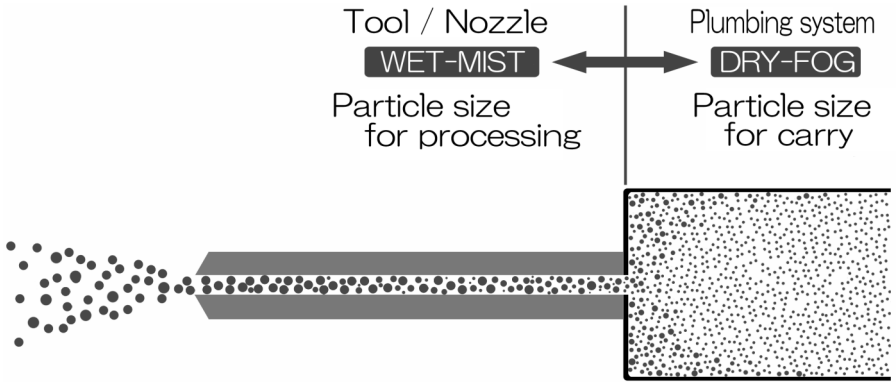
b) Acceleration air
Inner air pressure changes when the size of oil hole of the tools changes. When oil hole get larger, inner air pressure decreases. When inner pressure get lower and need more air to generate dry mist, acceleration air start to work together with the Mist air. See the "Inner Pressure Control Switch setting" at page 8.

If inner pressure switch indicates always the figure lower than the set value at P_1-H_1, it means the oil hole of that particular tool is too big. It is suggested to set the tool which has biggest oil hole and run EcoBooster to test if air pressure can be adjusted in advance. The tool which has too big oil hole needs to be plugged and drilled again for smaller hole.

Caution: If you see white smoke at the tip of the cutting tool, it means the size of hole is too big. Make the oil hole smaller. Acceptable size of oil hole is 0.5—5.0 mm^2 in total.

Key factor to smart use.

Dry Fog does not adhere to the inside of piping or spindle but it must be liquefied to Wet-Mist at the cutting point. Therefore, it is necessary to narrow the tool oil hole, and to liquefy Dry fog. Refer to "Recommended tools" for details.



OIL CONSUMPTION

The speed of the pump cycle is controlled by CNC of machine. The standard speed of the pump is one stroke per one second. Adjustment is made by changing M-code or switch. Sound of 3 times / 1 sec.(3Hz) is for maximum dispensing volume and 2 time / 1 sec.(2Hz) is for middle dispensing volume of oil. Sound 1 time / 1sec.(1Hz) is for minimum and standard volume.
Oil consumption depends on cutting condition and size of oil hole of tools. From 2ml to 20ml per hour is normal range of oil consumption.

CONFIGURATION OF INNER PRESSURE CONTROL SWITCH

Why Inner Pressure control switch required.

EcoBooster generates dry mist in the unit (chamber) by utilizing difference pressure of supplied air and that of tank inside. Basically, the oil hole of cutting tools has been changed, pressure of tank inside is changed so inner pressure must be maintained with oil holes of cutting tool changed every time. Inner Pressure control switch offers above issue to keep the difference of pressure constant with cutting tools changed.

Here shows pressure switch configuration.
The configuration value depends on supplied air pressure. Please read “How to configure inner pressure switch” in detail.

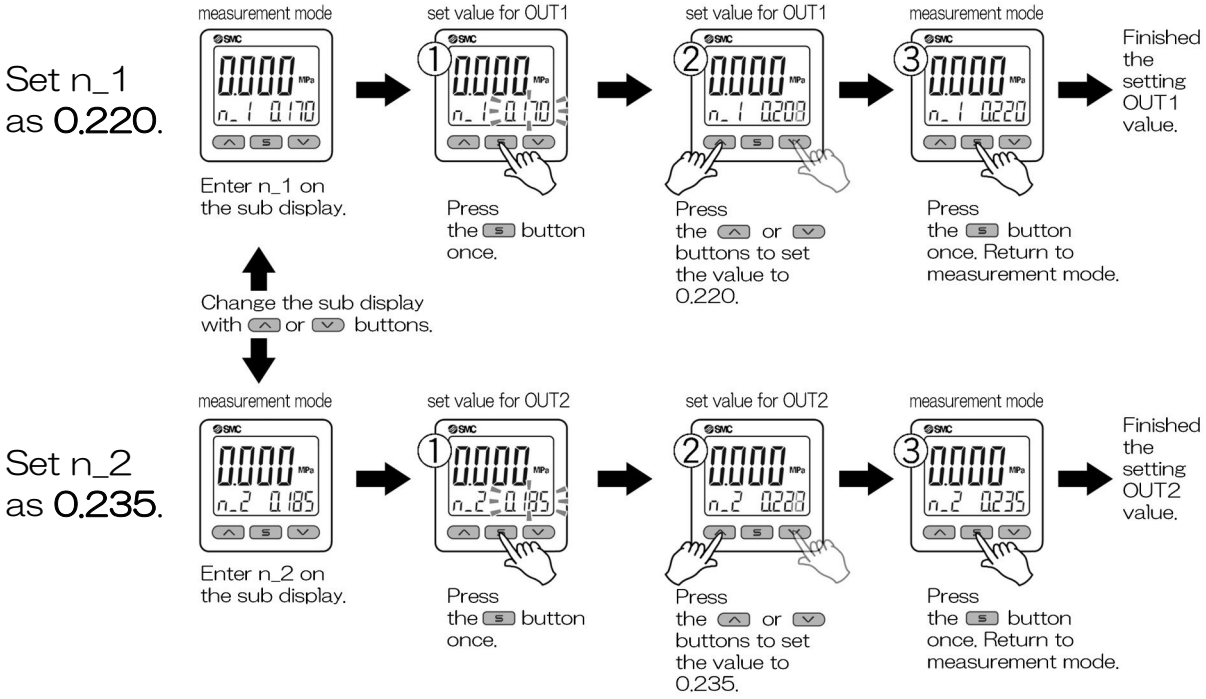
Example ▶

	Acceleration Air OUT1		Mist Air OUT2	
Air Supply	n_1	H_1	n_2	H_2
0.4 MPa	0.170	0.020	0.185	0.015
0.5 MPa	0.220	0.020	0.235	0.015
0.6 MPa	0.320	0.020	0.335	0.015
0.7 MPa	0.440	0.020	0.435	0.015

Be sure to set the value as indicated according to the given air supply pressure. See the setting procedure at next page.

How to set INNER PRESSURE CONTROL SWITCH

Example for Supply air pressure of 0.5MPa



※ Please look at the Digital Pressure Switch operation manual attached at the end.

RECOMMENDED LUBRICANTS

Viscosity of oil is important factor to generate micro lubricant droplets. Also from the safer work condition view point, we recommend the following oil to use.

Bluebe LB-1, LB-7, or LB-10 (in JAPAN)
Accu-lube LB-2000 or LB-6000 (in USA, Europe)

WARRANTY

EcoBooster is backed with One-year Limited Warranty against defects in workmanship and/or materials. Warranty applies only when used under normal operating conditions. Warranty does not applied if a lubricant other than recommended oil is used.

CONTACT

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616 East Industrial St. DeWitt, Iowa 52742
TEL: 1-770-243-8800 FAX:1-770-243-8899 www.itwprobrands.com

GERMANY ACCU-LUBE MFG. GMBH
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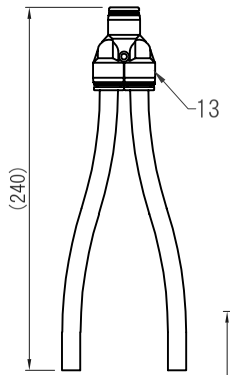
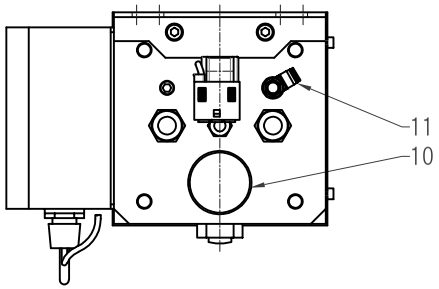
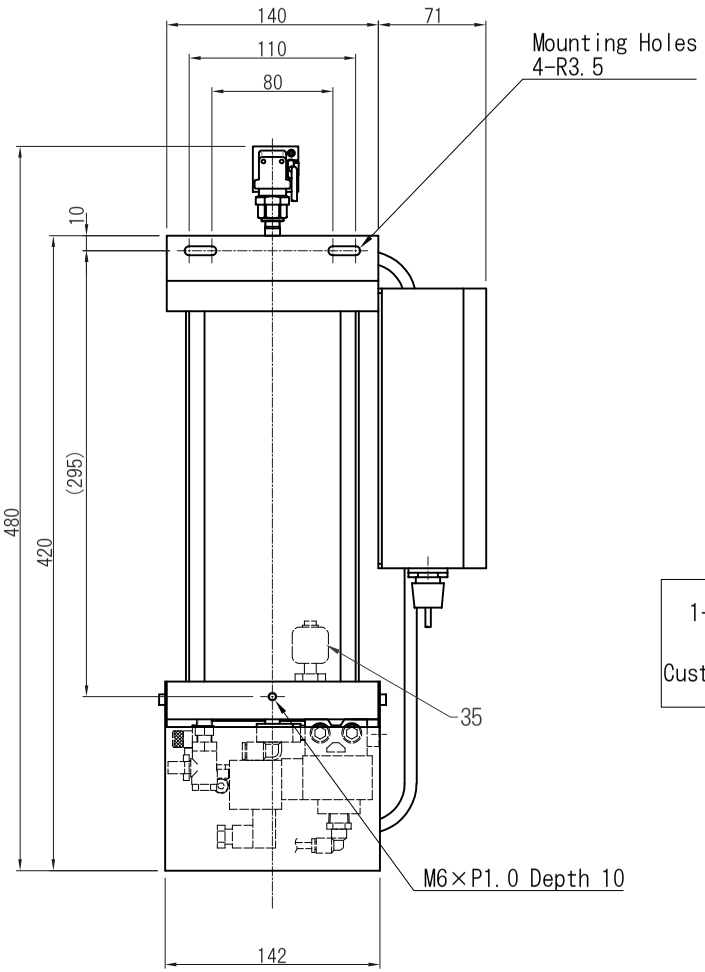
Medak Dist, 502307 India
TEL: 91-8455-224700 FAX: 91-8455-224705

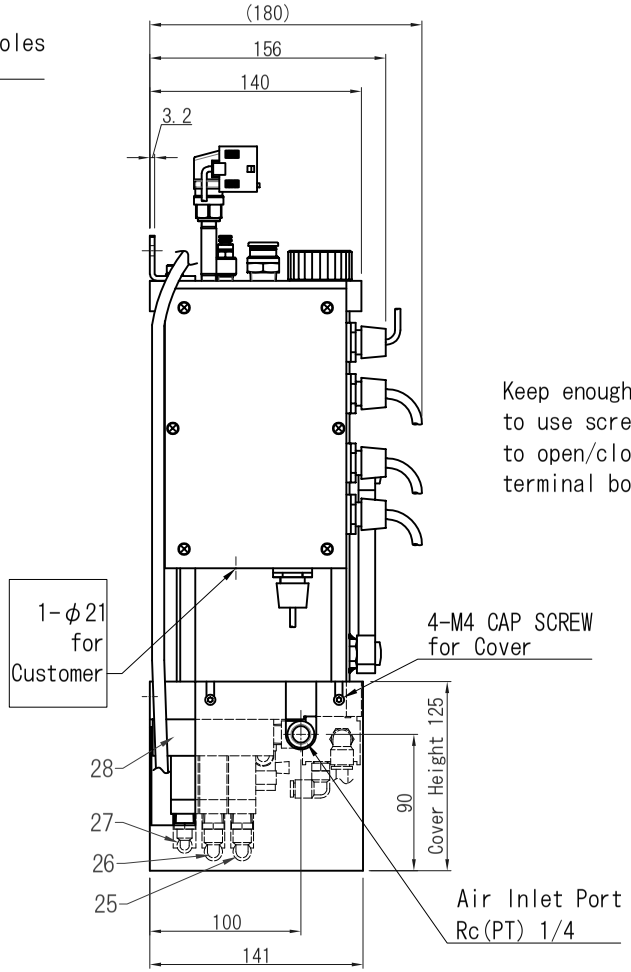
Accessories:
Union Y Φ12 Tubes (Connect to Mist outlet)



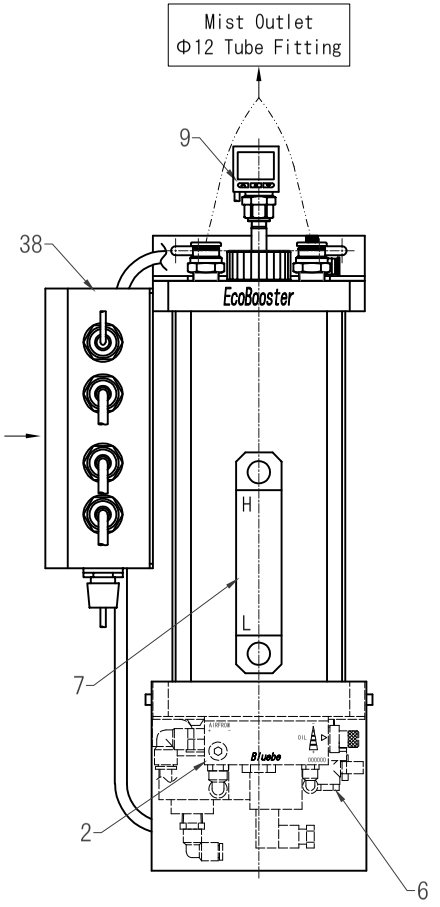
Install and keep EcoBooster vertically.
Keep enough room on the top and bottom of EcoBooster to fill lubricant, set piping, remove bottom cover and drain lubricant.







Keep enough room left to use screw driver to open/close terminal box.



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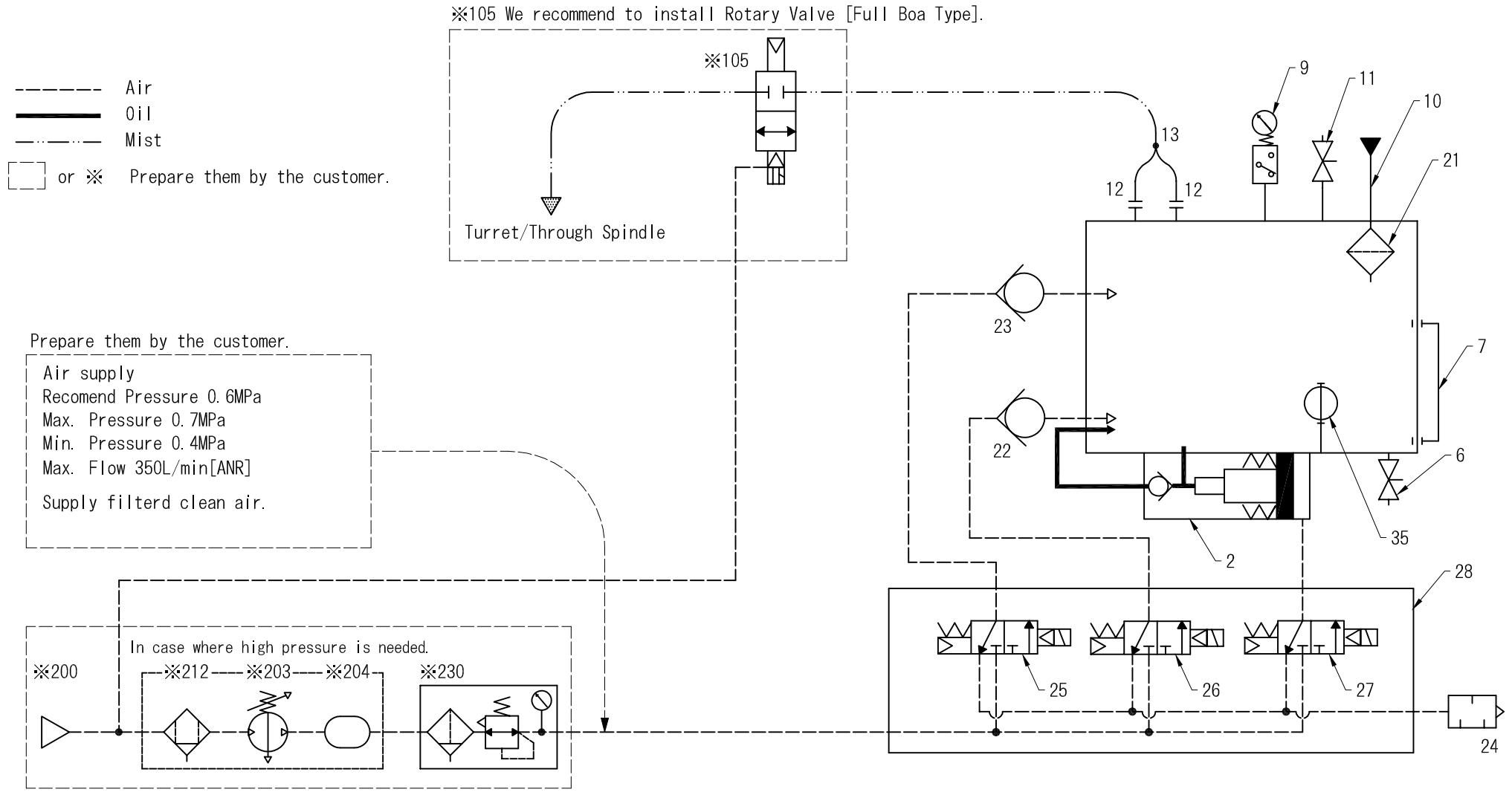
REVISIONS	DATE	DESIGNED	DRAWN	CHECKED	APPROVED	TITLE
	'20.09.10	INOUE	技術 '20.09.11 前野	ファジBC技研 '20.09.11 伊藤学	開発 '20.09.17 井上	EcoBooster EB3EP Outline
	FUJI BC ENGINEERING CO.,LTD				3RD ANGLE PROJECTION	SCALE 1:5 / DRAWING CODE EN-EB3EP-01-STD3.10



※ They are not included in Ecobooster.

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REVISIONS	DATE	DESIGNED	DRAWN	CHECKED	APPROVED	TITLE
	'18.06.05	INOUE	MAENO	SAKAI	FUTATSUGI	Ecobooster EB3EP Flow Sheet
	FUJI BC ENGINEERING CO.,LTD				3RD ANGLE PROJECTION	SCALE: - / DRAWING CODE: EN-EB3EP-02-STD3.01

EcoBooster EB3EP Parts List

Drawing Code: EN-EB3EP-03-STD3.10 '20.09.10

No.	ITEM	Q'ty	MAKER	TYPE	REMARKS
2	FK PUMP	1	FUJI BC	9722EB3	
6	DRAIN	1	KITZ	TKT1/8	
7	OIL LEVEL GAUGE	1	KYOWA	KHR-120A-M10	
9	INNER PRESS. CONTROL SW	1	SMC	ISE20C-Y-M-C01L-W ISE20C-X-M-C01L-W	2 PNP OUTPUT 2 NPN OUTPUT
10	OIL SUPPLY	1	FUJI BC	101MP1001	D42 × M27
11	DEPRESSURE VALVE	1	PISCO	JNC6-01	
12	MIST OUTLET	2	PISCO	PC12-03	
13	UNION Y	1	PISCO	PY12	
21	OIL FILTER	1	FUJI BC	102TNK2103	
22	CHECK VALVE	1	PISCO	CVU6-6	MIST AIR LINE
23	CHECK VALVE	1	PISCO	CVU6-6FN	ACCELERATION AIR LINE
24	SILENSER	1	FUJI BC	-	
25	SOLENOID VALVE(AIR ACCELERATION)	1	SMC	VQZ312-5YZB1-02	DC24V
26	SOLENOID VALVE(MIST AIR)	1		VQZ312-1YZB1-02	AC100V
27	SOLENOID VALVE(PUMP DRIVE)	1		VQZ312-2YZB1-02	AC200V
28	MANIFOLD	1	SMC	VV3QZ32-03C	3 stations
35	FLOAT SWITCH(OIL DETECTOR)	1	NOHKEN	OLV-5	
38	TERMINAL BOX	1	TOYOGIKEN	BOXTM-2001	20 TERMINAL BLOCKS
				Prepare it by the customer.	
105	Rotary valve (Air operated type 2 port valve)		CKD	CHB-V1-10-0L-□ (□ : Coil voltage)	(We recommend it.)
200	Air supply				
203	Booster regulator		SMC	VBA40A-04GN	〃
204	Air tank		SMC	VBAT20A1-V	〃
212	Mist separator		SMC	AFM30-03C-2-A	〃
230	Filter regulator		SMC	AW30-03CG-2-B	〃

Wiring

Diagrams vary on the specification.
Please refer to see electrical circuit of machinery maker or our operating instructions included with EcoBooster.
For more information on diagrams contact your FUJI BC sales engineer.

Terminal block layout

Diagrams vary on the specification.
Please refer to see electrical circuit of machinery maker or our operating instructions included with EcoBooster.
For more information on diagrams contact your FUJI BC sales engineer.

【Digital Pressure Switch Operation Manual】

April 1, 2021 FUJI BC ENGINEERING M. MAENO

Setting of EcoBooster INNER PRESSURE CONTROL SWITCH

	Acceleration Air OUT1		Mist Air OUT2	
Air Supply	n_1	H_1	n_2	H_2
0.4MPa	0.170	0.020	0.185	0.015
0.5MPa	0.220	0.020	0.235	0.015
0.6MPa	0.320	0.020	0.335	0.015
0.7MPa	0.420	0.020	0.435	0.015
※0.8MPa	0.520	0.020	0.535	0.015

Example for Supply Air Pressure of 0.4MPa

※ EB7EP AC Solenoid Type and EB3P, EB3EP Maximum Pressure : 0.7MPa

Adapted from SMC Co., Ltd. home page

Model : ISE20C-X/Y-M-C01L-W

Display unit : MPa
Display color : Nomally red

OUT1 Output mode : Hysteresis
Normal/Reveresed Output : Reveresed
Response time : 1.5ms

OUT2 Output mode : Hysteresis
Normal/Reveresed Output : Reveresed
Response time : 1.5ms

OUT1 Set value n_1 : 0.170 MPa
Hysteresis H_1 : 0.020 MPa

OUT2 Set value n_2 : 0.185 MPa
Hysteresis H_2 : 0.015 MPa

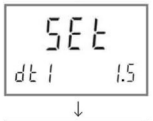
Setting Procedure 1 (3-step setting) The usual procedure. Other settings are set at the shipping time from FUJI BC ENGINEERING.

Setting items : OUT1, OUT2 Set value [n_1, n_2]

Mode	Display	Operation procedure
Preparation, measurement mode	0.000 n_1 0.500	Connect 12 to 24 VDC power supply. Go to measurement mode.
Entering the set value [n_1] for OUT1	0.000 n_1 0.500	Enter OUT1 set value [n_1] on the sub display with ▲ or ▼ buttons.
	0.000 n_1 0.170	Press the Ⓢ button once. Go to the setting of set value [n_1] for OUT1. Press the ▲ or ▼ button to change the set value on the right side of the sub display (see left).
	0.000 n_1 0.170	Press the Ⓢ button once. Return to measurement mode.
Entering the set value [n_2] for OUT2	0.000 n_2 0.500	Enter OUT2 set value [n_2] on the sub display with ▲ or ▼ buttons.
	0.000 n_2 0.185	Press the Ⓢ button once. Go to the setting of set value [n_2] for OUT2. Press the ▲ or ▼ button to change the set value on the right side of the sub display (see left).
	0.000 n_2 0.185	Press the Ⓢ button once. Return to measurement mode.
	Settings complete.	

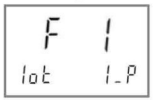
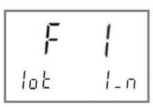
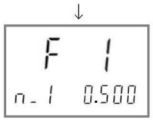
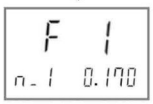
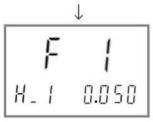
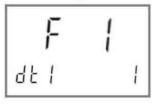
Setting Procedure 2 (Simple setting) Perform this procedure if you have changed the Hysteresis or Response time by mistake.

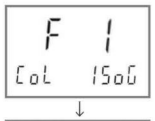
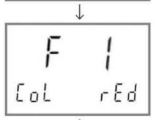
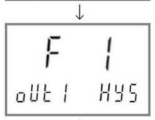
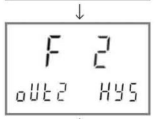
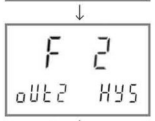
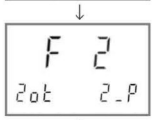
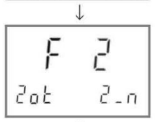
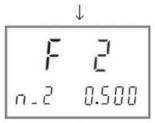
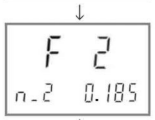
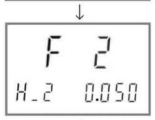
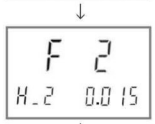
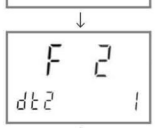
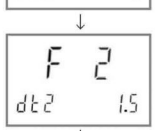
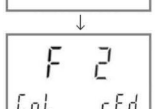
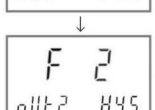
Setting items : OUT1, OUT2 Set value [n_1, n_2]、Hysteresis [H_1, H_2]、Response time

Mode	Display	Operation procedure
Preparation, measurement mode		Connect 12 to 24 VDC power supply. Go to measurement mode.
Entering the set value [n_1] for OUT1		Hold down the Ⓢ button for at least 1 seconds, but no more than 3 seconds [SEt] will be shown on the main display.
		Release the button while [SEt] is showing on the display. The main display will show the current pressure value and the left sub display will show the set value [n_1]. The set value will be blinking on the right sub display. Go to the setting of set value [n_1] for OUT1.
		Press the ▲ or ▼ button to change the set value on the right side of the sub display (see left).
Setting of hysteresis [H_1] for OUT1		Press the Ⓢ button once. Go to hysteresis [H_1] settings for OUT1.
		Press the ▲ or ▼ button to change the set value on the right side of the sub display (see left).
Setting response time for OUT1		Press the Ⓢ button once. Go to response time settings for OUT1.
		Press the ▲ or ▼ button to change the value on the right side of the sub screen (see left).
Entering the set value [n_2] for OUT2		Hold down the Ⓢ button for at least 1 seconds, but no more than 3 seconds [SEt] will be shown on the main display.
		Press the Ⓢ button once. Go to the setting of set value [n_2] for OUT2.
		Press the ▲ or ▼ button to change the set value on the right side of the sub display (see left).
Setting of hysteresis [H_2] for OUT2		Press the Ⓢ button once. Go to hysteresis [H_2] settings for OUT2.
		Press the ▲ or ▼ button to change the set value on the right side of the sub display (see left).
Setting response time for OUT2		Press the Ⓢ button once. Go to response time settings for OUT2.
		Press the ▲ or ▼ button to change the value on the right side of the sub screen (see left).
Measurement mode		Hold the Ⓢ button for 2 second or longer. Return to measurement mode.
	Settings complete.	

Setting Procedure 3 (Function Settings) Perform this procedure if you have restored SMC default settings.

Setting items : OUT1, OUT2 Output mode、Normal/Reversed output、Set value [n_1, n_2]、Hysteresis [H_1, H_2]、Response time、Display color

Mode	Display	Operation procedure
Preparation, measurement mode		Connect 12 to 24 VDC power supply. Go to measurement mode.
↓		
Function selection mode		Hold down the Ⓢ button for at least 3 seconds, but no more than 5 seconds [F 0] will be shown on the main display. Release the button when [F 0] is displayed to return to function selection mode.
↓		
Display unit settings		Display [F 0] by pressing the▲ or ▼ button in function selection mode. Press the Ⓢ button once. Go to display unit settings.
↓		
		Press the ▲ or ▼ button to change the value on the right side of the sub screen (see left).
↓		
		Press the Ⓢ button once. Return to function selection mode.
↓		
Setting output mode for OUT1		Display [F 1] by pressing the▲ or ▼ button in function selection mode. Press the Ⓢ button once. Go to output mode settings for OUT1.
↓		
		Press the ▲ or ▼ button to change the value on the right side of the sub screen (see left).
↓		
Setting of nomal/reversed output for OUT1		Press the Ⓢ button once. Go to normal/reversed output settings for OUT1.
↓		
		Press the ▲ or ▼ button to change the value on the right side of the sub screen (see left).
↓		
Entering the set value [n_1] for OUT1		Press the Ⓢ button once. Go to the setting of set value [n_1] for OUT1.
↓		
		Press the ▲ or ▼ button to change the set value on the right side of the sub display (see left).
↓		
Setting of hysteresis [H_1] for OUT1		Press the Ⓢ button once. Go to hysteresis [H_1] settings for OUT1.
↓		
		Press the ▲ or ▼ button to change the set value on the right side of the sub display (see left).
↓		
Setting response time for OUT1		Press the Ⓢ button once. Go to response time settings for OUT1.
↓		
		Press the ▲ or ▼ button to change the value on the right side of the sub screen (see left).
↓		

Display color settings		Press the Ⓢ button once. Go to display color settings.
	↓	
		Press the ▲ or ▼ button to change the value on the right side of the sub screen (see left).
	↓	
		Press the Ⓢ button once. Return to function selection mode.
	↓	
Setting output mode for OUT2		Display [F 2] by pressing the▲ or ▼ button in function selection mode. Press the Ⓢ button once. Go to output mode settings for OUT2.
	↓	
		Press the ▲ or ▼ button to change the value on the right side of the sub screen (see left).
	↓	
Setting of nomal/reversed output for OUT2		Press the Ⓢ button once. Go to normal/reversed output settings for OUT2.
	↓	
		Press the ▲ or ▼ button to change the value on the right side of the sub screen (see left).
	↓	
Entering the set value [n_2] for OUT2		Press the Ⓢ button once. Go to the setting of set value [n_2] for OUT2.
	↓	
		Press the ▲ or ▼ button to change the set value on the right side of the sub display (see left).
	↓	
Setting of hysteresis [H_2] for OUT2		Press the Ⓢ button once. Go to hysteresis [H_2] settings for OUT2.
	↓	
		Press the ▲ or ▼ button to change the set value on the right side of the sub display (see left).
	↓	
Setting response time for OUT2		Press the Ⓢ button once. Go to response time settings for OUT2.
	↓	
		Press the ▲ or ▼ button to change the value on the right side of the sub screen (see left).
	↓	
Display color settings		Press the Ⓢ button once. Move to display colour settings; this is the same as that of OUT1, which has already been set.
	↓	
		Press the Ⓢ button once. Return to function selection mode.
	↓	
Measurement mode		Hold the Ⓢ button for 2 second or longer. Return to measurement mode.
	↓	
	Settings complete.	
	↓	
Zero-clear		Press the▲ and ▼ buttons simultaneously for around 1 second under atmospheric pressure. This will reset the displayed value to zero.

■[F99] Reset to default settings

If the product settings are uncertain, the SMC default values can be restored.

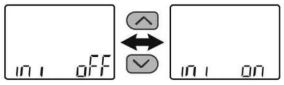
<Operation>

Press the ▲ or ▼ button in function selection mode to display [F99].

Press the S button. ▼ Move on to reset to default settings.

Reset to default settings

Press the ▲ or ▼ button to select reset to default settings.



Unused

Reset to the default setting

[oFF] (not use) is selected
Press the S button to set.

Return to function selection mode.

[on] (reset to default settings) is selected
Press the S and ▼ buttons simultaneously for 5 second or longer.
All settings are returned to the default values. Return to function selection mode.

[F99] Reset to default settings completed

Return to 【Digital Pressure Switch Operation Manual】、
Perform Setting Procedure 3 (Function Settings).