Instruction Manual

Bottles/Cans sorting system

DBS DBS-E

MI.BS.02.02 © 07/2000

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System

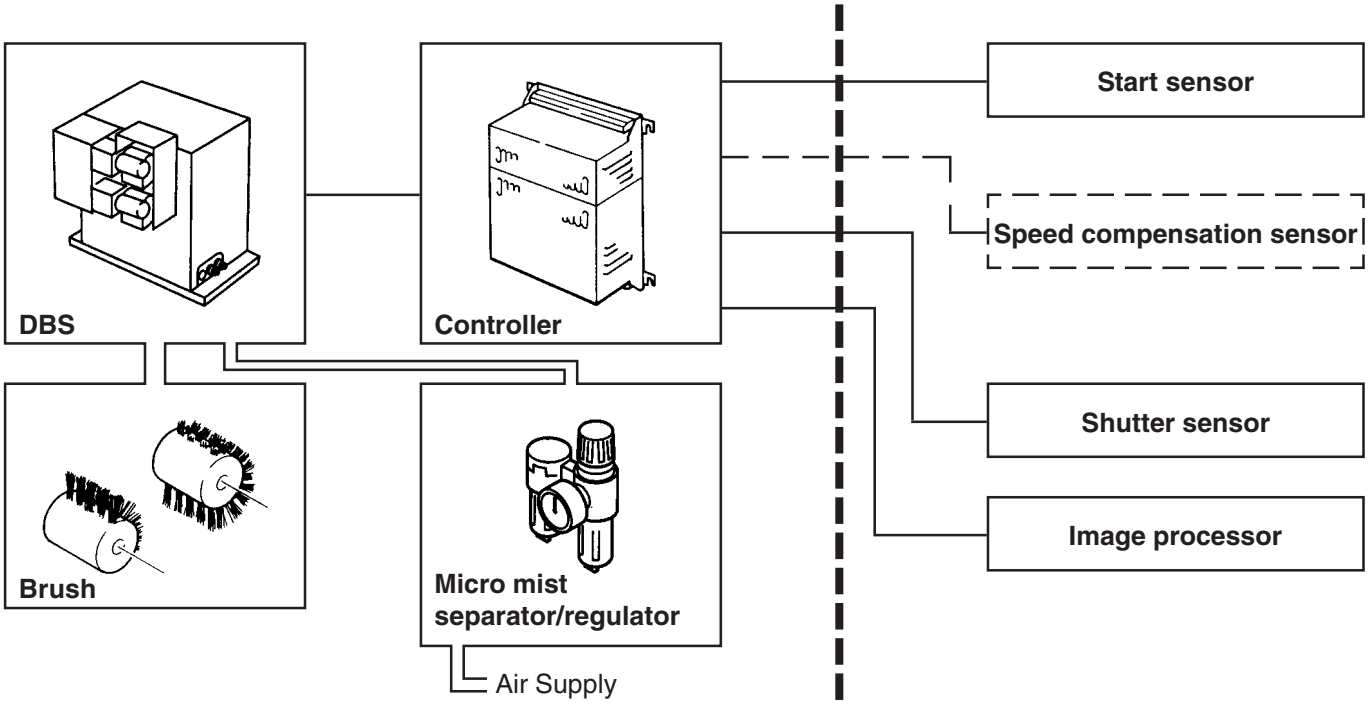
Application

Danfoss Bottles/Cans Sorting system(DBS) is a bottle/can sorting unit, specifically designed for the production lines which require fast and accurate sorting.

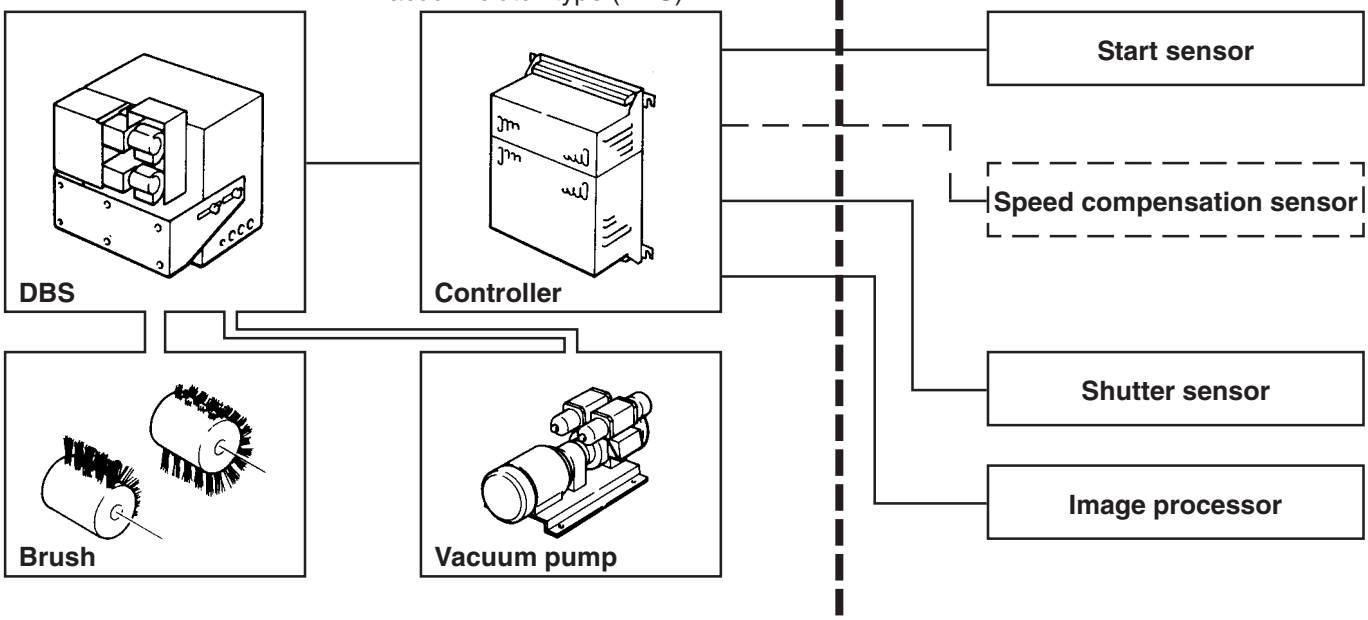
- At high speed(max. 1,800 bottles/ minute), DBS sorts out bottles/cans without damaging or knocking over.
- DBS can be applied to various inspections and sorting lines.
- Simple and user-friendly construction
- Remarkably high accuracy and long life time.

System

1. Air-clutch type (DBS-E)

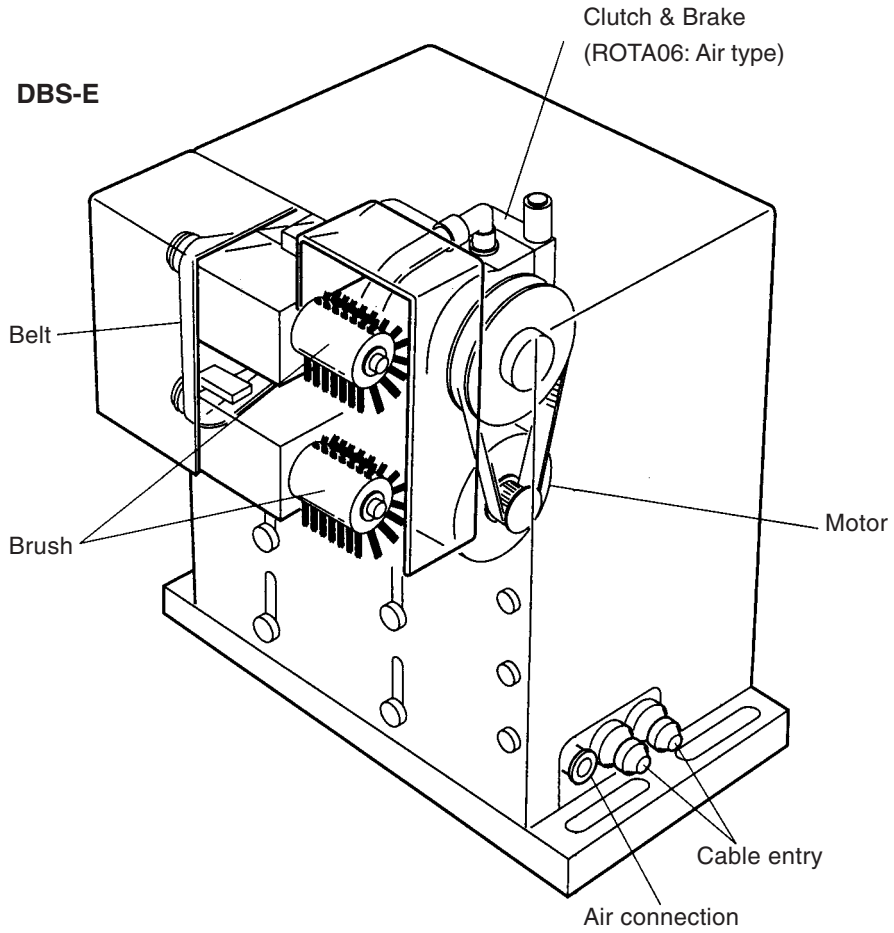


2. Vacuum-clutch type (DBS)

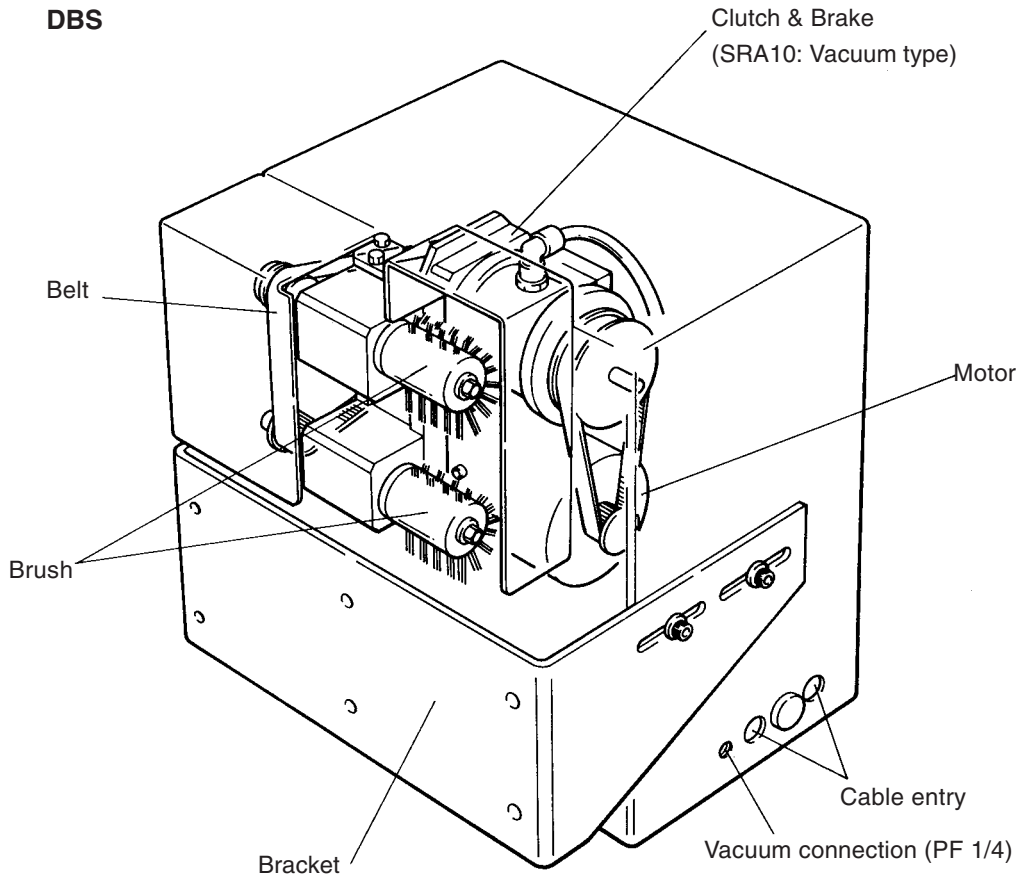


Design

DBS-E

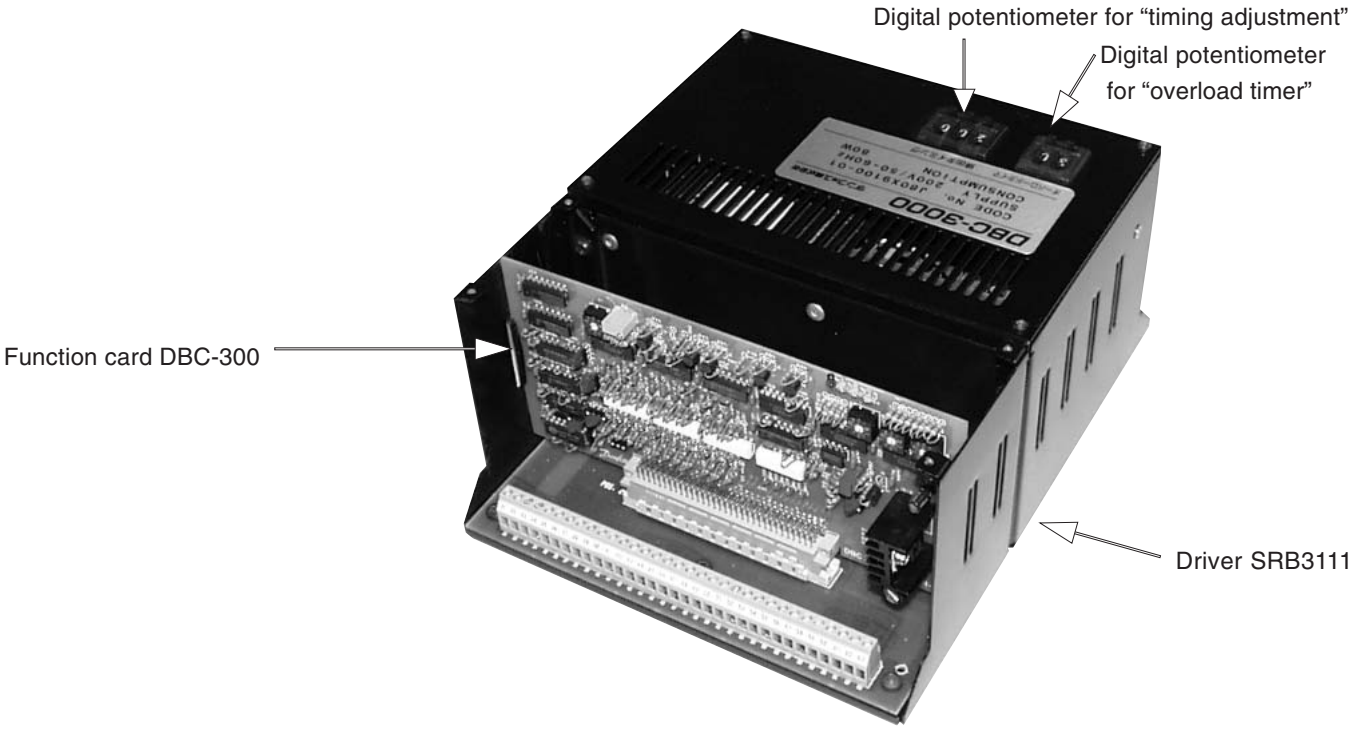


DBS

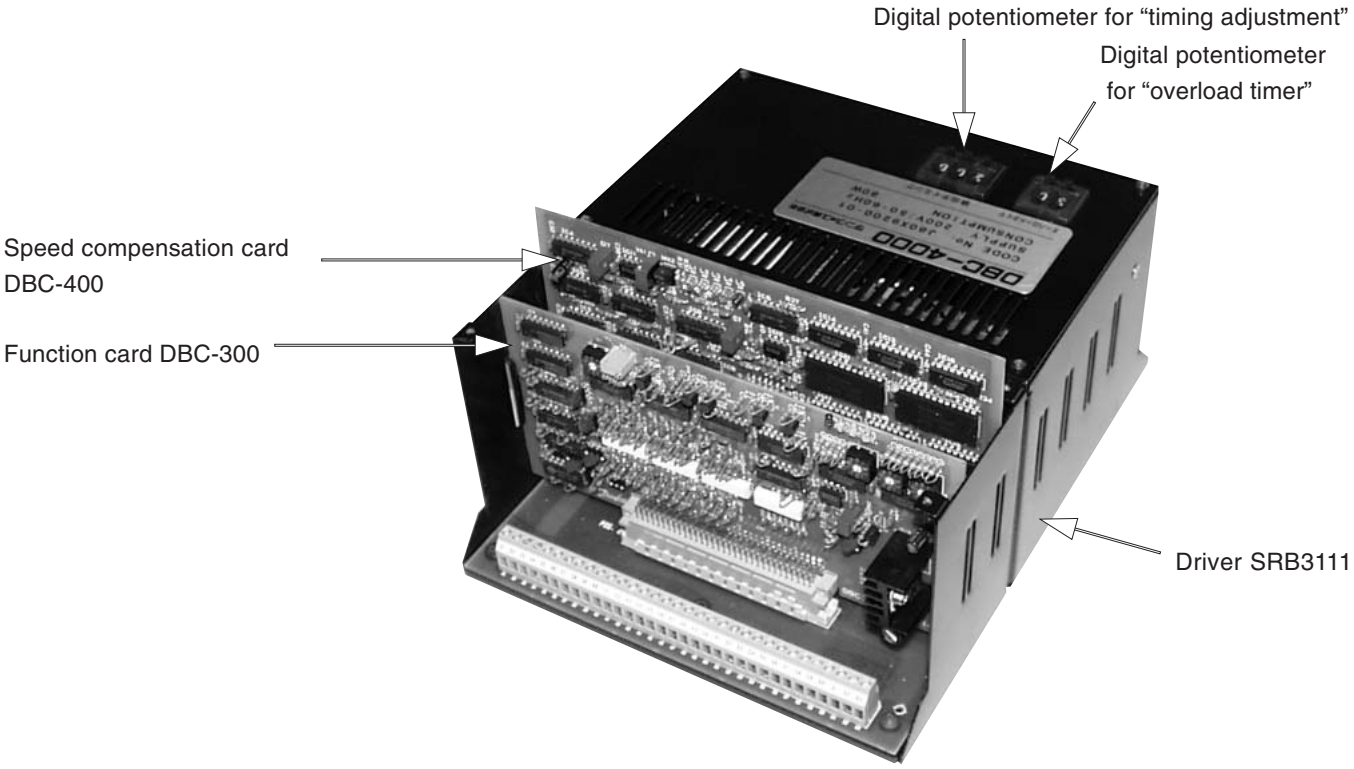


Controller

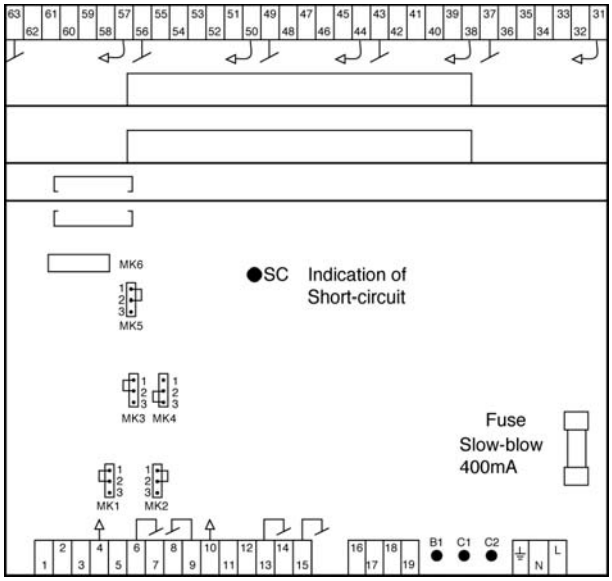
1. Standard type controller (Type: DBC 3000)
Standard type controller for Bottle sorting unit consists of “Driver” and “Function card”.



2. Controller with speed compensation (Type: DBC 4000)
Controller with speed compensation for Bottle sorting unit consists of “Driver”, “Function card” and speed compensation card”



Controller (SRB-3111)



LED indicates:

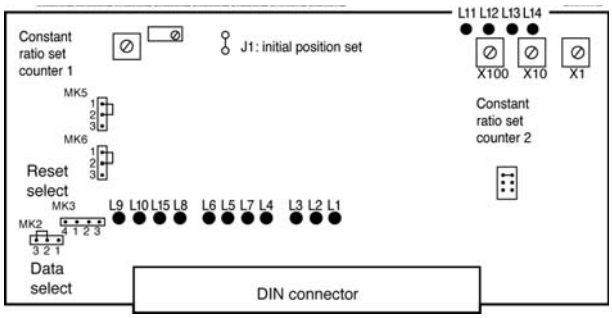
B1 ON while Brush is stopping
C1 ON while Brush is rotating
C2 Always OFF
SC Short circuit

Jumper program

MK1 1-2
MK2 1-2
MK3 1-2
MK4 2-3
MK5 1-2

Symbols

Function card (DBC-300)



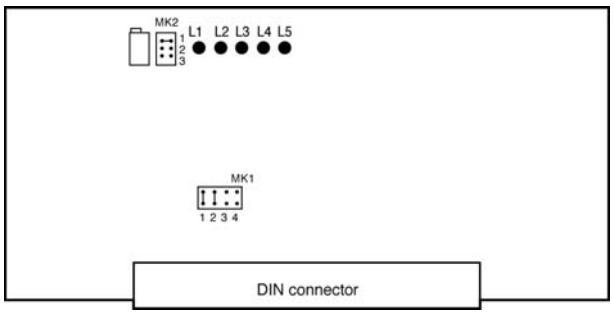
LED indication:

L1	Brush stop signal
L2	Brush position signal 1
L3	Brush position signal 2
L4	Start sensor signal
L5	F mode select signal
L6	PV mode select signal
L7	SR mode select signal
L8	Shutter signal
L9	Data (NG) signal
L10	PV mode start signal
L11	Brush position abnormal
L12	CR mode
L13	Brush start
L14	PV mode eject signal
L15	Reset signal Speed

Jumper program

MK1	to position 1
MK2	Data (NG) signal select
2-3	
1-2	
MK3	Reset select
1-2	SR mode, Reset shift resister
1-4	PV mode quit ejection
MK4	Jumper invalid
MK5	Select speed compensation (S-COMP)
1-2	S-COMP invalid
2-3	S-COMPC valid
MK6	Select S-COMP
1-2	S-COMP invalid
2-3	S-COMP valid

Speed compensation (S-COMP) Card (DBC-400)



LED indication:

L1	Speed compensation (S-COMP)
L2	
L3	Conveyor start signal and S-COMP counter reset
L4	Brush start signal
L5	Counter overflow signal output

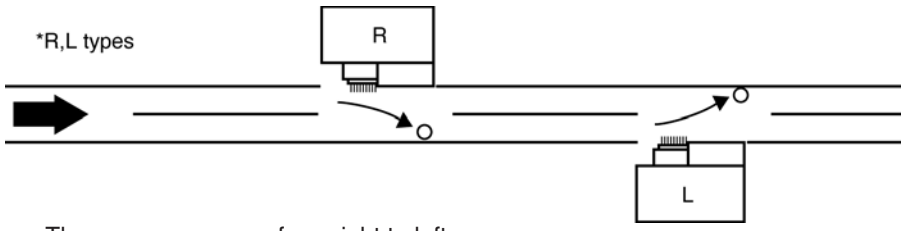
Jumper program

MK1	to position 1, 2
MK2	to position 1

LED Indicates:

	LED	Name	Status	Troubleshootings
Driver	B1	Brush stop	"On" while brush is stopping	- Power Supply
	C1	Brush rotate	"On" while brush is rotating	- Fuse of controller
	C2		Always OFF	
	SC	Short circuit	Output short	Resistor value(16-19, 17-19) about 9 Ω
Function Card	L1	Brush stop signal	ON at input stop signal	Terminal # 33 Stop sensor of DBS
	L2	Brush position signal 1	ON while brush is stopping	- Slip of brush stop point - Loose position adjust nuts - Broken belt
	L3	Brush position signal 2		
	L4	Brush start signal	ON at input start signal	Terminal # 32
	L5	F mode	ON at F mode	Select right mode? Terminal # 46 Terminal # 47 Terminal # 48
	L6	PV mode	ON at PV mode	
	L7	SR mode	ON at SR mode	
	L8	Shutter signal	ON when input shutter signal	Terminal # 34
	L9	Data (NG) signal	ON at low level	Terminal # 52
	L10	PV mode start signal	ON at input PV mode start	Terminal # 51
	L11	brush position abnormal	ON at wrong brush position	- Lag of brush position - Fix nuts - Over specification - Set Timing value Check (1>=)?
	L12	CR mode	ON when inner counter count up	
	L13	Brush start signal	ON when start timer run	- Mode check - Input starting signal
	L14	PV mode	ON when ejecting with PV mode	Mode check
	L15	Reset signal	ON when input reset signal	- Mode check - Signal input timing
Speed compensation (S-COMP) card	L1	S-COMP sensor	ON when dark sensor	Terminal # 53
	L2	Not used		
	L3	Conveyor starting signal S-COMP counter reset		Terminal # 42
	L4	Brush start signal	ON when brush starts (speed compensation)	Digital potentiometer for timing set is correct?
	L5	Counter overflow	Brink when counter overflows	- Check S-COMP sensors - Bottle stops on sensor?

Components

	Type	Description
Sorting unit	DBS-E30R DBS-E30L	Max. 300 Bottles/min.(BPM)
	DBS-060R DBS-060L	Max. 350 BPM
	DBS-100R DBS-100L	Max. 800 BPM
	DBS-150R DBS-150L	Max.1,200 BPM
	DBS-200R DBS-200L	Max. 1,800 BPM
		2,300 BPM is applicable
	 R type: The conveyor moves from right to left. L type: The conveyor moves from left to right.	

	Type	Description
Brush	DBB-54 DBB-56 DBB-86 DBB-87	L = 50 mm, brush diameter 0.4 mm L = 50 mm, brush diameter 0.6 mm L = 80 mm, brush diameter 0.6 mm L = 80 mm, brush diameter 0.7 mm

	Type	Description
Vacuum pump	SRD-6 SRD-7	30 [l/min]: less than 1,200 BPM 50 [l/min]: on and more than 1,200 BPM

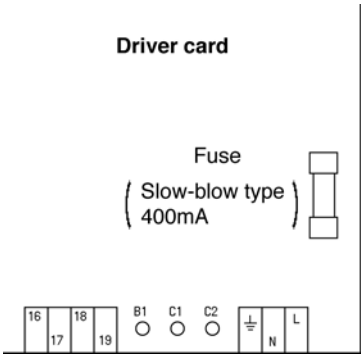
	Type	Description
Micro mist separator/regulaor	SRD10	Filter : 0.01 μm

	Type	Description
Controller	DBC-3000 DBC-4000	Standard type (SRB-3111 + DBC-300) Speed Compensation type (SRB-3111 + DBC-300 + DBC-400)

Data	Item	Description
Sorting unit DBS-060, 100, 150 & 200	Motor	3ϕ induction motor, 4P- 400W
	Clutch & Brake	Vacuum single-plate type SRA10; Air: 25 CC/Cycle Motor speed: Max. 2,000 rpm
	Sensor	Stop sensor: E2E-C1C1(Omron), distance: 0.5 – 0.7 mm Brush sensor: E2E-C1C2(Omron)
	Power supply	3ϕ 200V 50/60Hz
	Supply voltage for sensors	DC 24V +/–10%, Max. 70 mA
	Ambient temperature	0 – 40 °C(32 – 104 °F)
	Humidity	35 - 85%RH
	Storage temperature	–25 – 70 °C(–13 – 158 °F)
	Weight	25 kg(DBS200 : 24 kg)
Sorting unit DBS-E30	Motor	3ϕ induction motor, 4P- 200W
	Clutch & Brake	Air-compressed typeROTA06; Air: 39 CC/Cycle Motor speed: Max. 2,000 rpm
	Sensor	Stop sensor: E2E-C1C1(Omron), distance: 0.5 – 0.7 mm Brush sensor: E2E-C1C2(Omron)
	Air tube	Outer diameter >= 8 mm
	Power supply	3ϕ 200V 50/60Hz
	Supply voltage for sensors	DC 24V +/–10%, Max. 70 mA
	Ambient temperature	0 – 40 °C(32 – 104 °F)
	Ambient humidity	35 - 85%RH
	Storage temperature	–25 – 70 °C(7 – 158 °F)
	Weight	27 kg
Controller	Power supply	1ϕ 200V +/-10%, 50/60Hz
	Power consumption	Max. 80 W
	DC 24V Output	DC 24V(DC 18 – 30V), max. 350 mA
	Ambient temperature	0 – 40 °C(32 – 104 °F)
	Ambient humidity	35 - 85%RH
	Weight	4.3 kg
Vacuum pump for DBS-060 to 200	Power supply	3ϕ 200V 50/60Hz
	Vacuum	less than 550 mmHg
	Ambient temperature	–10 – 40 °C(14 – 104 °F)
	Tube connection	Rc 3/4
	Weight	20 kg
Micro mist separator/regulator for DBS-E30	Set pressure range	1.5 – 3.0 bar
	Max. Capacity	200 Nl/min.
	Filter	0.01 μm
	Tube connection	Rc 3/4
	Weight	1 kg

Function

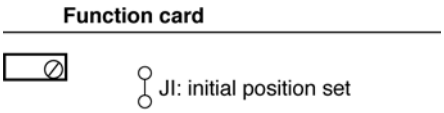
Sorting unit



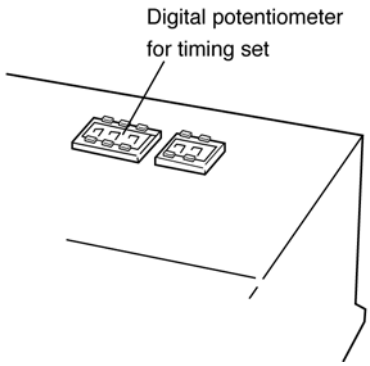
Brush stop signal
The brushes rotate by the clutch signal from Controller, and LED C1 turns on.
The built-in stop sensors make stop signal and output to the controller.

Brush stop position signal
The brushes stop by stop signal form the controller, and LED B1 turns on.
The brush stop positions are detected and the signal is output.

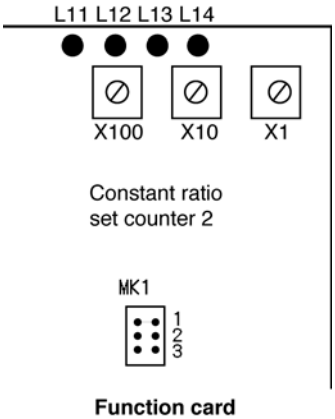
Controller



Set ofBrush initial position
About 1 second after power supply for the controller turns on, the brushes rotates once so that they start from their normal position.
If this function is not necessary, the jumper on the function card J1 may be cut.

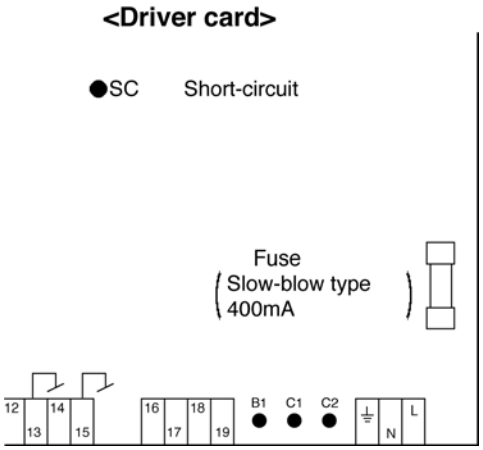


Adjustment of the brush start timing
Function to delay the signal of the start sensor elecrically so that the brushes can hit the center of bottles.
Use Digital potentiometer for timing set.



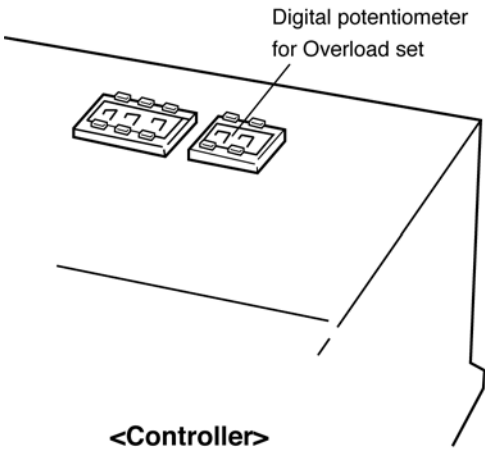
Unit monitoring
Alarm functions when brush stop position is abnormal dur to cut belt etc.
If Brush stop position is abnormal when start signal is ON, the red LED L11 turns on only when the brushes are rotating, as well as the signal outputs at terminal No. 62(NPN transistor Open collector output, max. 50 mA).

Controller(continued)



Shortcircuit(SC)

In case of shortcircuit of the solenoid valves in the Clutch & Brake, Output Shortcircuit protection functions.
LED(SC) on the Driver card turns ON, the outputs to the Sorting unit becomes OFF.
LEDs(C1 and B1) also turn off.
When LED(SC) has turned on, solve thecause of the trouble then turn off the power supply (about 10 seconds) to reset.



Overload protection

Protection against mechanical overload.
Alarm ON if brush rotation time is lomger than the set value.
Set Overload time by Digital potentiometer on the Controller.

Speed compensation(S-COMP) for DBC-4000

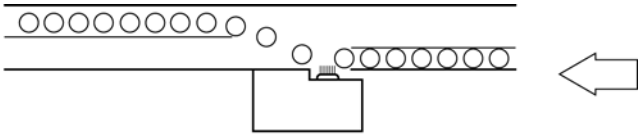
Function which changes brush start timing according to variation of the belt speed.
The brush start timing varies by diameter of bottles which shades the S-COMP sensor so that the belt speed variation can be compensated.

Note!

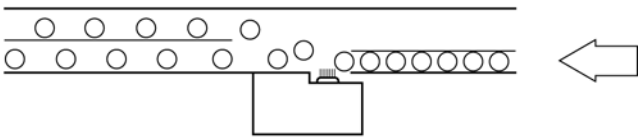
In application the S-COMP sensor is shaded by a bottle for more than 1 second, the DBC-4000 may malfunction.

Operation mode

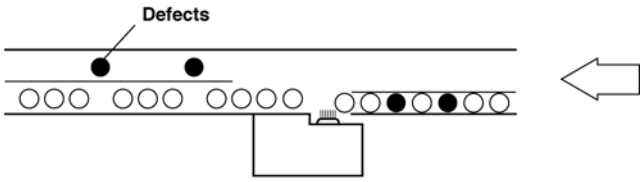
Adjust the sorting unit



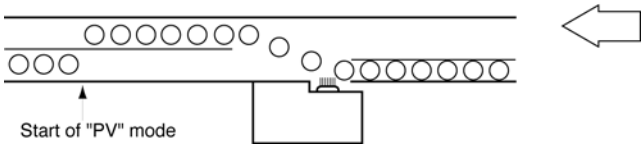
F(Full)
Adjustment mode.
All bottles/cans are sorted.



CR(Constant Ratio)
Sorting mode.
1 pc/set number of the Counter 1 is sorted every time.
the Counter 1: set number = 1 to 10



SR(Shift Register)
Defects ejecting mode.
Only NG bottles are sorted by memory function.

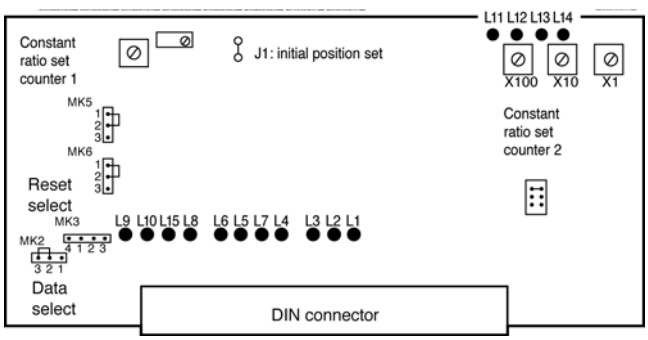


PV(Preset Value)
Sampling mode.
Number of the Counter 2 are sorted after input signal of PV mode.
the Counter 2: set number = 0 to 999

To select Mode...

Mode can be selected by connecting GND and terminals as follows:

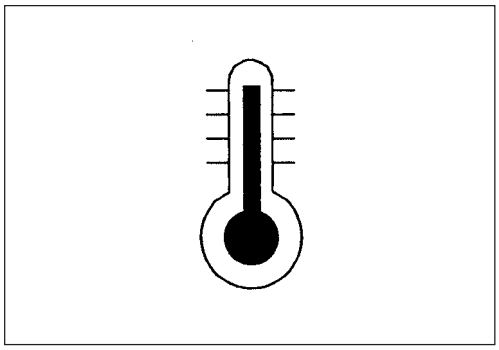
SR mode	Connect 0V and #46
PV mode	Connect 0V and #47
F mode	Connect 0V and #48
CR mode	No connection



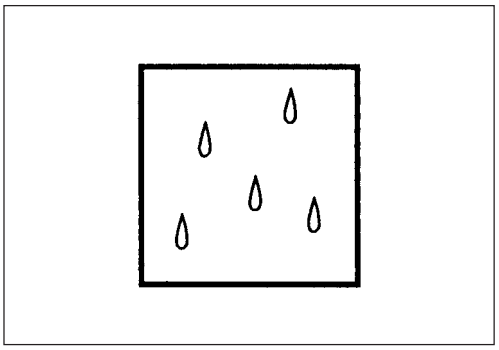
Installation

Installation at following places must be avoided to improve the reliability.

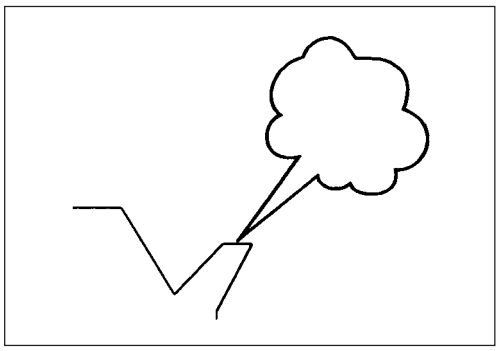
Ambient temperature out of specification



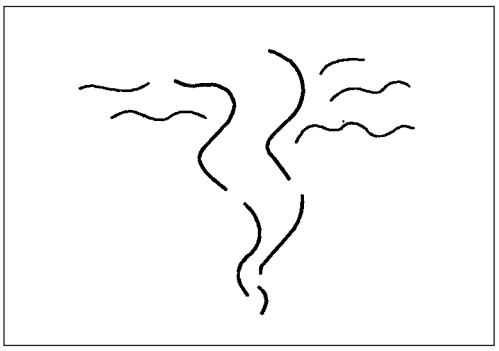
Dewing place with changeable temperature



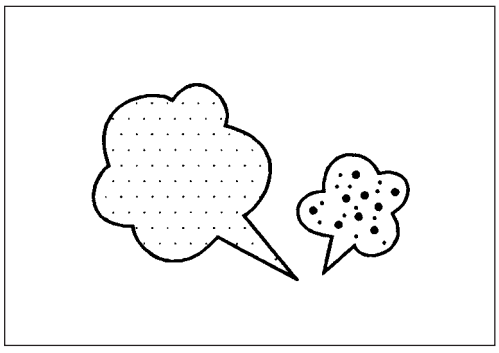
Humid place



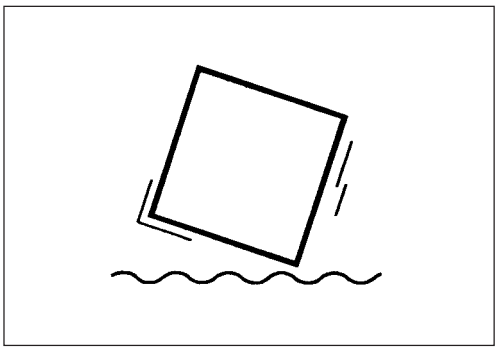
corrocive or inflammable gas



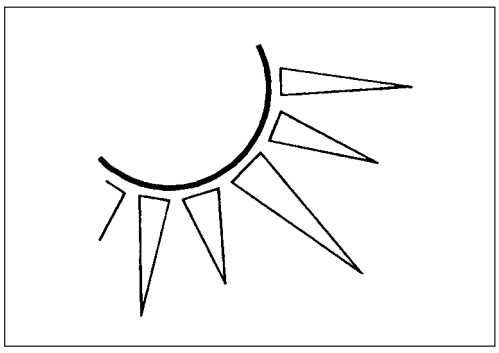
Dust, salt or metal particles



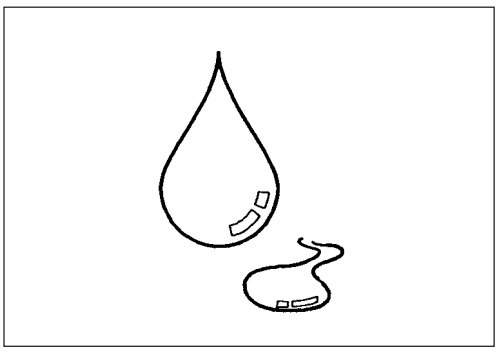
Vibration, shock or bump



Direct sunshine



Splash of water, oil or chemicals



To install the Controller in the panel...

The controller must be installed in following conditions:

Ambient temperature

- Enough ventilation must be provided,
- Do not install on or above equipments giving off heat,
- When ambient temperature rises more than 40 °C(104 °F), cooling fans or air-conditioners are recommended.

Operation and maintenance

- Install the controller separated as far as possible from high voltage equipments and power machines,
- Install the controller 1 to 1.6 m(about 3 to 5 ft) high on the floor for easy operation and maintenance.

Position

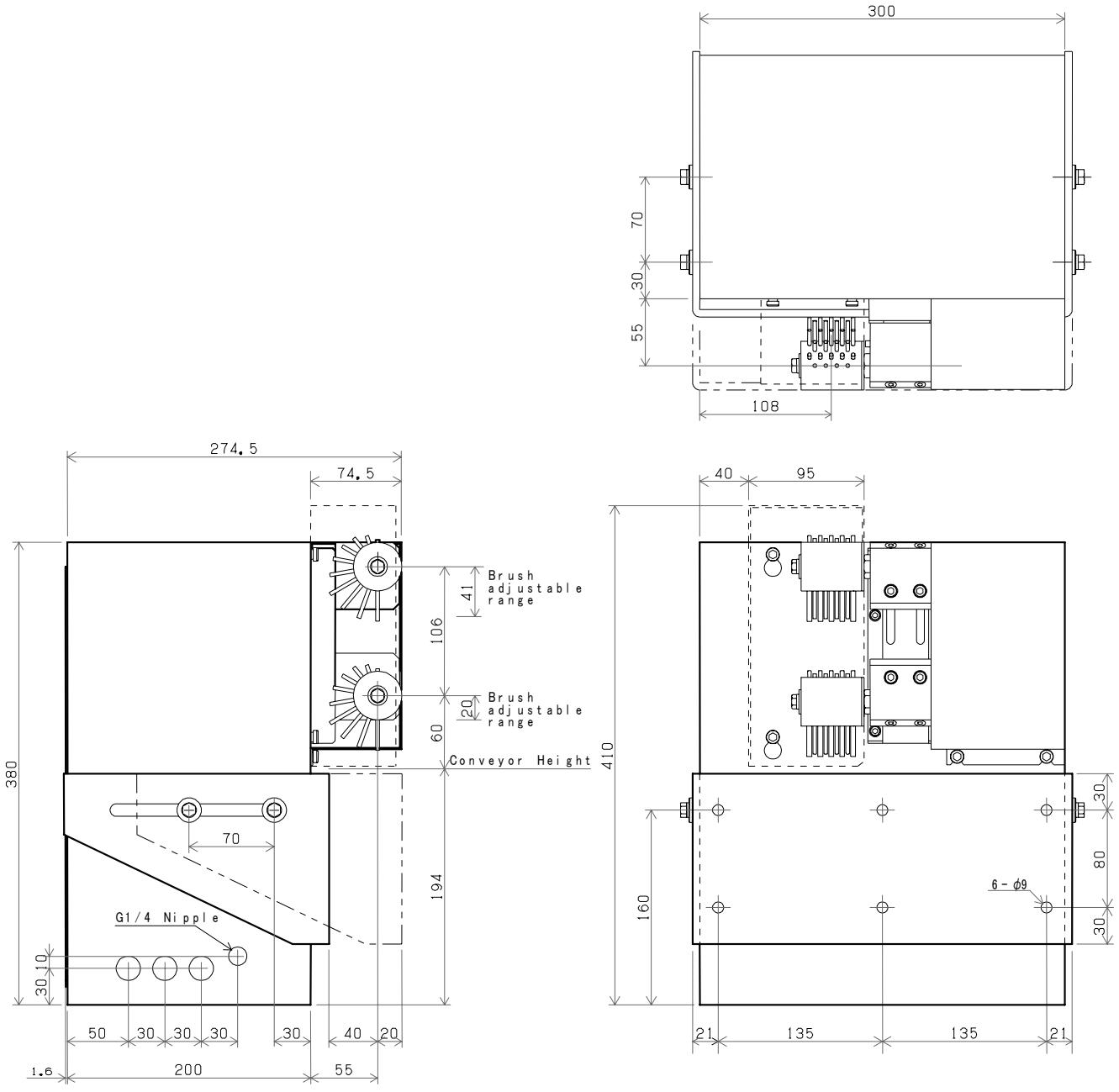
- Do not install near high voltage equipments,
- Separate the Controller at least 200 m(220 yds) far from power lines,

Wiring

- Shield cable must be used; bigger than 0.5 mm^2 (AWG No. 20) or resistance must be less than 0.25 Ω between the Sorting unit and the Controller.
- Signal and control cables must be separated from power cables in order to avoid electromagnetic interference.

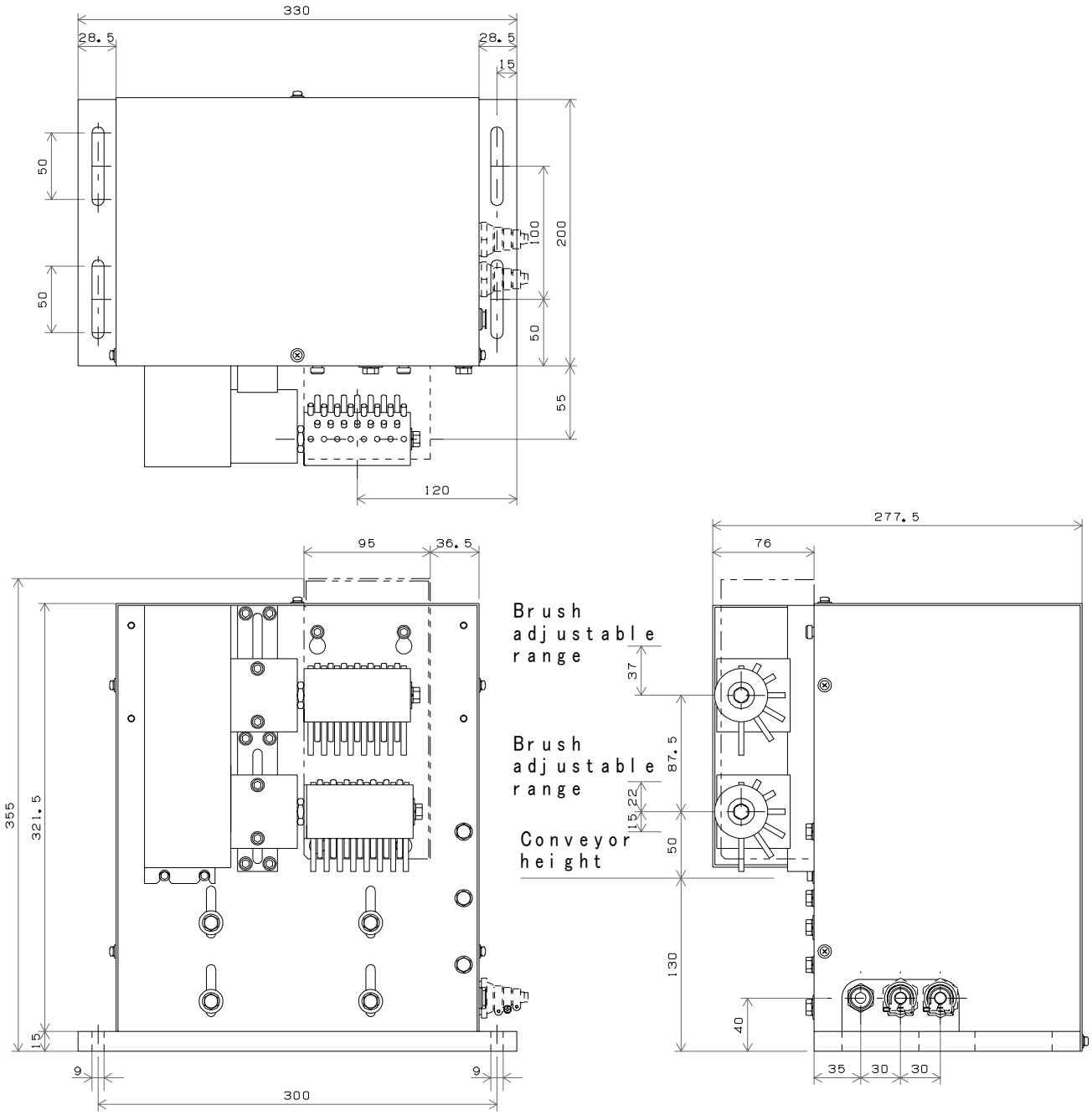
Dimensions

DBS-60, 100, 150
Outline below shows “R” type.



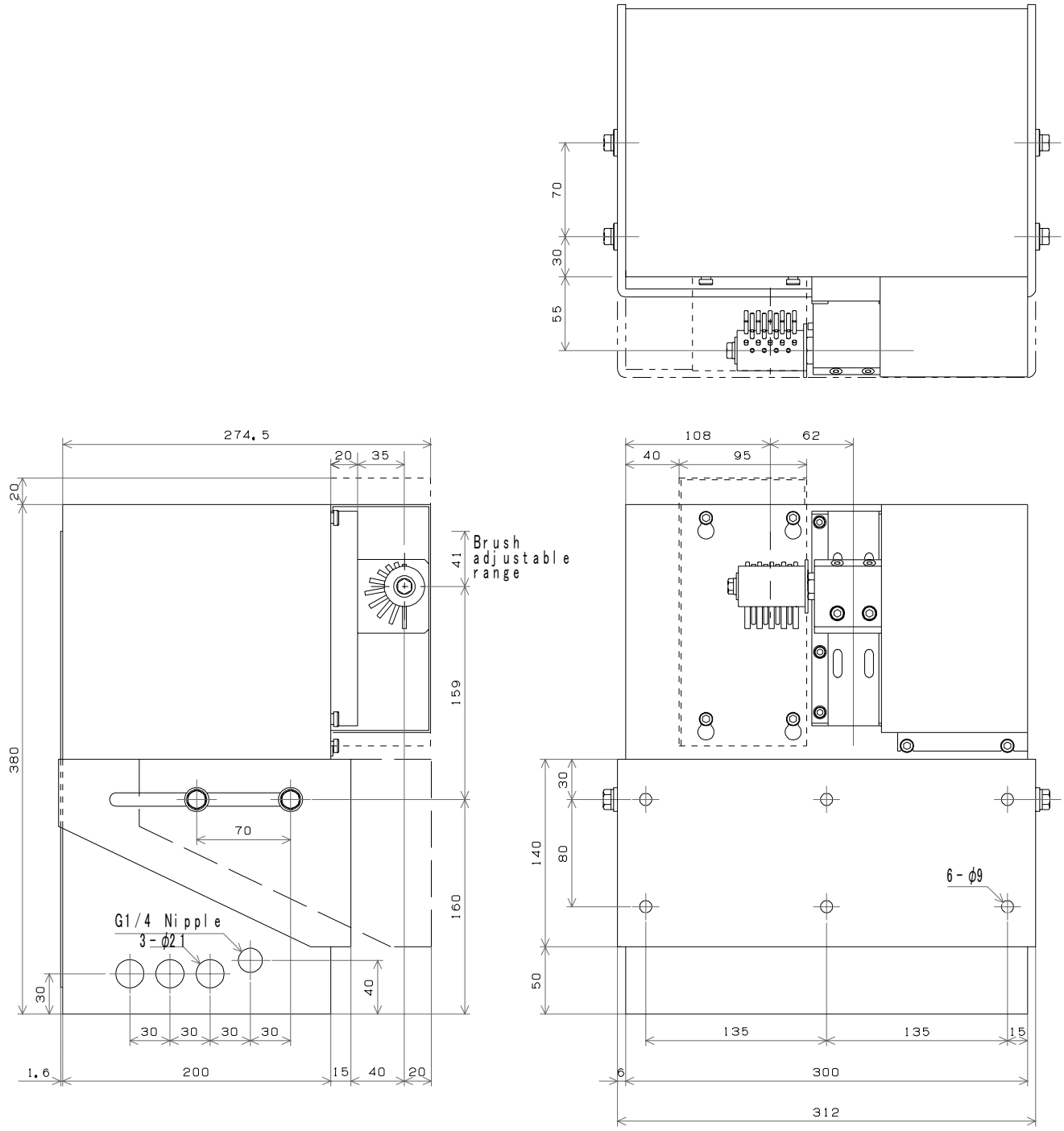
Dimensions(continued) DBS-E30

Outline below shows “L” type.

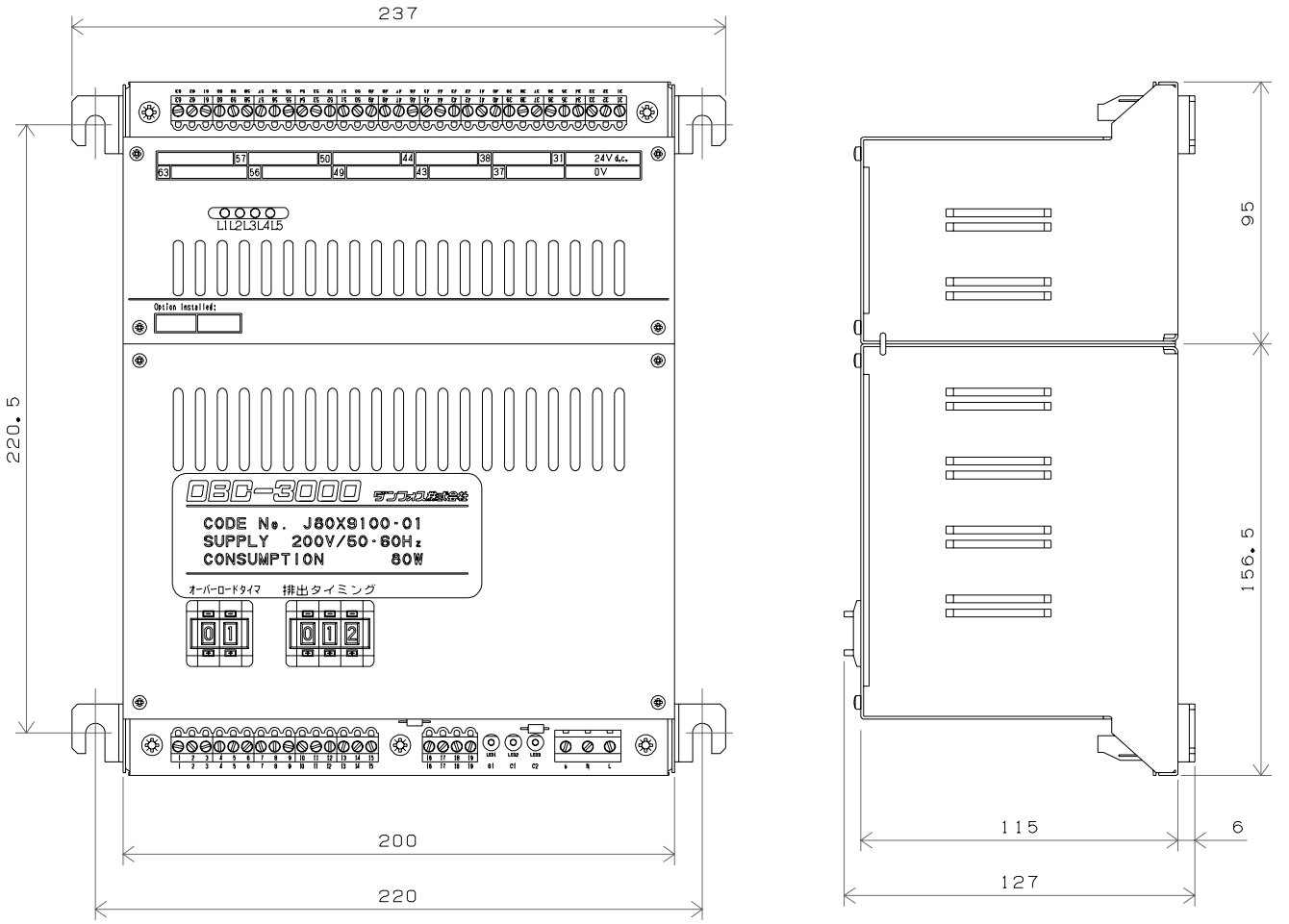


Dimensions(continued) DBS-200, 220

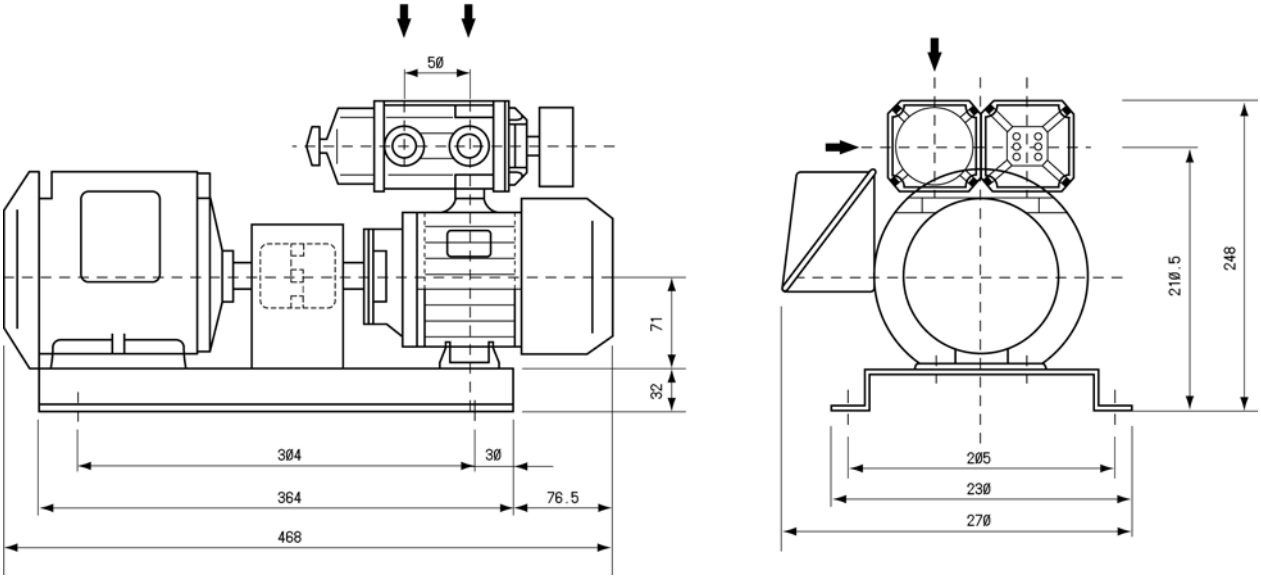
Outline below shows “R” type.



Dimensions(continued) Controller: common for all DBS.



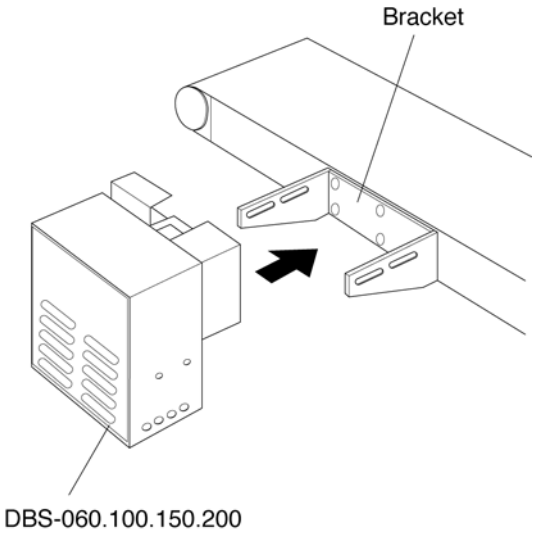
<Vacuum pump>
for DBS-060 to 200



Note! : In application more than 1,200 BPM, larger vacuum pump is required.

Montage

Sorting unit



If you mount the sorting unit on beside of the conveyor,

1: Disassemble the bracket out of the sorting unit,
2: mount the bracket. Height of the shaft of the lower brush must be 50 mm.
3: Assemble the sorting unit.

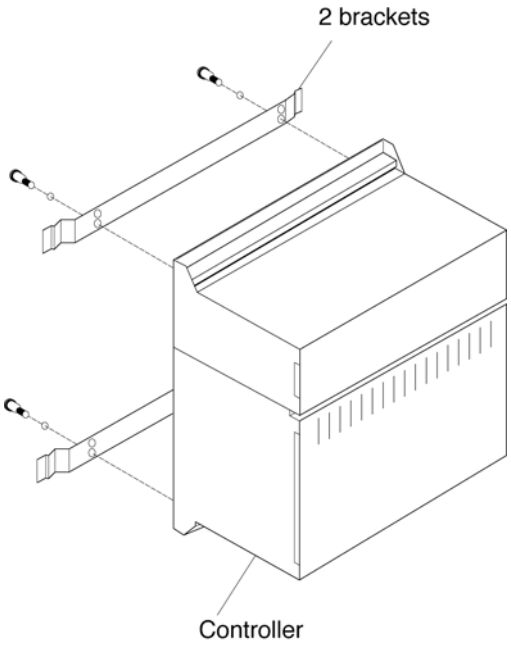
Caution!
The weight of the DBS is 25 kg. Enough support on the conveyor is necessary.

If you mount the sorting unit type the DBS-E30,

1: 4 long holes must be used.
2: Please note that height of the shaft of the lower brush must be 50 mm.

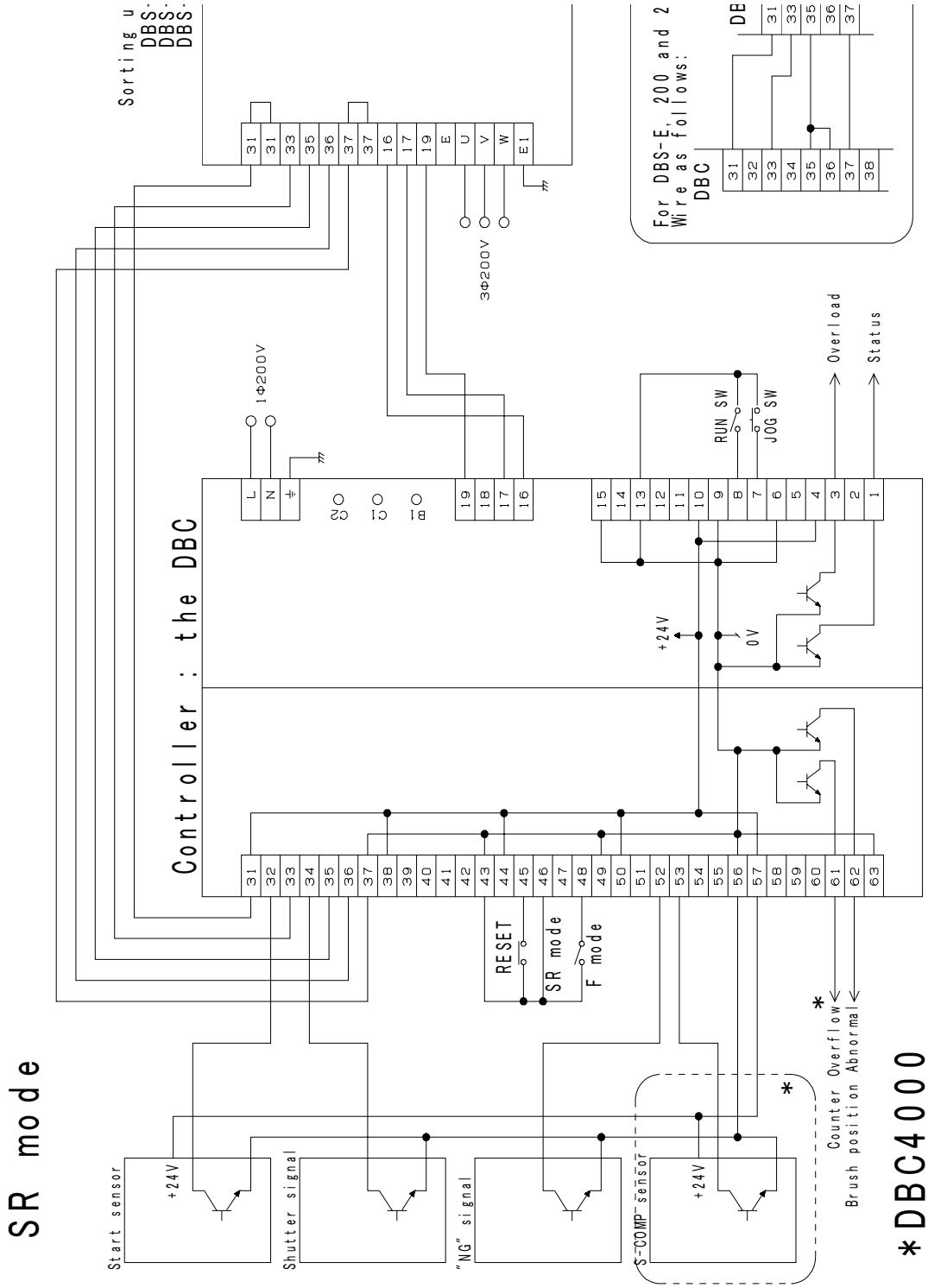
Note!
The weight of the DBS-E30 is 27 kg.

Controller

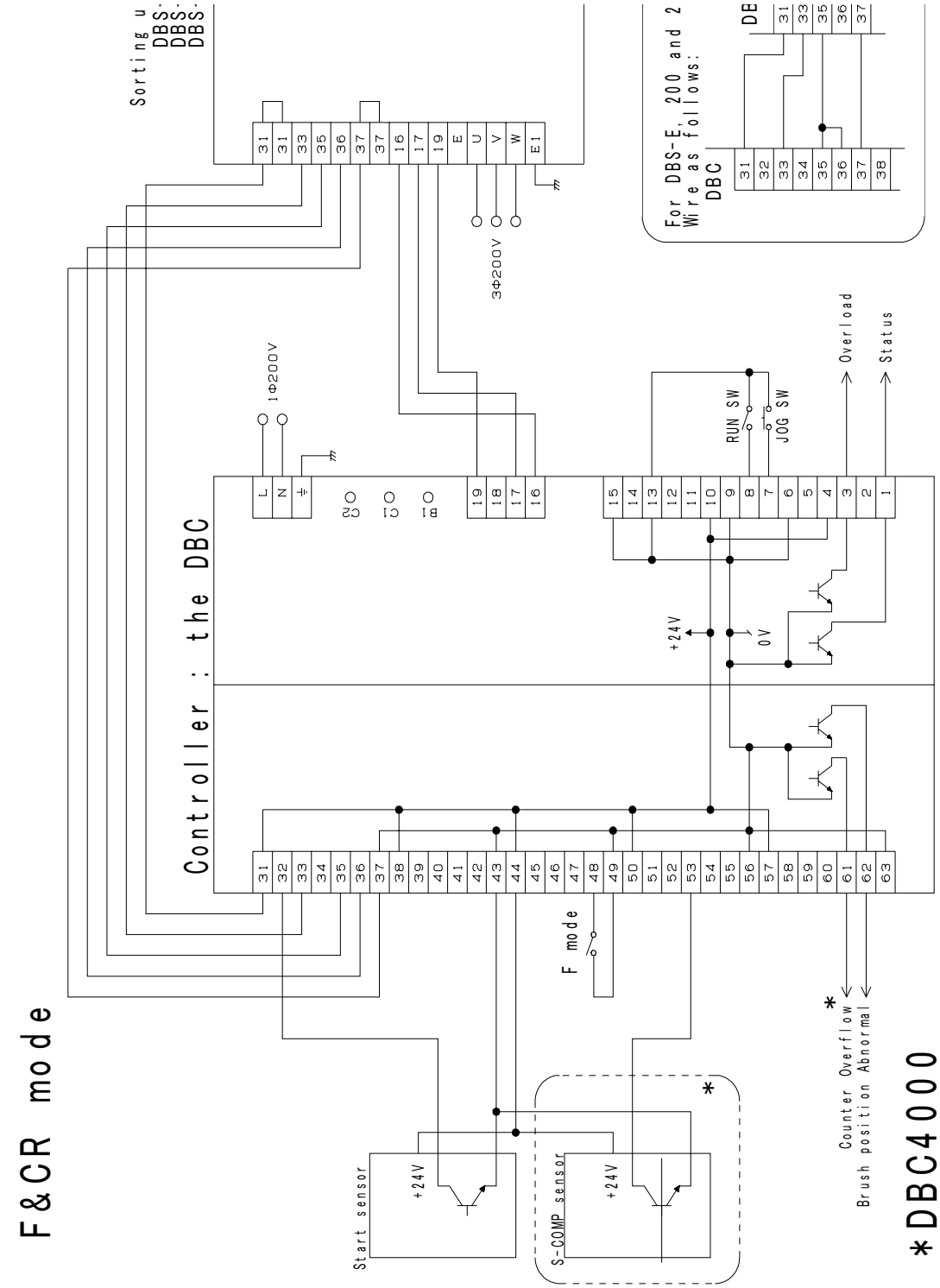


1: Mount 2 brackets on the controller.
2: Mount the controller with the brackets on panel etc.

Wiring


SR mode
Sorting u
DBS-
DBS-
DBS-
3Φ200V
1Φ200V
For DBS-E, 200 and 2
Wire as follows:
DBC
DE
Controller : the DBC
RUN SW
JOG SW
Overload
Status
+24V
0V
RESET
SR mode
F mode
Start sensor
Shutter signal
"NG" signal
S-COMP sensor
Counter Overflow
Brush position Abnormal
*DBC4000

Wiring(continued)



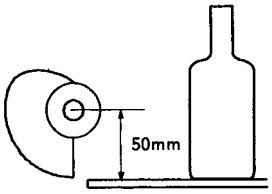
Terminals

	No.	Description	Remarks
Sorting unit	31	DC 24V	
	31	do	
	33	Brush stop signal output	NPN Open-collector
	35	Brush position signal 1 output	NPN Open-collector
	36	Brush position signal 2 output	NPN Open-collector
	37	0 V	
	37	do	
	16	Brake input	SRA10 – #2, ROTA – Black
	17	Clutch input	SRA10 – #1, ROTA – Blue
	19	CL/BR	SRA10 – #3, ROTA – Brown
	E	Earth terminal	
	U V W	3 – 200V Power supply for motor	
	E1	Earth terminal	
Controller	1	Status signal output	Open collector max. 50mA
	2		
	3	Overload signal output	Open collector max. 50mA
	4	DC 24V output	
	5		
	6	0 V	
	7	JOG SW input	Brushes rotate at Negative edge while Operation SW is OFF
	8	Operation SW input	Active at Low level
	9	0 V	
	10	DC 24V	
	11		
	12		
	13	0 V	
	14		
	15	0 V	
	16	Brake signal output	
	17	Clutch signal output	
	18		
	19	CL/BR signal output	
	E	Earth terminal	
	N	AC 200V Power supply input	
	L		

Terminals(continued)

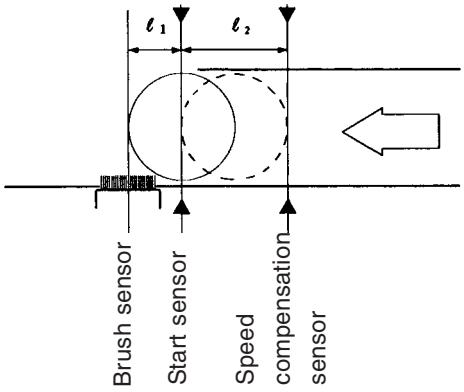
	No.	Description	Remarks
	31	DC 24V	
	32	Brush start signal input	at Negative edge
	33	Brush stop signal input	at Negative edge
	34	Shutter signal input	at Negative edge
	35	Brush position signal 1	Connect #35 to #36 in following case: 1: DBS-E30, DBS-200 and 220,
	36	Brush position signal 2	2: Only lower brush is used,
	37	0 V	
	38	DC 24V	
	39		
	40		
	41		
	42	Conveyor start signal input S-COMP counter Rest	at Negative edge
	43	0 V	
	44	DC 24V	
	45	Reset signal input	One-shot signal >1 ms necessary
	46	Select SR mode	Active at Low level
	47	Select PV mode	Active at Low level
	48	Select F mode	Active at Low level
	49	0 V	
	50	DC 24V	
	51	PV mode start signal input	One-shot signal >1 ms necessary
	52	NG signal input	Open collector
	53	S-COMP sensor signal input	Low level while shaded
	54		
	55	PV signal output	
	56	0 V	
	57	DC 24V	
	58		
	59		
	60		
	61	Counter Overflow signal output	Valid while DBC-400 is used
	62	Brush position abnormal output	Open collector max. 50mA
	63	0 V	

Installation Height

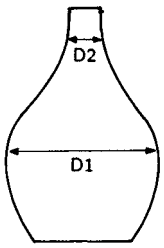


The height of the Brush shaft must be 50mm on the conveyor.

Position of sensors



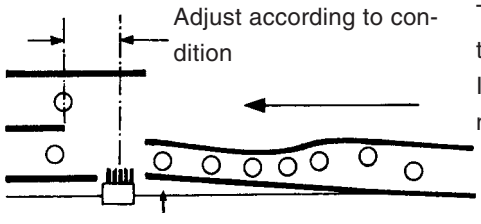
Start sensor position:
Given:
Maximum diameter of bottles = D_1mm,
Shaded diameter = D_2mm,
The start sensor position L_1 must be between values which are calculated by following formula:
L_1max(mm) = {(D_1 X 2 – D_2)/2} + R_t X 0.016 X Belt speed
L_1min(mm) = R_t X 0.02 X Belt speed
where
Rt = 0.2 X motor speed(mm)
Belt speed: (m/min)



Speed compensation(S-COMP) sensor position:
Given:
Shaded diameter by the start sensor = D_2mm,
Shaded diameter by S-COMP sensor = D_3mm,
The S-COMP sensor position L_2 must be:
$L_2 = (D_2 + D_3)/2 + \alpha$

Note!
Sensor must be ON while shaded.
Take the minimum distance between the S-COMP and the start sensor where both sensors are **NOT** shaded.

the Conveyor must be...



Decide the position here!

The positions of the Conveyor, Guide rails, bottles and the Sorting unit are significantly important.
If bottles fall down, the guide rails or table top chains must be checked.

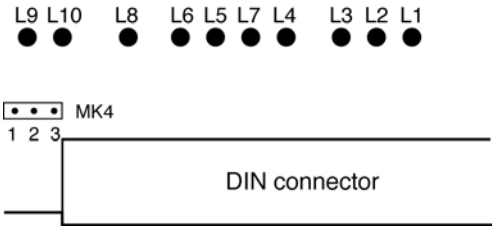
Adjust the sorting unit

1: Confirm jumper programs of the Controller.
2: Remove covers of the Sorting unit.
3: Adjust pitch of the Brushes to fit size of bottles/cans.
4: Set **Operation SW OFF** and **F mode SW ON**.
5: Turn on the power supply, then

Vacuum pump	Confirm vacuum pressure is 530mmHg +/- 5%.
Air pressure	Confirm air pressure is 3 bar +/- 0.5bar.
Motor	Confirm the direction.
Controller	Confirm LED B1 on the driver card is ON.

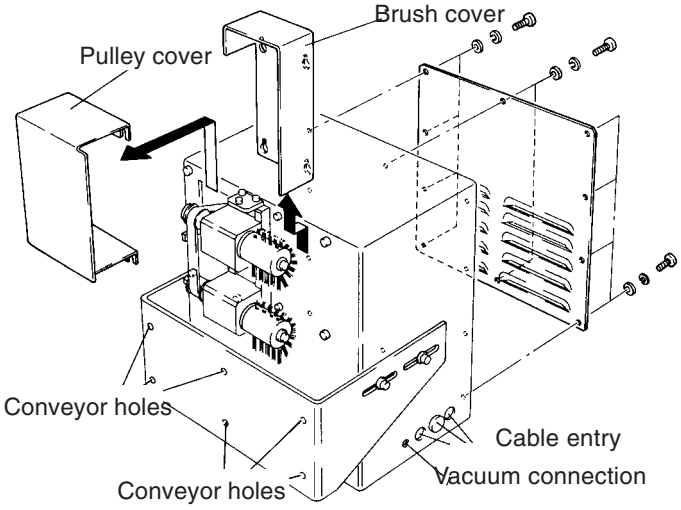
6: Adjust the Brush stop position.
Push **JOG SW** to rotate the brushes once.
See the next page(if the upper brush is not used, remove the brush and the plate).
After adjustment, push JOG SW several times to confirm the stop position.
Also confirm LED L2 and L3 are ON while the brushes are stopping.

<Function card>

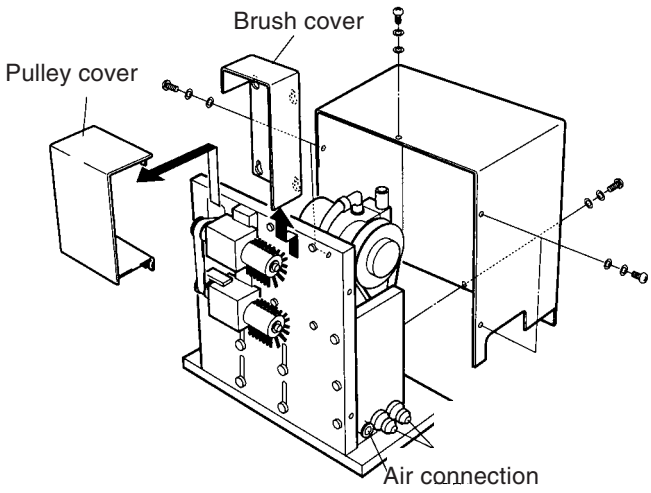


To remove covers...

Vacuum-clutch type



Air-clutch type

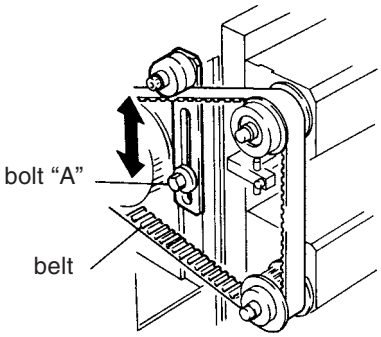


Adjustment

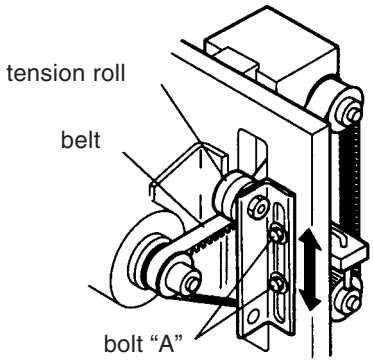
Brushes

1: Loosen a bolt “A” to separate the tension roll.

Vacuum clutch type
(DBS60, 100 & 150)



Air clutch type
(DBS-E30)

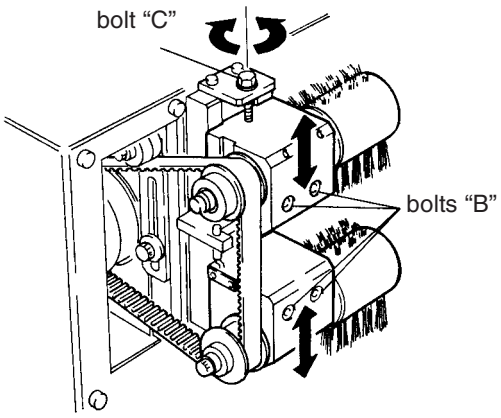


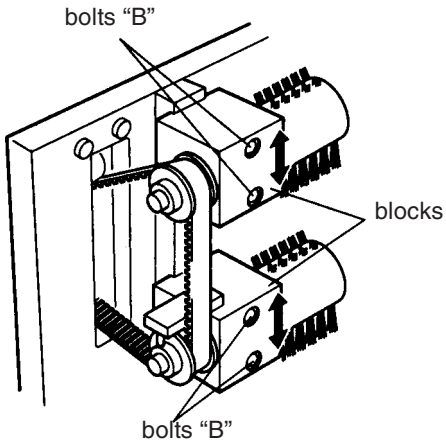
2: Loosen 4 bolts “B” of blocks, loosen bolt “C” (only vacuum type) and adjust the height according to size of bottles/ cans.

Bend of the belt must be 0.016 X Brush pitch (mm) at force of 7 N.

Caution!

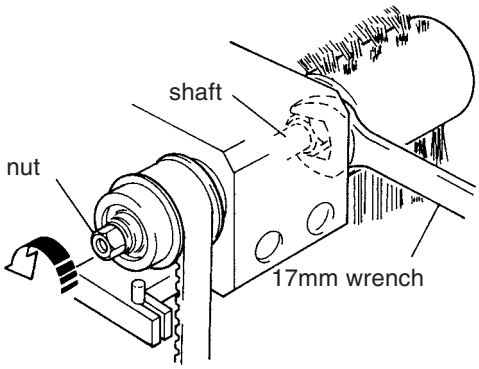
Don’t press JOG switch during adjustment of brush stop position.

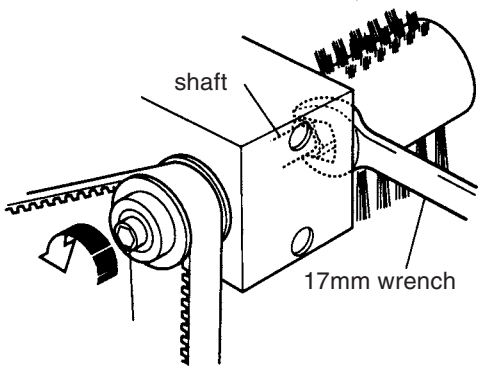




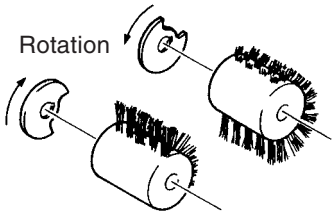
Brush stop position

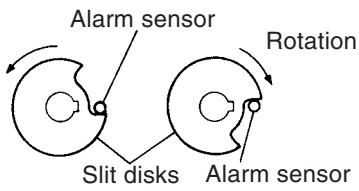
1: Fix the shaft by spanner and loosen the nut.



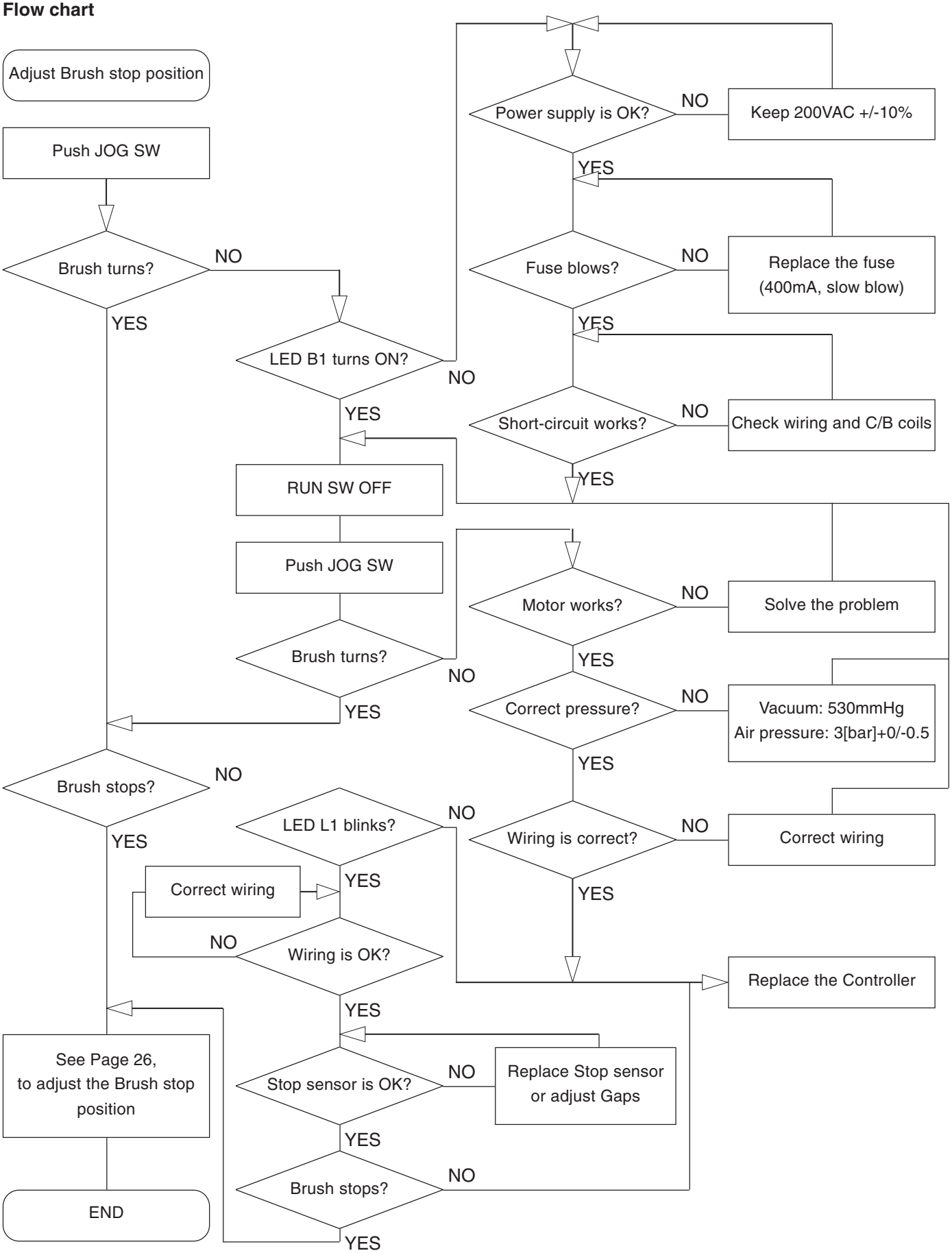


2: Set the position of the brushes and slit disks according to the position of the alarm sensors. (DBS-E has the lower alarm sensor and slit disk)

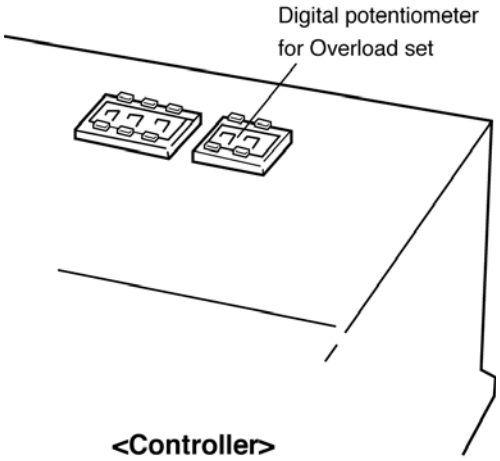




Flow chart


Adjust Brush stop position
Push JOG SW
Brush turns?
NO
YES
LED B1 turns ON?
NO
YES
RUN SW OFF
Push JOG SW
Brush turns?
NO
YES
Brush stops?
NO
YES
LED L1 blinks?
NO
YES
Correct wiring
NO
Wiring is OK?
YES
See Page 26, to adjust the Brush stop position
END
Power supply is OK?
NO
Keep 200VAC +/-10%
YES
Fuse blows?
NO
Replace the fuse (400mA, slow blow)
YES
Short-circuit works?
NO
Check wiring and C/B coils
YES
Motor works?
NO
Solve the problem
YES
Correct pressure?
NO
Vacuum: 530mmHg
Air pressure: 3[bar]+0/-0.5
YES
Wiring is correct?
NO
Correct wiring
YES
Replace the Controller
Stop sensor is OK?
NO
Replace Stop sensor or adjust Gaps
YES
Brush stops?
NO
YES

Set the Overload timer



Overload timer must be set by the Digital potentiometer according to the following formula:

a = c / b

where

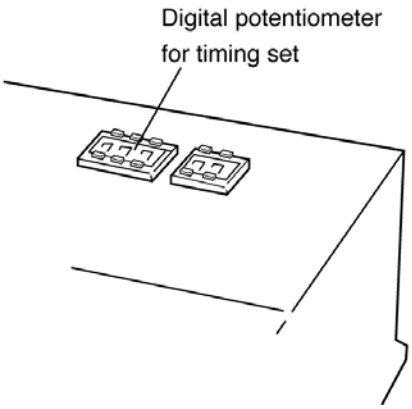
a : set time(ms), b: motor speed(Hz)

type	c
DBS200	1350
DBS150	2400
DBS100	3600
DBS060	5600
DBSE39	6800

Overload set value = (a – 3.5) / 3.3

Raise fractions.

Adjust the “hit” timing



Standard Controller(DBC-300)

1: The timing must be set by the Digital potentiometer according to the following formula:

BS X L1 – BS X Rt

where

BS: Belt speed(mm/s)
= 0.016 X Belt speed(m/min)

L1: distance between the Brush center and the start sensor(mm)

Rt: 0.2 X motor speed(Hz)

2: Operate the conveyor.

3: After the conveyor reachs the nominal speed, turn on **Operation SW**.

4: Put bottles/cans into the lanes.

5: Adjust the “hit” timing by the Digital potentiometer.

Speed compensation(DBC-400)

1: The timing must be set by the Digital potentiometer according to the following formula:

{BT – (60/V X L1)}/1.1

where

BT: Shaded time of the S-COMP sensor(ms)

L1: distance between the Brush center and the start sensor(mm)

V: Maximum speed of the conveyor(m/min)

2: Operate the conveyor at the maximum speed.

3: Put samples of bottles/cans into the lanes, then measure shaded time of the S-COMP sensor by Oscilloscope etc.

4: Turn on **Operation SW**.

5: Put bottles into the lanes.

6: Adjust the “hit” timing by the Digital potentiometer for the optimum sorting.

7: Vary the conveyor speed to confirm the speed compensation works well.

Note!

If 1.1 X the set value is bigger than measured value, the Controller may not operate properly.

Check the operation mode

F mode SW must be OFF.

<Function card>

CR mode

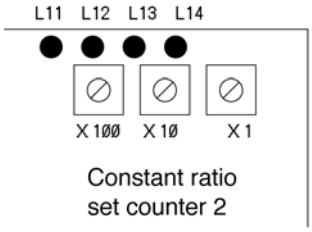
Confirm if the DBS sorts one bottle out of the number set by Constant ratio set counter 1.

SR mode

How to reset Shift Register:

Take products between the Start and the Shutter sensor, then input the reset signal for the Shift Register. Afterwards confirm the DBS sorts NG products out of good and NG ones.

<Function card>

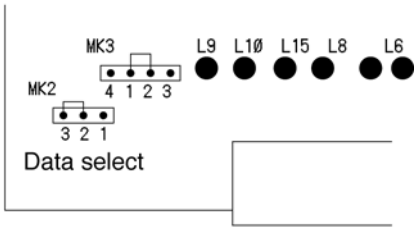


PV mode

After receiving PV mode start signal, confirm the DBS sorts the number set by Constant ratio set counter 2.

If the reset signal is received, it stops sorting.

PV mode start signal requires NPN open collector signal more than 1 msec.



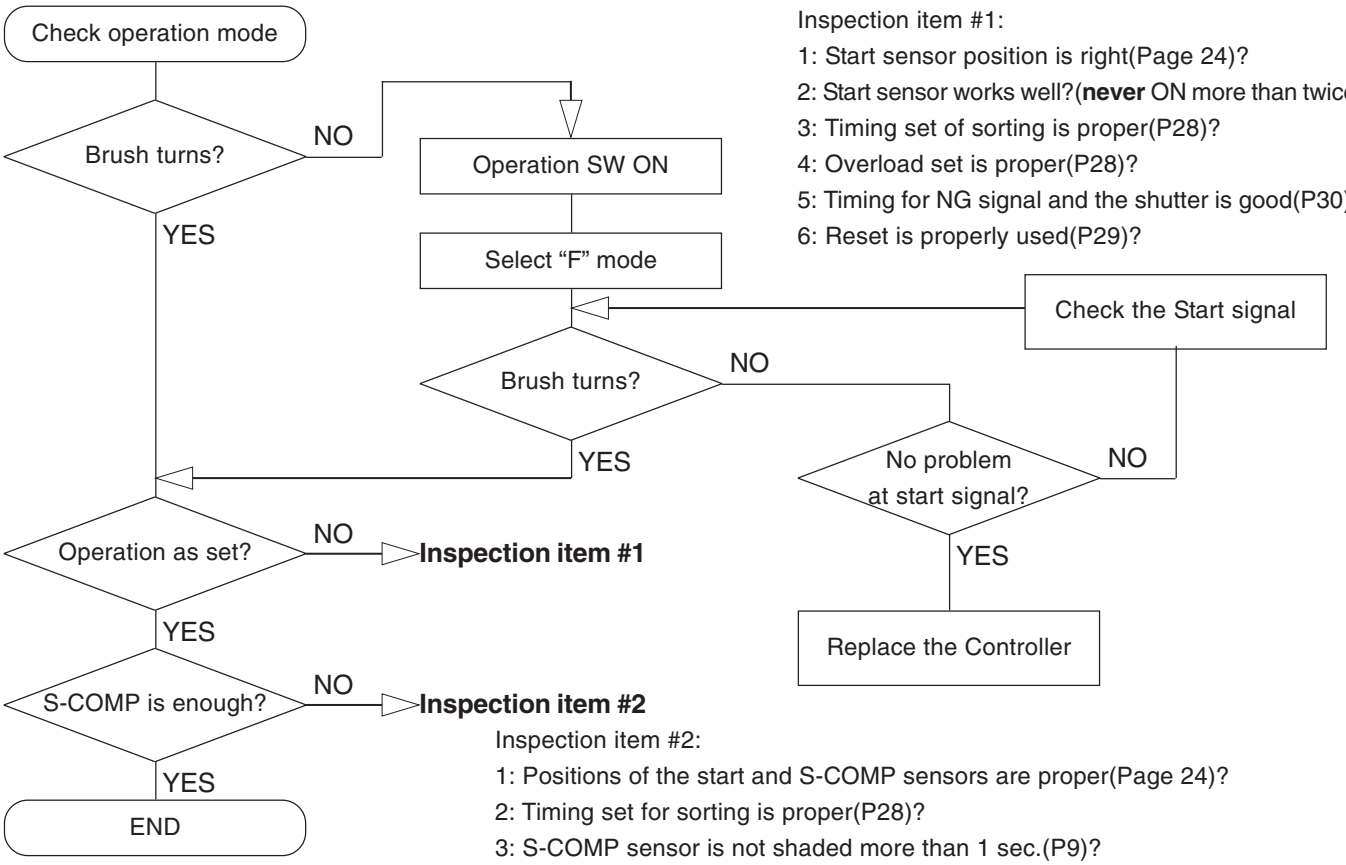
Note for the reset signal!

In SR mode, reset always once after the power supply for the controller is ON, to prevent malfunction through surge or noise at start.

In PV mode, the reset signal is used as stop signal of sorting. NPN open collector more than 1 msec.

In PV mode change of the jumper MK-3, #1 – 2 for #1 – 4 is required.

<Function card>



Inspection item #1:

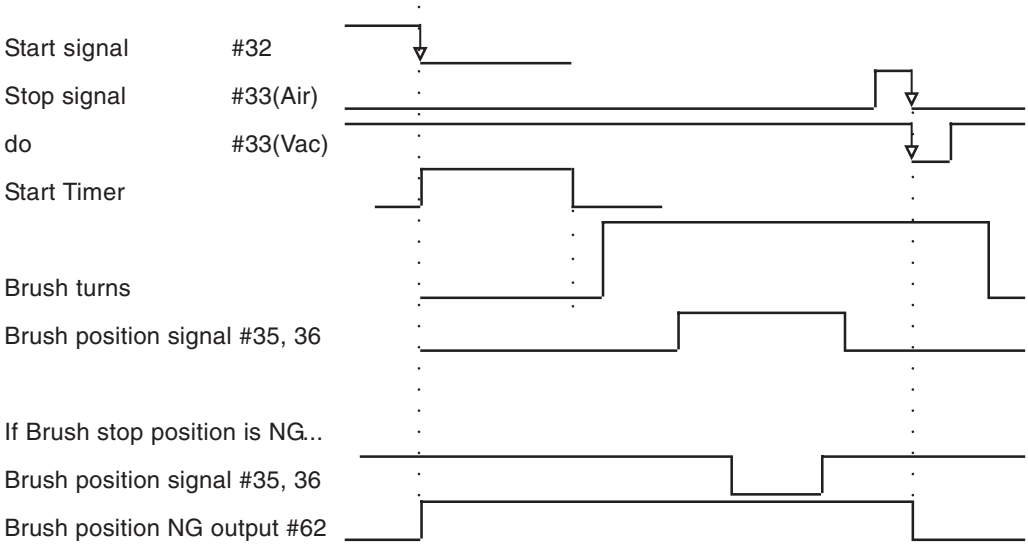
1: Start sensor position is right(Page 24)?
2: Start sensor works well?(**never** ON more than twice)
3: Timing set of sorting is proper(P28)?
4: Overload set is proper(P28)?
5: Timing for NG signal and the shutter is good(P30)?
6: Reset is properly used(P29)?

Inspection item #2:

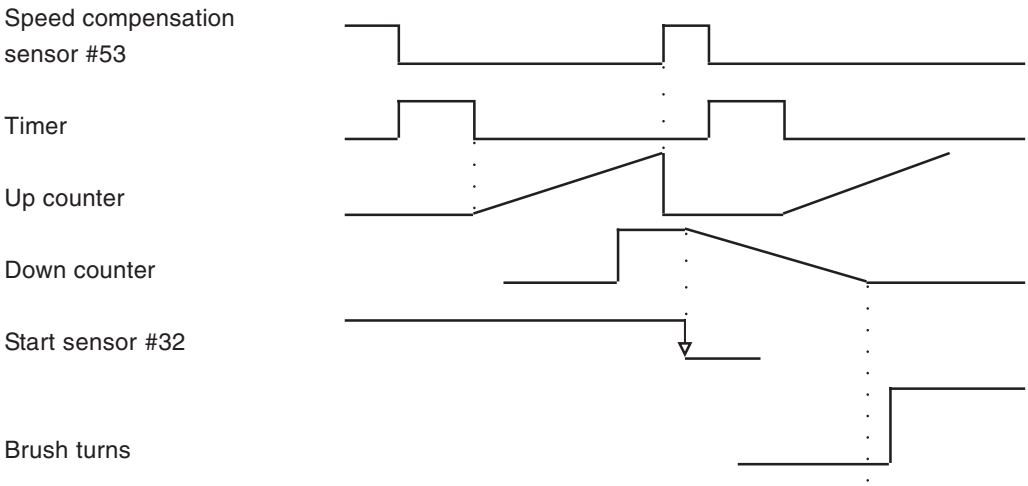
1: Positions of the start and S-COMP sensors are proper(Page 24)?
2: Timing set for sorting is proper(P28)?
3: S-COMP sensor is not shaded more than 1 sec.(P9)?

Time chart

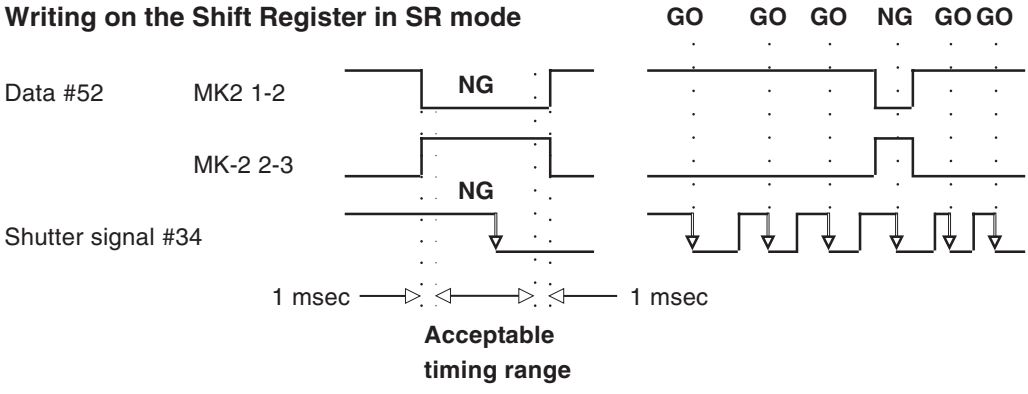
Standard Controller(DBC-3000)



Controller with speed compensation(DBC-4000)



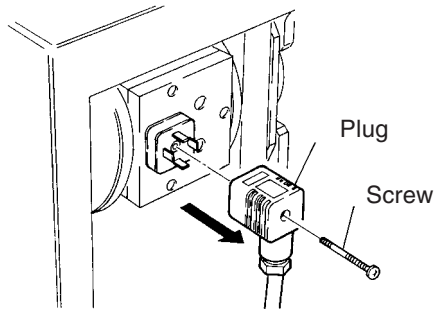
Writing on the Shift Register in SR mode



Troubleshooting

#	Symptom	Reason	Countermeasure
1	Neither LED B1 nor C1 turn ON	Power supply out of range	200VAC+/-10%
		Fuse blows	Replace for new one
		Short-circuit works	Replace C/B coils
		Loose terminals	Fasten the terminal screws
2	Fuse often blows	Power supply out of range	200VAC+/-10%
		Failure in the Printed Board	Replace the Printed board
3	Brushes don't turn	the Operation SW OFF	Operation SW ON
		the Motor stops	Run the Motor
		Vacuum out of range	Adjust within530[mmHg]+/-10%
		Air pressure out of range	Adjust within 3[bar]+0\-0.5
		Loose terminals	Fasten the terminal screws
4	Brushes don't stop	Wrong position of the Stop sensor	Install at right position
		Stop sensor broken	Replace the sensor
		Loose terminals	Fasten the terminal screws
5	Brush position NG	Brush stop position is NG	Adjust the stop position
		Frequency out of range	Raise the frequency (up to 2000rpm)
6	Brush stop position irregular	Malfunction by Noise to the stop signal	Solve the problem of Noise
		Stop sensor position NG	Adjust the Gap at 0.7mm
7	In CR mode, sort more or less bottles than 1/set number	Malfunction of Start sensor	Adjust the sensor to turn ON only once for a bottle
8	In SR mode, sort good bottles	MK2 on the function card wrong	Program MK2 for NG signal
		Timing for NG signal and Shutter signal is not good	Match the timing
		Malfunction by Noise to the reset signal	
9	Sort timing is NOT changed	Jumper MK4 1-2(wrong)	Change for 2-3(other MKs:1-2)
		Terminal #40 and 41 connected	Disconnect #40 and 41

Vacuum-clutch type



1:

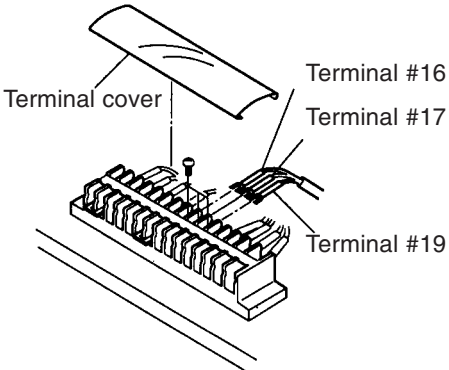
Vacuum type:

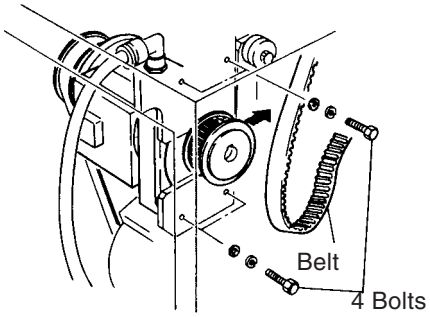
Loosen the screw and remove the plug.

Air-clutch type:

Take 3-wired cable out of the terminal.

Air-clutch type





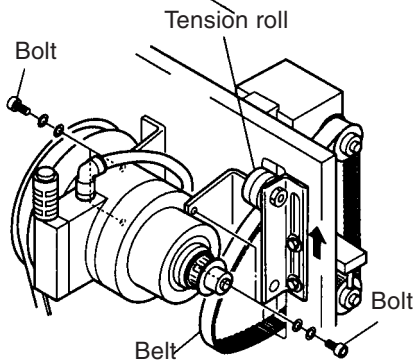
2:

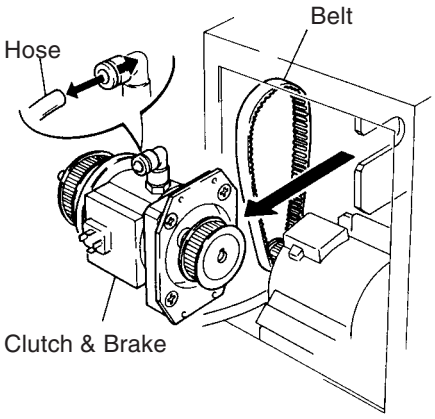
Vacuum type:

Take 4 bolts to move the clutch & Brake to arrow direction, and remove the belt.

Air-clutch type:

Loosen bolts to separate the tension roll, then remove 2 bolts of the bracket.



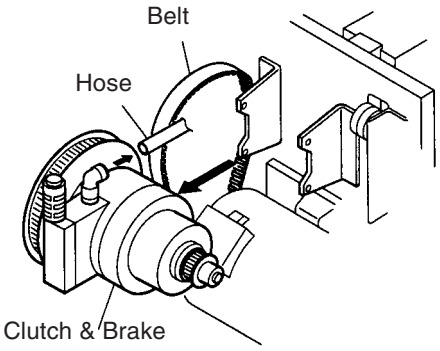


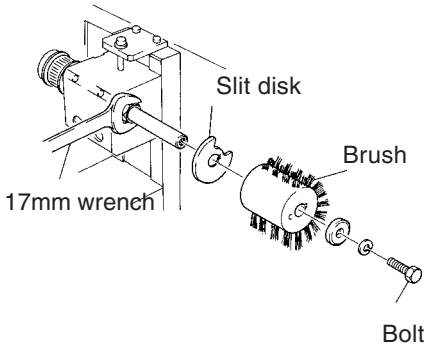
3:

Remove the belt while bending the clutch & Brake, remove the hose and take the clutch & Brake.

Note!

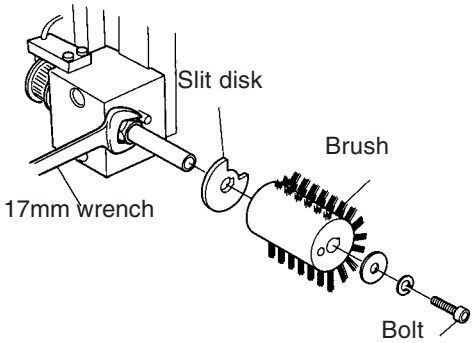
When installing a new clutch & Brake, keep alignment in order to avoid stress on the shaft and pulley.





To remove the brushes...

Fix the shaft by wrench and loosen the screw.



For quick recovery when troubles occur, we recommend to have spare units.

Checkup

To keep the best condition, periodical checkup is recommended.

Controller

For the Controller consists of semiconductors, devices may be damaged in critical condition.

Checked item	Description	Regulation
Power supply	within the regulation	AC 170 – 220V
Circumstance	Ambient temperature	0 – 40C
	Humidity	35 – 85%RH
	Dust	No dust
Installation	Fixed steadly?	
	Terminals not loose?	

Bottle sorting unit, vacuum pump and micro mist separator/regulator

The brushes and belt must be replaced periodically.

Checked item	Description	Regulation
Brushes	Not loose? Period of Replacement?	
Belt	Enough tension? Period of Replacement? Stop position right?	
Fixed situation	Fixed steadly? Terminals not loose? Screws and bolts not loose?	
Vacuum	Check up the vacuum	530 mmHg +/- 5%
Air pressure	Check up the air pressure	3 [bar] +0/-0.5[bar]
Micro mist separator	Filter must be replaced?	

Spare parts

Parts		DBS	Type
Belt	C/B Inlet	150 / E30	210L050
		100 / 060	240L050
	C/B Outlet	150	560-5M-15
		100	550-5M-15
Brush		060 / E30	520-5M-15
			DBB-56
			DBB-86
			DBB-87
Clutch & Brake		060 / 100 / 150 / 200	SRA 10
		E30	ROTA 06

Regarding the vacuum pump and the micro mist separator/regulator,
please see their own instruction manual published by the manufacturers.