disco

AUTOMATIC DICING SAW

DAD-2H/6T
DAD-2H/6TM

OPERATION MANUAL

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USING LINT-FREE PAPER

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INTRODUCTION

INTRODUCTION

This manual describes the operation procedures to be performed with the DISCO DICING SAW DAD-2H/6T and DAD-2H/6TM. The information here will asist you in obtaining the best performance of the machine.

Caution:

This manual uses lint free paper. Since this paper is weakened by heat, do not place near heat. Also when rubbing strongly with something such as an eraser, since the printing will be come thin and contaminated, please take adequate precautions in handling.

FEATURES AND SPECIFICATIONS

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Features

(1) Blade life has been extended by a considerable margin, thereby reducing running costs to a minimum. The life of the newly developed NBC-Z blades is about twice that of converntional blades and the number of dressings required has been reduced slightly.

(2) Cutting performance is the best of any saw in the world.

(3) The provision of ultra-precise guide surfaces permits the cutting of pieces of up to 6 inches in diameter. Recirculating bearings are employed to support the X-axis, permitting cutting at up to a maximum speed of 300mm/sec.-12"/sec.

(4) Operator can load up to 10 types of programs.
By specifying the program number after such data as the X stroke, X speed, Y index, Z index and θ index have been entered, any program can be used at any time.

(5) Fixed and variable cutting modes are provided.
The A, B, C and D modes are fixed modes, and the D mode is the dressing mode. In the variable mode, the cutting sequence can be freely programmed by the customer using the User Program Code (provisional name).
The variable mode is an optional function.

(6) Using the optional function mentioned in (5) (variable mode) ○, □ and ⬡ shaped pieces may be cut with the optimum number of strokes.

(7) The chuck table may be automatically rotated to any angle. (option)
The high speed, high resolution stepping motor employed for the θ-axis drive affords smooth and rapid rotation and highly precise positioning.

(8) Alignment may be accomplished with high precision using the bright TV monitor.

(9) Nonvolatile memories are employed to protect data against power cut-offs or power failure.

Specifications

1.	Wafer size	Max.152.4mm (ϕ50.8 to ϕ152.4)	Max. Dia 6" (2"to 6")
2.	X-axis (left-right movement of chuck table)		
1)	Maximum Table Stroke	160mm	$6\,^{5}/_{16}$"
2)	Cutting Range	20.4mm to 153mm in 1mm increments	1" to 6" in $^{1}/_{2}$"increments
3)	Cutting Feed Speed	0.3 to 300mm/sec.	0.012" to 12"/sec.
4)	Return Speed	300mm/sec.	12"/sec.
3.	Y-axis (forward-backward movement of spindle)		
1)	Maximum Spindle Stroke	160mm	$6\,^{5}/_{16}$"
2)	Spindle Index Range	0.002mm to 99.998mm	0.0001" to 4"
3)	Indexing Steps	in 0.002mm increments	in 0.0001" increments
4)	Indexing Speed of Spindle	30mm/sec.	1.18"/sec.
4.	Z-axis (up-down movement of spindle)		
1)	Vertical Stroke of Spindle	20mm	0.7874"
2)	Range of Depth Left Uncut	0.005mm to 19.995mm	0.0002" to 0.7872"
3)	Step of Depth Left Uncut	in 0.005mm increments	in 0.0002" increments
4)	Jog adjustment	0.0025mm increments	0.0001" increments
5)	Cutting Feed Speed	15mm/sec.	0.59"/sec.
6)	Return clearance of Spindle	0.7mm (in Mode A alone)	0.028"
7)	Cutting Mode (FIX)	A, B, C, and D (dressing mode)	
	Cutting Mode (VAR) (optional)	E to I	
5.	θ-axis (chuck table rotation)		(Manual θ-axis)
1)	Rotation Range	0 to 90 degree	90 degree
2)	Min. Index setting	±0.01 degree	-
3)	θ Orientation (Min. Index step)	0.00225° (8.1")	Fine Adjustment Range ±3°
4)	Rotation Speed	3.7 sec/90°	-
6.	Spindle Motor		
1)	Rotation speed	30,000r.p.m. (Variable range 3,000 to 40,000r.p.m.) High frequency air spindle (water-cooled type)	
2)	Output power	1.5 kW (at 30,000r.p.m.)	

7. Alignment Microscope With monitor TV (5")

8. Accuracy

1)	Chuck table flatness	0.005mm/ 152.4mm	0.0002"/6"
2)	Y-axis Index Accuracy		
	Unit Pitch Error	0.003mm	0.00012"
	Accumulated Pitch Error	0.005mm/152.4mm	0.0002"/6"

9. Utilities

1)	Power Supply		3 Phase AC 200 V ±10% 50/60Hz	
2)	Power Consumption		3.0kVA	
3)	Air Supply	Pressure	5.0kgf/cm^{2}G	71p.s.i.G
		Flow Rate	250Nℓ/min.	7.3c.f.m.
4)	Water Supply	Pressure	3kg/cm^2	43p.s.i.
		Flow Rate	6.5ℓ/min.	1.6g.p.m.
		2 Systems;	(Deionized Water used for cutting Tap Water used for spindle)	
		Pressure	3kg/cm^2 (Deionized Water)	43p.s.i.
		Flow Rate	4.5ℓ/min.	1.1g.p.m.
		Pressure	3kg/cm^2 (Tap Water)	43p.s.i.
		Flow Rate	2ℓ/min.	0.5g.p.m.
5)	Dimensions of Machine (W×D×H)		965×920×450mm	38"×36.2"×17.7"
6)	Weight of Machine		Approximately 313kg (Including Work Table 409kg-900 1b)	689 1b
7)	Coating Color (Standard)		Munsell 2.5Y4/2	

10. Accessories

1) Standard Accessories for Model DAD-2H/6T

Item	Name	Description	Disco Part No.	Quantity
1A	Universal Chuck Table	For 2-6 inch wafers	MODDN005	1
1B	Universal Chuck Table	(ditto) (Manual θ-axis)	MODDXA52	1
2	Hub Type Saw Blade	NBC-ZH2050 27HEBB	MODFN132	1
		NBC-ZH2050 27HEBC	MODFN133	1
		NBC-ZH2050 27HEBD	MODFN134	1
3	Hub Wheel Mount		MADFN922	1 set
4	Hub Demountable Ring		MODBN908	1
5	Hub Wheel Mount Extractor		MODBN82600	1 set
6	Wheel Mount Dressing Tool		MODBN844	1 set
7	Lifting Bar		MODBH052	4
8	Tool Box Containing:		MODBN015	1
	Adjustable Wrench	200 mm	MODBN013	1
	+ Screw Driver		MODBN011	1
	+ Screw Driver (Large)	100 mm	MOGAN01152	1
	- Screw Driver		MODBN022	1
	- Screw Driver	50 mm	MODDN006	1
	Double-Ended Spanner	7×8 mm	MODBN012	1
	Double-Ended Spanner	10×14 mm	MODBN021	1
	Double-Ended Spanner	12×14 mm	MODDN008	1
	Single-Ended Spanner	17 mm	MODBN876	1
	Hexagonal Wrenches	1/16", 1.5, 2, 2.5, 3, 4, 5, 6	MODBN014	1 set
	Wrench (Hexagonal T.Head)	6 mm	MODDN789	1
9	Fuse Element	1A	APG00001A250	18
	Fuse Element	2A	APG01002A250	3
	Fuse Element	3A	APG00003A250	12
	Fuse Element	4A	APG00004A250	12
	Fuse Element	5A	APG00005A125	6
	Fuse Element	10A	APMF65NM010A	6
10	Reinforced Plastic Hose	38 (I.D)×48 mm (O.D)× 2m (L)	MSTBH48×38C	1
	Water Supply Vinyl Hose	9 (I.D) ×15 mm (O.D) × 2m (L)	MSTBH15×09C	2
11	Air Hose	9 (I.D) ×15 mm (O.D) ×2m (L)	MSTBH15×09C	1
12	Trans-Box		EAUG--100501	1
13	Vinyl Machine Cover		MODDN003	1
14	Dressing Board Set	75×75×1.0 t	MODBN043	2 Boxes (10)
15	Binocular Microscope Spare Bulbs	6V 15 W	AQELB-12B	6
16	Manual Set:	With a file cover	MODDN010E	2 sets
	Operation Manual		MODDN011E	(2)
	Trouble Shooting Guide		MODDN012E	(2)

2) Optional Accessories

Item	Name	Description	Disco Part No.	Quantity
1A	Chuck Table	2"	MODDN716	1
	Chuck Table	2.5"	MODDN717	1
	Chuck Table	3"	MODDN718	1
	Chuck Table	3.5"	MODDN719	1
	Chuck Table	4"	MODDN720	1
	Chuck Table	4.5"	MODDN721	1
	Chuck Table	5"	MODDN722	1
	Chuck Table	6"	MODDN723	1
1B	Chuck Table	2" (Manual θ-axis)	MODDN749	1
	Chuck Table	2.5" (ditto)	MODDN750	1
	Chuck Table	3" (ditto)	MODDN751	1
	Chuck Table	3.5" (ditto)	MODDN752	1
	Chuck Table	4" (ditto)	MODDN753	1
	Chuck Table	4.5 (ditto)	MODDN754	1
	Chuck Table	5" (ditto)	MODDN755	1
	Chuck Table	6" (ditto)	MODDN756	1
2	Tape Ring Set	for 2", 2.5", 3", 3.5"	MODDN709	As Req'd
	Tape Ring Set	for 4", 4.5", 5", 6"	MODDN711	As Req'd
3	Flange Set (spare)	ϕ 49.6(1.9527")×40(1.5748")	MOFS496400	As Req'd
		Step 0.2 (0.008")		As Req'd
	Flange Set (spare)	47(1.8504")×40(1.5748")	MOFS470400	As Req'd
	Flange Set (spare)	Specified diameter×40(1.5748")	MOFSXXX400	As Req'd
	Flange Set (spare)	49.4(1.9449")×25.4(1")	MOFS494254	As Req'd
		Step 0.4 (0.016")		As Req'd
	Flange Set (spare)	47(1.8504")×25.4(1")	MOFS470254	As Req'd
	Flange Set (spare)	38(1.4961")×25.4(1")	MOFS380254	As Req'd
	Flange Set (spare)	Specified diameter×25.4(1")	MOFSXXX254	As Req'd
4	Diamond Saw Blade	NBC-Z1060 50.2×40×0.020	MODBN024	2
		NBC-Z1060 50.4×40×0.025	MODBN025	2
		NBC-Z1060 50.6×40×0.030	MODBN026	1
5	Flange Mount Extractor		MODBN036	1 set
6	Demountable Flange Ring		MODBN685	1
7	Extractor		MODBN798	1 set
8	Flange Dressing Tool		MODBN631	1 set
9	Blade Reducing Tool		MODBN634	1 set

Item	Name	Description	Disco Part No.	Quantity
10	Ocular Lens Assy	10×	MADDH908	1 set
	Ocular Lens Assy	20×	MADDH909	1 set
11	Oblique Lighting Assy		MADDNA57	1 set
12	Work Table		MADDN920	1 set
13	Freezing Type Air Dryer	IDF8C-1	MODBN789	1 set
14	Emergency Power Unit		EAUH--328401	1 set

* The specifications given above are subject to improvement without prior announcement.
* DISCO is not liable for any damage to the machine that may occur when other than genuine DISCO parts are used.

A. INSTALLATION

A. INSTALLATION

A-I. Installation Conditions

(1) The dicing saw requires a floor area of 965mm–38" by 920mm–36.2".

(2) Consideration should be given to ease of operation and maintenance when selecting a site for installation.

(3) Do not install in locations where large or rapid temperature variations occur. The temperature of the area of installation must be kept within ±1°C (34°F) of a set value (20~25°C–68~77°F). Relative humidity should be maintained at 55% ±15%.

(4) Do not use power sources with frequent fluctuations in voltage. (Voltage should be within ±10% of 3-phase 200V).

(5) Avoid noise levels equivalent to 2000V or above for an impulse pulse width of 500ns.

(6) Avoid locations where the machine may be subjected to shocks or sensible vibration.

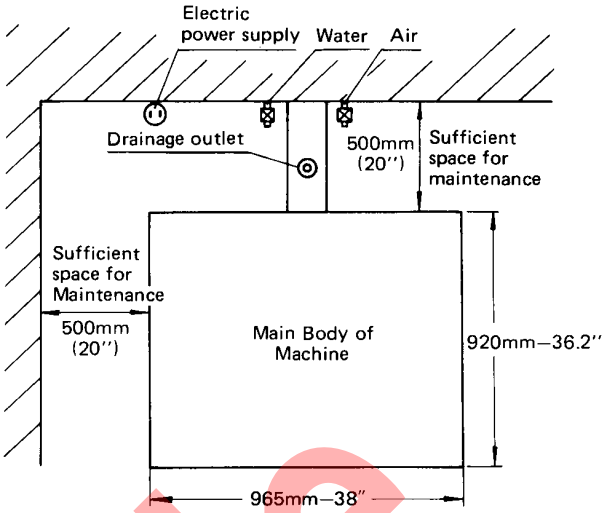

Fig. A-1

* For air and water piping connections refer to Schematic Diagram, Fig. B-38.

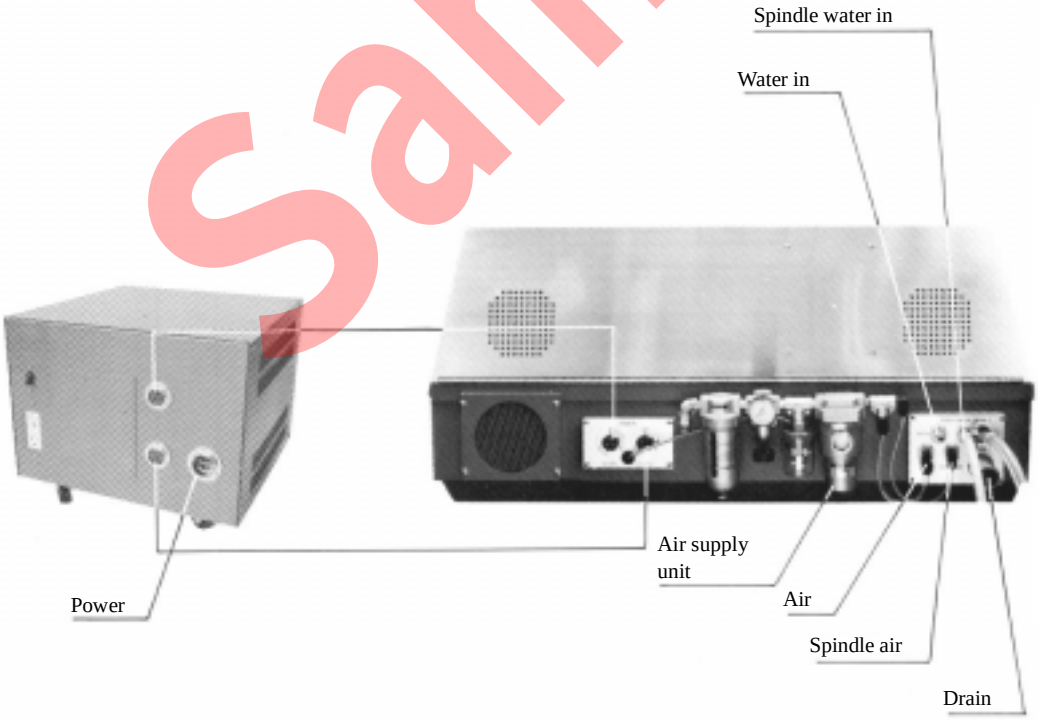

Fig. A-2

A-II. Preparations for Installation

(1) The electric power, pneumatic pressure, and water requirements of the DISCO DICING SAW are as follows:

1) Electric power supply: 3.0kVA at 3 phase AC 200V, (50/60Hz).

2) • Even with air pressure between 5.0kgf/cm^2·G (71PSI·G) and 8.0kgf/cm^2·G (113.6PSI·G), when the machine in operation, please be careful not to allow the pressure at the machine intake to fall below 5.0kgf/cm^2·G (71PSI·G).
Also, air consumption rate is 250Nℓ/min (8.83cfm).
• Please maintain the supplied air pressure within the fluctuation range of 0.3kgf/cm^2·G (4.26PSI·G).
• When using reinforced (braided) hose for the supplied air piping, please use hose not exceeding 25 (I.D) x 33 (O.D) mm.

3) Water pressure and flow rate: More than 6.5liters/min (1.6GPM) at 3kg/cm^2 (43PSI) (single system).

4) The water pressure of water circuits is divided into two systems (deionized water and city water) should be 3kg/cm^2 (±10%) and the minimum flow rate should be 4.5 liter/min for deionized water and 2 liter/min for city water.

5) Set the water temperature within 0~+2°C of the atmospheric temperature (set value) at the site where the machine is installed. (Temperature variations must not exceed ±1°C).

6) Excessively high ion content (Cl, Fe, Cu, Na, etc.) and conductivity in the water supply can lead to corrosion of blades and machine components.

(2) Electrical Cord and Hose −Wiring and Piping Requirements

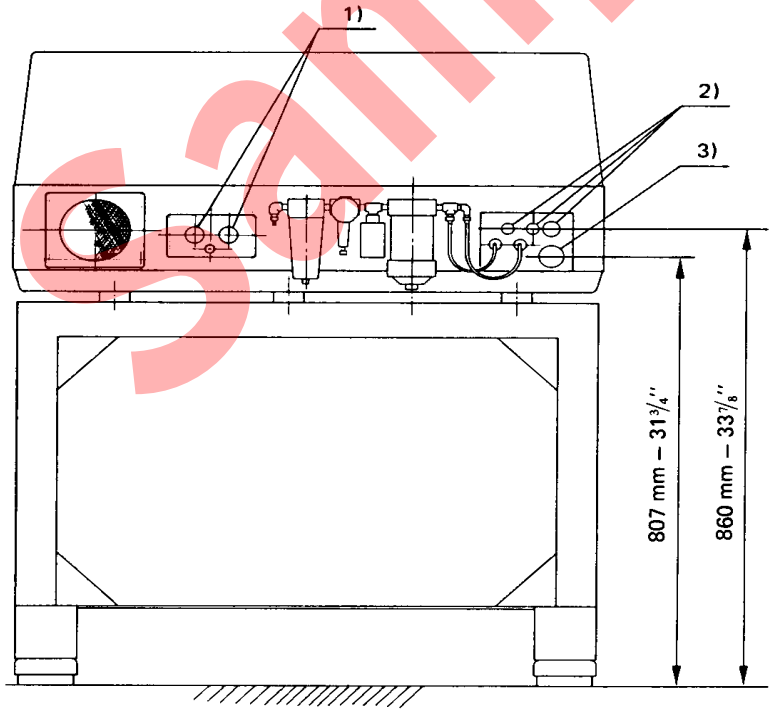

Fig. A-3

1)Electrical cord (2m −78 3/4")
The main unit of the dicing saw is provided with a 30 ϕ3P connector, 1 pole being earthed. (For 100V)
The main unit of the dicing saw is provided with a 30 ϕ4P connector, 1 pole being earthed. (For 200V)

2) Piping hose (2m −78 3/4" each)
- Hose of 9mm −0.35" inner diameter is employed for the pneumatic piping.
- Hose of 9mm −0.35" inner diameter is employed for the water piping.
- The above hoses must be suitable for the pneumatic and water pressures stated in 2) and 3) of 1 above.
- While a vacuum venturi unit is incorporated within the main unit, a vacuum pump may also be directly coupled.

3) Water drainage hose
- A hose of 38mm −1 1/2" inner diameter is employed for water drainage.

A-III. Precautions to be Taken When Installing

(1) When installing the dicing saw, full consideration should be given to the provision of levelness.
(2) Piping hoses should be connected after removing all dirt from the indise.
(3) After installation has been completed, check that all cords and hoses are firmly clamped in place.
(4) The drainage outlet should be placed beneath the main unit. (See ◎ mark in Fig. A-1.)
(5) Piping joints should always be secured by means of the hose clamps provided.
(6) Always use dry air (dew point less than −15° −5°F) passed through a filter (0.003PPM wt/wt) or nitrogen gas (N_2) as the air source. (An optional refrigerator-type air drier is available.)
(7) Always connect the ground to an anchor ground. Set the resistance at the point to grounding (class 3 ground) to 100 ohm or less.
(8) The dicing saw should be installed on a bench of adequate strength. (The dicing saw weighs about 313kg − 689 lb.)
(9) Remove all the shipping brackets provided for securing the X, Y and Z axes during transportation.

A-IV. Transportation

(1) Transportation Method
1) Secure the X, Y, and Z axes with the metal shipping brackets.
2) Disconnect all cords and hoses.
3) Screw the accessory lifting bars into the tapped holes on both sides of the dicing saw. (The tapped holes are normally closed with plugs.)
4) Use a crane to lift the dicing saw by the lifting bars.
5) Transport the dicing saw to the installation site, taking care to avoid severe vibration.

(2) Precautions to be Taken When Transporting
1) Be sure to screw in the lifting bars to the limits of their threads.
2) When hoisting the dicing saw, care should be taken to prevent the hoisting cable from touching the cover of the main unit.

3) Do not hoist the machine in a tilted position.
4) Do not transport the machine by taking hold of the cover of the main unit.
5) Avoid subjecting the machine to severe vibration when transporting.

B. STRUCTURAL SECTIONS AND THEIR FUNCTIONS