# MESS 🌗 MATÌG

## **VERTICAL BALANCING MACHINE**

## **INSTRUCTIONS MANUAL**



DIN EN ISO 9001:2000 Zertifikat: 01 100 042856







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#### CHAPTER 1 INTRODUCTION

#### 1.1 General Introducing

ODM Series Vertical Balancing Machine is an industrial balancing machine designed for sensitive balancing operation for flywheels, clutch, brake disc, pulleys, etc. The machine is not suitable for other purpose of usage. Balancing operation is performed when the spinning axis of the rotor is vertical to the ground. The motor spin movement (Accelarating, constant speed, braking) is performed by motor speed control device. The machine is computerized, Windows operated, and user friendly.

The machine measures the imbalance value by measuring the vibrations of spinning rotor with the help of the sensors located on the main body of the machine. The machine is capable of measuring static imbalance values. The angular position of this measured imbalance is measured by encoder which is connected to the mechanic of the machine.



Before starting using ht emachine, please read the instructions manual carefully in order to prevent the possible wrong usage of the machine. In case of any further needs, please keep this instructions manual always near to the machine

#### 1.2 Packacing and carriage

According to customers' request, the machines are packaged for delivery in the factory in two ways, 1. On pallet

- 2. Without package

In two ways, the machine is streched.



Carriage of the machine should be performed by fork-lift. The machine should never be lifted from the balance adaptor.



Please control the main body of the machine as you open the first cover if there is any broken part of not. If there is, please immediately contact with the seller or manufacturer.



#### 1.3 Technical Features Table

Balancing RPM (rpm/minute)	100-1000
Rotor Weight (Kg)	0.5 – 100
Maximum rotor diameter (mm)	700
Balancing type	STATIC



The operating of the machine should be performed by authorized and experienced operator. Do not change anything on the control panel of the machine. In case of any problem with the machine, contact with the after sales department or the manufacturer.

#### CHAPTER 2 INSTALLATION AND COMMISSIONING

#### 2.1 Customers' duty for installation

For installation, prefer a comfortable, safe, smooth surface, and far from any vibrating machines position. Please conntect the machine to the ground with the bolts that given with the machine. In case of not connecting the machine to the ground, the requested balancing measurement datas will not be measured. The required working condition are as follows:

- Humidity : %30 %95
- Temperature : -20 °C + 55 °C

#### **2.2 Electrical Connection**



If there is any voltage loss in your system, you should use regulator before connecting your machine to the electricity. There should be earth connection in your system.



Any change or work on the electricity system, should be performed by authorized personel.



#### **SECTION 3 INSTRUCTIONS**

#### 3.1 Starting the machine

After installing the machine and connected to the electricity, first turn on the shalter on the control panel. Then, if your computer doesn't starts automatically, push the button on the computer.



During balancing operation, please keep away your hands and body as much as possible from the spinning parts of the machine. Neckless, accessories, large clothes are dangerous for the operator. During operation, please do not wear these accessories

#### 3.2 Screen Information

After turning on the machine, you will see username and password enterance menu. (Figure-1) Username is (MESSMATIC) and password is (1), press enter.

User Name :	MESSMATIC	
Password :		
	1 OK	Cancel

#### Figure-1

During the startup, drilling unit moves on X and Y axial for referance. For this movements the door should be closed and emergency stop button should not be pressed.

After a while, you will see the main screen (Figure-2).



BALANS MAKINASI PROGRAMI Version 1.12.01 (20					
	MES	S 🌐 MAT	ĬC®	() 	
Control Pane	əl		_		
⊡ Log Test Data	1			0 Shutdown	
⊠ Eccentricity □ Compensatio	n			Operator Change	
X Comp.	K ISO Locate				
			<u></u>		
NO	ROTOR NAME	MATERIAL	TOLERANCE	DIAMETER	
NO 1	ROTOR NAME BUYUK PARCA	0 MATERIAL GG25	TOLERANCE 4.400 g	DIAMETER 296.00 mm	
NO 1 Start	ROTOR NAME BUYUK PARCA Iest Demo	MATERIAL GG25 Database Report	TOLERANCE 4.400 g	DIAMETER 296.00 mm	



#### Main screen buttons and functions:

- **DISPLAY BOX** : Shows the unbalance in selected units.
- **RIGHT AND LEFT ARROWS** : Shows you which direction that you should turn the rotor to find the imbalance point. You should turn the rotor in the direction of arrow untill you see OK on the screen.
- NO, ROTOR NAME,... : In this section, the information is displayed belonging to the part which is chosen in database menu.
- **START** : Starts the machine.
- **DEMO** : Show the demo page of the company
- DATABASE : To put and save the datas of the part and some special operations.
- **REPORT** : To print out the first and the last unbalance values of the rotor. (Note: Printer is not included on the machine and it is optional)



- **ABOUT** : To display the manufacturer company details.
- **RPM** : To see the RPM of the machine.
- **RATIO** : To see the measuring ratio of the machine.
- **DEPTH** : Maximum depth of the holes during the balancing operation with automatic drilling unit.
- HOLE COUNT (DRILLING) : Maximum drilling hole number of the balancing operation.
- **ECCENTRICITY** : Automatically eliminates the errorrs caused by mechanical eccentricty. During balancing operation, this option must be enabled.
- **COMPENSATION** : Electronically admits the imbalance of the adaptor as "Zero"
- X : Exit to Windows.
- K : It is a shortcut for eccentricity process

Eccentricity means to compansate the eccentric misalignments on the clamping unit. Rotating the loosen the balanced rotor 120 degree during the clamping unit is stable, you may read an unbalance value. This value means the error of centering. To compansate this error, you should perform the eccentricity process. You may change the angle of the eccentricity on the database menu.

Before starting the operation, put a mark on the clamping unit and the rotor make it easy for you. To start, click the K button or press the K button on the keyboard.

"Mount the part and the machine will run" message is going to appear. On the left side of this message there is a left arrow ok (ECCENTRICITY BACK), right arrow ok (ECCENTRICITY FORWARD) and ECCENTRICITY STOP buttons. Click the eccentricity forward button, the machine is going to start and after awhile it is going to stop.

"Rotate the part 120 degree and the machine will run" message is going to appear. Loose the rotor and rotate it 120 degree and mount it again. Click the eccentricity forward button and the machine is going to start, after awhile it is going to stop.

This procedure is going to go on until 360 degree is completed. (for 120° three times). After it is completed, eccentricity is completed message appeares. By pressing the eccentricity forward button eccentricity procedure ends.

- **ISO** : It is for calculate the resudable unbalance according to the number 1940 of ISO standard.
- LOCATE : Makes position.
- **SHUT DOWN** : Shuts down the computer.



• **OPERATOR CHANGE** : When you click this button, you will see the menu Figure-1. Every operator will enter their own username and password before starting operating. During shift changes and not working times on the machine, the operator clicks this button to prevent non authorized usage of the machine.

#### 3.3 Saving the data of the rotor

Before balancing, you should enter the DATA menu to enter the necessary information about the rotor. When you enter the DATA menu, you will see the screen on Figure-3.



#### Figure-3

- By pressing [TAB] or [SHIFT+TAB] buttons, or by clicking with your mouse on NO, PART NAME, MATERIAL, BALANCE DIAMETER, BALANCE TOLERANCE, you can start entering the datas. Here;
- NO : The number of the rotor.
- **ROTOR NAME** : The name of the rotor.
- MATERIAL : Production material of the rotor.

On the unbaalnce calculations for correction with drilling / milling, mass weight is being used automatically.

• **BALANCING DIAMETER** : The balancing diameter of the rotor.



#### • **BALANCING TOLERANCE:** Permitted minimum resiudable unbalance.

Using [CTRL+Home], UP key ok [↑], Down key ok [↓], [CTRL+End], [INSERT], [CTRL+Delete]
By clicking these buttons, you may add new record, delete or correct the record
By pressing the [INSERT] button or by cilicking <b>+</b> button you may add a new record.
By pressing the [CTRL+Delete] button or clicking the button you may erase the record.
By pressing the [CTRL+Home] button or by clicking the button you may go on the first record.
By pressing the [CTRL+End] button or by clicking the button you may go on the last record.
By pressing the Up arrow key [↑]or by cilcking the button you may go on the previous record.
By pressing the Down arrow key $[\downarrow]$ or by clicking the button you may go on the next record.
By pressing the [TAB] button you may g oto the next area.
By pressing the [SHIFT+TAB] button you may g oto the previous area.
By pressing the [End] button you may g oto the last area.

By pressing the [Home] button you may go to the first area.

If you press the [CTRL+Delete] button there wil appear a dialog box which is asking the approval of delete or not, if you want to delete the record press the vor button, otherwise press the button to cancel it.



				Data			×
14	•		M	+	-	Сору	Loading Constant
× NO NAME ▶ <mark>* 1</mark> ç		MATERIAL GG25		BALANC. DIAM. 243	BALANC. TOL	Part <u>N</u> o	User Rights
						<u>S</u> elect Part	Enable Windows
						Material Record	DB Import/Export
						Calibration	
						Kalibrasyon Kontrol	
						Milling Calibration	
						Calculate Ratio	
						Company Title	
						Demo Paramete <u>r</u> s	
						Pos. Correction	
						Filter <u>P</u> arameters	
						PLC Control	
						Machine Control	
						Maintenance	
۲.					>	Rotor Definition Calib.	
ODEDATO						PLC Ports	
OPERATO	R. WESSWATT					Setup	

#### The right side of the database manu means below;

#### • COPY

By pressing the [Alt + A] buttons or by clicking the copy button, you may copy the data of the rotor to another rotor line, for easy creating a database for a new rotor.

#### • PART NO

It uses to ake active the balancing rotor by its number. By pressing the [Alt + N] buttons or by clicking the "PART NO" button, you may choose this menu. After you choosed this there is going to appear a dialog box which is asking you the part number. Enter the number of the part and click the  $\checkmark$  button.

#### • SELECT PART

Is used to select the part which will be balanced. By pressing [Alt + S] or clicking on "SELECT PART" you can use this feature. The selected part will shown in red. The part that which is going to be operated should be selected in this way. After selecting the part, all the values needed for calibration, testing the imbalance value, etc will be used off the selected part.

#### • MATERIAL RECORD

During the entering the data of the rotor on the DATABASE menu, if there is not any information of



the production metarial of the part, you may add new record by pressing [Alt + M] buttons. Metarial list is going to appear on the screen. By pressing the [TAB] or [SHIFT+TAB] buttons or by clicking, you may move the line and put new data. On this menü, you may find the "METARIAL NAME" and "DENSITY" information. some general substances are already entered, if the your substance is not present on the list, you can enter by yourself.

[INSERT] you can create a new data. [CTRL+Delete] you can delete a present data. [CTRL+Home] you can reach the first data [CTRL+End] you can reach the last data you can reach the next area [TAB] [SHIFT+TAB] you can reach the previous area [End] you can reach the last area [Home] you can reach the first area

If you press [CTRL + Delete] a dialog box opens asking whether the entry should be deleted or not, if you want to delete, click  $\checkmark$ , if not you should click  $\varkappa$  cancel.

#### • CALIBRATION

You should definately perform calibration before starting balancing operation of the rotor which you choosed on the DATABASE menü. Press the. [Alt + K ] buttons or kalibrasyon button. There is going to appear a dialog box on the screen which is asking the calibration weight and calibration diameter.

Calibration		
Calibration Weight:	β <b>0.0</b>	g
Calibration Diameter	243.0	mm
	🖊 ок 🛛 🗶	Cancel

#### Figure-4

Calibration weight is very important. You should use the reccommended, certified special calibration weight which is delivered by the manufacturer. Write the calibration weight and calibration diameter on the screen and click the  $\checkmark \circ \lor$  button. There is going to appear " mount the rotor and pess enter" message on the screen.



The calibration weight and calibration diameter information can be entered once in the database menü: Enter Global Data menü by double clicking to the selected rotor's line.

C	Calibration
ſ	kalibrasyon Katsayisi Hesabi()
	READY TO START (WITHOUT ANY WEIGHT)
	OK Cancel



Mount the master calibration rotor on the balancing machine. (Attention: Do not mount the calibration weight on the master rotor!) Press OK button. Rotor is going to rotate and it is going to stop "Adjust the weight and press enter" message is going to appear on the screen.

1	Calibration
	kalibrasyonKatsayisiHesabi()
	ADJUST THE WEIGHT AND PRESS ENTER
l	OK Cancel

#### Figure-6

Mount the calibrtion weight and position this weight exactly under the drilling unit (laser line – if present) and press OK. Rotor is going to rotate again. "Calibration operation is completed" message is going to appear on the screen (Figure-7).



Calibration	
kalibrasyon Katsayisi Hesabi()	
CALIBRATION OPERATION IS COMPLETED	
ОК	ו



By pressing OK button you will save and exit.

You should make the calibration again in case of below occasions.

- After you install and setup the machine
- If the machine does not measure certain results
- If you change the fixture
- If you change the PC
- If you change the TMS card
- If you change the RPM of the machine
- If you change the vibration sensors (Piezzo)
- If you move the machine to other location.

#### • RATIO CALCULATION

It is a special feature for the manufacturer company. Please do not use this menu.

#### • COMPANY LETTERHEAD

It is used fort o print out report from the printer under your company's letterhead. By pressing the [Alt + F] buttons or  $\boxed{\text{Erma Arteti}}$  button you may choose this option. Text editor is going to be appear on the screen, After the changes on this text you may save the data by pressing the  $\boxed{\checkmark OK}$  button, or you may press the  $\boxed{\checkmark Cancel}$  button to cancel it.



#### • POS. CORRECTION

Position Correciton is used to change the unbalance position. After calibration, if the balance weight position is not correct when you test the master rotor (Compensation should be enabled), you can correct this error by position correction. Make Compensation without any weight on the master rotor. Then put the calibration weight and press TEST. After rotation it stops and position the master rotor to the correct balance weight position that you want to see for unbalance (Exactly under the drilling unit). To start the POS. CORRECTION, on the DATABASE menü press the [Alt + D] button or click POS. CORRECTION. "Attention you change the position" message appears. Press OK button to save tha changes. If you press CANCEL button it is going to be cancelled. Position correction will be completed.

NASI PROGI	Data							b	×
		4	4	₽	I	+	-	Сору	Setup
	* NO	NAME	DADCA	MATERIA	NL .	BALANC. DIAM.	BALANC. T ^	Part No	Loading Constant
		BUTUKI	ARGA	0025		290 11		T un 100	Louding Constant
	* 4	KUCCUR	A PARCA SUISS	GG25		223 1	m	Select Part	User Rights
	*	00704	OH27 12 AA	LI27 12		223 1		-	
	* 6	00104	0401 06 AC	0401.0	6	200 11		Material Record	Enable Windows
	* 6	1_09104	-0401-00 AC	GE5-01	0	100 m			DB Import/Export
	* 7	1-09104-	-0GR9-02 AB	GGV30	Tool Offset			×	
	* 8	1-09104	-0GF8-02 AA	GGV30	Distance enable	>>>	»»	Kalibrasyon Kontr	rol
	* (	L-09111-	-0G45-01	G45-0	MilingDistance	-			
	* 10	test 0q45	5-01 d8	TEST	0.0000	••••	• • •	Milling Calibration	n
	* 11	L-02104	-0G13-20	G13-20	Save Value			Calculate Ratio	
	* 12	KUCCU	K PARCA sure u	IZ GG25	MilingPosition				
	* 13	KUCCU	K PARCA sure u	z GG25	0.0000	• • •	• • •	Drill Offset	
	* 14	BUYUK I	PARCA	GG25	Save Value			Company Title	
								Company rite	
					El Carkini Devre	eve Sok Million	tart Milling stop	Demo Parameter	(S
					a yanan son o	Start dust	leaning Dust cleaning st	op Pos Correction	
					( Internet of the second second				
					Trip Reset	🗸 ок	X Cancel	Filter Parameters	s
								PLC Control	
								Machine Control	I.
	<						, ,	Maintenance	
		-DATOR	UFOOLUTIO					Rotor Definition Ca	lib
			B B B S S B B B B B B B B						

#### • TOOL OFFSET

You may calculate the Drill - rotor center by TOOL OFFSET operation.

If the drill depth is different or if you add a new rotor you should make the TOOL OFFSET in order to introduce the 0 (touching) point of the drilling unit to the rotor.

For this operation;

Mounth a rotor on the machine. On the TOOL OFFSET press twice to the **DISTANCE ENABLE** button.

Clemp the rotor manually. ATTENTION! If you don't clamp the rotor you may demage the system.

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www.messmatic.com



Start the drilling unit, and manually move the drilling unit to the rotor until touching level "0 point"

Click OK button. The machine will ask you to enter the depth of the drilling.

Drilling unit is going to move back. Take off the rotor and measure the depth of drill. By keyboard write this depth value and press OK button. The tool offset value is set.

#### • OPERATOR DEFINITIONS



Figure -8

You may assign name and password for every operator. There are levels between operators. Admin, Chef, Operator. The highest level is Admin. The lowest level is the operator. Chef is between Admin and Operator. (Figure-8)

#### • ENABLE WINDOWS

It allows the user to enter to the Windows menu without exiting the balancing machine software.

#### QUIT

By pressing [Alt + C] buttons or by pressing to the QUIT button you may choose this function. Quit operation makes you to get out from the GLOBAL DATA menü. To reach back the global data menu of a rotor double click on the rotor name.



#### **OTHER MENUS**

**SETUP :** On this menu, you may enable the eccentricity or disable if you have changed the rotor.

DİKEY BALANS MAKİNASI PROGRAMI Version 1.12.00 (2015-06-08 09:52:36)	
Di Global Data	
Setup General General2 Measurement Rotor M	MainMotor Tool Tool2 MillingFromTheTop RunTime ServoMilin ServoMiling
Control Control	Control of the second sec
Balance     Balance     Dust Cleaner Oto Check     Calkration Oto Control	Coentricity performed     Debug Window       Loading     Ukeug Window       Loading     Logo
X         Con         Measuring Rotor Definition           V         Rotor1 Enabled         Conflicient1 :         0.00           Constant1 :         0.00         Tolerance1 (%) :         1.00           Sample number :         1             V         Rotor2 Enabled	Losang Constant: U.O. Print Logo
NO     Constant2:     0.00       2     Language	Select part with part identification and tool Lubrication Lubrication period : 150 Calculate phase at Calibration Reference of the select calibration Reference of the select
RPM: RATIO: TOOL	LIFE: DEPTH: HOLE COUNT:
🛃 Başlat 🛛 🧿 😂 🙆 🔴 Dikey 💎 TRANSCEND (E:)	· · · · · · · · · · · · · · · · · · ·

Figure-9



**GENERAL:** On this menü, you may find the reference point, tolerances of the rotor, balancing methods, unbalance units.

the second second second second second second second second second second second second second second second s	General2	Measurem	ent Rotor	Kalibras	yonKontrol	MainMotor T	ool Tool2	MillingFromTheTo	p RunTime	ServoMain	ServoMilling	ServoMillingPosition	MachineSpece
Measuring			Continuous	Test		Automatic Ra	itio		-				
digitalFilterEn	able		waiting Tir	ne [ms] :	1000	AutoRatio	Enabled						
ENC_T :	102	4	cycle :		5	nRatioValue :		0 ~					
sample :	64					nRatioStartVa	lue :	7					
waiting Time (ms	s]: 600	00				nRatioLowerL	.imit :	50					
	20					nRatioUpperL	imit :	2000					
cycle :	50												
ENC_T2 no calc	culation	~				Ratio Values	1.00	ratio k10 ·	1.00				
INOCOMI						auu_kuu .	2.00	ratio_kiU.	2.00				
						ratio_k01 :	2.08	ratio_k11 :	2.09				
Gom Port	GOZ_T2	0				ratio_k02 :	4.35	ratio_k12 :	4.36				
MainMotorRe	verseDire	ction				ratio_k03 :	9.18	ratio_k13 :	9.17				
						ratio_k04 :	20.07	ratio_k14 :	20.24				
Rbw.						ratio_k05 :	41.61	ratio_k15 :	42.72				
Rpm [rpm] :		0				ratio_k06 :	88.38	ratio_k16 :	91.16				
Rpm Timeout (ms	s] :	21	0000			ratio_k07 :	189.68	ratio_k17 :	196.75	Ĩ.			
Rpm Tolerance [9	%]:	1	0					-		-4			
Rpm Tolerance [9	%]:	2											
								3					



#### **Suggested Parameters:**

- 1. Position after balancing should be clicked.
- 2. Do not position if in tolerance should be clicked.
- 3. Disable servo after positioning shoul be clicked.
- 4. Write the tolerances on the screen.
- 5. Balancing method is going to be DRILLING FROM THE TOP.
- 6. Eccentricity Phase should be written.
- 7. By pressing ISO you may determine the tolerances of the rotor.

**MEASUREMENT MENU:** You may just use Waiting Time on this menu. (Figure-11)

• Waiting time is the total time between the start of the rotation of the rotor, and unbalance measurement starting. After the adjusted rpm level is reached, the machine waits some seconds to get a stable signal level from the rotation. (During Accelaration



or decelaration, the unbalance signal is not stable!

- **Sample** this value is representing the number of the measurement points on the signal.
- **Cycle** this value is representing the teh cycle numbers which will define the unbalance measurement average of the total cycles' measurement.

ATTENTION! These values are factory set, changing these values will affect the cycle time of the balancing machine and may cause unexpected sensitivity problems fort he unbalance measurement.

**Com Port:** There are the cominication protocols of the TMS electronic inside of the computer. They are factory set.

DIKEY BALANS MAKINASI PROGRA	AMI Version 1.12	.00 (2015-06-08 09:52:36)					
	Da	ilobal Data					
		Setup General General2 Measurer	nent Rotor MainMotor Tool	Tool2 MillingFromTheTop	RunTime ServoMain ServoMilling		
		Measuring	Continuous Test	Automatic Ratio			
	Þ	digitalFilterEnable	waiting Time [ms]: 1000	RatioValue :	0 🗸		
	Control	ENC_T: 1024	cycle : 5			d	
		sample : 64		nRatioStartValue :	7	Shutdown	
	✓ Log rest	waiting Time [ms] : 6000		nRatioLowerLimit :	50	on ator Change	
	Compen:	cycle : 30		nratioupperLimit :	2000		
		ENC_T2 no calculation		Ratio Values			
	X Con	END017 (14-Oca-15)		ratio_k01: 1.99	ratio_k11: 1.98		
		Con Port GO7 T2: 1024		ratio_k02: 4.20	ratio_k12: 4.25	n 1	
		MainMotorReverseDirection		ratio_k03 : 8.84	ratio_k13: 8.78	rs	
-				ratio_k04 : 19.28	ratio_k14: 19.15		
		Rom Count	0	ratio_k05: 41.25	ratio_k15: 40.90		
		Rom Count Timeout Ims1:	20000	ratio_k06 : 88.51	ratio_k16: 87.55	alls.	
		Rpm Count Tolerance [%] :	10	ratio_k07 : 194.21	ratio_k17 : 192.43		
-		Rpm Count Tolerance [%]:	2				
	NO						
	2					7.00 mm	
					(minimum)		
		Read Parameters			Canc		
	Stal.						
		DATIO					
Rapiat C C C		RATIO:	TOOL LIFE:	DEF	ин: H(	DLE COUNT:	2. 18 dl 9.2 march
Daşlal 988	Ulkey	(E:)					1 2 2 2 2 4 USIDS

Figure 11

#### SERICOM[ timeout]:

It is the retime of connection time, If you see an error during the data transfer (milisecond)



#### **ROTOR MENU:**

channel_width_of_part (mkg) [mm]:       6.60         channel_depth_of_part (mkg) [mm]:       30.0         number_of_arm:       0         indication coefficient [g,mm/adc]:       33.66         density [g/cm3]:       7.25         rotor_pointion       1         Rotor Definition       Areas can be balanced         Pens Definition       Areas can be balanced         Pens Definition       Reference Phase         Pens Definition       Reference Phase         Pens Definition       Reference Phase	balancing diameter (Rb) [mm] : 296.00	Calibration		
number_of_arm:       0	channel_width_of_part (mkg) [mm] : 6.60 channel_depth_of_part (mkd) [mm] : 3.00	calibraiton_weight [g] : calibration diam [mm] :	25.00 296.00	
mid       mid       mid       mid         mid       mid       mid       mid         Rotor       Rotor       Rotor       mid         Rotor       Gass       mid       mid         Pens       Pens       Mid       Mid         Pens       Pension       Mid       Mid         Pens       Mid       Mid       Mid         Mid       er_of_arm:	calibration coefficient [g.mm/adc]:	33.66		
PensDefinition :	Rotor Definition Rotor Definition 1 [mm] : 0 Pens Definition 2 [mm] : 0 Refere	rotor_no : 1 name: BUVUK PARC/ material: GG25 an be balanced as can not be balanced as can be balanced nce Phase 41.53	ne : 14 ~	
	PensDefinition :		ß	

Figure 12

#### Parameters:

- 1. Balancing Diameter: Diameter of the rotor, calculated by the drilling center point on the rotor.
- 2. Calibration Weight: The weight of the calibration weight.
- 3. **Calibration Diameter:** The diameter of the place that you apply the calibration weight during the calibration.
- 4. Part Name: The technical drawing name of the balanced rotor.
- 5. **Material Name:** It shows the density of the rotor. (drilling unit considers the density for calculation dor automatic balancing operation.)
- 6. Balancing Areas: Balancing areas that the machine is permitted for drilling operation.





7. Reference angle: It is used if there are specified balancing areas, if there isn't any forbidden balance correction areas, this angle is useless, no need to enter, this means the drilling unit will be able to drill any location on the rotor. In order to specify this reference angle, mount the master rotor, enter TOOL OFSET menu, manually position the drilling unit to the master rotor's 0° and click "Reference Phase" (Figure-13). The actual position of the encoder will be saved as 0° of this rotor for the balancing area calculation.



Setup	General	General2	Measurer	ment Roto	r Kalibras	yonKontrol	MainMotor	Tool	Tool2	MillingFromTheTop	RunTime	ServoMain	Machines
Roto	or Dimensio	ns				Calibra	ation						
bala	incing diam	eter (Rb) [m	m] :	243.00		✓ Ca	libration Done	•					
cha	nnel_width	_of_part (m	kg) [mm] :	6.60		calibra	aiton_weight	[g] :		30.00			
cha	nnel_depth	_of_part (m	kd) [mm] :	3.00		calibra	ation diam (mr	nl·		243.00			
num	ber_of_arm	n:		0		Calibre				20.50			
						calibra	ation coefficie	ent (g.mm	vadc]:	26.58			
	mkd					densit	y [g/cm3] :			7.25			
-	 mkg		Rb			rotor_	no : [ DU ARE CHA		THE RE	FERENCE ANGLE! A	RE YOU SI	× JRE?	
Roto	or Definition				Are								
Rote	orDefinition orDefinition	1 [mm] : 2 [mm] :	0							Tamam	i	ptal	
Pen Pen	s Definition sDefinition	:			Reference F	Phase 0.0	00						_

Figure 13

8. Areas Can not be balanced: Forbidden areas for drilling of unbalance correction. Drilling unit will not drill these forbidden areas for balancing operation.







#### **Process Sequence:**

- 1. Calibration.
- 2. Compansation.
- 3. Test by putting the weight on the calibration diameter.
- 4. You should read the correct calibration weight under the drilling tool.
- 5. If the weight is under the drilling unit or on the lazer line, enter the Data menu.
- 6. Double left click on the selected part .
- 7. Press the reference degree to define the reference on the part menü on Figure-12.

#### **CALIBRATION CONTROL**

If this feature is enabled, every 4 hours the software will automatically request for calibration control. You have to enter the data. The operator chooses the gram calibration and presses te start button og the gram calibration.

Setup General General2	Measurement	Rotor	KalibrasyonKontrol	MainMotor	Tool T	ool2 MillingF	FromTheTop	RunTime	ServoMain	ServoMilling	ServoMillingPosition	MachineSpecs	•
Mastar Parça tolerance [mo] :	25.000 @ 18	33.3°											
Genlik Toleransı [q] :	0.500	1											
Açı Toleransı [*] :	5.0	1	4	•									
Köprüleme Toleransı [g] :	4.000												
Kalibrasyon Kontrol Sonuçlar	1												
kopruleme_testi_OK													

Figure 14



#### Main Motor:

You may adjust here the main motor's rpm, start and stop movements

Sub menus;

- Main motor rotating speed
- Main motor positioning speed
- Speed controller
- Current controller

#### MAIN MOTOR ROTATING SPEED

You may write here the balancing unit's rpm, start speed, stop speeds According to the rotor's weight.

#### MAIN MOTOR POSITIONING SPEED

You may check the rpm, start and stop movements of the balancing unit to find the unbalance position.

ATTENTION! These values are factory set for the optimum conditions of the balancing machine and is not reccommended to be changed.



Setup General General2 Meas	surement Ro	otor KalibrasyonKontrol	MainMotor	Tool	Tool2	MillingFromTheTop	RunTime	ServoMain	ServoMilling	ServoMillingPosition	MachineSpecs	
Max speed of main motor												
rpm [rpm] : 1284	4.98											
accel [rad/s2] : 42.83	3											
min acceleration time[s]: 0.50/	0											
min deceleration time [s] : 0.500	0											
Main motor Speed	Ма	ain motor spinning method										
rpm [rpm] : 500.00	۲	GoTargetWithHoming										
acceleration time[s]: 1.30	0	ManualStart										
deceleration time [s] : 2.00												
Main motor positioning speed				2								
rpm [rpm] : 30.00												
acceleration time[s]: 0.50	-											
deceleration time [s] : 0.70												
0	_											
P pain (Nms/rad) 0.00												
Reset time [ms] : 0.00												
Current Controller												
P gain [V/A] : 0.00												
Reset time [ms] : 0.00												

Figure 15

#### **DRILLING UNIT**

Drill diameter	: The diameter of the drill tool.
Drill conical degree	: Conical degree of the drill tool.
Drill tool life is changable on the	ROTOR MENU.
Max hole number	: Maximum balancing drilling hole number.
Degree between the holes	: The degree between two holes
Drill distance	: The distance of drill to the part. It automatically calculates
during the tool offset operation.	

### MESS () MATÍC

V

#### Global Data

olobal bata												~
Setup General General2 Measuremen	nt Rotor	Kalibrasy	onKontrol Ma	ainMotor	Tool Tool2	2 MillingFromTheT	op RunTime	ServoMain	ServoMilling	ServoMillingPosition	MachineSpecs	
Setup General General2 Measuremen Tool Coordinates milling_distance_reference (Z_ref) [mm] : milling_position_reference (Y_ref) [mm] : tool_wear (W) [mm] : tool_height (T) [mm] : part_height (P) [mm] : milling_safety_position (Z_gp) [mm] : milling_safety_distance (Z_gm2) [mm] : milling_pos_safety_pos. (Y_gp) [mm] :	tt Rotor 539.61 256.84 0.00 189.80 223.00 0.00 10.00 20.00 0.00	Kalibrasy		T T JP	Z_gm	MillingFromTheT	2	Z_ref	ServoMilling	ServoMillingPosition	MachineSpecs	
milling_pos_safety_dist. (Y_gm) [mm] :	200.00											
Tool Measurements												
tool_diameter (R) [mm] :	14.00	1	natkap_konik_	derinligi (m	m]: 2.479							
drill_conical_angle [deg] :	141.0		matkap_acisal	_bolge [°] :	5.42		2					
milling width of the mouth (ag) [mm] :	13.50						~0					
max_tool_depth [mm] :	10.00											
max balance angle [deg] :	65.0											
max hole count :	6											
angle_in_the_between_holes [deg] :	12.0	to	iol_life [mm] :			99999999999						
distance_between_holes [mm] :	0.00	u	sed_tool_life [	mm] :		4.20						
Read Parameters										🗸 ок	X Cancel	
				ri								

Figure 16



#### **MAIN SERVO**

You may ad	just the start /	/ stop spee	eds of the ma	ain servo motor.
<b>.</b>				

AKİNASI PROC Globa	al Data										×
Setu	p General General2	Measurement	Rotor KalibrasyonKontrol MainMot	or Tool	Tool2 Mil	lingFromTheTop	RunTime	ServoMain	ServoMilling	ServoMillingPosition	MachineSpecs
- Ser	rvoMain	luces -	Encoder								
G	Bearbox_factor_numera	itor : 65534	Feedback type : 10								
Gea	arbox_factor_denomina	itor : 28070	Encoder const : 4096								
	Gearbox_ra	tio : 2.33	Feedback pos : 0								
	Feed_constant [un	it/r]: 360.00	fdbk rat num : 1								
	VMax [uni	t/s]: 7709.91	fdbk rat den : 1						63		
	AMax [unit/	s2]: 15419.82	Act_polarity								
	VManual [%VM	ax]: 40.00	External Encoder								
	AManual [%AM	ax]: 25.00	Timeout								
	VHoming [%VM	ax]: 10.00	timeout [ms] : 60000								
	AHoming [%AM	ax]: 25.00	Positioning Tolerance								
	VProgram (%VM	ax]: 60.00	tolerence (unit) 0.10								
	AProgram [%AM	ax]: 20.00									
r.	positive_position_limit [u	nit]: 21474836.47									
n	egative_position_limit [u	nit]: -21474836.4	1								
	Vp_spe	eed : 0.00									
	Vp_An	gle : 0.00	1								
	fol_tolerance_1 [u	nit] : 0.00									
	fol_tolerance_2 [u	nit] : 0.00									
	set_polarity_inverse		-								
	modulo_correction										
							_				
Rea	adFromIniFile Write	TolniFile						Init			
	Dead Daramatere									1 OK	Canaal
	nous Farameters									V UK	A cancer

Figure 19

#### SERVO MILLING DISTANCE

You may adjust the forward, backward, start, stop speeds manually.

**Positive position limit:** The positive limits of the programme. (Drilling unit backward) limit switches determined before 10mm from the last touching point. Postive means that, the forward movement of the servo motor.

**Negative position limit**: These are the negative switches of the programme. Mekanik olarak (Drilling unit backward) limit switches determined before 10mm from the last touching point. Negative means that, the bacward movement of the servo motor.

#### You should not use the other adjustments.



Setup Genel Kristal Parca	OzelDelik A	naMotor Matkap	Freze	UsttenFrezeleme	RunTime	ServoAna	ServoFrezeUzaklik	Se 🔨
ServoFrezeUzaklik		Encoder	1				13	8 <u>.</u>
Gearbox_factor_numerator :	1	Feedback type	: 10					
Gearbox_factor_denominator :	1	Encoder const	: 4096					
KasnakCevrimOrani :	1.00	Feedback pos	: 0					
Feed_constant [unit/r]:	5.00	fdbk rat num	: 1					
VMax [unit/s] :	300.00	fdbk rat den	: 1					
AMax [unit/s2] :	260.00	Act_polarity	2					
∨Manual [%∨Max]:	2.00	External End	oder					
AManual [%AMax] :	60.00	Timeout						
VHoming [%∀Max]:	8.00	timeout [ms]	60000					
AHoming [%AMax]:	60.00							
vProgram [%VMax]:	70.00	-						
AProgram [%AMax] :	60.00							
positive_position_limit [unit] :	5000.00							
negative_position_limit (unit) :	-5000.00							
Vp_speed :	0.00							
Vp_Angle :	0.00							
fol_tolerance_1 [unit]:	0.00							
fol_tolerance_2 [unit] :	0.00							
set_polarity_inverse	1							
modulo_correction								
	_							
ReadFromIniFile	File						l	nit
Parametreleri Oku								

Figure 20

#### **SERVO MILLING POSITION**

You may adjust the forward, backward, start, stop speeds manually.

**Positive position limit**: The positive limits of the programme. Mekanik olarak (Drilling unit backward) limit switches determined before 10mm from the last touching point. Postive means that, the forward movement of the servo motor.

**Negative position limit**: These are the negative switches of the programme. Mekanik olarak (Drilling unit backward) limit switches determined before 10mm from the last touching point. Negative means that, the bacward movement of the servo motor.

#### You should not use the other adjustments.



					(	Global	Data		
Setup General General2 M	easurement Roto	r Kalibrasyo	onKontrol	MainMotor	Tool	Tool2	MillingFromTheTop	RunTime	Ser
Serial com timeout [ms] : 3000 Split Weight split_weight reference point : 0.00	Compens X0 : ( XEccen : Eccen. P	ation 163.54 @ 7 ( 209.57 @ 7 hase : 120 eccentr. elim.	167.5° 172.8° .0		Bal	lancing M ith Top D	lethod rill	V	,
posConst: 89.09				.4					
Report SerialNo : 0 Operator : MESSMATIC	Note : Breaking	Note : Breaking wait for breaking rpm				.mm	<b>~</b>		
	breaking positionn	rpm [rpm]: ing cycle :	100 10		tes M	t_freq : mark of rking dep	0 the piece within toler oth [mm] -: 4	ance	
Tolerance					✓	position	after balancing		
balancing tolerance [g] :	0.000	).00 g.cm				do not p	osition if in tolerance		
machining tolerance [g] :	0.000	).00 g.cm				position	to balancing start po	int	
maximum unbalance [g] :	1.500 1	18.23 g.cm				disable :	servo after positionni ntor after the test	ng	
rework tolerance [g] :	1.500 1	8.23 g.cm	ļS	0		unlock n unlock n acilista	otor after the test if o otor after balancing parca_cozme	k	



#### **REPORT:**

Serial number: During the saving of the unbalance values to the database, you should write the serial numbers here.

Operator: The name of the operator during saving the unbalance values.

#### TOLERANCE:

Machining Tolerance: is the target level that the balancing machine will try to reach during balance correction operation (Drilling)

Max. Residual unbalance: The maximum unbalance according to the ISO standards.

Tel: +90 232 376 84 40 (Pbx). Fax: +90 232 376 84 39	28
www.messmatic.com	



**COMPENSATION:** Compensation values in this menü are created automatically during compensation operation and should not be changed manually.

**ECCENTRICITY ANGLES:** This value is uses for the eccentricity. We advice it to make 120 degree or 90 degree. Depending on the rotor type.

**POSITIONING AFTER BALANCE:** It means automatic positioning according to the unbalance angle

BALANCING METHOD: You have to choose the balancing method for automatic operation

**UNIT:** You may choose the unity of unbalance.

#### **CHAPTER 4 BALANCING OPERATION**

#### 4.1. Turning on the machine and preparation of balancing

- 4.1.1. Turn ON the main switch on the control panel.
- 4.1.2. If the computer does not open automatically, turn on the computer manually and wait for a while. You should wait until the servo drivers connect to the opc server. It takes approx. one minute. And press ENERGY START button
- 4.1.3 Enter the user name and password.

4.1.4 Balancing machine is going to open the clamping unit after drilling offset is done and the programme will start.

- 4.1.5 Check the rotor if is selected or not after the system is ON. You may see the data of the current rotor at the bottom of the screen. If the right rotor is ntr choosen, enter the data menu and choose the correct rotor and press select part button. To enter the database menu you should enter the user name and password.
- 4.1.6 If you want to balance a new rotor, make the definition of new part operation that you may see how to do it below.
- 4.1.7 The tests on the first start up of the machine
  - i. Measuring test

Mount the master rotor and press compansation button. Put the calibration weight and press the TEST button, the rotor is going to rotate. Check the value if it is correct or not on the screen. Make this test with another weight to check the reading of the value. Because of the diameter differences the value may be different.



Value = Test weight x diameter of the place that you put the test weight / Calibration diameter

If the value is not equal to the calculated value perform Calibration. To check the unbalance position press the position button. If the unbalance position is not correct, by hand move the weight under the drilling unit and press the pos correction button.

ii. Eccentricity Test

By loosing the balanced rotor from the spindle, (by unclamp), rotate it 120 degree (the spindle should be stable.

#### 4.2 Balancing operation

For balancing operation, after you mount the rotor press the START button. Machine is going to balance automatically.

#### 4.3 Changing the Rotor Type

- 4.3.1 Mount the clamping unit according to the part.
- 4.3.2 Mount the suitable tool.
- 4.3.3 Adjust the position of the drilling unit according to the rotors' height and diameter.
- 4.3.4 Mount the rotor on the machine and adjust the rotor recognising sensor 3-4 mm untill catching the sensor light is On.
- 4.3.5 Select the rotor on the database menu.
- 4.3.6 Make the measuring test. If necessary perform the CALIBRATION again.
- 4.3.7 Perform the ECCENTRICITY.
- 4.3.8 Make a test by balancing a rotor.

#### 4.4 Description of a new rotor

- 4.4.1 Perform the first 4 steps of "Changing the Rotor Type"
- 4.4.2 Enter the database manu and press the + button.



- 4.4.3 One click on the bottom of the line and make it blue. Press OK button after you click the Copy button. The choosen part's all values are going to be copied on the new line.
- 4.4.4 Double click on the part to choose it.
- 4.4.5 General Menu
  - i. Residable unbalance (from the drawings of the par tor calculated value of ISO 1940).
  - ii. Balancing tolerance
- 4.4.6 Part Menu
  - i. Balancing diameter
  - ii. Channel width should be (0)
  - iii. Maximum channel depth (from the drawings of the part)
  - İv. Part name
- 4.4.7 Drilling Menu

Input the drilling values and movement speed

4.4.8 Milling Menu

Write the;

- i. Milling diameter
- ii. Milling mouth width
- iii. Maximum balancing angle
- iv. Milling depth
- 4.4.9 Do the measuring test. If necessary do the CALIBRATION.
- 4.4.10 Do the ECCENTRICITY.
- 4.4.11 Do the eccentricity test. If necessary do the ECCENTRICITY again.
- 4.4.12 Do the TOOL OFFSET.
- 4.4.13 Do the MILLING CALIBRATION
- 4.4.14 Balance one part to check.

#### 4.5 Shutting Down the Machine

Do not switch off the machine by the on off switch directly, always first turn off the computer from the balancing machine software.



- 4.6.1 To turn off the computer press the shut down button and wait for the computer to be OFF.
- 4.6.2 Turn off the main power switch.

#### HOW TO CHANGE THE CLAMPING SYSTEM

The clamping system is consist of the following parts in the example clamping unit

- 1. Clamping screw
- 2. The clamp
- 3. Clamping fixture supporting rotor, and point support for drilling
- 4. Clamping conical
- 5. Clamping mill.





The clamping system should be designed regarding the rotors' technical drawing. Clamping system shouldn't have any runout. In order to change the clamping unit for a different type of rotor, the pieces hould be dismounted and mounted in the same sequence.

#### **CHAPTER 5 MAINTENANCE INSTRUCTIONS AND AFTER SALES SERVICE ADDRESS**

#### 5.1 Meintenance of the operator shoul do



#### Before cleaning and maintenance of the machine, please turn off the power.

Clean the chips on the machine.

To make the life of the flange and adaptor long, make them lubricated regularly.

Fill the regulator tank with the oil.(ISO VG 32)

Please clean the monitorscreen by a dry swab. If the screen is so dirty, first clean it with a wet swab and than make it dry with another swab.



🔲 ВАКІМ	
Freze	Döner Tabla
Homing Trip Reset	Trip Reset
Balans Ünitesi	AC Motorlar
	Freze Motoru Çalıştır
	Freze Motoru Durdur Kapıları aç
Trip Reset	Toz Emme Motoru Çalıştır
FI	gure 22

These two screen below is uses for meintenance. (Figure 22-23)

With this screen you may test the SERVO MOTORS. In case of an error, By the Trip Reset button you may reset this error.



#### PLC Ports



Figure 23

On the right screen you may see the PLC outputs. You may test these outputs one by one.

On the left screen you may see the PLC inputs. You may test the inputs / outputs here one by one.



#### Vacumming System Meintenance

- 1. Vacumming system tank should be controlled regularly. If it is full, by openning the locks, you should make it empty.
- 2. The filter of the tank of the vaccumming system should be cleaned once in every six months and should be changed every year.
- 3. There are air blowers on the entrance and exit of the vacumming system. You should control these blowers regularly if there is a hole on it or not.

#### 5.2 Address and Telephones

#### <u>Teknik Balans A.Ş.</u>

Adres Tel	: Atatürk Organize Sanayi Bölgesi 10001 Sk. No:15 Çiğli / İZMİR - TÜRKİYE : 0-232- 376 84 40 (120)
Faks	: 0-232- 376 84 39
e-maii Mobile	: 0090-5305844930