AUTOMATIC ARMATURE

BALANCING MACHINE

SYM ORC-S

INTRODUCTION

SYM ORC-S is an automatic multi-station balancing machine especially designed for balancing operations of armatures. It works as an automatic balancing machine in measuring and correcting the unbalance of the armatures inside the production line.

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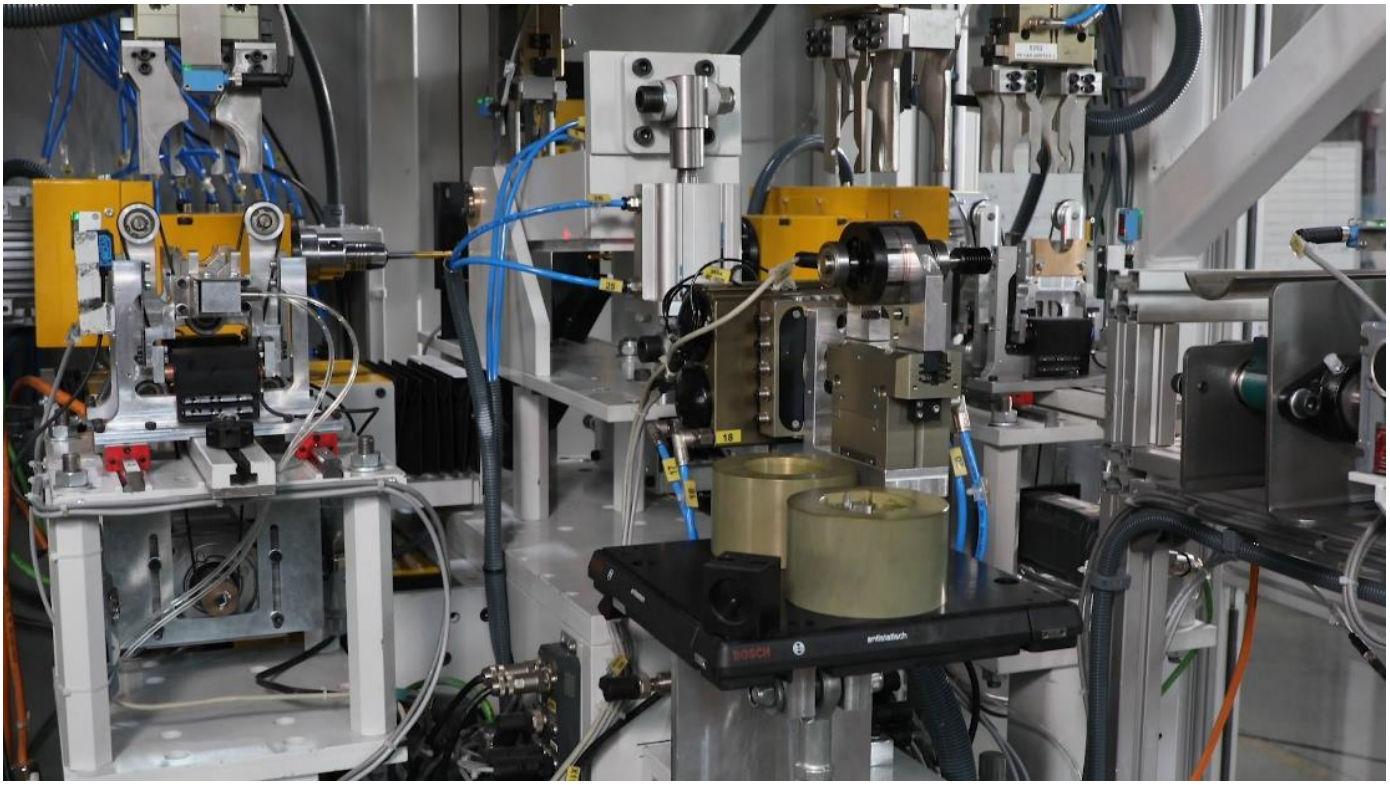
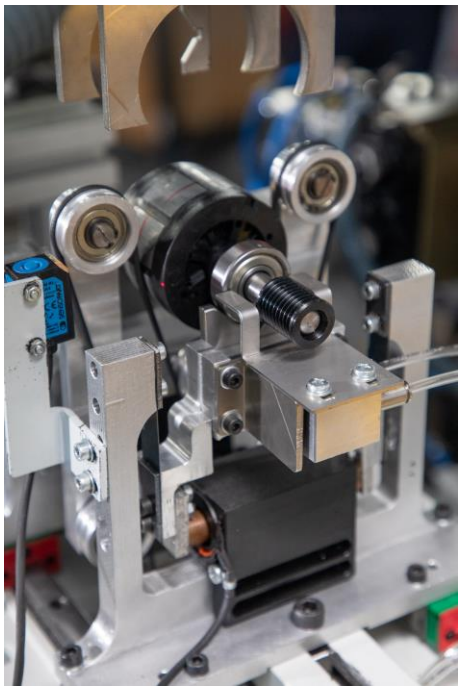
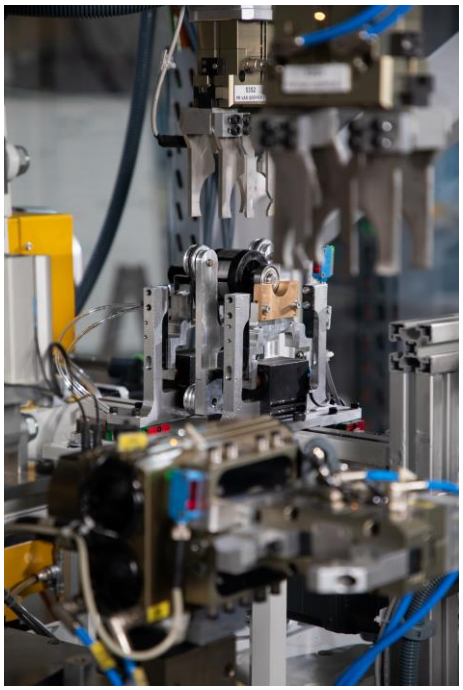






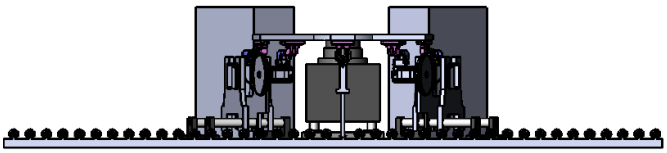
Sample photos

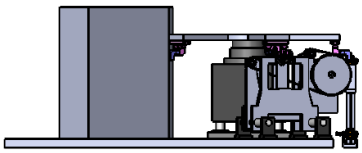
MAIN FEATURES

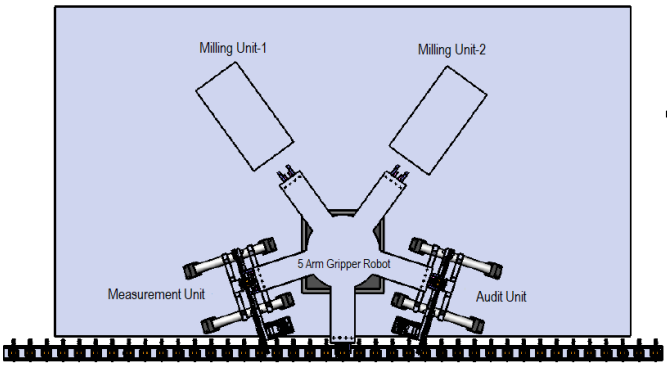
STATIONS

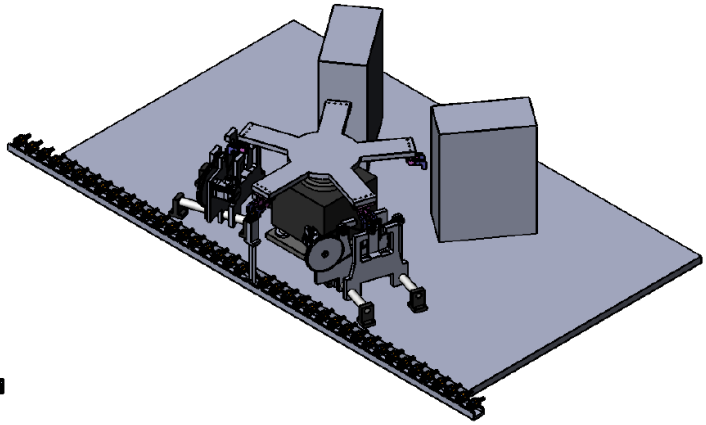
SYM ORC-S automatic armature balancing machine consists of 5 stations in total.

- ❑ 1. Station: Loading & Unloading
- ❑ 2. Station: Unbalance Measurement
- ❑ 3. Station: Unbalance Correction By Surface Milling (1st plane)
- ❑ 4. Station: Unbalance Correction By Surface Milling (2nd plane)
- ❑ 5. Station: Unbalance Audit (Return to step one if the value is outside the tolerance limits)









Basic Drawing

OPERATION STEPS

The machine operations are automatic. The operation steps are given below.

- ❑ Armature is transferred to the balancing machine by infeed conveyor.
- ❑ Lifting apparatus lifts armature from infeed conveyor for loading of gripper robot.
- ❑ Gripper robot takes armature from lifting apparatus and loads it to the unbalance measurement station.
- ❑ Armature begins to spin in the unbalance measurement station. Rotation speed, starting, stopping movements are controlled by the speed controller. After the rotation is completed, the unbalance values and positions are automatically displayed on the screen of the control panel. Positioning according to the unbalance points is performed by servo motor automatically.

❑ Armature is transferred to the 1st unbalance correction station for surface milling operation for 1st plane.

❑ Unbalance of armature is corrected by milling in the first plane, then gripper robot transfers armature to the 2nd unbalance correction station for surface milling operation for 2nd plane.

The chip extraction system which automatically works with milling units, removes chips during milling operation synchronously. During milling operations, armature is fixed with a pneumatic clamps.

❑ Armature is automatically transferred to the unbalance audit station.

❑ In unbalance audit station, unbalance of armature after corrections, is measured.

❑ If measured unbalance value is over the tolerance (maximum permissible unbalance value), the armature is rebalanced after transferring back to the unbalance correction stations.

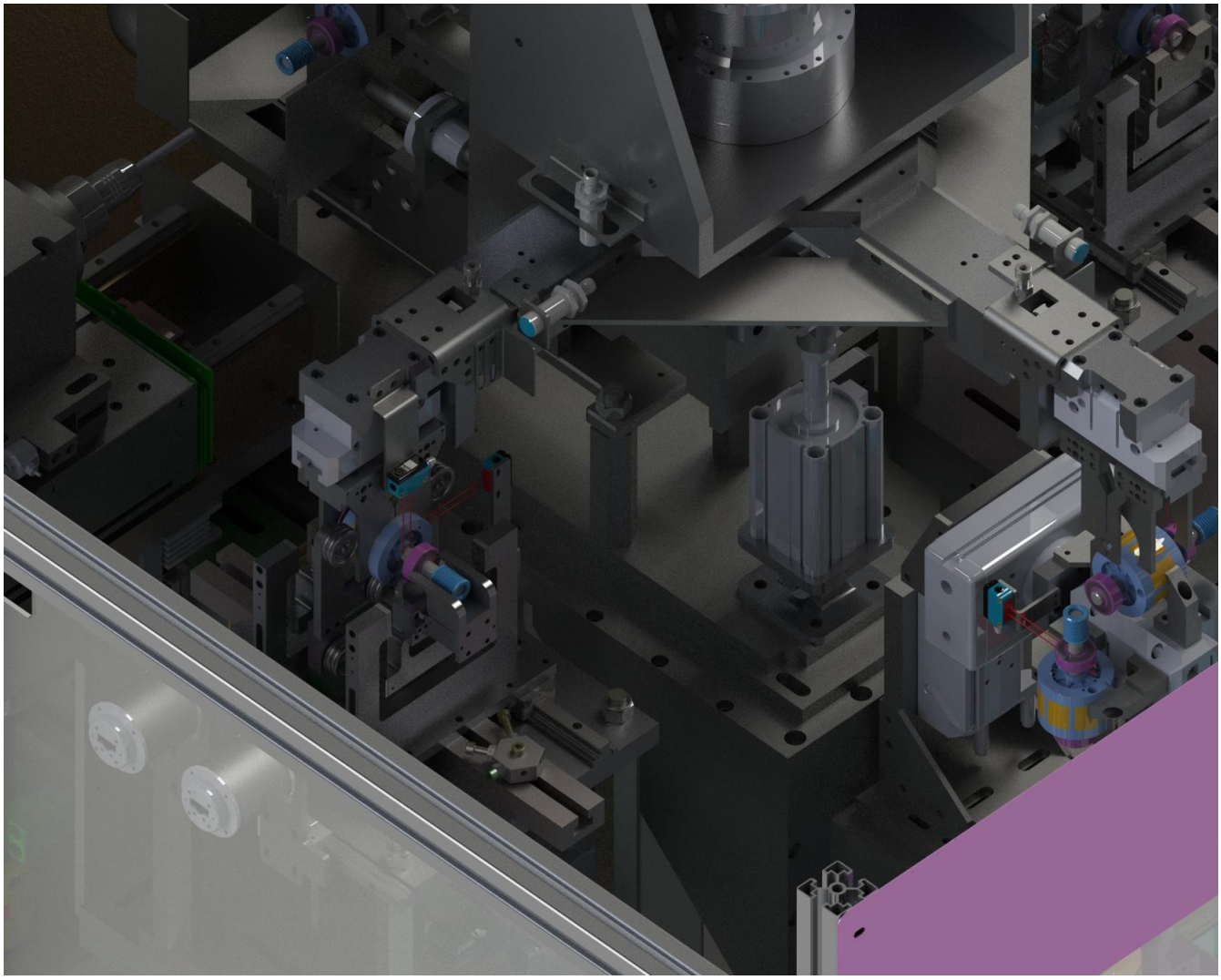
❑ If measured unbalance value of armature is within tolerance, armature is automatically transferred to OK outfeed conveyor. (*)

❑ If measured unbalance value of armature is still over tolerance after rebalance, armature is automatically transferred to NOK outfeed conveyor.

(*) Infeed conveyor and OK outfeed conveyors are one piece and a continuation of each other.

DESIGN CONCEPT

SYM ORC-S automatic armature balancing machine is is designed and produced specially for balancing operations of armatures. Clamping of armatures, unbalance measurement, milling for unbalance correction and unbalance audit are done totally automatically in the machine. It is equipped with thermal processed rigid construction and servo motor drives. The bearing construction is totally independent from the other units of the balancing machine and fixed to ground with bolts. The piezo sensors are mounted to the bearing construction in order to feel the vibrations. Main drives are servo motors. The system is fully developed against friction based problems and performing successfully. The part rotations on the balancing stations are transmitted to the bearing system on the body by help of servo motors. The start - stop and rotation speed are controlled with servo motors by help of computer system. Industrial type computer is used in the control unit.



*Sample drawing**

** Above drawing is sample and can be different from the machine offered according to necessary accessories.*

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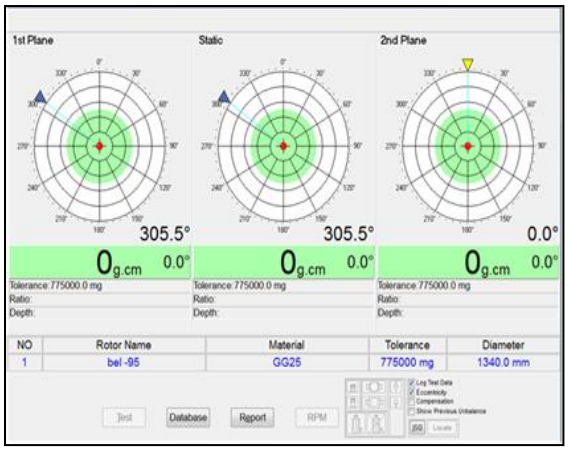
MAIN COMPONENTS

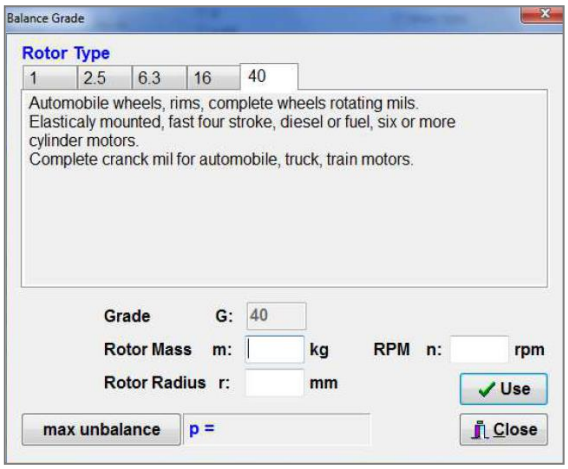
AUTOMATIC UNBALANCE MEASUREMENT UNIT

SYM ORC-S automatic armature balancing machine is equipped with PC controlled unbalance measurement unit. In unbalance measurement unit, by help of Messmatic balancing software, unbalance of brake drums are measured, unbalance correction calculations and correction checks are performed. Owing to the experience in balancing software development more than 20 years, Teknik Balans provides his customers with high balancing accuracy and reduced cycle time in SYM ORC-S automatic armature balancing machine

The operating system of the balancing software is WINDOWS. The software is capable of saving 10.000 different types of armatures' parameters like density, unbalance diameter, unbalance tolerance, unbalance area information. When armature is chosen, according to its parameter, the software calculates automatically the milling depth, milling angle according to the unbalance value. Dynamical unbalances of armatures are measured according to ISO 21940.



In design and production of SYM ORC-S automatic armature balancing machine, the principles of ISO 21940 International Standard are observed. The algorithm and formulas in the software of the balancing machines are in accordance with the standard. Moreover, balancing grades, residual permissible unbalance (tolerance) values are calculated observing the standard. There is a calculation panel in the balancing software in order to calculate max. unbalance according to the related formula in ISO 21940 International Standard.



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FEATURES

- ❑ Windows operating system
- ❑ Daily balancing operations automatic data saving
- ❑ 10.000 different types of rotor data saving capacity
- ❑ The first and last unbalance results report ability for every rotor
- ❑ Unbalance result display for given tolerance
- ❑ Polar graphic screen display per pedestal for unbalance position, tolerance and value
- ❑ Unbalance correction parameters calculation for unbalance value
- ❑ User identification & authorization
- ❑ Multi language support

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MESSMATIC

					1.Plane			2.Plane			Static				
Date	Time	Serial No	Part No	Rotor Name	First Value [g]	Last Value [g]	Tolerance [mg]	First Value [g]	Last Value [g]	Tolerance [mg]	First Value [g]	Last Value [g]	Tolerance [mg]	Rpm [rpm]	Operator
26.11.2012	12:15:19	0	9	a deneme								53.447	3400	199	MESSMATIC
27.11.2012	09:40:54	0	9	a deneme								52.274	3400	199	MESSMATIC
27.11.2012	11:16:41	0	10	by1								690.002	3400	199	MESSMATIC
27.11.2012	11:19:55	0	10	by1								725.616	3400	199	MESSMATIC
30.11.2012	15:17:42	0	10	by1								729.373	3400	200	MESSMATIC
30.11.2012	15:25:26	0	10	by1								723.392	3400	199	MESSMATIC
05.12.2012	11:59:09	0	10	by1								750.575	100000	200	MESSMATIC
05.12.2012	12:08:39	0	10	by1								670.713	100000	199	MESSMATIC
05.12.2012	12:11:24	0	10	by1								647.225	100000	199	MESSMATIC
05.12.2012	14:55:36	0	10	by1234								35.455	775000	200	MESSMATIC
05.12.2012	14:56:21	0	10	by1234								35.852	775000	199	MESSMATIC
05.12.2012	15:51:22	0	1	bel -95								2.516	775000	200	MESSMATIC
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06.12.2012	11:46:54	1	1	bel -95								465.169	775000	200	MESSMATIC
06.12.2012	11:48:51	1	1	bel -95								140.188	775000	199	MESSMATIC

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Sample report page

AUTOMATIC MILLING UNITS

SYM ORC-S automatic armature balancing machine is equipped with two automatic two axis V cutter milling units. The horizontal and vertical movement of the milling units are designed by using standard linear movement systems and these movements are controlled by servo motors. During milling, armature is fixed by adjustable clamping system and in each milling units there are part rotating units for separate unbalance correction points in correction plane.

AUTOMATIC CLAMPING UNITS

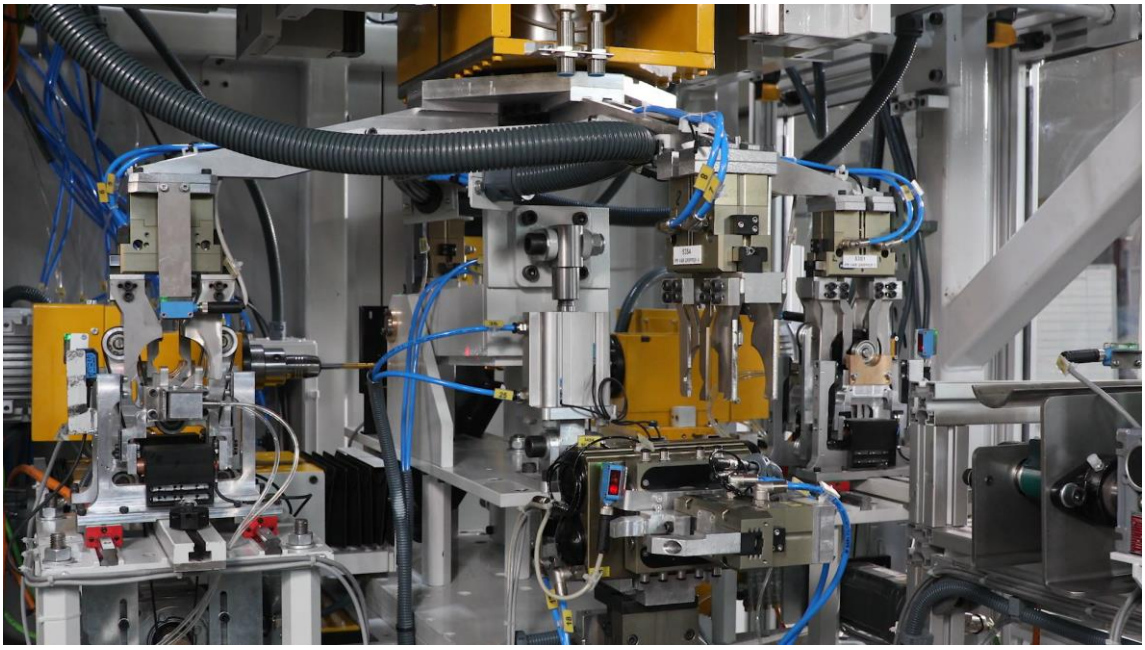
SYM ORC-S automatic armature balancing machine, there are four pneumatic clamping units.
In each station apart from loading & unloading station, there is one pneumatic clamping unit to fix the armature for unbalance measurements and corrections. Clamping units are working pneumatically and clamp armature by outside diameter. Pneumatic clamping units are designed and produced according to the technical drawing of armature.

Sample clamping unit

AUTOMATIC LOADING, TRANSFER & UNLOADING UNIT (GRIPPER ROBOT)

SYM ORC-S is equipped with 5 arm gripper robot which loads armatures from infeed conveyor to the balancing machine, transfers armatures between stations and unload them to the outfeed conveyors. OK armatures are unloaded to the OK outfeed conveyor, NOK armatures are

unloaded to NOK conveyor. Infeed conveyor and OK outfeed conveyors are one piece and a continuation of each other. Thanks to gripper robot, infeed and outfeed conveyors, SYM ORC-S provides operator-free, automatic balancing operations for the mass production of armatures.



Sample Gripper Robot

CHIP EXTRACTION UNIT (VACUUM CLEANER)

The milling units are equipped with automatic chip extraction units for the milling result metal chips. In each milling unit, there is one chip extraction unit so there are two chip extraction units in the balancing machine. They are running together with the milling units. Vacuum metal chips are stored in the tanks which are easy reachable and must be emptied by the operator in the specific time intervals.

PROTECTION CAGE (According to CE standards)

The protection cage is optional, designed according to CE standards. The cage is switch controlled so that, the operator cannot start the machine if the cage is not closed properly. The design of the protection cage will be discussed with the customer according to customer's rotor type and layout for the most ergonomic solution. CE certificate can only be supplied if protection cage is delivered together with the machine. Protection cage is of aluminium profile and plexy glass.

CALIBRATION

Calibration is user friendly and done by the operator with certified calibration weights which will be delivered together with the balancing machine. The factory calibration is done during tests before delivery and comissioning after delivery by expert Teknik Balans staff. Calibration certificate is given for the calibration weights by a laboratuary which is accredited by TURKAK (a Turkish official association) according to TS EN ISO/IEC 17025 standard. During calibration process, measurements are done by balancing machine software which observes the principles of ISO 21940 International Standard.

MACHINE TESTS

SYM ORC-S automatic armature balancing machine is %100 tested before delivery. If desired, customers can participate the test process in Teknik Balans factory and make FAT. After delivering the balancing machine, during installation and commissioning, same test procedure is repated by expert Teknik Balans technician in customer's factory. Machine is tested electronically and mechanically. Additionally, unbalance measurement tests with the master part are made. In measurement tests, repeatability and machine accuracy are inspected**.**

INSTALLATION, COMMISSIONING & TRAINING

Teknik Balans provides the customer with installation, commissioning and training service after the delivery of the balancing machine in agreed time in customer's factory. Services at customer's factory includes,

- ❑ Installation (3 days, consecutive)
- ❑ Commissioning (5 days, consecutive)
- ❑ Training (2 days)
  - ❖ Operator Training
  - ❖ Mechanical Maintenance Training
  - ❖ Electrical - Electronical Maintenance Training

Training language is English.

WARRANTY & AFTER SALES SUPPORT

The warranty period of the balancing machine is 12 months. The warranty period starts with the day of signing final acceptance of the machine. Machine warranty is valid on condition that the customer observe the directives and rules in “Machine Operating and Instruction Manual”. Machine Operating and Instruction Manual and Training will be given to the specified operators in customer site. Failures due to operators such as crash, smash on the machine, unconformity in electrical and air connections are not in scope of the warranty. Furthermore, problems occurred in the machine due to the apparatus produced or supplied by the customer, are in responsibility of the customer. Teknik Balans provides 24 hours online aftersales support with English speaking call center, and remote control of the balancing machine with an internet connection is available. In case of any need for presence of Teknik Balans technician at customer’s facility, this will be provided within maximum 72 hours. The spare part availability in warranty period, depending on the fast courier services will be within maximum 48 hours.