

# RQA 300/ITS

## Rotor Quality Analyzer



### Features

- Most sophisticated testing system for squirrel cache die cast rotors.
- Fully automatic test and evaluation cycle.
- Quick and easy adaption to different rotor type and sizes.
- For testing of a wide range of rotor sizes with no need of special tooling.
- For testing of rotors with and without shaft, thus preventing additional cost in case of poor rotor quality.
- RQA Software based on Windows 98 for ease of use including statistics and Zoom package.

### Introduction

The **RQA 300 ITS Rotor Quality Analyzer** is a computer controlled testing system applying most advanced evaluation technique for rotor quality control in an industrial environment. This unique desktop test system is especially designed for quality control of medium and large size rotors in the manufacturing and maintenance of squirrel cage induction motors. This new test system makes the leading testing technology gained in applications in laboratories and 100% QC testing at major manufacturers worldwide now also available for large size rotors. All measurement and result evaluations are automatically conducted, processed, evaluated, and stored for statistical evaluation. Max. dimensions of rotors to be tested: Outside-Ø 50-300mm, stack height 50-300mm.

These testing procedures are used for the detection of the following quality problems:

- Broken or interrupted rotor bars as well as no connection to the end rings.
- Missing material in the rotor bar (incomplete injection) or air enclosures (porosity) as well as poor connections to the end rings.
- Deviation of the rotor bar angle relevant to the axis (skew).
- Changes in the consistency of the aluminum alloy and/or the iron core.
- A short circuit between two or more rotor bars (soldering).
- Faults in the end rings.

## System Description

The RQA 300/ITS Rotor Quality Analyzer is an automated tester for squirrel cache die cast rotors. It is consisting of the Industrial Inductive Test Station and a separate Control and Measuring Unit.

This Rotor Quality Analyzer is especially designed to test different size rotors with or without shaft without need of special tooling. The max. rotor dimensions are 50 to 300 mm outside diameter and 50 to 300 mm rotor length. The rotor weight is limited to 35 kg.

The Inductive Test Station can be placed onto any heavy duty desk or frame platform. The measuring and control unit with built-in industrial PC with harddisc, floppy disk 1,44", CD-ROM, I/O modules data acquisition card, stepper motor control unit and all necessary electrical power supply and protection components, keyboard with integrated touch pad and fold-out 12.1" LCD color display may be placed beside the test station.

The Inductive Sensor with exchangeable pole shoes and adjustable angle relative to the rotor axis is placed underneath the rotor.

The adjustment of the gap between the rotor and the inductive sensor is mechanically connected to the adjustment of the distance between the support rollers – thus no need to adjust separately.

An adjustable synchron start sensor enables rotor bar position identification for detailed analysis.



The test rotor is placed onto two support rollers. One roller is connected to a speed controlled stepper motor drive for rotation

at constant speed.



The distance between the two support rollers can be changed precisely by handwheel to adapt the station to different rotor outside diameters.



## Windows based Testing Software

- User friendly menu-driven windows based software for automatic Accept/ Reject evaluation of rotors according to user selected parameter tolerance levels.
- Automatic set-up of all measurement and evaluation procedures (parameter tolerances) via the selection and retrieval of the *Master Parameter File* (reference rotor),
- Automatic learn feature to establish new *Master Parameter Files* for additional type of rotors to be tested.
- Mechanical set-up specifications for rotor type tested via the *Master Information Menu*.
- Automatic fault classification into different error types

Error I - Broken or interrupted rotor bars

Error II - Minimum amplitude

Error III - Maximum amplitude

Error IV - Deviation of amplitudes

Error V - Slope error

Error VI - Over-all evaluation error

- Integrated counter for the total number of tested and failed rotors, and a complete record of the specific type and frequency of fault errors is recorded.
- Complete statistics package to facilitate a complete and thorough analysis of both rotor quality and productions capability via the SPC concepts of in-process monitoring and correction on either an audit or 100% QC basis. Presentation of the statistics is facilitated with histograms and chronological occurrence charts for all different parameter tolerances.

- Interactive parameter tolerance functions via a "what if" approach in combination with the present and recommended  $C_p$  and  $C_{pk}$  values.
- Zoom function for rejected rotors automatically records all measurement results including the inductive waveform for more thorough analysis of the fault mechanism.
- Printout for Statistics and Zoom on external printer - not included in the scope of supply.

### Testing Procedure for Rotor with Test Station already set-up:

- Load the rotor onto the test station
- Start the test by start button

The rotor is rotated at the speed specified in the Master Parameter File.

The rotor is automatically evaluated

### Set-up of Test Station for new rotor type:

- Select Master Parameter File of rotor to be tested.
- Setup test station according to the information given in the corresponding Master Information file.
- Move the support rollers to specified position to match size of rotor with indication on ruler and adjust sensor angle.

That is all to do and the test set is ready for testing.

## Technical Data

<b>Rotor Quality Analyzer Model</b>	<b>RQA 300/ITS</b>
<b>Maximum rotor dimensions</b>	outside Ø 50 - 300mm, rotor length 50 - 300mm, rotor with or without shaft
<b>Loading of test rotors</b>	manually
<b>Testing cycle / time</b>	Fully automatic / minimum 5.5 seconds plus loading
<b>Testing methods</b>	Inductive test for rotor bar analysis
<b>Industrial PC</b>	Industrial PC min. 400Mhz, HD 10GB, Floppy Disk, CD-ROM, A/D Data Acquisition Card, Optically Isolated I/O Board, 12,1" LCD Color display
<b>Automatic controls by</b>	PC
<b>Rotor Test Station</b>	Desktop model, test rotor on support roller
<b>Rotor rotation for test by</b>	Speed controlled stepper motor drive directly to one support roller
<b>Synchrone start feature</b>	Adjustable optical sensor for physical identification of defective rotor bars
<b>Inductive sensor</b>	With exchangable Pole Shoes to match different rotor stack length, adjustable angle of magnetic field in steps of 0.1°, adjustable vertical position and adjustable gap towards the test rotor.
<b>Operator Security</b>	Emergency STOP button
<b>Electrical Supply</b>	Single phase 230V, 50/60 Hz or 115V, 50/60Hz to be specified with purchase order
<b>Dimensions of Test Station</b>	width 580mm, depth 400mm, height 305mm
<b>Dimensions of Measuring Unit</b>	width 450mm, depth 530mm, height 170mm with closed LCD-display
<b>Weight approx.</b>	net 60 kg, gross 85 kg

Due to the Company's continuous research program, the information above may change at any time without previous notification.  
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