

Intelligent Gear Testing





retrofitted tester with modern testing systems, doing a complete retrofit on an old tester or providing reworked and fully equipped tester including a numerical control, REMAUT Machine Tools and VISPIRON ROTEC are the suitable partners for all customers.

REMAUT Machine Tools Srl and VISPIRON ROTEC GmbH teamed up to offer high quality retrofits for various gear testers focussed on single flank testing. Combining their experience and professionalism in their respective sectors, they are now able to offer old gear testers being mechanically and electrically retrofitted and meeting current security standards and being fitted with up-to-date testing equipment made by VISPIRON ROTEC. Customers are offered complete service, ranging from technical advice up to reliable after sale services and support. Whether it is simply equipping an already

General

REMAUT, founded in 1970 and situated in Quarrata (Pistoia), is a specialist for retrofitting of various machines and providing turn-key solutions for custom made production machines. The company is equipped with all necessary machinery and modern working areas to ensure high quality, reliability and service for customers from various countries.

Offering 40 years of experience, REMAUT intends to meet customers' needs by offering a wide range of services including design and redesign of mechanical systems or adaption and integration of numerical control units, fully matching customers' requirements. High testing and inspection standards as well as a technical support team responding in 24 to 48 hours including spare part providence ensure best service to the customer.

Already back in the 1980s the company specialized in retrofitting old gear cutting and grinding machines from Gleason and Oerlikon and started collaboration with a specialist for numerical controls, hence being able to turn old machinery into up-to-date equipment meeting high quality standards.

VISPIRON ROTEC GmbH was founded in Munich in 1988 as rotec GmbH to develop, manufacture and market computer-aided testing systems for the automotive industry. The company has steadily grown to become a leading provider of equipment for measuring the noise and vibration of engines and transmissions. ROTEC offers particular expertise in torsional vibration measurement and is recognized as a specialist in this field. Early on the company also offered dedicated software turning the testing equipment into a highly precise tool for single flank testing based on the well known German industry standard DIN 3960.



Innovation has always been a watchword at rotec. Parallel to continuous internal product development and improvement,

intensive cooperation with customers underpins VISPIRON ROTEC's success. The company's main product is the Rotation Analysis System RAS, a pc-based signal acquisition and analysis system. A large number of these systems are in use worldwide in test and development departments of the automotive, mechanical engineering and automotive supplier industries.

VISPIRON ROTEC is based in Munich, Germany and is represented by sales partners worldwide. A wide range of testing products has evolved over the years which concentrate on the subject of torsional vibration. As a company which designs, develops and manufactures all its products, VISPIRON ROTEC can offer the customer all information, advice and support likely to be required in this highly challenging area.

In 2008 rotec GmbH was bought by VISPIRON AG and renamed to VISPIRON ROTEC GmbH.

Quality is one of the keywords for both VISPIRON ROTEC and REMAUT. It is being ensured that all works on the machines are being done to their best. Accuracy shall ensure perfect reliability, especially when have a look at the testing equipment supplied by VISPIRON ROTEC.

Gear Testing

For the mechanical retrofit, the tester is entirely taken apart. All part subjected to wear out are at least being checked and reworked, most of them are usually being replaced. Examples of such would be bearings, spindles or hydraulic and electric systems. Sensing devices required for either the numerical control or the ROTEK testing equipment are being mounted and the whole assembly is being repainted according to customers' wishes. The brake providing a constant braking force necessary for a single flank test can be either hydraulic or of a magnetic particle type, with the braking moment being fully adjustable.

The whole retrofitted system meets current safety standards and is fitted, for example, with protective shields or two-hand-switches. Of course, all necessary

documentations are provided, as well as certificates of conformity (CE).

VISPIRON ROTEK and REMAUT guarantee perfect quality and reliability, underlining this by giving an official guarantee valid for twelve months.

The application is feasible on structures tester or lapper from various manufacturers. Examples would be: Gleason 17, 19 or 511; Oerlikon ST2, ST3 or SL3; or testers by Modul or Hurth.

The machines can be provided in three versions:

- **Manual**
All necessary operations are done manually, ranging from the adjustment of all axes to the start of the engine or the start of a measurement cycle.

- **PLC**
(Mechanical) adjustment of axis is done manually, so can be the start of the driving engine. A small numerical control handles braking moments, speed and direction of rotation as well as start and stop of a measurement.
- **CNC**
Complete numerical control of both the machine and the testing equipment. This includes automated control of all five axes, of braking moments and turning speeds as well as further required actions for carrying out the single flank test. This package is recommended for integration of the tester in both small and large production lines.

Examples

Tester Manual o PLC

Gleason 17 A (manual) „Single Flank Testing, max crown diameter 500 mm



Tester CNC

Tester Gleason 119 cnc
„Single Flank Testing,
max crown diameter 450 mm



Tester Oerlikon SL3 cnc
„Single Flank Testing,
max crown diameter 700 mm



Measurement System



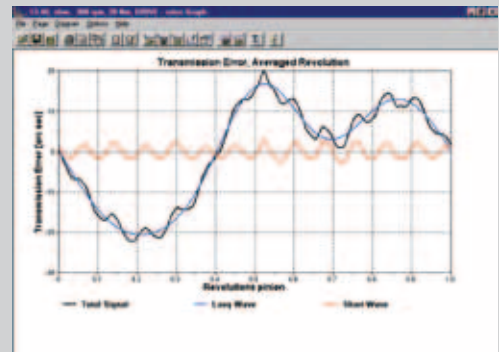
The RAS19“ frontend is a combination of a full scale Windows PC and a ROTECH frontend, hosting up to four measurement boards. The computer with up to date components is connected to an external display and both external mouse and keyboard. The integrated frontend always comes with a trigger and timing board, creating the central time base for all other boards and being fitted with an input for external trigger signals. For single flank testing the ROTECH system is usually equipped with two speed channels and – at choice – a measurement board offering eight analogue input channels. The speed channels, counter boards each running with a 10 GHz, 40 bit counter, are used for acquiring coast and drive input signals provided by the incremental encoders mounted on the gear tester. The analogue board can be used for recording signals provided by linear scales, acceleration sensors or microphones, for example. The ROTECH RAS control and analysis software runs on the PC and is accompanied by the single flank testing software module, offering various options for analysis of gears and gearboxes. The software is based on the principle of single flank testing as described in the German industry standard DIN 3960. The user interface is fully configurable, as can be seen in the following passage.

User Interface

The user interface can completely be configured according to the user's requirements. The following screen shot shows an example how an application may be realized. First, the operator has to input test specific data such as type of gear set, number of teeth, etc. He then has to push the drive button, starting the measurement.



Once completed, the desired curves and data, preselected and setup beforehand in the measurement configuration, are shown on the screen.



After pushing coast, a similar sequence is performed and the results are shown for the coast flank. Pushing the protocol button generates a protocol sheet, at choice to be printed out or saved, for example on a network storage disc. Again both style and contents are freely configurable.

Tester : A. Brown		PRINT_01_PROTOCOL_TEXT.001	
Plant : J4/12		Section : Gearlab	
		Machine : GT-440	
Gear Type : left hand		Ser. No : 06-05-12-A003	
Sequent. No: 133		Gearset No : LH-11-36	
No. Teeth, Pinion : 11			
No. Teeth, Gear : 36			
Type of Measurement: SFT			
Pos. H : 80.5			
Pos. J : 71.2			
H-Corr. : 13.4			
===== Drive ===== Coast =====			
Mesh Harm 1 :	23.21	39.61	
2 :	6.24	7.49	
Pin. Harm 1 :			
2 :	296.93	474.00	
3 :	28.83	5.47	
4 :	31.76	17.53	
5 :	14.49	10.73	