

Feature Article

50th Anniversary Product

Fully Automated Carbon/Sulfur Analyzer

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[The Development Team]

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The quantitative analysis of carbon/sulfur is very important for quality control in many materials fields including the steel industry. Therefore, the demand for high precision analysis is increasing, typically for investigations into manufacturing quality control. Furthermore, the demand for laborsaving automation is also increasing. Although until now, automation has been in demand mainly in the Japanese market, also in recent years, interest in the European and Chinese markets has been increasing. The Fully Automated Carbon/Sulfur Analyzer introduced here is a system which is high precision and laborsaving at the same time, so contributing to quality improvement and cost reduction.

Introduction

To realize high-precision performance, the latest model (EMIA-V Series), has been chosen as the measuring section of the Analyzer, so a standard deviation (σ_{n-1}) $\leq 0.3\text{ppm}$ is possible for very small quantity concentrations of 20ppm or less. Additionally, $\sigma_{n-2} \leq 2\text{ppm}$ can be selected according to requirements. Figure 1 shows the EMIA-V Series Fully Automated Carbon/Sulfur Analyzer.



Figure 1 Appearance of the Fully Automated Carbon/Sulfur Analyzer EMIA-V Series

Features

The analyzer consists of a crucible pre-burn unit (Figure 2), balance unit (Figure 3), sample storage unit (Figure 4), accelerator injection unit (Figure 5), sample loader unit (Figure 6), and a transferring mechanism to transfer crucibles. Conventional analyzer users have been demanding two big improvements; one is to reinforce the mechanism for preventing a failure in the transfer and the other is to shorten the measuring time. In the background of these demands, it is important for productivity improvement to provide measurement results accurately and in the shortest possible time since in many cases the analyzer is directly linked to the production line. An important point during development of the analyzer was how quickly measurements could be performed without making valuable data useless. We have paid special attention to the sample transfer mechanism and provided a structure that prevents samples from protruding and spilling when being transferred. From the viewpoint of quick measurement, each function has been integrated to perform parallel control, and accordingly parallel processing has resulted. Thereby, the processing time has been reduced to approximately 2 minutes from the conventional time of approximately 5 minutes. Further integration has allowed a flexible response to various customer requirements.

Another feature of this analyzer is its user interface. The software has been designed only for fully automated operation, and the screens have been configured to be different from those of a conventional analyzer. This is because we consider that the operators of a fully automated analyzer require different information. Now the status of each unit and the processing status of samples can be checked easily. In addition, various ideas related to maintenance work such as a simple check via a personal computer have been incorporated.

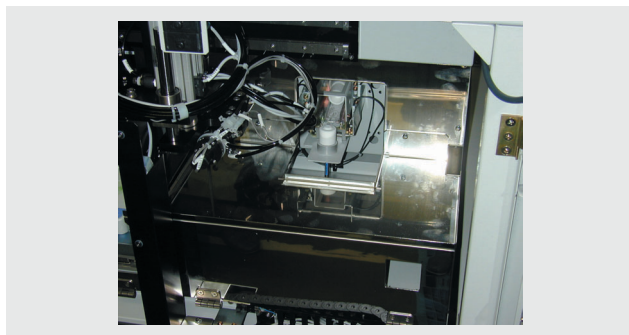


Figure 2 Crucible Pre-burn Unit

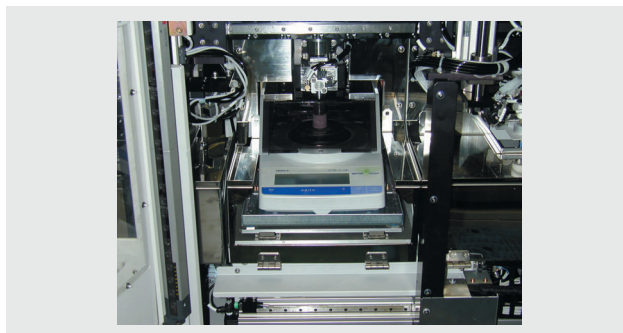


Figure 3 Balance Unit

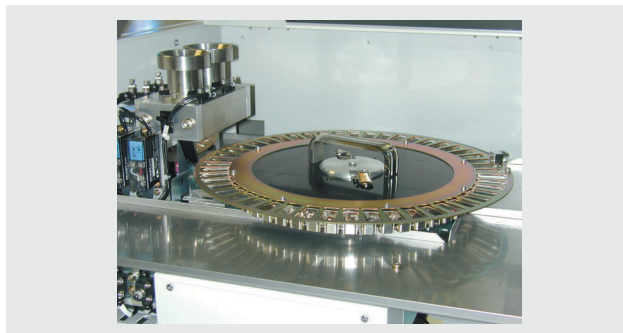


Figure 4 Sample Storage Unit

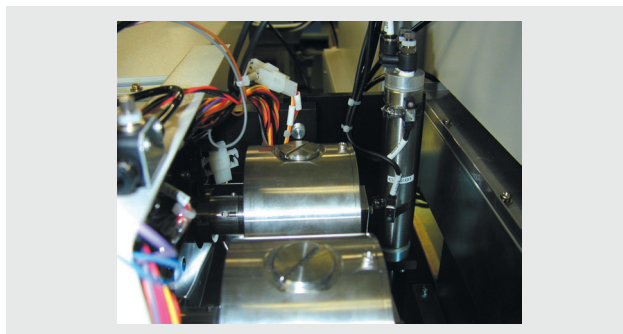


Figure 5 Accelerator Injection Unit

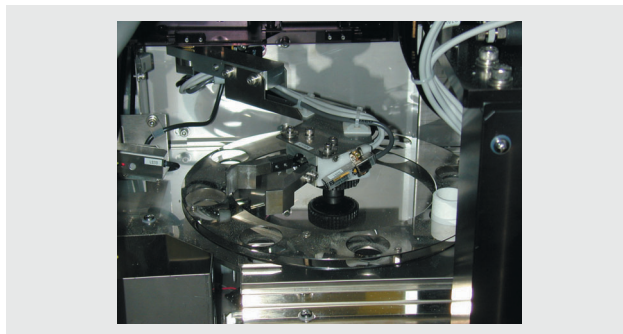


Figure 6 Sample Loader Unit

Conclusion

The Fully Automated Carbon/Sulfur Analyzer is one of HORIBA's 50th Anniversary products, and not only continues the important technologies accumulated in the last 50 years, as mentioned, but serves as an analyzer to which fresh new ideas have been added. The development team sincerely hopes that this analyzer will respond well to the many requirements in the field and that it will become a significant contributor to the customers' process development.