

Supply of natural gas between East Bavaria and Austria secured Compressor plant in Haiming commissioned

At the beginning of October this year the newly built compressor plant in Haiming was able to be commissioned on schedule. The plant, which provides international transport facilities for natural gas and increases the reliability of supplies to East Bavaria and Austria, is situated close to the German border, in the Burghausen region in Austria.

First steps in implementing the project

The first steps towards the design of the measuring equipment were taken around two years ago. In 2005 Elster-Instromet produced the first technical quotation for the planning agents, Gesellschaft für Industrieanlagen Planung (GIP), based in Marl, Germany.

According to the technical plant design, the complex natural gas measuring system was designed for bi-directional flow, with the following capacities for the first design stage:

- approx. 300,000 m³n/h for each standard load stream
- approx. 30,000 m³n/h for the low load stream

Three standard load streams were planned for the first design stage and then a further standard load stream for the second stage. These sections form the core of the measuring system – rounded off with a gas quality analysis system and an energy flow computer system.

The technical and commercial invitation to tender was issued in 2006 by GIP on behalf of Rohöl-Aufsuchungs AG (RAG), based in Austria. Agreement was quickly reached during the technical order placement negotiations – Elster-Instromet was able to offer high quality precision measuring devices and experience and GIP had confidence that we were able to deliver projects of this type on schedule. RAG and GIP chose to have the complex project completed by Elster-Instromet, both because of its products and its competence. A special feature for this particular order was the gas quality analysis system to be supplied, comprising the EnCal 3000



Haiming metering station: Elster sets the standards

system, which for the first time should be installed for custody transfer measurements in Germany.

Elster-Instromet in Dortmund took over the management and implementation of the project. An order for ultrasonic gas meters Q.Sonic-4 (DN 400, ANSI 600), which are larger than those usually sold in Germany, was placed with our factory in Belgium. Elster-Instromet in the Netherlands took

over the production of turbine gas meters SM-RI-X, size G 4000 (DN 400, ANSI 600). The turbine gas meters are operated in series with the ultrasonic gas meters. This guarantees a constant check on measurement results using various measuring methods. This also has the advantage that custody transfer measurements may be carried out in Germany for an unlimited period so long as the limit values prescribed by the German Calibration Department are observed. Consequently no recalibration on a high-pressure test rig is required.

The low load stream should originally have been fitted with a turbine gas meter. However, during the course of the project the customer expressed the wish to exchange the turbine gas meter for an ultrasonic gas meter Q-Sonic-3 DN 100. This was duly carried out.

The scope of the order also included the delivery of the complete inlet and outlet sections of the measuring system, as well as their installation on site. Due to the nearness of its location and because of

the good experience had during previous projects, Elster-Instromet assigned this order to Max Streicher GmbH.

The start of the testing phase

In November 2006 the high-pressure gas test on the metering sections was then able to be carried out using the "Pigsar" test rig in Dorsten. In keeping with the operating conditions, the test on the ultrasonic gas meters Q.Sonic was carried out together with the relevant inlet and outlet sections and the corresponding turbine gas meters SM-RI-X.

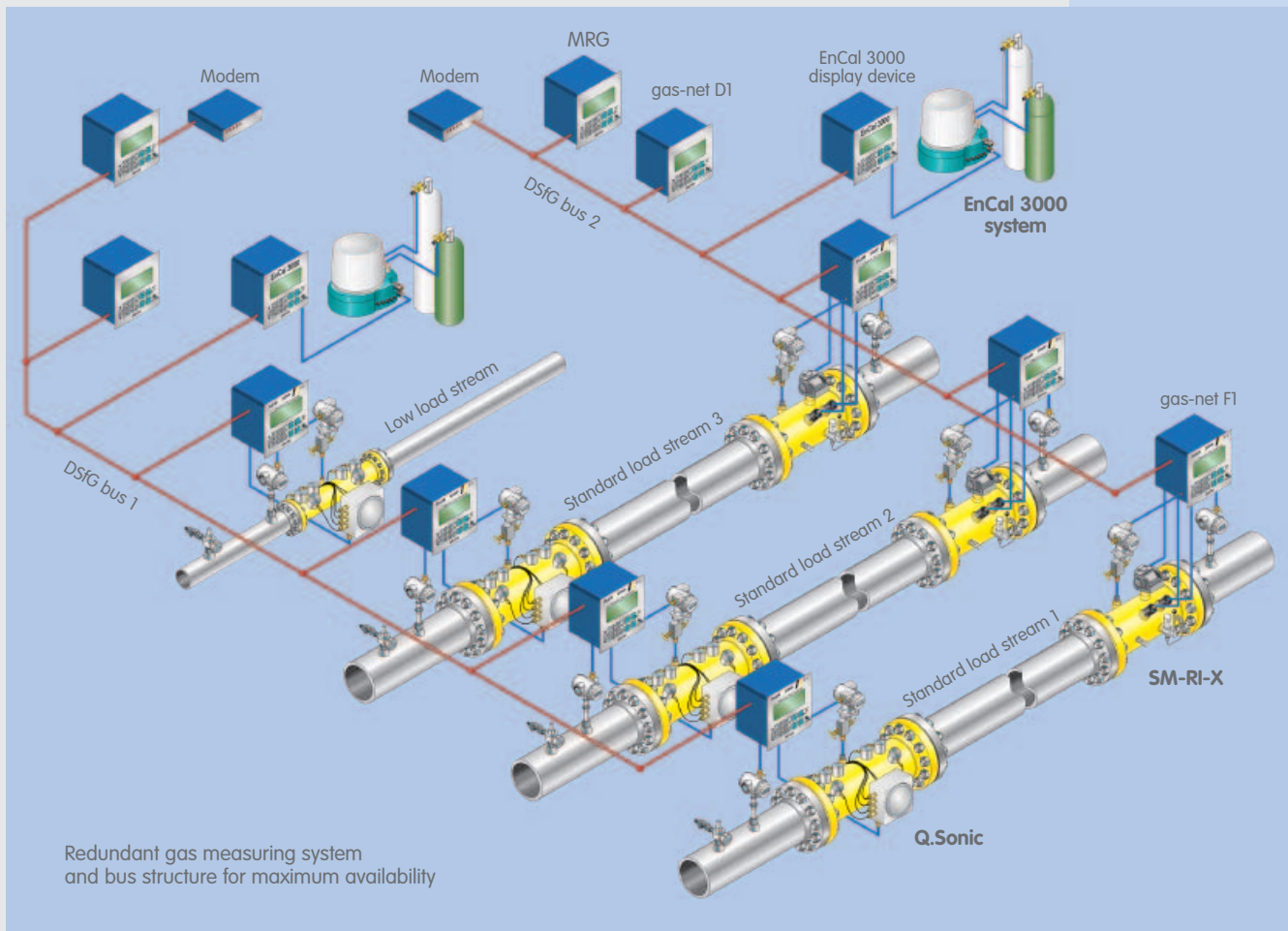
After testing, the completely assembled metering sections were then supplied as a complete measuring unit to the Haiming plant using special transport vehicles, where they were installed in the existing measurement system.

The energy flow computers (series gas-net FI), produced by Elster-Instromet in Dortmund, were calibrated at our testing facility with pressure and temperature transducers, and were then delivered to



SM-RI-X with fitted ENCODER index

the control cabinet manufacturer, Blumenbecker. After that, with the customer present, a test was then carried out in the factory on the fully wired control cabinet, which included the connections for the pressure and temperature sensors. In addition, extensive electrical documentation was produced.





processing, correction and updating of the output signals were carried out using the HF pulse generators.

The ENCODER index provides an independent comparison of the HF signals. In the case of a power failure, which is however unlikely, our ENCODER index would transfer the true meter reading of the turbine gas meter to the volume corrector, once the fault has been remedied. This meter reading can subsequently be transferred directly to the control system, where the flow volume at the time of the fault can be calculated with the help of the transferred meter reading, without any further effort being required.

telephone trunk line. This can also be used to synchronise the time with the PTB time server.

Large plants like Haiming use a higher-level control system, not intended for calibration purposes, which in this case was delivered by Siemens. Signalling the volume measurements to the control system is implemented using binary output contacts or 4 – 20 mA signals. Data from the EnCal 3000 gas quality analysis system are transferred to a Profibus-DP interface using external converters.

After installing the volume measuring system, the gas quality analysis system, consisting of a sampling unit, sample line, sample treatment unit (high-pressure reducer) and EnCal 3000, was installed. At the request of RAG/GIP, Elster-Instromet also installed the customer-supplied dew point measuring system and a sulphur gas chromatograph. The set up included the complete sample treatment system, as well as the installation and wiring of the indicators and display units in the electrical enclosures that we had delivered.



EnCal 3000 system

The testing on the gas quality analysis systems EnCal 3000 took place at the same time. For this, different officially calibrated test gases were fed forward, and their deviation from the test certificates was determined. After the factory test the products were delivered to the station and assembled.

Installation and wiring of the gas volume measuring system was then the first step to be taken on site. The ultrasonic gas meters Q.Sonic were connected to the energy flow computers gas-net F1 using an RS 485 digital interface. Apart from the transfer of the flow rates, at the same time this also allows the transfer of additional information, which can be used for diagnostic purposes. As regards the turbine gas meter SM-RI-X, both the HF pulse generators and the additional digital ENCODER index were connected to the gas-net F1. In order to ensure quick signal

Measurement accuracy and availability

In order to guarantee the accuracy and availability of the measurement, device connections are as important as the selection of products themselves. Therefore in each case, the volume correctors for the ultrasonic gas meters and the turbine gas meters take the form of an independent DSfG bus, which is used for the redundant data transfer. Furthermore, each DSfG bus has its own gas quality analysis system, namely the EnCal 3000, which transfers the current data (see Figure "Redundant gas measuring system and bus structure for maximum availability").

All measurement data is stored in the calibrated gas-net devices and additionally in a calibrated measurement data registration device. The data can be called up using the DSfG RDT unit gas-net D1 via a

Successful commissioning of the system

After completing all the assembly and installation work, the successful "cold commissioning" (i.e. with no gas flow) was carried out at the start of 2007. Then in June 2007 everything was ready: the "hot commissioning" (i.e. with gas this time) and the official Calibration Department acceptance procedure for the gas volume measuring and gas quality analysis systems was carried out without any problems and to the complete satisfaction of all concerned. Once the official Calibration Department test had been passed and the final documentation handed over, we were able to successfully complete the Haiming Project.

For the future, Elster-Instromet offered to provide servicing, inspections, maintenance work, troubleshooting and calibration for the measuring system, within the provisions of a maintenance and servicing contract. This is an important element of the service side of our range of products and services, which we want to expand further in the future, in the interest of our customers.

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