

## JUMO thermoCOR: Compact System for Calibrating Industrial Furnaces

Operators of industrial furnaces are very familiar with the terms "AMS2750E" and "CQI-9". The AMS2750 (Aerospace Material Specification) regulation describes the requirements of the aerospace industry regarding thermal process devices used in heat treatment. The "CQI-9 Heat Treat System Assessment" formulates the requirements from the automotive industry regarding industrial heat treatment and describes the procedure to follow when conducting process audits. For both standards, JUMO can now offer an easy-to-use compact solution for calibration in the form of the JUMO thermoCOR measuring system.

JUMO thermoCOR is a perfect remedy for the ever-growing number of customers who need to meet the demanding requirements of the aerospace industry. JUMO drew on many years of experience to develop the measuring system. The company has been manufacturing high-quality temperature measurement technology for almost 70 years. As early as 1992 a certified DKD (German calibration service) was opened at the company headquarters in Fulda. This was then certified by the new German National Accreditation Body (DAkkS) in 2011.

As part of a *DAkkS* calibration, the thermometer is measured at different temperatures. Using the measurement data, characteristic parameters are calculated and a certificate is issued on the measurements that are carried out. At JUMO, *DAkkS* calibration certificates can be issued for RTD temperature probes, thermocouples, measuring chains, data loggers, and temperature block calibrators in the measuring range between -80 and +1,100 °C

The calibration of the temperature probe alone is not enough in many cases because other components are still involved in the temperature acquisition and the display that influence the measurement result. These components include connection cables for the temperature probe, the measuring point changeover switch, and evaluation electronics such as controllers, recorders, or indicators. Only an on-site calibration can evaluate all influential factors correctly and include them in the calibration result. For this reason, JUMO has the *DAkkS* accreditation for the on-site calibration of temperature sensors at its disposal.

JUMO sets the same high quality standards for on-site calibration in the temperature block calibrators as it does in its in-house *DAkkS* laboratory. JUMO also offers these calibrations on a brand-independent basis for all temperature sensors. The accredited temperature range lies between -40 and +700 °C. The smallest assignable measurement uncertainty is between 0.25 and 2.5 K, depending on the calibration range.

If users wish to play it safe, a maintenance concept should be implemented for the entire plant. This involves compiling maintenance reports with quality-relevant protocols, monitoring calibration deadlines, as well as replacing wearing parts in good time. JUMO offers these maintenance concepts both in-house as well as on-site.

The combination of DAkkS expertise and diverse experience with on-site calibration sets JUMO thermoCOR apart. It is a portable measuring system with which plant operators can independently perform SAT and TUS tests. These are fixed components of the "AMS2750" and "CQI-9". With TUS (Temperature Uniformity Surveys) measuring, the uniformity of the temperature in the usable space of a heat treatment system needs to be checked at least once a year. Additionally, the system accuracy of the measuring chain needs to be checked every three months as part of a SAT test (System Accuracy Test). All results must be carefully documented.

The JUMO thermoCOR is calibrated in the in-house DAkkS laboratory and meets the tolerance limit requirements according to the AMS2750 and CQI-9 standards. The core of the system is a high-precision cold junction. The JUMO thermoCOR has an overall capacity of up to twelve configurable thermocouple inputs and four freely configurable universal inputs to which such devices as RTD temperature probes or pressure transmitters can be connected.

A touchscreen offers easy handling of process screens. The HMI offers familiar operating convenience with a TFT-touchscreen. Projects regarding types of furnaces can be configured individually and controlled via a process screen.

A master and user management system enables all activities to be easily understandable and all measured values to be acquired so that they are tamper-proof. The data is transmitted via LAN or USB interface through the JUMO PCC communication software to the JUMO PCA evaluation software. A test report can be prepared after testing.

JUMO also offers a selection of DAkkS calibration-certified temperature probes for TUS and SAT measurements. Individual customer requirements such as necessary cable lengths can be met during manufacturing.

Customers who are interested in this innovative testing system can choose from a range of different service offers. For example, the complete JUMO thermoCOR with DAkkS certificate can be purchased as part of the basic package. In this case, the customer performs all tests independently and creates the reports themselves. The introduction package includes the JUMO thermoCOR rental fee for one month including one day of support from a JUMO employee for startup, tests, and training.

With a duration of twelve months, the maintenance package includes comprehensive services such as recalibration, a full functional check, firmware updates, and a loan device for the duration of the recalibration work.

The "all-round, worry-free package" is a special feature. With this, prospective clients commission JUMO for tests. In this case, the Service department performs all the tasks for the customer up to and including the preparation of test reports. Furthermore, JUMO also plans all necessary recalibrations so that no deadlines are forgotten.

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**Fig. 1: JUMO thermoCOR measuring system**



**Fig. 2: JUMO thermoCOR process screen**



**Fig. 3: JUMO has been offering on-site calibration for several years.**



**Fig. 4: Industrial furnace**



**Fig. 5: Hood furnace**