



# GÜNTHER



Thermocouples

for heat treatment

according to DIN EN 60584

**Temperature Measurement Technology**  
Reliable . Precise . Certified

# Thermocouples for heat treatment

## Perfection in heat treatment

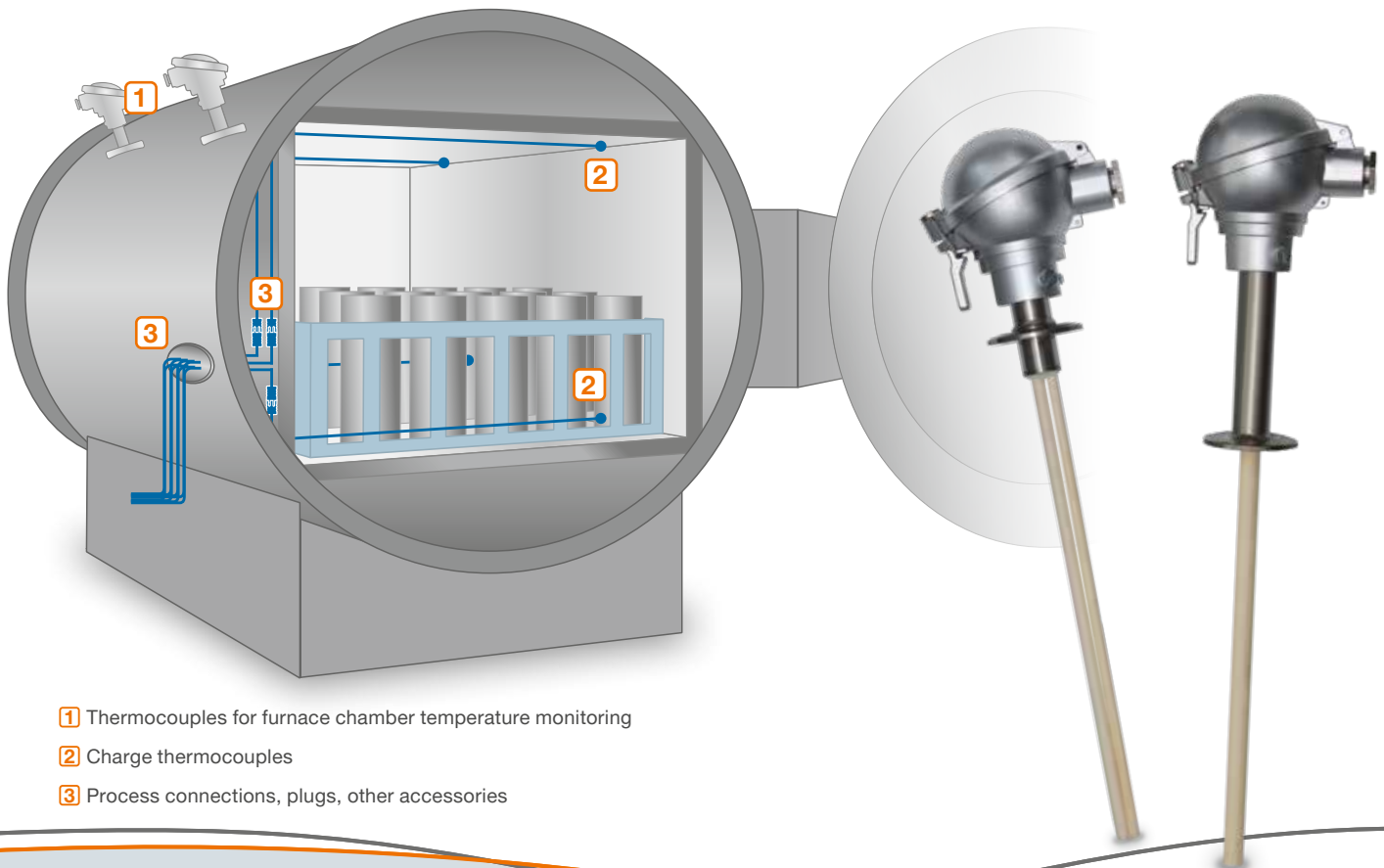
GÜNTHER GmbH Temperaturmesstechnik has been manufacturing thermocouples and resistance thermometers for applications in almost all industrial sectors at five European locations since 1968. Our core business consists in the development and production of small series of products tailored to specific requirements of our customers.

Extensive material stocks, as well as different, independent suppliers of raw materials or components usually allow for short production times. This also guarantees that spare parts can be supplied at short notice. A long-established QM system and our own calibration laboratories ensure the maintenance of highest quality standards.

Especially with the heat treatment of components for the automotive or aircraft industry, compliance with AMS 2750 or CQI-9 is indispensable. For decades, GÜNTHER has been intensively involved with the challenges of temperature measurement in this sector of industry and remains one of the leading German manufacturers of temperature sensors for heat treatment plants.

## Thermocouples for furnace chamber temperature monitoring

In order to achieve maximum measuring accuracy and process reliability, GÜNTHER furnace chamber thermocouples are usually manufactured with double thermocouples. Depending on the specifications, two different thermocouple pairs may also be used in one protective fitting. Protection tube diameters that are as small as possible enable short response times to temperature changes. Versions with a closable test port also allow quick and easy in-line calibration.



- ① Thermocouples for furnace chamber temperature monitoring
- ② Charge thermocouples
- ③ Process connections, plugs, other accessories

## Charge thermocouples

Charge thermocouples are used to measure the temperature distribution, for example in TUS measurements (Temperature Uniformity Survey) in the entire working chamber of the furnace, as well as to determine the temperature on or in the treated component itself. As a rule, flexible, mineral-insulated sheath thermocouples are used for this purpose, with measuring points that can be placed exactly at the desired measuring locations. For the production of these thermocouples, GÜNTHER uses **only class 1 materials compliant with DIN EN 60584.**

**This means that even the strict requirements of AMS 2750 or CQI-9 can be reliably met.** For a more direct response or for one-time and drag measurements, thermo-cables can also be used. These are mostly thermal wires braided with glass silk or ceramic fibre yarn, which are supplied in rolls.



## Temperature sensors for preheating, tempering and annealing processes

For temperature measurement in preheating and tempering furnaces, GÜNTHER supplies temperature sensors specially manufactured for the conditions prevailing there. For the temperatures prevailing in this area of material processing in the range between +500°C to +1000°C, thermocouples with a metal protection tube or ceramic outer protection tube and, depending on the configuration selected, a ceramic insulated thermocouple or a sheath measurement insert are especially suitable.



### Advantages of testable thermocouples

- No process interruption during the test
- Early detection of the drift behaviour of the thermocouples
- Cost savings through energy efficiency
- High environmental sustainability through conservation of resources
- Ensuring constant temperatures in the furnace and thus a consistently high quality of the production charge



# Thermocouples for heat treatment

## Angle thermocouples for use in salt bath hardening / nitriding

For temperature measurements in salt baths, where components are treated in a liquid molten salt at temperatures between +820°C and +920°C, angle thermocouples are used almost exclusively. This design can also be used for tempering and nitriding in the temperature range of approx. +500°C.

Due to the angular shape, the connection head with the connected compensation line are not directly in the area of the aggressive vapours above the melt.

Angled thermocouples with screwed angled bends are standard, but simple designs with bent or welded protective tubes can also be provided.

The advantage of bolted angle thermocouples is that the immersion tubes are interchangeable and the less stressed support tube can be made of less expensive materials. This design is also used for ceramic immersion tubes or tubes that cannot be bent due to the properties of the material.

Depending on the design, a test opening for simple and thus cost-effective SAT measurements can be realised using a T-piece in the angle connection.

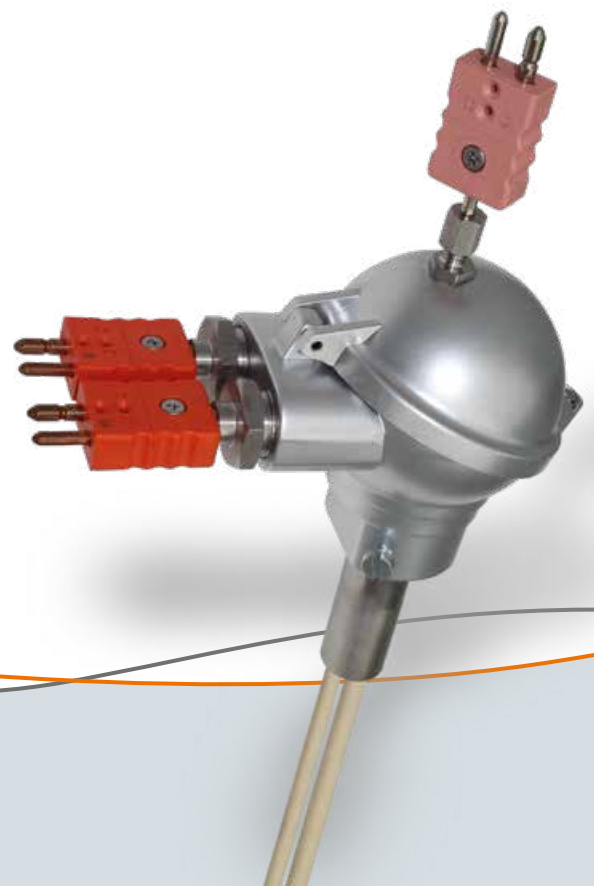


## Thermocouples with opening for permanent SAT test

For the permanent use of test thermocouples we have developed a connection head which allows the quick insertion and removal of a test element through an opening in the lid.

This means that „resident-SAT“ tests, where the test sensor remains permanently in the test specimen, can be carried out quickly and without the use of any tools.

This is permitted in AMS 2750, for example. The appropriate test thermocouples, as well as test resistance thermometers of any design, are available from GÜNTHER at short notice at any time.





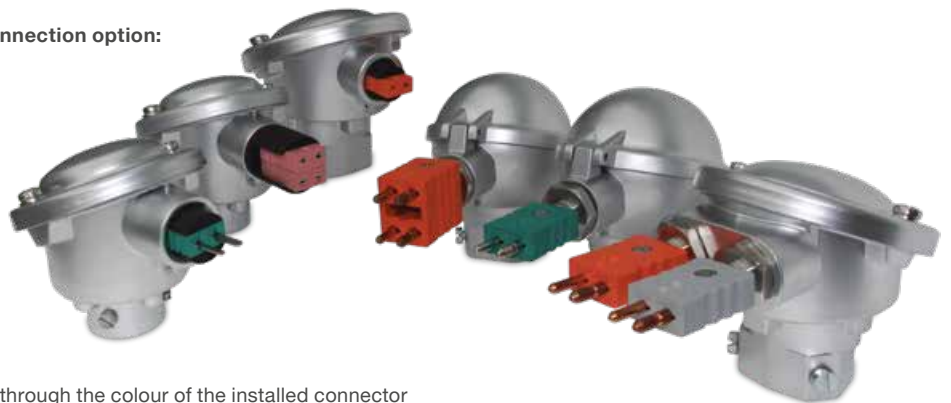
## Designs and components for heat treatment facilities

### Connection heads with plug connectors

To save time and ensure safe handling of GÜNTHER temperature sensors, especially when used in hardening shops, we have developed two types of plug connectors for connecting our sensors. Both versions are available for all thermocouple types and have already proven themselves in daily use for years.

#### The customer benefits of this standardised connection option:

- fast replacement of thermocouples
  - no need to open the head cover
  - no tools necessary
- connection with guaranteed reverse polarity protection
- execution of instrument calibrations without the need to disconnect the thermocouples
- reliable identification of the thermocouple type through the colour of the installed connector
- possibility to check the thermocouple without disconnecting it (connection option / measurement with a hand-held measuring device)



### Examples of various designs

#### Version with miniature plugs

- adapter made of impact-resistant plastic
- available as plug or coupling
- can be executed as single or duplex variant
- suitable for any connection head with cable connection M20 x 1.5
- cost-effective option



#### Version with standard plugs

- with metal screw connection
- use of standard plugs
- available as plug or coupling
- can be executed as single or duplex variant
- suitable for any connection head with cable connection M20 x 1.5
- particularly robust variant

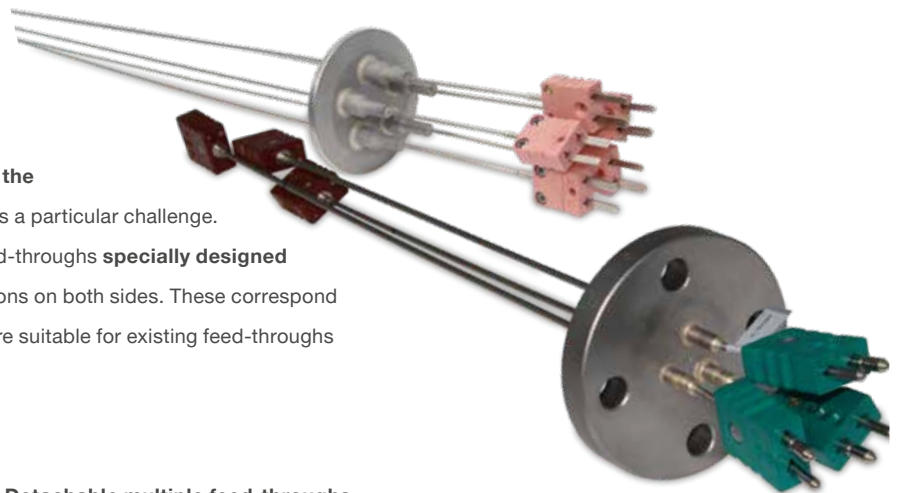


Duplex connectors are used either in temperature sensors with two measuring points or in elements with different thermocouples.

# Thermocouples for heat treatment

## Process implementations

The **gas-tight and process-safe feed-through of the charge thermocouples to the outside** often poses a particular challenge. For this purpose, we develop gas-tight process feed-throughs **specially designed for your installation**, usually with plug-in connections on both sides. These correspond exactly to the required technical requirements, or are suitable for existing feed-throughs or flange connections.



## Detachable multiple feed-throughs

Often the mineral-insulated sheathed cables are hard soldered into the multiple process feed-through. However, this makes it difficult to change the position and to replace individual sheathed cables if repairs are necessary. To counteract these disadvantages, we have developed a **flange with individually detachable screw connections** that can be installed cleanly, tightly and without distortion in almost any desired flange geometry.



## Multiple process feed-through with KF flange connection

Many designs and dimensions available at short notice.

## Plugs, compression fittings, compensating cables and other accessories

Common process connections such as compression connectors, flanges and sleeves, as well as compensating cables, plug connectors and other accessories are always available in stock at GÜNTHER. This way, we can guarantee short delivery times to our customers at all times.



## Service, calibration laboratory and trainings

For a successful heat treatment of components of any kind, an exact temperature or temperature distribution in the furnace is indispensable.

The testing of the temperature sensors used in this process is the task of the **GÜNTHER on-site service**. Our experienced employees work for you at home and abroad.

The main component of the GÜNTHER service are **SAT measurements (measurement of system accuracy)**, and/or **TUS measurements (measurement of temperature uniformity in the furnace)** and the performance of **instrument calibrations**.

If required, we are able to check all international standards and specifications such as AMS 2750 and CQI-9 (automotive and aerospace industry), DIN 17052-1, API 20H, etc.



### Calibration of thermocouples in the in-house, accredited calibration laboratory

At its headquarters in Schwaig, GÜNTHER maintains its own **DAkKS-accredited calibration laboratory**, where temperature sensors are calibrated.

The DAkKS accreditation of GÜNTHER GmbH Temperaturmesstechnik is in the temperature range from -100°C to +1500°C. In the temperature range between -100°C and +1550°C a factory test certificate can be issued for calibration.

Through our accreditation for display devices and simulators, we can provide our customers with instruments in our permanent laboratory as well as on location. Furthermore, it is possible to manufacture thermocouples from calibrated charges and to issue a corresponding charge certificate.



Laser-inscribed flange with calibration certificate, charge and order number for clear assignment of the thermocouple.

### Training and know-how transfer

To further support our customers, we offer various practical **training courses on the subject of temperature measurement technology**.

The topics range from the basics of temperature measurement technology to more in-depth topics such as the contents of CQI-9 or AMS 2750.

Each participant receives both a comprehensive hand-out with a detailed summary of the training content and a certificate of attendance. All training courses can be held either at the company's headquarters in Schwaig or at the customer's premises.







### **GÜNTHER** GmbH Temperaturmesstechnik

Bauhofstraße 12 · 90571 Schwaig · Germany  
Tel. +49 (0)911 / 50 69 95-0 · Fax +49 (0)911 / 50 69 95-55  
info@guenther.eu · www.guenther.eu

### **LANGKAMP** Technology B.V.

Molenvliet 22 · 3961 MV Wijk bij Duurstede · Nederland  
Tel. +31 (0)343 / 59 54 10  
info@ltbv.nl · www.ltbv.nl

### **GUENTHER** Polska Sp. z o.o.

ul. Wrocławska 27C · 55-095 Długoleka · Polska  
Tel. +48 (0)71 / 352 70 70 · Fax +48 (0)71 / 352 70 71  
biuro@guenther.com.pl · www.guenther.com.pl

### **S.C. GUENTHER** Tehnica Măsurării S.R.L.

Calea Aurel Vlaicu 28-32 · 310159 Arad · Romania  
Tel. +40 (0) 257 / 33 90 15 · Fax +40 (0) 257 / 34 88 45  
romania@guenther.eu · www.guenther.eu

## Head office in Schwaig · Germany

