# GA-120

KONGSBERG

# Thermocouple Amplifier

## Features

- Galvanically isolated input/output
- No “ground current” problems
- Well suited for sensors with low insulation from element to ground, or for grounded thermocouples
- Grounded hot junction thermocouples. An advantage when short time constant is required, and for metal temperature surface measurements
- A high quality thermocouple amplifier with excellent price/performance ratio

## Description

### Application and general description

The GA-120 Thermocouple Amplifier is intended for converting the low voltage output from a thermocouple (approximately 40 µV/°C when using the type K element) to a standard, 4 to 20 mA, signal with a 2-wire connection.

### Electrical design

Voltage supply must be between 12 and 35 VDC, and the load resistance at the output must determine the lower voltage. The thermocouple voltage is connected to an input network. The input voltage is dependent upon the temperature difference between the sensor element (hot junction) and the amplifier (cold junction). A built-in temperature sensor will compensate for variations in the amplifiers ambient temperature (cold junction). Galvanically isolation is obtained by using a current transformer.

### Mechanical design

The electronic circuitry is designed in a terminal block encapsulation and is intended for mounting on a standard rail type TS-32 or TS-35. TS-35 is the most recommended type.

The thermocouple amplifiers are intended to be mounted side by side at the rail. End clamps for support of the amplifiers must be installed at both sides.

KONGSBERG can also supply the correct number of amplifiers mounted in a cabinet. Connections are the made via cable glands.

### Electrical connection

Maximum cable cross section is 2.5 $mm^2$.
Temperature sensors are often delivered with armoured cables, and the armouring also works as an electric screen. If the sensors are delivered without armouring, screening must be obtained otherwise. From the amplifier to the control panel it is recommended to use a screened cable (cross section minimum 0.50 $mm^2$).
Colour coding for compensation cable type K according to DIN 43714:

| | |
|---|---|
| Outer shield: | Green |
| Positive conductor: | Red |
| Negative conductor: | Green |

The GA-120 Thermocouple Amplifier is adjusted from factory and further adjustments are normally not required.

## Technical specifications

| | |
|---|---|
| Power supply: | 12 to 35 VDC |
| Current consumption/output signal: | 4 to 20 mA, 2-wire connection, compensated for variations in ambient temperature |
| Load resistance: | 0 to 1150 Ω |
| Ambient temperature, operation: | -25 to +80 °C |
| Compensated temperature range: | 0 to +70 °C |
| Accuracy: | <±0.5 % of FRO* (incl. non linearity, hysteresis and repeatability) |
| Repeatability: | <±0.2 % of FRO* |
| Thermal zero and sensitivity shift: | <0.05 °C/°C ambient temperature shift |
| Dimensions (H x W x D): | 25 x 84 x 79 mm |
| Weight: | 80 g |
| Housing material: | Polyamide terminal block |
| Mounting: | TS-32 or TS-35 rail (DIN 46277) |
| Encapsulation: | IP40 |
| Vibrations: | Maximum 4 g at 2 to 100 Hz |
| Quality standard: | ISO 9001 |

**FRO = Full Range Output*

| Type | Thermocouple type | Range |
|---|---|---|
| The GA-120/E | K (NiCr-NiAl) | 0 to 160 °C |
| The GA-120/B | K (NiCr-NiAl) | 0 to 300 °C |
| The GA-120/A | K (NiCr-NiAl) | 0 to 600 °C |
| The GA-120/N | K (NiCr-NiAl) | 0 to 900 °C |

## Drawings

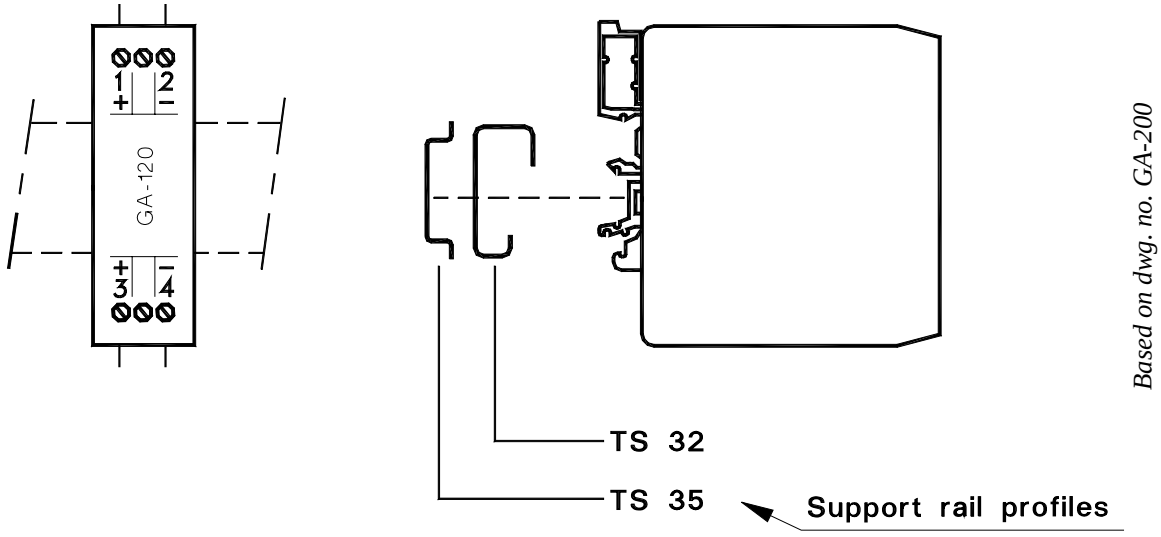
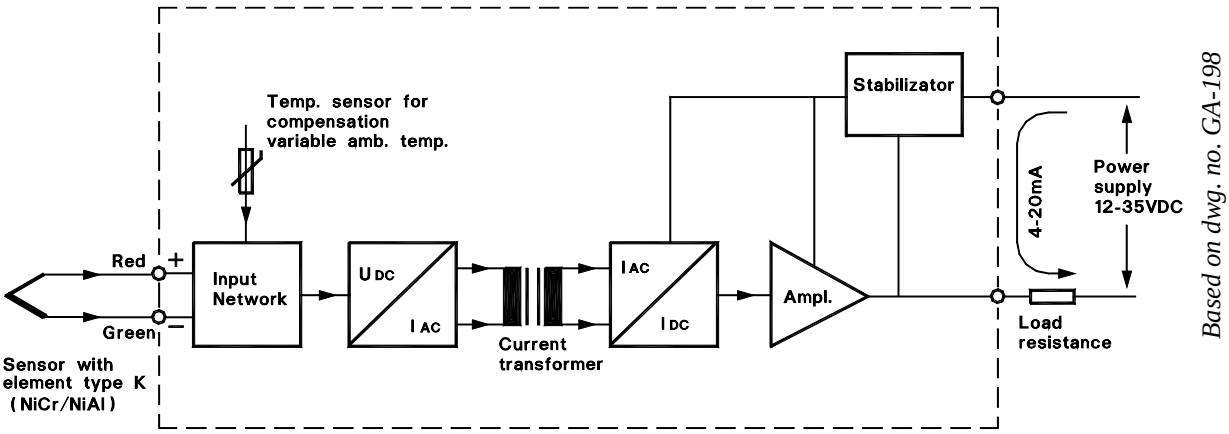
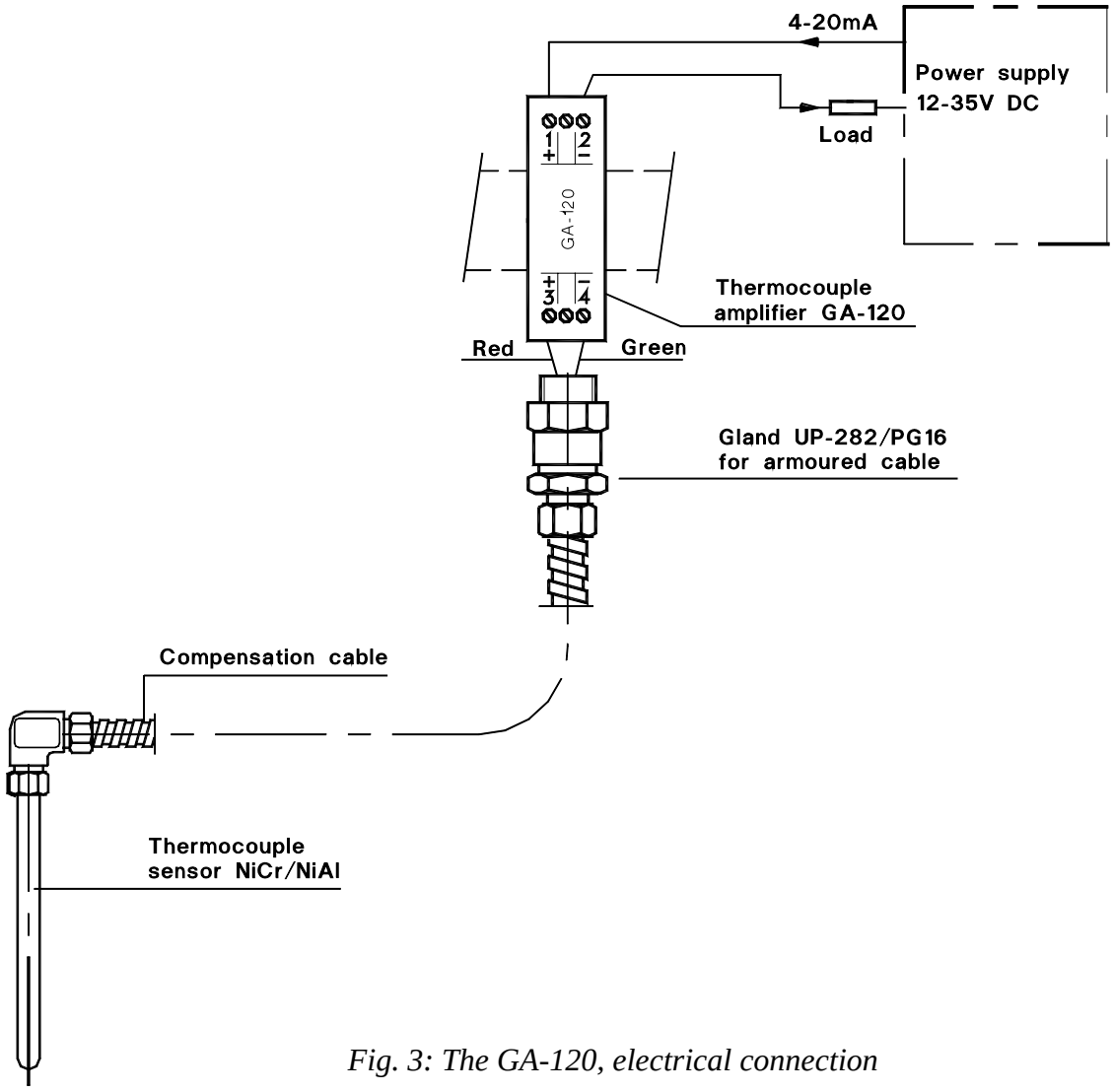



*Fig. 1: The GA-120*




*Based on dwg. no. GA-198*

*Fig. 2: The GA-120, electrical design*




*Based on dwg. no. GA-199*

*Fig. 3: The GA-120, electrical connection*

KONGSBERG MARITIME AS

NO-7005 Trondheim Norway km.sales@kongsberg.com

Telephone: +47 73 58 10 00 Telefax: +47 73 58 10 01 **www.km.kongsberg.com**

KONGSBERG