TEMPERATURE PROBE DS 1820 WITH 2 M SEMOFLEX CABLE AND RJ12 PLUG

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Order No. 18 40 67

Characteristic features

- **Ready made, plug-in type temperature probe with DALLAS semi-conductor sensor DS 1820**
- **High Quality SEMOFLEX Connection cable 2m**
- **Continuous operating temperature –40° ... 125°C**
- **Sensor in stainless steel protective sleeve**
- **Splash waterproof**
- **RJ 12 plug connector with breakage protection**
- **Resolution 0.06 °C**
- **Accuracy ±0.5 K nominal (from 0...70°C), as per data sheet of manufacturer**
- **Scratchpad memory for probe identification**

Typical areas of application

- **Monitoring of frozen goods as per cold storage regulations**
- **Building instrumentation**
- **air conditioning systems**
- **Quality assurance**
- **Science and research laboratories**
- **Industrial temperature logging**

Available probes: The reasonably priced probes with PVC connection cable are meant for measurement in open atmosphere, on surfaces or in non-aggressive gas medium. The probes are sealed and can bear water contact for some time. However, long term immersion in liquid is not recommended.

The models with stainless steel probe tube are chemically stable and the tube portion of probe can be submerged in liquid, the stainless steel (1.4571) does not get affected. However, in the cable termination area, the probe should not come into constant contact with liquid.

For application in pipeline system, pressure resistant models with 1/8" or M10 threads are also available. These models with gasket are suitable up to 20 bar.

Further customised models can be manufactured for special applications. Please send your enquiry to us!

Formation of temperature sensor Networks: All necessary components, with plug-in type RJ12 connectors, are available for the 16 channel temperature measuring system so that a fully functional system can be developed even without soldering knowledge.

The speciality about wiring of the sensors is the "Bus technology": All sensors can be driven parallel on a 3-wire line over which both supply and data communication can run through. Hence, the bus topology is completely arbitrary: it can built both as a star or extended structure. Mixed forms are also possible. It is only to be ensured that the sum of all connection cables does not exceed the maximum allowable length of approx. 60 m.

Hub: For connection of multiple probes, a hub is available with 10 ports (RJ12). One port is used for connection of temperature logger, and if necessary, another port is used for connection of another hub. As a result, 8 to 9 ports are available for connection of temperature probes.

The hub has a supply capacitor and a pullup resistance of 10 k-Ohm for compensation of connection capacitance. An RJ12 cable (1m) is also included in the scope of supply of hub, which is required for connection to a PC adaptor or for cascading with another hub.

Connection cable: For short connection lengths, there are no special requirements for the cable to be used. With unshielded cable, a larger connection length can be obtained in an undistorted environment, since the capacitive bus load is less. With additional measures, a total length of 60 m or more can be achieved without any problems.

In disturbed environment, the cable should be shielded in order to improve the noise immunity of the system. Due to higher capacitive loading, the maximum possible connection length is less for a shielded cable.

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Increase in connection length: The sum total length of all connection cables should be within around 60 m to ensure reliable functioning. By wiring of an additional pullup resistance of 1.5 to 10 k-Ohm (Line DATA against +5V), the cable length can be increased with minor deterioration in measuring accuracy due to higher self heating of the sensors.

Temperature range: The Dallas temperature sensors are semiconductor sensors. The un-housed sensors are suitable for temperature measurement in the range of -55°C to 125 °C. These temperature values are the final limits and operating above these values is not at all recommended, otherwise the component can get damaged.

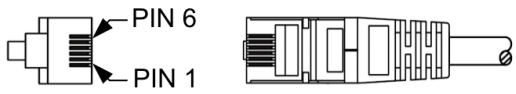
In addition, the allowable application temperature also depends on the connection cable and type of protection sleeve used. PVC insulated cable gets hard and brittle below -10°C and hence should not used at these lower temperatures otherwise the insulation may crack. Above 60°C continuous operating temperature, the PVC becomes soft and can get deformed. At approx. 80° C, the material becomes plastic and the insulation gets damaged under pressure.

Installing and configuration: The Dallas temperature sensor of type 1820 has an internal identification (serial number) and can be operated in parallel together with several other components on a three-wire bus. After wiring all the sensors, the PC adapter must be individually configured for the connected sensors. Operation is not possible without prior configuration of the system. Since the configuration is stored in the internal EEPROM of adapter, this process is to be done only once. Only if an additional sensor is to be used on the existing network, the configuration needs to be repeated.

The sorting of probes, found on the network, is done on the basis of binary serial number.

Pin configuration of RJ12-plug connector: The Western-plug connector is configured as follows (View on the cable, i.e. contact surfaces of the plug!):

1	Shielding or unoccupied
2	Ground
3	Dallas Data or unoccupied
4	Dallas Data
5	+5V
6	+5V or unoccupied



In 4-core flat cable, PIN 1 and PIN 6 are not occupied. PIN 3 and 4 are bridged together at the PC-adapter. Only PIN4 is needed to connect the data line of the sensor.

Measuring accuracy: The sensors are calibrated during manufacture and have a typical measuring accuracy of ±0.5°K at 23°C application temperature. At the upper and lower limit of measuring range, the accuracy is somewhat on the lower side. Further information is available in the data sheet of component at the website of manufacturer.

During all temperature measurements, the physical conditions are also to be taken care of in order to avoid measuring error, which mainly decides the precision of measuring arrangement.

Thermal transition resistance of measuring object-sensor: This is the main measuring error which occurs during surface measurements. This can be eliminated by providing good thermal contact through mounting in a tube, applying thermal conducting paste or thermal conducting adhesive.

Thermal heat transfer of sensor-ambient temperature: During surface measurements, the measuring arrangement should be thermally insulated from the surroundings, for example, with some foam material or mineral wood.

Thermal heat transfer of sensor-connecting wires: This measuring error can be minimised by itself, for example, if the connecting lead used is as thin as possible and the connecting material is a bad thermal conductor or if the connecting wire is tempered with the measuring object.

In principle, of course, the highest measuring accuracy is achieved through immersion in liquids or in a mounting tube. However, an additional measuring error should be included while taking measurements on surfaces.

Customer's own probes: Technically conversant users with knowledge of soldering can also make the probe themselves. Connector configuration of Dallas 1820 sensors is as below:

Care should be taken that a capacitor 100 nF is directly wired at the sensor between +5V and GND, in order to improve the EMV behaviour.

You can obtain the required accessories from us like sensors, flat cables, RJ12-connector or crimping tool.

Complimentary information: Further information on "Dallas Touch bus" and also a detailed data sheet of temperature sensor DS 1820 is available from MAXIM at the website www.maxim-ic.com or at our homepage www.hygrosens.com.

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