Data sheet



Thermostat

CAS

Description

The CAS series consists of a series of pressure controlled switches and temperature controlled switches. In this series, special attention has been given to meeting demands for a high level of enclosure, robust and compact construction and resistance to shock and vibration.

The series is suitable for use in alarm and regulation systems in factories, diesel plants, compressors, power stations and on board ships.

Features & benefits

- A high level of enclosure
- Fixed differential
- Robust and compact construction
- Resistance to shock and vibration
- Available with all major marine approvals

Ordering

Product code numbers

Type	Temperature range [°C] [min]	Temperature range [°C] [max]	Diff. @ Min. range setting [K]	Differential type	Max. sensor temperature [°C]	Sensor pocket length min. [mm]	Capillary tube length [mm]	Code number
CAS178	20	80	2.0	Fixed (max. value)	130	75	2000	060L315166
CAS178	20	80	2.0	Fixed (max. value)	130	75	2000	060L418366
CAS180	70	120	2.0	Fixed (max. value)	220	75	2000	060L315366
CAS180	70	120	2.0	Fixed (max. value)	220	75	2000	060L413766
CAS181	60	150	2.5	FIXED	250	75	2000	060L315566
CAS181	60	150	2.5	Fixed (max. value)	250	110	5000	060L319866
CAS1080	70	120		Fixed (max. value)	220	200		060L502066

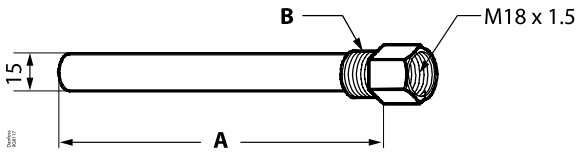
Note:
- 060L418366 has PE coated capillary tube
- 060L413766 is supplied with brass sensor pocket

Note:
For CAS1080 (2-step thermostat)
- Factory setting:
  – Step 1: 80 °C
  – Step 2: 80 °C
- Differential: 3.0 K

Enclosure
IP67 acc. to EN 60529. The thermostat housing is enameled pressure die cast aluminum (GD-AISI 12). The cover is fastened by four screws which are anchored to prevent loss. The enclosure can be sealed with fuse wire.

Identification
The type designation and code no. of the unit is stamped in the side of the housing.

Accessories code numbers



A	Sensor pocket length
B	Pressure inlet connection

Table: Product Name

Product Name	Sensor pocket material	Sensor pocket length min. [mm]	Pressure inlet conn. type	Pressure inlet conn. size [in]	Pressure inlet conn. std.	Code number
Sensor pocket	Brass	200	G	1/2	ISO 228-1	060L320666
Sensor pocket	Stainless steel	110	NPT	1/2-14	ANSI/ASME B1.20.1	060L327066
Sensor pocket	Stainless steel	160	G	1/2	ISO 228-1	060L326966
Sensor pocket	Brass	110	G	1/2	ISO 228-1	060L327166
Sensor pocket	Stainless steel	110	G	1/2	ISO 228-1	060L326866
Sensor pocket	Brass	75	G	3/4	ISO 228-1	060L326666
Sensor pocket	Brass	110	G	3/4	ISO 228-1	060L340366
Sensor pocket	Brass	250	G	1/2	ISO 228-1	060L325466
Sensor pocket	Stainless steel	75	G	1/2	ISO 228-1	060L326766
Sensor pocket	Brass	330	G	1/2	ISO 228-1	060L325566
Sensor pocket	Brass	160	G	1/2	ISO 228-1	060L326366
Sensor pocket	Brass	110	NPT	1/2-14	ANSI/ASME B1.20.1	060L328066
Sensor pocket	Brass	75	G	1/2	ISO 228-1	060L326266
Sensor pocket	Brass	75	G	1/2	ISO 228-1	060L328166
Sensor pocket	Brass	75	NPT	1/2-14	ANSI/ASME B1.20.1	060L326466
Sensor pocket	Brass	65	NPT	1/2-14	ANSI/ASME B1.20.1	060L326566
Clamping band						017-420466
						041E0115

Note:

- All sensor pockets are supplied without gland nut, gaskets and washes.
- Clamping band: for CAS temperature controls with remote sensor, L = 392 mm
- 041E0115: heat conductive compound for CAS with sensor fitted in a sensor pocket. For filling sensor pocket to improve heat transfer between pocket and sensor. Application range for compound: -20 – 150 °C, momentarily up to 220 °C.

Overview

Product portfolio

Figure: Thermostat

[°C] 0 20 40 60 80 100 120 140 160	Range [°C]	Type
	20 – 80	**CAS 178**
	70 – 120	**CAS 180**
	60 – 150	**CAS 181**

Functions

Differentials

The mechanical differential is the differential determined by the design of the thermostat. The thermal differential (operating differential) is the differential the system operates on.

The thermal differential is always greater than the mechanical differential and depends on three factors:

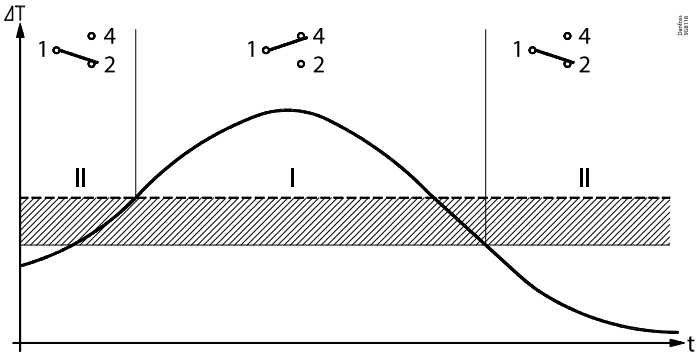
- Medium flow velocity
- Temperature change rate of the medium
- Heat transmission to the sensor

Thermostat function

Contacts 1-4 make while contacts 1-2 break when the temperature rises above the scale setting.

The contacts changeover to their initial position when the temperature falls to the scale setting minus the differential (*see Figure: Thermostat*).

Figure: Thermostat



I	Alarm for rising temperature given at range setting value.
II	Alarm for falling temperature given at range setting value minus the differential.
----	Scale setting
▬	Differential

Example 1

Diesel engine with cooling water temperature of 85 °C (normal). An alarm must be triggered if the cooling water temperature exceeds 95 °C. Choose a CAS thermostat 180 (range 70 – 120 °C). Main spindle setting: 95 °C. The required alarm function is obtained by connecting to thermostat terminals 1-4.

Example 2

Find the necessary scale correction for a CAS 180. Set 95 °C at 50 °C ambient temperature. The relative scale setting Z can be calculated from the following formula:

$$\frac{\text{Setting value - min.scale value}}{\text{max.scale value - min.scale value}} \times 100 = \ [\%]$$

$$\text{Relative scale setting: } \frac{95 - 70 \times 100}{120 - 70} = 50\%$$

Factor for scale deviation Z (*see Figure: Scale correction*), Z ≈ 0.7
Correction factor "a=2.4", *see Table: Correction factor "a"*
Scale correction = Z × a = 0.7 × 2.4 = 1.7 °C
CAS must be set at 95 + 1.7 = 96.7 °C

2-step thermostat type CAS 1080

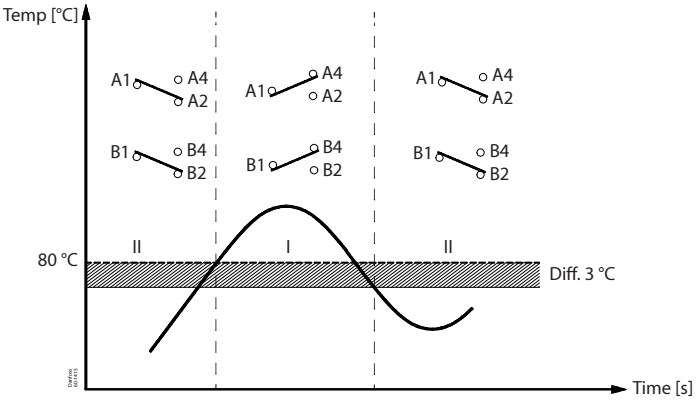
CAS 1080 thermostats have fixed factory settings. The thermostats with factory setting at 80 °C of step 1 and step 2 is used for special application, where double warning – like crank case fire – is requested. The contacts automatically reset when the temperature decreases in accordance with the differential.

Differentials
The mechanical differential is the differential determined by the design of the thermostat. The thermal differential (operating differential) is the differential the contact system operates on. The thermal differential is always greater than the mechanical differential and depends on three factors:

1. Medium flow velocity
2. Temperature change rate of the medium and
3. Heat transmission to the sensor

Thermostat function
Contacts 1-4 make while contacts 1-2 break when the temperature rises above the scale setting.
The contacts changeover to their initial position when the temperature falls to the scale setting minus the differential (*see Figure: Thermostat function*).
The contacts marked A correspond to step 1.
The contacts marked B correspond to step 2.

Figure: Thermostat function



I	Alarm for rising temperature given at range setting value.
I I	Alarm for falling temperature given at range setting value minus the differential.
----	Scale setting
▬	Differential

Product details

Performance and environmental conditions

Table: Technical data

Type		CAS 178, CAS 180, CAS 181	CAS 1080
Switch		Microswitch with single pole changeover (SPDT)	Microswitch with single pole changeover (2 x SPDT)
Contact load	Alternating current	AC-14 / AC-15: 0.1 A, 220 V	
	Direct current	DC-13: 12 W, 125 V	
Ambient temperature		-25 – 70 °C	
Vibration resistance		Vibration-stable in the range 2 – 30 Hz, amplitude 1.1 mm and 30 – 100 Hz, 4 g.	
Cable entry		Pg 13.5 for cable diameters from 5 – 14 mm	2 x g 13.5 for cable diameters from 5 – 14 mm

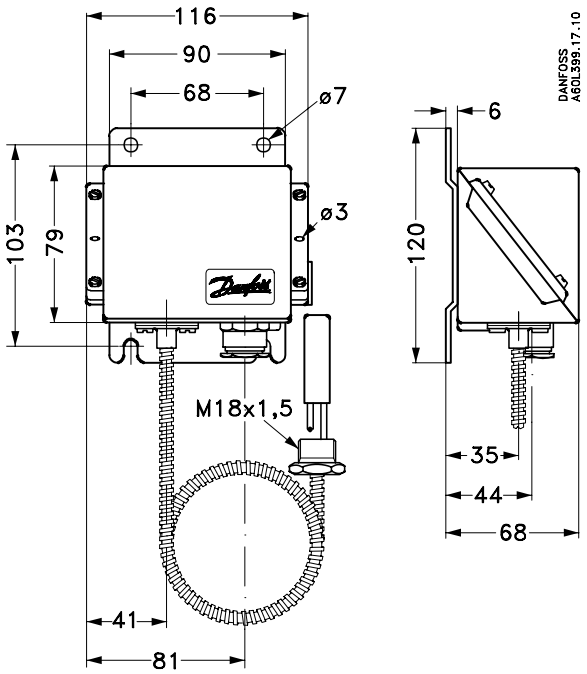
Terminology

Range setting
The temperature range within which the unit will give a signal (contact changeover).

Differential
The difference between make temperature and break temperature.

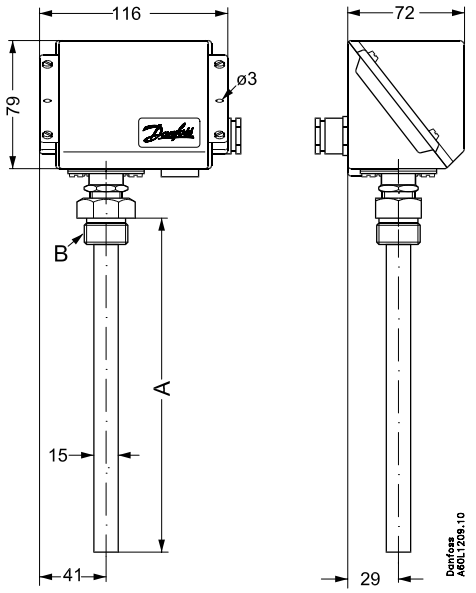
Dimensions

Figure: CAS with remote sensor and 2 m armoured capillary tube



Net weight: approx. 1.4 kg

Figure: 2-step thermostat, type CAS 1080



A: 200 or 80 mm
B: G ¾ A
Net weight: approx. 1.4 kg

Installation

Location of unit
CAS thermostats are designed to withstand the shocks that occur, for example, in ships on compressors and in large machine installations. CAS thermostats are fitted with a base of 3 mm steel plate for fixing to bulkheads, etc.

Resistance to media
Material specifications for sensor pockets.

Sensor pocket brass
The tube is made of Ms 72 to DIN 17660, the threaded portion of So Ms 58 Pb to DIN 17661.

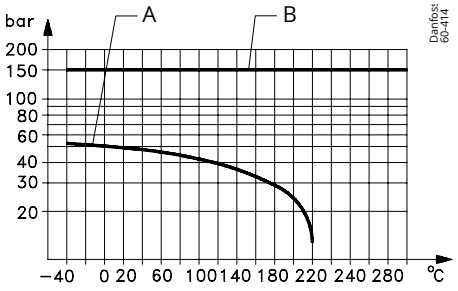
Sensor pocket, stainless steel 18/8
Material designation 1.4305 to DIN 17440.

Sensor position
As far as possible the sensor should be positioned so that its longitudinal axis is at right angles to the direction flow. The active part of the sensor is ø13 mm × 47.5 mm.

The medium
The fastest reaction is obtained from a medium having high specific heat and high thermal conductivity. It is therefore advantageous to use a medium that fulfils these conditions (provided there is a choice). The flow velocity of the medium is also of significance. (The optimum flow velocity for liquids is about 0.3 m/s). For permissible media pressure, *see Figure: Permissible media pressure on the sensor pocket as a function of temperature*.

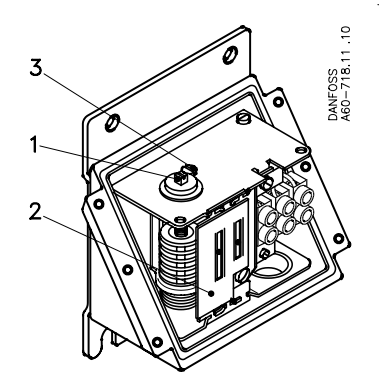
Setting
When the thermostat cover is removed, and the locking screw (3) is loosened, the range can be set with the spindle (1) while at the same time the scale (2) is being read (*see Figure: Setting*).

Figure: Permissible media pressure on the sensor pocket as a function of temperature



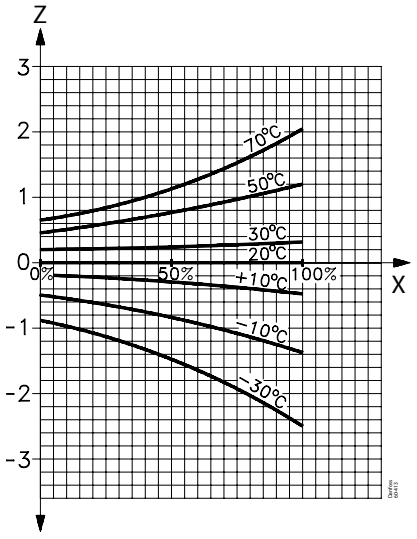
A	Brass
B	Stainless Steel

Figure: Setting



1	Range spindle
2	Range scale
3	Locking screw

Figure: Scale correction



Scale correction

The sensor on CAS thermostats contains an adsorption charge. Therefore, function is not affected whether the sensor is placed warmer or colder than the remaining part of the thermostatic element (bellows and capillary tube). However, such a charge is to some extent sensitive to changes in the temperature of bellows and capillary tube. Under normal conditions this is of no importance, but if the thermostat is to be used in extreme ambient temperatures there will be a scale deviation. The deviation can be compensated for as follows: Scale correction = Z × a.

Z can be found from *see Figure: Scale correction*, while "a" is the correction factor from the table below.

Table: Correction factor "a"

Type	Regulation range [°C]	Correction factor for "a" thermostats
CAS 178	20 – 80	2.5
CAS 180	70 – 120	2.4
CAS 181	60 – 150	3.7

CAS thermostats are fitted with a Pg 13.5 screwed cable entry suitable for cables from 5 – 14 mm.

Figure: Electrical connection

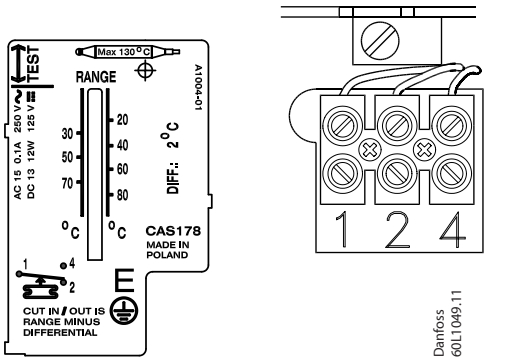
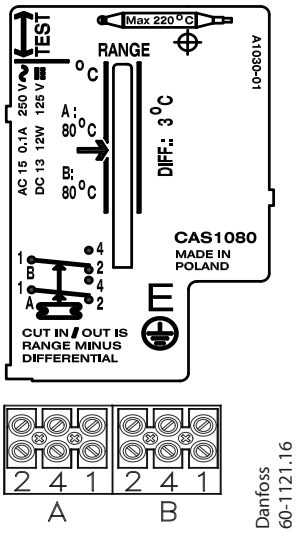


Figure: 2-step CAS thermostat, type CAS 1080



Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

When you click on the link you will be directed to the latest version of the 'Declaration of Conformity'. Products developed and sold before this date of issue conform to the directives/standards in force at the time of their sale.

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Electrical Safety Certificate	EAC KZ 7100841.01.01.01391	EAC - Eurasian Customs Union	EMC
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Pressure Safety Certificate	LLC CDC EURO-TYSK UA.TR.089.1015.05-22	LLC CDC EURO TYSK - Ukraine	Pressure
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