

Technical brochure

# Pressure and temperature controls, Type CAS



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 CAS series is equipped with a microswitch with single pole changeover (SPDT) offering higher electrical loads (AC15: 4A, 440V), higher differential and adjustable differential compared to switches with contact system.

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

## Features

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

**Approvals**

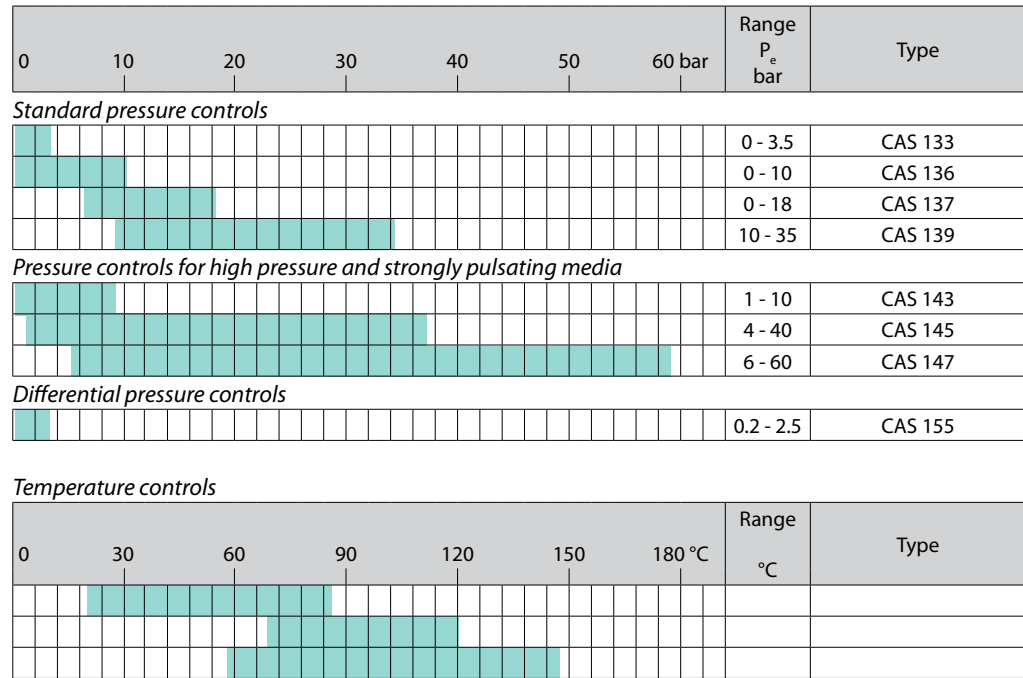
CE-marked acc. to EN 60947-5-1

**Ship approvals**

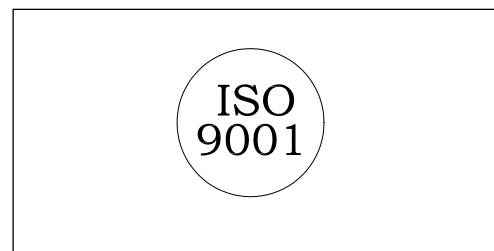
American Bureau of Shipping, ABS (excl. CAS 139)  
 Lloyds Register of Shipping, LR  
 Germanischer Lloyd, GL  
 Bureau Veritas, BV  
 Det Norske Veritas, DNV

Registro Italiano Navale, RINA  
 Maritime Register of Shipping, RMRS  
 Nippon Kaiji Kyokai, NKK

**Overview/Survey**



**ISO 9001 quality approval**



Danfoss A/S is certificated by BSI in accordance with international standard ISO 9001. This means that Danfoss fulfils the international standard in respect of product development, design, production and sale. BSI exercises continuous inspection to ensure that Danfoss observes the requirements of the standard and that Danfoss' own quality assurance system is maintained at the required level.

## Conversion table

	Pascal (= Newton per square metre) N/m <sup>2</sup> PA	Pascal per square mm N/mm <sup>2</sup>	bar	Kilopound per square metre (mm H <sub>2</sub> O) kp/m <sup>2</sup>	Meter water gauge m H <sub>2</sub> O	Technical atmosphere (kp/cm <sup>2</sup> ) atm	Physical atmosphere atm	Torr (0°C) mm Hg	Inches Hg (0°C)	Poundforce per square inch (lbf/in <sup>2</sup> ) psi
1 Pa	1	10 <sup>-6</sup>	10 <sup>-5</sup>	0.1020	1.020 × 10 <sup>-4</sup>	1.020 × 10 <sup>-5</sup>	9.869 × 10 <sup>-5</sup>	7.500 × 10 <sup>-3</sup>	2.953 × 10 <sup>-4</sup>	1.450 × 10 <sup>-4</sup>
1 N/mm <sup>2</sup>	10 <sup>6</sup>	1	10	1.020 × 10 <sup>5</sup>	102.0	10.20	9.869	7.5 × 10 <sup>3</sup>	295.3	145.0
1 bar	10 <sup>5</sup>	0.1	1	10.197 × 10 <sup>3</sup>	10.20	1.020	0.9869	750	29.53	14.50
1 kp/m <sup>2</sup>	9.80665	9.807 × 10 <sup>-6</sup>	9.807 × 10 <sup>-5</sup>	1	10 <sup>-3</sup>	10 <sup>-4</sup>	0.9678 × 10 <sup>-4</sup>	0.07355	2.896 × 10 <sup>-3</sup>	1.422 × 10 <sup>-3</sup>
1 m H <sub>2</sub> O	9806.7	9.807 × 10 <sup>3</sup>	0.09807	1000	1	0.1	0.09678	73.55	2.896	1.422
1 at	98.066 × 10 <sup>3</sup>	0.09807	0.9807	10 <sup>4</sup>	10	1	0.9678	735.5	28.96	14.22
1 atm	101.325 × 10 <sup>3</sup>	0.1013	1.013	10.333 × 10 <sup>3</sup>	10.33	1.033	1	760	29.92	14.70
1 mm Hg	133.32	1.333 × 10 <sup>-4</sup>	1.333 × 10 <sup>-3</sup>	13.60	0.01360	1.360 × 10 <sup>-3</sup>	1.315 × 10 <sup>-3</sup>	1	0.03937	1.934 × 10 <sup>-2</sup>
1 in Hg	3387	3.387 × 10 <sup>-3</sup>	0.03387	345.3	0.3453	0.03453	0.03342	25.4	1	0.4912
1 psi	6895	6.895 × 10 <sup>-3</sup>	0.06895	703.1	0.7031	0.07031	0.96804	51.71	2.036	1

## Pressure controls

### Technical data

*Switch*

Microswitch with single pole changeover (SPDT)

*Contact load*

Alternating current: 220 V, 0.1 A, AC-14 and AC-15 (inductive load)

Direct current: 125 V, 12 W DC-13 (inductive load)

*Materials in contact with the medium*

CAS 133	Bellows:	Stainless steel, material no. 1.4306 (DIN 17440)
CAS 136	Pressure connection:	Brass material no. 2.0401 (DIN 17660)
CAS 143	Diaphragm connection:	Nickel plated brass CuZn 40 Ob3 ISO R 426 (DIN 17569)
CAS 145		
CAS 147		
CAS 155	Diaphragm:	Nitrile-butadien rubber

*Ambient temperature*

CAS 133-139: -40 to +70°C

CAS 143-155: -25 to +70°C

*Temperature of medium*

CAS 133-139: -40 to + 100°C

CAS 143-155: -25 to + 100°C

For water and seawater, max. 80 °C

*Vibration resistance*

Vibration-stable in the range 2-30 Hz amplitude 1.1 mm and 30-100 Hz, 4 G.

*Enclosure*

IP 67 acc. to IEC 529 and DIN 40050.

The pressure control housing is enamelled pressure die cast aluminium (GD-AISI 12).

The cover is fastened by four screws which are anchored to prevent loss.

The enclosure can be sealed with fuse wire.

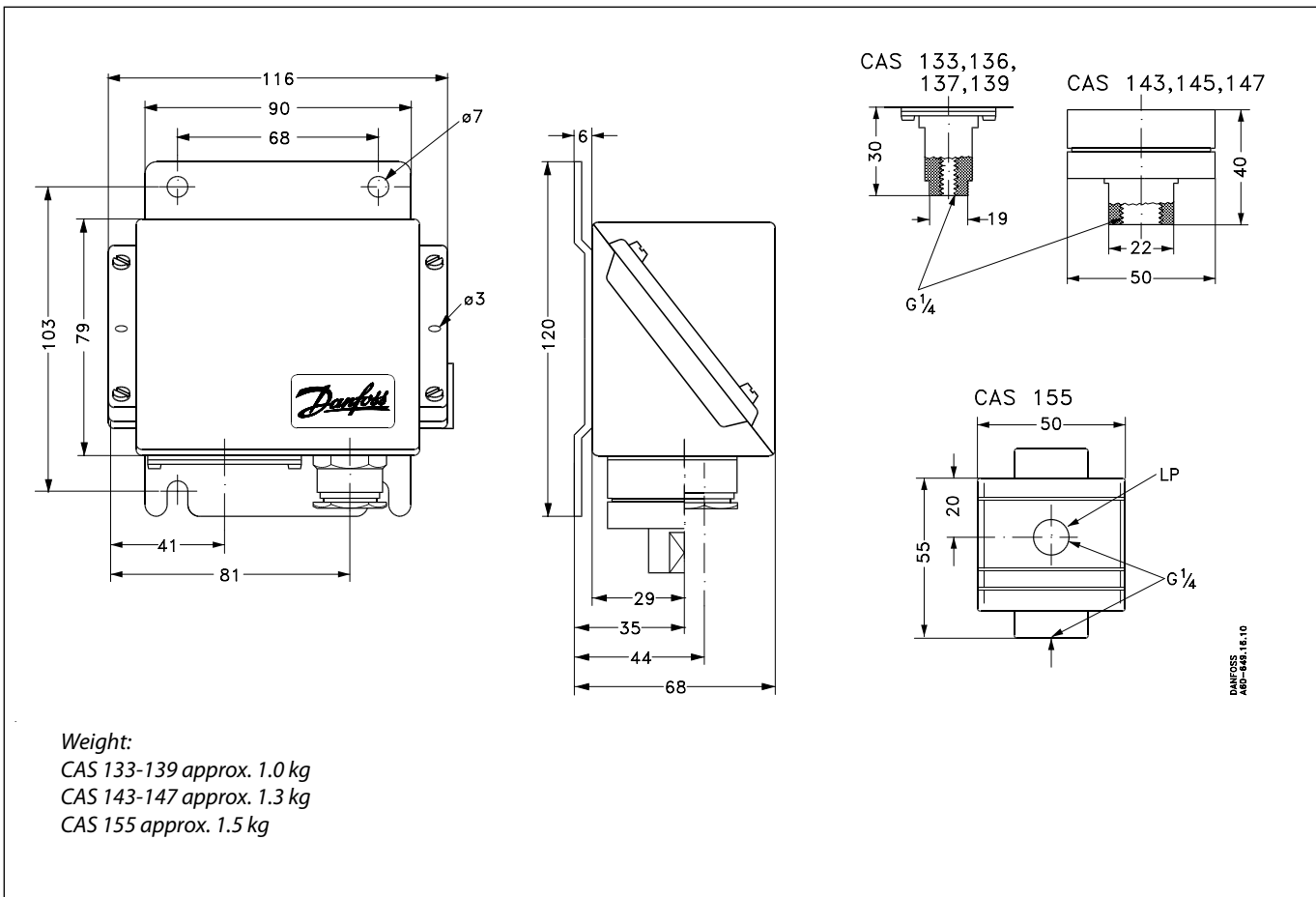
*Cable entry*

Pg 13.5 for cable diameters from 5 to 14 mm.

*Identification*

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

### Dimensions



## Ordering

Preferred version



CAS 133, 135, 139

## Standard pressure controls

Setting range p <sup>e</sup> (bar)	Mechanical differential (bar)	Permissible operating pressure (bar)	Max test pressure (bar)	Min. burst pressure (bar)	Pressure connection	Code no.	Type
0 → 3.5	0.1	10	10	40	G ¼	<b>060-315066</b>	CAS 133
0 → 10	0.2	22	22	40		<b>060-315166</b>	CAS 136
6 → 18	0.3	27	27	72		<b>060-315266</b>	CAS 137
10 → 35	0.6	53	53	100		<b>060-315366</b>	CAS 139



CAS 143, 145, 147

## Pressure controls for high pressure and strongly pulsating media

Setting range p <sup>e</sup> (bar)	Mechanical differential (bar)	Permissible operating pressure (bar)	Max test pressure (bar)	Min. burst pressure (bar)	Pressure connection	Code no.	Type
1 → 10	0.2 → 0.6	120	180	240	G ¼	<b>060-316066</b>	CAS 143
4 → 40	0.8 → 2.4	120	180	240		<b>060-316166</b>	CAS 145
6 → 60	1 → 3	120	180	240		<b>060-316266</b>	CAS 147



CAS 155

CAS 155

## Differential pressure controls

Setting range p <sup>e</sup> (bar)	Mechanical differential (bar)	Permissible operating pressure for low pressure (bar)	Max test pressure (bar)	Min. burst pressure (bar)	Pressure connection	Code no.	Type
0.2 → 2.5	0.1	0 → 8	22	42	2 x G ¼	<b>060-313066</b>	CAS 155

## Terminology

## Range setting

The pressure range within which the unit will give a signal (contact changeover).

## Differential

The difference between make pressure and break pressure (see also page 6).

## Permissible burst pressure

The highest permanent or recurring pressure the unit can be loaded with.

## Max. test pressure

The highest pressure the unit may be subjected to when, for example, testing the system for leakage. Therefore, this pressure must not occur as a recurring system pressure.

## Min. burst pressure

The pressure which the pressure-sensitive element will withstand without leaking.

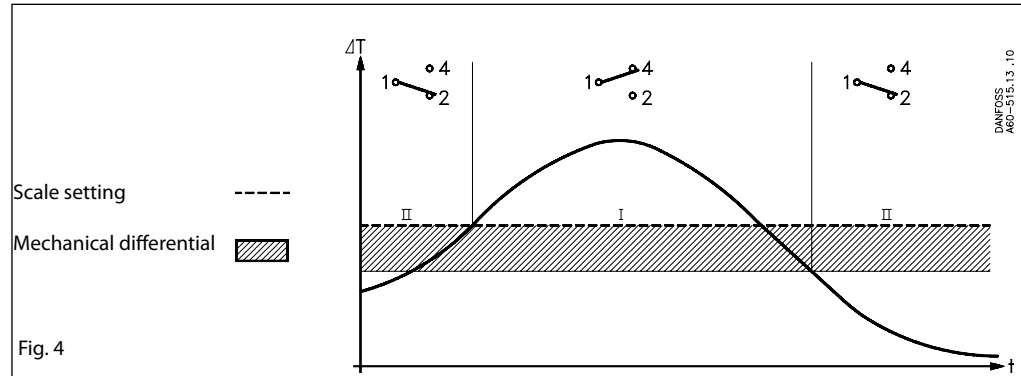
**Function**

a. CAS 155

Contacts 1-4 make and contacts 1-2 break when the differential pressure rises above the set range value. The contacts changeover to their initial position when the differential pressure again falls to the range value minus the differential (see fig. 4).

I. Alarm for rising differential pressure given at the set range value.

II. Alarm for falling differential pressure given at the set range value minus the differential.

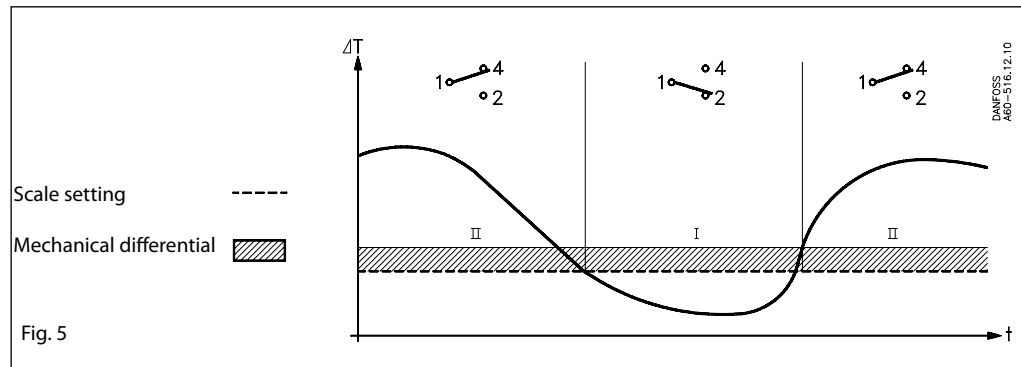


b. All other CAS pressure controls

Contacts 1-2 make and contacts 1-4 break when the pressure falls under the set range value. The contacts changeover to their initial position when the pressure again rises to the set range value plus the differential (see fig. 5).

I. Alarm for falling pressure given at the set range value.

II. Alarm for rising pressure given at the set range value plus the differential.



**Example 1:**

An alarm must be given when the lubrication oil pressure in a motor falls below 0.8 bar. Select CAS 133 (range 0 to 3.5 bar).

The minimum permissible lubricating oils pressure of 0.8 bar must be set using the range spindle. The differential is fixed at 0.1 bar, i.e. the alarm will not cut out before the pressure rises to 0.9 bar.

The switch break function is normally used for alarm purposes, i.e. the alarm must be connected to terminals 1 and 4.

**Example 2:**

When the differential pressure exceeds 1.3 bar a filter must be cleaned.

The maximum static pressure (LP) for the CAS 155 of 8 bar must not be exceeded.

The pressure control range spindle must be set at 1.3 bar.

The alarm must be connected to terminals 1 and 2 (alarm for broken circuit).

## Accessories

Part		Description	Qty.	Code no.
Connector with nipple		Pipe thread ISO 228/1, G 3/8 connector, nipple and AL washer (10 mm ext. 8 mm int. diam) for solering onto steel or copper tubing, steel span of jaws 22	5	<b>017-436866</b>
Connector with nipple		G 3/8 connector, nipple and washer (10 mm ext./ 6.5 mm int. diam.) for welding, steel span of jaws 22	1	<b>017-422966</b>
Reducer		Pipe thread ISO 228/1, G 3/8 x 7/16 - 20 UNF reducer, washer, brass span of jaws 22	5	<b>017-420566</b>
Adaptor		Pipe thread ISO 228/1, G 3/8 x 1/8 - 27 NPT with copper washer brass span of jaws 22	1	<b>060-333466</b>
Adaptor		Pipe thread ISO 228/1, G 3/8 A x 1/4 - 18 NPT with copper washer brass span of jaws 22	1	<b>060-333566</b>
Adaptor		Pipe thread ISO 228/1, G 3/8 x 1/4 - 18 NPT with copper washer brass span of jaws 22	1	<b>060-333666</b>
Adaptor		7/16 - 20UNF x R 3/8 (ISO 7/1) brass, span of jaws 19	1	<b>060-324066</b>
Nipple		G 1/4 A x G 3/8 A		<b>060-333266</b>
		G 1/4 A x ext. M10 x 1 with washer		<b>060-333866</b>
Damping coil		Pipe thread ISO 228/1, damping coil with G 3/8 connector and 1.5 m copper capillary tube. Standard washers are supplied.	1	<b>060-104766</b>
Armoured damping coil		Pipe thread ISO 228/1, damping coil with G 3/8 connector and 1 m copper capillary tube. Standard washers are supplied.	1	<b>060-333366</b>