ABB MEASUREMENT & ANALYTICS | DATA SHEET

JAA, JAF and JAG

Pneumatic indicating controllers



Measurement made easy
Engineered solutions for all applications

Campo series reliable pneumatic instrumentation

High reliability with good dynamic response

Reduced maintenance and easily removable components

Low air consumption

High compatibility with pneumatic valves

Introduction

The Campo series mod. JAx pneumatic indicating controllers are designed to measure and control process variable as pressure and temperature. JAx models can be equipped with a different primary measuring element as detailed hereafter.

Model JAA is a single-point pneumatic instrument, which measures, indicates and controls pressure.
It is designed to be used together with a spiral Bourdon tube measuring element.
The measuring element model DBT is a unit comprising a spiral or “C” Bourdon tube and a process connection linked together by a connecting pipe.
The Bourdon tube is directly connected to a process and the increase in process pressure is measured by the Bourdon tube. Movement of the Bourdon tube is transferred to the element by a linkage arrangement.

Model JAF is a single-point pneumatic instrument, which indicates and controls process measurements transmitted as proportional pneumatic signals from remote transmitter.

Model JAG is a single-point pneumatic instrument, which measures, indicates and controls temperature.
It is designed for use with a gas filled measuring element.
The thermal system model DTE comprises a gas filled thermometric sensor (bulb) and a steel Bourdon tube, connected by a capillary tube.
It operates on a principle of gas expansion, to convert process fluid temperature changes into a proportional bourdon
tube motion.
The DTE model is designed to operate Campo instruments series to provide monitoring and controlling of process fluid temperature up to 400 °C.
The calibration range is normally chosen according to the value and variations of the measured variable. For the best measuring conditions consider the following notes:

- for temperatures measurements below 0°C, the zero suppression of the instruments can not exceed the 60% of calibrated span.
- When the lower value of the calibration range is higher than 0°C, zero elevation should not exceed the 25% (for gas filling) of the span.

Technical caracteristics

Control unit

The control unit is based on the motion-balance principle: motion of the pneumatic feedback bellows unit balances the motion of the measuring element.

Control modes and control action

In addition to the standard continuous modes (P,PI,PID), the ON-OFF control is also available.
It is possible to operate with direct or reverse action, rotating in the required direction the dial connected to the flapper-nozzle amplifier unit, without further calibration of the control unit.

Desired value

Versions are available for internal or remote setpoint. Internal setpoint can be adjusted internally or by an external knob, allowing to set the desired value without opening the instrument door. External setpoint requires the connection of the relevant pneumatic signal on the rear of the instrument.

Auto/manual switching

The instrument can be selected with two possible variants:

- with external A/M module that consist of a sub-panel, complete with a pressure reducer and A/M switch, attached to the case of the instrument.
- with integral A/M module incorporated in the case of the instrument. The manual pressure reducer and A/M switch are fitted to the bottom of the instrument itself.

Output and supply gauges

The indicating gauges are embedded in the front case and have a diameter of 40 mm with circular scale.

Case and door

Made of die-cast aluminium with anti-corrosive painting , the case has a protection according to IPX4.

Scale

100 mm black horizontal sector scale with white graduations.
Green setpoint pointer for easy reading even when overlapping the red fluorescent measured variable pointer.
The scale has a safety glass window protection.

Alarms

Pneumatic or electric type alarms are available on request, activated on minimum or maximum value of the variable.

Specifications

INDICATING CONTROLLERS (JAA, JAF, JAG)

Pneumatic supply

- nominal: 140 kPa; 1.4 bar; 20 psi
- minimum: 125 kPa; 1.25 bar; 18 psi
- maximum: 175 kPa; 1.75 bar; 25 psi

Input/output signals

- 20 to 100 kPa
- 0.2 to 1 bar
- 3 to 15 psig

Air consumption (steady state)

0.05 Nm3/h (@ 1.4 bar supply)

Repeatability

0.5%

Accuracy

2%

Alarms

pneumatic switch or 24 V DC 2A
(factory selectable N/O or N/C)

Control functions

P, PI, PID, ON-OFF

Control mode adjustments

- Proportional: 0 to 200 %
- Integral: 0.15 to 15 rep/min
- Derivative: 0 to 5 min/rep

Ambient temperature limits

- 30° to +80°C (-22° to +176°F)

Indicator pointers colour

- Measured variable: red
- Set-point: black

Mounting

vertically on wall, panel or on 2in (60 mm) pipe

Case and cover

aluminium with gray painting RAL7032

Pneumatic connections

1/4 in. NPT female on rear of instrument,
with fitting for 4 x 6 mm pipe size

Shipping details

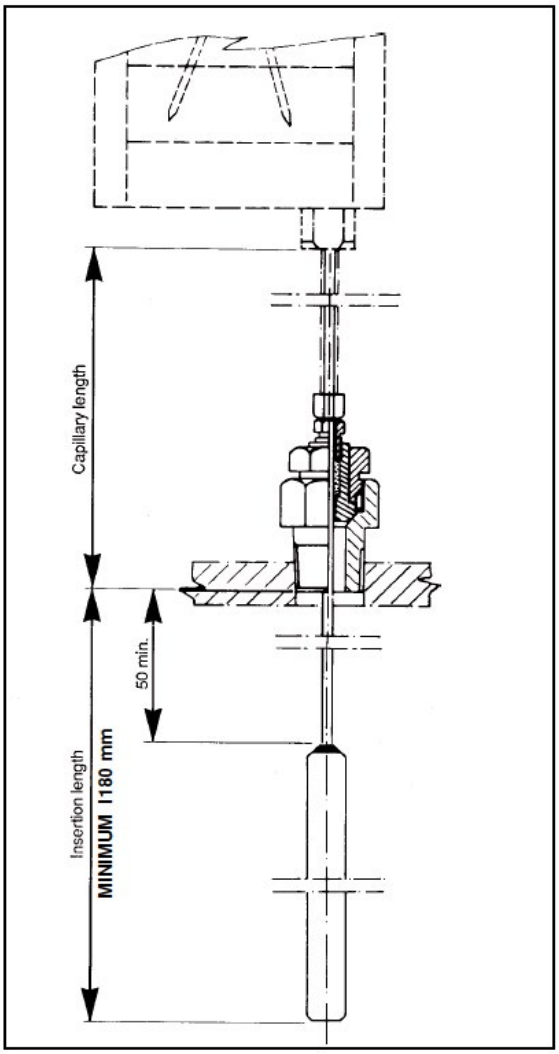
Net weight: 6.5 kg (14 lb) approx. without measuring element

Packing

External cardboard box with one or more instruments individually packed in single transparent bag.

GAS FILLED TEMPERATURE MEASURING ELEMENT (DTE)

The thermal system mod. DTE comprises a gas filled thermometric sensor (bulb) and a steel Bourdon tube,connected by a capillary tube.
It operates on a principle of gas expansion, to convert process fluid temperature changes into a proportional bourdon tube motion.
The DTE model is designed to operate Campo instruments series to provide monitoring and controlling of process fluid temperature up to 400 °C.



Insertion length

Insertion length for version DTE 02 (fig. 1) is continuously adjustable via a threaded bushing assembly.
Unless otherwise specified the insertion length is set at the value of 400 mm. and is added to the required capillary length. When additional protection of the capillary is required it is necessary to specify the maximum insertion length.
If the insertion length is not totally used, the unused part should be protected on site.
When insertion length over 400 mm is required, the part exceeding will be deducted from the required capillary length.
The minimum insertion lenght to be considered due to the bulb design and according to capillary lenght is 180 mm.
No capillary compensation for ambient temperature variation is required.

...Specifications

GAS FILLED TEMPERATURE MEASURING ELEMENT (DTE)

Capillary tube material
AISI 316 ss.

Capillary tube protection
None or AISI 316 ss flexible pipe (selectable).

Filling
Gas.

Maximum capillary length
15 m.

Measuring range
-80 to 500 °C (-112 to 932 °F)

Bulb diameter
13 mm.

Span limits
50 and 500 °C (122 and 932 °F)

Span and range limits
Available spans and relevant range limits are shown in the following table as selectable in the ordering information.

Span °C (°F)	Maximum overtemperature °C (°F)
50 (122)	60 (140)
80 (176)	160 (320)
100 (212)	270 (518)
150 (302)	300 (572)
200 (392)	330 (626)
250 (482)	350 (662)
300 (572)	420 (788)
350 (662)	590 (1094)
400 (752)	670 (1238)
450 and 500 (842 and 932)	700 (1292)

Accuracy rating (of thermometric sensor)
± 0.5%

BOURDON TUBE PRESSURE MEASURING ELEMENT (DBT)

The measuring element Model DBT is a unit comprising a spiral or “C” Bourdon tube and a connection linked together by a connecting pipe.
The Bourdon tube is directly connected to the process and the input pressure is then measured by the Bourdon tube. Movement of the Bourdon tube is transferred to the control unit of the controller by a linkage arrangement.

Span and range limits

Available spans are shown in the following table as selectable in the ordering information.

Span
100 kPa / 1 bar
150 kPa / 1.5 bar
200 kPa / 2 bar
300 kPa / 3 bar
400 kPa / 4 bar
500 kPa / 5 bar
600 kPa / 6 bar
800 kPa / 8 bar
1000 kPa / 10 bar
1200 kPa / 12 bar
1500 kPa / 15 bar
2000 kPa / 20 bar
2500 kPa / 25 bar
3000 kPa / 30 bar
4000 kPa / 40 bar
5000 kPa / 50 bar
6000 kPa / 60 bar
8000 kPa / 80 bar
10000 kPa / 100 bar
12000 kPa / 120 bar
15000 kPa / 150 bar
20000 kPa / 200 bar
25000 kPa / 250 bar
40000 kPa / 400 bar

Maximum overload

The overload limit corresponds to 150% of the span value.

Accuracy (limited to the pressure element only)

- up to 3 MPa / 30 bar: ± 0.5%
- over 3 MPa / 30 bar: ± 1%.

Process connections

1/2 in. NPT female, 1/4 in. NPT female / 1/2 in. GAS male.

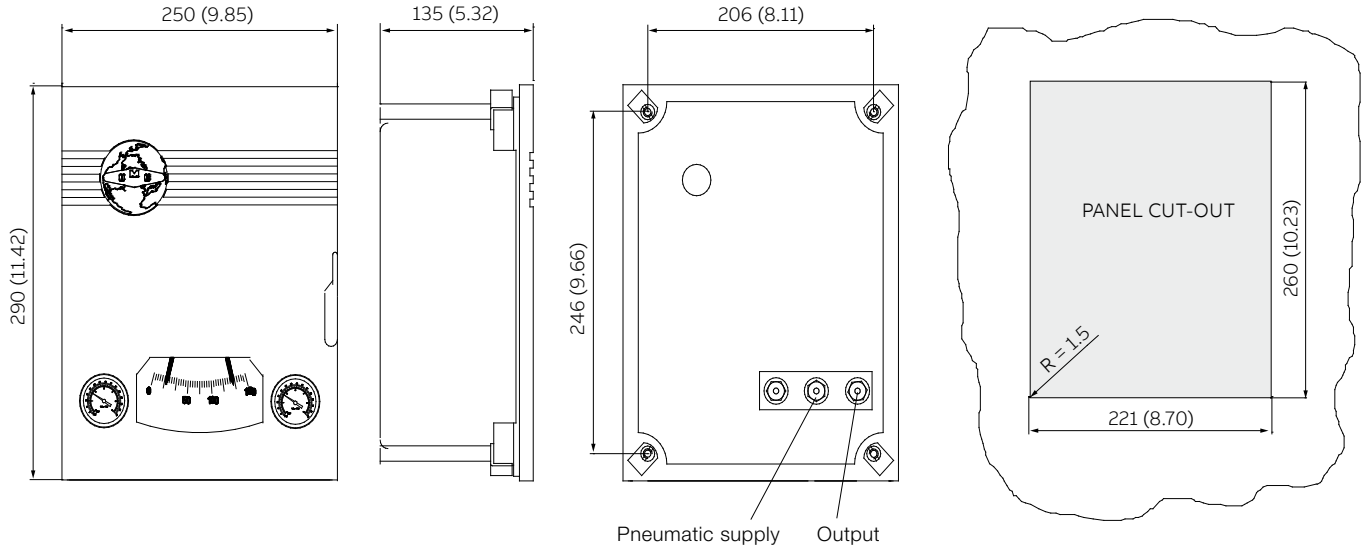
Bourdon tube material

AISI 316 L ss

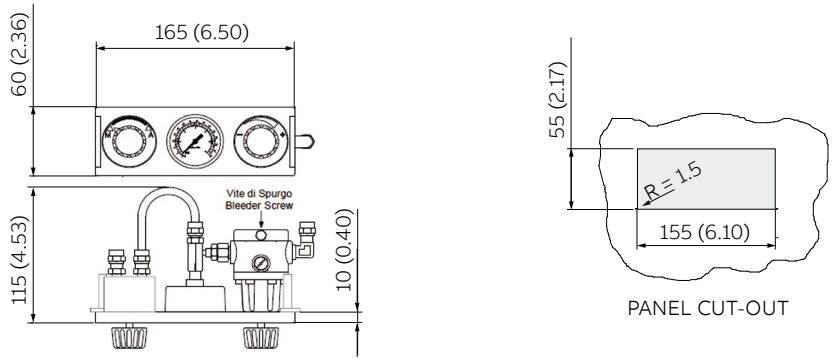
Dimensions

(not for construction unless certified) – dimensions in mm (inch)

JAx Instrument



External Auto/Manual module (optional)



Ordering information

Main ordering information for model JAx Serie Campo Pneumatic Indicating Controllers

Select one character or set of characters from each category and specify complete catalog number.
Refer to next page to specify required measuring element.

		XXX	X	X	X	X	X	X	X	X	X	X
Base model - 1st to 3rd characters												
Controller with Bourdon tube primary element (model DBT to be ordered separately)		JAA										
Controller with pneumatic receive unit		JAF										
Controller with gas filled temperature element (model DTE to be ordered separalely)		JAG										
Mounting - 4th character												
Vertical or horizontal pipe mounting			A									
Vertical or horizontal pipe mounting with airset			B									
Panel mounting			C									
Wall mounting			D									
Wall mounting with airset			E									
Auto/Manual switching - 5th character												
Not required				1								
Fitted with integral module (manual signal gauge provided)				6								
Fitted with external module (manual signal gauge provided)	(Note 1)			7								
Output signal - 6th character												
3 to 15 psig					1							
0.2 to 1 kg/cm2					2							
20 to 100 kPa / 0.2 to 1 bar					3							
Desired value - 7th character												
Internal with internal setting						1						
Internal with external setting						4						
External pneumatic signal						7						
Control modes - 8th character												
Continuous							0					
On / Off	(Note 2)						4					
Control unit/actions - 9th character												
On / Off	(Note 3)							0				
Proportional	(Note 4)							1				
Proportional + Integral	(Note 4)							3				
Proportional + Integral + Derivative	(Note 4)							5				
Integral action signal - 10th character												
Without or internal									0			
USE CODE - 11th character										0		
Alarms type - 12th character												
Not requested											0	
Pneumatic											1	
Electric											2	
USE CODE - 13th character												0

Note 1: Not avalable with panel mounting code C
Note 2: Not avalable with A/M switching code 6, 7
Note 3: Not avalable with countinuous control mode code 0
Note 4: Not avalable with On/Off control mode code 4

...Ordering information

Main ordering information for model DBT Campo Series pressure primary element

Select one character or set of characters from each category and specify complete catalog number.

	XXX	X	X	X	XXXXXX
Base model - 1st to 3rd characters					
Bourdon tube	DBT				
Pressure element - 4th character					
Bourdon spring with 1/2 in. NPT female connection		4			
Bourdon spring with 1/4 in. NPT female / 1/2 in. GAS male connection		5			
Span in kPa (bar) - 5th - 6th characters					
100 (1)			01		
150 (1.5)			02		
200 (2)			03		
300 (3)			04		
400 (4)			05		
500 (5)			06		
600 (6)			07		
800 (8)			08		
1000 (10)			09		
1200 (12)			10		
1500 (15)			11		
2000 (20)			12		
2500 (25)			13		
3000 (30)			14		
4000 (40)			15		
5000 (50)			16		
6000 (60)			17		
8000 (80)			18		
10000 (100)			19		
12000 (120)			31		
15000 (150)			32		
20000 (200)			33		
25000 (250)			34		
40000 (400)			35		
Zero reference - 7th character					
Atmospheric pressure				0	
Absolute pressure (vacuum)				1	
USE code - 8th to 13th characters					
Bourdon spring with threaded connection					010000

Main ordering information for model DTE Campo Series gas filled measuring element

Select one character or set of characters from each category and specify complete catalog number.

		XXX	X	X	X	X	X	X
Base model - 1st to 3rd characters								
Gas filled temperature element		DTE						
Version and material - 4th - 5th characters								
Compensated in stainless steel			02					
Span °C (°F) - 6th - 7th characters								
	50 (122)			41				
	80 (176)			42				
	100 (212)			43				
	150 (302)			44				
	200 (392)			45				
Zero based range	250 (482)			46				
	300 (572)			47				
	350 (662)			48				
	400 (752)			49				
	450 (842)			50				
	500 (932)			51				
	50 (122)			61				
	80 (176)			62				
	100 (212)			63				
	150 (302)			64				
Range with elevated /	200 (392)			65				
suppressed zero	250 (482)			66				
	300 (572)			67				
	350 (662)			68				
	400 (752)			69				
	450 (842)			70				
	500 (932)			71				
Process connection - 8th - 9th characters								
1/2 in. GAS male					31			
1/2 in. NPT male					32			
3/4 in. GAS male					33			
3/4 in. NPT male					34			
Bulb type - 10th character								
With adjustable fitting / 400 mm maximum insertion length						1		
Capillary length - 11th - 12th characters								
2 m							01	
4.5 m							02	
9 m							53	
12 m							54	
15 m							55	
Capillary protection - 13th character								
Not requested								0
AISI 316 ss flexible armor								1



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