



Application

- ✓ Circuit switching and plant monitoring
- ✓ Controlling industrial processes
- ✓ Making or breaking electric circuits in a plant
- ✓ Power plants, chemical, petrochemical and machine building
- ✓ Use as electric alarm contacts
- ✗ **Do not use** for medias that are viscous, crystallizing.
- ✗ **Do not use** in hazardous or explosion prone areas. Check Model 514 instead

Special Features

- ✓ Easily adjustable contacts
- ✓ Long lifespan and possibility of filling the instrument
- ✓ Full stainless steel construction with heavy duty tube
- ✓ Reliable reading and switching
- ✓ Various switch contact options

Description

In industrial processes, there are times when you need to read the temperature values and at the same time have the ability to alter electric circuits (open/close) at desired set values. In case the media demands a stainless steel instrument, then InstruMate model 512 electric contact pressure gauges are the right choice. Contact-Mate 512 is a heavy duty Gas Actuated with switch contacts of snap-action type.

InstruMate electric contact gauges open or close electric circuits depending on the position of the indicating pointer. So if temperature value monitoring and switching application are needed at the same time, InstruMate Electric switch gauges come in handy.

Having them put into correct application, InstruMate Electric Contact Gauges with their robust design are a reliable choice for switching functions (normally closed, normally open, and change-over contacts).

Setpoint for contacts are adjusted easily by the use of a key supplied with the product and free movement of the value-pointer is guaranteed regardless of the setpoints.

Default Specification

Design	Nominal Sizes mm
EN 13190	100, 160
Stem	Temperature Limitations
Material: SS316 Diameter: 10 mm (option 10mm,12mm)	Storage & Transport: -20...+60 °C Ambient: 0...40 °C
Scale Ranges in °C	Mounting Versions
-60...+40, -30...+50, -20...+80, 0...60, 0...100, 0...120, 0...160, 0...200, 0...250, 0...300, 0...400, 0...500, 0...600, 0...650	Surface mounting: Bottom connection with back flange (L) Panel mounting: Back connection with front flange (B)
Working Range	Standard insertion Lengths ¹ in mm:
According to measuring range per EN 13190	As per connection designs
Case	Ingress Protection
SS304	IP65
Pointer	Accuracy
Aluminum, adjustable Pointer	Class 2 per En13190
Window	Dial
Instrument Glass	Aluminum
Temperature Element	Pressure Limitation at Stem
Gas actuated bourdon tube	Max. 20 bar
Capillary Lengths (m)	Temperature Units
1, 3, 6, 10	°C (centigrade)

1. Insertion length includes the threads



Fillable case design

Options

- ✓ Other temperature units (F) or dual scale (C/F)
- ✓ Supplying suitable thermowell per customer request
- ✓ Accuracy Class 1
- ✓ Special dial designs for special applications
- ✓ Other scale ranges
- ✓ Stem diameter 8mm, 9mm, 12mm, others .

Measuring Range & Maximum Permissible Errors

InstruMate gas actuated thermometers model 422 follow Class 2 accuracy according to EN13190 standard.

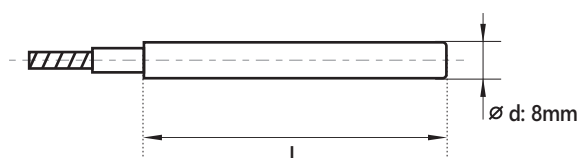
Temperature Range °C	Measuring Range °C	Limits of Error $\pm$ °C
-60...+40	-50...+30	2
-30...+50	-20...+40	2
-20...+80	-10...+70	2
0...60	+10...+50	2
0...100	+10...+90	2
0...120	+10...+110	4
0...160	+20...+140	4
0...200	+20...+180	4
0...250	+30...+220	5
0...300	+30...+270	10
0...400	+50...+350	10
0...500	+50...+450	10
0...600	+100...+500	15
50...650	+150...+550	15

* The measuring range limit is indicated on dial by the use of two triangular marks.

Connection Designs

1. Plain stem

Standard insertion lengths (L): 140mm, 190mm, 240mm, 290mm



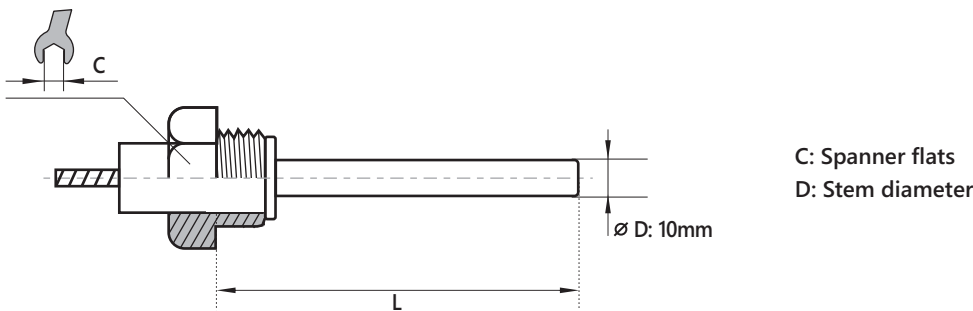
D: Stem diameter

Connection
Code

000

2. Male Nut

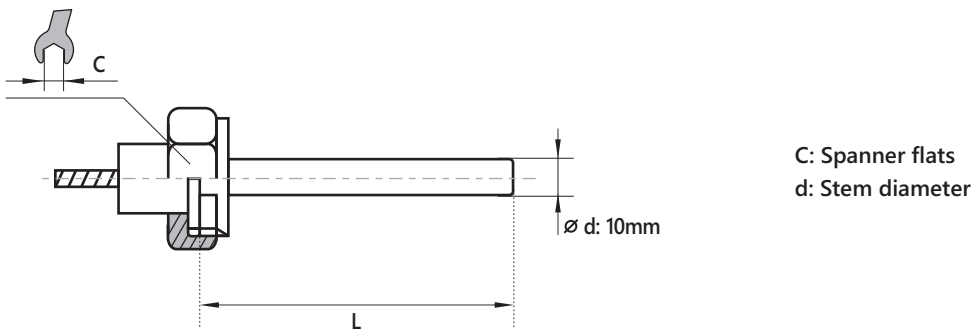
Process connection: G 1/2 B, 1/2 NPT
Standard insertion lengths (L): 100mm, 150mm, 200mm, 250mm



Nominal Size	Process connection	C	Connection Code
	Thread type & Thread size		
100,160	G 1/2 B	22	2B2
	1/2 NPT	22	2N2

3. Union nut (Female Connection)

Process Connection: G 1/2 B, G 3/4 B, M24x1.5
Standard insertion lengths (L): 100mm, 150mm, 200mm, 250mm



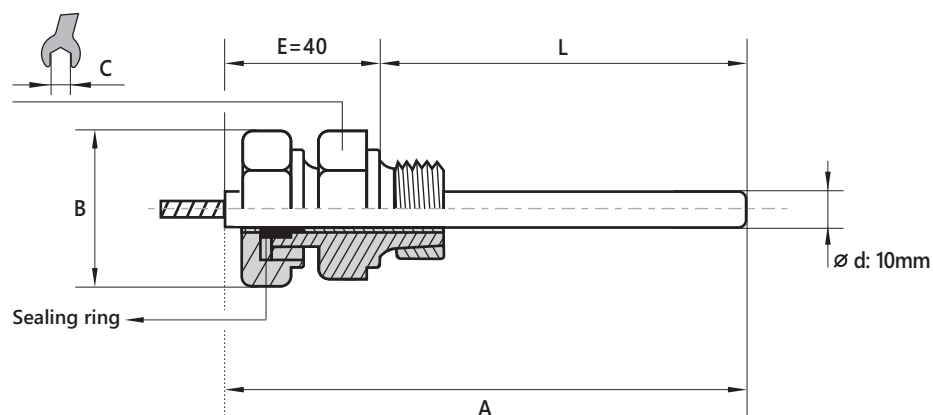
Nominal Size	Process connection	C	Connection Code
	Thread type & Thread size		
100,160	G 1/2 B	24	3B2
	G 3/4 B	32	3B3
	M24 x 1.5	27	3-M24 x 1.5

4. Compression fitting (Sliding Connection)

Process connection: G 1/2 B, 1/2 NPT, M18x1.5

Standard insertion lengths (L): 100mm, 150mm, 200mm, 250mm

Length A = L + 40 mm



C: Spanner flats

D: Stem diameter

Nominal Size	Process connection	Dimensions (in mm)		Connection Code
	Thread type & Thread size	B	C	
100,160	G 1/2 B	22	24	4B2
	1/2 NPT	22	24	4N2
	M18 x 1.5	22	22	4-M18 x 1.5

Choice of Contacts

Due to the fact that possible operating conditions can be in normal or hazardous environments, InstruMate offers EC1 and EC3 contact series. For none-explosion prone areas and none-hazardous environments, EC1 contacts can be used. InstruMate model 512 is enhanced with EC1 snap-action contacts. For EC3 Inductive contacts please refer to InstruMate model 214 datasheet.

EC1 Snap-action contacts

The most common and economical type of contact for switching loads of up to 30W 50VA are magnetic snap-action contacts. There is a permanent magnet there on the contact arm which with its force of magnet attracts the contact pin of moveable contact arm. The special magnet has the necessary holding force so the vibration will not be a trouble for InstruMate snap-action contacts.

EC1 contact series can be used to switch circuits in industrial applications including process control, **EXCLUDING** hazardous or explosion prone areas.

Contact Material

Due to the nature of switching function, the contacts are subject to erosion. InstruMate uses special contact alloy as 70% silver and 30% nickel which is 0.5µm gold-plated, as gold is extremely resistant to aging and corrosion.

InstruMate EC1 contacts have low contact resistance which makes them the first choice for applications with long periods of machine downtime or where sulphurous gases are present.

Contact operation details

Generally 3 contact operations are intended. Normally Closed, Normally Open, and Change-Over.

In the case of a normally-closed function, the rising actual-value pointer takes the contact arm with it, thus interrupting the circuit when the setpoint is reached.

In the case of a normally-open function, the rising pressure value pointer takes the contact arm with it, thus closing the circuit when the setpoint is reached.

In the case of a change-over (SPDT) contact, the rising actual-value pointer takes the contact arm with it and first interrupts and then closes the circuit when it approaches the setpoint.

Contact Function Codes

* Logics are based on a clock-wise pointer motion.

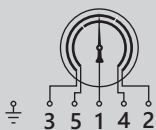
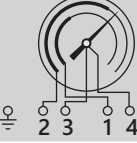
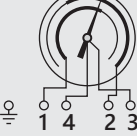
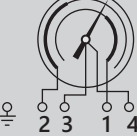
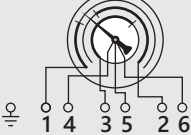
	a Normally Open contact (NO) Code: 1		a Normally Closed contact (NC) Code: 2		a change-over contact (SPDT) Code: 3
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Switching Function of InstruMate EC1 snap-action contacts

* Common terminal versions are shipped by default unless the customer points out his request for separate terminals.

* If there are more than 1 contact in the instrument, the first one is considered to be the closest one to the left sided beginning value in positive ranges. (for negatives it is the ending value).

* If there are going to be 3 contacts in the instrument, mention them sequentially in your order confirmation.

Model	Contact type	When the pointer reaches the set-point with the rising pressure...	And if the pointer passes the set-point again by falling pressure...	Wiring (common terminal) default	Wiring (separate terminal) optional
EC1-1	NO	...one Contact will close	...that contact will open again		—
EC1-2	NC	...one Contact will open	...that contact will close again		—
EC1-3	SPDT	...one contact will open and one contact will close at the set-point value	...one contact will close & one contact will open again at the set-point value		—
EC1-33	DPDT	...1 st and 2 nd contact both will open and close at the set-point value...	...2 nd and 1 st contact will close and open again at the set-point value...		—
EC1-11	NO-NO	...1 st and 2 nd contacts will close	...the contacts will open again accordingly		
EC1-22	NC-NC	...1 st and 2 nd contacts will open	...the contacts will close again accordingly		
EC1-12	NO-NC	...1 st contact will close and 2 nd contact will open	...2 nd contact will close and 1 st contact will open again		
EC1-21	NC-NO	...1 st contact will open and 2 nd contact will close	...2 nd contact will open and 1 st contact will close again		
EC1-212	NC-NO-NC	...1 st contact will open, 2 nd contact will close, 3 rd contact will open	...3 rd contact will close, 2 nd contact will open and 1 st contact will close accordingly		

The functions described in switching functions table is based on the clockwise pointer motion. In anti-clockwise motion, opposite switching results will occur.

* Use contact protection relays for high loads or liquid filled electric contact pressure gauges.

* Minimum switching current is 20mA.

* Use electronic contact for PLC service.

Maximum Contact Ratings for EC1 snap-action contacts

Max. contact ratings with resistive loads	Not filled instrument	Filled instrument
Contact closing	1.0 A	1.0 A
Contact opening	1.0 A	1.0 A
Continuous load	0.6 A	0.6 A
Maximum load	30 W / 50 VA	20 W / 20 VA
Ambient temperature	-20...+60°C	-25...+60°C

* For snap-action change-over contacts (SPDT, DPDT) the maximum load will be 10 W/ ~18VA and maximum thermal current will be 0.38 A, and the contact rating will be approximately 30% less than the other version.

* In an instrument with two EC1 contacts, if the range is lower than 2.5bar it is advised to consider half of the table values as maximum.

* It is advised to follow recommended contact ratings to ensure longtime durability of the instrument.

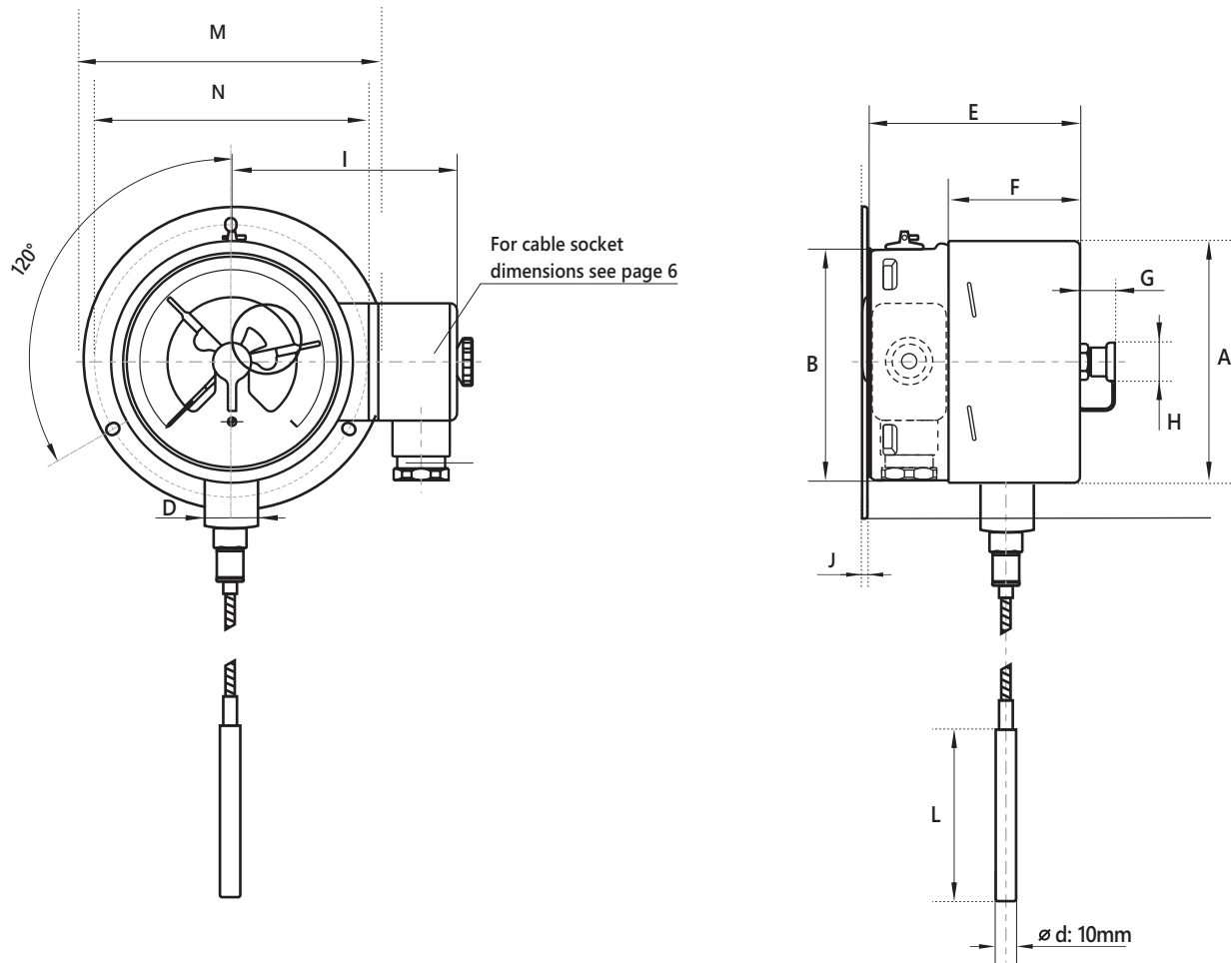
Recommended Contact Ratings for EC1 snap-action contacts

Voltage	Magnetic Snap-action EC1 Unfilled Instrument	
	Resistive load (mA)	Inductive load (mA)
24V DC	400	250
24V AC	600	250
48V DC	300	200
48V AC	450	200
110V DC	200	125
110V AC	240	125
230V DC	100	65
230V AC	120	65

* Abovementioned values are reduced by approximately 40% if the instrument is filled. It is advised that switching current does not fall below 25 mA and the switching voltage shall not fall below 24 V. It is highly recommended to use contact protection relays for higher loads and liquid filled instruments.

Dimensions (in mm)

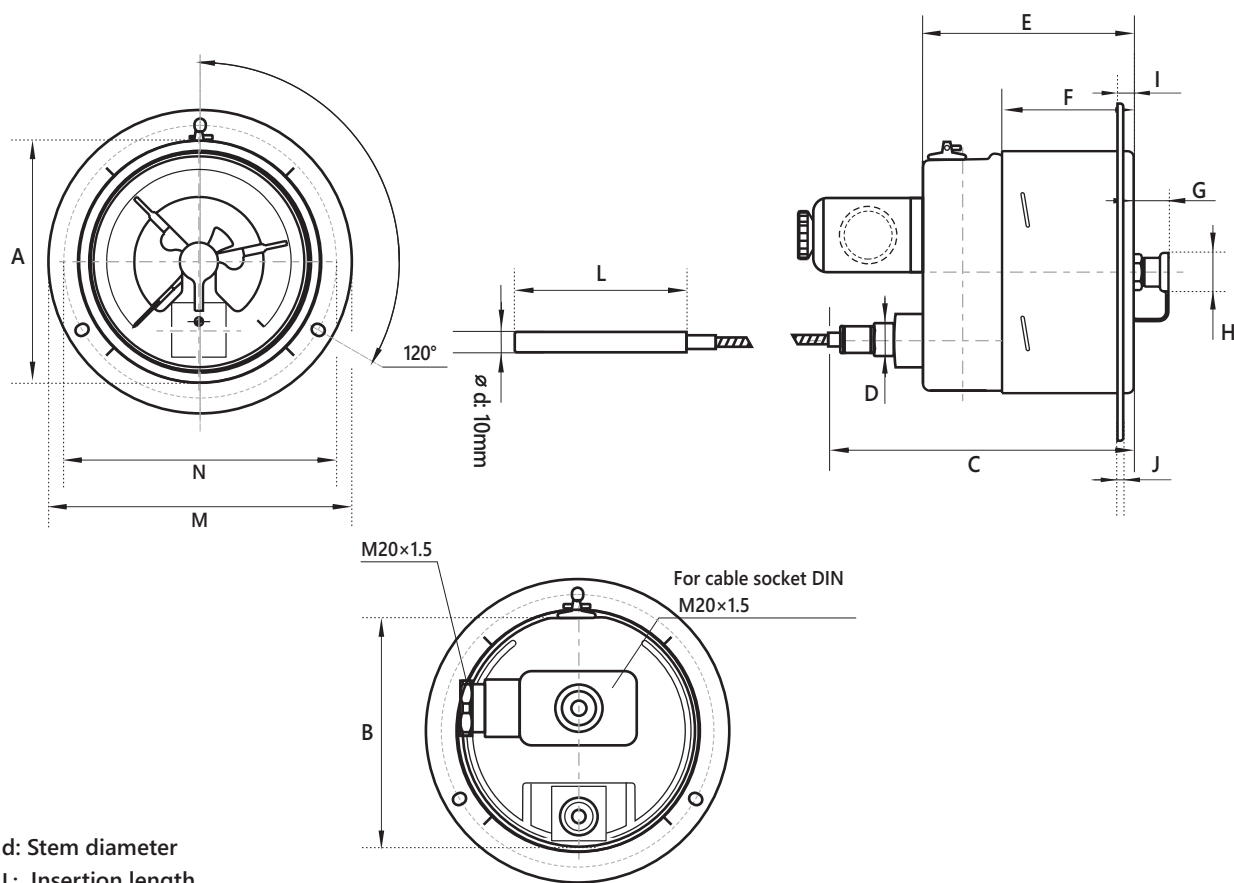
■ Surface mounting: Bottom connection with back flange (L)



d: Stem diameter
L: Insertion length

Nominal Size	A	B	D	E	F	G	H	I	J	M	N	KG
100	101	98.8	22	87	54	17.2	14.2	91.7	5	132	116	0.890
160	160.8	158.2	22	90.3	52.2	17.2	14.2	122.1	5.5	195	172	1.4

■ Panel mounting: Back connection with front flange (B)



Nominal Size	A	B	C	D	E	F	G	H	H	I	J	M	N	KG
100	101	98.8	129.3	22	88	54	17.2	14.2	38.5	10	5	140	124	0.960
160	160.8	158.2	193	22	90.3	52.2	17.2	14.2	54	10.5	5.5	195	172	1.50

How To Order

Model	Nominal Size	Mounting	Capillary length	Insertion length	Connection Code	Range	Contact Model	Options
E.g. 512	100	L	3	100	4N2	0...160 °C	EC1-21	Filled with silicon oil

Or simply order by item number on the basis of your previous purchases.

InstruMate®

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