



Application

- ✓ Circuit switching and plant monitoring in hazardous environments
- ✓ Controlling industrial processes in Explosion prone areas
- ✓ Large number of making or breaking electric circuits in a plant
- ✓ Use as electric alarm contacts
- ✓ Pressure relevant control in various fields
- ✗ **Do not use** directly with medias that are viscous or crystallizing

Special Features

- ✓ Easily adjustable contacts
- ✓ Long lifespan and possibility of filling the instrument
- ✓ Safe for hazardous or explosion prone environments
- ✓ Various switch contact options

Description

Safe switching at higher switching rates is just one of the advantages of InstruMate switch gauge with inductive contacts.

InstruMate electric contact gauges with EC3 contacts open or close electric circuits depending on the position of the metal flag entering or leaving the control head. And they operate in none-contact way. So if pressure value monitoring and switching application are needed at the same time in hazardous or explosive prone areas, InstruMate Electric switch gauges with EC3 Inductive contacts come in handy.

Set-point 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.

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 hazardous or explosion prone areas only EC3 type of contacts are allowed.

EC3 Inductive contacts

InstruMate Inductive Electric Contacts are proximity-type electrical switching elements working in a non-contact way. Basically they consist of a pair of coils, whose magnetic field is affected by a metal control flag (driven by the pointer), causing a change of output current. When the control flag on the pointer (actual value) approaches the head (on the set value), it increases its internal resistance and as a result the change in the current acts as the input signal for the switching amplifier of the control unit and the control unit has no effect on the work of measuring system.

This 2 or 3 wire contact with PNP output is very much in compliance with PLC. On the other hand, InstruMate Inductive Electric Contacts can be jointly used with InstruMate control units to switch higher electrical loads (as InstruMate control unit integrates AC to DC convertor, switching amplifier and the output relay)

InstruMate EC3 contacts can be used both inside and outside Explosion Hazardous areas. Outside EX areas they can be used where there is a need for large number of switching cycles as they are contact-free so there will be no wear. And Inside Hazardous area they can be used in Zone 1 and Zone 2.

Safety Versions

As per EN837, InstruMate Electric Contact gauges are offered in two safety versions.

Model	Safety Versions available	
	S1 (Blow out cap at backside of the instrument)	S3 (Combination of safety glass + solid front wall + blow out cap)
214		×

* S3 versions are option and need to be requested in order confirmation.

Contact Choice (EC3 Inductive series)

All inductive sensors used in InstruMate switch gauges with EC3 contacts are made in Germany by Pepperl+Fuchs.

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.

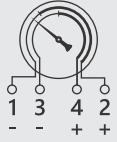
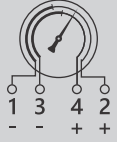
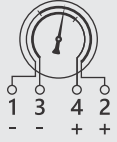
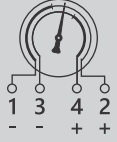
In the case of a change-over (SPDT) contact, the rising actual-value pointer takes the contact arm with it and first interrupts and then closes the circuit when it approaches the setpoint.

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 EC3 Inductive contacts

Model	Contact type	When the pointer reaches the set-point with the rising pressure, the metal flag...	and after that ...	Wiring
EC3-1	NO	...leaves the control head	...the contact will close	
EC3-2	NC	... enters the control head	... the contact will be open	
EC3-11	NO-NO	...leaves 1 st control head ...leaves 2 nd control head	...1 st contacts will close ...2 nd contact will close	
EC3-22	NC-NC	...enters 1 st control head ...enters 2 nd control head	...1 st contact will open ...2 nd contact will open	
EC3-12	NO-NC	...leaves 1 st control head ...enters 2 nd control head	...1 st contacts will close ...2 nd contact will open	
EC3-21	NC-NO	...enters 1 st control head ...leaves 2 nd control head	...1 st contacts will open ...2 nd contact will close	

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.
- * 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.

Triple inductive contact

With triple inductive contacts it is not possible to set all three contacts overlapping at the same scale value. Either the left (=no.1 contact) or the right contact (= no. 3 contact) must be at an approximate separation of $\geq 30^\circ$ to the left or the right of the other two contacts, which may be set to the same value:

Examples:

No.1 contact offset to the left



only the second and the third contact can be overlapping

only the first and the second contact can be overlapping



No.3 contact offset to the right

Possible configurations of triple EC3 inductive contacts:

EC3-1.11	EC3-1.21	EC3-2.11	EC3-2.21	EC3-11.1	EC3-12.1	EC3-21.1	EC3-22.1
EC3-1.12	EC3-1.22	EC3-2.12	EC3-2.22	EC3-11.2	EC3-12.2	EC3-21.2	EC3-22.2

Safety-related maximum values for EC3 contacts

Contact version	Ui	Ii	Pi	Ci	Li
EC3	20V	60 mA	130 mW	250 nF	350 μ H

Default Specification

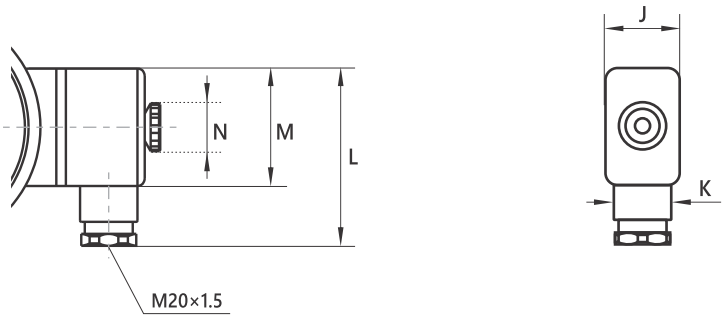
Design	Nominal sizes in mm
EN 837-1, DIN 16085	100, 160
Process Connection	Wetted parts
G ½	SS316L
Temperature Effect	Pressure Limitations
$\pm 0.035 \times (t_2 - t_1) \%$ of the span t_1 is the Reference temperature in degrees celsius. t_2 is the Ambient temperature in degrees celsius.	Steady: 100% of full scale Fluctuating: 90% of full scale Over pressure: 130% of full scale
Scale Range	Permissible Temperature
0...1 bar to 0...600 bar Vacuum & compound ranges	Ambient: -20...+60 °C Medium: +190 °C Maximum for dry version 95 °C Maximum for oil filled version
Pressure units	Pressure Element
bar / psi	SS316L
Pointer	Gauge Accuracy
Aluminum, Black	1%
Ingress Protection	Switching Accuracy
IP65	3%
Window	Dial
Safety Glass	Aluminum
Case	Movement
Stainless Steel (S1) according to EN 837-1	Stainless steel

Options

- ✓ Other wetted parts per customer request
- ✓ Requested process connections other than stated in the table
- ✓ Filled with silicon oil
- ✓ Assembled on a diaphragm seal chosen from InstruMate diaphragm seals category

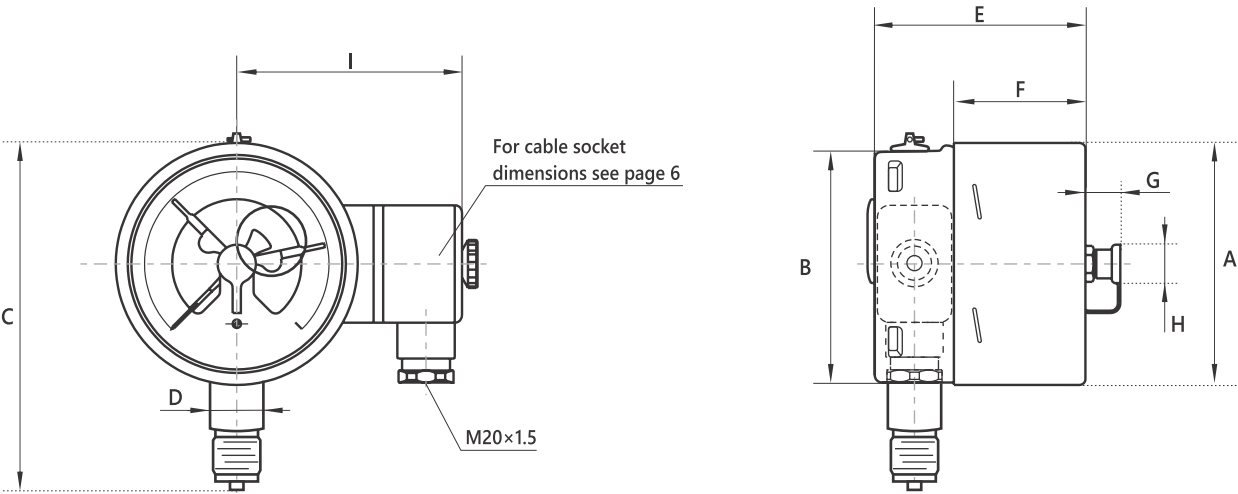
Dimintions (in mm)

■ Electrical Connectors for dial size 100, 160mm



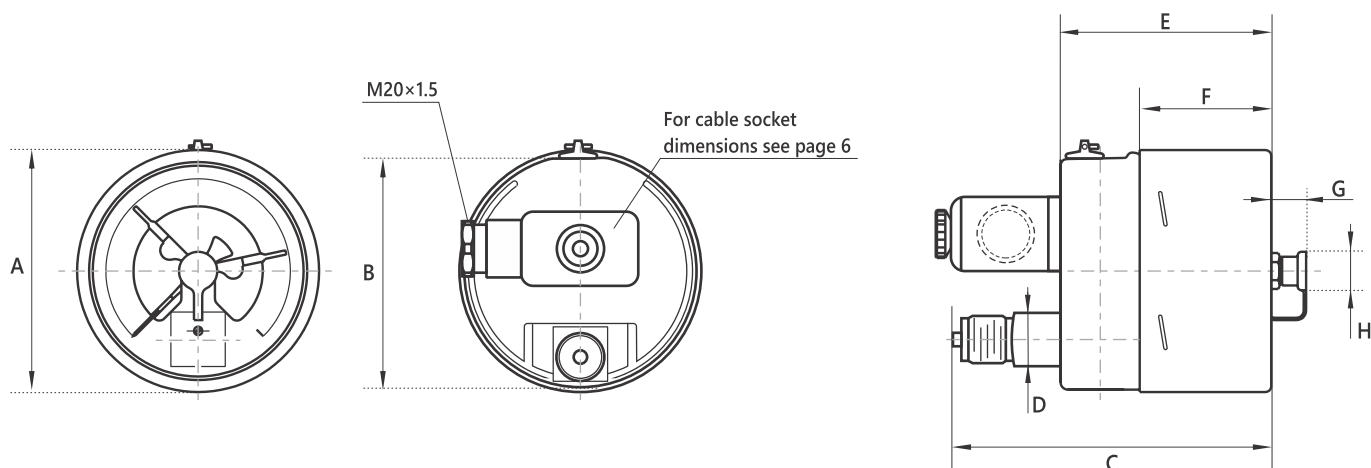
Nominal Size	J	K	L	M	N
100 & 160	31.5	19.6	73	49.9	19.7

■ DS 100, Bottom Connection, (S1) according to EN 837-1



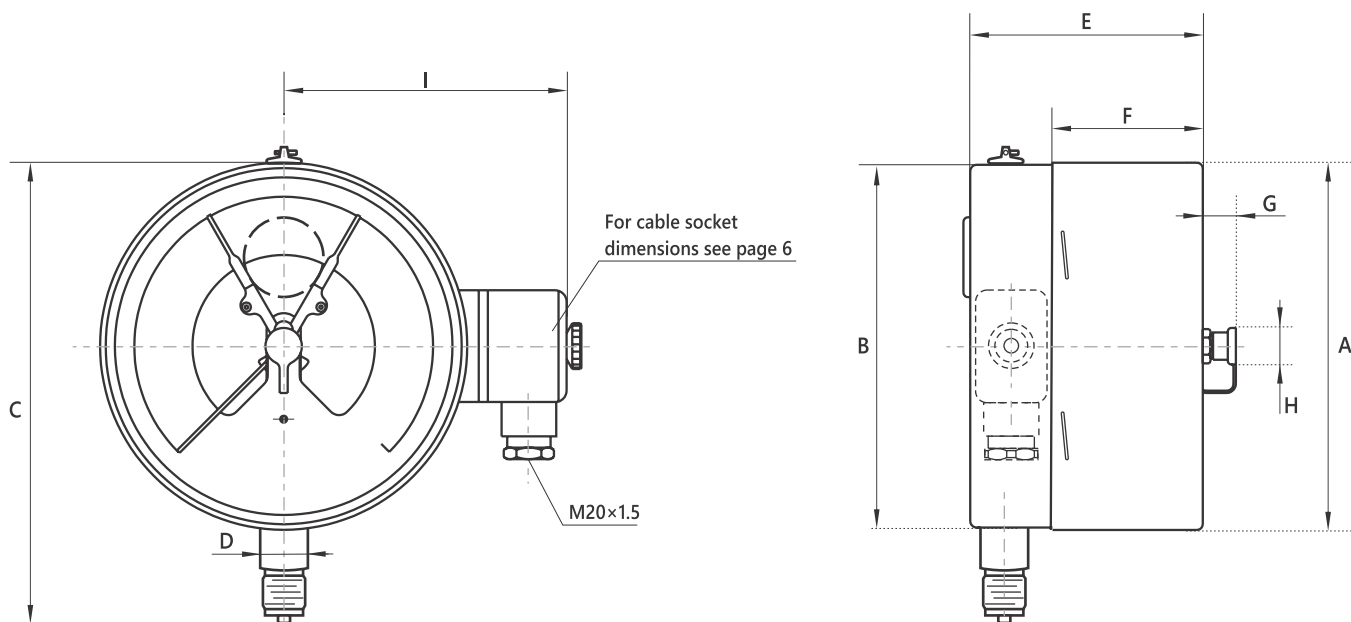
Nominal Size	A	B	C	D	E	F	G	H	I	KG
100	101	98.8	135.4	22	87	54	17.2	14.2	91.7	0.890

■ 837-1 DS 100, Lower Back Connection, (S1) according to EN



Nominal Size	A	B	C	D	E	F	G	H	KG
100	101	98.8	129.3	22	88	54	17.2	14.2	0.960

■ 837-1 DS 160, Bottom Connection, (S1) according to EN



Nominal Size	A	B	C	D	E	F	G	H	I	KG
160	160.8	158.2	193	22	90.3	52.2	17.2	14.2	122.1	1.4

Process connection

Thread Type	Code
NPT	N
BSPP (G)	B
BSPT	Z
Metric	M

Thread Size	Code
1/4	4
1/2	2
3/8	3
1/8	8
for metric sizes write the number	M20×1.5

How To Order

	Product Group Name	Model	Mounting	Nominal Size	Thread Type	Thread size	Contact Model	Scale Range	Options
Example:	Contact-Mate	214	L	100	B	2	EC3-12	0...16bar-psi	-

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

InstruMate®

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