

TDB 160, TDP 160

Operating pressure gauges



Operating pressure gauge 160 mm Ø

With and without angular position transmitter

Bourdon gauge or diaphragm gauge

Limit value contacts

Operating pressure gauges are used to measure the gauge pressure with respect to the atmosphere. Either diaphragm gauges or Bourdon gauges are used, depending on the magnitude of the pressure to be measured.

For the conversion of the indicated pressure into an electrical output signal an angular position transmitter can be installed on the back of the pressure gauges.

Technical data

Industrial pressure gauge type TDB 160

	Version 1	Version 2
Industrial pressure gauge with Bourdon	to DIN 16064 form A	
Class	1.0 to DIN 16005	
Indication ranges ¹⁾	per selection table min. 0...0.6 bar max. 0...600 bar	
Case	with bayonet ring	with bayonet ring a. press.-release opening
Material for case	CrNi stainless steel Mat. No. 1.4301	
Couplings	G ½ A to DIN 16288, radial downward	
Width across flats	SW 22	
Pointer train	Plate: brass, Moving parts: alpaca	CrNi steel, bearing and segment plastic
Dial	White lacquered aluminium Black scale and inscription to DIN 16109	
Pointer	Black lacquered aluminium	
Inspection glass	Flat instrument glass	Multilayer safety glass
Degree of protection	IP 54 to DIN 40050	
Permissible ambient temperature	-25...+60 °C	
Permissible measured medium temperature	max. +100 °C	
Pointer deflection	270°	
Pointer arrangement	Central	
Overload rating	1.3 × scale value	
Materials of the connections	Brass, Mat. No. 2.0405.26	CrNiMo steel, Mat. No. 1.4571
Bourdon tube	Cu-alloy, Mat. No. 2.1030	CrNiMo steel, Mat. No. 1.4571

Industrial pressure gauge type TDP 160

Industrial pressure gauge with diaphragm
to DIN 16026 form A

Measuring unit
perpendicular to plane of dial

Class
1.6 to DIN 16005 (as from 0...40 mbar)

Indication ranges¹⁾
as per selection table
min. 0...16 mbar
max. 0...25 bar

Case
with bayonet ring

Material for case and upper-measuring range
Grey casting, lacquered black

Couplings
G ½ A to DIN 16288 radial, downward

Width across flats SW 27

Pointer train
Plate: brass, movable parts: alpaca

Dial
White, lacquered aluminium, black scale and inscription
acc. to DIN 16109

Pointer
Black, lacquered aluminium

Inspection glass
Flat instrument glass

Degree of protection
IP 45 to DIN 40050

Permissible ambient temperature
-20...+60 °C

Permissible measured medium temperature
max. +100 °C

Effect of temperature
+0.6 %/10 K > 20 °C
-0.6 %/10 K < 20 °C

Pointer deflection
270°

Pointer arrangement
central

Overload rating at display range
0...16 mbar to 0...400 mbar and
0...0.6 bar to 0...25 bar 5fold, max. 40 bar

Materials of flange bottom
with couplings
Diaphragm
CrNiMo steel, Mat. No. 1.4571
≤ 0.4 bar
CrNiMo steel Mat. No. 1.4571 > 0.4 bar, Duratherm

Weight
see dimensional drawings

¹⁾ Quiescent load to upper scale value
Alternating load to 0.9 × upper scale value

Ordering information									
				Catalog No.					
Industrial pressure gauges				V14024A-		0		0 0	
Type TDB 160									
Bourdon gauge									
Couplings of brass, spring of Cu-alloy ≤ 60 bar (version 1)				1	0				
Couplings and spring Mat. No. 1.4571 ≤ 60 bar (version 2)				2	0				
Couplings and spring Mat. No. 1.4571 > 60 bar				3	0				
Type TDP 160									
Diaphragm gauge (≥ 16...≤ 400 mbar ¹⁾) Measuring flange 160 mm Ø									
Meas. flange bottom and couplings of Mat. No. 1.0401 Diaphragm 1.4571				0	1				
Meas. flange bottom and couplings of Mat. No. 1.4571 Diaphragm 1.4571				0	2				
Parts in contact with pressure medium coated with PTFE				0	3				
Diaphragm gauge (≥ 0.6...≤ 25 bar) Measuring flange 100 mm Ø									
Measuring flange bottom and couplings of Mat. No. 1.4571, Diaphragm 1.4571 ²⁾				0	7				
Parts in contact with pressure medium coated with PTFE				0	8				
Alarm contacts									
without						0	0		
1 Magnet spring contact with NC contact						1	0		
1 Magnet spring contact with NO contact						2	0		
2 Magnet spring contacts 1st and 2nd contact as NC contacts						5	0		
2 Magnet spring contacts 1st and 2nd contact as NO contacts						6	0		
2 Magnet spring contacts 1st as NC, 2nd contact as NO						7	0		
2 Magnet spring contacts 1st contact as NO, 2nd contact as NC						8	0		
1 Induct. coupler ³⁾ control circuit as NC						0	1		
						0	2		
2 Induct. couplers ³⁾ 1st and 2nd control circuit as NC						0	5		
						0	6		
						0	7		
						0	8		

¹⁾ See Code No. 493, 494 for < 60 mbar

²⁾ Beginning at 4 bar, only protective element of the diaphragm made of Mat. No. 1.4571

³⁾ Control units WE 77-Ex

Ordering information											
						Catalog No.					
Industrial pressure gauge with attached											
Angular position transmitter TGE 5, TGE 5-Ex						V14025A-					
Type TDB 160											
Bourdon gauge											
Couplings of brass, spring of Cu-alloy ≤ 60 bar (version 1)						1	0				
Couplings and spring Mat. No. 1.4571 ≤ 60 bar (version 2)						2	0				
Couplings and spring Mat. No. 1.4571 > 60 bar						3	0				
Type TDP 160											
Diaphragm gauge (≥ 16...≤ 400 mbar ¹⁾) Measuring flange 160 mm Ø											
Meas. flange bottom and couplings of Mat. No. 1.0401 Diaphragm 1.4571						0	1				
Meas. flange bottom and couplings of Mat. No. 1.4571 Diaphragm 1.4571						0	2				
Parts in contact with pressure medium coated with PTFE						0	3				
Diaphragm gauge (≥ 0.6...≤ 25 bar) Measuring flange 100 mm Ø											
Measur. flange bottom and couplings of Mat. No. 1.4571, Diaphragm 1.4571 ²⁾						0	7				
Parts in contact with pressure medium coated with PTFE						0	8				
Attached angular position transmitter (See Data Sheet 14-1.23 EN)											
TGE 5 ¹⁾ Output 0...20 mA						1					
Output 4...20 mA						2					
TGE 5-Ex ¹⁾ Output 0...20 mA						5					
Output 4...20 mA						6					
TGE 5 Other versions						0					
Alarm contacts											
without						0	0				
1 Magnet spring contact with NC contact						1	0				
1 Magnet spring contact with NO contact						2	0				
2 Magnet spring contacts 1st and 2nd contact as NC contacts						5	0				
2 Magnet spring contacts 1st and 2nd contact as NO contacts						6	0				
2 Magnet spring contacts 1st as NC, 2nd contact as NO						7	0				
2 Magnet spring contacts 1st contact as NO, 2nd contact as NC						8	0				
1 Induct. coupler ³⁾ control circuit as NC						0	1				
						0	2				
2 Induct. couplers ³⁾ 1st and 2nd control circuit as NC						0	5				
						0	6				
						0	7				
						0	8				

¹⁾ Output: 0...20 mA or 4...20 mA = 100 % indication range;
see Code No. 504 for partial calibration

²⁾ See page 5 for control units needed

³⁾ See Code No. 493, 494 for < 60 mbar

Additional Ordering information				
Additional optional ordering information		Code		
Bourdon gauge				
Indicating range... as per selection table	(...)	491		
other than selection table	(clear text)	492		
Diaphragm gauge with indicating range < 60 mbar				
as per selection table	(...)	493		
other than selection table	(clear text)	494		
Scale... other than indicating range		501		
2nd scale graduation	(clear text)	504		
Scale inscription, e.g. steam (max. 15 characters)	(clear text)	506		
Scale with ABB-symbol		507		
Calibration of the angular position transmitter for partial range	(clear text)	511		
(Setting range 66...< 100 % of the indicating range)				
With 196 mm diameter front ring for flush-mounting (only		521		
Bourdon gauge) without transmitter, coupling on rear side				
Pointer train wear-resistant, for Bourdon tube pressure gauge		522		
Pointer train wear-resistant, for diaphragm pressure gauge		523		
Pressure gauge non-lubricated for oxygen		524		
(with purge outlet and breakproof glass,				
Bourdon gauge of Mat. No. 1.4571 required)				
Pressure gauge prepared for attachment of angular position		526		
transmitter (extended pointer axes and holes on the rear of the case)				

(...) at this sign complete the Index No. by a measuring range code.

Technical data

Transmitter for angular position TGE 5, TGE 5-Ex

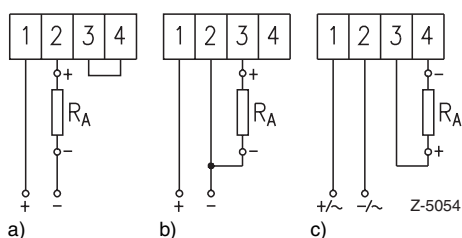
The pressure gauge reading is converted into a load-independent direct current proportional to the rotation angle of the pointer. The lowest pressure or the greatest underpressure corresponds to the current 0 or 4 mA, the highest pressure or the lowest underpressure always corresponds to an output signal of 20 mA.

Transmitters for angular position can only be installed on pressure gauges with couplings radially downward.

Pressure gauges with alarm switches can also be equipped with angular position transmitters.

See Data Sheet 14-1.23 EN for further technical data.

Connection diagram¹⁾



- a) = Two-wire-connection
- b) = Three-wire-connection
- c) = Four-wire-connection

¹⁾ Power supply and output on common minus pole



Mounting the angular position transmitter to the pressure gauge

Dimensional drawings (dimensions in mm)

Bourdon gauge

Standard version

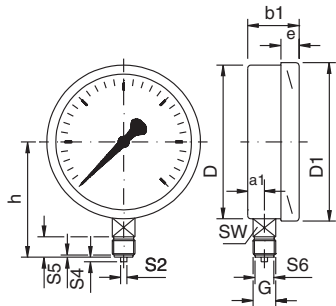


Fig. 1

Z-5640

with contact device

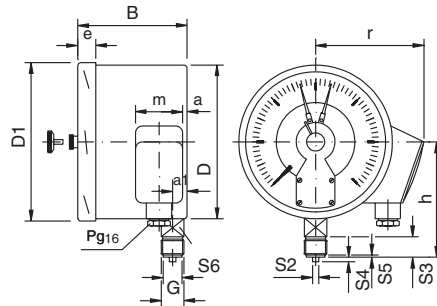


Fig. 2

with attached angular position transmitter

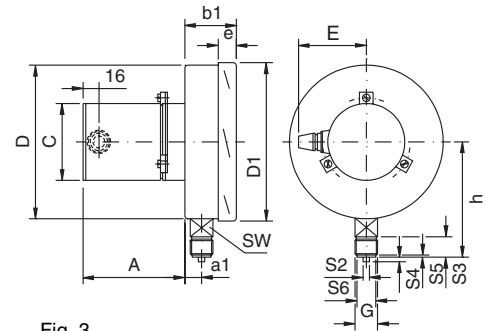


Fig. 3

NG	Dimensions in mm																				Weight approx. kg		
	a ₁	b ₁	D	D ₁	e	G	h±1	S ₂	S ₃	S ₁	S ₅	S ₆	B	m	O	r	A	C	E	SW	for Fig. 1	for Fig. 2	for Fig. 3
160	15.5	49.5 ¹⁾	159	161	17.5	R1/2"	118	6	20	5	3	17.5	101 ²⁾	50	5	113	105	80	70	22	1.2	1.6	1.8

Diaphragm pressure gauge

Standard version

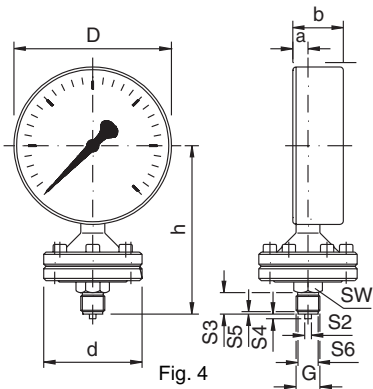


Fig. 4

with contact device

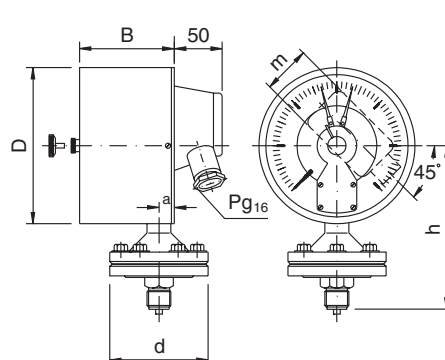


Fig. 5

with attached angular position transmitter

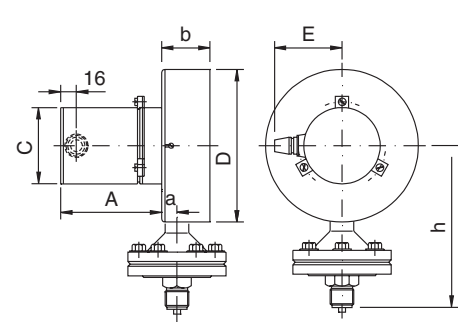


Fig. 6

Z-5641

with contact device and attached angular position transmitter only with bayonet ring case

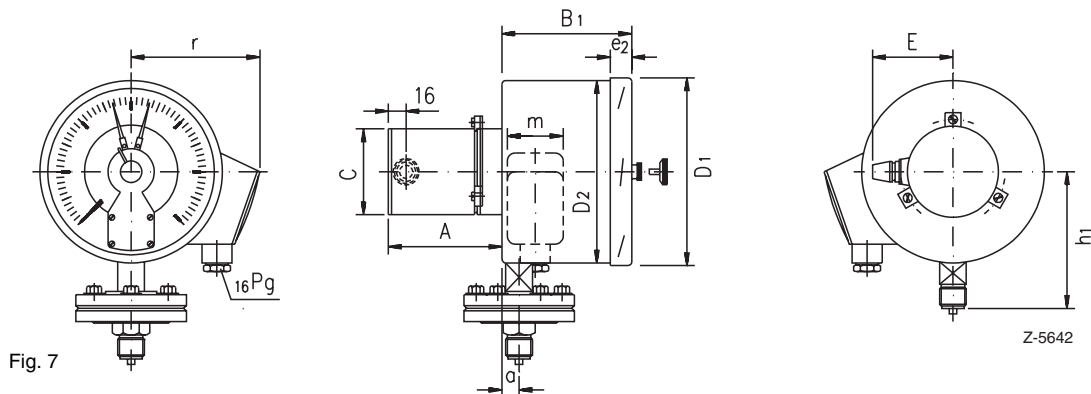


Fig. 7

Z-5642

Meas. flange = d	Dimensions in mm																					Weight approx. kg				
	a	b	D	h	G	S ₂	S ₃	S ₁	S ₅	S ₆	B	m	A	C	E	r	B ₁	e ₂	D ₁	D ₂	h ₁	SW	for Fig. 4	for Fig. 5	for Fig. 6	for Fig. 7
Ø 160	15.5	46.5	160	154	R $\frac{1}{2}$ "	6	20	5	3	17.5	98	50	105	80	70	113	101	17.5	161	159	153	27	2.6	3.0	3.2	3.6
Ø 160	15.5	46.5	160	168	R $\frac{1}{2}$ "	6	20	5	3	17.5	98	50	105	80	70	113	101	17.5	161	159	164	27	4.5	4.9	5.1	5.5

¹⁾ From 100 bar b₁ = 65.5 mm

²⁾ From 100 bar B = 115 mm, with 2-way inductive B = 128 mm, with contact device and angular position transmitter B + A

Dimensional drawings (dimensions in mm)

Attachment and/or installation	Bourdon gauge TDB 160						Diaphragm TDP 160					
							Meas. flange 100 mm Ø	Measuring flange 160 mm Ø				
with TGE 5 / TGE 5-Ex	X				X		X	X			X	X
with 1 or 2 magnet spring cont.			X		X		X		X		X	
with 1 or 2 inductivers			X		X		X			X		X
without	X						X	X				
Spring material	Cu-alloy	1.4571	Cu-alloy	1.4571	Cu-alloy	1.4571	1.4571	1.4571	1.4571	1.4571	1.4571	1.4571
Indicating ranges	Code No.											
0 2.5 mbar	307											
0 4	308											
0 6	309											
0 10	310											
0 16	311							X		X		Cl. 2.5
0 25	312							X		X		
0 40	313							X	X	X		
0 60	314							X	X	X		X
0 100	315							X	X	X	X	X
0 160	316							X	X	X	X	X
0 250	317							X	X	X	X	X
0 400	318							X	X	X	X	X
0 0.6 bar	319	X	X		1)		X		X	X	X	X
0 1	320	X	X	X	X		X					
0 1.6	321	X	X	X	X		X					
0 2.5	322	X	X	X	X	X	X					
0 4	323	X	X	X	X	X	X					
0 6	324	X	X	X	X	X	X					
0 10	325	X	X	X	X	X	X					
0 16	326	X	X	X	X	X	X					
0 25	327	X	X	X	X	X	X					
0 40	328	X	X	X	X	X	X					
0 60	329	X	X	X	X	X	X					
0 100	330		X		X		X					
0 160	331		X		X		X					
0 250	332		X		X		X					
0 400	333		X		X		X					
0 600	334		X		X		X					
-2.5 0 mbar	347											
-4 0	348											
-6 0	349											
-10 0	350											
-16 0	351											
-25 0	352							X		X		Cl. 2.5
-40 0	353							X		X		
-60 0	354							X	X	X		X
-100 0	355							X	X	X	X	X
-160 0	356							X	X	X	X	X
-250 0	357							X	X	X	X	X
-400 0	358							X	X	X	X	X
-0.6 0 bar	359	X	X		1)		X					
-1 0	360	X	X	X	X		X					
-1 +1.5 mbar	372											
-1.5 +1	365											
-1.5 +2.5	366											
-2.5 +1.5	367											
-2 +4	368											
-4 +2	369											
-4 +6	377											
-6 +4	378											
-6 +10	379											
-10 +6 mbar	380							X		X		Cl. 2.5
-15 +10	382							X		X		
-25 +15	384							X	X	X		
-10 +15	381							X		X		
-15 +25	383							X	X	X		
-20 +40	385							X	X	X		X
-40 +60	387							X	X	X	X	X
-40 +20	386							X	X	X	X	X
-60 +40	388							X	X	X	X	X
-60 +100	389							X	X	X	X	X
-100 +150	391							X	X	X	X	
-150 +250	393							X	X	X	X	
-200 +400	395	X	X		1)		X					
-400 +600	397	X	X	X	X		X					
-100 +60	390											
-150 +100	392											
-250 +150	394											
-400 +200	396	X	X		1)		X		X	X	X	X
-600 +400	398	X	X	X	X		X					
-1 +0.6 bar	399	X	X	X	X		X					
-1 +1.5	400	X	X	X	X	X	X					
-1 +3	401	X	X	X	X	X	X					
-1 +3	402	X	X	X	X	X	X					
-1 +9	403	X	X	X	X	X	X					
-1 +15	404	X	X	X	X	X	X					

¹⁾ Only possible with inductive coupler

²⁾ Only possible with one contact

Technical data

Alarm contacts

Single and dual contacts. Adjustment on the front side; for pressure gauge 160 mm Ø by means of removable wrench, for flush-mounting pressure gauges by means of screwdriver on adjusting spindle.

Setting range

0...100 % of the indicating range
 without pointer deflection limitation

Magnet spring contact

Contact material
 Silfram W 30

Switching voltage
 max. 380 V UC¹⁾

Switching capacity
 max. 30 W / 50 VA¹⁾

Switching current
 max. 1 A¹⁾

Switching differential between 2 contacts
 approx. 4 %

Inductive contact

The inductive contact comprises the inductive coupler installed in the pressure gauge and the control unit which is mounted separately. Switching differential between 2 contacts approx. 2 %.

Technical data of the control units

Explosion protection

Designation	WE 77 Ex 1	WE 77 Ex 2 ²⁾
Type test designation	PTB No. Ex-79/20-43X	
Type of protection	[EEx ia] IIC or [EEx ib] IIC	
Control circuit	type of protection: intrinsic safety	
Max. values		
Open-circuit voltage	≤ 13.5 V	≤ 13.5 V
Short-circuit current	≤ 31 mA	≤ 31 mA
Power	≤ 125 mW	≤ 125 mW
Effective internal capacitance	71 nF	141 nF
When connected to inductive coupler: (type SJ 3,5—...—...)		
Max. external inductance permitted for		
EEx ia IIC:	2.8 mH	0.8 mH
EEx ib IIC:	30.8 mH	7.4 mH
Max. external capacitance permitted for		
EEx ia IIC:	190 nF	120 nF
EEx ib IIC:	499 nF	499 nF
Voltage	8 V DC	
Current	8 mA	
Switching point	≥ 1.2... ≤ 2.1 mA	
Control lead resistance	max. 100 Ω	

¹⁾ Applies to pure ohmic load. For inductive load, correspondingly lower value apply

²⁾ Values p3r control circuit

Output

Switching voltage
 Switching current
 Switching capacity

Connection to mains

Ambient

temperature

Degree of protection

Mounting of the
 control unit

Changeover contact

max. 250 V AC

max. 4 A

max. 500 VA

220 V ± 15 %, 45...65 Hz

-25...+60 °C

Class HUE acc. to DIN 40040

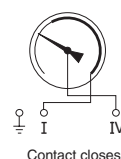
IP 30 (acc. to DIN 40050)

outside of the hazardous area

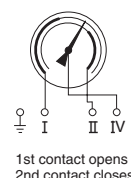
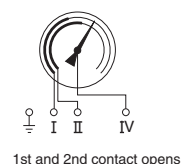
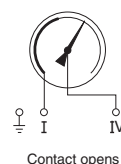
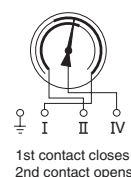
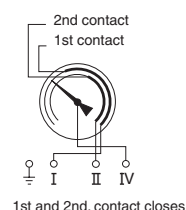
Connection diagrams and switching function when limit value is exceeded (pointer movement in clockwise direction, or from left to right).

Magnet spring contact

Single



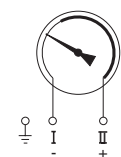
Dual



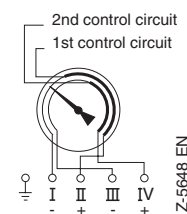
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Inductive coupler

Single



Dual



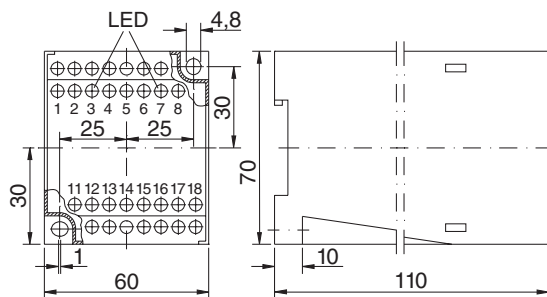
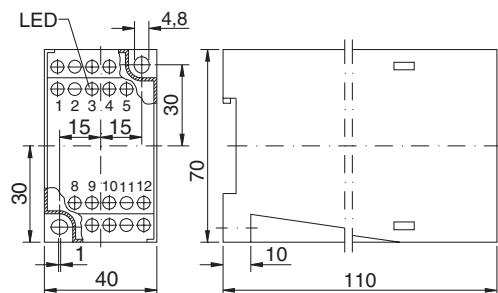
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If the pointer with the contact vane moves out of the inductive coupler when the set limit value is exceeded, the control circuit is closed and the relay energizes in the open contact circuit (standard version). Normally closed contact circuit (see connection diagram) causes reversal of the switching characteristics.

Stock versions				
Alarm value contact	Weight appr. kg	Catalog No.		
Typ WE 77 Ex 1				
Control unit for 1 inductive coupler	0.27	14039-8008373		
Typ WE 77 Ex 2				
Control unit for 2 inductive couplers	0.42	14039-8008374		

Dimensional drawings (dimensions in mm)

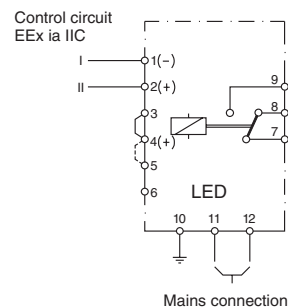
Type WE 77 Ex 1



Z-5646

Type WE 77 Ex 2

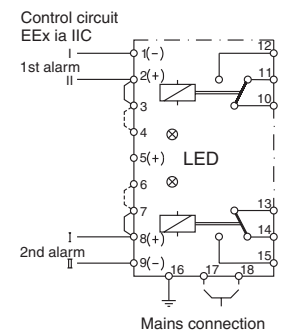
Type WE 77 Ex 1



(Open circuit design
 (Closed circuit design

⊗ Lights up when corresponding relay energizes

Type WE 77 Ex 2



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