

Selection Guide

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Ex i Power Supply

Type	Ex i																				
	9143/10-065-150-10	9143/10-065-200-10	9143/10-099-220-10	9143/10-104-220-10	9143/10-114-200-10	9143/10-124-150-10	9143/10-156-065-10	9143/10-156-160-10	9143/10-187-050-10	9143/10-244-035-10	9143/10-244-06-10	9143/10-065-200-20	9143/10-104-220-20	9143/10-114-200-20	9143/10-124-150-20	9143/10-156-065-20	9143/10-156-160-20	9143/10-187-050-20	9143/10-244-035-20	9143/10-244-060-20	
Function																					
For the intrinsically safe operation of field devices e.g. transmitters...	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Installation																					
In Zone 2 & 22	x	x	x	x	x	x	x	x	x	x	x										
Ex i Interfaces [Zone 1 und 21]	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Number of channels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Nominal voltage (U_N) [V]																					
4,0...5,6	x	x										x									
8,8...9,1			x																		
8,7...9,5				x									x								
9,4...10,4					x									x							
9,5...11,8						x									x						
12,5...14,7							x	x								x	x				
14,6...17,6									x										x		
18,9...23,0										x	x									x	x
Max. Nominal current I_N																					
15 mA										x										x	
35 mA									x										x		
40 mA											x										x
45 mA						x										x					
130 mA	x				x										x						
140 mA								x										x			
160 mA		x										x									
180 mA				x										x							
200 mA			x	x									x								
Power supply																					
24 V AC / DC	x	x	x	x	x	x	x	x	x	x	x										
85 V...230 V AC												x	x	x	x	x	x	x	x	x	x
Intrinsically safe output																					
[Ex ib] IIC / IIB	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Galvanic isolation																					
Between output and power supply	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Frequency Transmitter

Type	Ex i		Non-Ex i
	9146/10-11-12	9146/20-11-11	9146/10-11-62
Function			
To monitors the speed of rotating devices like fans, centrifuges, tube extruder,...	x	x	x
Installation			
In Zone 2 & 22	x	x	x
Ex i Interfaces [Zone 0 und 20]	x	x	
Number of Channels	1	2	1
Ex i Input signal			
Gem. EN 60947-5-6 (NAMUR)	x	x	x
Input frequency 0,001 Hz...20 kHz	x	x	x
Output			
0/4 mA ...20 mA	x	x	x
Limit value			
2 x NO (contact per channel)	x		x
Pulse output			
One NO selectable	x		x
Power supply			
24 V DC	x	x	x
Open-circuit and short-circuit			
Line fault detection	x	x	x
Potential free relay contact	x	x	x
Galvanic isolating			
Between input, output and power supply	x	x	x

Vibration transducer

Type	Ex i	
	9147/10-99-10s	9147/20-99-10s
Function		
for intrinsically safe operation of vibration sensors, speed and acceleration sensors.	x	x
Installation		
in Zone 2 & 22	x	x
Ex i Interfaces [Zone 0 und 20]	x	x
Number of channels	1	2
Ex i Input signal		
Input resistance 10 kΩ	x	x
Input signal I -0,5 ... -20 V	x	x
Functional range 0 ... -24 V	x	x
Output		
-0,5 ... -20 V	x	x
Power supply		
24 V DC	x	x
Galvanic isolating		
Between input, output and power supply	x	x

Transmitter Supply Unit and Isolating Repeater (AI)

Type	Ex i															Non-Ex i										
	9160/13-10-11	9160/13-10-10	9160/19-10-11	9160/23-10-11	9160/23-10-10	9160/13-11-11	9160/13-11-10	9160/19-11-11	9160/19-11-10	9160/23-11-11	9160/23-11-10	9162/13-11-12	9162/13-11-14	9163/13-11-11	9163/13-10-11	9163/23-11-11	9163/23-10-11	9164/13-22-08	9164/13-22-09	9160/13-11-61	9160/19-11-61	9160/23-11-61	9162/13-11-62	9162/13-11-64		
Function																										
Transmitter supply unit with HART	x	x	x	x	x	x	x	x	x	x	x	x	x								x	x	x	x	x	
Isolating repeater for 4-wire Transmitter	x	x	x	x	x	x	x	x	x	x	x	x	x								x	x	x	x	x	
Isolating repeater for 4-wire Transmitter with HART														x	x	x	x									
to integrate 4-wire transmitters with 2 wire I/O-cards																		x	x							
Installation																										
Zone 1																		x	x							
Zone 2 und 22	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Ex i Interfaces [Zone 0 und 20]	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							
Number of channels	1	1	1	2	2	1	1	1	1	2	2	1	1	1	1	2	2	1	1	1	1	2	1	1	1	1
Duplicate signal			x					x	x													x				
Input																										
[Ex ia] IIC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									
Exi: 0/4 mA...20 mA with HART	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									
0/4 mA...20 mA with HART																						x	x	x	x	x
4-wire MU (Ex i Anschluss)																		x								
4-wire MU (Ex e Anschluss)																			x							
Output A																										
0/4 mA...20 mA with HART						x	x	x	x	x	x	x	x			x						x	x	x	x	x
Passive with HART	x	x	x	x	x										x		x									
Output B																										
Passive without HART			x																							
Passive with HART				x	x																					
0/4 mA...20 mA								x	x														x			
0/4 mA...20 mA with HART										x	x												x			
Limit value contact																										
2 x NO												x	x											x	x	
Number of wire																										
2-wire HART transmitter	x	x	x	x	x	x	x	x	x	x	x	x	x									x	x	x	x	x
2- & 3-wire transmitter	x	x	x	x	x	x	x	x	x	x	x	x	x									x	x	x	x	x
4-wire HART transmitter														x	x	x	x									
4-wire transmitter and mA-Sources	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
SIL 2 (IEC 61508)	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x					x	x	x		x
Power supply																										
24 V DC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					x	x	x	x	x
Open-circuit and short-circuit																										
Line fault detection	x		x	x		x	x		x		x	x	x	x	x	x	x	x				x	x	x	x	x
fault message contact	x		x	x		x	x		x		x	x	x	x	x	x	x					x	x	x	x	x
fault signal contact (LED)	x		x	x		x	x		x		x	x	x	x	x	x	x					x	x	x	x	x
Galvanic isolating																										
Between input, output																		x	x							
Between input, output and power supply	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									

Isolating Repeater (AO)

Type	Ex i										Non-Ex i			
	9165/16-11-11	9165/16-11-10 Rev C	9165/26-11-11	9165/26-11-10 Rev C	9167/11-11-00	9167/21-11-00	9167/13-11-00	9167/23-11-00	9167/14-11-00	9167/24-11-00	9165/16-11-61	9165/16-11-61	9167/13-11-50	9167/23-11-50
Function														
Isolating repeaters are used in the intrinsically safe operation of control valves, i/p-converters or indicators.....	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Installation														
In Zone 2	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Ex i Interfaces [Zone 0 und 20]	x	x	x	x	x	x	x	x	x	x				
Number of channels	1	1	2	2	1	2	1	2	1	2	1	2	1	2
Input														
0/4 mA...20 mA with HART	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Output														
Exi: 0/4 mA...20 mA with HART	x	x	x	x	x	x	x	x	x	x				
0/4 mA...20 mA with HART											x	x	x	x
Uo / Io / Po (15,7 V / 60 mA / 233 mW)					x	x								
Uo / Io / Po (18,8 V / 107 mA / 503 mW)									x	x				
Uo / Io / Po (25 V / 99 mA / 613 mW)							x	x						
Uo / Io / Po (25,6 V / 96 mA / 605 mW)	x	x	x	x										
Min. load resistance R_L 150 Ω	x	x	x	x										
Max. load resistance R_L														
360 Ω					x	x								
590 Ω									x	x				
800 Ω							x	x					x	x
SIL (IEC 61508)														
SIL 2	x	x	x	x							x	x		
SIL 3					x	x	x	x	x	x			x	x
Power supply														
24 V DC	x	x	x	x							x	x		
Loop power					x	x	x	x	x	x			x	x
Open-circuit and short-circuit														
Line fault detection	x	x	x	x							x	x		
fault message contact	x		x								x	x		
fault signal contact (LED)	x	x	x	x							x	x		
Galvanic isolating														
Between input and output					x	x	x	x	x	x	x	x	x	x
Between input, output and power supply	x	x	x	x										

Switching Repeater and Ex i Relay Module (DI)

Type	Ex i																					
	9170/10-11-11	9170/11-11-13	9170/10-11-21	9170/20-10-11	9170/20-11-11	9170/21-11-13	9170/20-10-21	9170/20-11-21	9170/10-12-11	9170/10-12-21	9170/10-13-21	9170/20-12-11	9170/20-12-21	9170/10-14-11	9170/20-14-11	9170/11-14-12	9170/11-14-12-C1515*)	9170/21-14-12	9170/21-14-12-C1515*)	9172/10-11-00	9172/20-11-00	
Function																						
For intrinsically safe operation of contacts, optocoupler outputs etc.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
Relay Ex i activation / Non-Ex i contact																					x	x
Installation																						
In Zone 2	x	x		x	x	x	x							x	x	x	x	x	x	x	x	x
Ex i Interfaces [Zone 0 und 20]	x	x		x					x	x	x	x	x	x	x	x	x	x	x	x	x	x
Number of channels	1	1	1	2	2	2	2	2	1	1	1	2	2	1	2	1	1	2	2	1	2	
Input intrinsically safe input																						
[Ex ia] IIC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Output per channel																						
1 x Changeover (125 V / 1 A)				x			x															
1 x Changeover (250 V / 4 A)									x	x		x									x	x
2 x Changeover (125 V / 1 A)	x	x	x																			
2 x Changeover (250 V / 4 A)								x			x		x									
2 x NO (125 V / 1 A)					x	x																
1 x Electronic (35 V/50mA)														x	x	x	x	x	x			
Transmission frequency																						
≤ 6 Hz									x	x	x	x	x									
≤ 15 Hz	x	x	x	x	x	x	x	x													x	x
≤ 10 kHz														x	x	x	x	x	x			
SIL 2 (IEC 61508)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Power supply																						
24 V DC	x	x		x	x	x			x			x		x	x	x	x	x	x			
110 V ... 230 V			x				x	x		x	x		x									
Loop power																					x	x
Line fault transparency (LFT)																x	x	x	x			
Open-circuit and short-circuit																						
Line fault detection	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
fault message contact	x			x	x		x		x			x		x	x	x	x	x	x			
fault signal contact (LED)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
Galvanic isolating																						
Between input and output																					x	x
Between input, output and power supply	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			

*) only for Yokogawa ProSafe-RS I/O Modules SDV 144

Binary Output and Ex i Relay Module (DO)

Type	With power supply(9175)									Loop power (9176 & 9172)														
	9175/10-12-11	9175/20-12-11	9175/10-12-12	9175/10-14-11	9175/20-14-11	9175/10-14-12	9175/10-16-11	9175/20-16-11	9175/10-16-12	9176/10-12-00	9176/20-12-00	9176/10-14-00	9176/20-14-00	9176/10-15-00	9176/20-15-00	9176/10-16-00	9176/10-16-00-C1569*)	9176/20-16-00	9176/20-16-00-C1569*)	9176/10-17-00	9176/20-17-00	9172/11-11-00	9172/21-11-00	
Function																								
Binary output for the intrinsically safe operation of Ex i solenoid valves or indicators.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
Relay for Non-Ex i Activation / Ex i Contact																						x	x	
Installation																								
in Zone 2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Ex i Interface [Zone 0 und 20]	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Number of channels	1	2	1	1	2	1	1	2	1	1	2	1	2	1	2	1	1	2	2	1	2	1	2	
Intrinsically safe output																								
[Ex ia] IIC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
[Ex ib] IIC	x	x		x	x		x	x		x	x	x	x	x	x	x	x	x						
Ex i , 1 changeover (125 V / 4 A; 30 V / 4 A)																						x	x	
Max. Output current (I_{A max})																								
29 mA														x	x									
35 mA							x	x	x							x	x	x	x					
40 mA																				x	x			
45 mA				x	x	x						x	x											
58 mA															x									
60 mA	x	x	x							x	x													
Parallel interconnection 70 mA								x										x	x					
Parallel interconnection 80 mA																					x			
Parallel interconnection 90 mA					x								x											
Parallel interconnection 120 mA		x									x													
Internal resistance R_i																								
130 Ω				x	x	x						x	x											
150 Ω	x	x	x							x	x													
460 Ω																					x	x		
250 Ω							x	x	x							x	x	x	x					
320 Ω														x	x									
Parallel interconnection 65 Ω					x								x											
Parallel interconnection 75 Ω		x									x													
Parallel interconnection 125 Ω									x									x	x					
Parallel interconnection 160 Ω															x									
Parallel interconnection 230 Ω																						x		
NO-load voltage (U_A)																								
10 V	x	x	x							x	x													
17,5 V				x	x	x						x	x											
25 V							x	x	x					x	x	x	x	x	x	x	x	x		
SIL (IEC 61508)																								
SIL2			x			x			x														x	x
SIL3	x	x		x	x		x	x		x	x	x	x	x	x	x	x	x	x	x	x			
Power supply																								
24 V DC	x	x	x	x	x	x	x	x	x															
Loop power																								
Line fault transparent (LFT)			x			x			x															
Open-circuit and short-circuit																								
Line fault detection	x	x	x	x	x	x	x	x	x															
fault message contact	x	x	x	x	x	x	x	x	x															
fault signal contact (LED)	x	x	x	x	x	x	x	x	x															
Galvanic isolating																								
Between input and output	x	X**)	x	x	X**)	x	x	X**)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Between input, output and power supply	x	x	X**)	x	X**)	x	x	X**)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	

*) only for Yokogawa ProSafe-RS I/O Modules SDV 541 **) No galvanic isolating between outputs

**) No galvanic isolating between output and power supply

Resistance Isolator and Temperature Transmitter (TI)

Type	Ex i														Non-Ex i					
	9180/10-77-11	9180/20-77-11	9180/11-77-11	9180/21-77-11	9182/10-51-11	9182/20-51-11	9182/10-59-11	9182/10-59-13	9182/10-59-13	9182/10-50-12	9182/20-50-12	9182/10-51-12	9182/10-51-14	9182/10-51-61	9182/20-51-61	9182/10-51-63	9182/10-59-63	9182/10-51-62	9182/10-51-64	
Function																				
Resistance Isolator for intrinsically safe operation of Pt 100 resistance thermometer or other resistance sensors	x	x	x	x																
Temperature Transmitter for intrinsically safe operation of temperature sensors					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Installation																				
In Zone 2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Ex i interfaces [Zone 0 und 20]	x	x	x	x	x	x	x	x	x	x	x	x	x							
Number of channels	1	2	1	2	1	2	1	1	1	1	2	1	1	1	2	1	1	1	1	1
Sensor (Ex i input)																				
Pt 100 Resistance Isolator	x	x																		
Pt 1000 Resistance Isolator			x	x																
Most currently available sensors can be connected, such as Pt 100, Pt 500, Pt 1000, Ni 100, thermocouples and resistance transmitters					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Output																				
0/4 mA...20 mA active					x	x			x			x	x	x	x	x			x	x
0/4 mA...20 mA passive							x	x									x			
Resistance value	x	x	x	x																
Limit value contact (per channel)																				
2 x NO										x	x	x	x						x	x
Configuration																				
PC					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
DIP-switches					x	x	x							x	x					
Power supply																				
24 V	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
SIL 2 (IEC 61508)								x	x				x			x	x			x
Open-circuit and short-circuit																				
Line fault detection	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
fault message contact	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
fault signal contact (LED)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Galvanic isolating																				
Between input, output and power supply	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Fieldbus Isolating Repeater

Type	Ex i				Non-Ex i
	9185/11-35-10	9186/12-11-11	9186/15-12-11	9186/25-12-11	9185/12-45-10
Function					
Fieldbus Isolating Repeater to separate intrinsically safe or non-intrinsically safe RS 422 / RS 485 fieldbus from non-intrinsically safe RS 232, RS 422, RS 485 interface	x				x
Fibre Optic Isolating Repeater to build-up fibre optic network structures in hazardous areas		x	x	x	
Installation in					
Zone 1		x	x		
Zone 2, 22	x			x	x
Ex i Interfaces [Zone 1 und 21]	x				
LWL Interfaces [Zone 0 und 20]		x	x	x	
RS 485 Interfaces Zone 1 und 21]		x			
Transmission speed					
1,2 kbit/s...1,5 Mbit/s	x	x			x
9,6 kbit...1,5 Mbit/s			x	x	
Automatic setting Profibus DP	x				
Interfaces field area					
Intrinsically safe bus connection via RS 485 IS (PNO)	x	x	x	x	
Intrinsically safe optical interface			x	x	
Interfaces safe area					
RS 485, RS 422, RS 232	x				x
Intrinsically safe optical interface		x			
Network structure					
Line structure		x	x	x	
Point-to-Point Structure		x	x	x	
Ring structure		x		x	
Bitrefresh	x				x
Power supply					
24 V UC	x				
Line fault detection		x	x	x	
Galvanic isolating					
Between input, output and power supply	x	x	x	x	x