

Binary Output Series 9175



www.stahl.de



- > Intrinsically safe output [Ex ia] IIC / [Ex ib] IIC
- > Galvanic isolation between input, output and power supply
- > Open-circuit and short-circuit monitoring (can be switched off)
- > For use up to SIL 3 (IEC 61508)

A3



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Binary outputs are used for intrinsically safe operation of Ex i solenoid valves, indicator lamps or horns. Binary output is available in single or double channel versions.



ATEX / IECEx							NEC 505							NEC 506							NEC 500																				
							Class I														Class I							Class II							Class III						
Zone	0	1	2	20	21	22	Zone	0	1	2	20	21	22	Division	1	2	1	2	1	2	1	2																			
Ex i interface	x	x	x	x	x	x	Ex i interface	x	x	x				Ex i interface	x	x	x	x	x	x	x	x																			
Installation in			x			x	Installation in			x			x	Installation in		x		x				x																			

WebCode 9175A

Binary Output

Series 9175



Selection Table

Version	Channels	No-load voltage U_{out}	Max. output current $I_{out\ max}$	Internal resistance R_i	Order number
Binary output Series 9175	1	10 V	60 mA	150 Ω	9175/10-12-11s
		17.5 V	45 mA	130 Ω	9175/10-14-11s
		25 V	35 mA	250 Ω	9175/10-16-11s
	2	10 V	60 mA / 120 mA ^{*)}	150 Ω / 75 Ω ^{*)}	9175/20-12-11s
		17.5 V	45 mA / 90 mA ^{*)}	130 Ω / 65 Ω ^{*)}	9175/20-14-11s
		25 V	35 mA / 70 mA ^{*)}	250 Ω / 125 Ω ^{*)}	9175/20-16-11s

^{*)} Parallel connection of the outputs possible; thus, doubling of the output current.

Note The order numbers listed in the table are for devices equipped with screw-type terminals. For devices equipped with spring-type terminals, replace the ending "s" for screw-type terminals with "k" for spring-type terminals.

Explosion Protection

Global (IECEX)

Gas and dust IECEx BVS 10.0050X
Ex nA nC [ia Ga] IIC T4 Gc
[Ex ia Da] IIIC

Europe (ATEX)

Gas and dust DMT 03 ATEX E 043 X
Ⓔ II 3 (1) G Ex nA nC [ia Ga] IIC T4 Gc
Ⓔ II (1) D [Ex ia Da] IIIC

Certifications and certificates

Certificates IECEx, ATEX, Brazil (INMETRO), India (PESO), Canada (cFM), Kazakhstan (GOST K), Russia (GOST R), Ukraine (TR), USA (FM, UL), Belarus (operating authorisation)
Ship approval DNV

Functional safety (IEC 61508)

Test report	STAHL 07/10-01 R012		
Max. SIL	3		
Safe Failure Fraction SFF	single output	parallel output	
	94 %	93 %	
PFD _{AVG} at T _[Proof]		PFD _{AVG}	
	T _[Proof]	single output	parallel output
	1 year	4,25 x 10 ⁻⁵	8,36 x 10 ⁻⁵
	2 years	8,12 x 10 ⁻⁵	1,60 x 10 ⁻⁴
	5 years	1,97 x 10 ⁻⁴	3,89 x 10 ⁻⁴
Further information	see test report		

Further parameters

Installation in Zone 2, Div. 2 and in the safe area
Further information see respective certificate and operating instructions

Binary Output for $I_{max} = 60 \text{ mA}$

Series 9175/.0-12-11



Technical Data

Safety data

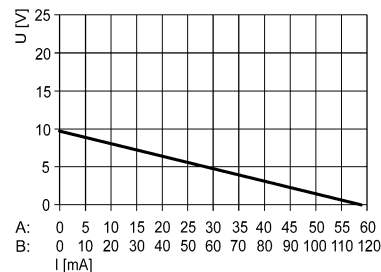
Max. values per output	9175/10-12-11. (1 channel)	9175/20-12-11. (2 channels)
Version		
Max. voltage U_o	11.3 V	11.3 V
Max. current I_o		
[Ex ia]	75 mA	75 mA
[Ex ib]	--	--
The binary outputs 9175 can also be used for supply of devices marked EEx ib IIC/IIB T*. Here the I_o values for [Ex ib] are valid.		
Max. power P_o	210 mW	210 mW
Max. connectable capacitance		
IIC	1.79 μF	1.79 μF
IIB	12.1 μF	12.1 μF
Max. connectable inductance		
IIC	6.3 mH	6.3 mH
IIB	25 mH	25 mH
Internal capacitance C_i	1.1 nF	1.1 nF
Internal inductance L_i	negligible	negligible
Isolation voltage U_m	253 V AC	253 V AC
Maximum values for two outputs connected in parallel		
Version		
Max. voltage U_o	--	11.3 V
Max. current I_o		
[Ex ia]	--	150 mA
[Ex ib]	--	--
The binary outputs 9175 can also be used for supply of devices marked EEx ib IIC/IIB T*. Here the I_o values for [Ex ib] are valid.		
Max. power P_o	--	420 mW
Max. connectable capacitance		
IIC	--	1.79 μF
IIB	--	12.1 μF
Max. connectable inductance		
IIC	--	1.5 mH
IIB	--	6 mH
Internal capacitance C_i	--	2.2 nF
internal inductance L_i	--	negligible
Isolation voltage U_m	--	253 V AC

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Ex i output

Output characteristic

(at U_{Ni} : -20 ... +60 °C)



X-axis (I [mA])

A: characteristic curve each channel
 B: characteristic curve channel 1 parallel channel 2 (only types 9175/20-...)

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Maximum values per output

Version	9175/10-12-11. (1 channel)	9175/20-12-11. (2 channels)
No-load voltage U_{out}	10 V	10 V
Max. output current $I_{out \max}$	60 mA	60 mA
Internal resistance R_i	150 Ω	150 Ω
Residual ripple output	$\leq 50 \text{ mV}$	$\leq 50 \text{ mV}$
Switching delay AUS \leftrightarrow EIN	$\leq 1 \text{ ms}$	$\leq 1 \text{ ms}$
Switching frequency	$\leq 200 \text{ Hz}$	$\leq 200 \text{ Hz}$
Display	LED yellow "OUT" each channel	LED yellow "OUT" each channel

Binary Output for $I_{max} = 60 \text{ mA}$ Series 9175/.0-12-11



Technical Data

Ex i output

Maximum values for two outputs connected in parallel

Version	9175/10-12-11. (1 channel)	9175/20-12-11. (2 channels)
No-load voltage U_{out}	--	10 V
Max. output current $I_{out \max}$	--	120 mA
Internal resistance R_i	--	75 Ω
Residual ripple output	--	$\leq 50 \text{ mV}$
Switching delay AUS \leftrightarrow EIN	--	$\leq 1 \text{ ms}$
Switching frequency	--	$\leq 200 \text{ Hz}$
Display	--	LED yellow "OUT" each channel

Fault detection Ex i output

Version	9175/10-12-11. (1 channel)	9175/20-12-11. (2 channels)
Open-circuit		
per output	$> 7 \text{ k}\Omega$	$> 7 \text{ k}\Omega$
two outputs parallel	--	$> 3,5 \text{ k}\Omega$
Short circuit		
per output, at 23 °C	$40...60 \Omega \pm 3 \Omega / 10 \text{ K}$	$40...60 \Omega \pm 3 \Omega / 10 \text{ K}$
two outputs parallel, at 23 °C	--	$20...30 \Omega \pm 3 \Omega / 10 \text{ K}$
Test current		
per output		
100 Ω load	2,7 mA	2,7 mA
7 k Ω load	0,68 mA	0,68 mA
two outputs parallel		
100 Ω load	--	5,4 mA
7 k Ω load	--	1,36 mA
Settings (Switch LF)	activated / deactivated	activated / deactivated
Error detection	LED red "LF" each channel	LED red "LF" each channel
Signalization of faulty line and power supply failure	- Contact (30 V / 100 mA) closed to ground in case of fault - pac-Bus, floating contact (30 V / 100 mA)	

Binary Output for $I_{max} = 45 \text{ mA}$

Series 9175/.0-14-11



Technical Data

Safety data

Max. values per output

Version	9175/10-14-11. (1 channel)	9175/20-14-11. (2 channels)
Max. voltage U_o	19.6 V	19.6 V
Max. current I_o		
[Ex ia]	150 mA	150 mA
[Ex ib]	60 mA	60 mA
The binary outputs 9175 can also be used for supply of devices marked EEx ib IIC/IIB T*. Here the I_o values for [Ex ib] are valid.		
Max. power P_o	732 mW	732 mW
Max. connectable capacitance		
IIC	235 nF	235 nF
IIB	1470 nF	1470 nF
Max. connectable inductance		
IIC	1.5 mH	1.5 mH
IIB	6 mH	6 mH
Internal capacitance C_i	1.1 nF	1.1 nF
Internal inductance L_i	negligible	negligible
Isolation voltage U_m	253 V AC	253 V AC

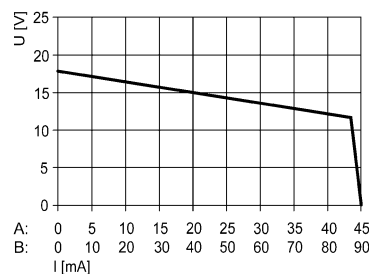
Maximum values for two outputs connected in parallel

Version	9175/10-14-11. (1 channel)	9175/20-14-11. (2 channels)
Max. voltage U_o	--	19.6 V
Max. current I_o		
[Ex ia]	--	300 mA
[Ex ib]	--	120 mA
The binary outputs 9175 can also be used for supply of devices marked EEx ib IIC/IIB T*. Here the I_o values for [Ex ib] are valid.		
Max. power P_o	--	1464 mW
Max. connectable capacitance		
IIC	--	235 nF
IIB	--	1471 nF
Max. connectable inductance		
IIC	--	0.3 mH
IIB	--	1.5 mH
Internal capacitance C_i	--	2.2 nF
internal inductance L_i	--	negligible
Isolation voltage U_m	--	253 V AC

Ex i output

Output characteristic

(at U_N : -20 ... +60 °C)



X-axis (I [mA])

A: characteristic curve each channel
B: characteristic curve channel 1 parallel channel 2 (only types 9175/20-...-...)

Maximum values per output

Version	9175/10-14-11. (1 channel)	9175/20-14-11. (2 channels)
No-load voltage U_{out}	17.5 V	17.5 V
Max. output current $I_{out \max}$	45 mA	45 mA
Internal resistance R_i	130 Ω	130 Ω
Residual ripple output	$\leq 50 \text{ mV}$	$\leq 50 \text{ mV}$
Switching delay AUS \leftrightarrow EIN	$\leq 1 \text{ ms}$	$\leq 1 \text{ ms}$
Switching frequency	$\leq 200 \text{ Hz}$	$\leq 200 \text{ Hz}$
Display	LED yellow "OUT" each channel	LED yellow "OUT" each channel

Binary Output for $I_{max} = 45 \text{ mA}$

Series 9175/.0-14-11



Technical Data

Ex i output

Maximum values for two outputs connected in parallel

Version	9175/10-14-11. (1 channel)	9175/20-14-11. (2 channels)
No-load voltage U_{out}	--	17,5 V
Max. output current $I_{out \max}$	--	90 mA
Internal resistance R_i	--	65 Ω
Residual ripple output	--	$\leq 50 \text{ mV}$
Switching delay AUS \leftrightarrow EIN	--	$\leq 1 \text{ ms}$
Switching frequency	--	$\leq 200 \text{ Hz}$
Display	--	LED yellow "OUT" each channel

Fault detection Ex i output

Version	9175/10-14-11. (1 channel)	9175/20-14-11. (2 channels)
Open-circuit		
per output	$> 10 \text{ k}\Omega$	$> 10 \text{ k}\Omega$
two outputs parallel	--	$> 5 \text{ k}\Omega$
Short circuit		
per output, at 23 °C	$40 \dots 80 \Omega \pm 6 \Omega / 10 \text{ K}$	$40 \dots 80 \Omega \pm 6 \Omega / 10 \text{ K}$
two outputs parallel, at 23 °C	--	$20 \dots 40 \Omega \pm 6 \Omega / 10 \text{ K}$
Test current		
per output		
100 Ω load	2,1 mA	2,1 mA
10 k Ω load	0,76 mA	0,76 mA
two outputs parallel		
100 Ω load	--	4,2 mA
10 k Ω load	--	1,52 mA
Settings (Switch LF)	activated / deactivated	activated / deactivated
Error detection	LED red "LF" each channel	LED red "LF" each channel
Signalization of faulty line and power supply failure	- Contact (30 V / 100 mA) closed to ground in case of fault - pac-Bus, floating contact (30 V / 100 mA)	

Binary Output for $I_{max} = 35 \text{ mA}$

Series 9175/.0-16-11



Technical Data

Safety data

Max. values per output

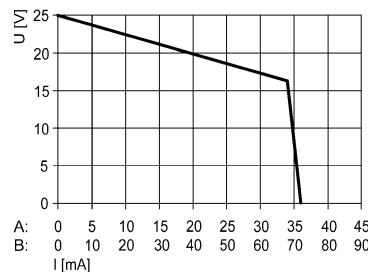
Version	9175/10-16-11. (1 channel)	9175/20-16-11. (2 channels)
Max. voltage U_o	27.6 V	27.6 V
Max. current I_o		
[Ex ia]	110 mA	110 mA
[Ex ib]	50 mA	50 mA
The binary outputs 9175 can also be used for supply of devices marked EEx ib IIC/IIB T*. Here the I_o values for [Ex ib] are valid.		
Max. power P_o	760 mW	760 mW
Max. connectable capacitance		
IIC	85 nF	85 nF
IIB	667 nF	667 nF
Max. connectable inductance		
IIC	1.2 mH	1.2 mH
IIB	9 mH	9 mH
Internal capacitance C_i	1.1 nF	1.1 nF
Internal inductance L_i	negligible	negligible
Isolation voltage U_m	253 V AC	253 V AC
Maximum values for two outputs connected in parallel		
Version	9175/10-16-11. (1 channel)	9175/20-16-11. (2 channels)
Max. voltage U_o	--	27.6 V
Max. current I_o		
[Ex ia]	--	220 mA
[Ex ib]	--	100 mA
The binary outputs 9175 can also be used for supply of devices marked EEx ib IIC/IIB T*. Here the I_o values for [Ex ib] are valid.		
Max. power P_o	--	1520 mW
Max. connectable capacitance		
IIC	--	--
IIB	--	665 nF
Max. connectable inductance		
IIC	--	--
IIB	--	1.8 mH
Internal capacitance C_i	--	2.2 nF
internal inductance L_i	--	negligible
Isolation voltage U_m	--	253 V AC

A3

Ex i output

Output characteristic

(at U_N : -20 ... +60 °C)



X-axis (I [mA])

A: characteristic curve each channel
 B: characteristic curve channel 1 parallel channel 2 (only types 9175/20-...-...)

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Maximum values per output

Version	9175/10-16-11. (1 channel)	9175/20-16-11. (2 channels)
No-load voltage U_{out}	25 V	25 V
Max. output current $I_{out max}$	35 mA	35 mA
Internal resistance R_i	250 Ω	250 Ω
Residual ripple output	$\leq 50 \text{ mV}$	$\leq 50 \text{ mV}$
Switching delay AUS \leftrightarrow EIN	$\leq 1 \text{ ms}$	$\leq 1 \text{ ms}$
Switching frequency	$\leq 200 \text{ Hz}$	$\leq 200 \text{ Hz}$
Display	LED yellow "OUT" each channel	LED yellow "OUT" each channel

Binary Output for $I_{max} = 35 \text{ mA}$

Series 9175/.0-16-11



Technical Data

Ex i output

Maximum values for two outputs connected in parallel

Version	9175/10-16-11. (1 channel)	9175/20-16-11. (2 channels)
No-load voltage U_{out}	--	25 V
Max. output current $I_{out \max}$	--	70 mA
Internal resistance R_i	--	125 Ω
Residual ripple output	--	$\leq 50 \text{ mV}$
Switching delay AUS \leftrightarrow EIN	--	$\leq 1 \text{ ms}$
Switching frequency	--	$\leq 200 \text{ Hz}$
Display	--	LED yellow "OUT" each channel

Fault detection Ex i output

Version	9175/10-16-11. (1 channel)	9175/20-16-11. (2 channels)
Open-circuit		
per output	$> 15 \text{ k}\Omega$	$> 15 \text{ k}\Omega$
two outputs parallel	--	$> 7,5 \text{ k}\Omega$
Short circuit		
per output, at 23 °C	$50 \dots 90 \Omega \pm 8 \Omega / 10 \text{ K}$	$50 \dots 90 \Omega \pm 8 \Omega / 10 \text{ K}$
two outputs parallel, at 23 °C	--	$25 \dots 45 \Omega \pm 8 \Omega / 10 \text{ K}$
Test current		
per output		
100 Ω load	2,3 mA	2,3 mA
15 k Ω load	0,72 mA	0,72 mA
two outputs parallel		
100 Ω load	--	4,6 mA
15 k Ω load	--	1,44 mA
Settings (Switch LF)	activated / deactivated	activated / deactivated
Error detection	LED red "LF" each channel	LED red "LF" each channel
Signalization of faulty line and power supply failure	- Contact (30 V / 100 mA) closed to ground in case of fault - pac-Bus, floating contact (30 V / 100 mA)	

Technical Data

Electrical data

Auxiliary power	
Nominal voltage U_N	24 V DC
Voltage range	18 ... 31.2 V
Residual ripple within voltage range	$\leq 3.6 V_{SS}$
Nominal current (at $U_N, I_{out max}$)	
1 channel	80 mA
2 channels	140 mA
Power consumption ($U_N, I_{out max}$)	
1 channel	1.9 W
2 channels	3.4 W
Power dissipation (at $U_N, I_{out max}$)	
1 channel	1.4 W
2 channels	2.4 W
Operation indication	LED green "PWR"
Polarity reversal protection	yes
Undervoltage monitoring	yes (no faulty module / output states)
Galvanic separation	
Test voltage	
acc. to standard	EN 60079-11
Ex i output to input	1.5 kV AC
Ex i output to power supply	1.5 kV AC
Ex i outputs to each other	--
Ex i output to error contact	1.5 kV AC
acc. to standard	EN 50178
Input to power supply	350 V AC
Inputs to each other	350 V AC
Error contact to power supply and inputs	350 V AC
Input	
Switching level	acc. to EN 61131-2
Voltage for ON / OFF	
ON	15 ... 31.2 V
OFF	0 ... 5 V
Control circuit	$< 5 \text{ mA}$
Electromagnetic compatibility	Tested under the following standards and regulations: EN 61326-1 (Use in industrial environment) NAMUR NE 21
Note	You may find a list of compatible Ex i solenoid valves on our homepage www.stahl.de (WebCode 9175A)

Ambient conditions

Ambient temperature	
Single device	-20 ... +70 °C
Group assembly	-20 ... +60 °C
	The installation conditions affect the ambient temperature. Observe the "Cabinet installation guide".
Storage temperature	-40 ... +80 °C
Relative humidity (no condensation)	$\leq 95 \%$

Binary Output Series 9175



Technical Data

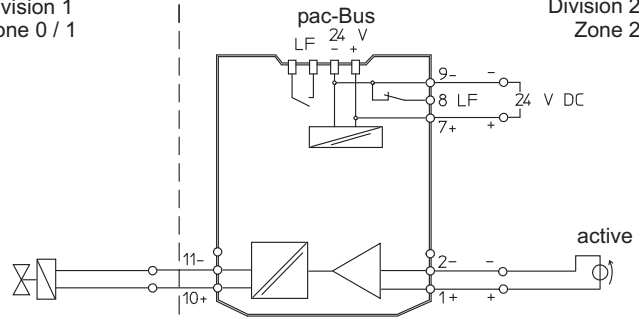
Electrical connection

Connection diagram

1 channel 9175/10-1.-11.

Hazardous area
Division 1
Zone 0 / 1

Safe area
Division 2
Zone 2



Field Device

ISpac Isolator

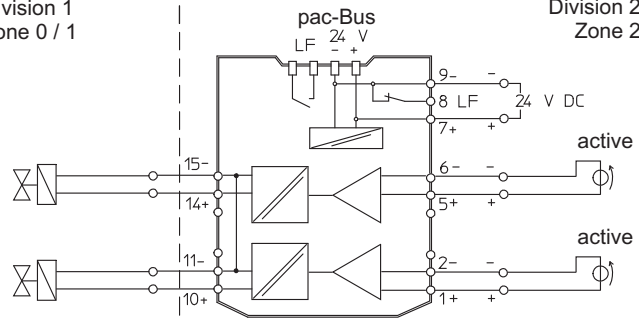
Control System

06700E02

2 channel 9175/20-1.-11.

Hazardous area
Division 1
Zone 0 / 1

Safe area
Division 2
Zone 2



Field Device

ISpac Isolator

Control System

06701E02

Mechanical data

Connection

Screw-type terminals

Spring-type terminals

Single-wire connection

- rigid
- flexible
- flexible with core end sleeves
(without / with plastic sleeve)

0.2 ... 2.5 mm²
0.2 ... 2.5 mm²
0.25 ... 2.5 mm²

0.2 ... 2.5 mm²
0.2 ... 2.5 mm²
0.25 ... 2.5 mm²

Two-wire connection

- rigid
- flexible
- flexible with core end sleeves

0.2 ... 1 mm²
0.2 ... 1.5 mm²
0.25 ... 1 mm²

--
--
0.5 ... 1 mm²

Weight

approx. 160 g

Mounting type

on top hat rail (NS35/15, NS35/7.5) or in pac-Carrier

Mounting orientation

horizontal or vertical

Enclosure

IP30

Terminals

IP20

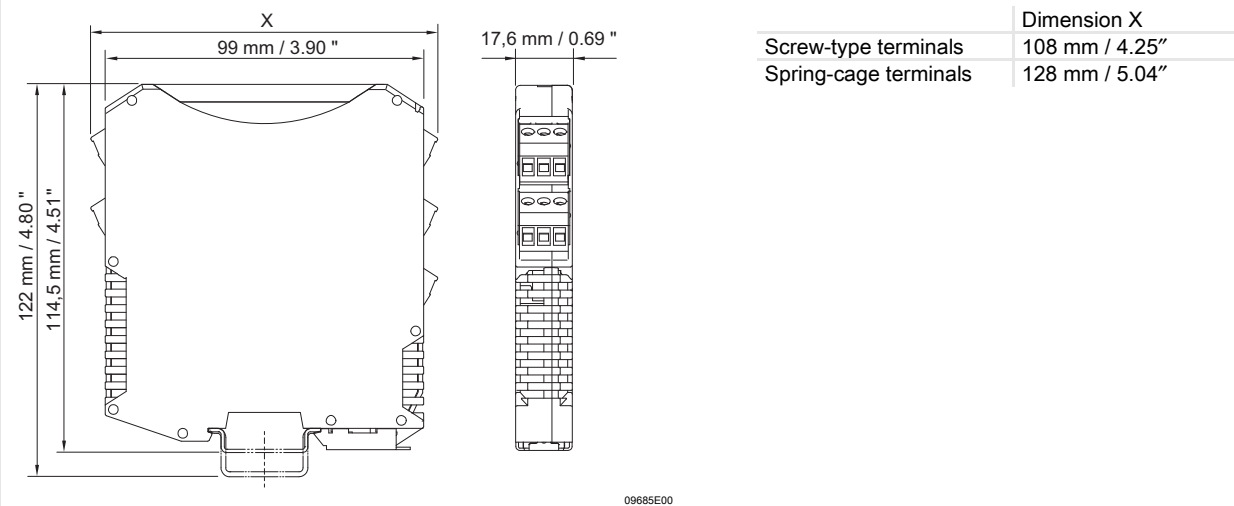
Enclosure material

PA 6.6

Fire resistance (UL-94)

V0

Dimensional Drawings (All Dimensions in mm / inch) - Subject to Alterations



We reserve the right to make alterations to the technical data, dimensions, weights, designs and products available without notice. The illustrations cannot be considered binding.