

# General Notes for IND500x Control Drawing

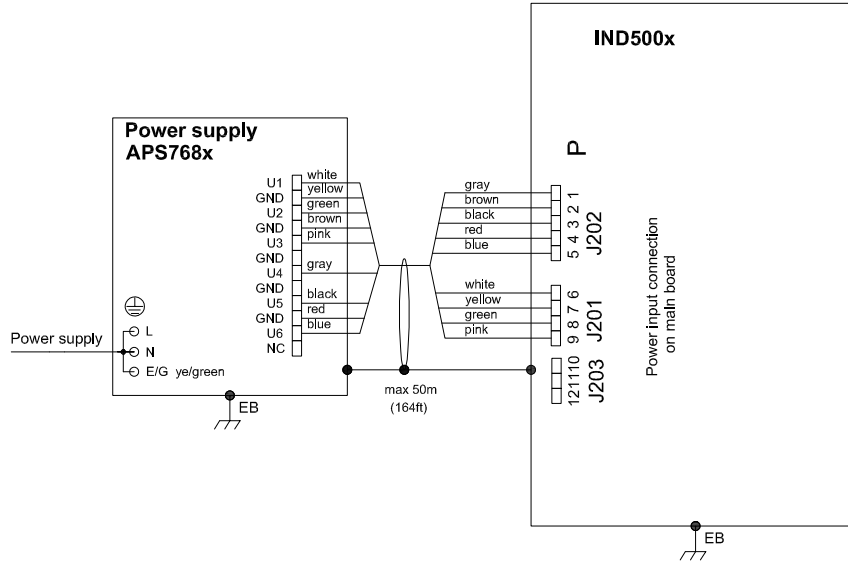
- IND500x ambient temperature range: -10°C to +40°C
- Special conditions for safe use: refer to IND500x installation manual
- The entity concept allows interconnection of intrinsically safe apparatus and associated apparatus when the following is true:  
 $U_o \leq U_i$  ,  $I_o \leq I_i$  ,  $P_o \leq P_i$  ,  $C_o \geq C_i + C_{cable}$ ;  $L_o \geq L_i + L_{cable}$ .
- Cable shields shall be connected to IND500x by metal cable glands (refer to IND500x installation manual)
- Field cable installation shall be protected from damage and movement.  
Copper wire isolation shall be at least 0.25mm thick per conductor. The actual isolation distance is farther if solid insulation is not considered.
- Connection of equipotential bonding (EB) as per country specific regulations.  
It must be ensured that the housings of all devices are connected to the same potential via the EB terminals. No circulating current may flow via the shielding of the intrinsically safe cables.
- In general, installations shall comply with the relevant country specific regulations.  
Installations in the U.S. should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the latest edition of the National Electrical Code (ANSI/NFPA 70).  
Installation in Canada shall be in accordance with the latest edition of the C22.1 Canadian Electrical Code, Part I.  
Installations in Europe shall comply with the relevant requirements of EN 60079-14 and applicable National regulations.  
Installations for IECEx certification shall be in accordance with IEC 60079-14 and the wiring practices for the country of origin.
- The intrinsically safe apparatus and associated apparatus shall be certified for installations according the country specific requirements.  
For U.S installations it shall be FM approved.
- The intrinsically safe apparatus and associated apparatus manufacturer's installation drawing and instructions shall be followed when installing this equipment
- The equipment connected to associated apparatus (e.g. control room equipment) shall not generate more than 250 Vrms or Vdc, or the marked Um on the associated apparatus, whichever is less.

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<b>METTLER TOLEDO</b>	MTCT	Drawn	Zhang YongJun	2021/11/16	Scale	1:1	
	CN-213125 ChangZhou	Change			Format	mt_A4	
Refer to protection notice ISO 16016 / Schutzvermerk ISO 16016 beachten		Note	-		Replaces	-	
Description IND500x 控制接线图		ERP NO.	30595335			ERP Rev	A
External Design No.:	External Design Rev.: A	Status:	NOTApproved	Mass:	Units:	mm	1/15

# Power Input connection

Hazardous area (classified)  
Class I, II, III, DIV I or Zone 1 / Zone 21; Indoor location



## Entity Parameters:

### Power Input P1-P12

Designator	Ui/V	Ii/mA	Pi/W	Ci/uF	Li/mH
P1(J202.1)	12.6	92	1.16	0.33	0
P3(J202.3)	5.9	240	1.41	0.22	0
P5(J202.5)	12.6	92	1.16	0.32	0
P6(J201.1)	8.7	133	1.16	0.357 **	0.08 **
P8(J201.3)	12.6	42	0.53	0.142 **	0.08 **
P9(J201.4)	8.7	133	1.16	0.22	0
P10(J203.1) *	5.9	338	2	0	0
P12(J203.3) *	12.6	158	2	0.21	0

Common GND connections: P2(J202.2), P4(J202.4), P7(J201.2), P11(J203.2)

\* These Power Inputs are Intended to be used for future use.

\*\* Due to the fact that P6 and P8 are passed through the IND500x to the digital scale, the worst case Ci and Li values and also 20m cable of the connected loadcells or scalebases are already included.

## Application specific notes:

- Also refer to general notes on page 1

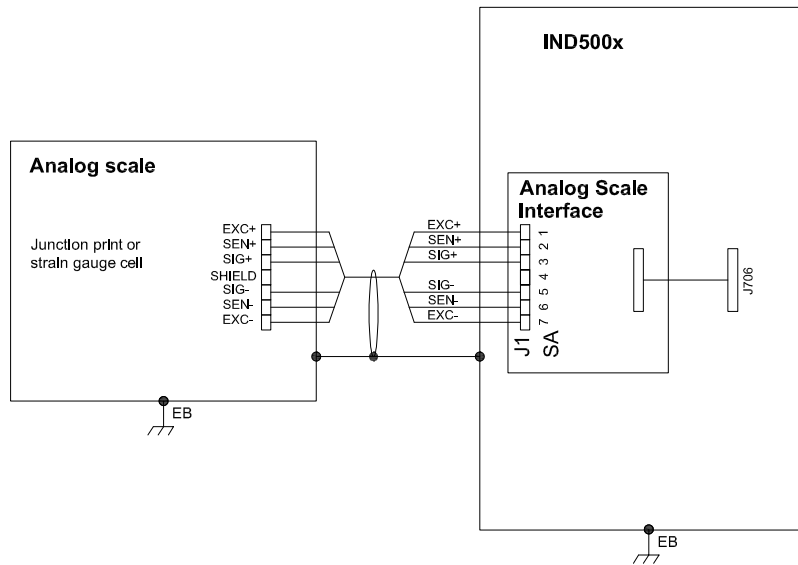
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<b>Control Drawing IND500x</b>		<b>30595335</b>			<b>A</b>			
External Design No.:	External Design Rev.: A	Status:	NOTApproved	Mass:	Units:	mm	2/15	

# Analog Scale Interface connection

Hazardous area (classified)  
Class I, II, III, DIV I or Zone 1 / Zone 21; Indoor location



## Entity Parameters:

### Analog Scale Interface

Designator	Uo/V	Io/mA	Po/W	Co/uF	Lo/mH
SA1-7(J1)	5.88	133	0.79	0.2	0.3

## Application specific notes:

- analog scale connection:  
ensure  $U_o \leq U_i$ ,  $I_o \leq I_i$ ,  $P_o \leq P_i$ ,  $C_o \geq C_i + C_{cable}$ ,  $L_o \geq L_i + L_{cable}$ .  
If cable parameters are unknown, use  $C_{cable} = 200\text{pF/m}$  and  $L_{cable} = 1\mu\text{H/m}$
- Also refer to general notes on page 1

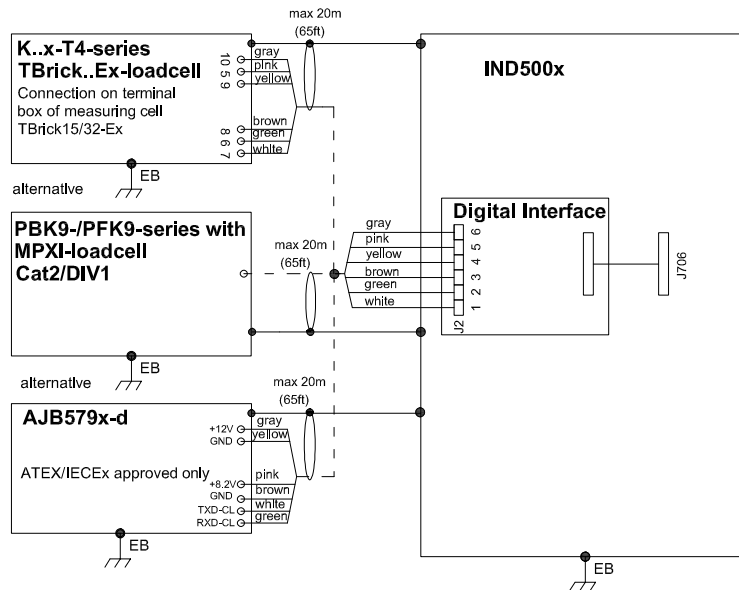
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# Digital Interface connection

Hazardous area (classified)  
Class I, II, III, DIV I or Zone 1 / Zone 21; Indoor location



## Entity Parameters:

### Digital Interface

Designator	Uo/V	Io/mA	Po/W	Co/uF	Lo/mH
J2.6(J2.6)	12.6	42	0.53	0.39 see remarks	0.95 see remarks
J2.5(J2.5)	8.7	133	1.16	0.77 see remarks	0.25 see remarks
J2.2(J2.2)	5.88	30	0.045	0.1	0.1
J2.1(J2.1)	5.88	30	0.045	0.1	0.1

GND connections: J2.3(J2.3), J2.4(J2.4)

## Remarks:

- Listed values are based on APS768x power supply and a 50m power supply cable.
- If another power supply is used, follow the description and formulas below:  
The J2.6(J2.6) and J2.5(J2.5) circuits are derived from power input line P8(J201.3) and P6(J201.1) of main board and are passed through the IND500x. Therefore the Co and Lo values correspond to the Co and Lo values of the corresponding connected power supply lines reduced by the internal C and L values and the externally connected power supply cable C and L values of IND500x:

$$Co\_IND500x = Co\_ps - C\_ps\_cable - C\_internal$$

$$Lo\_IND500x = Lo\_ps - L\_ps\_cable - L\_internal$$

- If cable parameters are unknown, use  $C_{cable} = 200pF/m$  and  $L_{cable} = 1\mu H/m$

## Application specific notes:

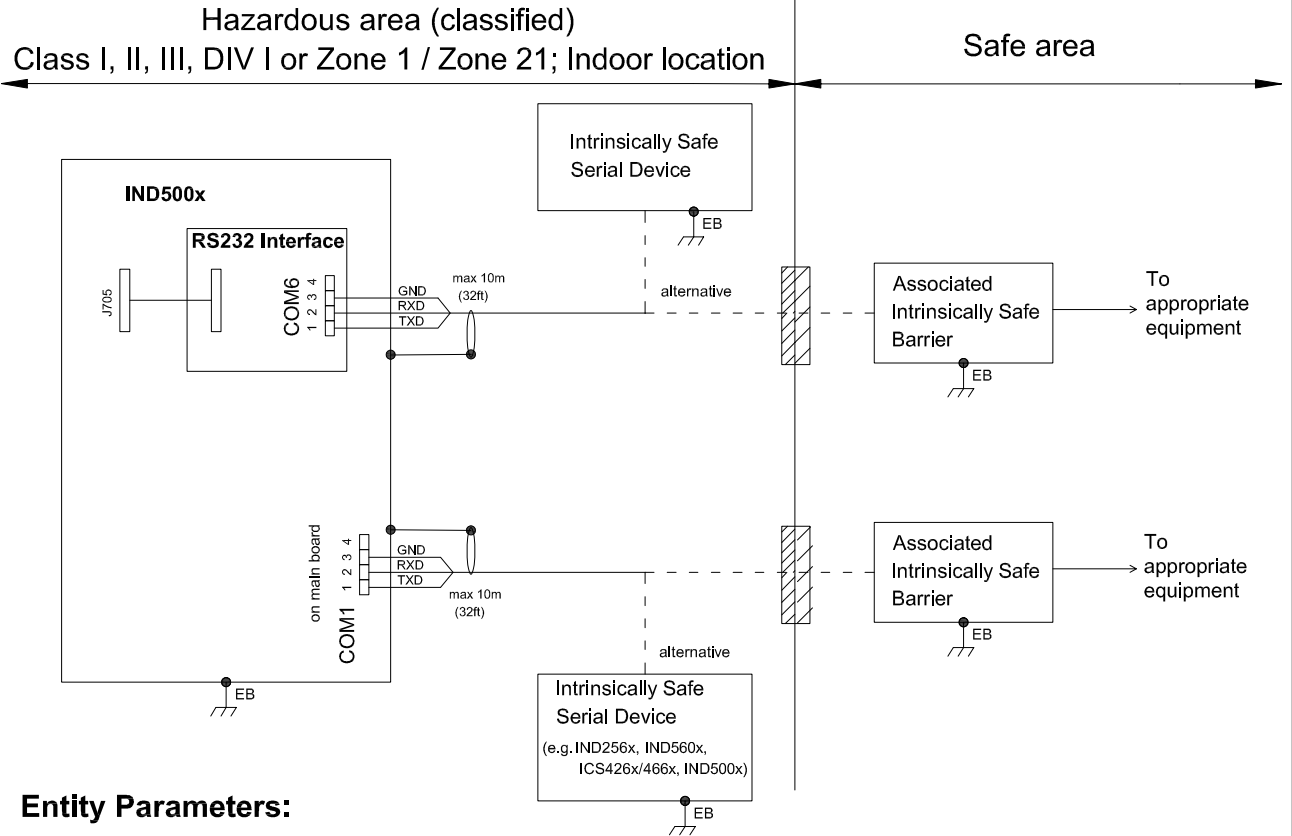
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# RS232 IS connection



## Entity Parameters:

### COM1 (RS232 IS)

Designator	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
COM1.1 (J605.1)	±10	±100	250	0	0
COM1.2 (J605.2)	±10	±100	250	0	0

Common GND connections: COM1.3 (J605.3); COM1.4 (J605.4)

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
COM1.1 (J605.1)	±5.88	±19.8	29.1	100	100
COM1.2 (J605.2)	±5.88	±19.8	29.1	100	100

Common GND connections: COM1.3 (J605.3); COM1.4 (J605.4)

### COM6 (RS232 IS)

Designator	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
COM6.1 (J1.1)	±10	±100	250	0	0
COM6.2 (J1.2)	±10	±100	250	0	0

Common GND connections: COM6.3 (J1.3); COM6.4 (J1.4)

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
COM6.1 (J1.1)	±5.88	±19.8	29.1	100	100
COM6.2 (J1.2)	±5.88	±19.8	29.1	100	100

Common GND connections: COM6.3 (J1.3); COM6.4 (J1.4)

## Application specific notes:

- Install cable seal between differently rated areas per country-specific regulations
- Also refer to general notes on page 1

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**METTLER TOLEDO**

MTCT  
 CN-213125 ChangZhou

Drawn Zhang YongJun 2021/11/16 Scale 1:1

Change - Format mt\_A4

Refer to protection notice ISO 16016 / Schutzvermerk ISO 16016 beachten

Note - Replaces -

Description IND500x 控制接线图

ERP NO.

ERP Rev

**Control Drawing IND500x**

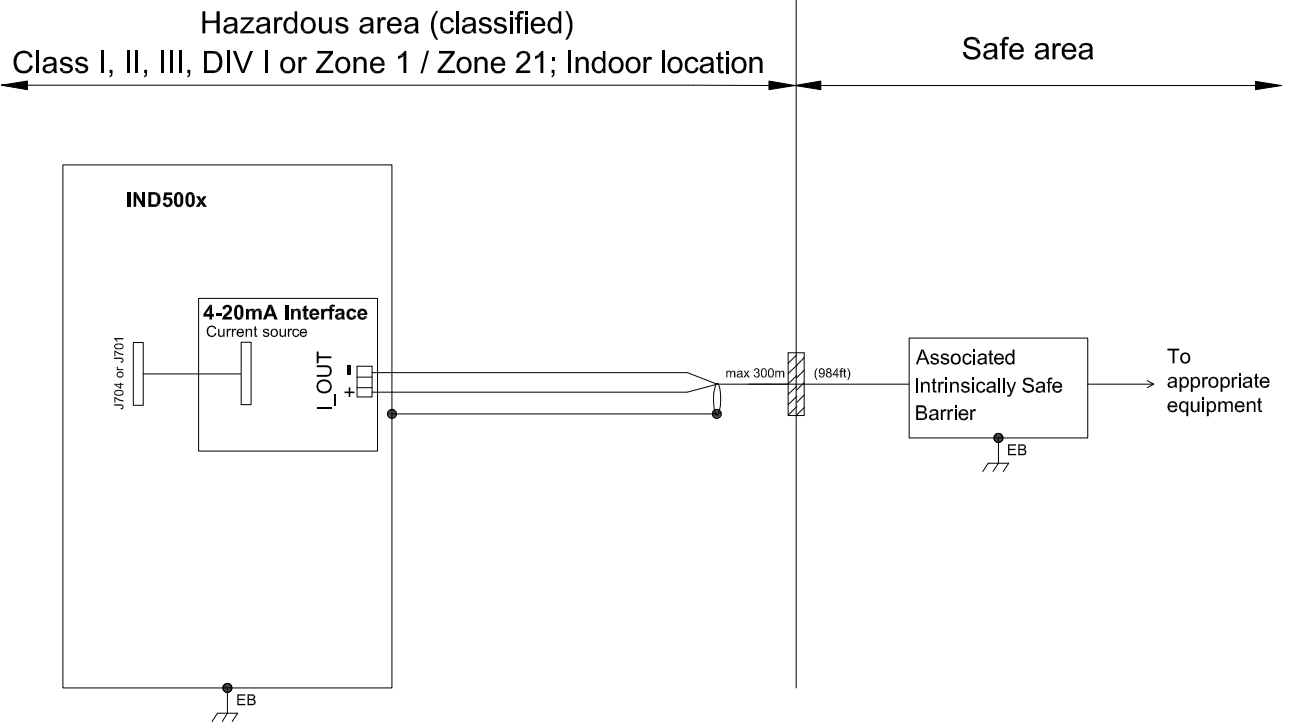
**30595335**

**A**

External Design No.: External Design Rev.: A

Status: NOT Approved Mass: Units: mm 5/15

# 4-20mA Interface connection



## Entity Parameters:

### 4-20mA Interface

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
I_OUT+ (J4.1) to I_OUT- (J4.3)	13.65	115	400	680	400
Designator	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
I_OUT+ (J4.1) to I_OUT- (J4.3)	12	115	345	110	0

## Application specific notes:

- Install cable seal between differently rated areas per country-specific regulations
- Also refer to general notes on page 1

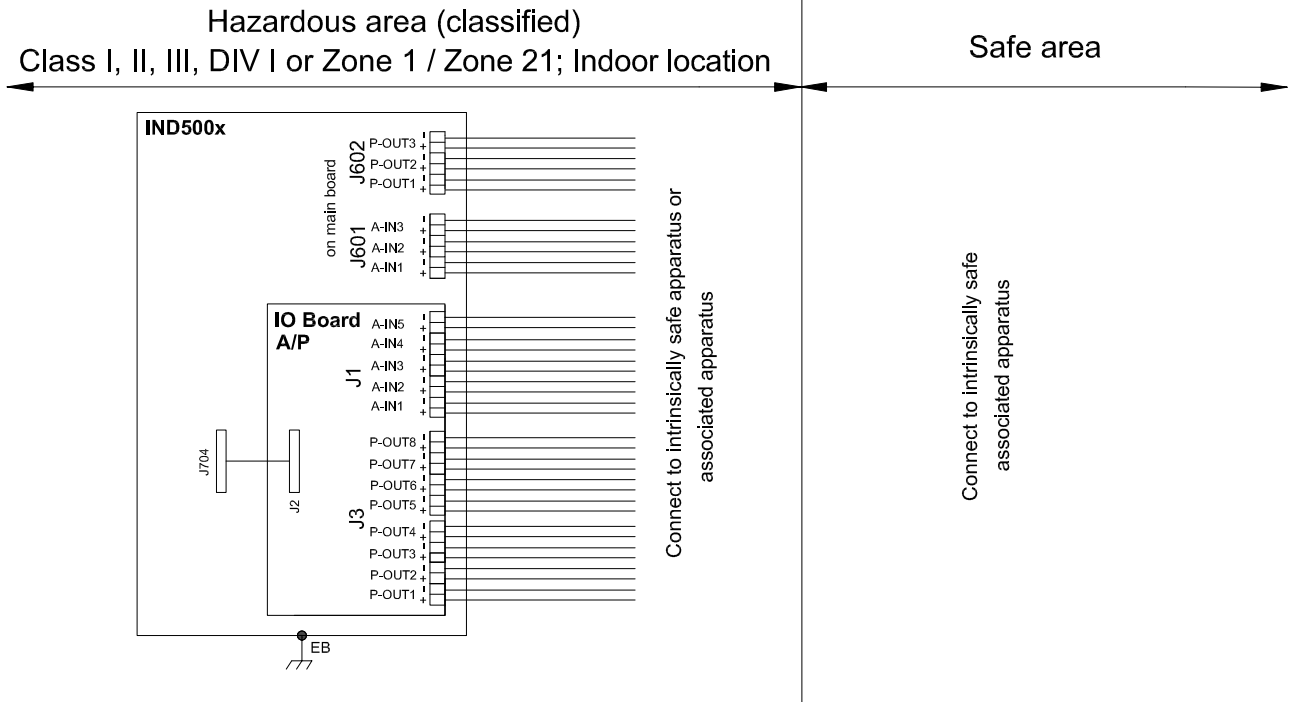
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<b>Control Drawing IND500x</b>		<b>30595335</b>			<b>A</b>			
External Design No.:	External Design Rev.: A	Status:	NOT Approved	Mass:	Units:	mm	6/15	

# Discrete I/O connection

CASE 1: main board I/O + IO Board A/P



## Entity Parameters:

### Main Board Active Inputs:

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
A-IN1+(J601.1)---A-IN3+(J601.5)	5.88	2	2.94	100	100

Common GND connections: A-IN\*:- J601.2, J601.4, J601.6

### Main Board Passive Outputs:

Designator	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
P-OUT1+(J602.1) to P-OUT1-(J602.2)	15	40	150	0	0
P-OUT2+(J602.3) to P-OUT2-(J602.4)	15	40	150	0	0
P-OUT3+(J602.5) to P-OUT3-(J602.6)	15	40	150	0	0

### IO Board A/P Active Inputs:

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
A-IN1+(J1.1A)---A-IN5+(J1.5A)	5.88	2	2.94	100	100

Common GND connections: A-IN\*:- J1.1B, J1.2B, J1.3B, J1.4B, J1.5B

### IO Board A/P Passive Outputs:

Designator	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
P_OUT1+(J3.1A)---P_OUT8+(J3.8A)	15	40	150	0	0

P\_OUT\*+(J3.\*A) refers separately to P\_OUT\*-(J3.\*B)

## Application specific notes:

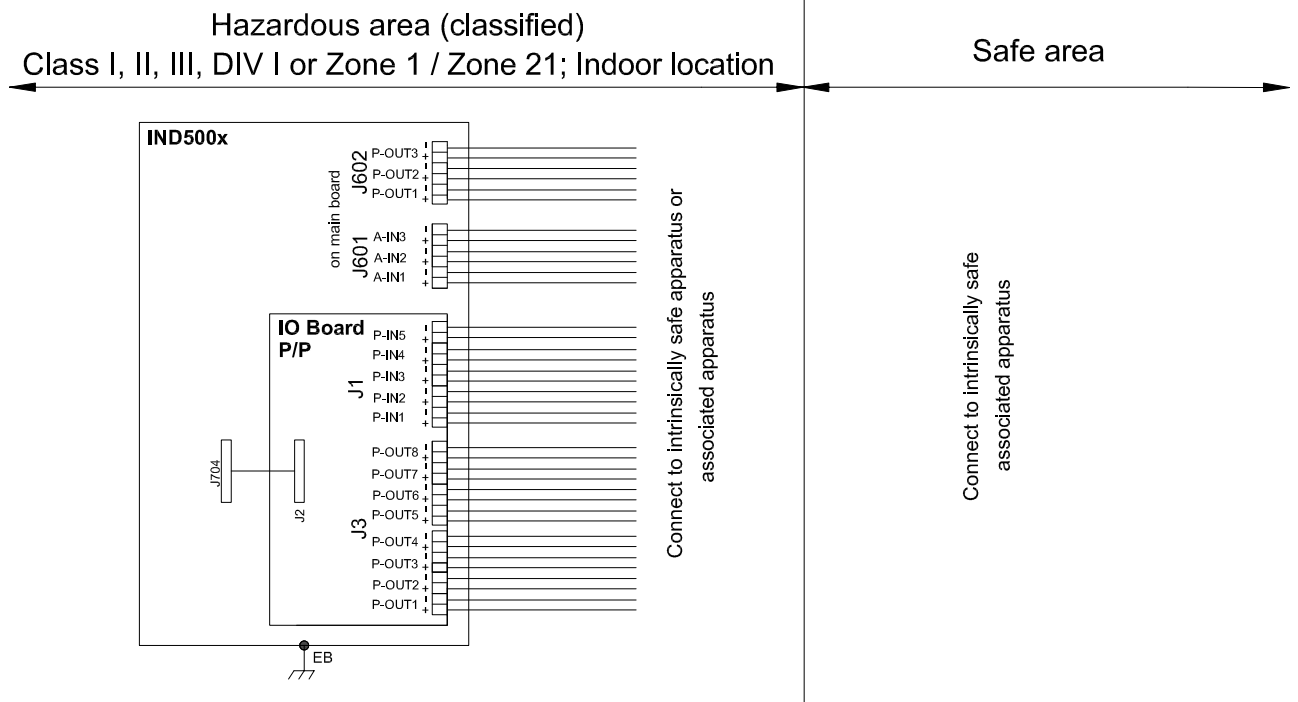
- Install cable seal between differently rated areas per country-specific regulations
- Discrete I/O active input: connection to simple apparatus (e.g. operator switches) according ATEX/IECEx regulations respectively country specific guidelines.  
For US: NEC (NFPA70), section 504.2 and 504.4
- Also refer to general notes on page 1

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	CN-213125 ChangZhou	Change			Format	mt_A4		
Refer to protection notice ISO 16016 / Schutzvermerk ISO 16016 beachten		Note	-		Replaces			-
Description IND500x 控制接线图		ERP NO.				ERP Rev		
<b>Control Drawing IND500x</b>		<b>30595335</b>				<b>A</b>		
External Design No.:	External Design Rev.: A	Status:	NOTApproved	Mass:	Units:	mm	7/15	

# Discrete I/O connection

CASE 2: main board I/O + IO Board P/P



## Entity Parameters:

### Main Board Active Inputs:

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
A-IN1+(J601.1)---A-IN3+(J601.5)	5.88	2	2.94	100	100

Common GND connections: A-IN\*--: J601.2, J601.4, J601.6

### Main Board Passive Outputs:

Designator	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
P-OUT1+(J602.1) to P-OUT1-(J602.2)	15	40	150	0	0
P-OUT2+(J602.3) to P-OUT2-(J602.4)	15	40	150	0	0
P-OUT3+(J602.5) to P-OUT3-(J602.6)	15	40	150	0	0

### IO Board P/P Passive Inputs:

Designator	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
P-IN1+(J1.1A)---P-IN5+(J1.5A)	30	50	375	0	0

P-IN\*+(J1.\*A) refers separately to P-IN\*-(J1.\*B)

### IO Board P/P Passive Outputs:

Designator	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
P_OUT1+(J3.1A)---P_OUT8+(J3.8A)	15	40	150	0	0

P\_OUT\*+(J3.\*A) refers separately to P\_OUT\*-(J3.\*B)

## Application specific notes:

- Install cable seal between differently rated areas per country-specific regulations
- Discrete I/O active input: connection to simple apparatus (e.g. operator switches) according ATEX/IECEX regulations respectively country specific guidelines.  
For US: NEC (NFPA70), section 504.2 and 504.4
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CN-213125 ChangZhou

Drawn Zhang YongJun 2021/11/16 Scale 1:1

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Refer to protection notice ISO 16016 / Schutzvermerk ISO 16016 beachten

Note - Replaces -

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**Control Drawing IND500x**

**30595335**

**A**

External Design No.: External Design Rev.: A

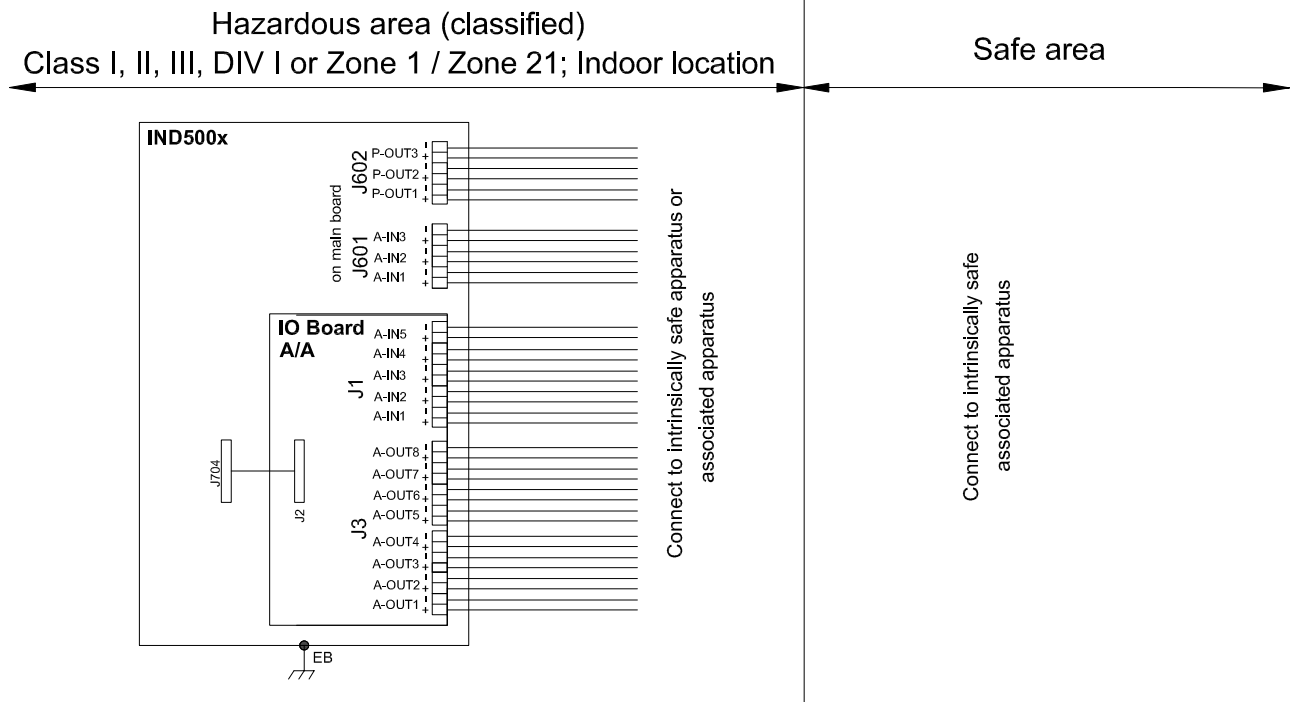
Status:NOTApproved Mass:

Units:mm 8/15



# Discrete I/O connection

CASE 3: main board I/O + IO Board A/A



## Entity Parameters:

### Main Board Active Inputs:

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
A-IN1+(J601.1)---A-IN3+(J601.5)	5.88	2	2.94	100	100

Common GND connections: A-IN\*-: J601.2, J601.4, J601.6

### Main Board Passive Outputs:

Designator	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
P-OUT1+(J602.1) to P-OUT1-(J602.2)	15	40	150	0	0
P-OUT2+(J602.3) to P-OUT2-(J602.4)	15	40	150	0	0
P-OUT3+(J602.5) to P-OUT3-(J602.6)	15	40	150	0	0

### IO Board A/A Active Inputs:

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
A-IN1+(J1.1A)---A-IN5+(J1.5A)	5.88	2	2.94	100	100

Common GND connections: A-IN\*-: J1.1B, J1.2B, J1.3B, J1.4B, J1.5B

### IO Board A/A Active Outputs:

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
A-OUT1+(J3.1A)---A-IN8+(J3.8A)	12.6	92	610	100	400

Common GND connections: A-OUT\*-: J3.1B, J3.2B, J3.3B, J3.4B, J3.5B, J3.6B, J3.7B, J3.8B

## Application specific notes:

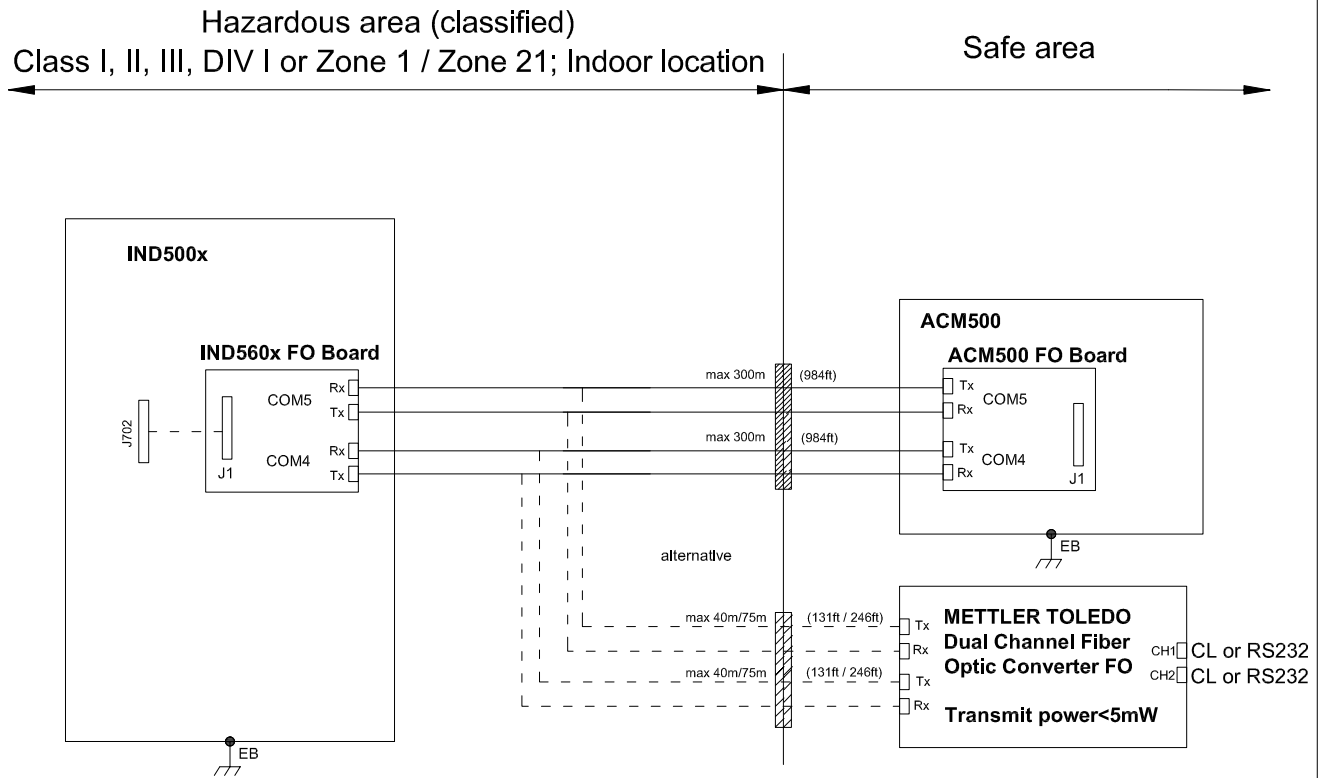
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# IND560x FO Board connection

CASE 1: connect with 2 channel devices in safe area



## Entity Parameters:

### IND560x FO board

The highest continuous light output power at transmission data line and the highest continuous light input power at receiving data line is:

FO-COM4 Pout < 5mW Pin < 35mW

FO-COM5 Pout < 5mW Pin < 35mW

## Application specific notes:

- Install cable seal between differently rated areas per country-specific regulations
- HCS fiber maximum length 300m (984 ft) or POF fiber maximum length 40m (131 ft) @ 115kbd or 75m (246 ft) @ 9600bd
- Also refer to general notes on page 1

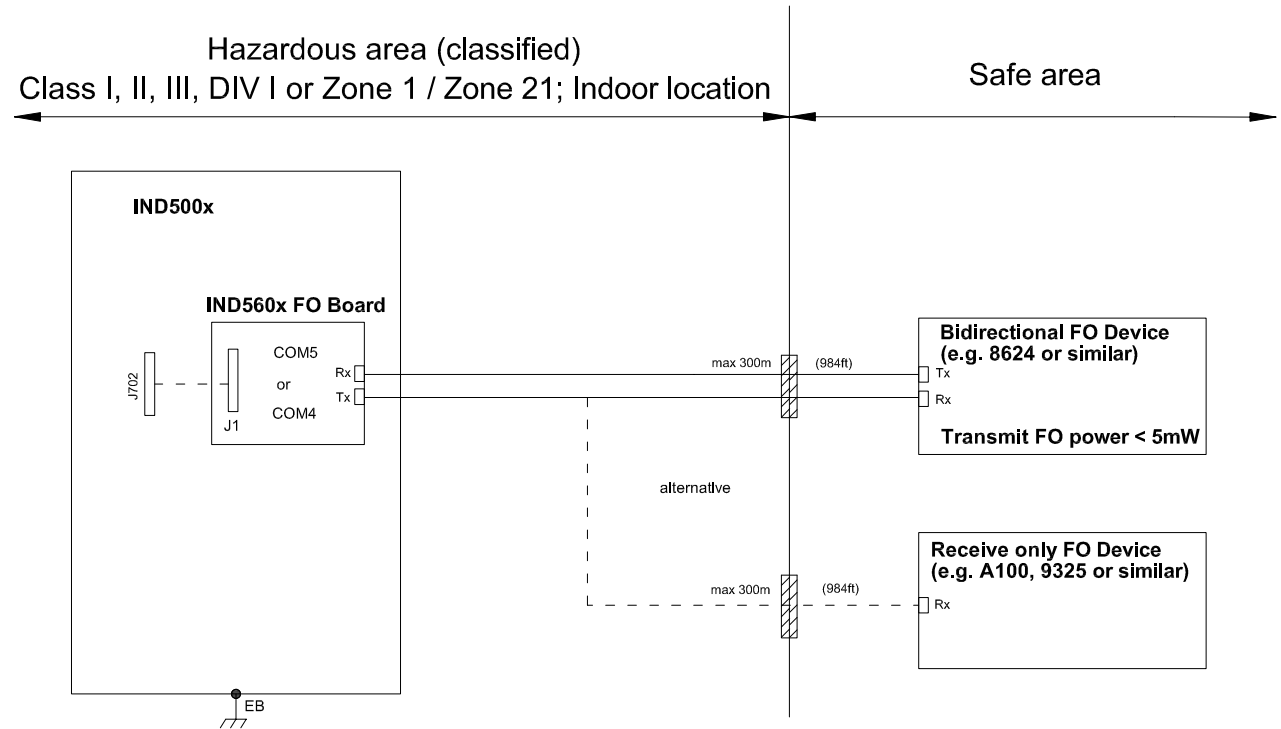
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Description IND500x 控制接线图		ERP NO.	30595335			ERP Rev	A	
External Design No.:	External Design Rev.: A	Status:	NOT Approved	Mass:	Units:	mm	10/15	

# IND560x FO Board connection

CASE 2: connect with 1 channel devices in safe area



## Entity Parameters:

### IND560x FO board

The highest continuous light output power at transmission data line and the highest continuous light input power at receiving data line is:

FO-COM4 Pout < 5mW Pin < 35mW

FO-COM5 Pout < 5mW Pin < 35mW

## Application specific notes:

- Install cable seal between differently rated areas per country-specific regulations
- HCS fiber maximum length 300m (984 ft) or POF fiber maximum length 40m (131 ft) @ 115kbaud or 75m (246 ft) @ 9600baud
- Also refer to general notes on page 1

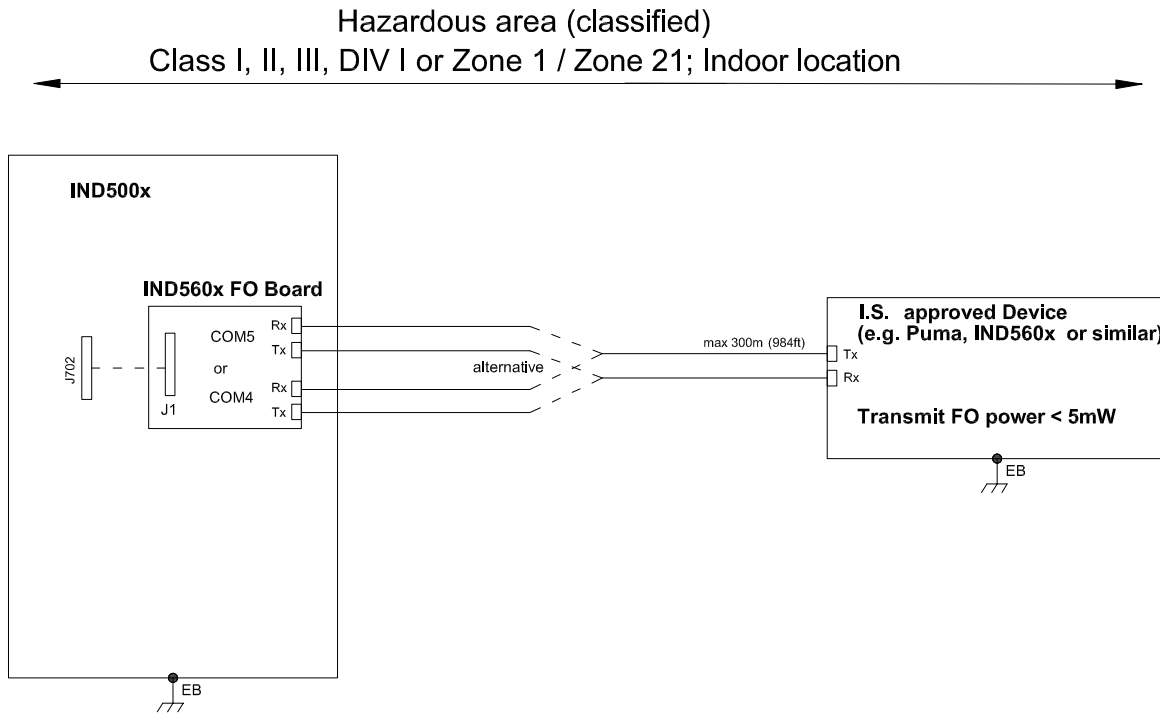
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# IND560x FO Board connection

CASE 3: connect with devices in hazardous area



## Entity Parameters:

### IND560x FO board

The highest continuous light output power at transmission data line and the highest continuous light input power at receiving data line is:

FO-COM4 Pout < 5mW Pin < 35mW

FO-COM5 Pout < 5mW Pin < 35mW

## Application specific notes:

- HCS fiber maximum length 300m (984 ft) or POF fiber maximum length 40m (131 ft) @ 115kbd or 75m (246 ft) @ 9600bd
- Also refer to general notes on page 1

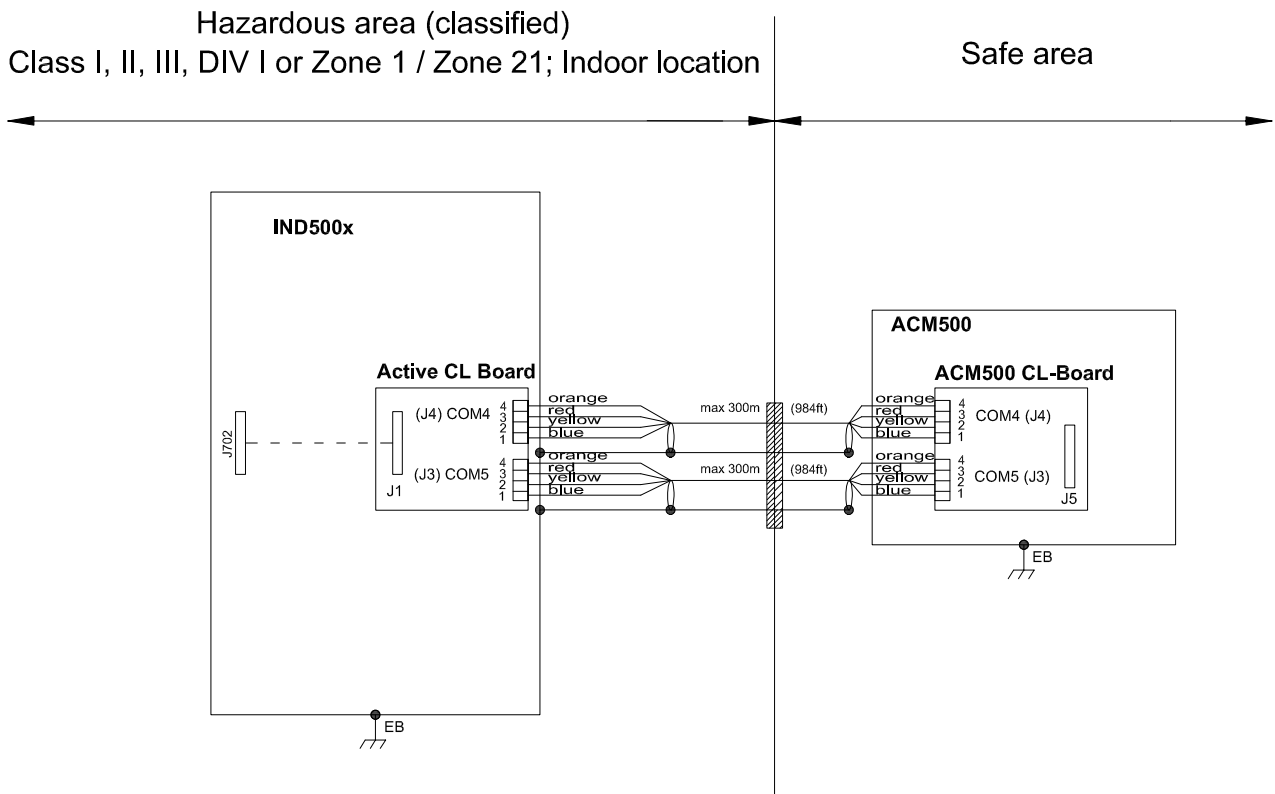
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<b>METTLER TOLEDO</b>	MTCT	Drawn	Zhang YongJun	2021/11/16	Scale	1:1		
	CN-213125 ChangZhou	Change			Format	mt_A4		
Refer to protection notice ISO 16016 / Schutzvermerk ISO 16016 beachten		Note	-		Replaces			-
Description IND500x 控制接线图		ERP NO.			ERP Rev			
<b>Control Drawing IND500x</b>		<b>30595335</b>			<b>A</b>			
External Design No.:	External Design Rev.: A	Status:	NOT Approved	Mass:	Units:	mm	12/15	

# Active CL Board connection

CASE 1: connect with ACM500 in safe area



## Entity Parameters:

### Active current loop board

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
COM 4 ( J4 )	5.88	133	211	600	400
COM 5 ( J3 )	5.88	133	211	600	400

## Application specific notes:

- Install cable seal between differently rated areas per country-specific regulations
- Don't connect cable shield at ACM500 / ACM200 end. Maximum length 300m (984 ft)
- Also refer to general notes on page 1

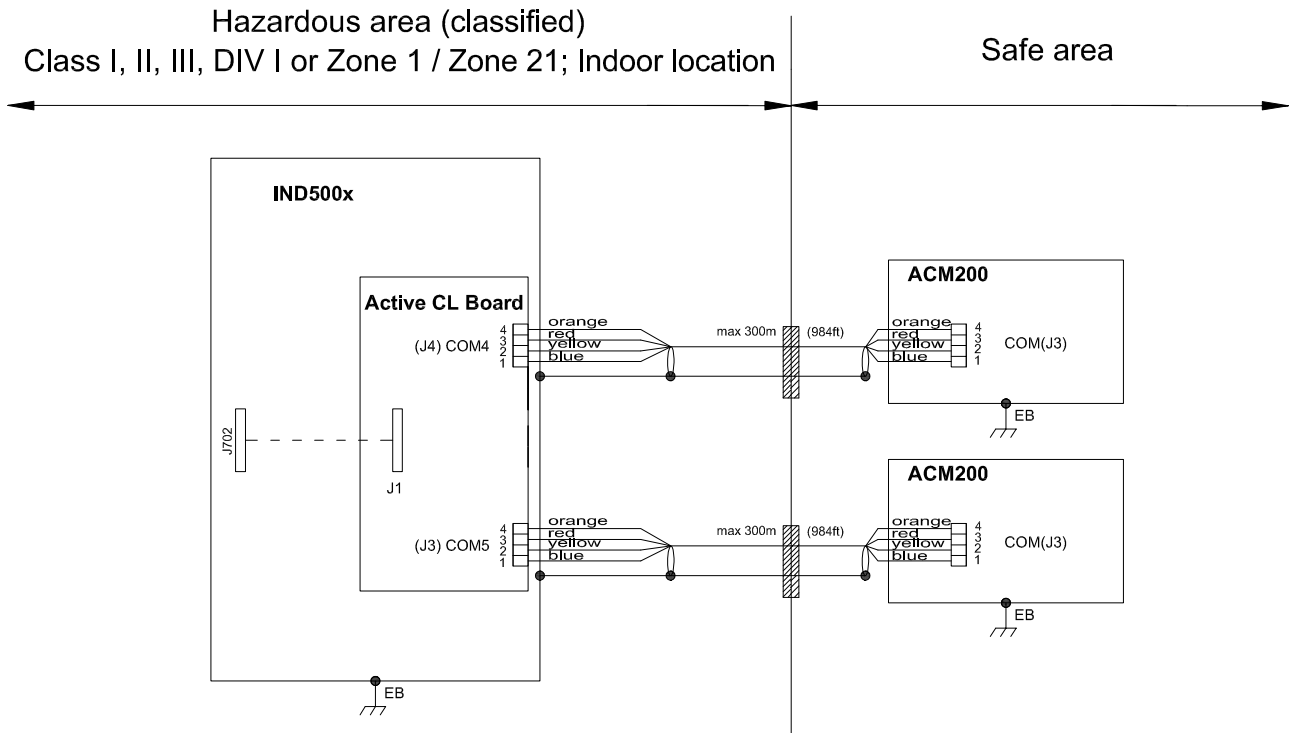
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External Design No.:	External Design Rev.: A	Status:	NOTApproved	Mass:	Units:	mm	13/15	

# Active CL Board connection

CASE 2: connect with ACM200 in safe area



## Entity Parameters:

### Active current loop board

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
COM 4 ( J4 )	5.88	133	211	600	400
COM 5 ( J3 )	5.88	133	211	600	400

## Application specific notes:

- Install cable seal between differently rated areas per country-specific regulations
- Don't connect cable shield at ACM500 / ACM200 end. Maximum length 300m (984 ft)
- Also refer to general notes on page 1

## NOTICE

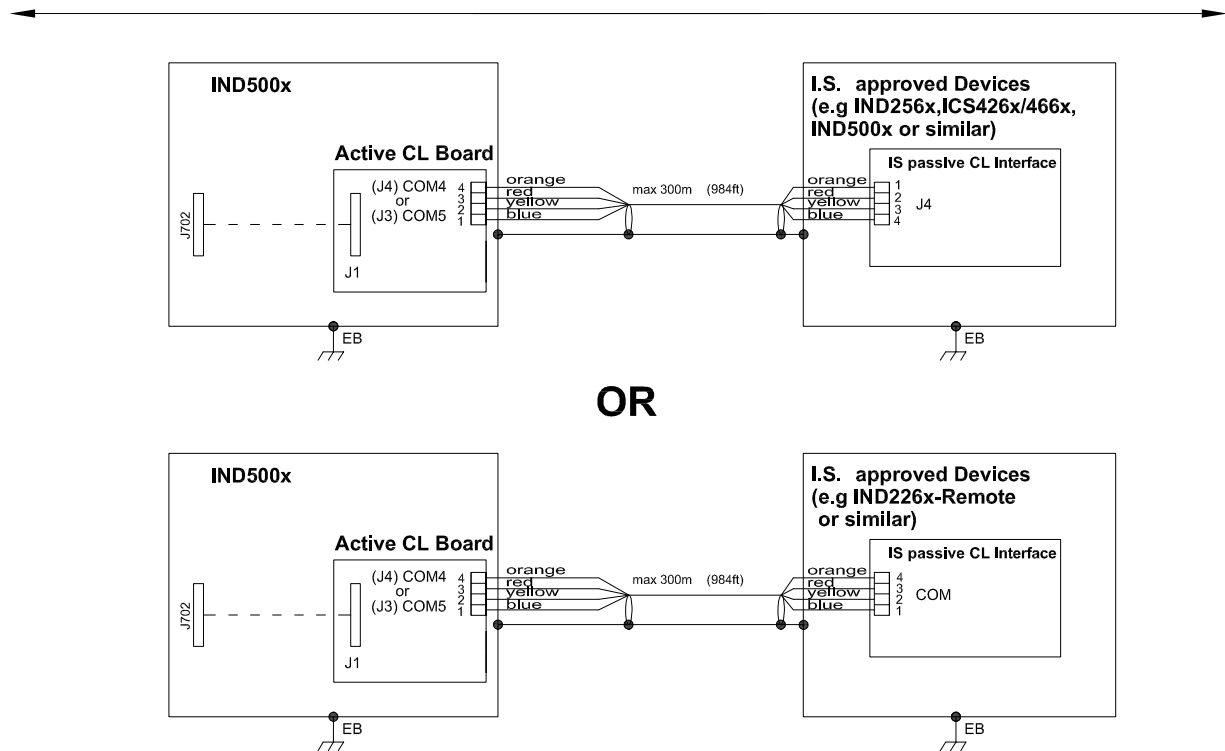
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<b>METTLER TOLEDO</b>	MTCT	Drawn	Zhang YongJun	2021/11/16	Scale	1:1		
	CN-213125 ChangZhou	Change			Format	mt_A4		
Refer to protection notice ISO 16016 / Schutzvermerk ISO 16016 beachten		Note	-		Replaces			-
Description IND500x 控制接线图		ERP NO.			ERP Rev			
<b>Control Drawing IND500x</b>		<b>30595335</b>			<b>A</b>			
External Design No.:	External Design Rev.:	Status:NOTApproved		Mass:	Units:mm	14/15		

# Active CL Board connection

CASE 3: connect with intrinsically safe devices with passive CL board in hazardous area

Hazardous area (classified)  
Class I, II, III, DIV I or Zone 1 / Zone 21; Indoor location



## Entity Parameters:

### Active current loop board

Designator	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
COM 4 ( J4 )	5.88	133	211	600	400
COM 5 ( J3 )	5.88	133	211	600	400

## Application specific notes:

- Also refer to general notes on page 1

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<b>METTLER TOLEDO</b>	MTCT	Drawn	Zhang YongJun	2021/11/16	Scale	1:1		
	CN-213125 ChangZhou	Change			Format	mt_A4		
Refer to protection notice ISO 16016 / Schutzvermerk ISO 16016 beachten		Note	-		Replaces			-
Description IND500x 控制接线图		ERP NO.			ERP Rev			
<b>Control Drawing IND500x</b>		<b>30595335</b>			<b>A</b>			
External Design No.:	External Design Rev.: A	Status:	NOT Approved		Mass:	Units:	mm 15/15	