



Intrinsically Safe Power Supply with linear characteristic

MM 20.. AC/DC

Characteristics

Power supply: 12 V - 80 V DC, 80 - 230 V AC
 Number of channels: 1, 2, 3 and 4
 Environmental conditions Ta: -20°C to 80°C
 Cover: IP 20
 Assembly: DIN 35
 Dimensions: (w) x (h) x (d) - 22,5 x 99 x 114,5

Classification: II (1)G [Ex ia Ga] IIC
 I (M1) [Ex ia Ma] I

ATEX certificate: FTZU 02 ATEX 0308

Application

Intrinsically safe power supply units are intended for powering devices located in the explosion hazard zone. The input supply voltage is galvanically separated from the output intrinsically safe voltage

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

Parameters



Type	Intrinsically safe terminals																	
	Ex output	U _o [V]	I _o [mA]	P _o [mW]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]	Co to Lo [nF] [mH]
	Ex input	U _i [V]	I _i [mA]	P _i [mW]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]	Ci to Li [nF] [mH]
MM 2024	14(10) - 16(12)	28	82	0,58	70 0	60 1	30 4,1	150 10	350 0	0 10	480 8							
MM 2012	14(10) - 16(12)	15,8	149	0,589	x x	600 0,8	x x	1600 2,2	x x	x x	1600 2,2							
MM 2012(16,8V)	14(10) - 16(12)	16,8	177	0,744	240 1,1	x x	x x	x x	x x	x x	8uF 10							
MM 2012 L	14(10) - 16(12)	12,6	184	0,58	240 1,1	240 1,1	240 1,1	240 1,1	240 1,1	240 1,1	8uF 10							
MM 2005	14(10) - 16(12)	9,9	198	0,49	x x	1900 0,6	x x	3100 1,8	x x	x x	3100 1,8							
MM 2005(10,5V)	14(10) - 16(12)	10,5	221	0,58	1,8uF 0,8	x x	x x	x x	x x	x x	50uF 7,8							
MM 2005 B	14(10) - 16(12)	8,2	870	1,8	x x	x x	x x	0 0,3	70uF 0	25uF 0,1	25uF 0,1							

MM GROUP, s.r.o.



Intrinsically Safe Power Supply
with rectangular characteristics

MM 03.. AC/DC MM 30.. AC/DC

Characteristics - MM 3012 AC/DC

Number of channels:	1
Short circuit resistant:	yes
Recovery/start time:	500 us
Classification:	II (1)G [Ex ia Ga] IIA, I (M1) [Ex ia Ma] I
Max Voltage:	U _{max} : 265 V/50 Hz lub 250 V DC
Power supply:	Un: 90 V - 265 V AC or Un: 90 - 250 V DC, 9 - 18 V DC, 18 - 36 V DC, 36 - 72 V DC
Power consumption P _{max} :	< 50 VA
Output voltage:	5 V 12 V 16 V
Output current:	1,5 A 1,5 A 0,9 A
The gas group IIA: Methane I:	Co - 30 uF, Lo - 125 uH for all types Co - 30 uF, Lo - 125 uH for all types
Environmental conditions:	Ta = -20°C - 80°C
Casing:	electronics > IP 54, terminals IP 20
Dimensions:	L x W x H - 225 mm x 66 mm x 65 mm
ATEX certificate:	FTZU 14 ATEX 0197



Characteristics - MM 0312 AC/DC

Number of channels:	1
Output voltage:	5 V/200 mA, 12 V/200 mA, 15 V/170 mA
Short circuit resistant:	yes
Recovery/start time:	50 us
Classification:	II 1 G [Ex ia Ga] IIB, I M1 [Ex ia Ma] I
Power supply:	230 V/50 Hz lub 24 V AC/DC
Power consumption at full load:	max. 8 VA
Cover:	min. IP 20
Assembly:	DIN 35 rail
Dimensions:	(w). x (h x d) - 159 mm x 58 mm x 90 mm
LED indications:	green LED - line voltage blue LED - voltage at the outputs red LED - overload signaling
IIB:	U _o - 12,6 V, I _o - 560 mA, Co - 3 uF, Lo - 300 uH, Po - 3,53 W
I:	U _o - 12,6 V, I _o - 560 mA, Co - 10 uF, Lo - 750 uH, Po - 3,53 W
ATEX certificate:	FTZU 12 ATEX 0164



Application

Intrinsically safe power supply units are intended for powering devices located in the explosion hazard zone. The input supply voltage is galvanically separated from the output intrinsically safe voltage. It is used wherever a voltage stability is required, regardless of the electric current load. It's unlike power supply units with linear characteristics in which the voltage drops proportionally to the electric current load.

Further information: www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.



Intrinsically Safe Zener Barriers with linear characteristic

JBB 7....

Types of Zener Barriers

Single-channel barriers for simple signals with positive or negative polarity in grounded
Two-channel barriers for simple signals with positive or negative polarity in grounded
Zener barriers with backward diode for 4 - 20 mA current loops
Zener barriers for variable or bipolar signals in grounded
Zener barrier with a star topology
Classification: II (3)G [Ex ic Gc] IIC

Application

Intrinsically safe Zener barriers from the MM 7 series are the simplest kind of intrinsically safe interface designed to protect electric circuits used in the explosion danger zone. In order for the barrier to function properly it is necessary to ground the circuit so that the electrical resistance $R < 1 \text{ Ohm}$.

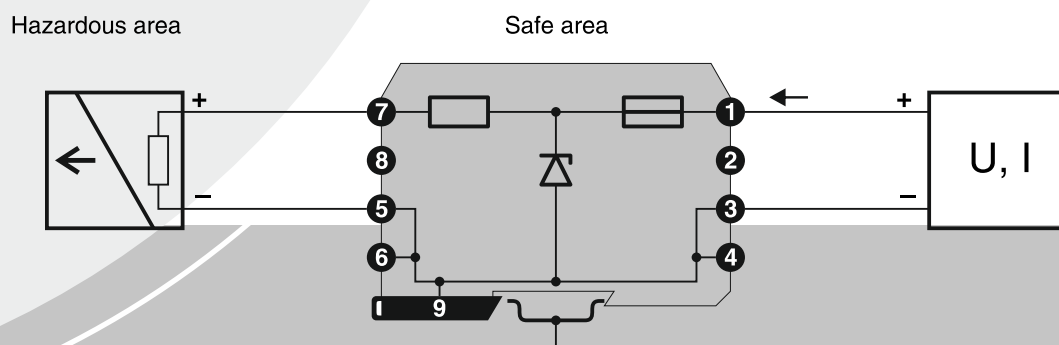
Characteristics

Number of channels: 1, 2
Assembly: DIN 35 rail
Cover: IP 20
Dimensions: width x height x depth - 12,5 x 99 x 114,5

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

Example connection



MM GROUP, s.r.o.



Intrinsically Safe Zener Barriers with linear characteristic

JBB 7....

Parameters

Type	U ₀	R ₀	I ₀	U _{prc}	R _{max}	Po _j	C ₀	L ₀	Code:
	[V]	[Ω]	[mA]	[V]	[Ω]	[mA]	[μF]	[mH]	
JBB 7029+	31,4	171	184	30	204	50	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7029 01 31
JBB 7129+	31,4	171	184	30	214	30	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7129 01 31
JBB 7029-	31,4	171	184	30	204	50	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7029 02 31
JBB 7129-	31,4	171	184	30	214	30	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7129 02 31
JBB 7028+	28,0	304	93	27	346	50	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7028 01 28
JBB 7128+	28,0	304	93	27	356	30	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7128 01 28
JBB 7028-	28,0	304	93	27	346	50	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7028 02 28
JBB 7128-	28,0	304	93	27	356	30	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7128 02 28
JBB 7027+	15,8	106	149	14	134	100	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7027 01 15
JBB 7127+	15,8	106	149	14	144	80	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7127 01 15
JBB 7027-	15,8	106	149	14	134	100	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7027 02 15
JBB 7127-	15,8	106	149	14	144	80	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7127 02 15
JBB 7026+	9,9	50	198	8,5	74	160	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7026 01 10
JBB 7126+	9,9	50	198	8,5	84	100	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7126 01 10
JBB 7026-	9,9	50	198	8,5	74	160	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7026 02 10
JBB 7126-	9,9	50	198	8,5	84	100	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7126 02 10
JBB 7025+	3,0	10,1	298	2,5	24	250	IIC: 1000	IIC: 0,46	7025 01 03
JBB 7125+	3,0	10,1	298	2,5	34	160	IIC: 1000	IIC: 0,46	7125 01 03
JBB 7025-	3,0	10,1	298	2,5	24	250	IIC: 1000	IIC: 0,46	7025 02 03
JBB 7125-	3,0	10,1	298	2,5	34	160	IIC: 1000	IIC: 0,46	7125 02 03

Type	U ₀	R ₀	I ₀	U _{prc}	R _{max}	Po _j	C ₀	L ₀	Code
	[V]	[W]	[mA]	[V]	[W]	[mA]	[μF]	[mH]	
JBB 7089+	31,4	171	184	30	204	50	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7089 01 31
	31,4			30	18+0,9V	50			
JBB 7189+	31,4	171	184	30	214	30	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7189 01 31
	31,4			30	28+0,9V	30			
JBB 7088+	28,0	234	120	27	270	50	* IIB: 0,13 / IIA: 0,2	IIB: 0,7 / IIA: 2	7088 01 28
	28,0			27	18+0,9V	50			
JBB 7188+	28,0	234	120	27	280	30	* IIB: 0,13 / IIA: 0,2	IIB: 0,7 / IIA: 2	7188 01 28
	28,0			27	28+0,9V	30			
JBB 7087+	28,0	304	93	27	346	50	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7087 01 28
	28,0			27	18+0,9V	50			
JBB 7187+	28,0	304	93	27	356	30	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7187 01 28
	28,0			27	28+0,9V	30			
JBB 7086+	15,8	106	149	14	134	100	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7086 01 15
	15,8			14	18+0,9V	100			
JBB 7186+	15,8	106	149	14	144	80	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7186 01 15
	15,8			14	28+0,9V	80			
JBB 7085+	9,9	50	198	8,5	74	160	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7085 01 10
	9,9			8,5	18+0,9V	160			
JBB 7185+	9,9	50	198	8,5	84	100	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7185 01 10
	9,9			8,5	28+0,9V	100			

Type	U ₀	R ₀	I ₀	U _{prc}	R _{max}	Po _j	C ₀	L ₀	Code
	[V]	[Ω]	[mA]	[V]	[Ω]	[mA]	[μF]	[mH]	
JBB 7049+	31,4	171	184	30	204	50	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7049 01 31
JBB 7149+	31,4	171	184	30	214	30	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7149 01 31
JBB 7049-	31,4	171	184	30	204	50	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7049 02 31
JBB 7149-	31,4	171	184	30	214	30	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7149 02 31
JBB 7048+	28,0	304	93	27	346	50	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7048 01 28
JBB 7148+	28,0	304	93	27	356	30	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7148 01 28
JBB 7048-	28,0	304	93	27	346	50	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7048 02 28
JBB 7148-	28,0	304	93	27	356	30	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7148 02 28
JBB 7047+	15,8	106	149	14	134	100	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7047 01 15
JBB 7147+	15,8	106	149	14	144	80	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7147 01 15
JBB 7047-	15,8	106	149	14	134	100	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7047 02 15
JBB 7147-	15,8	106	149	14	144	80	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7147 02 15
JBB 7046+	9,9	50	198	8,5	74	160	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7046 01 10
JBB 7146+	9,9	50	198	8,5	84	100	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7146 01 10
JBB 7046-	9,9	50	198	8,5	74	160	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7046 02 10
JBB 7146-	9,9	50	198	8,5	84	100	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7146 02 10
JBB 7045+	3,0	10,1	298	2,5	24	250	IIC: 1000	IIC: 0,1	7045 01 03
JBB 7145+	3,0	10,1	298	2,5	34	160	IIC: 1000	IIC: 0,1	7145 01 03
JBB 7045-	3,0	10,1	298	2,5	24	250	IIC: 1000	IIC: 0,1	7045 02 03
JBB 7145-	3,0	10,1	298	2,5	34	160	IIC: 1000	IIC: 0,1	7145 02 03

Type	U ₀	R ₀	I ₀	U _{prc}	R _{max}	Po _j	C ₀	L ₀	Code
	[V]	[Ω]	[mA]	[V]	[Ω]	[mA]	[μF]	[mH]	
JBB 7279	31,4	342	92	30	387	50	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7279 03 31
	31,4	342	92	30	387	30			
JBB 7278	28,0	327	86	27	353	50	* IIB: 0,15 / IIA: 0,25	IIB: 0,9 / IIA: 2,7	7278 03 28
	28,0	327	86	27	353	30			
JBB 7078	28,0	608	47	27	672	50	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7078 03 28
	28,0	608	47	27	672	50			
JBB 7178	28,0	608	47	27	682	30	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7178 03 28
	28,0	608	47	27	682	30			
JBB 7077	15,8	212	75	14	248	100	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7077 03 15
	15,8	212	75	14	248	100			
JBB 7177	15,8	212	75	14	258	80	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7177 03 15
	15,8	212	75	14	258	80			
JBB 7076	9,9	100	99	8,5	128	160	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7076 03 10
	9,9	100	99	8,5	128	160			
JBB 7176	9,9	100	99	8,5	138	100	IIC: 1,9 / IIB: 3,1	IIC: 0,6 / IIB: 1,8	7176 03 10
	9,9	100	99	8,5	138	100			

Type	U ₀	R ₀	I ₀	U _{prc}	R _{max}	Po _j	C ₀	L ₀	Code
	[V]	[Ω]	[mA]	[V]	[Ω]	[mA]	[μF]	[mH]	
JBB 7058	14,0	304	46	13	346	50	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7058 03 14
	14,0	304	46	13	346	50			
JBB 7158	14,0	304	46	13	356	30	IIC: 0,083 / IIB: 0,18	IIC: 2,8 / IIB: 4,6	7158 03 14
	14,0	304	46	13	356	30			
JBB 7057	7,9	106	74	7	134	100	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7057 03 07
	7,9	106	74	7	134	100			
JBB 7157	7,9	106	74	7	144	80	IIC: 0,6 / IIB: 1,6	IIC: 0,8 / IIB: 2,2	7157 03 07
	7,9	106	74	7	144	80			
JBB 7055	3,0	10,1	298	2,5	24	250	IIC: 1000	IIC: 0,1	7055 03 03
	3,0	10,1	298	2,5	24	250			
JBB 7155	3,0	10,1	298	2,5	34	160	IIC: 1000	IIC: 0,1	7155 03 03
	3,0	10,1	298	2,5	34	160			



MM GROUP, s.r.o.



Intrinsically Safe Separation Amplifiers

MM 50.. AC/DC

Parameters

Type	Intrinsically safe terminals				IIC		IIC		IIC		IIB		IIB		IIB		I	Output terminals power
	Ex output	U _o [V]	I _o [mA]	P _o [mW]	Co to Lo [nF] [mH]		Co to Lo [nF] [mH]		Co to Lo [nF] [mH]		Co to Lo [nF] [mH]		Co to Lo [nF] [mH]		Co to Lo [nF] [mH]		Co to Lo [nF] [mH]	Temperature range -20 to +80°C
	Ex input	U _i [V]	I _i [mA]	P _i [mW]	Ci to Li [nF] [mH]		Ci to Li [nF] [mH]		Ci to Li [nF] [mH]		Ci to Li [nF] [mH]		Ci to Li [nF] [mH]		Ci to Li [nF] [mH]		Ci to Li [nF] [mH]	
MM 5040	10-11,12	28	82	0,58	70	0	60	1	30	4,1	150	10	350	0	0	10	480	5,6 or 7,6 and 3-4 or 8-4
	11-12, 15-16	28	93	0,66	0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5041, 41A, 41B, 41C,	10-11, 12	28	82	0,58	70	0	60	1	30	4,1	150	10	350	0	0	10	480	5-6 or 7-6
	11.12	28	93	0,66	0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5041x, 41Ax, 41Bx, 41Cx, Pr	14-15, 16	28	82	0,58	70	0	60	1	30	4,1	150	10	350	0	0	10	480	3-4 lub 8-4 5-6-7
	15 - 16	28	93	0,66	0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5041 X1	14-15, 16	21,42	147	788	1,25u	4,1	60	1	30	4,1	150	10	350	0	0	10	480	3-4 or 8-4
	15 - 16	21,42	147	788	0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5041 X2	14-15, 16	23,1	82	474	70	0	60	1	30	4,1	150	10	350	0	0	10	480	3-4 or 8-4
	15 - 16	23,1	82		0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5041 X3	14-15, 16	27	82	474	70	0	60	1	30	4,1	150	10	350	0	0	10	480	3-4 or 8-4
	15 - 16	27	82		0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5042	14(10)-15(11), 16	28	82	0,58	70	0	60	1	30	4,1	150	10	350	0	0	10	480	3(7)-4(8) or 5-4(8)
	15(11) - 16	28	93	0,66	0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5043	10-11, 12	28	82	0,58	70	0	60	1	30	4,1	150	10	350	0	0	10	480	5,6 or 7,6 and 3-4 or 8-4
	11.12	28	93	0,66	0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5044	10-11, 12, 14-15, 16	28	82	0,58	70	0	60	1	30	4,1	150	10	350	0	0	10	480	5,6 or 7,6 and 3-4 or 8-4
	11-12, 15-16	28	93	0,66	0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5044 X3	10-11, 12, 14-15, 16	27	82	0,58	70	0	60	1	30	4,1	150	10	350	0	0	10	480	5,6 or 7,6 and 3-4 or 8-4
	11-12, 15-16	27	93	0,66	0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5045 and MM5046	14-15, 16	28	82	0,58	70	0	60	1	30	4,1	150	10	350	0	0	10	480	3-4 or 8-4
	15-16	28	93	0,66	0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5050	14-15, 16	28	82	0,58	70	0	60	1	30	4,1	150	10	350	0	0	10	480	3-4 or 8-4
	15-16	28	93	0,66	0	0	0	0	0	0	0	0	0	0	0	0	0	
MM 5024	14(10)-16(12)	28	82	0,58	70	0	60	1	30	4,1	150	10	350	0	0	10	480	3(7)-4(8) or 5-4(8)



Intrinsically Safe Separation Amplifiers binary signals - relays

MM 501.. AC/DC

Characteristics

Power supply:	12 V - 80 V DC, 80 - 230 V AC
Number of channels:	1, 2, 3
Input from Ex/output to normal area:	yes
Input from normal area/output to Ex:	yes
Input signals:	NAMUR, relay, impuls
Output:	relay 230 V/10 A OC 28 V/50 mA
Environmental conditions Ta:	-20°C to 60°C
Cover:	IP 20
Assembly:	DIN 35 rail
Classification:	II (1)G [Ex ia Ga] IIC I (M1) [Ex ia Ma] I
ATEX certificate:	FTZU 02 ATEX 0284



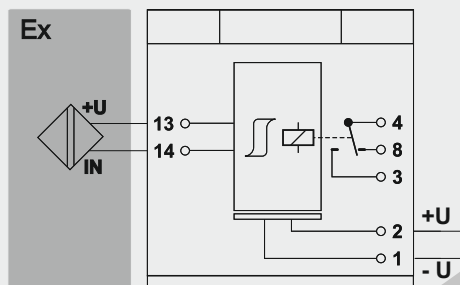
Zastosowanie

Intrinsically safe transmitter - active barrier of binary signals is used for supplying and transmitting the measured signal from or to the explosion danger zone. Input voltage supplying barriers, input and output circuits are galvanically separated from one another. The input circuits are intended for connection of indicative, capacitive and other sensors according to PN EN 60947-5-6 (NAMUR), clean contacts, including voltage or current impulses. The output is equipped with a power transmitter or Open Collector output - NPN.

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

Connection example



MM GROUP, s.r.o.



Intrinsically Safe Separation Amplifiers binary signals - relays

MM 501.. AC/DC

Parameters

Type	Intrinsically safe terminals				IIC				IIB				I		Power terminals
		U _o	I _o	P _o	Co to Lo		Co to Lo		Co to Lo		Co to Lo		Co to Lo		
		[V]	[mA]	mW	[uF]	[mH]	[uF]	[mH]	[uF]	[mH]	[uF]	[mH]	[uF]	[mH]	
MM 5011	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4-8
MM 5011 B	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4-8
MM 5011 C	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4-8, 5-6
MM 5011 TR	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4-8
MM 5012	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4
MM 5012 A	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 7-8
MM 5013	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4
MM 5013 A	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6
MM 5013 B	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6
MM 5013 C	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6, 7-8
MM 5013 TR	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4
MM 5014	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6
MM 5014 A	13-14	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6, 7-8
MM 5015	13-14, 15-16	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6
MM 5015 A	13-14, 15-16	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6, 7-8
MM 5015 B	13-14, 15-16	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6
MM 5015 C	13-14, 15-16	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6
MM 5016	13-14, 15-16	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6
MM 5016 A	13-14, 15-16	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6
MM 5017	13-14, 15-16	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6, 7-8
MM 5018	13-14, 15-16	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6
MM 5019	9-10, 13-14, 15-16	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6, 7-8
MM 5019 A	9-10, 13-14, 15-16	9,87	9,97	24,6	2,1	0	0,55	7,1	18	0	7	21	4,4	56,8	3-4, 5-6, 7-8
MM 5020	14-16	0	0	0	*	*	*	*	*	*	*	*	*	*	3-4, 7-8, 5
MM 5032	13-14-10	28	82	574	0,07	0	0,03	4,1	0,35	0	0,15	10	0,48	8	3-4, 5-6
MM 5033	13-14-10	28	82	574	0,07	0	0,03	4,1	0,35	0	0,15	10	0,48	8	3-4-8, 5-6-7
MM 5032 TR	13-14-10	28	82	574	0,07	0	0,03	4,1	0,35	0	0,15	10	0,48	8	3-4, 5-6
MM 5033 TR	13-14-10	28	82	574	0,07	0	0,03	4,1	0,35	0	0,15	10	0,48	8	3-4-8, 5-6-7
MM 5032 STP	9 až (to) 16	28	82	574	0,07	0	0,03	4,1	0,35	0	0,15	10	0,48	8	3-4, 5-6
MM 5033 STP	9 až (to) 16	28	82	574	0,07	0	0,03	4,1	0,35	0	0,15	10	0,48	8	3-4-8, 5-6-7

* According to parameters placed on the connected device

MM GROUP, s.r.o.



Intrinsically Safe Overvoltage Protectors

PB(D) 2(3)....

Characteristics

Power supply:
Number of channels:
Protection:

3 - 42 V DC, 230 V AC
1, 2
current loops 4 - 20 mA
NAMUR signals
Ethernet data transmission
Power lines 230 V/50 Hz

Assembly:

DIN 35 rail
outdoor use IP 65
industrial

Environmental conditions Ta:
Cover:

-20°C to 60°C
IP 20 - IP 65

Classification - compatibility with circuits:

II (1)G [Ex ia Ga] IIC Ga
I (M1) [Ex ia Ma] I

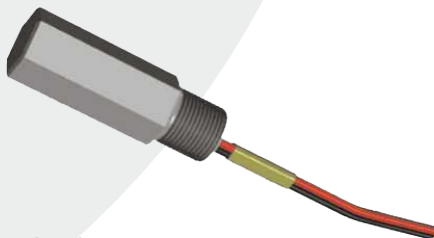
ATEX certificate:

simple device



Application

Overvoltage protector type PB protects electronic circuits against overvoltage above the required voltage (overvoltage). Due to the fact that the barriers are four-pole passive and their design meets the requirements for non-explosive devices, it is possible to use them to protect intrinsically safe devices up to the level II 1G Ex ia IIC Ga. Independent PB barriers .../..M can also be installed in "Zone 1" explosion danger zones. The voltage surge barrier type PB .. depending on the implementation, it is placed in a plastic box on the DIN 35 rail (IP 20) or flooded with insulating substance and placed in the IP 54 (IP 65) cover for outside use in the explosion danger zone.



Further information::

www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.



Intrinsically Safe Measurement Displays

MM 633 - 634

Characterstics

Power supply:	8 - 28 V DC
Display:	LCD, LCD with backlight
Power supply:	3 1/2, 4 1/2, 6 digital
Implementation:	from 4 - 20 mA current loop
	assembly onto the panel
	external IP 65
	industrial
Environmental conditions Ta:	0°C to 60°C
Cover:	IP 20 - IP 65
Classification:	II 2G Ex ia IIC T5 Gb
	I M1 Ex ia I Ma
ATEX certificate:	FTZU 07 ATEX 350 X



Application

Measurement displays attached to the current loop can display the required value. The configuration of display parameters is available in the series.. 633 .. (hardware) and ...634 .. (software). Displays can additionally be produced in various cover, such as ABS plastic or aluminum - in industrial manufacture.

Further information::

www.mmgroup.cz or www.iskrobezpiecznie.pl



MM GROUP, s.r.o.



Intrinsically Safe Limit Temperature Sensor

BTS.... Ex

Characterstics

Temperature sensor:
Operating range:
Hysteresis:
Vibration resistance:

Output:
Contact power:

Ex Parameters:

Assembly /thread:

Pivot diameter:
Material: Stainless steel
Output connector:

Classification of Ex execution:

Certificate:

Bimetal
50°C to 160°C
± 5 %
10G in central axis
5Hz to 2 kHz
NC
0,36 kW, 230 V/50 Hz, 1,6 A
24 Vss/2 A
12 Vss/4 A

Ui - 13,6 V
Ii - 14 mA
Pi - 0,2 W
Ci - 0
Li - 0
M 20 x 1,5; G 1/2 "
or other to order
10 mm
food grade or other
DIN 43650 conector

II 1G Ex ia IIB T6-T4 Ga
II 1D Ex ia IIIC T 125°C Da
I M1 Ex ia I Ma

FTZU 10 ATEX 0211



Application

Temperature limit sensors are designed to detect and inform about the set and reached temperature. Very often it is used for protection against overheating of motors, pumps, detection of the increase of the surface temperature of the device, etc. The sensors are manufactured in several variants depending on the method of mounting (thread) to the pipelines and the required tightness in the cover IP 68. Rendering Ex version can be used when connecting through intrinsically safe transmitters.

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.



Intrinsically Safe Temperature Sensors

TI.... Ex

Characterstics

Temperature sensor:
Measuring range:
Output without transducer:
Output with analogue transducer:
Power supply from the current loop:
Digital output:

Pt 100, Ni 1000
-40°C to 250°C
Pt 100, Ni 1000
4 - 20 mA
yes
5 - 15 Hz

Implementation:

chemical industry
gas engineering
mines
submersible
for outside use

Assembly / thread:

M 20 x 1,5; G 1/2 "
or other to order
6, 8, 10 mm
food grade or other
DIN 43650 connector
cable gland
wire

Pivot diameter:
Material: Stainless steel
Output connector:

Classification of Ex execution:

II 1G Ex ia IIC T6-T4 Ga
I M1 Ex ia I Ma

Certificate:

FTZU 02 ATEX 0285
FTZU 10 ATEX 0151

Application

Intrinsically safe temperature sensors type TI are intended for measuring media in tanks, pipelines, containers, air, etc. The measured medium can be a flammable liquid or an explosive gas. The temperature is converted into an electrical signal by means of resistance elements - sensors type Ni 1000 or Pt 100. Temperature sensors can be equipped with electronics in the sensor body, which transfers the sensor voltage to a unified electrical signal 4 - 20 mA or 5 - 15 Hz. Sensor power supply is provided from a 4 - 20 mA current loop (two-conductor) or from an intrinsically safe power supply with a digital output (four-conductor).

Further information :

www.mmgroup.cz or www.iskrobezpiecznie.pl



MM GROUP, s.r.o.



Intrinsically Safe Pressure Sensors and Position

TSz, TSp.... Ex

Characteristics

Implementation - pressure transducers:

standard industrial transducers
high-pressure industrial transducers
low-pressure transducers
conductors with a cooling element - 180° C
precise transducers <0.15%
transducers with a diaphragm
submersible position sensors
4 - 20 mA
yes
yes - CAN open, RS 485

Output with analogue transducer:
Power supply from the current loop:
Digital output:

Implementation - application:

chemical industry

gas engineering
mines
submersible
for outside use

Assembly /thread:

M 20 x 1,5; G 1/2 ", G 1/4
or other to order
food grade or other
DIN 43650 connector
wire

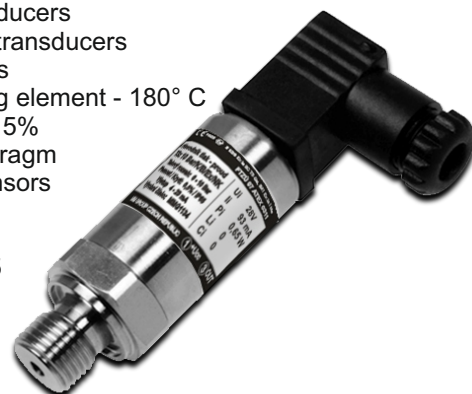
Material: Stainless steel:
Output connector:

Classification of Ex execution:

II 1/2G Ex ia IIC T6-T5 Ga
II 1G Ex ia IIC T4 Ga
II 1G Ex ia IIB T4 Ga (Ta = -40 do +85°C)
I M1 Ex ia I Ma

Certificate:

FTZU 07 ATEX 0311
IBExU10ATEX1014



Application

Pressure sensors and intrinsically safe pressure sensors are designed for various industrial solutions, where it is necessary to measure the pressure of volatile substances, fluids, plumbing and measuring their level. Manometers work on the principle of strain gauge measurement. In this case it is about a group of sensors that work in a wide range from very low to very high pressures. Precise implementation for favorable price

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.



Intrinsically Safe Limit Pressure Sensors

MM TS .. Ex

Characterstics

Position of pressure limit by type detects:
Detects:

20 mBar to 200 bar
overpressure
underpressure

Differential limit sensor:

40 Pa - 5 kPa

The output depends on the type:
Electrical connector:

NC, NO, relay
DIN 43650 connector
faston

Hysteresis:
Temperature range:
Body - material:

15 - 20 %
to 120°C without cooling
galvanized steel
stainless steel
brass

Sealing:
Media:

Viton, NBR, EPDM
powietrze, woda, olej hydrauliczny
oil emulsions and others

Pressure setting:
Max. sampling frequency:
Cover:
Number of cycles:
Ex implementation:

yes
200 / min
IP 0 do IP 65 / depends on the type
1 000 000
yes

Certificates:

MM 13 ATEX 003 X
BVS 06 ATEX E 141 X

Application

Limit pressure sensors for industrial applications.

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl



MM GROUP, s.r.o.



Intrinsically Safe differential
pressure gauge

MM DPG .. Ex

Characteristics

The measuring range depends on the type:

0 - 2,5 mBar
0 - 100 mBar
0 - 25kPa
0 - 40 Mpa
i inne

Implementation:

membrane
piston
(moderate media
flow)

Accuracy:

2 %

Terminal:

1/4 NPT internal

Bodyrpus - material:

aluminium Al., plastic

Relay output:

yes
1 or 2 SPST
1 or 2 SPDT

Dial diameter:

63 mm, 80 mm, 100 mm,
115 mm, 150 mm

Holder (to order):

yes

Output:

DIN 43650 connector
separating block

Sealing:

Viton, EPDM, NBR



Application

Piston or diaphragm manometer with magnetic clutch and transmittion limiter. The manometer is also made to be Ex intrinsically safe with the possibility of installing it in the explosion danger area. The transmitter output must be connected to the certified intrinsically safe input of the device or separated by a barrier - eg. intrinsically safe separating amplifier MM 501... by MM GROUP, s.r.o.

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.



Intrinsically Safe
security systems

Intrinsically Safe PIR + MW / EX Detectors

Characteristics

Power supply U_i :

I_i :

P_i :

C_i :

C_{eq} :

L_i :

Max. sinusoidal signal (0 to 100Hz):

Current consumption (max): 24 mA/12 V

Alarm output:

- alarm:

- anti masking:

- tamper switch

- alarm delay time:

- antimasking delay time

- Anti-masking relay respond time

Optical sensor:

Microwave sensor:

Mounting height:

Working conditions:

- Environmental conditions:

- Casing according to IEC 529:

- Frequency resistance (0.1 to 2000 MHz):

Dimensions:

Classification:

Models:

Certificate:

13,02 V DC

125 mA

0,407 W

2 μ F

< 1000 μ F

0

2,0 Vpp

30 V DC/100 mA

30 V DC/100 mA

30 V DC/100 mA

2 s

20 s

2 s

black infrared mirror

10,525 GHz or 10,687 GHz

1,5 - 4,0 m

-20° to +50°C

IP 40

> 20V/m

160 x 77 x 47

II 2 G Ex ia IIB T4, V2

MMO Ex, MMVTAM12 Ex,
VW33430 Ex, VW 33440 Ex

FTZU 10 ATEX 0140

FTZU 10 ATEX 0141

FTZU 10 ATEX 0143



Application

Intrinsically safe motion detectors are intended for detecting and signalling the entry of an undesirable person to a protected object with an explosion danger zone. To supply and transmit the signal use a certified intrinsically safe power supply unit and a transmitting separator for the signal channel separation. It is permissible to supply only one detector from an intrinsically safe power supply unit. The connection of the output contacts must be carried out in the same way as above - only one intrinsically safe separator is used.

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.



Intrinsically Safe
security systems

Contactors MM ... Ex

Characteristics

Assembly:

Mounting:

Material:

The gap - max

Mounting surface

Tamper transmitter

Connection (number of strands)

Wire's length

Alarm output

Colour:

Dimensions:

-height:

-width:

-depth:

Special features:

surface

screws

aluminium

50 mm

Conductive + non-con

yes

4 lines

45 cm

NC

grey

27 mm

84 mm

27 mm

cable housing

II 1G Ex ia IIC T6 Ga

II 3G Ex nA T6

II 1D Ex ia IIIC T 125°C ...

Compatible with intrinsically safe zones:



Parameters

Cover:

Simple device:

$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$,

$P_i = 0,65 \text{ W}$, $C_i = 0$, $L_i = 0$

IP 65

Application

Magnetic contactors for explosive danger areas. Signaling of an intrusive person entering a protected object with an explosion danger zone. To power and transmit the signal, use a certified isolation amplifier.



Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.



Intrinsically Safe
security systems

Emergency Stop Push Button MM 1.C200..

Characterstics

Number of inset phases:

Dimensions:

Cover:

Output:

Cable gland:

Diameter of the cabel:

1

65 (100) x 85 x 60

IP 65

potential free relay

blue M20

6 - 11 mm



Parameters

Cover:

Simple device:

$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$

$P_i = 0,65 \text{ W}$, $C_i = 0$

IP 65

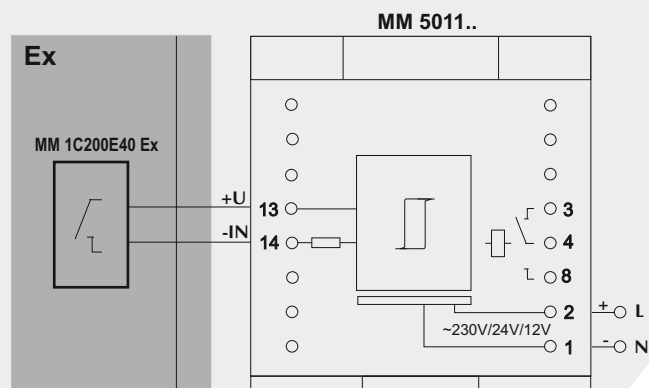
Application

Emergency stop-push button MM 1.C200E40 Ex Ex is a single-phase switch. It serves as a safety button, placed in the explosion danger zone. The output is connected to a MM 501 separation amplifier... In this case it is about a one or two-channel transmitting isolation amplifier of input circuits according to DIN 19234 (NAMUR).



Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl



MM GROUP, s.r.o.



Intrinsically Safe
security systems

Fire and Smoke Detector MM 23.. Ex

Characteristics

Range - radius:	6 m
Installation height - max:	7,5 m
Alarm activation temperature:	A1R 58 °C do 90°C (set upon customer's request)
Environmental conditions Ta:	-20 to A1R - 10°C
Output:	open/close
Reset:	automatic
Sensitivity:	low, medium and high
Automatic compensation:	dustiness of the optical chamber
Alarm signalling:	red LED, relay
Work signalling:	green LED
Power supply:	from an intrinsically safe power supply 10 - 16 V
Current consumption in normal mode:	0,2 mA
Current consumption in alarm mode:	43 mA
Alarm output:	contact powered from intrinsically safe transmitter 10 V/20 mA
Cover:	IP 23
Dimensions:	diameter 127 mm height 60 mm
Weight:	205 g
Classification:	II 3G Ex ic IIB T5 Gc, II 3D Ex ic IIIA T=100°C Dc
Built-in Ex fuse:	62 mA
Ui:	16,8 V
Ci:	0
Li:	0



Application

Combined optical and thermal detector with socket, automatic reset and autocalibration of the sensitivity of the optical sensor, Usually connected to the alarm control panels of Fire Alarm Systems as an optional fire protection element. The new intelligent fire detector consists of a head and socket, and the electronics of the socket constantly resets the entire detector. The detector is made of ABS, which has been covered with a layer of colloidal graphite to eliminate the accumulation of electrostatic charges. The detector is intended for use in explosion danger areas (zone 2). Intrinsically safe is provided by the power supply and transmitters in execution Ex ia...

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.



Intrinsically Safe
security systems

Distribution Boxes RK - ERK ..

Characteristics

Distribution boxes type **RK [Ex I]**:

Dimensions:

Number of cable gland - max.:

Number of terminals - max.:

Implementation / material:

Mounting method:

Environmental conditions Ta:

Cable gland color:

Cable galde dimension:

Cover:

Classification:

Compatibility with circuits (plug-in option):

Declaration of conformity:

Distribution boxes type: **ERK [Ex e]**

Dimensions:

Implementation / material:

Mounting method:

Environmental conditions Ta:

Cable gland color:

Cable galde dimension:

Cover:

Classification:

Compatibility with circuits (plug-in option):

Classification for circuits type high power:

Certificate:

Application

Distributions boxes RK.. are designed for connecting and separating intrinsically safe circuits. ERK type boxes are designed for connecting and branching power cables (lighting, thermostats, switches, etc.)

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

for intrinsically safe circuits

88 x 88 mm, 98 x 98 mm

6

13

black ABS

screws

-20°C to 60°C

blue

M12, M 16, M 20

IP 65

II 2G Ex ib IIB T6 Gb

II 1G Ex ia IIB .. Ga

MM 15220 RK

for circuits type high power

details in the data sheet

AlSi

screws

-40°C to 110°C

black

M12, M 16, M 20

IP 66

II 1G Ex ia IIC T6 Gb

II 1G Ex ia IIC .. Ga

II 2G Ex e IIC T5 Gb

II 2D Ex tb IIIC T 85°C - T110°C Db

DEMKO 13 ATEX 1327771U



MM GROUP, s.r.o.



Intrinsically Safe
security systems

Limit Sensor .IS .. Ex

Characterstics

Capacitive sensors

Implementation / assembly:

Power supply:

Sensitivity:

Signalling:

Short circuit frequency:

Environmental conditions:

Cover:

Pressure:

Material:

Electrical connector:

Weight:

pipelines
body
submersible

NAMUR current loop - two-conductor
8 - 28 V, output PNP, NPN (24 V / 30 mA)
0,1 pF - 1000pF
LED
2 Hz
- 30°C to 130°C
IP65, IP 68
3 Mpa
stainless steel 17 246,
stainless steel food grade
terminal block
0,2 kg



Flow sensors

Implementation / assembly:

Material:

Electrical connector::

Weight:

pipelines
body
submersible
stainless steel 17 246,
stainless steel food grade
terminal block
0,1 kg



Optical sensors

Implementation / assembly:

Power supply:

Signalling:

Short circuit frequency:

Environmental conditions:

Cover:

Pressure:

Material:

Electrical connector:

Weight:

Classification:

Certificate

pipelines
body
NAMUR current loop - two-conductor
LED
2 Hz
- 30°C to 80°C
IP65, IP 68
3 Mpa
stainless steel 17 246,
stainless steel food grade
terminal block, cabel
0,2 kg
II 1/2G Ex ia IIC T6 Ga/Gb
II 2G Ex ia IIC T6 Ga
I M1 Ex ia I Ma
FTZU 07 ATEX 0336X
FTZU 07 ATEX 0047X

Application

The limit sensors are used to detect the level of liquid and non-liquid substances, diluterinners, oils, paints, etc.

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.



Intrinsically Safe
security systems

Spot lights and indicators Ex LS, LSP, CSP .. Ex

Characterstics

lintrinsically safe spot lights and indicator devices

Power supply:	Intrinsically safe power supply
Number of LEDs:	7 - 12
LED:	low-consumption or efficient
Power:	0,5 W to 4,2 W
Luminous flux:	400 lm
Color:	white (warm, cold) red green blue
Body - material:	stainless steel
Connection:	terminal block
Classification:	II 1G Ex ia op is IIB T4 Ga I M1 Ex ia op is I Ma
Certificate:	FTZU 12 ATEX 058



LED Indicators lights

Power supply:	Intrinsically safe power supply
Number of LEDs:	1
LED	low-consumption or efficient
Color:	white (warm, cold) red green blue
Body - material:	stainless steel
Connection:	terminal block, cabel
Classification:	II 1G Ex ia op is IIB T4 Ga I M1 Ex ia op is I Ma
Certificate:	FTZU 12 ATEX 058



Application

Lighting the explosion danger areas. Installation on coalmining machinery and equipment working in the Ex environment.

Further information

www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.



Intrinsically Safe Lights

LFL .. NICHIA ..Ex

Characterstics

Street lights

High efficiency of the NICHIA chip:

Luminous flux:

Lifespan:

Energy saving:

Cover for industrial applications:

Cover - material:

Cover:

Classification:

30 W - 180 W

to 21 600 lm (180 W)

> 50 000 h

up to 90 %

yes

AlSi with modifications

IP 66

II 3G Ex e II T4 Gc,

II 3D Ex t IIIC T135°C Dc



Fluorescent and LED lamp

Dustproof lamp:

Cover:

Resistance to mechanical damage:

Electronic ballast:

Body - material:

Cover - material:

Direct attachment:

Connection with a three-pole terminal block:

Possibility to work in a loop:

Zone:

Zone:

Classification:

IP 65

IK 02

220 - 240 V, 50/60 Hz

PC (polycarbonate)

PC (polycarbonate)

to the ceiling or wall

2,5 mm²

2 x glade cabel Ex

2

22

II 3G Ex nA IIC T4 Gc

II 3D Ex tc IIIC 72 °C Dc



Application

Lighting in the explosive danger area. Halls, gas stations, outdoor areas, tanks and various types of hazardous substance storage stations.

Further information:

www.mmgroup.cz or www.iskrobezpiecznie.pl

MM GROUP, s.r.o.