

EU - TYPE EXAMINATION CERTIFICATE

Safety Device, Controlling Device or Regulating Device intended for use outside a potentially explosive atmosphere but required for or contributing to the safe functioning of Equipment and Protective Systems with respect to the risks of explosion
Directive 2014/34/EU

EU - Type Examination Certificate Number: **SGS23ATEX0019 – Issue 2**

Product: **MTL4500 & MTL5500 Series Galvanic Isolators – Analogue Input modules**

Manufacturer: **Eaton Electric Limited**

Address: **Great Marlings, Butterfield, Luton, Bedfordshire, LU2 8DL United Kingdom**

This re-issued certificate extends EU Type Examination Certificate No. SGS23ATEX0019 to apply to product designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

SGS Fimko Oy, Notified Body number 0598, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report No. **See Certificate History**

Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0: 2018 EN 60079-11: 2012

except in respect of those requirements listed at item 18 of the Schedule.

If the sign “X” is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

The marking of the product shall include the following:

⊕ II (1) GD	[Ex ia Ga] IIC	-20°C ≤ Ta ≤ +60°C – All Models
	[Ex ia Da] IIIC	-20°C ≤ Ta ≤ +65°C – MTL5541-T Model only
⊕ I (M1)	[Ex ia Ma] I	-40°C ≤ Ta ≤ +60°C – MTL5544D-L Model only

SGS Fimko Oy Customer Reference No. **0703**

Project File No. **23/0605**

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Schedule 1 – MTL4541* / MTL4544* Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters

Certificate Number SGS23ATEX0019 – Issue 2

Description of Product

The MTL4544* Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters is designed to provide a floating d.c. supply for energising two conventional 2 or 3-Wire 4/20mA transmitters or a 'smart' transmitter in the hazardous area and repeat these currents in the non-hazardous area, whilst restricting the transfer of energy from the unspecified non-hazardous area apparatus to the intrinsically safe circuits by the means of limitation of current and voltage. The apparatus also allows bi-directional signal communication between the hazardous and non-hazardous area by the connection of a hand-held communicator (HHC).

The MTL4544* Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters comprises four isolating transformers that provide galvanic isolation between the hazardous and non-hazardous area circuitry, zener diode chains and resistors providing voltage and current limitation. The above, together with other electronic components, are mounted on a single printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plug and sockets are provided for the hazardous and non-hazardous area connections. All models are fitted with a power indication LED.

The MTL4541* Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters is a depopulated version of the MTL4544* and has only one channel populated. Both the MTL4541* and MTL4544* available in a number of model variants, denoted by the last digit in the model number. All models variants are built on a common PCB.

Model Range:

Model No.	
MTL4541	Single Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters
MTL4541B	Single Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters
MTL4541P	Single Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters
MTL4544	Dual Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters
MTL4544B	Dual Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters

Input / Output Parameters

MTL4541, MTL4541B, MTL4544 & MTL4544B Models Parameters

Non-Hazardous Area Terminals 8, 9, 11, 12, 13 & 14

$$U_m = 253V$$

The apparatus is designed to operate on the above terminals from a d.c. supply voltage of up to 35V.

Hazardous Area Terminals 2 w.r.t. 1

or

Hazardous Area Terminals 5 w.r.t 4 (MTL4544 & MTL4544B only)

$$\begin{aligned} U_o &= 28V & C_i &= 0 \\ I_o &= 93mA & L_i &= 0 \\ P_o &= 0.65W \end{aligned}$$

Hazardous Area Terminals 3 w.r.t. 1

or

Hazardous Area Terminals 6 w.r.t 4 (MTL4544 & MTL4544B only)

$$\begin{aligned} U_o &= 1.1V & U_i &= 30V \\ I_o &= 53mA & I_i &= 121mA \\ P_o &= 15mW \\ C_i &= 0 \\ L_i &= 0 \end{aligned}$$

When an intrinsically safe source is connected to these terminals it should have a source resistance of U_i / I_i and the capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area connections must not exceed the values detailed in the certificate of the intrinsically safe source.

Hazardous area terminals 2 and 5 must not be used when the source is connected to these terminals.

Hazardous Area Terminals 2 w.r.t. 3

or

Hazardous Area Terminals 5 w.r.t 6 (MTL4544 & MTL4544B only)

$$\begin{array}{ll} U_o = 28V & C_i = 0 \\ I_o = 87mA & L_i = 0 \\ P_o = 0.61W & \end{array}$$

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load connected must not exceed the following values for either channel:

GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR L/R RATIO ($\mu H/ohm$)
Hazardous Area Terminals 2 w.r.t. 1 or 5 w.r.t 4			
IIC	0.083	4.2	56
IIB*	0.65	12.6	210
IIA	2.15	33.6	444
I	3.76	53.7	668
Hazardous Area Terminals 3 w.r.t. 1 or 6 w.r.t 4			
IIC	100	12.8	2,438
IIB*	1,000	47.8	8,932
IIA	1,000	104.7	18,140
I	1,000	156.2	28,229
Hazardous Area Terminals 2 w.r.t. 3 or 5 w.r.t 6			
IIC	0.083	4.9	59
IIB*	0.65	20.0	222
IIA	2.15	40.9	469
I	3.76	59.1	710

Notes:

- 1) The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- 2) The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than $1\mu F$ for Groups IIB, IIA & I and $600nF$ for Group IIC.

* Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

MTL4541P Model Parameters

Non-Hazardous Area Terminals 8, 9, 11, 12, 13 & 14

$$U_m = 253V$$

The apparatus is designed to operate on the above terminals from a d.c. supply voltage of 35V d.c.

Hazardous Area Terminals 2 w.r.t. 1

$$\begin{array}{ll} U_o = 28V & C_i = 0 \\ I_o = 116.6mA & L_i = 0 \\ P_o = 0.82W & \end{array}$$

Hazardous Area Terminals 3 w.r.t. 1

$$\begin{array}{ll} U_o = 1.1V & U_i = 30V \\ I_o = 53mA & I_i = 121mA \\ P_o = 15mW & \\ C_i = 0 & \\ L_i = 0 & \end{array}$$

When an intrinsically safe source is connected to these terminals it should have a source resistance of U_i / I_i and the capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area connections must not exceed the values detailed in the certificate of the intrinsically safe source.

Hazardous area terminal 2 must not be used when the source is connected to these terminals.

Hazardous Area Terminals 2 w.r.t. 3

$$\begin{array}{ll} U_o = 28V & C_i = 0 \\ I_o = 107mA & L_i = 0 \\ P_o = 0.75W & \end{array}$$

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load connected must not exceed the following values:

GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR L/R RATIO ($\mu H/\Omega$)
Hazardous Area Terminals 2 w.r.t. 1			
IIC	0.083	2.7	45
IIB*	0.65	11.8	175
IIA	2.15	23.5	370
I	3.76	33.5	545
Hazardous Area Terminals 3 w.r.t. 1			
IIC	100	12.8	2,438
IIB*	1,000	47.8	8,932
IIA	1,000	104.7	18,140
I	1,000	156.2	28,229
Hazardous Area Terminals 2 w.r.t. 3			
IIC	0.083	3.2	50
IIB*	0.65	13.7	190
IIA	2.15	27.5	401
I	3.76	39.3	596

Notes:

- The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than 1 μF for Groups IIB, IIA & I and 600nF for Group IIC.

* Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

16 Report Number

See Certificate History

17 Specific Conditions of Use

None

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

New drawings submitted for this issue of certificate.

Number	Sheet	Issue	Date	Description
CI4541-1	1 of 8	5	12.23	Parts List for MTL4541/MTL4544

Current drawings also associated with this certificate.

Number	Sheet	Issue	Date	Description
CI4541-1	2 of 8	5	07.09	Circuit Diagram for the MTL 4541/4544
CI4541-1	3 of 8	5	07.09	Circuit Diagram for the MTL 4541/4544
CI4541-1	4 of 8	5	1.18	MTL4541/MTL4544 Track Layout
CI4541-1	4A of 8	5	1.18	MTL4541/MTL4544 Track Layout
CI4541-1	5 of 8	6	1.13	MTL4541 Component Layout
CI4541-1	6 of 8	2	1.07	PCB Detail for TPL300
CI4541-1	7 of 8	2	1.07	PCB Detail for TPL301
CI4541-1	8 of 8	8	2.23	MTL4541 Certification Label Details - Baseefa
CI4500-3	1 of 1	1	12.10	MTL4500 and MTL5500 – Alternative Zener Diode (Panjit)
CI4500-6	1 of 1	1	20.12.10	MTL4500 and MTL5500 – Conformal Coating
CI4500-100	1 of 1	2	1.13	MTL 4500 Case

The above drawings are associated with BAS23UKEX0026 and held with IECEx BAS 23.0013.

For certificate history for MTL4541* / MTL4544* Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters, see Baseefa06ATEX0156 Issue 11.

**Schedule 2 – MTL4541A / MTL4541AS Single Channel & MTL4544A /
MTL4544AS Two Channel Current Repeater**

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Certificate Number SGS23ATEX0019 – Issue 2

15 Description of Product

The MTL4544A Two Channel Current Repeater is designed to repeat up to two 4-20mA current signals from separately powered 4/20mA transmitters located in the hazardous area to unspecified apparatus in the non-hazardous area, whilst restricting the transfer of energy from the unspecified non-hazardous area apparatus to the intrinsically safe circuits by the means of limitation of current and voltage. The apparatus also allows bi-directional signal communication between the hazardous and non-hazardous area by connection of a hand-held communicator (HHC).

The MTL4544A Current Repeater comprises four isolating transformers that provide galvanic isolation between the hazardous and non-hazardous area circuitry, fuses, Zener diodes and resistors providing voltage and current limitation on each channel. The above, together with other electronic components are mounted on a single printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plug and sockets are provided for hazardous and non-hazardous area connections. The apparatus is fitted with a Power-on LED indication.

The MTL4541A Single Channel Current Repeater is a depopulated version of the MTL4544A and has only one channel populated.

Minor changes to the non-hazardous are circuitry of both models of the apparatus form the MTL4541AS Single Channel and MTL4544AS Two Channel Current Repeater. These models use the same common PCB and enclosure and in terms of intrinsic safety are identical.

Input/Output Parameters

Non-Hazardous Area Terminals 8, 9, 11, 12, 13 & 14)

$$U_m = 253V \text{ r.m.s.}$$

The circuit connected to non-hazardous area terminals 8, 9, 11, 12, 13 & 14 is designed to operate from a d.c. supply voltage of up to 35V.

Hazardous Area Terminals 2 w.r.t. 1 (Channel 1)

Or

Hazardous Area Terminals 5 w.r.t. 4 (Channel 2 – MTL4544A / 4544AS models only)

$$\begin{array}{ll} U_o = 8.6V \text{ (Diode)} & C_i = 0 \\ I_o = 0 & L_i = 0 \\ P_o = 0 & \end{array}$$

This output voltage does not contribute to the short circuit spark risk, but must be considered for the calculation of load capacitance.

Although the apparatus does not itself comply with the simple apparatus requirements of Clause 5.7 of EN 60079-11: 2012, when each hazardous area channel is connected in an intrinsically safe circuit the internal stored energy, voltage and current of the interface will not add more than the values specified in Clause 5.7 of EN 60079-11: 2012 to the parameters of the circuit into which it is connected.

Each hazardous area channel is also considered suitable for the connection of an external intrinsically safe source with a $U_o = 30V$ and $I_o = 100mA$ having a source resistance of U_o/I_o to be connected to hazardous area terminals 2 w.r.t. 1 - Channel 1 and 5 w.r.t. 4 – Channel 2.

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area cable must not exceed the values as detailed in the original schedule or the certificate relating to the external intrinsically safe source.

Each channel must be considered as a separate intrinsically safe circuit.

Hazardous Area Terminals 5 w.r.t. 1 (Channels 1 & 2 combined with Terminals 2 & 4 connected together – MTL4544A / 4544AS models only)

$$\begin{array}{ll} U_o = 17.2V \text{ (Diode)} & C_i = 0 \\ I_o = 0 & L_i = 0 \\ P_o = 0 \end{array}$$

This output voltage does not contribute to the short circuit spark risk, but must be considered for the calculation of load capacitance.

The connection of channel 1 and 2 together is also considered suitable for the connection of an external intrinsically safe source with a $U_o = 30V$ and $I_o = 100mA$ having a source resistance of U_o/I_o to be connected to hazardous area terminals 5 w.r.t. 1.

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area cable must not exceed the values as detailed in the original schedule or the certificate relating to the external intrinsically safe source.

Load Parameters

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area load connected to the apparatus must not exceed the following values:

GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR L/R RATIO ($\mu H/ohm$)
Hazardous Area Terminals 2 w.r.t. 1 (Channel 1) or 5 w.r.t. 4 (Channel 2 – MTL4544A/44AS models only)			
IIC	6.2	5.01	1,351
IIB*	55	20.06	5,406
IIA	1,000	40.12	10,813
I	1,000	65.82	17,740
Hazardous Area Terminals 5 w.r.t. 1 (Channels 1 & 2 combined – MTL4544A/44AS models only)			
IIC	0.36	5.01	675
IIB*	2.11	20.06	2,703
IIA	8.7	40.12	5,406
I	12.16	65.82	8,870

*Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

Notes:

- The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than $1\mu F$ for Groups IIB, IIA & I and $600nF$ for Group IIC.

16 Report Number

See Certificate History

17 Specific Conditions of Use

None

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
CI4541-2	1 of 8	1	10.08	Parts List for MTL4541A/MTL4544A
CI4541-2	2 of 8	1	11.08	Certification Diagram for MTL4544A & 4541A
CI4541-2	3 of 8	1	11.08	Certification Diagram for MTL4544A & 4541A
CI4541-2	4 of 8	1	11.08	MTL4541A & 4544A Track Layout
CI4541-2	5 of 8	2	1.13	MTL4541A & MTL4544A Component Layout
CI4541-2	6 of 8	1	11.08	PCB Detail for TPL300
CI4541-2	7 of 8	1	11.08	PCB Detail for TPL301
CI4541-2	8 of 8	4	2.23	MTL4541A Certification Label Details - Baseefa
CI4500-3	1 of 1	1	12.10	MTL4500 and MTL5500 – Alternative Zener Diode (Panjit)
CI4500-6	1 of 1	1	20.12.10	MTL4500 and MTL5500 – Conformal Coating
CI4500-100	1 of 1	2	1.13	MTL 4500 Case

The above drawings are associated with BAS23UKEX0026 and held with IECEx BAS 23.0013.

For certificate history for MTL4541A / MTL4541AS Single Channel & MTL4544A / MTL4544AS Two Channel Current Repeater, see Baseefa08ATEX0321 Issue 3.

**Schedule 3 - MTL4541S, MTL4541T, MTL4544S & MTL4544D Repeater
Power Supplies, 4/20mA**

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14 **Certificate Number SGS23ATEX0019 – Issue 2**

15 Description of Product

The MTL4544S Two Channel Repeater Power Supply, 4/20mA for ‘Smart’ Transmitters is designed to provides floating d.c. supplies for energising two ‘Smart’ 4/20mA Transmitters located in the hazardous area and repeat these currents in the non-hazardous area, whilst restricting the transfer of energy from the unspecified non-hazardous area apparatus to the intrinsically safe circuits by means of limitation of current and voltage. The apparatus also allows bi-directional signal communication between the hazardous and non-hazardous area by the connection of a hand-held communicator (HHC).

The MTL4544S Two Channel Repeater Power Supply, 4/20mA for ‘Smart’ Transmitters comprises four isolating transformers that provide galvanic isolation between the hazardous and non-hazardous area circuitry, zener diode chains and resistors providing voltage and current limitation. The above, together with other electronic components are mounted on a single printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections. LED indication is fitted to indicate power-on.

The MTL4541S Single Channel Repeater Power Supply, 4/20mA for ‘Smart’ Transmitters is a depopulated version of the MTL4544S and has only one channel populated.

The MTL4544D Repeater Power Supply, 4/20mA for 2 or 3 Wire Transmitters with two outputs is designed to provide a floating d.c. supplies for energising a 2 or 3-Wire 4/20mA Transmitter located in the hazardous area and repeat the current on two channels in the non-hazardous area, whilst restricting the transfer of energy from the unspecified non-hazardous area apparatus to the intrinsically safe circuits by means of limitation of current and voltage. The apparatus also allows bi-directional signal communication between the hazardous and non-hazardous area by the connection of a hand-held communicator (HHC). The apparatus uses the same printed circuit board and enclosure as the MTL4544S but is populated with only one hazardous area transmitter connection and two non-hazardous area outputs fitted.

The MTL4541T Single Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters is similar to the MTL4541S but is fitted with different voltage and current limitation components and therefore has different output parameters.

Model Range

MTL4541S	Single Channel Repeater Power Supply, 4/20mA for ‘Smart’ Transmitters
MTL4541T	Single Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters
MTL4544S	Two Channel Repeater Power Supply, 4/20mA for ‘Smart’ Transmitters
MTL4544D	Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters with Two Outputs

Input / Output Parameters

MTL4541S, MTL4544S & MTL4544D Input / Output Parameters

Non-hazardous Area Terminals 8, 9, 11, 12, 13 & 14

$$U_m = 253V \text{ r.m.s.}$$

The apparatus is designed to operate on non-hazardous area terminals 8, 9, 11, 12, 13 & 14 from a d.c. supply voltage of up to 35V.

Hazardous Area Terminals 2 w.r.t. 1 (Channel 1)

Or

Hazardous Area Terminals 5 w.r.t. 4 (Channel 2 – MTL4544S model)

$$\begin{array}{ll} U_o = 28V & C_i = 0 \\ I_o = 93mA & L_i = 0 \\ P_o = 0.65W & \end{array}$$

Hazardous Area Terminals 3 w.r.t. 1 (Channel 1)

Or

Hazardous Area Terminals 6 w.r.t. 4 (Channel 2 – MTL4544S model)

$$\begin{array}{lll} U_o = 1.1V & U_i = 30V & C_i = 0 \\ I_o = 53mA & I_i = 121mA & L_i = 0 \\ P_o = 15mW & & \end{array}$$

Although the apparatus does not comply with the simple apparatus requirements of Clause 5.7 of EN 60079-11: 2012, when terminals 3 w.r.t. 1 or terminals 6 w.r.t. 4 (MTL4544S model only) are connected in an intrinsically safe circuit the internal stored energy, voltage and current of the interface will not add more than the values specified in Clause 5.7 of EN 60079-11: 2012 to the parameters of the circuit into which it is connected.

When an external intrinsically safe source is connected to these terminals it should have a source resistance of U_i / I_i and the capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area connections must not exceed the values detailed in the certificate of the intrinsically safe source. Hazardous area terminals 2 and 5 must not be used when the source is connected.

Hazardous Area Terminals 2 w.r.t. 3 (Channel 1)

Or

Hazardous Area Terminals 5 w.r.t. 6 (Channel 2 – MTL4544S model)

$$\begin{array}{ll} U_o = 28V & C_i = 0 \\ I_o = 87mA & L_i = 0 \\ P_o = 0.61W & \end{array}$$

Each channel must be considered as a separate intrinsically safe circuit.

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area load connected must not exceed the following values for either channel:

GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR L/R RATIO ($\mu H/\Omega$)
Hazardous Area Terminals 2 w.r.t. 1 or 5 w.r.t. 4 (MTL4544S only)			
IIC	0.083	4.2	56
IIB*	0.65	12.6	210
IIA	2.15	33.6	444
I	3.76	53.7	668
Hazardous Area Terminals 3 w.r.t. 1 or 6 w.r.t. 4 (MTL4544S only)			
IIC	100	12.8	2,438
IIB*	1,000	47.8	8,932
IIA	1,000	104.7	18,140
I	1,000	156.2	28,229
Hazardous Area Terminals 2 w.r.t. 3 or 5 w.r.t. 6 (MTL4544S only)			
IIC	0.083	4.9	59
IIB*	0.65	20.0	222
IIA	2.15	40.9	469
I	3.76	59.1	710

* Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

Notes:

- The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than $1\mu F$ for Groups IIB, IIA & I and $600nF$ for Group IIC.

MTL4541T Input / Output Parameters

Non-hazardous Area Terminals 8, 9, 11, 13 & 14

$$U_m = 253V \text{ r.m.s.}$$

The apparatus is designed to operate on non-hazardous area terminals 8, 9, 11, 13 & 14 from a d.c. supply voltage of up to 35V.

Hazardous Area Terminals 2 w.r.t. 1

$$\begin{array}{ll} U_o = 22V & C_i = 0 \\ I_o = 167mA & L_i = 0 \\ P_o = 0.92W \end{array}$$

Hazardous Area Terminals 3 w.r.t. 1

$$\begin{array}{llll} U_o = 1.0V & U_i = 30V & C_i = 0 \\ I_o = 53mA & I_i = 121mA & L_i = 0 \\ P_o = 14mW \end{array}$$

Although the apparatus does not comply with the simple apparatus requirements of Clause 5.7 of EN 60079-11: 2012, when terminals 3 w.r.t. 1 are connected in an intrinsically safe circuit the internal stored energy, voltage and current of the interface will not add more than the values specified in Clause 5.7 of EN 60079-11: 2012 to the parameters of the circuit into which it is connected.

When an external intrinsically safe source is connected to these terminals it should have a source resistance of U_i / I_i and the capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area connections must not exceed the values detailed in the certificate of the intrinsically safe source. Hazardous area terminal 2 must not be used when the source is connected.

Hazardous Area Terminals 2 w.r.t. 3

$$\begin{array}{ll} U_o = 22V & C_i = 0 \\ I_o = 145mA & L_i = 0 \\ P_o = 0.80W \end{array}$$

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area load connected must not exceed the following values:

GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR L/R RATIO ($\mu H/ohm$)
Hazardous Area Terminals 2 w.r.t. 1			
IIC	0.165	0.91	39
IIB*	1.14	5.5	147
IIA	4.20	10.7	322
I	6.00	16.4	517
Hazardous Area Terminals 3 w.r.t. 1			
IIC	100	12.8	2,438
IIB*	1,000	47.8	8,932
IIA	1,000	104.7	18,140
I	1,000	156.2	28,229
Hazardous Area Terminals 2 w.r.t. 3			
IIC	0.165	1.49	45
IIB*	1.14	7.5	174
IIA	4.20	14.9	381
I	6.00	22.5	575

* Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

Notes:

- 1) The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- 2) The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than $1\mu\text{F}$ for Groups IIB, IIA & I and 600nF for Group IIC.

16 Report Number

See Certificate History

17 Specific Conditions of Use

None

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

New drawings submitted for this issue of certificate.

Number	Sheet	Issue	Date	Description
CI4541-3	1 of 8	5	12.23	Parts List for MTL4541S, MTL5541S, MTL4544S, MTL5544S, MTL4544D, MTL5544D

Current drawings also associated with this certificate.

Number	Sheet	Issue	Date	Description
CI4541-3	2 of 8	2	10.12	Circuit Diagram for the MTL4541S, MTL5541S, MTL4544S, MTL5544S, MTL4544D, MTL5544D, MTL4541T
CI4541-3	3 of 8	2	10.12	Circuit Diagram for the MTL4541S, MTL5541S, MTL4544S, MTL5544S, MTL4544D, MTL5544D, MTL4541T
CI4541-3	4 of 8	1	6.09	Track Layout for MTL4541S, MTL5541S, MTL4544S, MTL5544S, MTL4544D, MTL5544D
CI4541-3	5 of 8	3	1.14	Component Layout for MTL4541S, MTL4541T, MTL5541S, MTL4544S, MTL5544S, MTL4544D, MTL5544D
CI4541-3	6 of 8	1	6.09	PCB Detail for TPL300
CI4541-3	7 of 8	1	6.09	PCB Detail for TPL301
CI4541-3	8 of 8	6	2.23	MTL4541S, MTL4541T, MTL4544S, MTL4544D Certification Label Details - Baseefa
CI4541T-1	1 of 1	1	1.13	Parts List for MTL4541T
CI4500-3	1 of 1	1	12.10	MTL4500 and MTL5500 – Alternative Zener Diode (Panjit)

Number	Sheet	Issue	Date	Description
CI4500-6	1 of 1	1	20.12.10	MTL4500 and MTL5500 – Conformal Coating
CI4500-100	1 of 1	2	1.13	MTL 4500 Case

The above drawings are associated with BAS23UKEX0026 and held with IECEx BAS 23.0013.

For certificate history for MTL4541S, MTL4541T, MTL4544S & MTL4544D Repeater Power Supplies, 4/20mA, see Baseefa09ATEX0155 Issue 6.

Schedule 4 – MTL4541Y Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters

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14 **Certificate Number SGS23ATEX0019 – Issue 2**

15 Description of Product

The MTL4541Y Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters is designed to provide a floating d.c. supply for energising a conventional 2 or 3-Wire 4/20mA Transmitter in the hazardous area and repeat these currents in the non-hazardous area, whilst restricting the transfer of energy from unspecified non-hazardous area equipment to the intrinsically safe circuits by means of limitation of current and voltage. The equipment also allows bi-directional signal communication between the hazardous and non-hazardous area by connection of a hand-held communicator (HHC).

The MTL4541Y Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters comprises two isolating transformers that provide galvanic isolation between the hazardous and non-hazardous area circuitry, zener diode chains and resistors providing voltage and current limitation. The above, together with other electronic components, are mounted on a single printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plug and sockets are provided for hazardous and non-hazardous area connections. A LED is fitted to provide power on indication.

Input / Output Parameters

Non-Hazardous Area Terminals 8, 9, 12, 13 & 14

$$U_m = 253V$$

The apparatus is designed to operate on the above terminals from a d.c. supply voltage of up to 35V.

Hazardous Area Terminals 2 w.r.t. 1

$$\begin{array}{ll} U_o = 28V & C_i = 0 \\ I_o = 93mA & L_i = 0 \\ P_o = 0.65W \end{array}$$

Hazardous Area Terminals 3 w.r.t. 1

$$\begin{array}{lll} U_o = 1.1V & C_i = 0 & U_i = 30V \\ I_o = 53mA & L_i = 0 & I_i = 121mA \\ P_o = 15mW \end{array}$$

When an intrinsically safe source is connected to these terminals it should have a source resistance of U_i / I_i and the capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area connections must not exceed the values detailed in the certificate of the intrinsically safe source.

Hazardous Area Terminal 2 must not be used when the source is connected to these terminals.

Hazardous Area Terminals 2 w.r.t. 3

$$\begin{array}{ll} U_o = 28V & C_i = 0 \\ I_o = 87mA & L_i = 0 \\ P_o = 0.61W \end{array}$$

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load connected must not exceed the following values:

GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	OR L/R RATIO (μ H/ Ω)
Hazardous Area Terminals 2 w.r.t. 1			
IIC	0.083	4.2	56
IIB**	0.65	12.6	210
IIA	2.15	33.6	444
I	3.76	53.7	668
Hazardous Area Terminals 3 w.r.t. 1			
IIC	100	12.8	2,438
IIB**	1,000	47.8	8,932
IIA	1,000	104.7	18,140
I	1,000	156.2	28,229
Hazardous Area Terminals 2 w.r.t. 3			
IIC	0.083	4.9	59
IIB**	0.65	20.0	222
IIA	2.15	40.9	469
I	3.76	59.1	710

** Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

Notes:

- The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than 1 μ F for Groups IIB, IIA & I and 600nF for Group IIC.

16 Report Number

See Certificate History

17 Specific Conditions of Use

None

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
CI4500-100	1 of 1	2	1.13	MTL 4500 Case
CI4541Y-1	1 & 2	1	11.14	Circuit Diagram for the MTL 4541Y
CI4541Y-2	1 & 2	1	10.14	MTL4541Y Parts List
CI4541Y-3	1 of 1	1	11.14	Track Layout for MTL4541Y
CI4541Y-4	1 & 2	1	10.14	MTL4541Y Component Layout
CI4541Y-5	1 of 1	1	10.14	PCB Detail for TPL300
CI4541Y-6	1 of 1	1	10.14	PCB Detail for TPL301
CI4541Y-7	1 of 1	3	2.23	MTL4541Y Certification Label Details – Baseefa – Ex i

The above drawings are associated with BAS23UKEX0026 and held with IECEx BAS 23.0013.

For certificate history for MTL4541Y Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters, see Baseefa15ATEX0032 Issue 1.

**Schedule 5 – MTL4541YA Single Channel Current Repeater, 4/20mA Passive
Input for Smart Transmitters**

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14 **Certificate Number SGS23ATEX0019 – Issue 2**

15 Description of Product

The MTL4541YA Single Channel Current Repeater, 4/20mA Passive Input for Smart Transmitters is designed to repeat a current signal from a separately powered 4/20mA transmitter located in the hazardous area to unspecified equipment location in the non-hazardous area, whilst restricting the transfer of energy from the unspecified non-hazardous area equipment to the intrinsically safe equipment by means of voltage and current limitation. The equipment also allows bi-directional signal communication between the hazardous and non-hazardous area by connection of a hand-held communicator (HHC).

The equipment comprises two isolating transformers that provide galvanic isolation between the hazardous and non-hazardous area circuitry, fuses, diodes, zener diodes and resistors providing voltage and current limitation. The above, together with other electronic components, are mounted on a single printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plug and sockets are provided for hazardous and non-hazardous area connections. The equipment is fitted with a power-on LED indication.

Input / Output Parameters

Non-Hazardous Area Terminals 8, 9, 12, 13 & 14

$$U_m = 253V$$

The apparatus is designed to operate on the above terminals from a d.c. supply voltage of up to 35V.

Hazardous Area Terminals 2 w.r.t. 1

$$\begin{array}{ll} U_o = 8.6V \text{ (Diode)} & C_i = 0 \\ I_o = 0 & L_i = 0 \\ P_o = 0 \end{array}$$

This output voltage does not contribute to the short circuit spark risk, but must be considered for the calculation of load capacitance.

Although the apparatus does not itself comply with the simple apparatus requirements of Clause 5.7 of EN 60079-11: 2012, when the hazardous area terminals are connected in an intrinsically safe circuit the internal stored energy, voltage and current of the interface will not add more than the values specified in Clause 5.7 of EN 60079-11: 2012 to the parameters of the circuit into which it is connected.

The hazardous area terminals are also considered suitable for the connection of an external intrinsically safe source with a $U_o = 30V$ and $I_o = 100mA$ having a source resistance of U_o/I_o connected to hazardous area terminals 2 w.r.t. 1. The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area cable must not exceed the values as detailed in the original schedule or the certificate relating to the external intrinsically safe source.

Load Parameters

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load connected must not exceed the following values:

GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR L/R RATIO ($\mu H/ohm$)
IIC	6.2	5.01	1,351
IIB*	55	20.06	5,406
IIA	1,000	40.12	10,813
I	1,000	65.82	17,740

* Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

Notes:

- 1) The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- 2) The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than $1\mu F$ for Groups IIB, IIA & I and $600nF$ for Group IIC.

16 Report Number

See Certificate History

17 Specific Conditions of Use

None

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
CI4500-100	1 of 1	2	1.13	MTL 4500 Case
CI4541YA-1	1 & 2	1	11.14	Certification Diagram for MTL4541YA
CI4541YA-2	1 & 2	1	10.14	MTL4541YA Parts List
CI4541YA-3	1 of 1	1	11.14	Track Layout for MTL4541YA
CI4541YA-4	1 & 2	1	10.14	MTL4541YA Component Layout
CI4541YA-5	1 of 1	1	10.14	PCB Detail for TPL300
CI4541YA-6	1 of 1	1	10.14	PCB Detail for TPL301
CI4541YA-7	1 of 1	3	2.23	MTL4541YA Certification Label Details – Baseefa – Ex i

The above drawings are associated with BAS23UKEX0026 and held with IECEx Certificate No. IECEx BAS 23.0013.

For certificate history for MTL4541YA Single Channel Current Repeater, 4/20mA Passive Input for Smart Transmitters, see Baseefa15ATEX0034 Issue 1.

**Schedule 6 – MTL5541 / MTL5541-T / MTL5544 Repeater Power Supply,
4/20mA for 2 or 3-Wire Transmitters**

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Certificate Number SGS23ATEX0019 – Issue 2

15 Description of Product

The MTL5544 Two Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters is designed to provide a floating d.c. supply for energising two conventional 2 or 3-Wire 4/20mA transmitters or a 'smart' transmitter in the hazardous area and repeat these currents in the non-hazardous area, whilst restricting the transfer of energy from the unspecified non-hazardous area apparatus to the intrinsically safe circuits by the means of limitation of voltage and current. The apparatus also allows bi-directional signal communication between the hazardous and non-hazardous area by the connection of a hand-held communicator (HHC).

The MTL5544 Two Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters comprises four isolating transformers that provide galvanic isolation between the hazardous and non-hazardous area circuitry, zener diode chains and resistors providing voltage and current limitation. The above, together with other electronic components are mounted on a single printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections. A power indicator LED is fitted to the top of the equipment.

The MTL5541 Single Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters is a depopulated version of the MTL5544 and has only one channel populated.

The MTL5541-T Single Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters is of similar construction to the MTL5541 variants of the equipment with the same input and output parameters, but has an extended ambient temperature range of -20°C to +65°C.

Input / Output Parameters

Non-Hazardous Area Terminals 7 to 14 (10 to 14 on MTL5541 & MTL5541-T models)

$$U_m = 253V$$

The apparatus is designed to operate on the above terminals from a d.c. supply voltage of up to 35V.

Hazardous Area Terminals 2 w.r.t. 1

or

Hazardous Area Terminals 5 w.r.t 4 (MTL5544 model only)

$$\begin{array}{ll} U_o = 28V & C_i = 0 \\ I_o = 93mA & L_i = 0 \\ P_o = 0.65W & \end{array}$$

Hazardous Area Terminals 3 w.r.t. 1

or

Hazardous Area Terminals 6 w.r.t 4 (MTL5544 model only)

$$\begin{array}{ll} U_o = 1.1V & U_i = 30V \\ I_o = 53mA & I_i = 121mA \\ P_o = 15mW & \\ C_i = 0 & \\ L_i = 0 & \end{array}$$

When an intrinsically safe source is connected to these terminals it should have a source resistance of U_i / I_i and the capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area connections must not exceed the values detailed in the certificate of the intrinsically safe source.

Hazardous area terminals 2 and 5 must not be used when the source is connected to these terminals.

Hazardous Area Terminals 2 w.r.t. 3

or

Hazardous Area Terminals 5 w.r.t 6 (MTL5544 model only)

$$\begin{array}{ll} U_o = 28V & C_i = 0 \\ I_o = 87mA & L_i = 0 \\ P_o = 0.61W & \end{array}$$

On the MTL5544 each channel must be considered as a separate intrinsically safe circuit.

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load connected must not exceed must not exceed the following values for either channel:

GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	OR L/R RATIO (μ H/ohm)
Hazardous Area Terminals 2 w.r.t. 1 or 5 w.r.t. 4			
IIC	0.083	4.2	56
IIB*	0.65	12.6	210
IIA	2.15	33.6	444
I	3.76	53.7	668

GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	OR L/R RATIO (μ H/ohm)
Hazardous Area Terminals 3 w.r.t. 1 or 6 w.r.t. 4			
IIC	100	12.8	2,438
IIB*	1,000	47.8	8,932
IIA	1,000	104.7	18,140
I	1,000	156.2	28,229
Hazardous Area Terminals 2 w.r.t. 3 or 5 w.r.t. 6			
IIC	0.083	4.9	59
IIB*	0.65	20.0	222
IIA	2.15	40.9	469
I	3.76	59.1	710

* Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

Notes:

- 1) The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- 2) The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than 1 μ F for Groups IIB, IIA & I and 600nF for Group IIC.

The values of L_o and C_o determined by this method shall not be exceeded by the sum of all the L_i plus cable inductances in the circuit and the sum of all of the C_i plus cable capacitances respectively.

16 Report Number

See Certificate History

17 Specific Conditions of Use

None

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

New drawings submitted for this issue of certificate.

Number	Sheet	Issue	Date	Description
CI4541-1	1 of 8	5	12.23	Parts List for MTL4541/MTL4544
CI4541-T-2	1 of 1	2	12.23	Parts List for MTL5541-T

Current drawings also associated with this certificate.

Number	Sheet	Issue	Date	Description
CI4541-1	2 of 8	5	07.09	Circuit Diagram for the MTL 4541/4544
CI4541-1	3 of 8	5	07.09	Circuit Diagram for the MTL 4541/4544
CI4541-1	4 of 8	5	1.18	MTL4541/MTL4544 Track Layout
CI4541-1	4A of 8	5	1.18	MTL4541/MTL4544 Track Layout
CI4541-1	5 of 8	6	1.13	MTL4541 Component Layout
CI4541-1	6 of 8	2	1.07	PCB Detail for TPL300
CI4541-1	7 of 8	2	1.07	PCB Detail for TPL301
CI4541-T-1	1 & 2	1	1.18	Circuit Diagram for the MTL5541-T
CI4541-T-3	1 & 2	1	1.18	MTL5541-T Track Layout
CI4541-T-4	1 of 1	1	1.18	MTL5541-T Component Layout
CI4541-T-6	1 of 1	1	1.18	PCB Detail for TPL300
CI4541-T-7	1 of 1	1	1.18	PCB Detail for TPL301
CI5541-T-1	1 of 1	3	2.23	MTL5541-T Certification Label Details & DIN Rail Fittings - Baseefa
CI4500-3	1 of 1	1	12.10	MTL4500 and MTL5500 – Alternative Zener Diode (Panjit)
CI4500-5	1 of 1	1	11.10	MTL5500 - Alternative DIN Rail Mechanism
CI4500-6	1 of 1	1	20.12.10	MTL4500 and MTL5500 – Conformal Coating
CI5500-100	1 of 1	3	1.13	New 5500 Outline
CI5541-1	1 of 1	7	2.23	MTL5541 Certification Label Details & DIN Rail Fittings - Baseefa

The above drawings are associated with BAS23UKEX0026 and held with IECEx Certificate No. IECEx BAS 23.0013.

For certificate history for MTL5541 / MTL5541-T / MTL5544 Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters, see Baseefa07ATEX0213 Issue 7.

**Schedule 7 – MTL5541A / MTL5541AS Single Channel & MTL5544A /
MTL5544AS Two Channel Current Repeater**

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Certificate Number SGS23ATEX0019 – Issue 2

15 Description of Product

The MTL5544A Two Channel Current Repeater is designed to repeat up to two 4-20mA current signals from separately powered 4/20mA transmitters located in the hazardous area to unspecified apparatus in the non-hazardous area, whilst restricting the transfer of energy from the unspecified non-hazardous area apparatus to the intrinsically safe circuits by the means of limitation of current and voltage. The apparatus also allows bi-directional signal communication between the hazardous and non-hazardous area by connection of a hand-held communicator (HHC).

The MTL5544A Current Repeater comprises four isolating transformers that provide galvanic isolation between the hazardous and non-hazardous area circuitry, fuses, zener diodes and resistors providing voltage and current limitation on each channel. The above, together with other electronic components are mounted on a single printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plug and sockets are provided for hazardous and non-hazardous area connections. The apparatus is fitted with a Power-on LED indication.

The MTL5541A Single Channel Current Repeater is a depopulated version of the MTL5544A and has only one channel populated.

Minor changes to the non-hazardous are circuitry of both models of the apparatus form the MTL5541AS Single Channel and MTL5544AS Two Channel Current Repeater. These models use the same common PCB and enclosure and in terms of intrinsic safety are identical.

Input/Output Parameters

Non-Hazardous Area Terminals 8, 9, 11, 12, 13 & 14)

$$U_m = 253V \text{ r.m.s.}$$

The circuit connected to non-hazardous area terminals 8, 9, 11, 12, 13 & 14 is designed to operate from a d.c. supply voltage of up to 35V.

Hazardous Area Terminals 2 w.r.t. 1 (Channel 1)

Or

Hazardous Area Terminals 5 w.r.t. 4 (Channel 2 – MTL5544A / 5544AS models only)

$$\begin{array}{ll} U_o = 8.6V \text{ (Diode)} & C_i = 0 \\ I_o = 0 & L_i = 0 \\ P_o = 0 \end{array}$$

This output voltage does not contribute to the short circuit spark risk, but must be considered for the calculation of load capacitance.

Although the apparatus does not itself comply with the simple apparatus requirements of Clause 5.7 of EN 60079-11: 2012, when each hazardous area channel is connected in an intrinsically safe circuit the internal stored energy, voltage and current of the interface will not add more than the values specified in Clause 5.7 of EN 60079-11: 2012 to the parameters of the circuit into which it is connected.

Each hazardous area channel is also considered suitable for the connection of an external intrinsically safe source with a $U_o = 30V$ and $I_o = 100mA$ having a source resistance of U_o/I_o to be connected to hazardous area terminals 2 w.r.t. 1 - Channel 1 and 5 w.r.t. 4 – Channel 2.

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area cable must not exceed the values as detailed in the original schedule or the certificate relating to the external intrinsically safe source.

Each channel must be considered as a separate intrinsically safe circuit.

Hazardous Area Terminals 5 w.r.t. 1 (Channels 1 & 2 combined with Terminals 2 & 4 connected together – MTL5544A / 5544AS models only)

$$\begin{aligned}U_o &= 17.2V \text{ (Diode)} & C_i &= 0 \\I_o &= 0 & L_i &= 0 \\P_o &= 0\end{aligned}$$

This output voltage does not contribute to the short circuit spark risk, but must be considered for the calculation of load capacitance.

The connection of channel 1 and 2 together is also considered suitable for the connection of an external intrinsically safe source with a $U_o = 30V$ and $I_o = 100mA$ having a source resistance of U_o/I_o to be connected to hazardous area terminals 5 w.r.t. 1.

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area cable must not exceed the values as detailed in the original schedule or the certificate relating to the external intrinsically safe source.

Load Parameters

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area load connected to the apparatus must not exceed the following values:

GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR L/R RATIO ($\mu H/ohm$)
Hazardous Area Terminals 2 w.r.t. 1 (Channel 1) or 5 w.r.t. 4 (Channel 2 – MTL5544A/44AS models only)			
IIC	6.2	5.01	1,351
IIB*	55	20.06	5,406
IIA	1,000	40.12	10,813
I	1,000	65.82	17,740
Hazardous Area Terminals 5 w.r.t. 1 (Channels 1 & 2 combined – MTL5544A/44AS models only)			
IIC	0.36	5.01	675
IIB*	2.11	20.06	2,703
IIA	8.7	40.12	5,406
I	12.16	65.82	8,870

*Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

Notes:

- The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than $1\mu F$ for Groups IIB, IIA & I and $600nF$ for Group IIC.

16 Report Number

See Certificate History

17 Specific Conditions of Use

None

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
CI5541-2	1 of 1	4	2.23	MTL5541A Certification Label Details & DIN Rail Fittings - Baseefa
CI4541-2	1 of 8	1	10.08	Parts List for MTL4541A/MTL4544A
CI4541-2	2 of 8	1	11.08	Certification Diagram for MTL4544A & 4541A
CI4541-2	3 of 8	1	11.08	Certification Diagram for MTL4544A & 4541A
CI4541-2	4 of 8	1	11.08	MTL4541A & 4544A Track Layout
CI4541-2	5 of 8	2	1.13	MTL4541A & MTL4544A Component Layout
CI4541-2	6 of 8	1	11.08	PCB Detail for TPL300
CI4541-2	7 of 8	1	11.08	PCB Detail for TPL301
CI4500-3	1 of 1	1	12.10	MTL4500 and MTL5500 – Alternative Zener Diode (Panjit)
CI4500-5	1 of 1	1	11.10	MTL5500 - Alternative DIN Rail Mechanism
CI4500-6	1 of 1	1	20.12.10	MTL4500 and MTL5500 – Conformal Coating
CI5500-100	1 of 1	3	1.13	New 5500 Outline

The above drawings are associated with BAS23UKEX0026 and held with IECEx Certificate No. IECEx BAS 23.0013.

For certificate history for MTL5541A / MTL5541AS Single Channel & MTL5544A / MTL5544AS Two Channel Current Repeater, see Baseefa08ATEX0322 Issue 3.

**Schedule 8 – MTL5541S, MTL5541S-T, MTL5544S, MTL5544D &
MTL5544D-L Repeater Power Supplies, 4/20mA**

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Certificate Number SGS23ATEX0019 – Issue 2

15 Description of Product

The MTL5544S Two Channel Repeater Power Supply, 4/20mA for ‘Smart’ Transmitters is designed to provide floating d.c. supplies for energising two ‘Smart’ 4/20mA Transmitters located in the hazardous area and repeat these currents in the non-hazardous area, whilst restricting the transfer of energy from the unspecified non-hazardous area apparatus to the intrinsically safe circuits by means of limitation of current and voltage. The apparatus also allows bi-directional signal communication between the hazardous and non-hazardous area by the connection of a hand-held communicator (HHC).

The MTL5544S Two Channel Repeater Power Supply, 4/20mA for ‘Smart’ Transmitters comprises four isolating transformers that provide galvanic isolation between the hazardous and non-hazardous area circuitry, zener diode chains and resistors providing voltage and current limitation. The above, together with other electronic components are mounted on a single printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections. LED indication is fitted to indicate power-on.

The MTL5541S Single Channel Repeater Power Supply, 4/20mA for ‘Smart’ Transmitters is a depopulated version of the MTL5544S and has only one channel populated.

The MTL5541S-T Single Channel Repeater Power Supply, 4/20mA for ‘Smart’ Transmitters is of a similar construction to the MTL5541S variant of the equipment with the same input and output parameters, but has an extended ambient temperature range of -20°C to +65°C.

The MTL5544D Repeater Power Supply, 4/20mA for 2 or 3 Wire Transmitters with two outputs is designed to provide a floating d.c. supplies for energising a 2 or 3-Wire 4/20mA Transmitter located in the hazardous area and repeat the current on two channels in the non-hazardous area, whilst restricting the transfer of energy from the unspecified non-hazardous area apparatus to the intrinsically safe circuits by means of limitation of current and voltage. The apparatus also allows bi-directional signal communication between the hazardous and non-hazardous area by the connection of a hand-held communicator (HHC). The apparatus uses the same printed circuit board and enclosure as the MTL5544S but is populated with only one hazardous area transmitter connection and two non-hazardous area outputs fitted.

The MTL5544D-L Repeater Power Supply, 4/20mA for 2 or 3 Wire Transmitters is of a similar construction to the MTL5544D variant of the equipment with the same input and output parameters, but has an extended ambient temperature range of -40°C to +60°C.

Input/Output Parameters

Non-hazardous Area Terminals 8, 9, 11, 12, 13 & 14

$$U_m = 253V \text{ r.m.s.}$$

The apparatus is designed to operate on non-hazardous area terminals 8, 9, 11, 12, 13 & 14 from a d.c. supply voltage of up to 35V.

Hazardous Area Terminals 2 w.r.t. 1 (Channel 1)

Or

Hazardous Area Terminals 5 w.r.t. 4 (Channel 2 – MTL5544S model)

$$\begin{array}{ll} U_o = 28V & C_i = 0 \\ I_o = 93mA & L_i = 0 \\ P_o = 0.65W & \end{array}$$

Hazardous Area Terminals 3 w.r.t. 1 (Channel 1)

Or

Hazardous Area Terminals 6 w.r.t. 4 (Channel 2 – MTL5544S model)

$U_o = 1.1V$ $U_i = 30V$ $C_i = 0$
 $I_o = 53mA$ $I_i = 121mA$ $L_i = 0$
 $P_o = 15mW$

Although the apparatus does not comply with the simple apparatus requirements of Clause 5.7 of EN 60079-11: 2012, when terminals 3 w.r.t. 1 or terminals 6 w.r.t. 4 (MTL5544S model only) are connected in an intrinsically safe circuit the internal stored energy, voltage and current of the interface will not add more than the values specified in Clause 5.7 of EN 60079-11: 2012 to the parameters of the circuit into which it is connected.

When an external intrinsically safe source is connected to these terminals it should have a source resistance of U_i / I_i and the capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area connections must not exceed the values detailed in the certificate of the intrinsically safe source. Hazardous area terminals 2 and 5 must not be used when the source is connected.

Hazardous Area Terminals 2 w.r.t. 3 (Channel 1)

Or

Hazardous Area Terminals 5 w.r.t. 6 (Channel 2 – MTL5544S model)

$U_o = 28V$ $C_i = 0$
 $I_o = 87mA$ $L_i = 0$
 $P_o = 0.61W$

Each channel must be considered as a separate intrinsically safe circuit.

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area load connected must not exceed the following values for either channel:

GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR L/R RATIO ($\mu H/\Omega$)
Hazardous Area Terminals 2 w.r.t. 1 or 5 w.r.t. 4 (MTL5544S only)			
IIC	0.083	4.2	56
IIB*	0.65	12.6	210
IIA	2.15	33.6	444
I	3.76	53.7	668
Hazardous Area Terminals 3 w.r.t. 1 or 6 w.r.t. 4 (MTL5544S only)			
IIC	100	12.8	2,438
IIB*	1,000	47.8	8,932
IIA	1,000	104.7	18,140
I	1,000	156.2	28,229
Hazardous Area Terminals 2 w.r.t. 3 or 5 w.r.t. 6 (MTL5544S only)			
IIC	0.083	4.9	59
IIB*	0.65	20.0	222
IIA	2.15	40.9	469
I	3.76	59.1	710

* Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

Notes:

- The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than $1\mu F$ for Groups IIB, IIA & I and $600nF$ for Group IIC.

16 Report Number

See Certificate History

17 Specific Conditions of Use

None

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

New drawings submitted for this issue of certificate:

Number	Sheet	Issue	Date	Description
CI4541-3	1 of 8	5	12.23	Parts List for MTL4541S, MTL5541S, MTL4544S, MTL5544S, MTL4544D, MTL5544D
CI4541S-T-2	1 of 1	2	12.23	Parts List for MTL5541S-T

Current drawings which remain unaffected by this issue:

Number	Sheet	Issue	Date	Description
CI4541S-T-1	1 & 2	1	3.17	Circuit Diagram for the MTL5541S-T
CI4541S-T-3	1 of 1	1	3.17	Track Layout for MTL5541S-T
CI4541S-T-4	1 of 1	1	3.17	Component Layout for MTL5541S-T
CI4541S-T-6	1 of 1	1	3.17	PCB Detail for TPL300
CI4541S-T-7	1 of 1	1	3.17	PCB Detail for TPL301
CI5541S-T-1	1 of 1	2	2.23	MTL5541S-T IECEx Certification Label Details and DIN Rail Fittings - Baseefa
CI4541-3	2 of 8	2	10.12	Circuit Diagram for the MTL 4541S, MTL5541S, MTL4544S, MTL5544S, MTL4544D, MTL5544D, MTL4541T
CI4541-3	3 of 8	2	10.12	Circuit Diagram for the MTL 4541S, MTL5541S, MTL4544S, MTL5544S, MTL4544D, MTL5544D, MTL4541T
CI4541-3	4 of 8	1	6.09	Track Layout for MTL4541S, MTL5541S, MTL4544S, MTL5544S, MTL4544D, MTL5544D
CI4541-3	5 of 8	4	7.23	Component Layout for MTL4541S, MTL4541T, MTL5541S, MTL4544S, MTL5544S, MTL4544D, MTL5544D
CI4541-3	6 of 8	1	6.09	PCB Detail for TPL300
CI4541-3	7 of 8	1	6.09	PCB Detail for TPL301
CI4500-3	1 of 1	1	12.10	MTL4500 and MTL5500 – Alternative Zener Diode (Panjit)
CI4500-5	1 of 1	1	11.10	MTL5500 - Alternative DIN Rail Mechanism
CI4500-6	1 of 1	1	20.12.10	MTL4500 and MTL5500 – Conformal Coating

Number	Sheet	Issue	Date	Description
CI5500-100	1 of 1	3	1.13	New 5500 Outline
CI5541-4	1 of 1	6	7.23	MTL5541S, MTL5544S, MTL5544D Certification Label Details & DIN Rail Fittings - Baseefa

The above drawings are associated with BAS23UKEX0026 and held with IECEx Certificate No. IECEx BAS 23.0013. For certificate history for MTL5541S, MTL5541S-T, MTL5544S & MTL5544D Repeater Power Supplies, 4/20mA, see Baseefa09ATEX0156 Issue 7.

20 Certificate History

Certificate No.	Date	Comments
SGS23ATEX0019	3 May 2023	The release of the prime certificate. The associated test and assessment against the requirements of EN IEC 60079-0:2018 and EN 60079-11: 2012 is documented in Test Report No. GB/BAS/ExTR23.0019/00, Project File No. 22/0560.
SGS23ATEX0019 Issue 1	30 August 2023	This issue of the certificate permits the addition of the MTL5544D-L Repeater Power Supply, 4/20mA for 2 or 3 Wire Transmitters variant to the range covered by the certificate. The associated assessment is documented in Certification Report No. GB/SGS/ExTR23.0073/00, Project File No. 23/0360.
SGS23ATEX0019 Issue 2	8 February 2024	To permit a minor change to the product design and drawings not affecting the certification assessment. The associated assessment is documented in Certification Report No. GB/SGS/ExTR24.0008/00, Project File No. 23/0605.
For drawings applicable to each issue, see original of that issue.		