IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	**IECEx BAS 23.0014**	Page 1 of 4	Certificate history:
Status:	**Current**	Issue No: 1	Issue 0 (2023-05-05)
Date of Issue:	2024-12-05		

Applicant: **Eaton Electric Limited**
Great Marlings
Butterfield
Luton
Bedfordshire
LU2 8DL
United Kingdom

Equipment: **MTL4500 & MTL5500 Series Galvanic Isolators – Analogue Output modules**

Optional accessory:

Type of Protection: **Intrinsic Safety**

Marking: **[Ex ia Ga] IIC**
[Ex ia Da] IIIC
[Ex ia Ma] I

-20°C ≤ Ta ≤ +60°C – All Models
-20°C ≤ Ta ≤ +65°C – MTL5546Y-T Model only

Approved for issue on behalf of the IECEx Certification Body: **D Brearley**

Position: **Lead Certification Engineer**

Signature: (for printed version)

Date: (for printed version) 5/12/2024

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Certificate issued by:

SGS UK Limited
Rockhead Business Park
Staden Lane
Buxton, Derbyshire SK17 9RZ
United Kingdom

IECEx Certificate of Conformity

Certificate No.: **IECEx BAS 23.0014**

Date of issue: 2024-12-05

Issue No: 1

Manufacturer: **Eaton Electric Limited**
Great Marlings
Butterfield
Luton
Bedfordshire
LU2 8DL
United Kingdom

Manufacturing locations: **Eaton Electric Limited**
Great Marlings
Butterfield
Luton
Bedfordshire
LU2 8DL
United Kingdom

MTL Instruments PVT Limited
No 3 Old Mahabalipuram Road,
Sholinganallur, Chennai, 600 119
India

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements.This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :
The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

IEC 60079-11:2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Reports:

GB/BAS/ExTR23.0020/00 GB/SGS/ExTR24.0207/00

Quality Assessment Reports:

GB/BAS/QAR06.0022/11 GB/BAS/QAR07.0017/11

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EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

This certificate covers the following types:

- MTL4546 / MTL4546C / MTL4546Y / MTL4546S Single Channel Isolating Driver, 4/20mA for Smart I/P Converters.
- MTL4549, MTL4549C & MTL4549Y 2 Channel Isolating Driver, 4/20mA for Smart I/P Converters.
- MTL4545Y Isolating Driver, 4/20mA for Smart I/P Converters.
- MTL5546 / MTL5546Y / MTL5546Y-T Single Channel Isolating Driver, 4/20mA for Smart I/P Converters.
- MTL5549 & MTL5549Y 2 Channel Isolating Driver, 4/20mA for Smart I/P Converters.

See Certificate Annex for a description of the types of equipment and electrical parameters

SPECIFIC CONDITIONS OF USE: NO

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

Variation 1.1

To permit the addition of the MTL5546S Single Channel Isolating Driver, 4/20mA for Smart I/P Converters variant to the range covered by the certificate.

Variation 1.2

To permit the addition of the Zone 2 specific load parameters for all modules.

ExTR: **GB/SGS/ExTR24.0207/00** File Reference: **24/0524**

Annex:

IECEx BAS 23.0014 Annex Issue 1.pdf

Schedule 1 – MTL4546 / MTL4546C / MTL4546Y / MTL4546S Single Channel Isolating Driver, 4/20mA for Smart I/P Converters

The MTL4546 / MTL4546C / MTL4546Y / MTL4546S Single Channel Isolating Driver, 4/20mA for Smart I/P Converters accepts a 4/20mA signal from a controller located in the non-hazardous area to drive a load in the hazardous area. It permits bi-directional transmission of digital signal to and from an operator station or hand-held communicator. The equipment restricts the transfer of energy from unspecified nonhazardous area equipment to an intrinsically safe circuit by limitation of voltage and current. Three transformers provide galvanic isolation between the hazardous and non-hazardous area circuitry.

The apparatus comprises a power transformer, two signal transformers, zener diodes and current limiting resistors to provide voltage and current limitation. The above, together with other electronic components are mounted on a single printed circuit board and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections.

The MTL4546, MTL4546C & MTL4546Y models in terms of intrinsic safety are identical. The difference between them is the MTL4546C & MTL4546Y have the Line Fault Detection (LFD) facility disabled. The MTL4546S uses the same PCB and enclosure but the PCB is populated with different voltage and current limitation components, and therefore has different output parameters to the other variants.

Input/Output Parameters

MTL4546, MTL4546C & MTL4546Y Single Channel Isolating Driver, 4/20mA for Smart I/P Converters

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

U_m = 253V r.m.s.

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

Hazardous Area Terminals 2 w.r.t. 1

U_o = 28V C_i = 0
I_o = 93mA L_i = 0
P_o = 0.65W

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: -

Zone 0 and Zone 1 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.083	4.2		56
IIB*	0.65	12.6		210
IIA	2.15	33.6		444
I	3.76	53.7		668

Zone 2 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.272	9.2		122
IIB*	1.65	36.9		472
IIA	6.6	73.9		979

* 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 ≥ 1% of the L_o value and
   - the total C_i of the external circuit (excluding the cable) is ≥ 1% of the C_o value.

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

MTL4546S Single Channel Isolating Driver, 4/20mA for Smart I/P Converters

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

U_m = 253V r.m.s.

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

Hazardous Area Terminals 2 w.r.t. 1

U_o = 22V C_i = 0
I_o = 100mA L_i = 0
P_o = 0.55W

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: -

Zone 0 and Zone 1 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.165	3.55		64
IIB*	1.14	14.6		258
IIA	4.20	30.5		517
I	6.00	44.3		848

Zone 2 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.63	8		144
IIB*	3.9	32		580
IIA	15	64		1160

* 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 ≥ 1% of the L_o value and
   - the total C_i of the external circuit (excluding the cable) is ≥ 1% of the C_o value.

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

Schedule 2 – MTL4549, MTL4549C & MTL4549Y 2 Channel Isolating Driver, 4/20mA for Smart I/P Converters

The MTL4549, MTL4549C & MTL4549Y 2 Channel Isolating Driver, 4/20mA for Smart I/P Converters, accepts up to two separate 4/20mA signals from controllers located in the non-hazardous to drive loads in the hazardous area. It permits bi-directional transmission of digital signals to and from an operator station or hand-held communicator. The apparatus restricts the transfer of energy from unspecified nonhazardous area apparatus to intrinsically safe circuits by limitation of voltage and current. Three transformers on each channel provide galvanic isolation between the hazardous and non-hazardous area circuitry.

Each channel of the apparatus comprises a power transformer, two current transformers, zener diodes and current limiting resistors to provide voltage and current limitation. The above, together with other electronic components are mounted on a printed circuit board and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections.

The MTL4549, MTL4549C & MTL4549Y models in terms of intrinsic safety are identical. The difference between them is the MTL4549C & MTL4549Y have the Line Fault Detection (LFD) facility disabled.

Input/Output Parameters

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

U_m = 253V 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)

U_o = 28V C_i = 0
I_o = 93mA L_i = 0
P_o = 0.65W

Each channel must be considered as a separate intrinsically safe circuit

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 for either channel:

Zone 0 and Zone 1 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.083	4.2		56
IIB*	0.65	12.6		210
IIA	2.15	33.6		444
I	3.76	53.7		668

Zone 2 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.272	9.2		122
IIB*	1.65	36.9		472
IIA	6.6	73.9		979

*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 ≥ 1% of the L_o value and
   - the total C_i of the external circuit (excluding the cable) is ≥ 1% of the C_o value.

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

Schedule 3 – MTL4545Y Isolating Driver, 4/20mA for Smart I/P Converters

The MTL4545Y Isolating Driver, 4/20mA for Smart I/P Converters accepts a 4/20mA signal from a controller located in the non-hazardous area to drive a load in the hazardous area. It permits bi-directional transmission of a digital signal to and from an operator station or hand-held communicator. The equipment restricts the transfer of energy from unspecified non-hazardous area equipment to an intrinsically safe circuit by limitation of voltage and current. Three transformers provide galvanic isolation between the hazardous and non-hazardous area circuitry.

The apparatus comprises a power transformer, two signal transformers, zener diodes and current limiting resistors to provide voltage and current limitation. The above, together with electronic components are mounted on a single printed circuit board 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

U_o = 28V C_i = 0
I_o = 93mA L_i = 0
P_o = 0.65W

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:

Zone 0 and Zone 1 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.083	4.2		56
IIB*	0.65	12.6		210
IIA	2.15	33.6		444
I	3.76	53.7		668

Zone 2 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.272	9.2		122
IIB*	1.65	36.9		472
IIA	6.6	73.9		979

*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 ≥ 1% of the L_o value and
   - the total C_i of the external circuit (excluding the cable) is ≥ 1% of the C_o value.

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

Schedule 4 – MTL5546 / MTL5546Y / MTL5546Y-T / MTL5546S Single Channel Isolating Driver, 4/20mA for Smart I/P Converters

The MTL5546 / MTL5546Y Single Channel Isolating Driver, 4/20mA for Smart I/P Converters accepts a 4/20mA signal from a controller located in the non-hazardous area to drive a load in the hazardous area. It permits bi-directional transmission of digital signals to and from an operator station or hand-held communicator. The apparatus restricts the transfer of energy from unspecified non-hazardous area apparatus to an intrinsically safe circuit by limitation of voltage and current. Three transformers provide galvanic isolation between the hazardous and nonhazardous area circuitry.

The apparatus comprises a power transformer, two current transformers, zener diodes and current limiting resistors to provide voltage and current limitation. The above, together with other electronic components are mounted on a printed circuit board and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections. The MTL5546 & MTL5546Y models in terms of intrinsic safety are identical. The difference between them is the MTL5546Y has the Line Fault Detection (LFD) facility disabled.

The MTL5546Y-T Single Channel Isolating Driver, 4/20mA for Smart I/P Converters is of a similar construction to the MTL5546Y 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 MTL5546S Single Channel Isolating Driver, 4/20mA for Smart I/P Converters is of an identical construction to the MTL4546S variant with the same input and output parameters but is made in a housing for mounting on a DIN rail.

Input/Output Parameters

MTL5546 / MTL5546Y / MTL5546Y-T Single Channel Isolating Driver, 4/20mA for Smart I/P Converters

Non-Hazardous Area Terminals 11 to 14

U_m = 253V r.m.s.

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

Hazardous Area Terminals 2 w.r.t. 1

U_o	=	28V	C_i	=	0
I_o	=	93mA	L_i	=	0
P_o	=	0.65W			

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:

Zone 0 and Zone 1 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.083	4.2		56
IIB*	0.65	12.6		210
IIA	2.15	33.6		444
I	3.76	53.7		668

Zone 2 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.272	9.2		122
IIB*	1.65	36.9		472
IIA	6.6	73.9		979

* 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 ≥ 1% of the L_o value and
   - the total C_i of the external circuit (excluding the cable) is ≥ 1% of the C_o value.

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

MTL5546S Single Channel Isolating Driver, 4/20mA for Smart I/P Converters

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

U_m = 253V r.m.s.

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

Hazardous Area Terminals 2 w.r.t. 1

U_o = 22V C_i = 0
I_o = 100mA L_i = 0
P_o = 0.55W

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: -

Zone 0 and Zone 1 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.165	3.55		64
IIB*	1.14	14.6		258
IIA	4.20	30.5		517
I	6.00	44.3		848

Zone 2 Load Parameters / Locations:

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.63	8		144
IIB*	3.9	32		580
IIA	15	64		1160

* 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 ≥ 1% of the L_o value and
   - the total C_i of the external circuit (excluding the cable) is ≥ 1% of the C_o value.

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

Schedule 5 – MTL5549 & MTL5549Y 2 Channel Isolating Driver, 4/20mA for Smart I/P Converters

The MTL5549 & MTL5549Y 2 Channel Isolating Driver, 4/20mA for Smart I/P Converters accepts up to two separate 4/20mA signals from controllers located in the non-hazardous to drive loads in the hazardous area. It permits bi-directional transmission of digital signals to and from an operator station or hand-held communicator. The apparatus restricts the transfer of energy from unspecified non-hazardous area apparatus to intrinsically safe circuits by limitation of voltage and current. Three transformers on each channel provide galvanic isolation between the hazardous and non-hazardous area circuitry.

Each channel of the apparatus comprises a power transformer, two current transformers, zener diodes and current limiting resistors to provide voltage and current limitation. The above, together with other electronic components are mounted on a printed circuit board and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections.

The MTL5549 & MTL5549Y models in terms of intrinsic safety are identical. The difference between them is the MTL5549Y has the Line Fault Detection (LFD) facility disabled.

Input/Output Parameters

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

U_m = 253V 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)

U_o = 28V C_i = 0
I_o = 93mA L_i = 0
P_o = 0.65W

Each channel must be considered as a separate intrinsically safe circuit

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 for either channel:

Zone 0 and Zone 1 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.083	4.2		56
IIB*	0.65	12.6		210
IIA	2.15	33.6		444
I	3.76	53.7		668

Zone 2 Load Parameters / Locations

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	OR	L/R RATIO (µH/ohm)
IIC	0.272	9.2		122
IIB*	1.65	36.9		472
IIA	6.6	73.9		979

*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 ≥ 1% of the L_o value and
   - the total C_i of the external circuit (excluding the cable) is ≥ 1% of the C_o value.

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