



# (1) EU-TYPE-EXAMINATION CERTIFICATE (Translation)

(2) Equipment or Protective Systems Intended for Use in  
Potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number:

**PTB 12 ATEX 2014 X**

**Issue: 1**

(4) Product: Flow meters, type series OPTIMASS  
1400C VE\*\*\*, 2400C VE\*\*\*, 3400C VE\*\*\*, 6400C VE\*\*\*, 7400C VE\*\*\*

(5) Manufacturer: Krohne Ltd.

(6) Address: Rutherford Drive, Park Farm South Ind. Est.  
Wellingborough, Northants NN8 6AE, Great Britain

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the 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 the confidential Test Report PTB Ex 17-27039.

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

**EN 60079-0:2012 + A11:2013**  
**EN 60079-11:2012**

**EN 60079-1:2014**  
**EN 60079-26:2015**

**EN 60079-7:2015**  
**EN 60079-31:2014**

(10) 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.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

|                                                                                     |              |                                       |    |
|-------------------------------------------------------------------------------------|--------------|---------------------------------------|----|
|  | II 1/2 (1) G | Ex db ia [ia Ga] IIC T6...T1 Ga/Gb    | or |
|                                                                                     | II 1/2 (1) G | Ex db eb ia [ia Ga] IIC T6...T1 Ga/Gb | or |
|                                                                                     | II 1/2 G     | Ex db ia IIC T6...T1 Ga/Gb            | or |
|                                                                                     | II 1/2 G     | Ex db eb ia IIC T6...T1 Ga/Gb         | or |
|                                                                                     | II 2 (1) D   | Ex tb [ia Da] IIIC Txxx°C Db          | or |
|                                                                                     | II 2 D       | Ex tb IIIC Txxx°C Db                  |    |

Konformitätsbewertungsstelle, Sektor Explosionsschutz

Braunschweig, May 9, 2017

On behalf of PTB:

Dr.-Ing. F. Lienesch  
Regierungsdirektor



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EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

## SCHEDULE

(13)

(14) **EU-Type Examination Certificate Number PTB 12 ATEX 2014 X, Issue: 1**

(15) Description of Product

The flow meters of type series OPTIMASS 1400C VE\*\*\*, 2400C VE\*\*\*, 3400C VE\*\*\*, 6400C VE\*\*\*, 7400C VE\*\*\* are used for direct determination and display of the mass flow rate of flammable and non-flammable liquids and gases. The equipment consists of the separately certified components, sensor unit and MFC400F measuring converter which are mounted to each other to form a compact device. All electrical connections between sensor unit and converter are internal connections designed to type of protection "Intrinsic Safety". The converter housing which is also separately certified is designed to type of protection "Flameproof Enclosure". It can be made of the materials aluminum or stainless steel. The flow meters are designed as associated apparatus and may be installed in the hazardous area.

For relationship between maximum permissible ambient temperature, maximum medium temperature, maximum surface temperature and temperature class for the individual types of sensors, reference is made to the following tables:

### OPTIMASS 1400C

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|-------------------------------------|
| - 40 ... + 40                                                  | 45                                       | T6-T1             | T80°C                               |
|                                                                | 60                                       | T5-T1             | T95°C                               |
|                                                                | 95                                       | T4-T1             | T130°C                              |
|                                                                | 130                                      | T3-T1             | T165°C                              |
|                                                                | 150                                      | T3-T1             | T185°C                              |
| - 40 ... + 50                                                  | 60                                       | T5-T1             | T95°C                               |
|                                                                | 95                                       | T4-T1             | T130°C                              |
|                                                                | 130                                      | T3-T1             | T165°C                              |
|                                                                | 150                                      | T3-T1             | T185°C                              |
| - 40 ... + 65                                                  | 65                                       | T4-T1             | T100°C                              |

**Table 1:** OPTIMASS 1400C with aluminum converter housing, with or without heating jacket or insulation

Minimum process temperature: - 45 °C

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**SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 12 ATEX 2014 X, Issue: 1**

**OPTIMASS 1400C**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|-------------------------------------|
| – 40 ... + 40                                                  | 45                                       | T6-T1             | T80°C                               |
|                                                                | 60                                       | T5-T1             | T95°C                               |
|                                                                | 95                                       | T4-T1             | T130°C                              |
|                                                                | 130                                      | T3-T1             | T165°C                              |
|                                                                | 150                                      | T3-T1             | T185°C                              |
| – 40 ... + 50                                                  | 60                                       | T5-T1             | T95°C                               |
|                                                                | 95                                       | T4-T1             | T130°C                              |
| – 40 ... + 60                                                  | 60                                       | T5-T1             | T95°C                               |

**Table 2:** OPTIMASS 1400C with stainless steel converter housing, with or without heating jacket or insulation

Minimum process temperature: – 45 °C

**OPTIMASS 2400C including VE90... (4-tube-option)**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|-------------------------------------|
| – 40 ... + 40                                                  | 40                                       | T6-T1             | T70°C                               |
|                                                                | 55                                       | T5-T1             | T85°C                               |
|                                                                | 90                                       | T4-T1             | T120°C                              |
|                                                                | 130                                      | T3-T1             | T160°C                              |
| – 40 ... + 50                                                  | 55                                       | T5-T1             | T85°C                               |
|                                                                | 90                                       | T4-T1             | T120°C                              |
|                                                                | 130                                      | T3-T1             | T160°C                              |
| – 40 ... + 60                                                  | 65                                       | T5-T1             | T95°C                               |
|                                                                | 100                                      | T4-T1             | T130°C                              |
| – 40 ... + 65                                                  | 65                                       | T5-T1             | T95°C                               |

**Table 3:** OPTIMASS 2400C with aluminum converter housing, with or without heating jacket or insulation

Minimum process temperature: – 45 °C

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## OPTIMASS 2400C including VE90... (4-tube-option)

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|-------------------------------------|
| – 40 ... + 40                                                  | 40                                       | T6-T1             | T70°C                               |
|                                                                | 55                                       | T5-T1             | T85°C                               |
|                                                                | 90                                       | T4-T1             | T120°C                              |
|                                                                | 130                                      | T3-T1             | T160°C                              |
| – 40 ... + 50                                                  | 55                                       | T5-T1             | T85°C                               |
|                                                                | 90                                       | T4-T1             | T120°C                              |
| – 40 ... + 60                                                  | 60                                       | T5-T1             | T90°C                               |

**Table 4:** OPTIMASS 2400C (incl. VE90...) with stainless steel converter housing, with or without heating jacket or insulation

Minimum process temperature: – 45 °C

## OPTIMASS 3400C

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|-------------------------------------|
| – 40 ... + 40                                                  | 65                                       | T6-T1             | T80°C                               |
|                                                                | 80                                       | T5-T1             | T95°C                               |
|                                                                | 115                                      | T4-T1             | T130°C                              |
|                                                                | 150                                      | T3-T1             | T165°C                              |
| – 40 ... + 50                                                  | 65                                       | T6-T1             | T80°C                               |
|                                                                | 80                                       | T5-T1             | T95°C                               |
|                                                                | 115                                      | T4-T1             | T130°C                              |
|                                                                | 150                                      | T3-T1             | T165°C                              |
| – 40 ... + 65                                                  | 65                                       | T6-T1             | T80°C                               |

**Table 5:** OPTIMASS 3400C with aluminum converter housing, with or without heating jacket or insulation

Minimum process temperature: – 45 °C

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**OPTIMASS 3400C**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|-------------------------------------|
| – 40 ... + 40                                                  | 65                                       | T6-T1             | T80°C                               |
|                                                                | 80                                       | T5-T1             | T95°C                               |
|                                                                | 115                                      | T4-T1             | T130°C                              |
|                                                                | 150                                      | T3-T1             | T165°C                              |
| – 40 ... + 50                                                  | 65                                       | T6-T1             | T80°C                               |
|                                                                | 80                                       | T5-T1             | T95°C                               |
|                                                                | 115                                      | T4-T1             | T130°C                              |
|                                                                | 130                                      | T3-T1             | T145°C                              |
| – 40 ... + 60                                                  | 60                                       | T6-T1             | T75°C                               |

**Table 6:** OPTIMASS 3400C with stainless steel converter housing, with or without heating jacket or insulation

Minimum process temperature: – 45 °C

**OPTIMASS 6400C**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|-------------------------------------|
| – 40 ... + 40                                                  | 40                                       | T6-T1             | T80°C                               |
|                                                                | 55                                       | T5-T1             | T95°C                               |
|                                                                | 90                                       | T4-T1             | T130°C                              |
|                                                                | 150                                      | T3-T1             | T190°C                              |
|                                                                | 230                                      | T2-T1             | T270°C                              |
| – 40 ... + 50                                                  | 40                                       | T6-T1             | T80°C                               |
|                                                                | 55                                       | T5-T1             | T95°C                               |
|                                                                | 90                                       | T4-T1             | T130°C                              |
|                                                                | 150                                      | T3-T1             | T190°C                              |
|                                                                | 230                                      | T2-T1             | T270°C                              |
| – 40 ... + 65                                                  | 65                                       | T4-T1             | T105°C                              |

**Table 7:** OPTIMASS 6400C with aluminum converter housing, with heating jacket AND insulation or without heating jacket and with or without insulation

Minimum process temperature: – 50 °C

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**OPTIMASS 6400C**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|-------------------------------------|
| – 40 ... + 40                                                  | 40                                       | T6-T1             | T80°C                               |
|                                                                | 55                                       | T5-T1             | T95°C                               |
|                                                                | 90                                       | T4-T1             | T130°C                              |
|                                                                | 150                                      | T3-T1             | T190°C                              |
|                                                                | 230                                      | T2-T1             | T270°C                              |
| – 40 ... + 50                                                  | 40                                       | T6-T1             | T80°C                               |
|                                                                | 55                                       | T5-T1             | T95°C                               |
|                                                                | 90                                       | T4-T1             | T130°C                              |
|                                                                | 150                                      | T3-T1             | T190°C                              |
|                                                                | 230                                      | T2-T1             | T270°C                              |
| – 40 ... + 60                                                  | 60                                       | T4-T1             | T100°C                              |

**Table 8:** OPTIMASS 6400C with stainless steel converter housing, with heating jacket AND insulation or without heating jacket and with or without insulation  
Minimum process temperature: – 50 °C

**OPTIMASS 6400C, cryogenic applications**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Permissible range of the medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|-----------------------------------------------------------|-------------------|-------------------------------------|
| – 35 ... + 65                                                  | – 140 ... + 40                                            | T6-T1             | T80°C                               |
| – 35 ... + 65                                                  | – 160 ... + 40                                            | T6-T1             | T80°C                               |
| – 30 ... + 65                                                  | – 180 ... + 40                                            | T6-T1             | T80°C                               |
| – 25 ... + 65                                                  | – 200 ... + 40                                            | T6-T1             | T80°C                               |

**Table 9:** OPTIMASS 6400C with aluminum converter housing, with heating jacket AND insulation or without heating jacket and with or without insulation  
Minimum process temperature: < – 50 °C  
Minimum ambient temperature: – 35 °C

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**OPTIMASS 6400C, cryogenic applications**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Permissible range of the medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature [°C] |
|----------------------------------------------------------------|-----------------------------------------------------------|-------------------|----------------------------------|
| – 35 ... + 60                                                  | – 140 ... + 40                                            | T6-T1             | T80°C                            |
| – 30 ... + 60                                                  | – 160 ... + 40                                            | T6-T1             | T80°C                            |
| – 30 ... + 60                                                  | – 180 ... + 40                                            | T6-T1             | T80°C                            |
| – 25 ... + 60                                                  | – 200 ... + 40                                            | T6-T1             | T80°C                            |

**Table 10:** OPTIMASS 6400C with stainless steel converter housing, with heating jacket AND insulation or without heating jacket and with or without insulation

Minimum process temperature: < – 50 °C

Minimum ambient temperature – 35 °C

**OPTIMASS 6400C VE...0... (short stem option)**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature [°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|----------------------------------|
| – 40 ... + 40                                                  | 40                                       | T6-T1             | T80°C                            |
|                                                                | 55                                       | T5-T1             | T95°C                            |
|                                                                | 90                                       | T4-T1             | T130°C                           |
|                                                                | 150                                      | T3-T1             | T190°C                           |
| – 40 ... + 50                                                  | 40                                       | T6-T1             | T80°C                            |
|                                                                | 55                                       | T5-T1             | T95°C                            |
|                                                                | 90                                       | T4-T1             | T130°C                           |
|                                                                | 145                                      | T3-T1             | T185°C                           |
| – 40 ... + 65                                                  | 65                                       | T4-T1             | T105°C                           |

**Table 11:** OPTIMASS 6400C VE...0... with aluminum converter housing, with heating jacket AND insulation or without heating jacket and with or without insulation

Minimum process temperature: – 50 °C

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**OPTIMASS 6400C VE...0... (short stem option)**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|-------------------------------------|
| – 40 ... + 40                                                  | 40                                       | T6-T1             | T80°C                               |
|                                                                | 55                                       | T5-T1             | T95°C                               |
|                                                                | 90                                       | T4-T1             | T130°C                              |
|                                                                | 150                                      | T3-T1             | T190°C                              |
| – 40 ... + 50                                                  | 40                                       | T6-T1             | T80°C                               |
|                                                                | 55                                       | T5-T1             | T95°C                               |
|                                                                | 90                                       | T4-T1             | T130°C                              |
|                                                                | 145                                      | T3-T1             | T185°C                              |
| – 40 ... + 60                                                  | 60                                       | T4-T1             | T100°C                              |

**Table 12:** OPTIMASS 6400C VE...0... with stainless steel converter housing, with heating jacket AND insulation or without heating jacket and with or without insulation  
Minimum process temperature: – 50 °C

**OPTIMASS 6400C VE...0... (short stem option), cryogenic applications**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Permissible range of the medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|-----------------------------------------------------------|-------------------|-------------------------------------|
| – 20 ... + 65                                                  | – 140 ... + 40                                            | T6-T1             | T80°C                               |
| – 15 ... + 65                                                  | – 160 ... + 40                                            | T6-T1             | T80°C                               |
| – 15 ... + 65                                                  | – 180 ... + 40                                            | T6-T1             | T80°C                               |
| – 10 ... + 65                                                  | – 200 ... + 40                                            | T6-T1             | T80°C                               |

**Table 13:** OPTIMASS 6400C VE...0... with aluminum converter housing, with heating jacket AND insulation or without heating jacket and with or without insulation  
Minimum process temperature: < – 50 °C  
Minimum ambient temperature – 20 °C

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**OPTIMASS 6400C VE...0... (short stem option), cryogenic applications**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Permissible range of the medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature [°C] |
|----------------------------------------------------------------|-----------------------------------------------------------|-------------------|----------------------------------|
| – 10 ... + 65                                                  | – 140 ... + 40                                            | T6-T1             | T80°C                            |
| – 5 ... + 65                                                   | – 160 ... + 40                                            | T6-T1             | T80°C                            |
| – 0 ... + 65                                                   | – 180 ... + 40                                            | T6-T1             | T80°C                            |
| + 10 ... + 60                                                  | – 200 ... + 40                                            | T6-T1             | T80°C                            |

**Table 14:** OPTIMASS 6400C VE...0... with stainless steel converter housing, with heating jacket AND insulation or without heating jacket and with or without insulation

Minimum process temperature: < – 50 °C

Minimum ambient temperature – 10 °C

**OPTIMASS 7400C**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature [°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|----------------------------------|
| – 40 ... + 40                                                  | 65                                       | T6-T1             | T80°C                            |
|                                                                | 80                                       | T5-T1             | T95°C                            |
|                                                                | 100                                      | T4-T1             | T115°C                           |
|                                                                | 115                                      | T4-T1             | T130°C                           |
|                                                                | 150                                      | T3-T1             | T165°C                           |
| – 40 ... + 50                                                  | 100                                      | T4-T1             | T115°C                           |
|                                                                | 115                                      | T4-T1             | T130°C                           |
|                                                                | 150                                      | T3-T1             | T165°C                           |
| – 40 ... + 65                                                  | 65                                       | T4-T1             | T80°C                            |

**Table 15:** OPTIMASS 7400C with aluminium converter housing, with or without heating jacket or insulation

Minimum process temperature: – 50 °C

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**OPTIMASS 7400C**

| Permissible range of the ambient temperature<br>$T_{amb}$ [°C] | Maximum medium temperature<br>$T_m$ [°C] | Temperature class | Maximum surface temperature<br>[°C] |
|----------------------------------------------------------------|------------------------------------------|-------------------|-------------------------------------|
| – 40 ... + 40                                                  | 65                                       | T6-T1             | T80°C                               |
|                                                                | 80                                       | T5-T1             | T95°C                               |
|                                                                | 100                                      | T4-T1             | T115°C                              |
|                                                                | 115                                      | T4-T1             | T130°C                              |
|                                                                | 130                                      | T3-T1             | T145°C                              |
| – 40 ... + 50                                                  | 80                                       | T4-T1             | T95°C                               |
|                                                                | 100                                      | T4-T1             | T115°C                              |
|                                                                | 115                                      | T3-T1             | T130°C                              |
| – 40 ... + 60                                                  | 60                                       | T4-T1             | T75°C                               |

**Table 16:** OPTIMASS 7400C with stainless steel converter housing, with or without heating jacket or insulation

Minimum process temperature: – 50 °C

**Painted versions:**

Maximum permissible ambient temperature:  $T_{amb} = 40$  °C

Maximum permissible medium temperature:  $T_m = 110$  °C

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## Electrical data:

### Measuring converter, type MFC400F VE53...

#### Auxiliary power (non-intrinsically safe)

|                             |                                                                                     |
|-----------------------------|-------------------------------------------------------------------------------------|
| depending on version        | $U_N = 12...24 \text{ V DC, } +30 \% / -10 \% \text{ (for short periods } -25 \%),$ |
| Terminals, PCB power supply | 12 W                                                                                |
| (L/L+)                      | internal fuse $I_N \leq 2 \text{ A}$                                                |
| (N/L-)                      | $U_m = 253 \text{ V}$                                                               |
| (PE)                        | for connection to protective extra low voltage<br>with safe isolation (PELV)        |
|                             | or                                                                                  |
|                             | $U_N = 24 \text{ V AC/DC, } 22 \text{ VA/12 W}$                                     |
|                             | 24 V AC, $+10 \% / -15 \%$ , 50/60 Hz                                               |
|                             | 24 V DC, $+30 \% / -25 \%$                                                          |
|                             | internal fuse $I_N \leq 2 \text{ A}$                                                |
|                             | $U_m = 253 \text{ V}$                                                               |
|                             | for connection to protective extra low voltage<br>with safe isolation (PELV)        |
|                             | or                                                                                  |
|                             | $U_N = 100...230 \text{ V AC, } +10 \% / -15 \%$ , 50/60 Hz, 22 VA                  |
|                             | internal fuse $I_N \leq 1.6 \text{ A}$                                              |

#### Input/output circuits (non-intrinsically safe)

|                  |                            |
|------------------|----------------------------|
| Nominal voltage: | $U_N \leq 32 \text{ V DC}$ |
|                  | $U_m = 253 \text{ V}$      |

### Printed circuit board:

#### Basic IO

|            |           |                                |                             |
|------------|-----------|--------------------------------|-----------------------------|
| (Terminals | B, B-     | Status output, passive         | $I_{\max} = 100 \text{ mA}$ |
|            | C, C-     | Status output, passive         | $I_{\max} = 100 \text{ mA}$ |
|            |           | or control input               | $U_{\max} = 32 \text{ V}$   |
|            | A, A-, A+ | Pulse output, passive          | $I_{\max} = 100 \text{ mA}$ |
|            | D, D-     | Current output, active/passive | HART                        |

#### Modular IO

|            |       |                                |                             |
|------------|-------|--------------------------------|-----------------------------|
| (Terminals | C, C- | Current output, active/passive | HART                        |
|            | D, D- | Status/pulse output, active    | $I_{\max} = 20 \text{ mA}$  |
|            |       | Status/pulse output, passive   | $I_{\max} = 100 \text{ mA}$ |

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## Modular Carrier + IO Module (Terminals A, A- or B, B-)

depending on module (max. 2 modules)  
Current output, active/passive 0(4) – 20 mA  
Status/pulse output, active  $I_{\max} = 20 \text{ mA}$   
Status/pulse output, passive  $I_{\max} = 100 \text{ mA}$   
Control input active/passive  $U_{\max} = 32 \text{ V}$   
Control input, active/passive 0(4) – 20 mA,  $U_{\max} = 32 \text{ V}$

## Fieldbus IO

(Terminals C, C-, D, D-)

according to function  
Profibus-PA, passive  
Foundation Fieldbus, passive  
Nominal voltage 9 V...32 V

## Profibus DP IO

(Terminals B, B-, C, C-, D, D-)

Profibus-DP, active, 12 Mbit/s  
Termination

## Modbus IO

(Terminals C, C-, D, D-)

RS 485 Modbus, active

## Input/output circuits (intrinsically safe)

(depending on PCB and IO-function)

### Printed circuit board:

#### Exi-IO

Current output, passive  
HART communication  
(Terminals C, C-)

type of protection Intrinsic Safety Ex ia IIC  
or Ex ib IIC  
only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 30 \text{ V}$   
 $I_i = 100 \text{ mA}$   
 $P_i = 1.0 \text{ W}$   
 $C_i = 10 \text{ nF}$   
 $L_i$  negligibly low

or

# SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 12 ATEX 2014 X, Issue: 1

Current output, active  
HART communication  
(Terminals C, C-)

type of protection Intrinsic Safety Ex ia IIC  
or Ex ib IIC

Maximum values:

$U_o = 21 \text{ V}$   
 $I_o = 90 \text{ mA}$   
 $P_o = 0.5 \text{ W}$   
linear characteristic

|       |        |        |
|-------|--------|--------|
| $C_o$ | 90 nF  | 110 nF |
| $L_o$ | 2.0 mH | 0.5 mH |

and

Puls/Status output  
Control input, passive  
(Terminals D, D-)

type of protection Intrinsic Safety Ex ia IIC  
or Ex ib IIC

only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 30 \text{ V}$   
 $I_i = 100 \text{ mA}$   
 $P_i = 1.0 \text{ W}$   
 $C_i = 10 \text{ nF}$   
 $L_i$  negligibly low

## Exi-Option

Current output, passive  
(Terminals A, A-)

type of protection Intrinsic Safety Ex ia IIC  
or Ex ib IIC

only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 30 \text{ V}$   
 $I_i = 100 \text{ mA}$   
 $P_i = 1.0 \text{ W}$   
 $C_i = 10 \text{ nF}$   
 $L_i$  negligibly low

or

Current output, active  
(Terminals A, A-)

type of protection Intrinsic Safety Ex ia IIC  
or Ex ib IIC

Maximum values:

$U_o = 21 \text{ V}$   
 $I_o = 90 \text{ mA}$   
 $P_o = 0.5 \text{ W}$   
linear characteristic

|       |        |        |
|-------|--------|--------|
| $C_o$ | 90 nF  | 110 nF |
| $L_o$ | 2.0 mH | 0.5 mH |

# SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 12 ATEX 2014 X, Issue: 1

and

Puls/Status output  
Control input, passive  
(Terminals B, B-)

type of protection Intrinsic Safety Ex ia IIC  
or Ex ib IIC  
only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 30 \text{ V}$   
 $I_i = 100 \text{ mA}$   
 $P_i = 1.0 \text{ W}$   
 $C_i = 10 \text{ nF}$   
 $L_i$  negligibly low

## Exi-Option 2

Current input, passive  
(Terminals C, C-)

type of protection Intrinsic Safety Ex ia IIC  
or Ex ib IIC  
only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 30 \text{ V}$   
 $I_i = 100 \text{ mA}$   
 $P_i = 1.0 \text{ W}$   
 $C_i = 10 \text{ nF}$   
 $L_i$  negligibly low

or

Current input, active  
(Terminals A, A-, B, B-)

type of protection Intrinsic Safety Ex ia IIC  
or Ex ib IIC

Maximum values:

$U_o = 24.1 \text{ V}$   
 $I_o = 99 \text{ mA}$   
 $P_o = 0.6 \text{ W}$   
linear characteristic  
 $C_o = 75 \text{ nF}$   
 $L_o = 0.5 \text{ mH}$

and

Puls/Status output  
Control input, passive  
(Terminals D, D-)

type of protection Intrinsic Safety Ex ia IIC  
or Ex ib IIC  
only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 30 \text{ V}$   
 $I_i = 100 \text{ mA}$   
 $P_i = 1.0 \text{ W}$   
 $C_i = 10 \text{ nF}$   
 $L_i$  negligibly low

## SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 12 ATEX 2014 X, Issue: 1

### Fieldbus IO

Profibus-PA or  
 Foundation Fieldbus  
 passive  
 (Terminals C, C-, D, D-)

type of protection Intrinsic Safety Ex ia IIC  
 or Ex ib IIC  
 only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 24 \text{ V}$   
 $I_i = 380 \text{ mA}$   
 $P_i = 5.32 \text{ W}$   
 $C_i = 5 \text{ nF}$   
 $L_i = 10 \text{ } \mu\text{H}$

FISCO-field device according to EN 60079-27

### Internal intrinsically safe measuring circuits

Internal circuits in type of protection Intrinsic Safety:

Driver circuit A

Driver circuit B

Sensor circuit

RTD / DMS circuit

The intrinsically safe circuits are safely electrically isolated from all non-intrinsically safe circuits up to a peak value of the nominal voltage of 375 V.

### Measuring converter, type MFC400F VE54...

#### Auxiliary power (non-intrinsically safe)

Depending on PSU version  
 Terminals  
 (L/L+)  
 (N/L-)  
 (PE)

$U_N = 12...24 \text{ V DC, } +30 \% / -10 \%, 12 \text{ W}$

$U_m = 253 \text{ V}$

for connection to protective extra low voltage  
 with safe isolation (PELV)

or

$U_N = 24 \text{ V DC, } +30 \% / -25 \%$

$24 \text{ V AC, } +10 \% / -15 \%, 50/60 \text{ Hz}$

$U_m = 253 \text{ V}$

for connection to protective extra low voltage  
 with safe isolation (PELV)

or

$U_N = 100...230 \text{ V AC, } +10 \% / -15 \%, 50/60 \text{ Hz, } 22 \text{ VA}$

## SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 12 ATEX 2014 X, Issue: 1

### Input/output circuits (non-intrinsically safe)

(Depending on I/O board configuration)

#### Printed circuit board:

##### **SIL I/O**

Terminals  
(C, C-, D, D)

Current output, active/passive HART  
 $I < 22 \text{ mA}$ ,  $U_{\text{ext}} < 32 \text{ V DC}$   
Pulse-, frequency- or status output or control input, passive  
 $I < 100 \text{ mA}$ ,  $U_{\text{ext}} < 32 \text{ V DC}$

##### **Fieldbus IO**

Terminals  
(C, C-, D, D)

Profibus-PA or Foundation Fieldbus  
 $I = 10,5 \text{ mA}$ ,  $U_{\text{ext}} < 32 \text{ V DC}$

##### **Modbus IO**

Terminals  
(C, C-, D, D)

RS 485

##### **Profibus DP**

Terminals  
(B, B-, C, C-, D, D)

Profibus-DP, max. 12 Mbaud

##### **Carrier + max. 2 I/O-Modules**

Terminals  
(A, A- or B, B-)

Current output, active/passive  $I < 22 \text{ mA}$ ,  $U_{\text{ext}} < 32 \text{ V DC}$   
Current input, active/passive  $I < 22 \text{ mA}$ ,  $U_{\text{ext}} < 32 \text{ V DC}$   
Pulse-, frequency- or status output, passive  
 $I < 100 \text{ mA}$ ,  $U_{\text{ext}} < 32 \text{ V DC}$   
Control input, active/passive  $U_{\text{ext}} < 32 \text{ V}$

### Input/output circuits (intrinsically safe)

(Depending on I/O board configuration)

#### Printed circuit board:

##### **Exi-SIL I/O, active**

Current output, active  
HART Kommunikation  
(Terminals C, C-)

type of protection Intrinsic Safety Ex ia IIC

Maximum values:

$U_o = 21 \text{ V}$   
 $I_o = 90 \text{ mA}$   
 $P_o = 0.5 \text{ W}$

linear characteristic

|       |        |        |
|-------|--------|--------|
| $C_o$ | 90 nF  | 110 nF |
| $L_o$ | 2.0 mH | 0.5 mH |

# SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 12 ATEX 2014 X, Issue: 1

Pulse-, frequency- or status  
output, passive  
(Terminals D, D-)

type of protection Intrinsic Safety Ex ia IIC

only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 30 \text{ V}$   
 $I_i = 100 \text{ mA}$   
 $P_i = 1.0 \text{ W}$   
 $C_i = 10 \text{ nF}$   
 $L_i$  negligibly low

## Exi-SIL I/O, passive

Current output, passive,  
HART communication  
(Terminals C, C-)

type of protection Intrinsic Safety Ex ia IIC

only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 30 \text{ V}$   
 $I_i = 130 \text{ mA}$   
 $P_i = 1.0 \text{ W}$   
 $C_i = 10 \text{ nF}$   
 $L_i$  negligibly low

Pulse-, frequency- or status  
output, passive  
(Terminals D, D-)

type of protection Intrinsic Safety Ex ia IIC

only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 30 \text{ V}$   
 $I_i = 130 \text{ mA}$   
 $P_i = 1.0 \text{ W}$   
 $C_i = 10 \text{ nF}$   
 $L_i$  negligibly low

## Fieldbus I/O

Profibus-PA or  
Foundation Fieldbus  
(Terminals C, C-, D, D-)

type of protection Intrinsic Safety Ex ia IIC

FISCO Field Device

only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 24 \text{ V}$   
 $I_i = 380 \text{ mA}$   
 $P_i = 5.32 \text{ W}$   
 $C_i = 5 \text{ nF}$   
 $L_i$  negligibly low

# SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 12 ATEX 2014 X, Issue: 1

## Exi-Option, active

Current output, active  
(Terminals A, A-)

type of protection Intrinsic Safety Ex ia IIC

Maximum values:

$$\begin{aligned} U_o &= 21 \text{ V} \\ I_o &= 90 \text{ mA} \\ P_o &= 0.5 \text{ W} \end{aligned}$$

linear characteristic

|       |        |        |
|-------|--------|--------|
| $C_o$ | 90 nF  | 110 nF |
| $L_o$ | 2.0 mH | 0.5 mH |

Pulse-, frequency- or status output  
or control input, passive  
(Terminals B, B-)

type of protection Intrinsic Safety Ex ia IIC  
only for connection to a certified intrinsically safe circuit

Maximum values:

$$\begin{aligned} U_i &= 30 \text{ V} \\ I_i &= 130 \text{ mA} \\ P_i &= 1.0 \text{ W} \\ C_i &= 10 \text{ nF} \\ L_i &\text{ negligibly low} \end{aligned}$$

## Exi-Option, passive

Current output, passive  
Terminals (A, A-)

type of protection Intrinsic Safety Ex ia IIC  
only for connection to a certified intrinsically safe circuit

Maximum values:

$$\begin{aligned} U_i &= 30 \text{ V} \\ I_i &= 130 \text{ mA} \\ P_i &= 1.0 \text{ W} \\ C_i &= 10 \text{ nF} \\ L_i &\text{ negligibly low} \end{aligned}$$

Pulse-, frequency- or status output  
or control input, passive  
(Terminals B, B-)

type of protection Intrinsic Safety Ex ia IIC  
only for connection to a certified intrinsically safe circuit

Maximum values:

$$\begin{aligned} U_i &= 30 \text{ V} \\ I_i &= 130 \text{ mA} \\ P_i &= 1.0 \text{ W} \\ C_i &= 10 \text{ nF} \\ L_i &\text{ negligibly low} \end{aligned}$$

## SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 12 ATEX 2014 X, Issue: 1

**Internal intrinsically safe measuring circuits**  
**Internal circuits in type of protection Intrinsic Safety:**

**Driver circuit A**

**Driver circuit B**

**Sensor circuit**

**RTD / DMS circuit**

The intrinsically safe circuits are safely electrically isolated from all non-intrinsically safe circuits up to a peak value of the nominal voltage of 375 V.

### Changes with respect to previous issues:

Compilation of the specifications from the initial certificate and the 1<sup>st</sup> supplement as well as the specifications resulting from the following changes:

1. In addition to flammable and non-flammable liquids also gases are specified in the description as measuring medium.
2. Introduction of a revised CF-stem and a new CF-bush between sensor unit and converter enclosure as an additional option.
3. Correction of the marking for the flow meter of type OPTIMASS 3400 VE\*\*\*, omission of markings which are no longer applied.
4. Update of the state of standards
5. Revision of the operating instructions manual

(16) Test Report      PTB Ex17-27039

### (17) Specific conditions of use

1. The flow meters of type series OPTIMASS 1400C VE..., 2400C VE..., 3400C VE..., 6400C VE..., 7400C VE... shall be included in the equipotential bonding system of the hazardous area.
2. Opening the enclosure inside the hazardous area is only permissible in a de-energized state and with keeping a subsequent waiting time (warning label !)

This waiting time is:      35 minutes for temperature class T6  
and                              10 minutes for temperature class T5

No waiting time is required for temperature classes T4 ... T1.

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## SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 12 ATEX 2014 X, Issue: 1

3. Only certified cable glands may be applied as cable entries. Non-used openings shall be sealed by means of certified blind plugs.
4. The connecting cables shall be installed as fixed wiring and in such a way that they are sufficiently protected against damage.
5. For relationship between maximum permissible ambient temperature, maximum medium temperature, maximum surface temperature and temperature class for the individual type series, reference is made to tables given in the operating instructions manual or the tables given above respectively.

(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz  
On behalf of PTB:

Braunschweig, May 9, 2017

  
Dr.-Ing. F. Lienesch  
Regierungsdirektor

