

# Technical Datasheet



## FOP 70 and OPTV

Fiberoptical Amplifier and  
Light Pulse Receiver

## Application

The FOP is a fibre-optic amplifier for KEM gear flow meters used in highvoltage applications. Its integral pickup detects the r.p.m. of the gears and the FOP provides a flow-proportional light pulse signal. The OPTV receiver will convert the light pulses into a current or voltage squarewave signal which may be used for evaluation.

## Applications

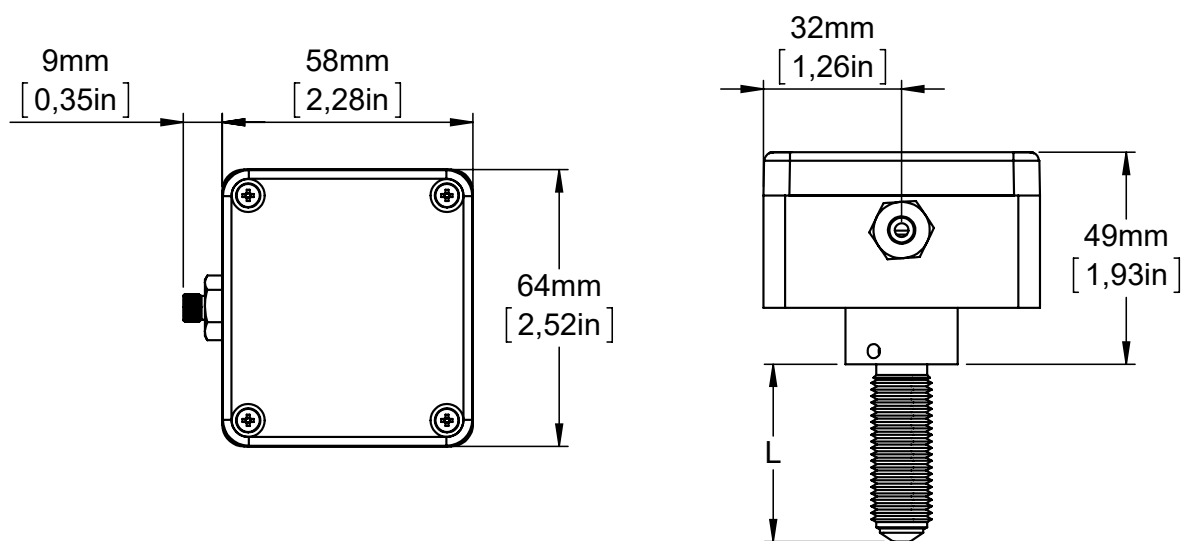
- Interference-free Pulse Detection
- No Electrical Connection to OPTV Receiver
- Light Weight and Handy Design

## Technical Data FOP 70

| FOP Fiber-Optic Amplifier         |                                                       |
|-----------------------------------|-------------------------------------------------------|
| Power Supply                      | Lithium battery (exclusively use original batteries)  |
| Battery Lifetime                  | ≤ 10 months (depending on operating condition)        |
| Ambient Temperature               | -40 °C up to +70 °C [-40 °F up to +158 °F]            |
| Frequency Range                   | 3 up to 1,000 Hz                                      |
| Weight                            | max. 350 g                                            |
| Ingress Protection                | IP65                                                  |
| Ex-Protection, intrinsically safe | ATEX: II 2G Ex ia IIC T4 Gb<br>IECEx: Ex ia IIC T4 Gb |
| Housing                           | Painted aluminum (for dimensions please see drawings) |

| LW cable LABS-free, incl. pre-assembled plugs |                                                  |
|-----------------------------------------------|--------------------------------------------------|
| Type                                          | HITRONIC POF                                     |
| Cable Ø                                       | 5.5 mm                                           |
| Plug Ø                                        | < 8.5 mm                                         |
| Bending Radius                                | Permanently installed: 55 mm, temporarily: 30 mm |
| Tensile Radius                                | Permanently installed: 100 N, temporarily: 600 N |
| Ambient Temperature                           | -20 °C up to +70 °C [-68 °F up to +158 °F]       |
| Protection Class                              | IP65                                             |
| Cable Length                                  | max. 10 m                                        |
| Wire Tip Material                             | 1.4305 [AISI 303]                                |

## Dimensional Drawing – FOP 70

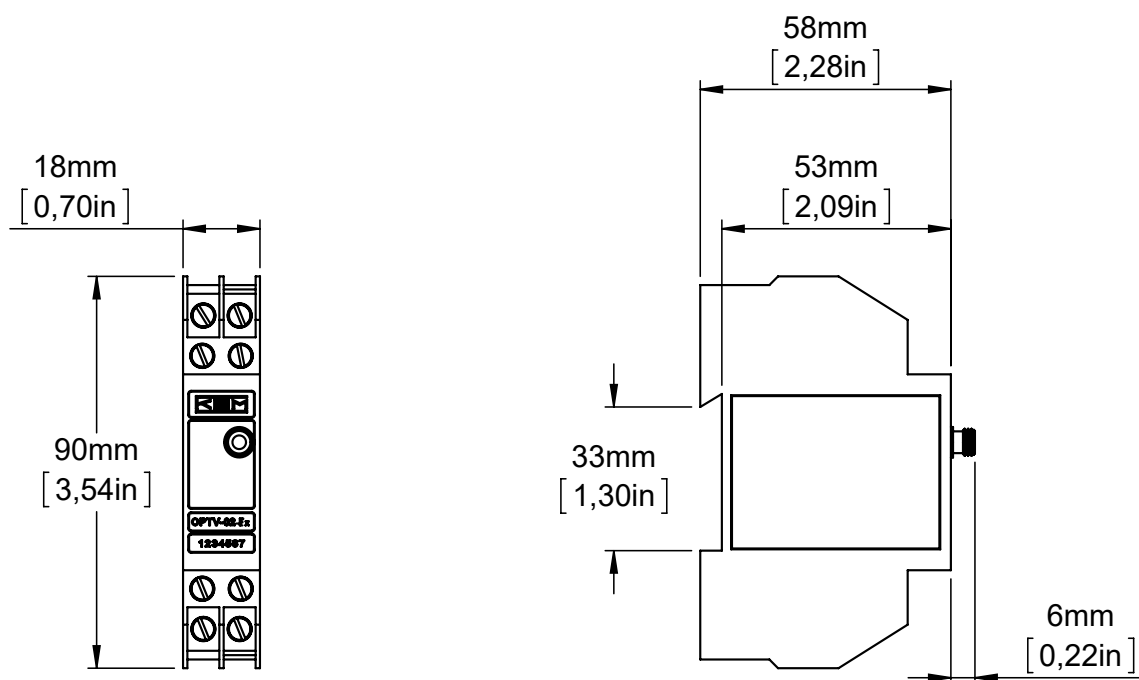


| Sensor Type | L                  |
|-------------|--------------------|
| KG or RG    | 42 mm<br>[1.65 in] |
| LG or SG    | 76 mm<br>[2.99 in] |

## Technical Data – OPTV

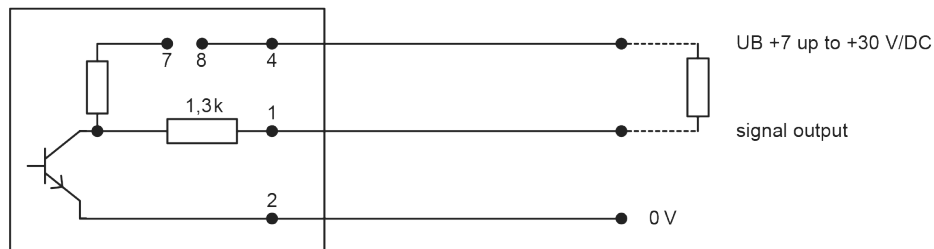
| OPTV-02-Ex Light Pulse Receiver and Converter |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient Temperature                           | -20 °C up to +60 °C [-4 °F up to +140 °F]<br>Ex:<br>-20°C ≤ Ta ≤ +60°C T5<br>-20°C ≤ Ta ≤ +40°C T6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Supply Voltage                                | U <sub>B</sub> : 7 up to 30 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Quiescent Current                             | I <sub>R</sub> < 1,1 mA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Output                                        | Frequency output, constant pulsetime 500 µsec                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Electrical Data, Alternatively                | <p>Voltage outputs (3-wire connection)</p> <p>a. Active output<br/>           High level: <math>U_{\text{high}} &gt; U_B - 0,6 \text{ V} - [2,5 \text{ k}\Omega \times I_{\text{out}} \text{ (mA)}]</math><br/>           Low level: <math>U_{\text{low}} &lt; 0,6 \text{ V} + [1,3 \text{ k}\Omega \times I_{\text{out}} \text{ (mA)}]</math></p> <p>b. Passive output<br/>           High level: <math>U_{\text{high}} &gt; U - [I_{\text{out}} \text{ (mA)} \times 1,3 \text{ k}\Omega]</math><br/>           Low level: <math>U_{\text{low}} &lt; 0,6 \text{ V} + [1,3 \text{ k}\Omega \times I_{\text{out}} \text{ (mA)}]</math><br/>           U is the voltage applied at the output<br/>           (Open-circuit voltage) max. 30 V</p> <p>Current output (2-wire connection)</p> <p>a. For U<sub>B</sub> &lt; 9 V (NAMUR supply units)<br/>           High level: I<sub>high</sub> &gt; 2,2 mA<br/>           Low level: I<sub>low</sub> &lt; 1,1 mA</p> <p>b. For U<sub>B</sub> 7 bis 30 V<br/>           High level: <math>I_{\text{high}} = [(U_B - 0,6 \text{ V})/1,3 \text{ k}\Omega] + I_{\text{low}}</math><br/>           Low level: <math>I_{\text{low}} = (U_B - 4 \text{ V})/7,5 \text{ k}\Omega</math></p> |
| Frequency Range                               | 3 up to 1,500 Hz according to flow meter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Electrical Connection                         | Two off 4-pin screw terminals for supply and output signals (see wiring schemes)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Ex Protection ATEX                            | II 2G EEx ia IIC T5 / T6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Housing                                       | Grey-colored polycarbonate for DIN hat top rail mounting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Dimensional Drawing – OPTV

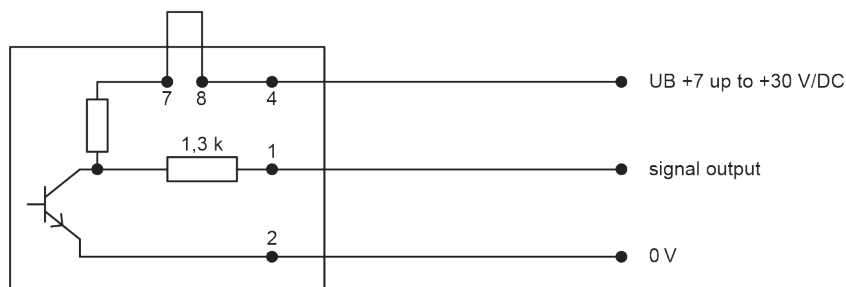


## Electrical Connection - OPTV

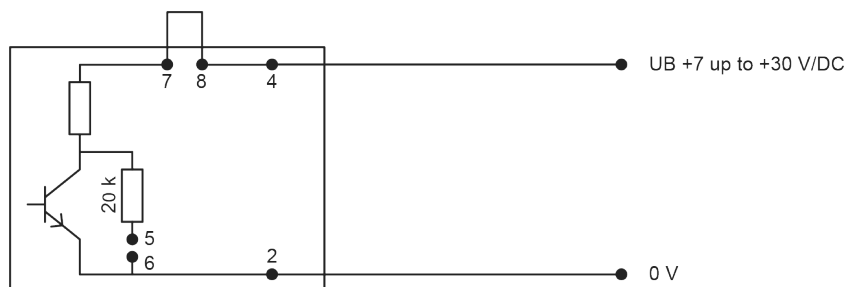
### 3-wire passive



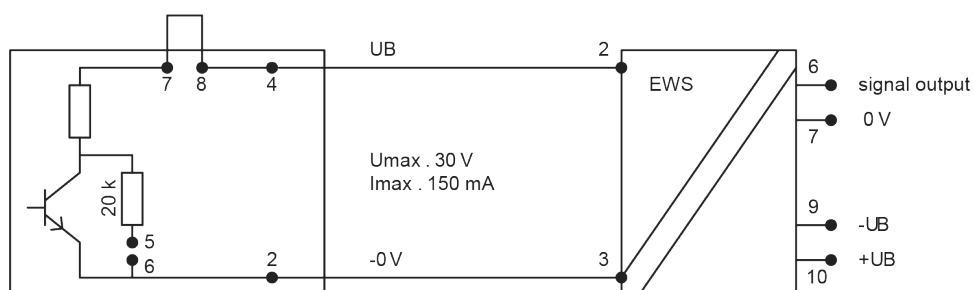
### 3-wire active



### 2-wire



### 2-wire with KEM separation amplifier type EWS



## Ordering Code

|                                                         |       |   |   |   |   |   |   |   |    |   |         |
|---------------------------------------------------------|-------|---|---|---|---|---|---|---|----|---|---------|
|                                                         | FOP70 | - | X | X | - | X | X | X | -  | X | X       |
| <b>Pickup Form</b>                                      |       |   |   |   |   |   |   |   |    |   |         |
| Thread Pickup                                           |       |   | X | X |   |   |   |   |    |   |         |
| Thread Pickup                                           |       |   |   |   |   |   |   |   |    |   |         |
| short for HM, ZHM 02 to ZHM 04                          |       |   |   |   |   | K | G |   |    |   |         |
| long for HM, ZHM 02 to ZHM 07                           |       |   |   |   |   | L | G |   |    |   |         |
| Short with step for ZHM 01 (01/1; 01/2; 01/3), SRZ, LFM |       |   |   |   |   | R | G |   |    |   |         |
| Long with step for ZHM 01 (01/1; 01/2; 01/3), SRZ       |       |   |   |   |   | S | G |   |    |   |         |
| <b>Ex Protection</b>                                    |       |   |   |   |   |   |   |   |    |   |         |
| No certification                                        |       |   |   |   |   |   |   |   |    |   |         |
| ATEX (II 2G Ex ia IIC T4 Gb), IECEEx (Ex ia IIC T4 Gb)  |       |   |   |   |   |   |   |   | Ex |   |         |
| <b>Optionen</b>                                         |       |   |   |   |   |   |   |   |    |   |         |
| Custom specific options                                 |       |   |   |   |   |   |   |   |    |   | 01 - 99 |

## Marking

### FOP 70:

KEM Küppers Elektromechanik GmbH

 0123  II 2G Ex ia IIC T4 Gb

ATEX: BVS 17 ATEX E 041

Ex ia IIC T4 Gb

IECEEx: IECEEx BVS 17.0037

FOP 70 \*\*-\* Ser.Nr. 123456789

-40 °C [-40 °F] ≤ Ta ≤ +70 °C [+158 °F]

WARNING: Replace battery only with battery type BG.BATT-FOP-07 specified by KEM for this purpose.

### OPTV:

KEM Küppers Elektromechanik GmbH

 0123  II 2G EEx ia IIC T6

DMT 03 ATEX E 089X

OPTV-02 Ser.Nr. 123456789

-20 °C [-4 °F] ≤ Ta ≤ +60 °C [+140 °F]

U<sub>i</sub> = 30 V; I<sub>i</sub> = 185 mA

C<sub>i</sub> = 30 nF; L<sub>i</sub> = 265 μH

The test sticker indicates year of building and person in charge of test.

## Safety Instructions

The following has to be adhered to:

- a. Installation instructions for electrical devices,
- b. Installation instructions for associated intrinsically-safe devices,
- c. The »Special conditions for safe use« as per EC-Type Examination Certificate
- d. The devices have to be installed in a way that the max. ambient temperature does under no circumstances exceed the mentioned maxima (consider self heating).
- e. With cables care should be taken, that the max. inductivity and capacity of the respective voltage or gas group are not exceeded.
- f. Exceeding or falling below the regular measuring range will cause invalid frequency output signals.
- g. Shielded cables are to be used as connecting lines.
- h. Generally, supplied units have to be connected by an expert according to EMC stipulations.
- i. Terminals 5 - 6 and 7 - 8 must not be connected with an other device.

## Battery replacement

- a. Only the original KEM battery pack BG.BATT-FOP-07 may be used. Otherwise the ex-approvals will be extinguished.
- b. Remove the empty battery
- c. Insert the new battery into the battery holder
- d. Insert the polarity-proof plug on the circuit board
- e. Dispose of empty battery properly



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