

# Technical Datasheet



## FOP 70 and OPTV

Fibreoptical Amplifier and  
Light Pulse Receiver

# Fiber Optic Amplifier and Receiver – FOP 70 and OPTV

## Application

The FOP is a fibre-optic amplifier for KEM gear flow meters used in high-voltage 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

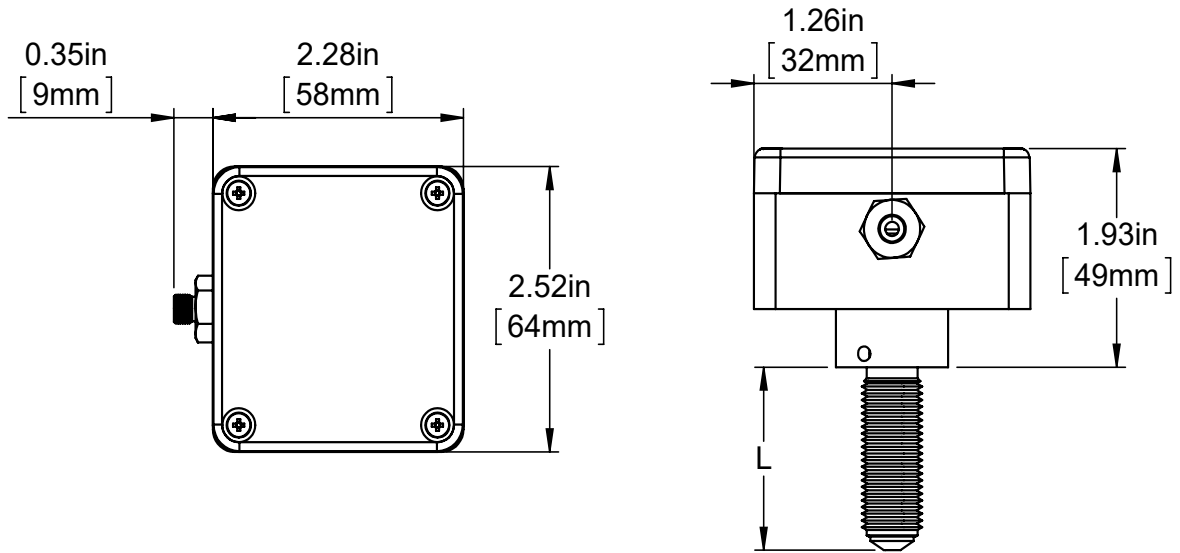
- Interference-free Pulse Detection
- No Electrical Connection to OPTV Receiver
- Light Weight and Handy Design

## Technical Data FOP 70

FOP Fibre-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 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 Strength	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

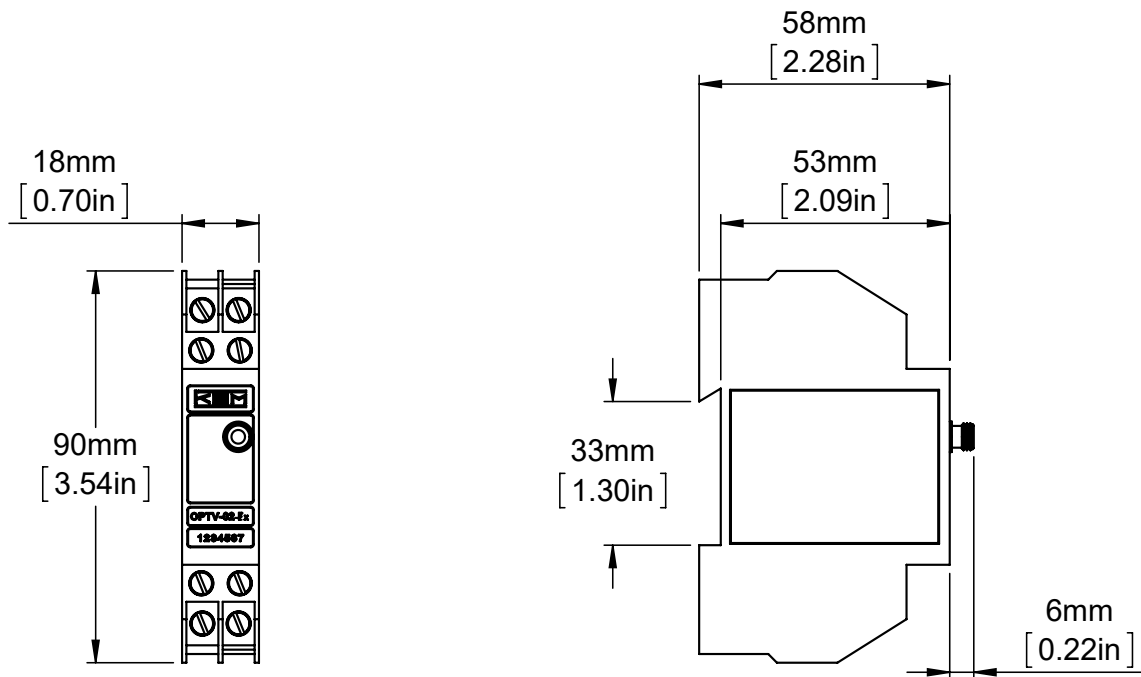


Sensor Type	L
KG oder RG	42 mm [1,65 in]
LG oder SG	76 mm [2,99 in]

## 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]
Supply Voltage	$U_B$ : 7 up to 30 V
Quiescent Current	$I_R < 1.1$ mA
Output	Frequency output, constant pulsetime 500 µsec
Electrical Data, Alternatively	<p>Voltage outputs (3-wire connection)</p> <p>a. Active output            High level: <math>U_{high} &gt; U_B - 0.6 \text{ V} - [2.5 \text{ k}\Omega \times I_{out} \text{ (mA)}]</math>            Low level: <math>U_{low} &lt; 0.6 \text{ V} + [1.3 \text{ k}\Omega \times I_{out} \text{ (mA)}]</math></p> <p>b. Passive output            High level: <math>U_{high} &gt; U - [I_{out} \text{ (mA)} \times 1.3 \text{ k}\Omega]</math>            Low level: <math>U_{low} &lt; 0.6 \text{ V} + [1.3 \text{ k}\Omega \times I_{out} \text{ (mA)}]</math>            U is the voltage applied at the output, max. 30 V</p> <p>Current output (2-wire connection)</p> <p>a. For <math>U_B &lt; 9</math> V (NAMUR supply units)            High level: <math>I_{high} &gt; 2.2</math> mA            Low level: <math>I_{low} &lt; 1.1</math> mA</p> <p>b. For <math>U_B</math> 7 up to 30 V            High level: <math>I_{high} = [(U_B - 0.6 \text{ V})/1.3 \text{ k}\Omega] + I_{low}</math>            Low level: <math>I_{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 T6
Housing	Grey-colored polycarbonate for DIN hat top rail mounting

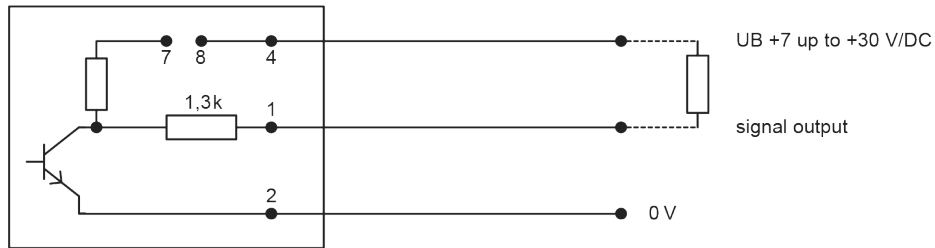
## Dimensional Drawing – OPTV



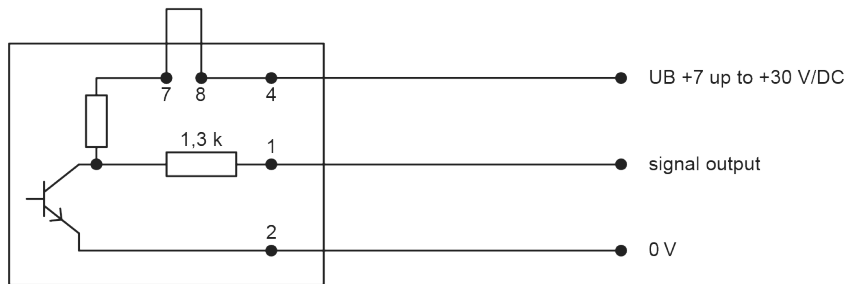
# Fiber Optic Amplifier and Receiver – FOP 70 and OPTV

## Electrical Connection OPTV

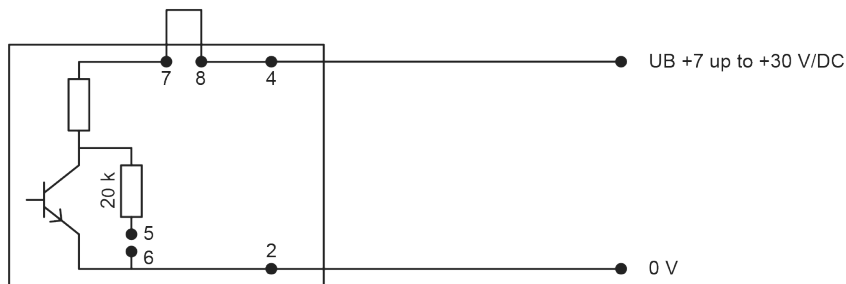
### 3-wire passive



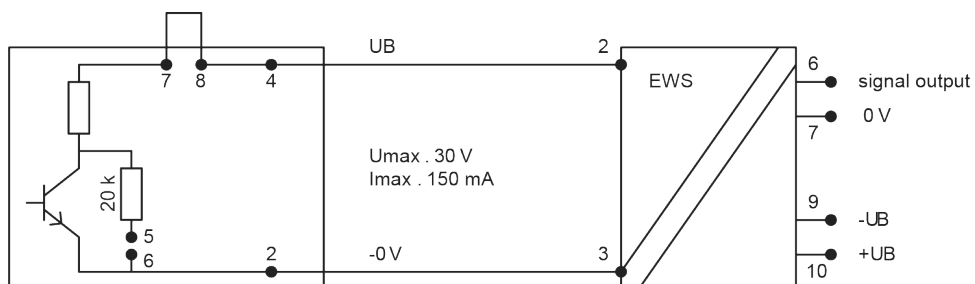
### 3-wire active



### 2-wire



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



## Ordering Code

	<b>FOP70</b>	-	<b>X</b>	<b>X</b>	-	<b>X</b>	<b>X</b>	<b>X</b>	-	<b>X</b>	<b>X</b>
<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), IECEX (Ex ia IIC T4 Gb)									Ex		
<b>Optionen</b>											
Custom spezific options											01 - 99

## Marking

### FOP 70:

KEM Küppers Elektromechanik GmbH

CE 0123  II 2G Ex ia IIC T4 Gb

ATEX: BVS 17 ATEX E 041

Ex ia IIC T4 Gb

IECEX: IECEX 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

CE 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; L<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

Only the original KEM battery pack BG.BATT-FOP-07 may be used. Otherwise the ex-approvals will be extinguished.

- a. Remove the empty battery
- b. Insert the new battery into the battery holder
- c. Insert the polarity-proof plug on the circuit board
- d. Dispose of empty battery properly





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