



OP-400 Optical Probe User Manual and Datasheet

Date:
Aug 2023



German Metring GmbH
www.german-metering.com

Address:
German Metering GmbH
Reuterweg 65
D-60323 Frankfurt am Main
Germany

Tel.: +49 (0) 69 / 770 622 - 06
Fax: +49 (0) 69 / 770 622 - 05

Index

1 About the product.....	2
2 Installation Topology	2
3 Wiring Configuration	2
4 Electrical Characteristics	2
5 Optical Characteristics	3
6 Absolute Maximum ratings	3
7 Cable Characteristic	3
8 Optical Filter Characteristics	3
8.1 Physical.....	3
8.2 Optical	4
8.3 Chemical Resistance	4
9 Mechanical Dimensions	4
10 Warnings.....	4
10.1 Electrostatic Sensitive Device Warnings.....	4
10.2 Magnet Safety Warnings	5
10.2.1 Damage to Magnetic Storage Media.....	5
10.2.2 Damage to Electronics	5
10.3 DISCLAIMER	5

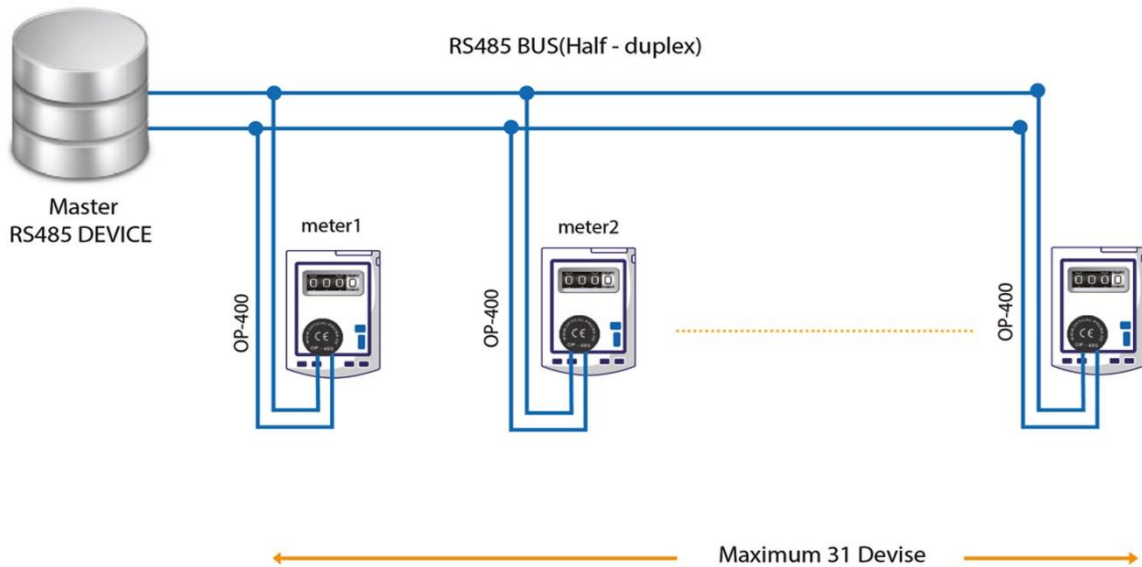
1 About the product

The Optical Probe OP-400 is an interface that communicates with peripheral devices such as electric meters, water meters, heat meters or smart gas meters via IR port. Any other device that supports the European standard IEC 62056-21 (IEC 1107) is compatible with this product and the maximum data rate is 19200 bit/s due to this standard.

Be noticed that OP-400 does not process or change the received nor transmitted data so no extra initial settings are required and these probes do not provide any network address by themselves. Custom-made products are available on demand.

2 Installation Topology

- Bus length: Maximum 1000 Meters (twisted pair).
- Multi-drop communication for up to 32 devices (Except this device 31 other devices could be connected to RS-485 BUS).
- Bidirectional Half-duplex communications possible over a single pair of twisted pair.
- The meters should be addressable because OP-400 is not addressable.



3 Wiring Configuration

Number	Signal Name	Wire Color	Description
1	VCC	Yellow ■	Power Voltage
2	B-	White ■	Data B (Inverting Pin)
3	B+	Green ■	Data A (non-Inverting Pin)
4	GND	Brown ■	Ground

4 Electrical Characteristics

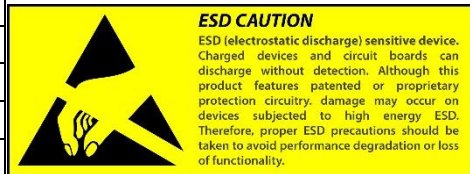
@25 °C	Min	Typical	Max	Unit
Supply Voltage	5	-	12	V
Consumption Current	4	6	15	mA

5 Optical Characteristics

	Min	Typical	Max	Unit
Peak Emission Wavelength		880		nm
Radiant Intensity	8.0	12		mW/sr
Viewing Angle	0	10	25	deg

6 Absolute Maximum ratings

Condition	Values
Maximum Operating Voltage	+12V0 ±0.3 tolerable
Operating Temperature	-30 to +60 °C
Differential Input Threshold (A, B)	-7 to +12 V
Driver Outputs (A, B)	0 to +3.3V
Storage Temperature	-40 to 85 °C
Ambient operating humidity	10% to 90%
Electrostatic Discharge	4 KV (Human body model)



Note: Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

7 Cable Characteristic

- Mutual capacitance:
 - C/C approx. 140 nF/km
 - C/S approx. 150 nF/km
- Peak operating voltage: (not for power applications) 250 V
- Inductivity: approx. 0.65 mH/km
- Based on: VDE 0812
- Specific insulation resistance: > 20 G Ω x cm
- Conductor stranding: Stranded, extra-fine wire
- Test voltage: 1200 V
- Temperature range:
 - Fixed installation: -30 to +80 °C
 - Occasional flexing: -5 to +70 °C
- Number of cores and mm² per conductor: 4 x 0,14
- Outer diameter (mm): 4.5±0.2mm
- Copper index (kg/km): 12.0
- Weight (kg/km): 27

8 Optical Filter Characteristics

8.1 Physical

Technical Data	Test Method	Unit	Approx. Value(s)
Pencil Hardness	ASTM D-3363	H	2 – 3H
Water Absorption	ASTM D-570	%	0.3

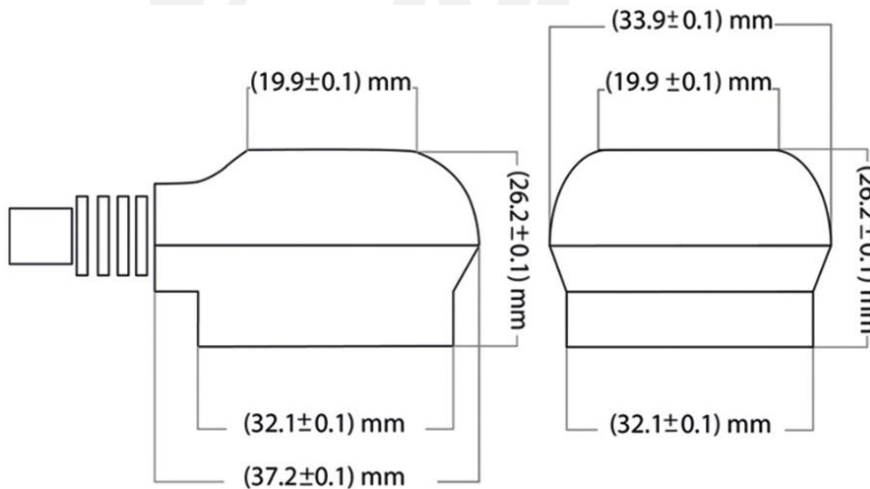
8.2 Optical

Technical Data	Test Method	Unit	Approx. Value(s)
Transmittance (From app. 800nm)	ASTM D-1003	%	92
Reflective Index	ASTM D-542	%	1.49

8.3 Chemical Resistance

"+" = no change, "x" = conditionally resistant, "-" = not resistant			
- Acetone	- Alcohol (96%)	+ Dilute Alcohol (50%)	- Amine
- Aniline	x Ether	- Aromatic Hydrocarbon	+ Ethylene glycol
+ Benzine	- Benzene	x Bromine Vapors	x Chlorine Vapors
- Chlorinated Hydrocarbon	- Ester	x Fluorine Vapors	x Formaldehyde (10-40%)
+ Glycerin	+ Factory fume	+ Hexane	- Ketones
- Paint thinner	+ Lanolin	+ Bases (10%)	x Bases (20%)
+ Methylamine	+ Mineral Oil	+ Chlorinated Paraffin	+ Petroleum Ether
- Phenol	+ Salt Solutions	+ Acids (20%)	- Carbon Tetrachloride
- Fuel mixture	+ Water	+ Xylene	

9 Mechanical Dimensions



10 Warnings

10.1 Electrostatic Sensitive Device Warnings

The enclosure of this device is safe against ESD (up to 4KV in Human body model). But safety precautions should be considered while touching bare ports (bare wire, connectors, etc.).



10.2 Magnet Safety Warnings

This device contains a strong Neodymium magnet. German Metering will NOT be responsible for personal injury or property damage resulting from the use or misuse of our products! Please use caution and common sense, and please read and understand our safety warnings below!



10.2.1 Damage to Magnetic Storage Media

Magnetic fields can cause damage to magnetic storage media. These include: cassette tapes, floppy disks, credit cards, video tapes, and computer hard drives. Keep this device at least 24 inches away from all types of magnetic media.

10.2.2 Damage to Electronics

Certain electronic devices are sensitive to magnetic fields and may be damaged permanently or temporarily disabled if exposed to a magnetic field that is too strong. Any video screen or television will become distorted and/or discolored if exposed to a strong magnetic field. While damaged screens can usually be demagnetized, it's often tricky and may require qualified service technicians to do so. Other electronic devices like cellphones and pagers can also be damaged. Store this device in a safe place away from electronics of any kind.

10.3 DISCLAIMER

German metering reserves the right to make corrections, enhancements, improvements and other changes to its products and services. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products (also referred to herein as "devices") are sold subject to German metering terms and conditions of sale supplied at the time of order acknowledgment.