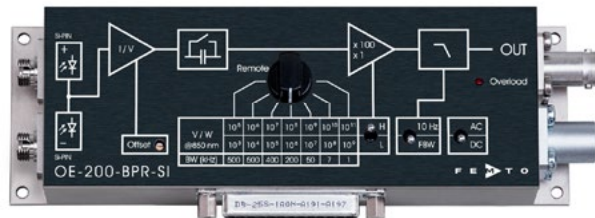




**Datasheet**
**OE-200-BPR-SI**
**Variable Gain Balanced Photoreceiver**


The picture shows model OE-200-BPR-SI-FC

<b>Features</b>	<ul style="list-style-type: none"> <li>• <b>Balanced Si-PIN detectors, active diameter 1.2 mm</b></li> <li>• <b>Common-Mode Rejection Ratio (CMRR) 50 dB typ.</b></li> <li>• <b>Spectral range 320 - 1060 nm</b></li> <li>• <b>Very low noise, NEP down to 13 fW/√Hz</b></li> <li>• <b>Bandwidth up to 500 kHz</b></li> <li>• <b>Conversion gain adjustable from 1 x 10<sup>3</sup> up to 1 x 10<sup>11</sup> V/W</b></li> <li>• <b>FC Fiber optic inputs</b></li> <li>• <b>Factory calibrated at 850 nm</b></li> <li>• <b>Full manual and remote control capability</b></li> </ul>
<b>Applications</b>	<ul style="list-style-type: none"> <li>• <b>Heterodyne detection</b></li> <li>• <b>Spectroscopy</b></li> <li>• <b>Differential optical front-end for oscilloscopes, spectrum analyzers, A/D converters and lock-in amplifiers</b></li> </ul>
<b>Block Diagram</b>	<p style="text-align: right;">BS01-OE-200-BPR_R1</p>

**SOPHISTICATED TOOLS FOR SIGNAL RECOVERY**
**F E M T O**

OE-200-BPR-SI\_R1/TH/06MAY2026

<b>Datasheet</b>		<b>OE-200-BPR-SI</b>																								
<b>Variable Gain Balanced Photoreceiver</b>																										
Intended Use	<p>The OE-200-BPR-SI is a low-noise, balanced variable gain photoreceiver. It is designed for fast and precise conversion of the difference between optical signals into equivalent output voltages. Operation is largely self-explanatory. If in doubt, consult this document or contact <a href="mailto:support@femto.de">support@femto.de</a>.</p> <p>For safe operation, please refer to the damage thresholds specified in the "Absolute Maximum Ratings", "Temperature Range" and "Power Supply" sections of this document.</p> <p>The operating environment must be free of smoke, dust, grease, oil, condensing moisture, and other contaminants that could affect the operation or performance.</p>																									
Related balanced Model	OE-200-BPR-IN-FC	Balanced InGaAs-PIN, integrated ball lens, 900 - 1700 nm, conversion gain calibrated at 1550 nm, 2 × FC fiber connectors (fix/permanent)																								
Related Single Channel Models	<table border="0" style="width: 100%;"> <tr> <td style="width: 20%; vertical-align: top;">Si Free Space</td> <td style="width: 15%;">OE-200-SI-FST</td> <td>Si-PIN, Ø 1.2 mm, 320 - 1060 nm, conversion gain adjusted at 850 nm, free space input, 1.035"-40 threaded flange</td> </tr> <tr> <td></td> <td>OE-200-UV-FST</td> <td>Si-PIN, 1.1 × 1.1 mm<sup>2</sup>, 190 - 1000 nm conversion gain adjusted at 850 nm, free space input, 1.035"-40 threaded flange</td> </tr> <tr> <td style="vertical-align: top;">Si Fiber Coupled</td> <td>OE-200-SI-FC</td> <td>Si-PIN, Ø 1.2 mm, 320 - 1060 nm, conversion gain calibrated at 850 nm, FC fiber connector (fix/permanent)</td> </tr> <tr> <td></td> <td>OE-200-UV-FC</td> <td>Si-PIN, 1.1 × 1.1 mm<sup>2</sup>, 190 - 1000 nm conversion gain calibrated at 850 nm, FC fiber connector (fix/permanent)</td> </tr> <tr> <td style="vertical-align: top;">InGaAs Free Space</td> <td>OE-200-IN1-FST</td> <td>InGaAs-PIN, Ø 300 µm, 900 - 1700 nm, conversion gain adjusted at 1310 nm, free space input, 1.035"-40 threaded flange</td> </tr> <tr> <td></td> <td>OE-200-IN2-FST</td> <td>InGaAs-PIN, Ø 300 µm, 900 - 1700 nm, conversion gain adjusted at 1550 nm, free space input, 1.035"-40 threaded flange</td> </tr> <tr> <td style="vertical-align: top;">InGaAs Fiber Coupled</td> <td>OE-200-IN1-FC</td> <td>InGaAs-PIN, integrated ball lens, 900 - 1700 nm, conversion gain calibrated at 1310 nm, FC fiber connector (fix/permanent)</td> </tr> <tr> <td></td> <td>OE-200-IN2-FC</td> <td>InGaAs-PIN, integrated ball lens, 900 - 1700 nm, conversion gain calibrated at 1550 nm, FC fiber connector (fix/permanent)</td> </tr> </table>		Si Free Space	OE-200-SI-FST	Si-PIN, Ø 1.2 mm, 320 - 1060 nm, conversion gain adjusted at 850 nm, free space input, 1.035"-40 threaded flange		OE-200-UV-FST	Si-PIN, 1.1 × 1.1 mm <sup>2</sup> , 190 - 1000 nm conversion gain adjusted at 850 nm, free space input, 1.035"-40 threaded flange	Si Fiber Coupled	OE-200-SI-FC	Si-PIN, Ø 1.2 mm, 320 - 1060 nm, conversion gain calibrated at 850 nm, FC fiber connector (fix/permanent)		OE-200-UV-FC	Si-PIN, 1.1 × 1.1 mm <sup>2</sup> , 190 - 1000 nm conversion gain calibrated at 850 nm, FC fiber connector (fix/permanent)	InGaAs Free Space	OE-200-IN1-FST	InGaAs-PIN, Ø 300 µm, 900 - 1700 nm, conversion gain adjusted at 1310 nm, free space input, 1.035"-40 threaded flange		OE-200-IN2-FST	InGaAs-PIN, Ø 300 µm, 900 - 1700 nm, conversion gain adjusted at 1550 nm, free space input, 1.035"-40 threaded flange	InGaAs Fiber Coupled	OE-200-IN1-FC	InGaAs-PIN, integrated ball lens, 900 - 1700 nm, conversion gain calibrated at 1310 nm, FC fiber connector (fix/permanent)		OE-200-IN2-FC	InGaAs-PIN, integrated ball lens, 900 - 1700 nm, conversion gain calibrated at 1550 nm, FC fiber connector (fix/permanent)
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Available Accessories	PRA-PAP   PS-15-25-L 	<p>Alternative mounting option: post adapter plate, easy to mount on FEMTO photoreceiver series OE, FWPR, PWPR, HCA-S and LCA-S</p> <p>Power Supply input: 100 – 240 VAC output: ±15 VDC</p>																								
<b>SOPHISTICATED TOOLS FOR SIGNAL RECOVERY</b>		<b>F E M T O</b>																								

OE-200-BPR-SI\_R1/TH/06MAY2026

**Datasheet**
**OE-200-BPR-SI**
**Variable Gain Balanced Photoreceiver**

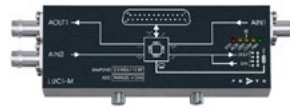
 Available Accessories  
(continued)

LUCI-10



Compact digital I/O interface for USB remote control, supports opto-isolation of amplifier signal path from PC USB port, 16 digital outputs, 3 opto-isolated digital inputs, bus-powered operation

LUCI-M



Compact, universal USB system for data acquisition (DAQ) and control, up to 4 parallel 16 bit ADC channels with 2.5 MS/s, 3 12 bit DAC channels, 24 digital I/O s galvanic isolation from computer,

Specifications

Test conditions

 $V_s = +15\text{ V}$ ,  $T_a = 25\text{ }^\circ\text{C}$ , output load impedance  $1\text{ M}\Omega$ , warm-up 20 minutes (min. 10 minutes recommended)

Gain

Conversion gain

 $1 \times 10^3 \dots 1 \times 10^{11}\text{ V/W}$  (@ 850 nm, output load  $\geq 100\text{ k}\Omega$ )

Gain accuracy

 $\pm 1\%$  electrical, between settings

Conversion gain accuracy

 $\pm 5\%$  (@  $P_{\text{OPT}} \leq 1\text{ mW}$ , 850 nm) guaranteed by factory calibration\*

\* factory verified with MM 50/125, FC/APC, NA 0.22 (when using FC/PC fiber connector, coupling efficiency may differ slightly), coupling efficiency depends on fiber type.

Gain drift

see table below

Frequency Response

Lower cut-off frequency

DC / 1 Hz, switchable

Upper cut-off frequency (-3 dB)

up to 500 kHz (see table below), switchable to 10 Hz

Input

Input offset current (dark current)

 $2\text{ pA}$  typ for each photo diode.

Common mode rejection

 $50\text{ dB}$  typ.

Input offset compensation range

 $\pm 600\text{ pA}$ , adjustable by offset potentiometer or  $\pm 400\text{ pA}$ , adjustable by external control voltage

Input offset drift

see table below

Noise equivalent power (NEP)

see table below

Max. differential CW power

see table below

Max. optical CW balanced power (common mode power)

 $10\text{ mW}$  (on each photodiode, @ 850 nm)

Detector

Detector type

 $2 \times \text{Si-PIN}$  photodiodes

Active area

 $\varnothing 1.2\text{ mm}$ 

Spectral range

 $320 - 1060\text{ nm}$ 

Sensitivity

 $0.61\text{ A/W}$  (@ 850 nm)

 $0.64\text{ A/W}$  (@ 900 nm)

Output

Output voltage

 $\pm 10\text{ V}$  (@  $\geq 100\text{ k}\Omega$  output load)

Output impedance

 $50\ \Omega$  (terminate with  $\geq 10\text{ k}\Omega$  load)

Max. output current

 $\pm 30\text{ mA}$  (short-circuit proof)

SOPHISTICATED TOOLS FOR SIGNAL RECOVERY

**F E M T O**

OE-200-BPR-SI\_R1/TH/06MAY2026

**Datasheet**
**OE-200-BPR-SI**
**Variable Gain Balanced Photoreceiver**
**Specifications (continued)**

 Performance depending  
on Gain Setting

Gain setting (low noise) (V/W)**	10 <sup>3</sup>	10 <sup>4</sup>	10 <sup>5</sup>	10 <sup>6</sup>	10 <sup>7</sup>	10 <sup>8</sup>	10 <sup>9</sup>
Upper cut-off frequency (-3 dB)	500 kHz	500 kHz	400 kHz	200 kHz	50 kHz	7 kHz	1.1 kHz
Rise/fall time (10 % - 90 %)	700 ns	700 ns	900 ns	1.8 µs	7 µs	50 µs	300 µs
NEP (√Hz)**	40 pW	5.0 pW	1.0 pW	310 fW	97 fW	34 fW	13 fW
Measured at	10 kHz	10 kHz	10 kHz	1 kHz	1 kHz	100 Hz	100 Hz
Integr. input noise (RMS)***	44 nW	5.3 nW	1.4 nW	500 pW	140 pW	18 pW	2.7 pW
Input offset drift (°C)**	60 nW	6 nW	0.6 nW	51 pW	5.1 pW	0.8 pW	0.6 pW
Gain drift (°C)	0.008%	0.008%	0.008%	0.01%	0.01%	0.01%	0.02%
Max. differential CW power**	2 mW	1 mW	0.1 mW	10 µW	1 µW	0.1 µW	10 nW
Gain setting (high speed) (V/W)**	10 <sup>5</sup>	10 <sup>6</sup>	10 <sup>7</sup>	10 <sup>8</sup>	10 <sup>9</sup>	10 <sup>10</sup>	10 <sup>11</sup>
Upper cut-off frequency (-3 dB)	500 kHz	500 kHz	400 kHz	200 kHz	50 kHz	7 kHz	1.1 kHz
Rise/fall time (10 % - 90 %)	700 ns	700 ns	900 ns	1.8 µs	7 µs	50 µs	300 µs
NEP (√Hz)**	19 pW	2.4 pW	1.0 pW	210 fW	97 fW	35 fW	16 fW
Measured at	10 kHz	10 kHz	10 kHz	1 kHz	1 kHz	100 Hz	100 Hz
Integr. input noise (RMS)***	19 nW	3.1 nW	1.1 nW	430 pW	130 pW	17 pW	2.5 pW
Input offset drift (°C)**	60 nW	6 nW	0.6 nW	51 pW	5.1 pW	0.8 pW	0.6 pW
Gain drift (°C)	0.008%	0.008%	0.008%	0.01%	0.01%	0.01%	0.02%
Max. differential CW power**	0.1 mW	10 µW	1 µW	0.1 µW	10 nW	1 nW	0.1 nW

\*\*referred to 850 nm

\*\*\*The integrated input noise is measured with a shaded input in the full bandwidth ("FBW") setting (referred to 850 nm). Measurement bandwidth of the oscilloscope was 20 MHz.

The input referred peak-peak noise can be calculated from the RMS noise as follows:

$$P_{\text{Input noise peak-to-peak}} = P_{\text{Input noise RMS}} \times 6$$

The output noise is given by:

$$U_{\text{Output noise RMS}} = P_{\text{Input noise RMS}} \times \text{gain}$$

$$U_{\text{Output noise peak-to-peak}} = U_{\text{Output noise RMS}} \times 6 = P_{\text{Input noise RMS}} \times \text{gain} \times 6$$

The integrated noise will be reduced considerably by setting the low pass filter to "10 Hz" instead of "FBW".

Indicator LED	Function	overload
Digital Control	Control input voltage range	LOW bit: -0.8 V ... +1.2 V, HIGH bit: +2.3 V ... +12 V
	Control input current	0 mA @ 0 V, 1.5 mA @ +5 V, 4.5 mA @ +12 V
	Overload output	non active: <0.4 V @ 0 ... -1 mA active: typ. 5 ... 5.1 V @ 0 ... 2 mA
Ext. Offset Control	Control voltage range	±10 V
	Offset control input impedance	20 kΩ
	Conversion factor	40 pA/V
Optical Input Connector	Material FC receptacle	nickel silver
Power Supply	Supply voltage	±15 V (±14.75 V ... ±16.5 V)
	Supply current	±110 / -80 mA typ. (depends on operating conditions, recommended power supply capability min. ±200 mA)
Case	Weight	360 g (0.79 lbs)
	Material	AlMg4.5Mn, nickel-plated
Temperature Range	Storage temperature	-40 °C ... +80 °C
	Operating temperature	0 °C ... +60 °C

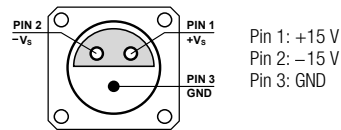
**SOPHISTICATED TOOLS FOR SIGNAL RECOVERY**
**F E M T O**

OE-200-BPR-SI\_R1/TH/06MAY2026

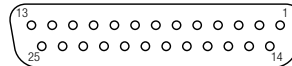
**Datasheet**
**OE-200-BPR-SI**
**Variable Gain Balanced Photoreceiver**

Absolute Maximum Ratings (Damage Threshold)	Optical input power (CW) Digital control input voltage Analog control input voltage Power supply voltage	20 mW for each photodiode -5 V/+16 V relative to digital ground DGND (pin 9) ±15 V relative to analog ground AGND (pin 3) ±20 V
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Connectors	Input Output Power supply	2 × FC fiber optic connectors BNC jack (female) LEMO® series 1S, 3-pin fixed socket (mating plug type: FFA.1S.303.CLAC52)
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Control port	Sub-D 25-pin, female, qual. class 2
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- Pin 1: +12 V (stabilized power supply output\*)
- Pin 2: -12 V (stabilized power supply output\*)
- Pin 3: AGND (analog ground)
- Pin 4: +5 V (stabilized power supply output\*)
- Pin 5: digital output: overload (referred to pin 3)
- Pin 6: signal output (connected to BNC)
- Pin 7: NC
- Pin 8: input offset control voltage
- Pin 9: DGND (ground for digital control pins 10 - 14)
- Pin 10: digital control input: gain, LSB
- Pin 11: digital control input: gain
- Pin 12: digital control input: gain, MSB
- Pin 13: digital control input: AC/DC
- Pin 14: digital control input: high speed / low noise
- Pin 15 - 25: NC

\*stabilized power supply output current  
±12 V: max. ±50 mA, +5V: max. 30 mA

**SOPHISTICATED TOOLS FOR SIGNAL RECOVERY**
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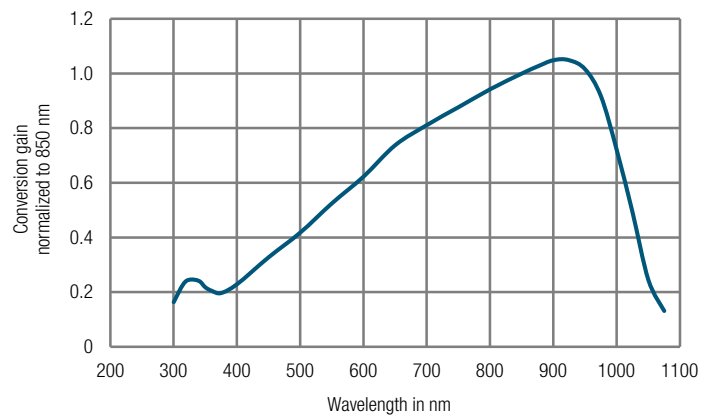
**Datasheet**
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Remote Control Operation	General	Remote control input bits are opto-isolated and connected by logical OR function to local switch settings. For remote control set the corresponding local switches to "Remote", "AC" and "H" (High speed) and select the wanted setting via a bit code at the corresponding digital inputs.  Mixed operation, e.g. local gain setting and remote controlled AC/DC setting, is also possible.  Switch setting "FBW / 10 Hz" of the low pass signal filter is not remote controllable.				
	Gain setting	Low noise	High speed			
		Pin 14=HIGH	Pin 14=LOW	Pin 12	Pin 11	Pin 10
		Gain (V/W)	Gain (V/W)	MSB		LSB
		10 <sup>3</sup>	10 <sup>5</sup>	LOW	LOW	LOW
		10 <sup>4</sup>	10 <sup>6</sup>	LOW	LOW	HIGH
		10 <sup>5</sup>	10 <sup>7</sup>	LOW	HIGH	LOW
		10 <sup>6</sup>	10 <sup>8</sup>	LOW	HIGH	HIGH
		10 <sup>7</sup>	10 <sup>9</sup>	HIGH	LOW	LOW
		10 <sup>8</sup>	10 <sup>10</sup>	HIGH	LOW	HIGH
		10 <sup>9</sup>	10 <sup>11</sup>	HIGH	HIGH	LOW
	Gain settling time	<150 ms				
	AC/DC setting	Coupling		Pin 13		
		AC		LOW		
		DC		HIGH		

Scope of Delivery OE-200-BPR-SI-FC, LEMO® 3-pin connector, datasheet, transport package

Ordering Information OE-200-BPR-SI-FC Balanced photoreceiver, 2 × FC fiber optic connectors (fix/permanent, FC/PC and FC/APC compatible).

Conversion Gain

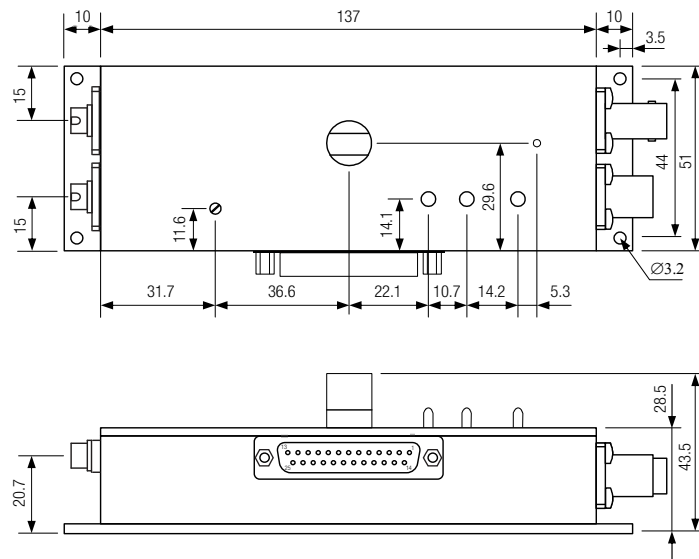

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**Datasheet**
**OE-200-BPR-SI**
**Variable Gain Balanced Photoreceiver**

Dimensions

OE-200-BPR-SI-FC



02-OE-200-BPR-FC\_R1

all dimensions in mm unless otherwise noted

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