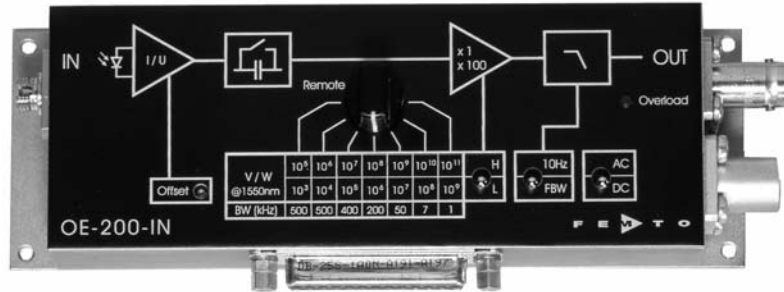


Variable-Gain Photoreceiver - Fast Optical Power Meter



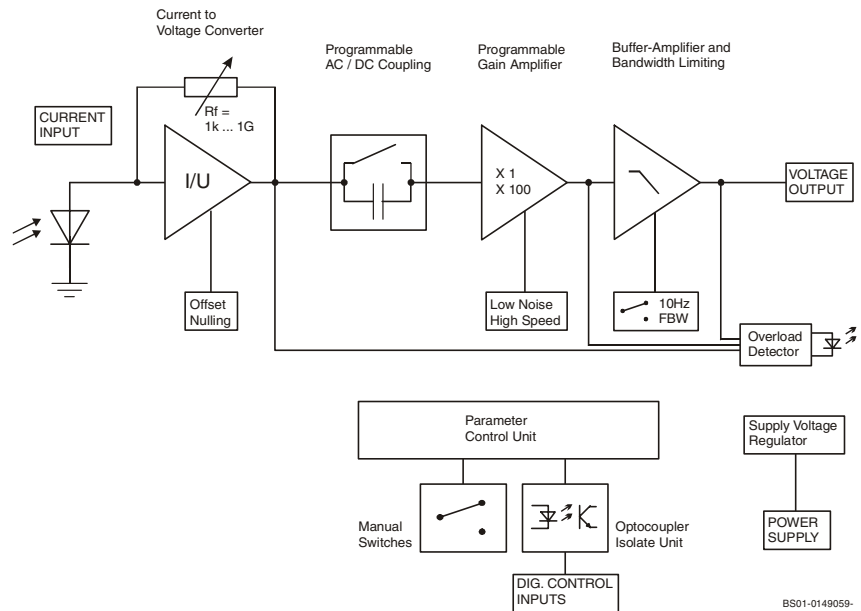
Features

- InGaAs PIN Detector, \varnothing 100 μ m Active Diameter, FC or ST Fiber Receptacle
- Spectral Range 900 - 1700 nm
- Conversion Gain Switchable from 1×10^3 to 1×10^{11} V/W
- Calibrated at 1550 nm, Traceable to NIST Standards
- Bandwidth up to 500 kHz
- Local and Remote Control

Applications

- Fast Optical Power Meter
- Spectroscopy
- General-Purpose Opto-Electrical Measurements
- Optical Receiver for Use with Lock-In Amplifiers

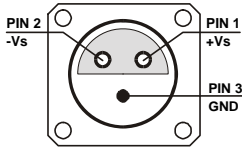
Block Diagram



Variable-Gain Photoreceiver - Fast Optical Power Meter

Specifications	<i>Test Conditions</i>	<i>V_s = ± 15 V, T_a = 25°C</i>							
Gain	Conversion Gain	1 x 10 ³ ... 1 x 10 ¹¹ V/W (@ 1550 nm)							
	Gain Accuracy	± 5 % electro-optical (P _{opt} ≤ 1 mW), traceable to NIST							
	Gain Drift	see table below							
Frequency Response	Lower Cut-Off Frequency	DC / 1 Hz, switchable							
	Upper Cut-Off Frequency	up to 500 kHz (see table), switchable to 10 Hz							
	Gain Flatness	± 0.1 dB							
	Gain Accuracy	± 1 % electrical, between settings							
Input	NEP	see table							
	Max. cw-Saturation Power	see table							
	Dark Current Compensation	± 500 pW, adjustable by offset trimpot and external control voltage							
Detector	Detector	InGaAs PIN photodiode in FC or ST fiber receptacle							
	Active Area	Ø 100 µm							
	Spectral Response	900 – 1700 nm							
	Sensitivity	0.95 A/W (@ 1550 nm)							
	Dark Current	2 pA typ.							
Performance Depending on Gain Setting	Gain Setting (Low Noise) (V/W)	10 ³	10 ⁴	10 ⁵	10 ⁶	10 ⁷	10 ⁸	10 ⁹	
	Upper Cut-Off Frequency (- 3 dB)	500 kHz	500 kHz	400 kHz	200 kHz	45 kHz	7 kHz	1.2 kHz	
	Rise / Fall Time (10% - 90%)	700 ns	700 ns	900 ns	1.8 µs	8 µs	50 µs	300 µs	
	NEP (√Hz, @ 100Hz)	23 pW	2.6 pW	530 fW	150 fW	53 fW	21 fW	10 fW	
	Offset Current Drift (°C)	40 nW	4 nW	0.4 nW	34 pW	3.4 pW	0.5 pW	0.4 pW	
	Gain Drift (°C)	0.008%	0.008%	0.008%	0.01%	0.01%	0.01%	0.02%	
	cw-Saturation Power	2 mW	1 mW	0.1 mW	10 µW	1 µW	0.1 µW	10 nW	
	Gain Setting (High Speed) (V/W)	10 ⁵	10 ⁶	10 ⁷	10 ⁸	10 ⁹	10 ¹⁰	10 ¹¹	
	Upper Cut-Off Frequency (- 3 dB)	500 kHz	500 kHz	400 kHz	200 kHz	45 kHz	7 kHz	1.2 kHz	
	Rise / Fall Time (10% - 90%)	700 ns	700 ns	900 ns	1.8 µs	8 µs	50 µs	300 µs	
	Min. NEP (√Hz, @ 100Hz)	15 pW	2.1 pW	510 fW	150 fW	53 fW	21 fW	10 fW	
	Offset Current Drift (°C)	40 nW	4 nW	0.4 nW	34 pW	3.4 pW	0.5 pW	0.4 pW	
	Gain Drift (°C)	0.008%	0.008%	0.008%	0.01%	0.01%	0.01%	0.02%	
	cw-Saturation Power	0.1 mW	10 µW	1 µW	0.1 µW	10 nW	1 nW	0.1 nW	
	Output	Output Voltage	± 10 V (@ > 10 kΩ load)						
Output Impedance		50 Ω (terminate with > 10 kΩ load for best performance)							
Max. Output Current		± 30 mA							
Indicator LED	Function	Overload							
Digital Control	Control Input Voltage Range	Low: - 0.8 ... + 1.2 V, High: + 2.3 ... + 12 V							
	Control Input Current	0 mA @ 0 V, 1.5 mA @ + 5 V, 4.5 mA @ + 12 V							
	Overload Output	non active: 0 V, max. -1 mA, active: 5.1 V, max. 7 mA							
Ext. Offset Control	Control Voltage Range	± 10 V							
	Offset Control Input Impedance	20 kΩ							

Variable-Gain Photoreceiver - Fast Optical Power Meter

Specifications (continued)	<p>Power Supply</p> <p>Supply Voltage $\pm 15\text{ V}$ Supply Current $+ 150 / -100\text{ mA}$ (depends on operating conditions, recommended power supply capability minimum 250 mA) Stabilized Power Supply Output $\pm 12\text{ V}$, max. 150 mA, $+ 5\text{V}$, max. 50 mA</p> <p>Case</p> <p>Weight 320 g (0.74 lbs) Material AlMg4.5Mn, nickel-plated</p> <p>Temperature Range</p> <p>Storage Temperature $-40 \dots +80\text{ }^\circ\text{C}$ Operating Temperature $0 \dots +60\text{ }^\circ\text{C}$</p>
Absolute Maximum Ratings	<p>Max. cw-Power (averaged) 20 mW Control Input Voltage $- 5\text{ V} / + 16\text{ V}$ Power Supply Voltage $\pm 22\text{ V}$</p>
Connectors	<p>Input optical, FC or ST fiber receptacle</p> <p>Output BNC</p> <p>Power Supply</p> <p>LEMO series 1S, 3-pin fixed socket Pin 1: $+ 15\text{V}$ Pin 2: $- 15\text{V}$ Pin 3: GND</p> <div style="text-align: center;">  </div> <p>Control Port</p> <p>Sub-D 25-pin, female, qual. class 2 Pin 1: $+12\text{V}$ (stabilized power supply output) Pin 2: -12V (stabilized power supply output) Pin 3: AGND (analog ground) Pin 4: $+5\text{V}$ (stabilized power supply output) Pin 5: digital output: High = overload 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</p>
Available Models	<p>OE-200-IN2-FC FC receptacle, calibrated at 1550 nm OE-200-IN2-ST ST receptacle, calibrated at 1550 nm</p>

Variable-Gain Photoreceiver - Fast Optical Power Meter

Remote Control Operation

General

Remote control input bits are opto-isolated and connected by a logical OR function to the local switch settings. For remote control set the corresponding local switches to "Remote", "AC" and "H" and select the desired setting via a bit-code at the corresponding digital inputs. Mixed operation, e.g. local AC/DC setting and remote controlled gain setting, is also possible.

The switch setting "FBW / 10 Hz" of the lowpass signal filter is not remote controllable.

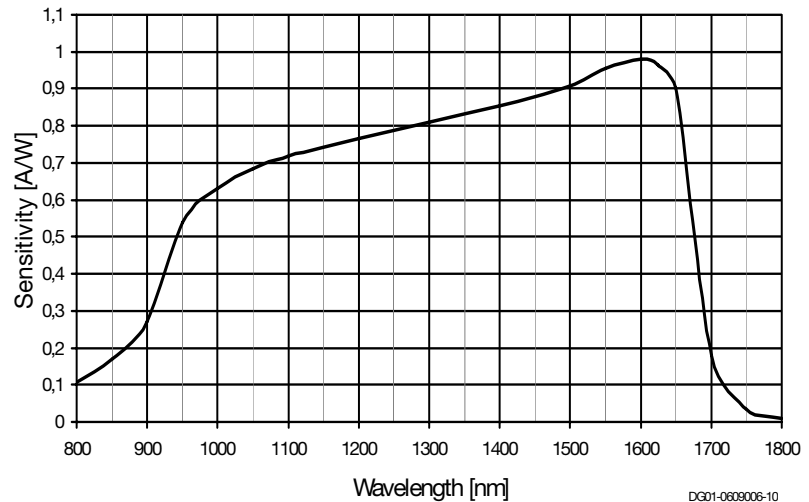
Gain Setting

Low Noise Gain (V/W) Pin 14=High	High Speed Gain (V/W) Pin 14=Low	Pin 10 LSB	Pin 11	Pin 12 MSB
10^3	10^5	Low	Low	Low
10^4	10^6	High	Low	Low
10^5	10^7	Low	High	Low
10^6	10^8	High	High	Low
10^7	10^9	Low	Low	High
10^8	10^{10}	High	Low	High
10^9	10^{11}	Low	High	High

AC/DC Setting

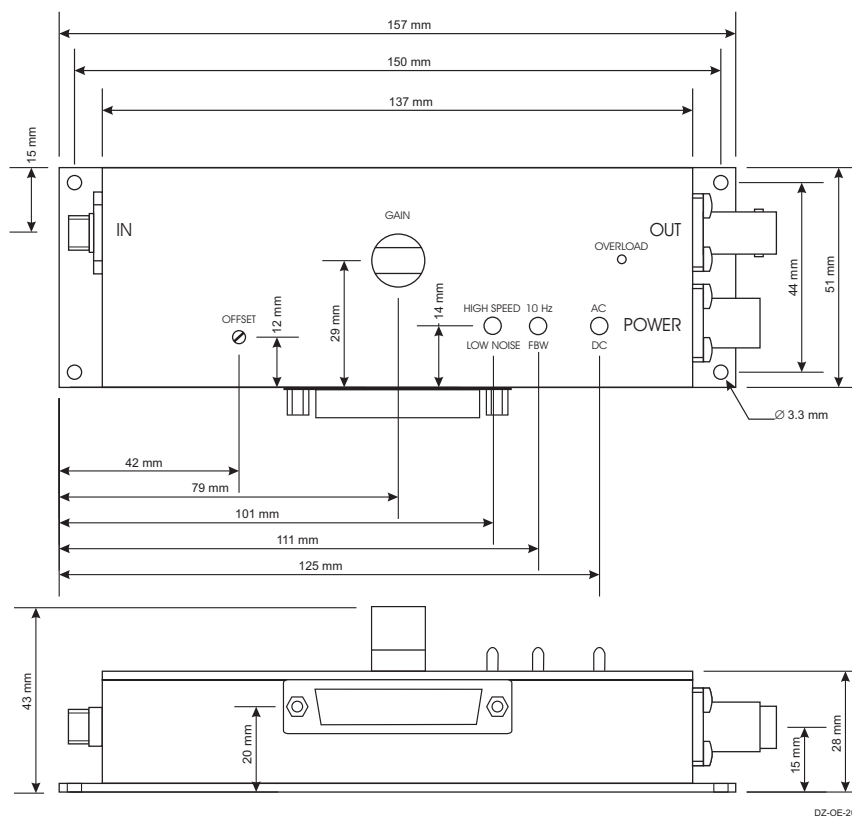
Coupling	Pin 13
AC	Low
DC	High

Spectral Response



Variable-Gain Photoreceiver - Fast Optical Power Meter

Dimensions



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