



Example Assembling
(see: Recommended Accessories)

Features

- Compact size
- High signal-to-noise ratio
- Dedicated for operation with 2-, 3- and 4-stage TE cooled or uncooled detectors
- Parameters settable by the user:
 - output voltage offset
 - gain (in 40 dB range)
 - bandwidth:
 - 150 kHz, 1.5 MHz, 20 MHz
 - 1.5 MHz, 15 MHz, 200 MHz
 - coupling AC/DC
 - detector parameters (in some cases, with limitation)
- Programmable modules and programmable controllers are interchangeable
- Highly flexible configuration allows the user to adapt the module to variety of system parameters
- Additional accessories available

Applications

- Contactless temperature measurement
- Free space optical communication
- Laser radiation detection
- Gas analysis
- Fourier spectroscopy
- Fire, flame and human body detection
- Pyrometers, scanners
- Nondestructive material testing
- OEM applications

Preamplifier Specification

Parameter	Symbol	Unit	Typical Value	Conditions, Remarks
Input Noise Voltage Density	e_n	$\frac{nV}{\sqrt{Hz}}$	0.95	$f_o = 10 \text{ kHz}^{2)}$
Input Noise Current Density	i_n	$\frac{pA}{\sqrt{Hz}}$	4.5 ¹⁾ 7.0 ¹⁾	first stage transimpedance = 5 kΩ first stage transimpedance = 1 kΩ
Low Cut-Off Frequency	f_{lo}	Hz	DC/1k	user configurable by software
High Cut-Off Frequency	f_{hi}	Hz	150k/1.5M/20M ³⁾ 1.5M/15M/200M ³⁾	maximum values, with limited range of detector with „in circuit” filter activated
Transimpedance	K_i	$\frac{V}{A}$	250 – 25k 1.25k – 125k	first stage transimpedance = 5 kΩ first stage transimpedance = 1 kΩ
Output Impedance	R_{out}	Ω	50	
Output Voltage Swing	V_{out}	V	±1	with 50 Ω load applied
Output Voltage Offset	V_{off}	mV	max ±25 ⁴⁾ max ±10	DC coupling set AC coupling set
Power Supply Voltage	V_{sup}	V	±9	
Power Supply Current	I_{sup}	mA	typ ±80 max ±100	
Dimensions	-	mm×mm×mm	40×81.3×40 40×82.8×40 40×84.3×40	width×depth×height - with 2TE width×depth×height - with 3TE width×depth×height - with 4TE
Operation Temperature	T	°C	+5...+35	
Storage Temperature	-	°C	-10...+50	
Relative Humidity	-	%	10...90	

Electrical characteristics @ $T_a=20 \text{ }^\circ\text{C}$.

¹⁾ The preamplifier noise may significantly reduce the system performance in some situations. This happens for large capacitance detectors operating at high frequencies.

²⁾ f_o – noise measurement frequency

³⁾ Depending on preamplifier option.

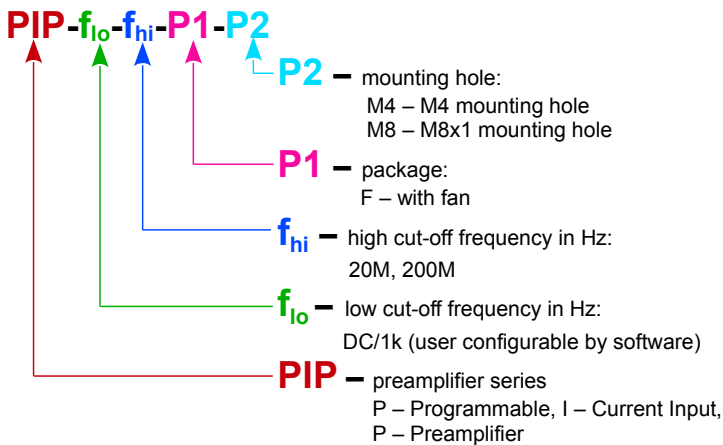
⁴⁾ Measured with equivalent resistor at the input instead of the detector. It's to avoid the environmental thermal radiation's impact.

Description

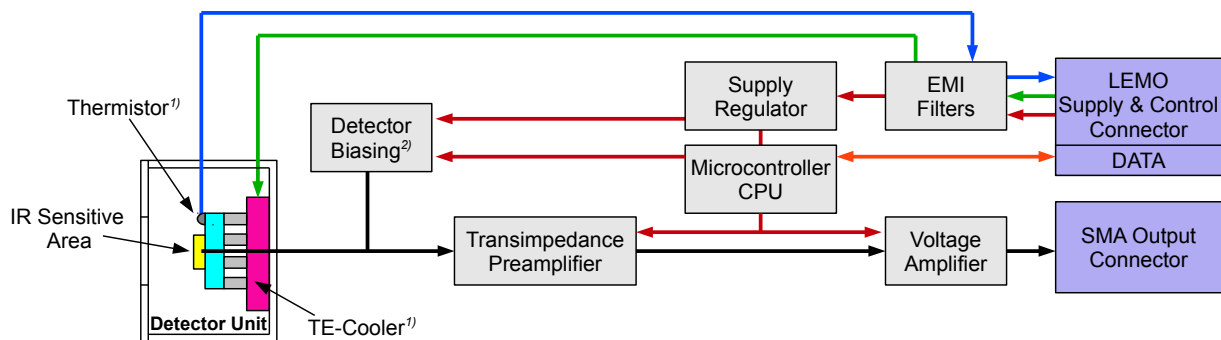
PIP is the programmable “smart” preamplifier. Due to the modern internal configuration, it offers extreme flexibility combined with superior signal parameters and high reliability. Included voltage monitor allows user to check the working conditions (supply voltages, detector bias voltage, first and last stage output voltage offset etc.)

- User may also immediately change the gain, coupling (AC/DC), optimize the first stage transimpedance (in terms of input noise and overall bandwidth), reduce the bandwidth down to 1.5 MHz (for suppressing wideband noise and convenient weak signal observation), and also manually or automatically suppress the voltage offset.
- The optimized parameters are immediately stored into the internal EEPROM memory and automatically loaded after the power is on.
- Reset to the factory settings is always available, and following the manual, the operation and manipulation is both: easy and safe.
- In some cases, detector biasing condition may be adjusted, however, for detector safety this function is blocked in factory by default.

Preamplifier Code Description



Schematic Diagram



¹⁾, Only for TE-cooled detectors
²⁾ Only for biased detectors

Operation

After turning on the controller, blinking LEDs, or splash screen are shown (depending on the version). The **PTCC-01** controller probes the version of IR module, and when **PIP** is found, the content of its internal memory is downloaded, and following the data, proper working conditions are set: detector temperature, module supply voltage and above mentioned preamplifier parameters. From the user point of view: **PTCC-01** informs of cooling down the detector indicated by blinking green LOCK LED, and when the valid temperature is reached, module supply is switched on and the IR detecting set is ready to operate.

- The intelligent controller and intelligent module together constantly probe the working conditions and, if any potential risk is recognized (overloading the supply or TEC lines, overheating the module, opening up the temperature stabilization loop etc.) the module is being shut down, and ERROR LED is on.
- For controlling the preamplifier parameters or performing a firmware update, please use the PC software. Parameters may be controlled by using **PTCC-01-ADV** – no PC is then necessary.

WARNING! For proper operation, **PIP** preamplifier integrated with IR detector should be connected to the **PTCC-01** controller.

The preamplifier can be integrated with following types IR detectors:

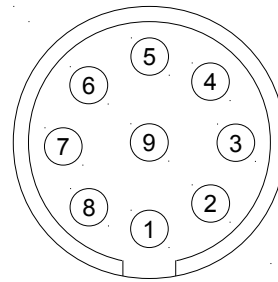
Detector Type	Description
PC, PC-2TE, PC-3TE, PC-4TE	photoconductive
PCI, PCI-2TE, PCI-3TE, PCI-4TE	photoconductive, optically immersed
PV, PV-2TE, PV-3TE, PV-4TE	photovoltaic
PVI, PVI-2TE, PVI-3TE, PVI-4TE	photovoltaic, optically immersed
PVM, PVM-2TE, PVM-3TE, PVM-4TE	multiple heterojunction photovoltaic
PVMI, PVMI-2TE, PVMI-3TE, PVMI-4TE	multiple heterojunction photovoltaic, optically immersed

Symbol -2TE, -3TE, -4TE means 2-, 3- or 4-stage TEC integrated with detector. No TE mark informs that the detector is not TE cooled.

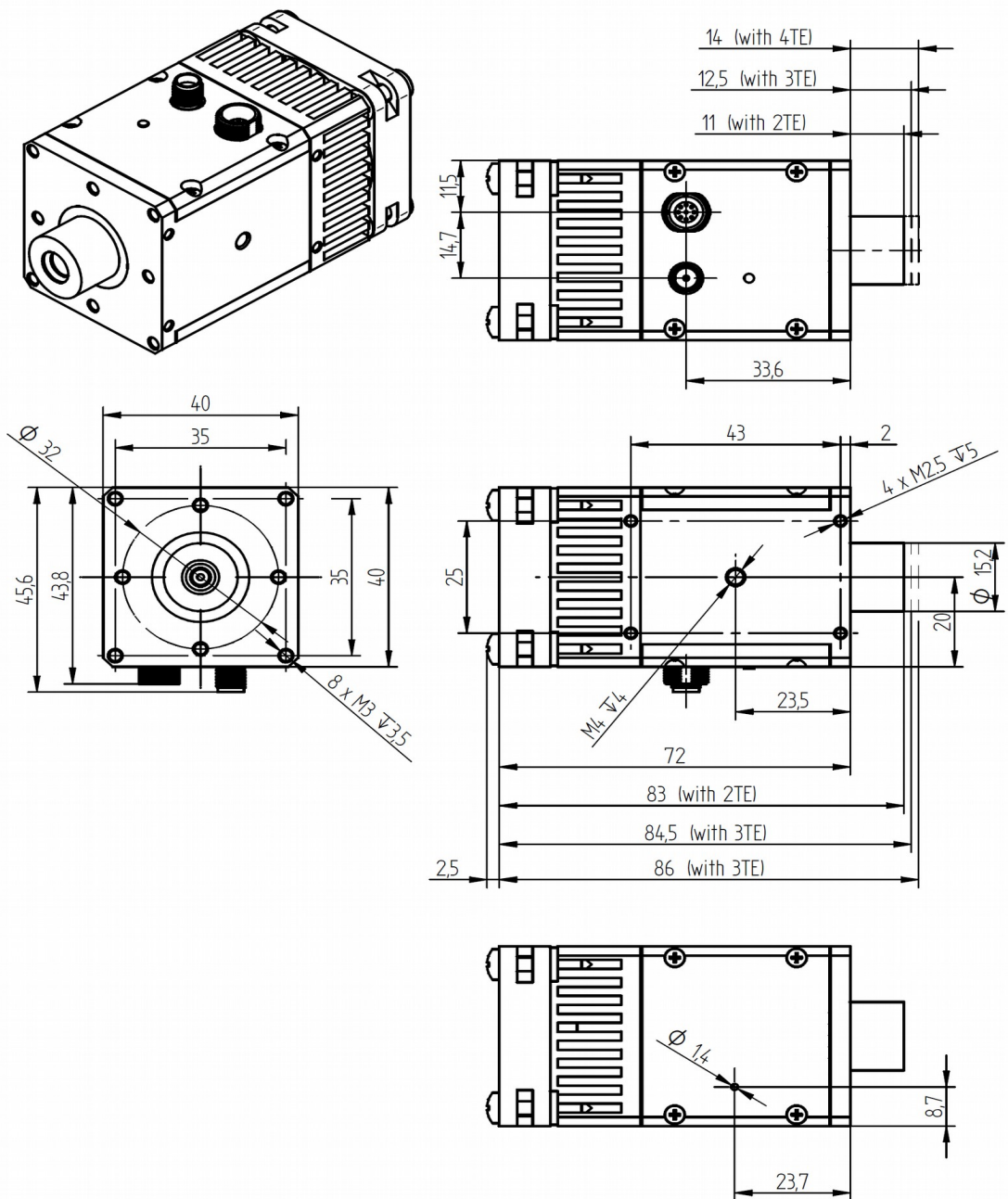
Power Supply and TEC Control Connector

Pin Number	Symbol	Function
1	FAN+	FAN (+)
2	TH2	thermistor output (2)
3	TEC-	TEC supply input (-)
4	-V _{sup}	power supply input (-)
5	GND	power ground
6	+V _{sup}	power supply input (+)
7	TEC+	TEC supply input (+)
8	TH1	thermistor output (1)
9	DATA	data pin

LEMO Connector Female



Physical Dimensions [mm]



Recommended Accessories

PTCC-01-OEM	PTCC-01-BAS	PTCC-01-ADV	SMA-BNC	SMA-SMA
Programmable "Smart" TEC Controller – OEM	Programmable "Smart" TEC Controller – Basic	Programmable "Smart" TEC Controller – Advanced	Signal Output Cable	Signal Output Cable
LEMO-DB9	LEMO-DUBOX2x5	KK2-POWER	USB: TypeA-MicroB	AC Adaptor
TEC and Supply Cable	TEC and Supply Cable	Power Supply Cable	Cable for PC Connection	Power Supply Adaptor
DRB-1	DRB-2	MP	PH	STA-8x1-4
Base Mounting System	Base Mounting System	Mounting Post	Post Holder	Special Thread Adapter