The output side is the **same three wires as any pressure sensor** — supply, ground, signal — so it wires into any analog input and calibrates with two points. Sold as the **module alone**: the probe and the bung it threads into are bought separately, to the specifications under Recommended to use with.



EG5



EG12

Specifications

EG5 · EG12

PARAMETER	EG5	EG12
MEASUREMENT		
Sensor	Type K thermocouple, ungrounded	Type K thermocouple, ungrounded
Range	0 – 960 °C	0 – 1250 °C
Scaling	5 mV/°C	4 mV/°C
Zero	0.000 V = 0 °C	0.000 V = 0 °C
Full scale	4.800 V at 960 °C	5.000 V at 1250 °C
At a 10-bit input	≈ 0.98 °C per count	≈ 1.22 °C per count
OUTPUT		
Type	0 – 5 V analog, single ended	0 – 5 V analog, single ended
Source impedance	Amplifier output, no series resistor	≤ 150 Ω
Drives	10 kΩ analog input	10 kΩ input, or a thermistor input with a 2.49 kΩ pull-up to 5 V
Maximum output	Supply rail	≈ 5.3 V — buffered off a regulated rail, cannot reach the supply
Open probe	Drives high	Drives to 5 V
SUPPLY		
Voltage	5 V — the ECU's sensor rail	8 – 16 V switched, 12 V nominal
Current	≤ 2 mA. Design value, not yet measured	≤ 5 mA. Design value, not yet measured
Reverse polarity	Not protected	**Protected indefinitely.** Design value, not yet tested

PARAMETER	EG5	EG12
Jump start	Not applicable at 5 V	24 V for 5 minutes. Design value, not yet tested
Load dump	Not applicable at 5 V	Transient to 40 V. Designed for a load dump that peaks at 40 V, and for its bench test: 4,700 microfarads charged to 40 V and discharged into the module's 12 V input through 1 Ω. Design values, not yet tested
Input protection	Direct input	Series limits, RC filter and clamp diodes on both legs
AMPLIFIER		
Part	AD8495, MSOP-8	AD8497ARMZ, MSOP-8
Initial accuracy	±3 °C at 25 °C	±3 °C at 60 °C
Ambient rejection	0.05 °C per °C	0.05 °C per °C
Gain error	0.3 %	0.3 %
Scaling network	—	0.1 % thin film, ratio-matched — +0.5 °C at full scale
Cold-junction window	0 – 50 °C trimmed	25 – 100 °C trimmed
ENVIRONMENT		
Component rating	Amplifier −40 to +125 °C; other parts not specified	−40 to +105 °C
Recommended ambient	Under 50 °C — see rule 2	Under 100 °C — see rule 2
Ingress	Sealed by design. Not yet tested to an IP rating	Sealed by design. Not yet tested to an IP rating
MECHANICAL		
Enclosure	36.3 × 27.5 × 15.6 mm, 51.1 mm long over the zip-tie saddles, ASA-CF	44 × 34 × 16.1 mm, 58.8 mm long over the zip-tie saddles, ASA-CF
Board	20.3 × 16.5 mm	28 × 23 mm, 2-layer, own design
Module mounting	Two zip-tie saddles, one at each cable end	Two zip-tie saddles, one at each cable end
Thermocouple cable	150 mm, Type K extension, 2-core, yellow jacket: yellow +, red −. Ends in a miniature Type K socket	150 mm, Type K extension, 2-core, yellow jacket: yellow +, red −. Ends in a miniature Type K socket
Output cable	150 mm, 3-core 22 AWG, black jacket: red / black / yellow. Jacket stripped back 13 mm, the conductor tips bare	150 mm, 3-core 22 AWG, black jacket: red / black / yellow. Jacket stripped back 13 mm, the conductor tips bare

PARAMETER	EG5	EG12
Connectors	Thermocouple cable: a miniature Type K socket. Output cable: none. Every ECU takes its inputs in its own plug, so one fitted here would most often be cut off; the cable comes stripped, ready for your ECU's terminal or a splice. Orders of 10 or more can have a connector fitted to your pinout, quoted on request	Thermocouple cable: a miniature Type K socket. Output cable: none. Every ECU takes its inputs in its own plug, so one fitted here would most often be cut off; the cable comes stripped, ready for your ECU's terminal or a splice. Orders of 10 or more can have a connector fitted to your pinout, quoted on request

These are component datasheet figures and design values, not measured system accuracy. No system-level accuracy has been characterised over temperature yet. For scale, a Type K probe and its extension wire contribute roughly 8 – 16 °C of their own at 800 °C.

Wiring

THERMOCOUPLE IN, 0 – 5 V OUT

A yellow thermocouple cable on one side, ending in a miniature Type K socket, and a black sensor cable out the other, stripped back 13 mm with its conductor tips bare, ready to splice or crimp. A probe with a miniature Type K plug plugs straight in, and the plug fits only one way. On a probe without one, fit a miniature Type K plug to its leads, yellow to + and red to −, or cut the socket off and splice the cable's yellow and red to the probe's leads. The cable is Type K extension, so the splice can sit anywhere along the run: a splice adds no error while its two ends are at one temperature. A reversed probe reads right at room temperature, so once it is connected, warm the probe's tip: the reading must rise. If it falls, swap the probe's two leads at its plug or the splices. On a probe whose leads are not marked, the − lead is the one a magnet sticks to.

Output cable — 150 mm, 3-core 22 AWG, black jacket, stripped back 13 mm, tips bare

WIRE	GOES TO
Red	**EG5** — 5 V sensor supply **EG12** — switched 12 V, through a 3 A fuse
Black	Sensor ground. Use the ECU's sensor ground, not chassis.
Yellow	Any 0 – 5 V analog input.

Thermocouple cable — 150 mm, Type K extension, yellow jacket, ending in a miniature Type K socket

WIRE	GOES TO
Yellow	Probe **+** through the socket — yellow on a Type K lead
Red	Probe **−** through the socket — red on a Type K lead

Calibration

TWO-POINT CALIBRATION

Calibration points

MODEL	LOW	HIGH
EG5	0.000 V = 0 °C	4.800 V = 960 °C
EG12	0.000 V = 0 °C	5.000 V = 1250 °C

Three fitting rules

READ BEFORE FITTING

1. Use an ungrounded probe

A grounded or exposed-junction probe ties the manifold's ground to the amplifier input. Every bump in the manifold-to-module ground offset then lands on the reading. Check the listing says **ungrounded** or **isolated junction**, then verify it: ohmmeter from either thermocouple lead to the metal sheath should read **open**. A few ohms means grounded — send it back.

2. Mount it cool, not on the exhaust side

Cabin side of the firewall, or an inner fender. The probe lead is the hot part — an EG5 wants to stay under 50 °C and an EG12 under 100 °C. Cold-junction compensation is referenced to the module's own temperature, so a hot module reads high, and the enclosure is ASA-CF.

3. Extend with K-type wire only, never copper

A copper run between the probe and the module spans a temperature gradient and reads wrong with no other symptom. The module's own 150 mm cable is Type K extension, so the alloy runs unbroken to the chip that compensates the cold junction, whether the probe plugs into its socket or is spliced in wherever is convenient. If you need more reach, use Type K extension wire from the probe end.

Recommended to use with

NOT IN THE BOX

The module is sold alone. Buy the probe, its fitting and any extension wire to these specifications.

- **A Type K probe**, ungrounded, with a sealed tip, a 1/8″ NPT compression fitting and a lead ending in a miniature Type K plug. Its rating is its ceiling: one rated 1200 °C covers an EG5's full 960 °C, and an EG12's range up to 1200 °C; the EG12's full 1250 °C takes an Inconel sheath rated 1300 °C. Look for a sheath of Inconel 600, or 310 or 321 stainless, not 304, which scales and embrittles in exhaust. On arrival, an ohmmeter from either lead to the sheath should read open.
- **Before a turbo**, a 1/4″ Inconel sheath, sealed and ungrounded, or one swaged down to 1/8″ at the tip. Look for one on a 1/8″ NPT compression fitting, so it fits the same bung, and with a miniature Type K plug.
- **A 1/8″-27 NPT weld-in bung**, 304 stainless, not aluminium, for the probe's compression fitting to thread into. **Without welding**, an M18 × 1.5 male to 1/8″ NPT female adapter fits an unused O2 port. It raises the probe: check stack height and insertion depth first.
- **Type K extension wire**, if the probe's lead needs more reach. Extend from the probe end, never with copper.

In the box

MODULE

The module and a card.

- **The module**, its thermocouple cable ending in a miniature Type K socket, its output cable stripped back 13 mm with the conductor tips bare
- **A card** with the wiring notes

Warranty

12 MONTHS

12 months, replaced, no questions asked.

Support: the question form on thirdshiftelectronics.com, or sales@thirdshiftelectronics.com. Include the model and what it is fitted to.

Full terms: thirdshiftelectronics.com/support