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## Corsa Thermocouple Installation and Usage Guidelines

When installing and using Corsa thermocouples, these guidelines should be followed to minimize problems and to ensure maximum accuracy and life span.

### ***Thermocouple Placement***

Thermocouples measure the temperature of the surrounding liquid or gas at the tip only. Consequently, the tip of the thermocouple should be placed as close to the middle of the exhaust gas stream as possible. The airflow near the outside of the exhaust port can be as much as 100°F cooler than in the middle of the airflow. If you wish to minimize restriction, place the thermocouple tip no less than ¼ of the way into the exhaust port. The reading at this distance should be pretty close to the reading at the center.

The thermocouple should be mounted at a safe distance from the exhaust outlet on you motor. It is not recommended that the thermocouples be placed any closer than 1" from the exhaust outlet. Consequently, if the thermocouple is placed too far from the exhaust outlet, then the accuracy will be sacrificed and response time will decrease. Therefore, the recommended placement for thermocouples is 2" – 4" from the exhaust port.

### ***Weld Bung / Compression Fitting Usage***

Compression fittings are recommended for any pressurized application (including EGT) of thermocouples. Compression fittings will seal around the thermocouple as well as hold it in place. The part number for these fittings will depend on the thermocouple size. The part numbers with their appropriate thermocouples are listed below:

<u>Thermocouple</u>	<u>Compression Fitting</u>
TK1 – TK3	TKF
TK6	TKF6
TK4	N/A (custom order)

If a cast manifold of sufficient thickness is used, then it can be drilled and tapped to accept the 1/8" NPT threaded compression fitting. Otherwise, we recommend using a 1/8" NPT weld-on bung (TKB). This will allow for the thermocouples to be easily removed for replacement or for transfer between multiple applications.

When compression fittings are used correctly, the inner fitting (ferrule) will permanently affix to the thermocouple shaft. This will ensure a permanent seal within the fitting. If thermocouples are replaced, then new ferrules will be required. These



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are available from Corsia Instruments. When initially installing compression fittings, the top nut should only be tightened an additional  $\frac{1}{4}$  to  $\frac{1}{2}$  turn after the nut becomes hand-tight. This will sufficiently seat the fitting, as heating will permanently seat the ferrule on the thermocouple. Using anti-seize compound on the compression fitting threads at both ends will facilitate later removal if necessary.

## ***Bending***

The thermocouple shaft can be safely bent to allow for limited clearance applications. The radius of such a bend should be at least 1". Any tighter of a bend may sacrifice the internal leads and would no longer be guaranteed to function. Any bending should be done similar to brake line bending and should be done carefully. The braided thermocouple cable is flexible and can be bent with as little as a  $\frac{1}{2}$ " radius. The location where the thermocouple cable exits the thermocouple shaft is sensitive to bending. Please avoid bending either the thermocouple shaft or the cable within 1" of this junction. Some Corsia thermocouples are equipped with a spring in this region. The spring will help protect this junction, but excessive bending should still be avoided.

## ***Wire Routing***

The steel braided cables used by the thermocouple are very durable and heat resistant. The thermocouple and cable are waterproof and temperature rated to 500°F. The braided cable also provides for reasonable EMI protection. It is still important to route the wires away from ignition components, including spark plugs, spark plug wires, magnetos, coils, and distributors. Also avoid any engine components which would be very hot, like turbochargers. It may be convenient to tie the wires to each other and route them as a bundle. This is acceptable and will provide for a cleaner installation. If the wires are in an area which will be serviced frequently and are not mounted rigidly, be careful not pull or push on the wires. This may excessively bend the thermocouple or sacrifice the junction of the thermocouple body and wire.

The cable is constructed of dissimilar metals specific to this type of thermocouple. The cable cannot be cut and soldered together or to an extension piece because solder will not adhere to the metals. If an extension cable is necessary, please order one specifically designed for "K" type thermocouples. This type of extension cable is available from Corsia Instruments. If you must shorten the cable, a replacement connector must be used. These connectors also utilize the dissimilar metal technology and therefore cannot be soldered. Only "K" type connectors can be used. These connectors are available from Corsia Instruments.



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### ***TKA5 Thermocouple Connectors***

The Corsa TKA5 Thermocouple Interface contains a row of five (5) Mini SMP "K" type thermocouple connectors. Thermocouples provided by Corsa Instruments will plug directly into these connectors. Each connector consists of two slots, which are polarized by size. The smaller slot, which is closest to the DB-9 connector, is the positive (+) lead while the larger slot on the bottom is the negative (-) lead. The connector on the thermocouple is similarly polarized. It is possible, using a great deal of force, to insert the connector backwards. If done correctly, the connector should insert firmly and smoothly into the interface box. The outer edges of the connectors are rolled out to help the blades on the plug seat in the correct position between the leaves. If the blades are inserted on the outside of the leaves, the leaves may be bent outwards and could provide intermittent signals.