

Geartronics GCU connector termination

As with any motorsport electronic installation, success is highly dependent upon high quality wiring. This document provides a step-by-step guide to correctly terminating the 25-way AMP connector.

Tools & materials you will require

Wire cutters (flush cut)
Wire strippers ('Ideal' or similar)
Crimp tool for AMP 'timer' contacts
Steel rule
Sharp knife
Hot air gun
Kapton tape (1/2")
Raychem 'spec-55' primary wire, 22AWG
Raychem DR25 sleeving (3/8" dia.)
Raychem moulded boot (202A111)
Adhesive-lined heatshrink (32mm dia. 4:1 ratio)



The gearshift wiring harness should be constructed using the highest quality materials available. We strongly recommend the use of Raychem 'spec-55' primary wire and DR25 tubing. The maximum current carried by any of the GCU wires is 1 Amp. It's therefore unnecessary & undesirable to use wires capable of carrying high current, as this will lead to a heavier and unsightly harness. Wire gauge should be 22AWG maximum, and of thin-wall construction. We do not recommend the use of standard PVC automotive wire! Raychem spec-55 is unquestionably the finest wire available, and it will perform reliably at temperatures in excess of 150°C.

The wiring harness construction should be started at the GCU connector. Start by cutting wires to length, allowing for some wastage and length taken up by twisting. Several wire colours can be used if desired, but spec-55 wire is only available in a limited range of colours. Most 'professional' motorsport and aircraft harnesses are constructed almost entirely of white wires. Wires should be colour coded using heat-shrink markers where necessary.

Strip approximately 3.5-4.0mm of insulation from the end of each wire. Do not twist the strands of wire any more than they already are as this can lead to failures. Using the correct tool, crimp the timer contacts to the wires, making sure that both the conductor and the insulation are securely crimped. Do not under any circumstances apply solder to the crimped joints, as this can lead to vibration failures. A correct crimp is always superior to a soldered joint. Also do not attempt to crimp more than one wire into each contact, use proper slices within the loom whenever multiple wires connect to the same GCU pin.



Carefully insert the contacts into the rear of the connector housing. When all the wires have been inserted, bend them at 90° as shown below.



Next, place the connector in a vice and temporarily secure the wires to the housing using a cable-tie as shown below. Carefully twist the wires in a uniform pattern up to the first harness transition. Twisting the wires adds greatly to the flexibility of the harness, and also helps with noise immunity. Experienced harness constructors may employ a contra-helical twist pattern for even greater flexibility & reliability.



When you are satisfied that the wires are twisted correctly, cover with the appropriate size of DR25 sleeving. Push the sleeve as far as it will go over the bundle of wires. Most GCU harnesses with approximately 20-23 conductors will require 3/8" diameter (un-shrunk) sleeving. Using the correct wiring heat gun (not a paint stripper!) gently shrink the sleeving down onto the wires, taking care not to overheat the sleeve or melt the connector.



Next, place a Raychem moulded boot, part #: 202A111, over the wires. Make sure the thickest end is closest to the connector housing. For increased reliability, 'RT125' 2-part glue should be used on the inside of the boot. Gently shrink the boot, being careful to initially direct the hot air closer to the thick end of the boot in order to prevent the thin end folding back on itself!



The next job is to apply Kapton tape to the lower half of the connector. When the adhesive-lined heat-shrink tube is applied in the next stage, the tape provides a mask to prevent glue entering the contacts.

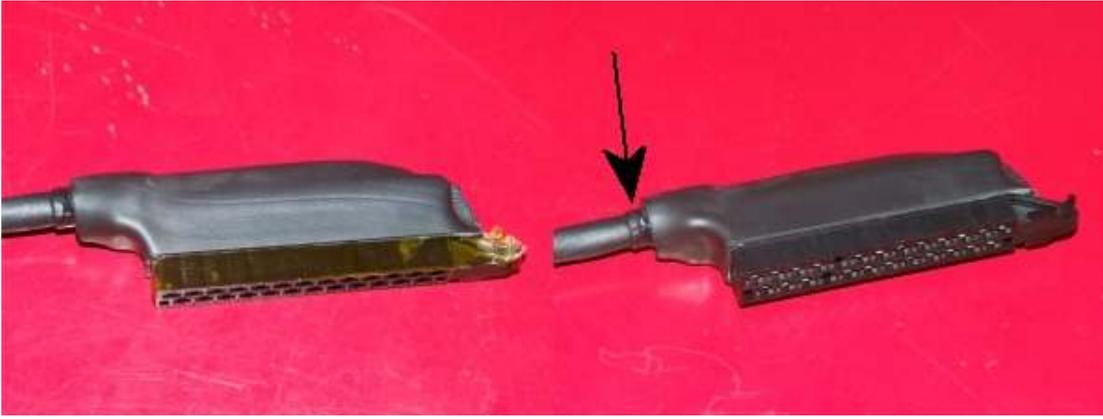


In order to seal the rear of the connector and improve the mechanical reliability & aesthetics, a large piece of adhesive-lined sleeving is applied over the entire connector housing. This sleeving must have a shrink ratio of 4:1 to that it will shrink down sufficiently to seal the cable exit.



When you have fully shrunk down the sleeving, use a pair of pointed-nosed pliers to seal the end as shown by the arrow in the above picture.

Allow the sleeve to cool sufficiently to handle, but still remaining soft enough to cut easily. Using a steel rule and a sharp knife, carefully cut away the sleeving from around the bottom of the connector.



Remove the Kapton tape. To finish the job and improve the aesthetics, you can add a small amount of RT125 glue around the cable exit. The glue should be allowed to cure for 24 hours at room temperature before being handled.