ELECTRIC GRIPPER types E1, E2, EG12 and EG17

The motorized electric gripper fitted to this robot is software controlled.
The software rapidly switches on and off the power to the motor to control the speed of opening and closing so that it does not accelerate onto the end stops causing damage to the gearbox.

The time the power is on is determined by a variable TON in microseconds and the time the power is off is 1000 microseconds. Thus if TON has a value of 1000 the mark-space ratio will be 1:1
In practice the value of TON may be smaller or larger than 1000. At the end of GRIP the power is switched fully on to ensure maximum gripping force. At the end of UNGRIP power is left off.

The total time allowed for both opening and closing is determined by a variable TGRIP as for pneumatic grippers and the default value is 1000 milliseconds. You can change this at any time e.g. 500 TGRIP !

GTYPE
This is a variable that contains the value 0 for a pneumatic gripper and 1 for an electric gripper. To use the electric gripper enter
1 GTYPE !
To make it permanent enter
USAVE

E2 gripper
You will notice two long screws in the jaws. These are to prevent the jaw closing with no fingers attached.
It is intended that the customer fit fingers to the jaws to match the products being picked.
If you remove the safety screws and do not attach any fingers then enter GRIP then the annulus of the lead screw will jam against the gripper body.
This will not happen once you have fingers attached that prevent full closing of the jaws.

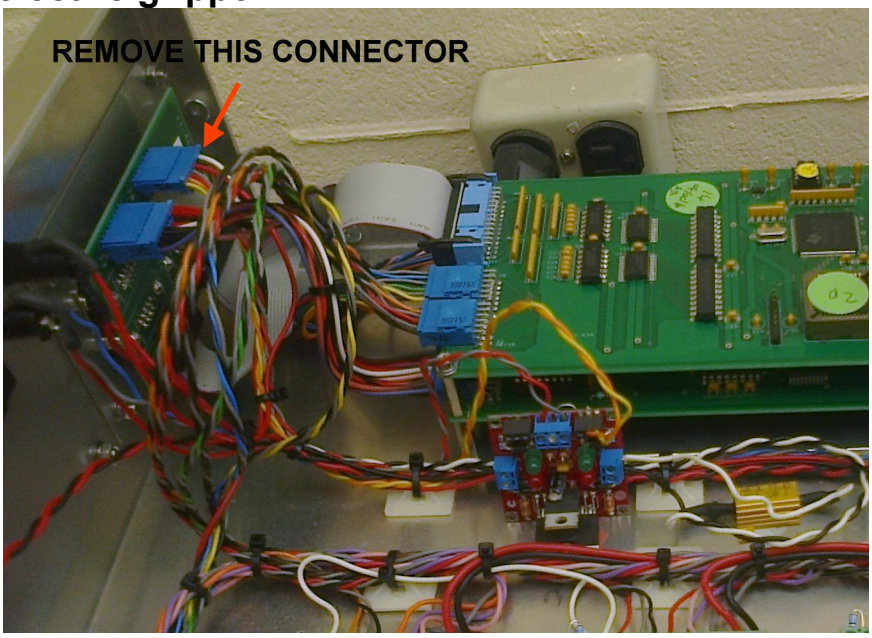
In the event that you accidentally grip with no fingers and no safety screws then nothing will break but you will need to remove the gripper from the robot and manually unjam the lead screw by turning the small gear on the underside.

EG12 and EG17
These both use rack and pinion and linear slides for parallel operation.

EG17 grip confirmation sensor
The way the grip sensor works is it senses a mid position which equates to the position when gripping the object. If it closes beyond this position the sense goes low again indicating that the object was not gripped.

This position may be adjusted by loosening the screw in the side of the top plate and moving the sensor along the slot as required. The sensor senses a small piece of steel which may also be re-positioned if necessary.

Retro-fitting electric gripper.



In your controller find the blue HE connector on the rear PCB. Remove that and place it somewhere safe, perhaps in a small polythene bag.
Replace it with the blue HE connector that comes with the kit.

The wires to the module are as follows:
red/grey – supply to module. The red should be left, grey on right with center terminal empty as showing above.
Yellow/orange – control signals PA 0 and 1. These are soldered to a 2-way header. In the event the gripper is reversed (GRIPs when it should UNGRIP) simply remove this header and replace the other way round.

Find the white/black twisted pair. You can see them in the above picture. These are the wires to the gripper motor. One of them must go through the ballast resistor of 12R provided.
Ideally the resistor should be glued to the floor of the cabinet using heat-sink glue, or at least placed where it can not burn adjacent wires. The dissipation is 12 watts.
These wires arrive at the robot sensor connector pins 22 and 25. From there they go up through the robot, continuing white/black. Remove the forearm covers and fit the connectors provided. You will need to drill a hole in one cover.

Gripper sensor
The sensor is PNP and requires a pull-down resistor that is embedded in the supplied cable. Inside the fore-arm you will also find a group of 3 wires not connected to anything. These should be soldered to the connector provided.
Pin numbers are

A	black, gripper
K	white, gripper
G	black, sensor 0v
H	pink, sensor 12v
J	blue, sensor signal