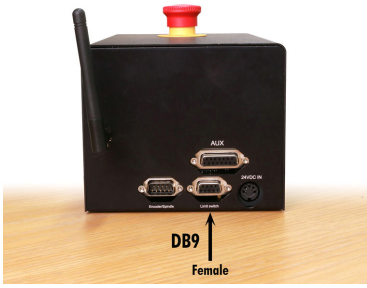

SHERLINE PRODUCTS
INCORPORATED 1974

Adding a Relay from the Sherline/MASSO CNC Controller

About Adding a Relay to the CNC Controller

Our Sherline/MASSO controller has one extra connection on the DB9 connector for an additional relay. This can be used for a coolant pump, an air cylinder, or any other accessory.

On all of our controllers sold prior to 2020, you will need to solder in two wires for your additional relay. Step-by-step instructions begin on page 2. Our controllers sold after 1/1/2020 will have the two additional wires for your use.

The new MASSO Touch controller is designed to accept the "MASSO Relay Module" (see Figure 1), which can control several relays. The Touch control has TTL outputs. The G2 does not have any TTL outputs. Therefore the MASSO relay module cannot be used with the G2 controller.

*FIGURE 1—This is the MASSO relay module for the G3 Touch Control. It **CANNOT** be used on the G2 controller. CLICK HERE to learn more about MASSO's G3 relay module.*

Wiring Information for an Additional Relay from the Controller

DB9 (FEMALE) Connector on circuit board:

1. X Home Input
2. Y Home Input
3. Z Home Input
4. A Home Input
5. B Home Input
6. Tool Setter Input (for auto tool zero). Has an internal pull up resistor, and this input, when grounded will give touch signal.
7. Touch Plate Input (to find edge of work piece). Has an internal pull up resistor, and this input, when grounded will give touch signal.
8. Optional Relay (output) for relay coil.
9. 24v (output) for relay coil & for homing switch inputs.

Please make the connection to the DB9 Connector as seen in Figure 2.

⚠CAUTION

1. Do not wire or remove the relay coil wires when the unit power is on!
2. The wires from the relay to the board should not be longer than 8.0" (200mm).

Caution must be observed with the above points. Backfire from the relay coil can induce high reverse voltage into the board, which will damage the entire controller!

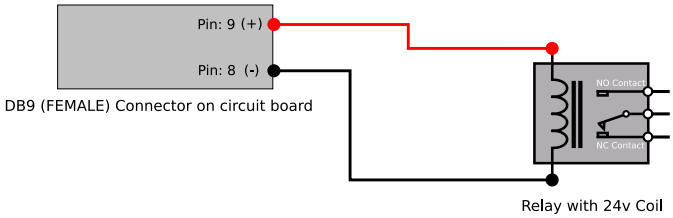

FIGURE 2—The DB9 connector voltage is 24 volts.

1. Once the relay is wired, please go to the F1 screen and assign **Output 1** as **Coolant Flood** or **Coolant Mist** output.
   A. Under **OUTPUTS**, double click on the **Output 1** function.

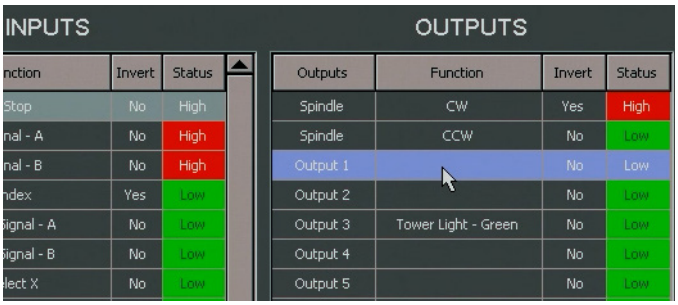

FIGURE 3

   B. On the **Select Function** window, double click on **Coolant Flood**.

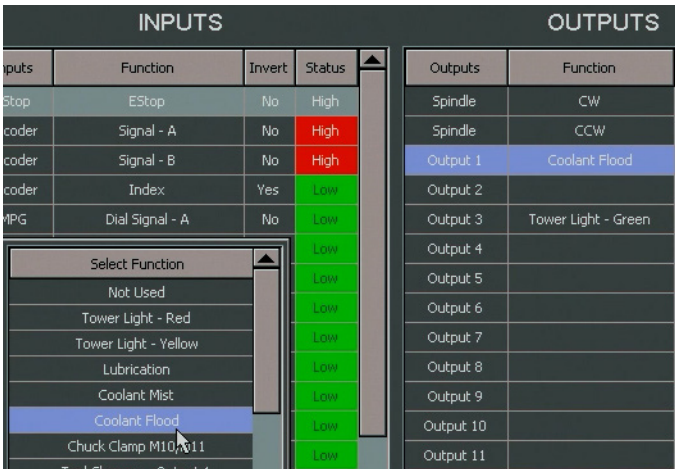

*FIGURE 4—Now the **Output 1** will show **Coolant Flood** as the function.*

2. If assigned as **Coolant Flood**, then this g-code can be used–M08: https://masso.com.au/masso-documentation/?section=m08-turn-flood-coolant-on
3. If assigned as **Coolant Mist**, then this g-code can be used–M07: https://masso.com.au/masso-documentation/?section=m07-turn-mist-coolant-on

Instructions for Adding the Wires to the DB9 Connector for an Additional Relay

1. Disconnect and disassemble the DB9 connector for the limit switches.

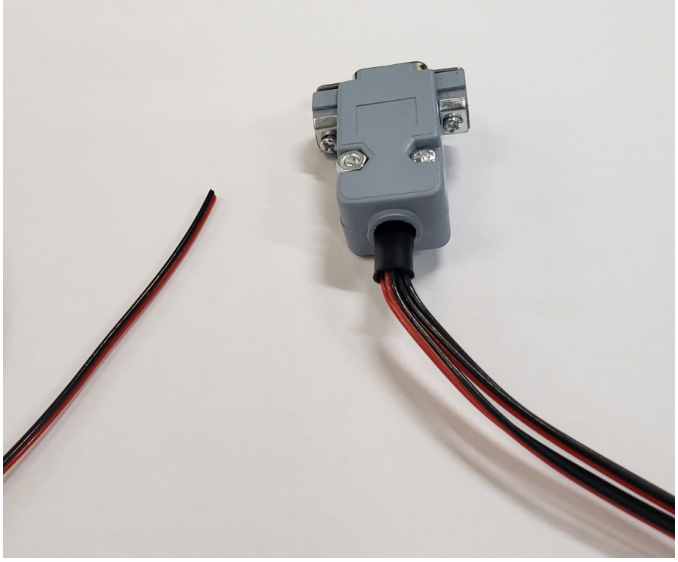

FIGURE 5—The new relay wires on the left and the DB9 connector for the limit switches on the right.

2. The DB9 connector showing the original wiring for the limit switches. The red wire is the 24 volt wire and the black wires are the signal wires. The wire is 26 gauge.

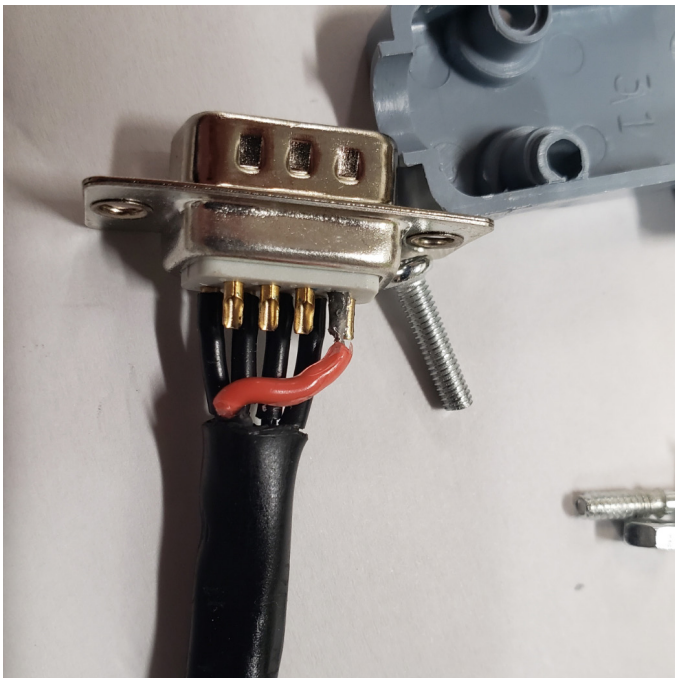

FIGURE 6—This photo shows the wire housing and clamp removed from the DB9 connector.

3. Strip the two wires back and slip a piece of "shrink fit" onto the black wire (see Figure 7).

FIGURE 7—The new relay wires on the left and the "shrink fit" sleeve on the right.

4. Solder the black wire onto the pin #8

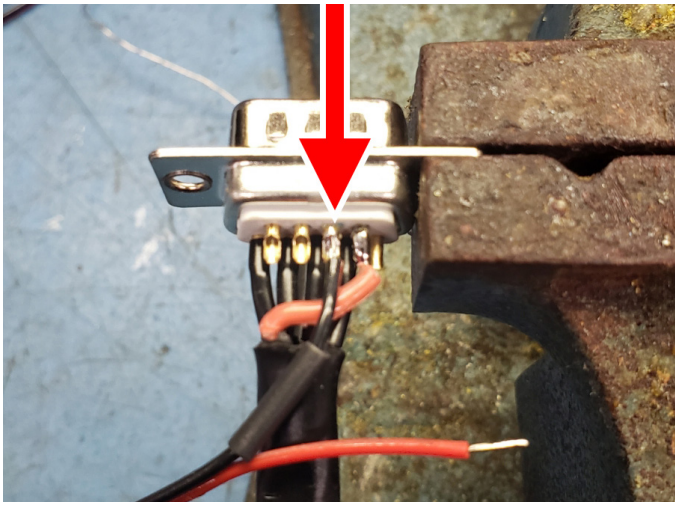

FIGURE 8—The DB9 connector is held in a clamp. The red arrow points to the #8 pin.

5. Push the shrink fit over the soldered wire and #8 pin so there can be no connection between it and the red, 24-volt wires coming off of pin #9. Then apply heat to shrink the sleeve in place.

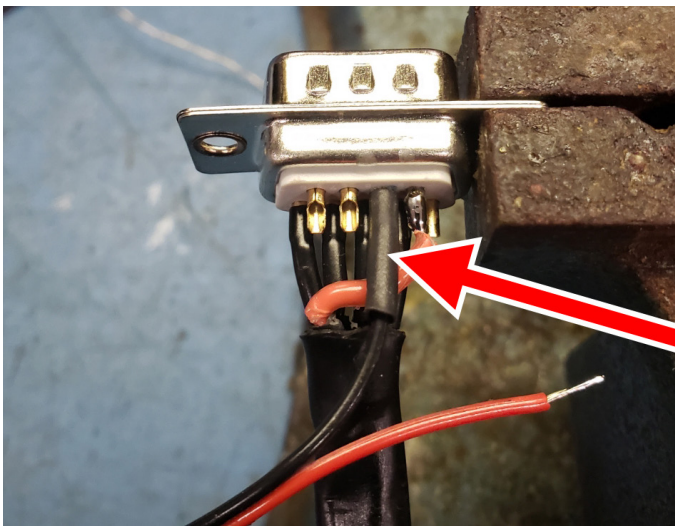

FIGURE 9—The red arrow shows the new shrink fit covering the black wire and the #8 pin.

6. Solder the red wire onto the existing red wire that is already soldered onto pin #9.

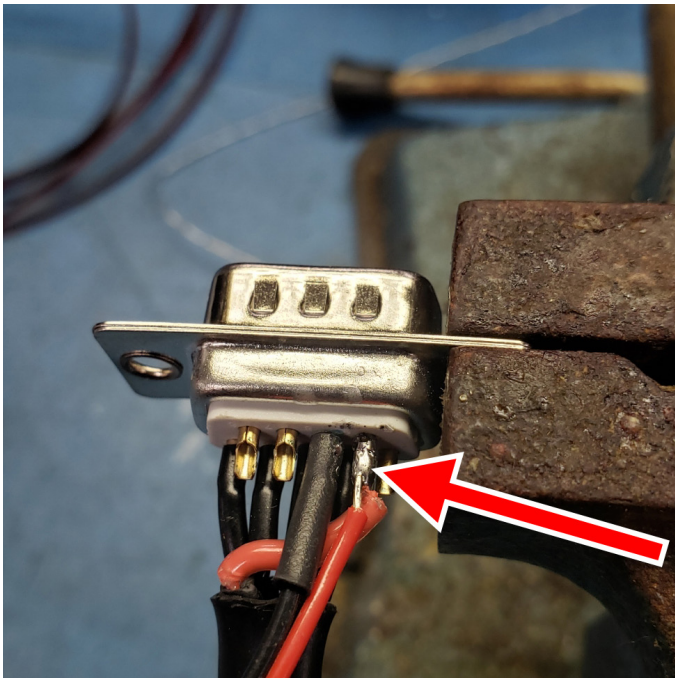

FIGURE 10—The red arrow points to the #9 pin.

7. Put the wire clamp back on and assemble the DB9 connector housing.

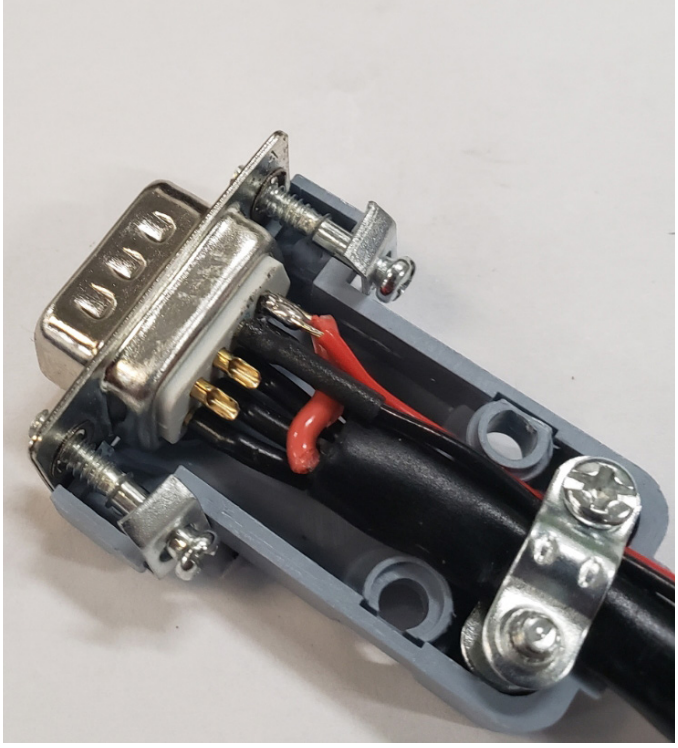

FIGURE 11

8. Plug in the DB9 connector to the controller. When you enter the code M08, a signal should be sent to the relay. The M09 command will turn it off.

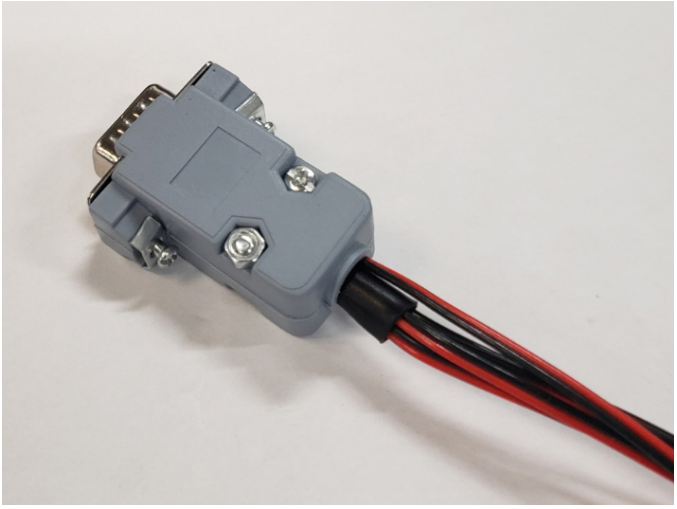

FIGURE 12—This photo shows the new relay wires coming from the plastic housing.

A relay can also be connected to the DB9 (Male) connector as shown below, if needed (see Figure 13). Use the same wiring method as shown in Figure 2 for the DB9 (female) connector.

DB9 (MALE) Connector on circuit board:

1. P3 of the DC spindle motor drive (+ve of the KBLC Spindle Drive)
2. P2 of the DC spindle molor drive (RPM of the KBLC Spindle Drive)
3. P1 of the DC spindle motor drive (-ve of the KBLC Spindle Drive)
4. 24v (output)
5. Encoder A Signal (input)
6. Encoder B Signal (input)
7. Encoder Z Signal (input)
8. Spindle CW relay (output) for relay coil
9. 24v (output) for relay coil

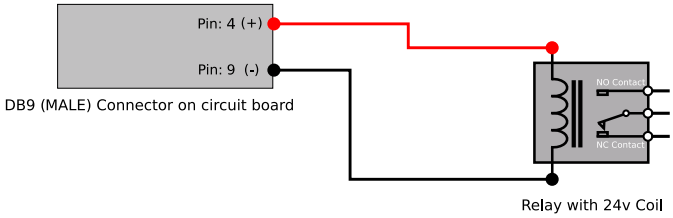

FIGURE 13—The DB9 connector voltage is 24 volts.

Supported G-codes and M-codes

G-Codes

G00 – Rapid Motion

G01 – Linear Interpolation Motion

G02 – Clockwise Circular Interpolation

G03 – Counter Clockwise Circular Interpolation

G04 – Dwell

G10 – Set Work Offset Values

G17 – XY Plane Selection

G18 – ZX Plane Selection

G19 – YZ Plane Selection
G20 – Set Machine Units To Inches
G21 – Set Machine Units To Millimetres
G28 – Return To Machine Home
G32 – Threading Cycle
G38.2 – Straight Probe Cycle
G53 – Move In Absolute Machine Coordinates
G54 to **G59** – Select Work Offset Coordinate System
G73 – High Speed Peck Drilling
G80 – Cancel Modal Motion
G81 – Drilling Cycle
G82 – Drilling Canned Cycle With Dwell
G83 – Peck Drilling For Deeper Holes
G90 – Set Distance Mode To Absolute
G91 – Set Distance Mode To Incremental
G92 – Temporary Work Offset
G92.1 – Cancel Temporary Work Offset
G93 – Inverse Time Mode
G94 – Units Per Minute Mode
G96 – Turn on Constant Surface Speed (CSS)
G97 – Turn off Constant Surface Speed (CSS)
G98 – Canned Cycle – Retract Back To The Initial Z
G99 – Canned Cycle – Retract Back To R Plane

M-Codes

M00 – Program Stop
M01 – Optional Program Stop
M02 – Program End
M03 – Spindle ON (Clockwise)
M03 – Plasma Torch ON
M04 – Spindle ON (Counter Clockwise)
M05 – Spindle OFF
M05 – Plasma Torch OFF
M06 – Tool Change
M07 – Turn Mist Coolant On
M08 – Turn Flood Coolant On
M09 – To Turn All Coolant Off
M10 – Chuck Or Rotary Table Clamp On
M11 – Chuck Or Rotary Table Clamp Off
M30 – End The Program And Rewind
M62 – Turn On Digital Output Synchronized With Motion
M63 – Turn Off Digital Output Synchronized With Motion
M666 – Plasma – Turn THC Function Off
M667 – Plasma – Turn THC Function On
M98 & **M99** – Sub Program Call

Thank you,
Sherline Products Inc.