Hypertherm®

# *MAX200*
# Underwater Torch Supplement

## Field Service Bulletin
## IM-127
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**ATTENTION**

**Genuine Hypertherm parts are the factory-recommended replacement parts for your Hypertherm system. Use of other than genuine parts may be cause for invalidation of the Hypertherm warranty.**

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## Safety

Refer to *Section 1: Safety* in the 800870 MAX200 instruction manual for general safety practices when operating a plasma cutting system.

Observe the following additional safety precautions when operating a plasma cutting torch in an underwater environment.

**WARNING**
**ELECTRIC SHOCK CAN KILL**

1. **Shut off all power to the power supply before removing the torch parts. The cap sensor circuit is not activated in this system configuration.**
2. **Never attempt to remove torch parts while underwater.**
3. **Never hold onto the work clamp while firing the torch.**
4. **Never hold onto the workpiece that is being cut.**
5. **Never drag the torch lead over sharp objects. Always check the torch lead after every dive for rips and holes in the rubber sheathing. Replace the torch assembly if rips and holes are found.**
6. **A top-side operator must be present during underwater operation to activate the enabling safety switch at the diver's signal. NEVER OPERATE THE SYSTEM UNDERWATER ALONE!**
7. **Never wrap the torch lead around yourself or others while diving.**
8. **Never let the torch, torch lead, or work cable come into contact with the diving helmet.**
9. **All divers working in the vicinity of the cutting area should stay clear of the diver cutting and should not touch any non-grounded metal while the torch is being operated.**
10. **Never attach a metal cable to a diver or diving helmet. Use nylon rope or other nonconductive materials for tethering.**
11. **Wear only a dry rubber diving suit. Wear 2 or 3 pairs of latex gloves while cutting.**
12. **Maintain metal diving helmets at "floating" potential at all times, i.e., no connections to power or ground.**
13. **Assisting personnel should never hold a coiled torch lead while the torch is being operated.**

## Introduction

The MAX200 underwater torch assembly consists of the MAX200 hand torch and a torch leads assembly that are permanently bonded together in the torch handle, The only changeable parts in the torch are the consumable parts. Refer to the MAX200 instruction manual 800870 for additional information on the MAX200 hand torch plasma arc cutting system.

The remote start/stop switch is connected in a different configuration when used in underwater cutting. The torch will fire only when the diver presses the torch switch and a top-side operator activates the remote start/stop switch (at the diver's signal). This safety switch configuration also enables top-side personnel viewing the cutting to deactivate the torch start circuit if any potentially dangerous conditions arise that could harm the diver.

## Specifications

| | |
|---|---|
| Maximum cutting thickness range | 2 inches (51 mm) |
| Maximum current at 100% duty cycle | 200 amps |
| Plasma Gas Flow | 66 scfh (air); 60 scfh (N2); 70 scfh (H35); 72 scfh (O2) |
| Shield Gas Flow | 220 scfh ($CO_2$), 280 scfh (air); 290 scfh (N2) |
| Water Coolant Flow Rate | 0.8 gpm (3 lpm) |
| Weight | 43 pounds (19.5 kg) with 50 ft (15.3 m) torch leads |

# Setup

See *Section 3, Setup*, in the MAX200 instruction manual 800870 to make all connections to the MAX200 system.

To provide the diver with a margin of safety, underwater cutting also requires connecting the remote switch 028328 in series with the torch start switch.

## Diver Safety Switch Connections

1. Looking at the power supply from the front, remove its right side cover.
2. Remove the power supply rear cover.
3. Route the remote switch cable through the feed-through at the rear of the power supply. See Figure 1.

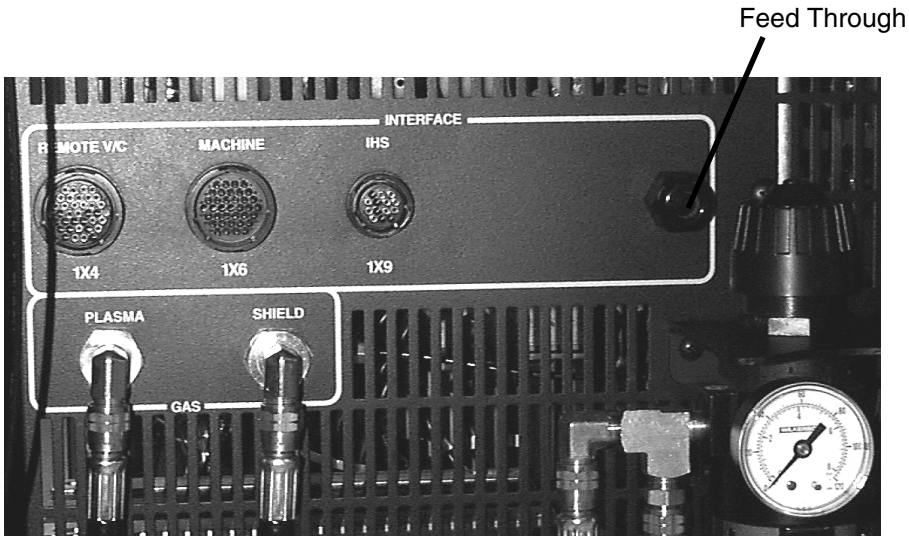


**Figure 1 Remote Switch Feed-Through Location**

4. Locate terminal strips TB3 and TB4 on the inside, right side of the power supply.

5. At TB3, locate the 2 white lead pairs marked 83 and disconnect both wire pairs from TB3. Determine which of the lead pairs connects with the torch start switch. To do this, measure between each lead pair and the left terminal point on TB2 for continuity. See Figures 2 and 3 below.

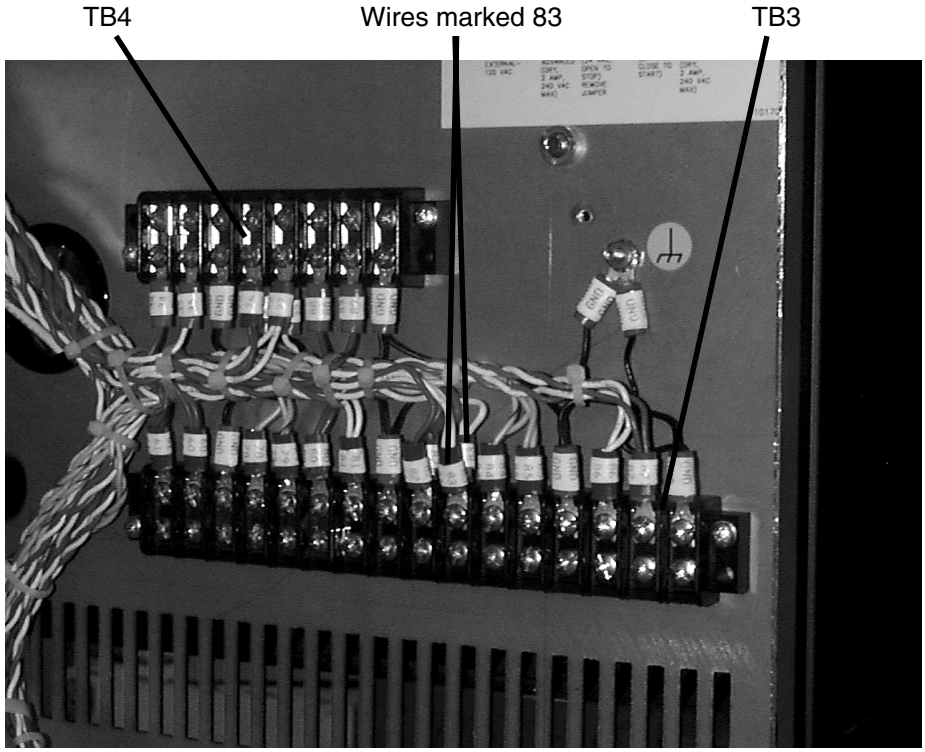


**Figure 2 TB3 and TB4 Location**

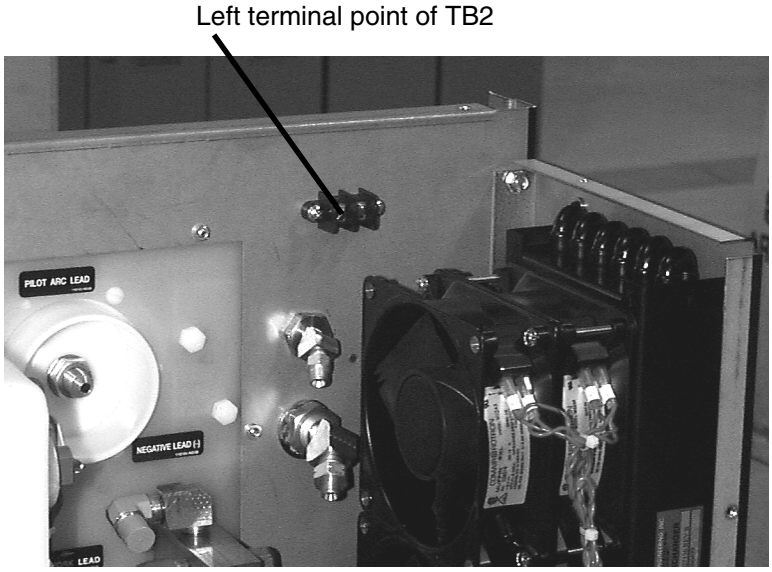


**Figure 3 TB2 Location**

6. Splice the lead pair marked 83 that indicates continuity to TB2 with the remote switch black lead marked 34 as follows (see Figure 4):

   - Cut off the white lead pair above the 83 fork connector.
   - Strip back the insulation on both leads 3/8" (10 mm), twist leads together and crimp into one end of a butt splice.
   - Cut off the remote switch black lead marked 34 above the fork connector.
   - Strip back the insulation on the lead 3/8" (10 mm) and then crimp the lead into the other end of the butt splice.

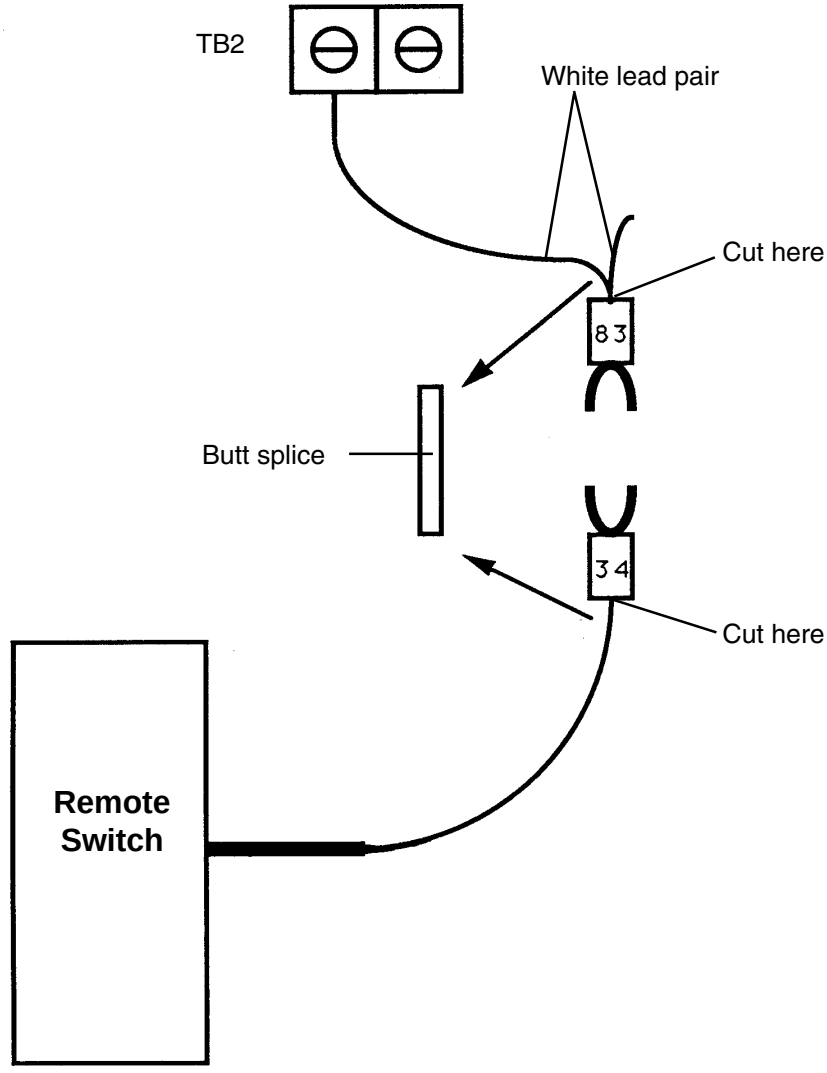


**Figure 4 Splicing Remote Switch Wire 34 to Power Supply 83 Wires**

7. At TB3, reconnect the remaining white lead pair marked 83 back to its original terminal location. Also connect the remote switch red lead marked 33 to the 83 terminal location.

8. At TB4, connect the remote switch white lead marked 38 to the terminal that the lead marked 76 (24 VAC Hot) is connected to. Also connect the remote switch black lead marked 37 to the terminal that the power supply lead marked 77 (24 VAC Neutral) is connected to. See Figure 5.

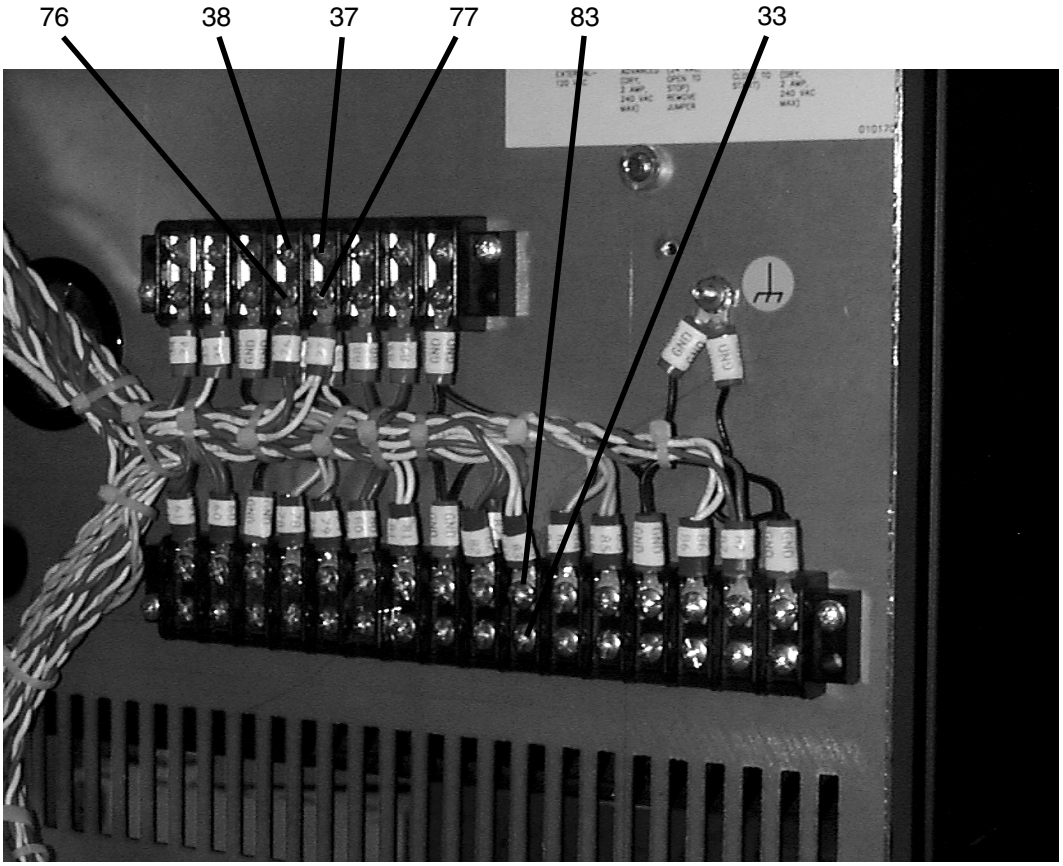


**Figure 5 Remote Switch Connections to TB3 and TB4**

# Parts List

## Underwater Torch Assemblies

| Part Number | Description |
|---|---|
| 073264 | Torch Assembly with 25 ft (7.6 m) lead |
| 073041 | Torch Assembly with 50 ft (15.3 m) lead |
| 073265 | Torch Assembly with 75 ft (23 m) lead |
| 073266 | Torch Assembly with 100 ft (30.5 m) lead |

## Consumable Parts

| Part Number | Description |
|---|---|
| 020595 | Shield Guard |

Refer to the MAX200 instruction manual 800870, *Section 5*, for other consumable parts used in the MAX200 torch.