

# Reciprocating/Dual Pump Cable

## Part #: CBL-TTL-1

### Description

In Reciprocating mode, the cable synchronizes the pump motor starting and stopping operation and pumping direction for 2 pumps. When one pump is set to infuse or withdraw, the other pump will be set to the opposite pumping direction. With an appropriate control program, and valving, this will create a continuous infusion system.

In Dual pump mode, the cable synchronizes the pump motor starting and stopping operation and pumping direction for 2 pumps. When one pump changes direction, the other pump will change to the similar direction.

### Contents:

- 1) (2) TTL pump adapters (Figure 2), labeled Pump 1 and Pump 2.
- 2) (1) Adapter cable, 7' (Figure 1).



Figure 1: Adapter Cable, 7'

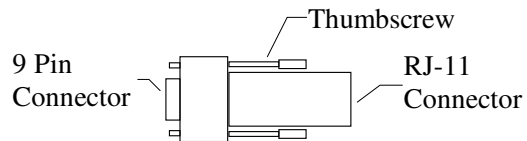


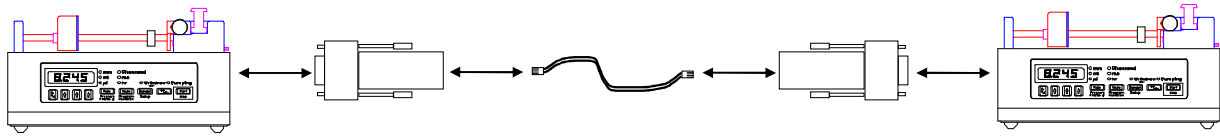
Figure 2: TTL Pump Adapter

### Pump Setup

- For each pump, set the “Operational Trigger” to “level”. To set, with the pump stopped, press and hold the “Diameter/Setup” key to access the pump setup. Select [ttl ] when displayed using any arrow key, located below the LCD display. Then, wait until the display shows the current “Operational Trigger” [tr:aa]. Use the right-most arrow key to select the mode. “Level” mode is selected when the display shows:  $\boxed{\text{tr:L}}$ . The setting will be stored in non-volatile memory after the display blinks.
- For each pump, set the operational mode to Reciprocating or Dual pump mode:  
As above, press and hold the "Diameter/Setup" key to access the pump setup. Select [ttl ], then wait until the directional control is displayed:  $\boxed{\text{r:aa}}$ , where 'aa' is the current setting, 'du' for Dual, or 'rE' for reciprocating. Press the right-most arrow key to select the appropriate mode. The setting will be stored in non-volatile memory after the display blinks.
- Before connecting the cable, turn power off to the pumps.
- Attach one end of the Adapter Cable to the RJ-11 Connector on each of the TTL Pump Adapters.
- Connect one end of the cable to the 9 pin connector on the back of each pump labeled “TTL-I/O”. Secure the cable to each pump with the 2 screws on each cable connector.
- When the power is turned on to both pumps, their pumping directions will be reversed and the pumps’ starting and stopping operation will be synchronized.

**IMPORTANT NOTE:** When turning off power to the pumps, turn off power to both at the same time. Otherwise, when one pump is powered off, the other pump will start pumping.

If programming a complex pumping program that automatically changes pumping directions, use one pump as the program master. Only set dispense volumes on the master pump. Then just set the other pump to operate at a fixed rate and it will then follow the operation of the master pump.



## **Reciprocating Pump Program**

Below are examples of how to setup the pumps for reciprocating, continuous flow operation. Pump 1 is the master pump which controls when the pumps change direction. Pump 2 pump's continuously in the opposite direction of Pump 1 until Pump 1 changes direction. Both pumps should be set to the same flow rate.

### **Pump 1**

Phase	Function	Rate	Volume	Direction
1	RATE	750 ml/hr	10.0 ml	Infuse

Phase	Function	Rate	Volume	Direction
2	RATE	750 ml/hr	10.0 ml	Withdraw

Phase	Function
3	JP:01

### **Pump 2**

Phase	Function	Rate	Volume	Direction
1	RATE	750 ml/hr	0.0 ml (off)	Withdraw

Phase	Function
2	Stop