

## REMOTE CONTROL PIPETTOR



### DESCRIPTION

The BRC 2501 Remote Control Pipettor is an electronic single channel, 250µl dispenser module with liquid level sensing, electronic tip ejection and a versatile communication interface. The precision of the molded cylinder with a Biohit patented displacement mechanism guarantees a high performance front-end for liquid handling robotic applications.

### Versatile serial interface

BRC Pipettor modules are equipped with two serial interfaces. An asynchronous RS-232 interface is for a host unit with RS-232 communication port, such as a PC. In addition to this, the module is equipped with differential 2-wire RS-485 interface for long distance communication. This option enables to build-up a network of several modules even with a host having a single RS232 communication port. At maximum 35 units can be connected to the same linear network.

Effective, yet reliable protocols with simple ASCII-commands are used to control the operation of the modules. Communication speed is user selectable up to 57.6 kbps.

### Liquid Level Sensing

Integrated liquid level sensing provides detection of the fluid surface when used with Biohit conductive polypropylene/carbon tips. A 10 ms response time is achieved by data polling. However,

dedicated digital output signal option provides even faster response times.

### Electronic tip eject mechanism

The unit is equipped with an integrated tip eject mechanism. A single command, when executed, will run the tip eject collar outwards thus removing the affixed tip.

### In-build Intelligence

Multitasking nature of the software enables data and status information polling when running the piston. On board self diagnostics provide continuous monitoring of the module's performance.

### INSTALLING

Four 3 mm screw holes are provided to mount the module to the supporting fixture. A 3 mm alignment pin aids the precise orientation. The position of these elements and the dimensions of the module are illustrated by the following figure.

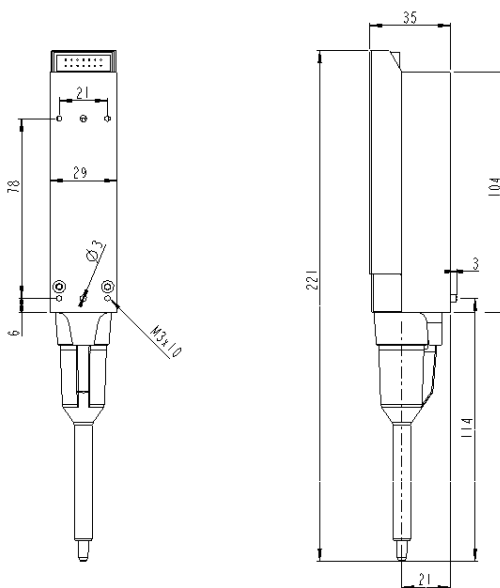


Figure 1. Mounting of the module. A 300 µl Biohit tip adds ~43 mm to the total length of the module.

The nominal supply voltage is 9 VDC. The power source must be able to deliver 1.5 A current to overcome stall consumption of the motor. Figure 2 lists the connector terminals.

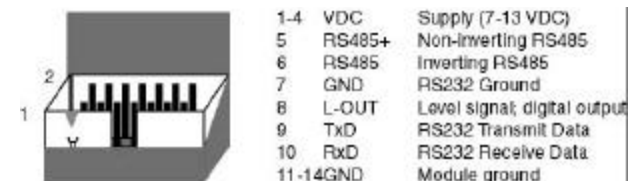


Figure 2. Connector signals.

### DISPLACEMENT SPACE

The displacement space is from -45 to 400 steps. The Zero position is located 45 steps from the bottom of the travel reference point. 250 µl volume corresponds to 300 steps.

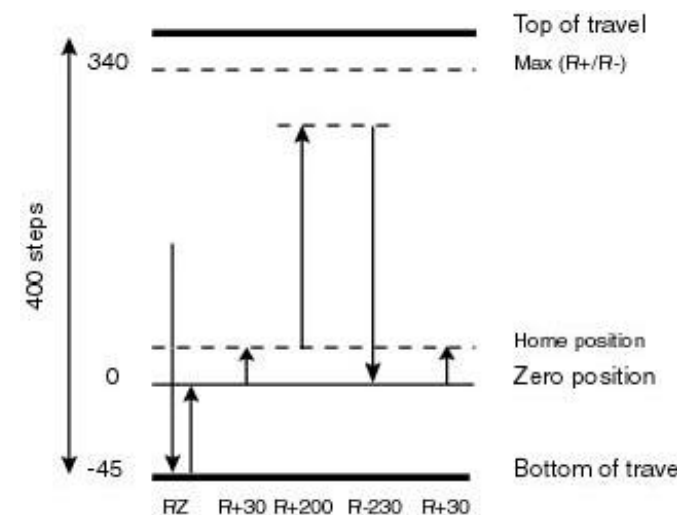


Figure 3. Displacement space with a command sequence.

## TECHNICAL DATA

### Mechanical

Dimensions	220 · 29 · 35 mm (L · W · H)
Weight	170 g
Material	Body: Aluminium, black anodized Cylinder/piston: NBR Cone: Polished stainless steel

### Electrical

Supply Voltage	9 VDC (1.2 A)
Current consumption	Idle: 50 mA Drive: 0.3 A (typ.), 1.2 A (max)
Serial I/O	RS-232 and RS-485 (2-wire), 9600 (default), 8, n, 1
Digital Output	Level Signal

### Dispenser

Type	Air displacement
Resolution	0.83 µl (250 µl / 300)
Nominal Vol.	250 µl (300 steps)
Inaccuracy	≤ 3% at 25µl, <0.5% at 250µl H <sub>2</sub> O
Imprecision	≤ 1% at 25µl, <0.2% at 250µl H <sub>2</sub> O
Smallest Vol.	1.7 µl (2 steps)
Conversion	1 step ~ 0.1 mm ~ 0.83 µl
Tip Eject	4 mm (~ 40 steps)
Zero Point	4.5 mm (~ 45 steps)
Displacement	40.0 mm (-45 .. 400 steps)

### Level Sensing

Type	Capacitive
Range	50 – 320 (operational)
Meas. time	4 ms

## COMMUNICATION

The module is controlled with a simple set of ASCII-commands.  
The message format is as follows:

<PRE><ADR><CODE><DATA><LRC><POST>

PRE = preamble; 0x01 (master-to-slave)  
0x09 (slave-to-master)  
ADR = unit id; alphanumeric 1-9, a-z  
CODE = Two upper case characters (master-to-slave)  
Two lower case characters (slave-to-master)  
DATA = data string; 0 to 5 characters  
LRC = Longitudinal Redundancy Check; one byte  
POST = postamble; 0x0D

!R Reset  
!C Clear reset

DV Display version  
DP Display step position  
DC Display encoder position  
DX Display cycles  
DN Display level sensor value  
DR Display level sensor reference  
DL Display level sensor difference  
DS Display status  
DE Display errors  
SIn Inward speed (1..5)  
SO<sub>n</sub> Outward speed (1..5)  
SL<sub>m</sub> Level reference in %  
RZ Run to the Zero position  
RE Eject tip  
RIn<sub>nn</sub> Run inwards (aspirate) *nnn* steps  
RO<sub>nnn</sub> Run outwards (dispense) *nnn* steps  
RA<sub>nnn</sub> Run to absolute step position *nnn*

\*A<sub>n</sub> Set address  
\*B<sub>n</sub> Set baudrate  
\*C<sub>n</sub> Enable LRC check

Returned error codes:

er0 Module in reset state  
er1 Unknown parameter  
er2 Parameter out of range  
er3 Check sum mismatch  
er4 Drive busy

## ORDER CODES

|                                  |        |
|----------------------------------|--------|
| BRC 2501 Pipettor                | 710940 |
| Conductive tips, 300 µl, 100 pcs | 782045 |
| Pipettor assembly                | 712601 |
| Tip eject collar                 | 712602 |
| Frame assembly                   | 712603 |
| PCB                              | 712604 |
| Connector (female)               | 712605 |
| Cover assembly                   | 712606 |



Figure 4. BRC 2501 Spare parts.

## DISASSEMBLY

The parts delivered as spares are easily replaceable by unscrewing the fixing screws and removing the parts as illustrated by the figure above.

If the module is contaminated in use, a suitable cleaning procedure must be completed prior to accessing the module.

## SUPPORT

Detailed information is available via your local Biohit representative or via the Internet.



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Preliminary Information, subject to change without prior notice  
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