

CETAC ADX-500 AUTODILUTOR

The ADX-500 is an accessory to the ASX-500/510 autosampler.

The dilutor contains its own processor to provide communication with the with the autosampler and Z axis drive for the dilutor probe. The use of a second and independent probe for dilution eliminates the need for valves in the sample introduction path or a dual probe assembly. This allows the autosampler to function normally until dilution is needed and prevents accidental contamination from the dilution probe.

Storing the dilution sequence command file in the autosampler simplifies software requirements for the controlling instrument. The dilution factor can be changed by calling different files rather than changing commands within the file. This is simply one possibility since all commands pertaining to autodilutor functions operate as direct commands. If accessed through the autosampler, a backslash (\) before the command is a dilutor command. The dilutor returns (OK:) to the autosampler which passed it onto the host. In this manner, a command to the autosampler becomes a command to the dilutor.

The syringe pump is also a processor controlled device and communicates through an internal serial link with the dilutor controller. Direct control of the pump is accomplished again by the use of a backslash. If controlled through the autosampler, the sequence \\/1 must be the first four characters in the pump command string. The number following the slash is the pump address. Complete information is contained in the Cavro XP 3000 operators manual.

This manual can be obtained from:

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SEQUENCE FOR PRIMING (From park position) .

STD=5 Any position with an empty container.
PRBB Move dilutor probe over center of container.
\PRIME Pre-programmed prime command.
PARK Return to rinse position. Return to probe "A" is automatic.

BEFORE SAMPLE RUN

TRAY=60 Or any tray size required.
STORE Required for the RESTORE command in the dilution sequence.
FROM-n Required for the NEXT command in the dilution sequence.
TO-n Same as above. FROM and TO are determined by the size and location of the dilution Vials. For example, if a 60 size rack is selected and the last rack on the tray is used for Dilution, FROM would be 180 and TO would be 240 or however number of dilution vials Are required. FROM must be reset when a new rack of dilution vials is required.

OPERATION

TUBE-0-0-150 Normal operation is the same as existing CETAC autosamplers.

To use the dilutor, the dilution sequence file must be loaded. The files occupy 16 by 1K Byte locations of NOVRAM. If no changes in dilution ratio or sequence are needed, the File need only be loaded once.

LOAD-n Where n=0 to 15. At the command LOAD, the autosampler returns the prompt, ">". The dilution file can be uploaded at this time by any normal method. END must be the Last command in the dilution file and must be followed by a CR (OD)hex. Only.

DIL-n Where n=0 to 15. Calls the dilution sequence. Different files may be used for different Dilution ratios, rack sizes etc. Alternately, one file may be altered and re-loaded if the The programmer prefers.

The internal files may be used as macros for operations such as priming the system. The files may be linked by having RUN or SEL as the last command in the sequence.

If, for example, the DSS and the dilutor are to be used together, the last command (before END) in the dilutor file would be RUN-n, where n is the DSS file number. This would run the DSS sequence after dilution, by drawing from the tube that was just diluted. The dilution sequence is called by the command DIL-n, where n is the dilution file number. When using the automatic method (TUBE command) file enable must be ON.

The last file accessed will be the file run by the automatic method. If a file is to be selected but not run, use the SEL command.

The standards, using the TUBE command, will operate the same as samples. Tuning solutions using the STD command will require the sequence OFF, STD-n, DOWN-150, RUN-n (n= DSS program.)

This is an example of a dilutor command file. A command without a backslash is an autosampler command, a single backslash a dilutor command and a double backslash a command to the pump. Remarks must be on the same line as a valid command line. Tabs and all text followed by a semi-colon are ignored. The commands only are stored when the file is loaded. END must be the last line followed only by a CR. This file provides a 10 to 1 dilution.

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STORE           ; STORES THE LAST TRAY NUMBER
\ SETZ-1        ; DILUTOR PROBE RETRACT TIME
\ RINSE         ; RINSES DILUTOR PROBE
  PAUSE-2       ; RINSE TIME
\ UP           ; MOVE DIL. PROBE UP
RET            ; RETURN TO LAST SAMPLE POSITION TESTED
PRBB          ; SELECT DILUTION PROBE
\ DOWN=140     ; EXTEND DILUTION PROBE
\\ / 1S20IA640R ; SET PUMP SPEED 20, VALVE TO I, 600 =1ML+40=
AIR BUBBLE
PAUSE=12       ; WAIT 12 SECS.
\ UP           ; RETRACT PROBE
TRAY=60        ; SELECT TRAY FOR DILUTION
NEXT          ; GO TO NEXT POSITION
\ DOWN=130     ; EXTEND DILUTION PROBE
\\ / 1A0R      ; DISPENSE SAMPLE
PAUSE =10      ; WAIT 10 SECS
\\ / 1S100A22700R ; SET PUMP SPEED TO 10 , VALVE TO 0 , 2700 STEPS
(4.5ML)
PAUSE=6        ; WAIT FOR PUMP
\\ / 1IA0R     ; DISPENSE FIRST HALF OF DILUENT
PAUSE =6       ; TIME FOR PUMP TO MOVE
\\ / 10A2700R ; GET SECOND HALF OF DILUENT
PAUSE=6       ; WAIT FOR PUMP
\\ / 1IA0R     ; DISPENSE
\ SETZ-8       ; 8 SECOND WITHDRAW TIME
\ UP          ; WITHDRAW PROBE
\\ / 1IA40R   ; PUT AIR BUBBLE IN DILUTION LINE (40 STEPS)
PRBA          ; SELECT SAMPLE PROBE
RESTR         ; RESTORE SAMPLE TRAY NO.
\ SETZ-1      ; RESTORE PROBE TIME
END

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ADX -500 AUTO-DILUTOR COMMANDS
DILROM V1.0

HOME	Returns Z axis to home position. Example HOME<CR>
DOWN=	Moves the Z axis down by the parameter in mm. Example DOWN=140<CR> Moves down 140 mm from the top of the travel. Always returns to the top before Moving if in a down position.
UP	Returns the Z axis to the maximum up position. Example UP<CR>
SETZ=	Defines the retract speed of the sipper. Range= 1 to 10 seconds from 150mm Extension. Defaults to 1 sec. On power up. 1 sec is also extension speed (Fixed). Example SETZ=5<CR> 5 sec. Retract time from 150mm.
Rinse	Extends and retracts the sipper 3 times. Stays in the down position until the UP Command. Not affected by SETZ, does not turn on the rinse pump. Example RINSE<CR>
VER	Returns firmware version. (To be determined). Example VER<CR>
PAUSE=	Pause, in seconds, determined by the parameter. Example PAUSE=20<CR> (0 TO 9999)
\	A backslash before a command connects com1 to com2. The command is sent through to the next device and the autosampler waits for a <cr> from the accessed device to close the port. The port can also be closed by sending a pipe () from the host computer. Two backslashes will access the next device connected etc. The <cr> from the last device in the chain will then close all ports and return to the The host. Example \ (command) <cr> Returns OK: from next device in the chain.
PRIME	Primes the dilution system. Diluent must be provided and the dilutor probe over an empty vial before this command is used. Example PRIME<CR> Sends: /1ZS100A3000M2000IA0M2000OA3000 M2000IAO2000IA40R<CR> See Cavro Operator's Manual.

A dash “-“(minus sign) or equals “= “ may be used interchangeably as shown in the examples. One or the other must always be used before a parameter.

Control input port is COM1. RS-232C 9600 baud, 8 data bits, 1 stop bit, no parity. No commands can be entered while the sipper is moving and before the OK: response is received. The pump operates independently after receiving a command string and external timing must be used to prevent conflicts with other operations. See Cavro Operator's Manual.