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EPS300 Programming

Introduction. One of the unique features of the EPS300 is its ability to allow the user to develop complex clamping algorithms using a proprietary command language. The unit can store up to ten programs that control the clamping and declamping operation. Each program can be up to 32 steps long. The unit may be directed to execute any one of the ten stored programs, giving the user maximum flexibility in both the setup phase, when testing clamp reliability, and in production operation. All ten of the EPS300 programs are stored in nonvolatile RAM and can be downloaded to a host computer. The EPS300 programming command set provides the user optimum flexibility for developing sophisticated clamping algorithms for multiple process conditions.

Programming Examples. The following program emulates basic electrostatic chuck power supply functions of clamping and declamping. The program will set the high voltage setpoint to 800 VDC, wait for the high voltage go off command and then apply a reverse pulse of 800 VDC for two seconds to discharge the chuck and release the substrate.

```
01 TP      ; toggle the polarity
02 SO 800  ; set the output to 800 VDC
03 ON      ; turn on the high voltage
04 WF      ; wait for the high voltage off command
05 TP      ; toggle polarity
06 ON      ; turn on the high voltage
07 ST 2    ; start a two second timer
08 WT      ; wait for the timer to expire
09 OF      ; turn off the high voltage
```

This program better illustrates the flexibility of the EPS300. An oscillating voltage can be produced by the EPS300 to discharge the chuck, and more effectively release the substrate. Digital output bit commands are included as well.

```
01 PP      ; select positive polarity
02 SO 800  ; set the output to 800 VDC
03 CX 1    ; clear aux output bit 1 - "clamp is up"
04 SX 2    ; set aux output bit 2 - "clamp is down"
05 ON      ; turn on the high voltage
06 WF      ; wait for the high voltage off command
07 TP      ; toggle polarity
08 ON      ; turn on the high voltage
```

```
09 SO 600 ; set the output to 600V
10 ST 4   ; start four second timer
11 WT     ; wait for timer to expire
12 TP     ; toggle polarity
13 ON     ; turn on the high voltage
14 SO 400 ; set the output to 400V
15 ST 3   ; start three second timer
16 WT     ; wait for timer to expire
17 TP     ; toggle polarity
18 ON     ; turn on the high voltage
19 SO 200 ; set the output to 200V
20 ST 2   ; start two second timer
21 WT     ; wait for timer to expire
22 OF     ; turn high voltage off
23 SX 1   ; set aux output bit 1 - "clamp is up"
24 CX 2   ; clear aux output bit 2 - "clamp is down"
```

These programs are shown for example only. Some electrostatic chuck algorithms have been patented. Use of patented algorithms may be a violation of federal patent laws.



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