











# EN6001 Weld Schedule Quick Start

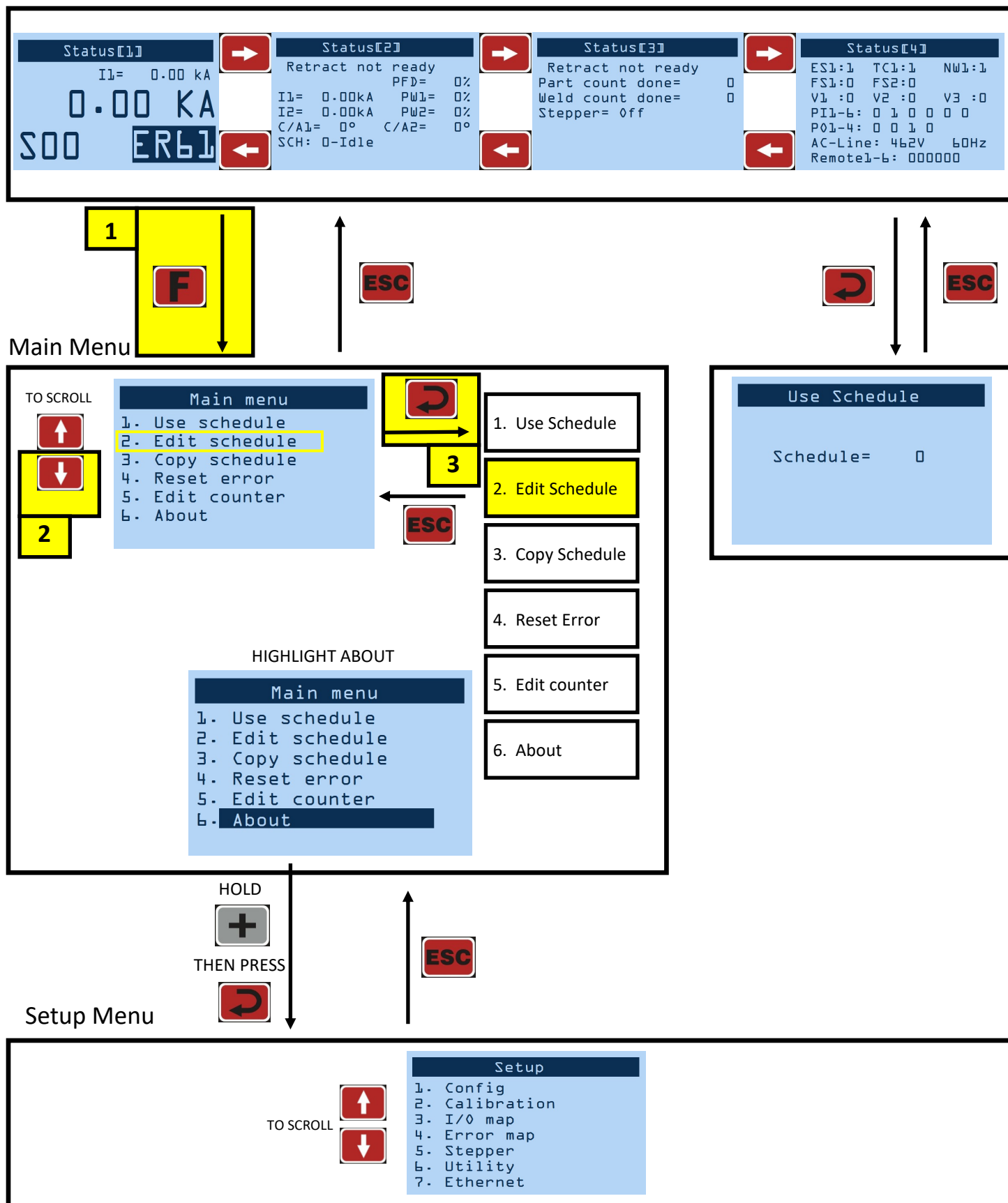
## Application Note 700242

This Application Note provides a Quick Start method for creating a weld schedule in the EN6001. For a comprehensive description of the EN6001, refer to document 700230

The EN6001 Keypad functions are described below:

KEYPAD FUNCTIONS	
	The ESCAPE key. Used to return to the previous menu.
   	The ARROW keys. Used to navigate. If in the menu screens, the down and right arrows move the cursor/selection down, while the up and left arrows move the cursor/selection up. If in the Status screens, the up and left arrows navigate to the previous Status screen, while the down and right arrows navigate to the next Status screen.
	The ENTER key. Used to select menus and confirm changes to parameters.
 	The PLUS and MINUS keys. Used to make changes to parameters. If the input for the parameter to be changed is a number, PLUS will increase the number by one and MINUS will decrease the number by one. If the input for the parameter to be changed is a menu of different options, either key can be used to scroll through the menu options. Holding the buttons down will cause the control to increment/decrement at a faster rate.
	The FUNCTION key. Used to navigate from the Status screens to the Main Menu.
	Enables weld current. If not on, then an ER35 (Panel no-weld error) is displayed.

The figure below shows the comprehensive navigation map of the EN6001. To edit a weld schedule, press the buttons identified in steps 1—3 highlighted in yellow.



A weld schedule is created by setting values for the parameters shown below. Use the Up and Down arrows to scroll through the list shown on the right. To change the value of the highlighted parameter, use the + and —button. Remember to press ENTER to save the value.

### Schedule Number [0-63]

Default = 0

Selects the schedule to edit.

### Squeeze Delay [0-99] cycles

Default = 0

Additional time delay to be added to 'Squeeze'. This is usually utilized when 'Cycle Mode' is set to repeat. The squeeze delay will only be applied to the first weld of the repeating cycle. Parameter is replaced by 'Advance' when 'air-over-oil' is enabled.

### Squeeze [0-99] cycles

Default = 0

Time delay between the signal to the programmed valve(s) and weld initiation. Parameter is replaced by 'Intensify' when 'air-over-oil' is enabled.

### >Valve [None/1/2/3/1+2/2+3/1+3/1+2+3]

Selection of valve(s) to be activated.

### Weld 1 [0-99] cycles

Default = 0

Time in cycles of Weld segment 1. Also referred to as "pre-heat"

```
Schedule
Schedule Number= 0
Squeeze delay= 99 Cyc
Squeeze= 60 Cycle
>Valve= 1+2+3
Weld1= 0 Cycles
>Mode= Phase shift
>Heat= 0 %
```



```
Schedule
>Current= 0.00 kA
>I1 Monitor= 0n
>High= 0 %
>Low= 0 %
>Pre-low=0 %
>Pre-low count= 0
>PWL Monitor= 0n
>High= 0 %
```



```
Schedule
>Low= 0 %
Cool1= 0 Cycles
Slope= 0 Cycles
Weld2= 10 Cycles
>Mode= Phase shift
>Heat= 50 %
>Current= 0.00 KA
```



```
Schedule
>I2 Monitor= 0n
>High= 0 %
>Low= 0 %
>Pre-low=0 %
>Pre-low count= 0
>PW2 Monitor= 0n
>High= 0 %
>Low= 0 %
```



```
Schedule
Cool2= 30 Cycles
Hold= 0 Cycles
Off= 60 Cycles
Impulses= 1
I offset= 0 %
>Change all= No
Cycle Mode= Chained
```

### >Mode [Phase Shift/Const Current]

Current regulation mode of Weld 1.

- Phase Shift—welding current is not regulated
- Const Current—current is regulated

### >Heat [0-99]%

Phase shift %. Does not apply when Current Mode is set to Const Current.

### >Current [0.00-100.00] kA

Weld current setting. Does not apply when Mode is set to Phase Shift.

### >I1 Monitor [On/Off]

Must be enabled in order to track/report current errors.

### >>High [0-99]%

Default = 0

% current above programmed value that will trigger an error. Only visible when 'I1 Monitor' configuration is on.

### >>Low [0-99]%

Default = 0

% current below programmed value that will trigger an error. Only visible when 'I1 Monitor' is on.

### >>Pre-low [0-99]%

Default = 0

% current below programmed value that will trigger ER44. Only visible when 'I1 Monitor' is on.

Schedule	
Schedule Number=	0
Squeeze delay=	99 Cyc
Squeeze=	60 Cycle
>Valve=	1+2+3
Weld1=	0 Cycles
>Mode=	Phase shift
>Heat=	0 %



Schedule	
>Current=	0.00 kA
>I1 Monitor=	On
>High=	0 %
>Low=	0 %
>Pre-low=	0 %
>Pre-low count=	0
>PW1 Monitor=	On
>High=	0 %



Schedule	
>Low=	0 %
Cool1=	0 Cycles
Slope=	0 Cycles
Weld2=	10 Cycles
>Mode=	Phase shift
>Heat=	50 %
>Current=	0.00 KA



Schedule	
>I2 Monitor=	On
>High=	0 %
>Low=	0 %
>Pre-low=	0 %
>Pre-low count=	0
>PW2 Monitor=	On
>High=	0 %
>Low=	0 %



Schedule	
Cool2=	30 Cycles
Hold=	0 Cycles
Off=	60 Cycles
Impulses=	1
I offset=	0 %
>Change all=	No
Cycle Mode=	Chained

### >>Pre-low count [0-99] cycles

Default = 0

Number of 'Weld 1' cycles that must fall below the 'Pre-low' limit in order to trigger an error. Only visible when 'I1 Monitor' configuration is on.

### >PW1 Monitor [On/Off]

Must be enabled in order to track/report phase shift abnormalities.

### >>High [0-99]%

Default = 0

Maximum phase shift the control can apply in order to achieve the 'Current' setting without triggering an error. Only visible when 'PW1 Monitor' configuration is on.

### >>Low [0-99]%

Default = 0

Minimum phase shift the control can apply in order to achieve the 'Current' setting without triggering an error. Only visible when 'PW1 Monitor' configuration is on.

### Cool 1 [0-99] cycles

Default = 0

Time delay between 'Weld 1' and 'Weld 2'. Designed to give an impulse effect.

```
Schedule
Schedule Number= 0
Squeeze delay= 99 Cyc
Squeeze= 60 Cycle
>Valve= 1+2+3
Weld1= 0 Cycles
>Mode= Phase shift
>Heat= 0 %
```



```
Schedule
>Current= 0.00 kA
>I1 Monitor= 0n
>High= 0 %
>Low= 0 %
>Pre-low=0 %
>Pre-low count= 0
>PW1 Monitor= 0n
>High= 0 %
```



```
Schedule
>Low= 0 %
Cool1= 0 Cycles
Slope= 0 Cycles
Weld2= 10 Cycles
>Mode= Phase shift
>Heat= 50 %
>Current= 0.00 KA
```



```
Schedule
>I2 Monitor= 0n
>High= 0 %
>Low= 0 %
>Pre-low=0 %
>Pre-low count= 0
>PW2 Monitor= 0n
>High= 0 %
>Low= 0 %
```



```
Schedule
Cool2= 30 Cycles
Hold= 0 Cycles
Off= 60 Cycles
Impulses= 1
I offset= 0 %
>Change all= No
Cycle Mode= Chained
```

## Slope [0-99] cycles

Default = 0

The number of additional cycles between 'Weld 1' and 'Weld 2' in order to transition between the two gradually. A larger 'Weld 1' will result in a downslope; whereas a larger 'Weld 2' will result in an upslope. This segment will begin after Cool 1.

## Weld 2 [0-99] cycles

Default = 0

Time in cycles of Weld segment 2. Also known as "main heat"

## >Mode [Phase Shift/Const Current]

Current regulation mode of Weld 2.

- Phase Shift—welding current is not regulated
- Const Current—current is regulated

## >Heat [0-99]%

Phase shift %. Does not apply when Current Mode is set to Const Current.

## >Current [0.00-100.00] kA

Weld current setting. Does not apply when Mode is set to Phase Shift.

## >I2 Monitor [On/Off]

Must be enabled in order to track/report current errors.

### Schedule

```
Schedule Number= 0
Squeeze delay= 99 Cyc
Squeeze= 60 Cycle
>Valve= 1+2+3
Weld1= 0 Cycles
>Mode= Phase shift
>Heat= 0 %
```



### Schedule

```
>Current= 0.00 kA
>I1 Monitor= 0n
>High= 0 %
>Low= 0 %
>Pre-low=0 %
>Pre-low count= 0
>PW1 Monitor= 0n
>High= 0 %
```



### Schedule

```
>Low= 0 %
Cool1= 0 Cycles
Slope= 0 Cycles
Weld2= 10 Cycles
>Mode= Phase shift
>Heat= 50 %
>Current= 0.00 KA
```



### Schedule

```
>I2 Monitor= 0n
>High= 0 %
>Low= 0 %
>Pre-low=0 %
>Pre-low count= 0
>PW2 Monitor= 0n
>High= 0 %
>Low= 0 %
```



### Schedule

```
Cool2= 30 Cycles
Hold= 0 Cycles
Off= 60 Cycles
Impulses= 1
I offset= 0 %
>Change all= No
Cycle Mode= Chained
```



### >>High [0-99]%

Default = 0

% current above programmed value that will trigger an error. Only visible when 'I2 Monitor' configuration is on.

### >>Low [0-99]%

Default = 0

% current below programmed value that will trigger an error. Only visible when 'I2 Monitor' configuration is on.

### >>Pre-low [0-99] %

Default = 0

% current below programmed value that will trigger ER46. Only visible when 'I2 Monitor' configuration is on.

### >>Pre-low count [0-99] cycles

Default = 0

Number of 'Weld 2' cycles that must fall below the 'Pre-low' limit in order to trigger an error. Only visible when 'I2 Monitor' is on.

### >PW2 Monitor [On/Off]

Must be enabled in order to track/report phase shift abnormalities.

### >>High [0-99]%

Default = 0

Maximum phase shift the control can apply in order to achieve the 'Current' setting without triggering an error. Only visible when "PW2 Monitor" is on.

```
Schedule
Schedule Number= 0
Squeeze delay= 99 Cyc
Squeeze= 60 Cycle
>Valve= 1+2+3
Weld1= 0 Cycles
>Mode= Phase shift
>Heat= 0 %
```



```
Schedule
>Current= 0.00 kA
>I2 Monitor= 0n
>High= 0 %
>Low= 0 %
>Pre-low=0 %
>Pre-low count= 0
>PW1 Monitor= 0n
>High= 0 %
```



```
Schedule
>Low= 0 %
Cool1= 0 Cycles
Slope= 0 Cycles
Weld2= 10 Cycles
>Mode= Phase shift
>Heat= 50 %
>Current= 0.00 KA
```



```
Schedule
>I2 Monitor= 0n
>High= 0 %
>Low= 0 %
>Pre-low=0 %
>Pre-low count= 0
>PW2 Monitor= 0n
>High= 0 %
>Low= 0 %
```



```
Schedule
Cool2= 30 Cycles
Hold= 0 Cycles
Off= 60 Cycles
Impulses= 1
I offset= 0 %
>Change all= No
Cycle Mode= Chained
```

## >>Low [0-99]%

Default = 0

Minimum phase shift the control can apply in order to achieve the 'Current' setting without triggering an error. Only visible when 'PW2 Monitor' configuration is on.

## Cool 2 [0-99] cycles

Default = 0

Primarily used when applying multiple impulses; time delay following each 'Weld 2' impulse.

## Hold [0-99] cycles

Default = 0

Time delay during which the electrodes remain in contact with the part being welded to allow weld nugget to congeal.

## Off [0-99] cycles

Default = 0

Time delay following 'Hold' cycle in which the valve (s) release; the next schedule/sequence will not begin until the 'Off' cycle is complete.

## Impulses [1-99] cycles

Default = 1

Number of times to deliver Weld 2—Cool 2.  
(Impulses do NOT apply to Weld 1—Cool 1.)

Schedule	
Schedule Number=	0
Squeeze delay=	99 Cyc
Squeeze=	60 Cycle
>Valve=	1+2+3
Weld1=	0 Cycles
>Mode=	Phase shift
>Heat=	0 %



Schedule	
>Current=	0.00 kA
>I1 Monitor=	0n
>High=	0 %
>Low=	0 %
>Pre-low=	0 %
>Pre-low count=	0
>PW1 Monitor=	0n
>High=	0 %



Schedule	
>Low=	0 %
Cool1=	0 Cycles
Slope=	0 Cycles
Weld2=	10 Cycles
>Mode=	Phase shift
>Heat=	50 %
>Current=	0.00 KA



Schedule	
>I2 Monitor=	0n
>High=	0 %
>Low=	0 %
>Pre-low=	0 %
>Pre-low count=	0
>PW2 Monitor=	0n
>High=	0 %
>Low=	0 %



Schedule	
Cool2=	30 Cycles
Hold=	0 Cycles
Off=	60 Cycles
Impulses=	1
I offset=	0 %
>Change all=	No
Cycle Mode=	Chained



## I offset [up to -15% through +15%]

Adjustable increase or decrease to total current delivered by a sequence. This is one of the few adjustable parameters when control is locked. Only visible when 'Max I offset' is not "0". Range is dependent on what 'Max I offset' is set to in the Config menu.

### >Change all [Yes/No]

- Yes—'I offset' will be applied to all schedules
- No—'I offset' will only be applied to the current schedule

### Cycle Mode [Non-Repeat/Repeat/ Chained/Successive/ Wait-Here]

- Non-Repeat—Control can be initiated for only one sequence/schedule even if initiation remains close.
- Repeat—Sequences/schedules will continue if initiation remains closed.
- Chained—Schedules are chained together so that consecutive schedules will be sequenced from one initiation.
- Successive—Schedules are chained together so that consecutive schedules will be sequenced from separate initiations.
- Wait-Here—Only applies when certain parameters (Presqueeze, Squeeze, Weld 1, Cool 1, Weld 2, Cool 2, or Hold) are set to 99 cycles. This allows infinite duration until Escape is triggered, at which point the sequence will immediately chain to next schedule. 'Beat Mode' must also be set to 'Wait-Here' if this Cycle mode is desired.

```
Schedule
Schedule Number= 0
Squeeze delay= 99 Cyc
Squeeze= 60 Cycle
>Valve= 1+2+3
Weld1= 0 Cycles
>Mode= Phase shift
>Heat= 0 %
```



```
Schedule
>Current= 0.00 kA
>I1 Monitor= 0n
>High= 0 %
>Low= 0 %
>Pre-low=0 %
>Pre-low count= 0
>PW1 Monitor= 0n
>High= 0 %
```



```
Schedule
>Low= 0 %
Cool1= 0 Cycles
Slope= 0 Cycles
Weld2= 10 Cycles
>Mode= Phase shift
>Heat= 50 %
>Current= 0.00 KA
```

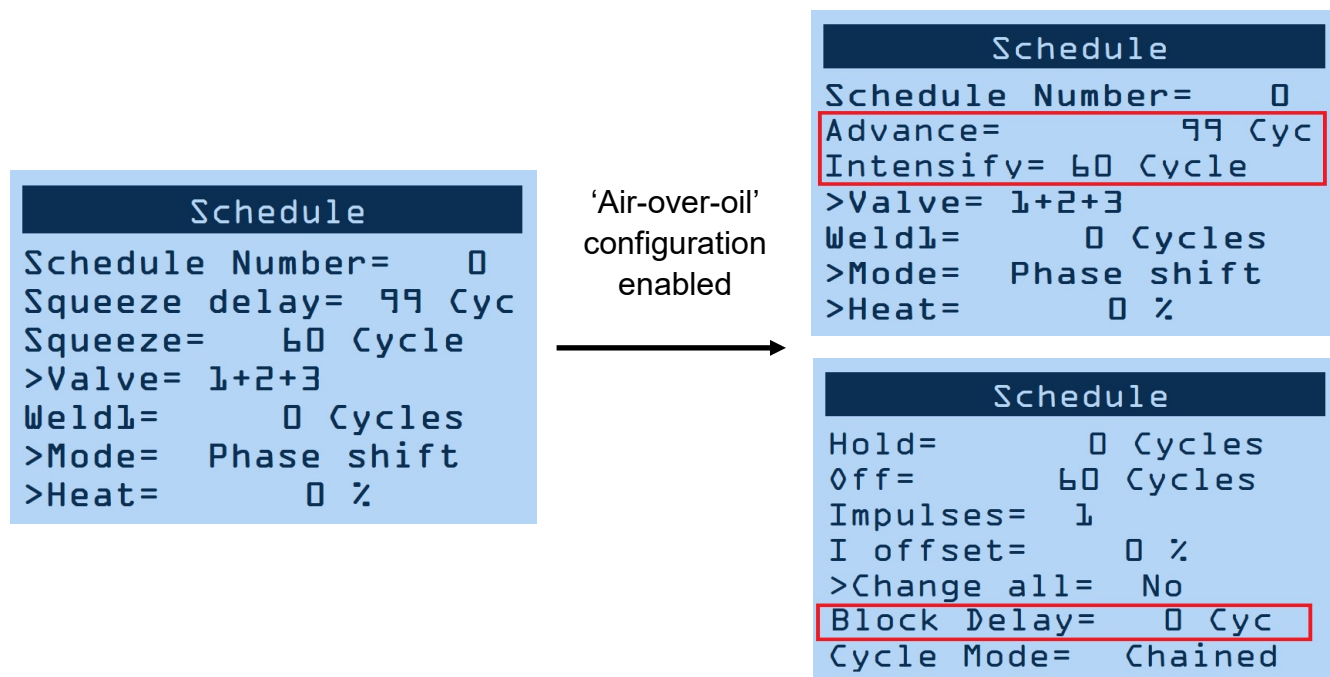


```
Schedule
>I2 Monitor= 0n
>High= 0 %
>Low= 0 %
>Pre-low=0 %
>Pre-low count= 0
>PW2 Monitor= 0n
>High= 0 %
>Low= 0 %
```



```
Schedule
Cool2= 30 Cycles
Hold= 0 Cycles
Off= 60 Cycles
Impulses= 1
I offset= 0 %
>Change all= No
Cycle Mode= Chained
```

The following parameters are available when Air-Over-Oil is selected in the Configuration Menu.



### **Advance [0-99] cycles**

Default = 0

Time delay to allow advancement of the cylinder using oil pressure only. Only visible when 'air-over-oil' configuration (Mode1 or Mode2) is selected. Otherwise, parameter is replaced by Squeeze Delay.

### **Intensify [0-99] cycles**

Default = 0

Time delay to allow force buildup of the cylinder using air pressure. Only visible when 'air-over-oil' configuration (Mode1 or Mode2) is selected. Otherwise, parameter is replaced by Squeeze.

### **Block Delay [0-99] cycles**

Default = 0

Timed delay to allow high force of the cylinder to release air pressure after the welding process. Only visible when 'air-over-oil' configuration (Mode2 only) is selected.