SK-54

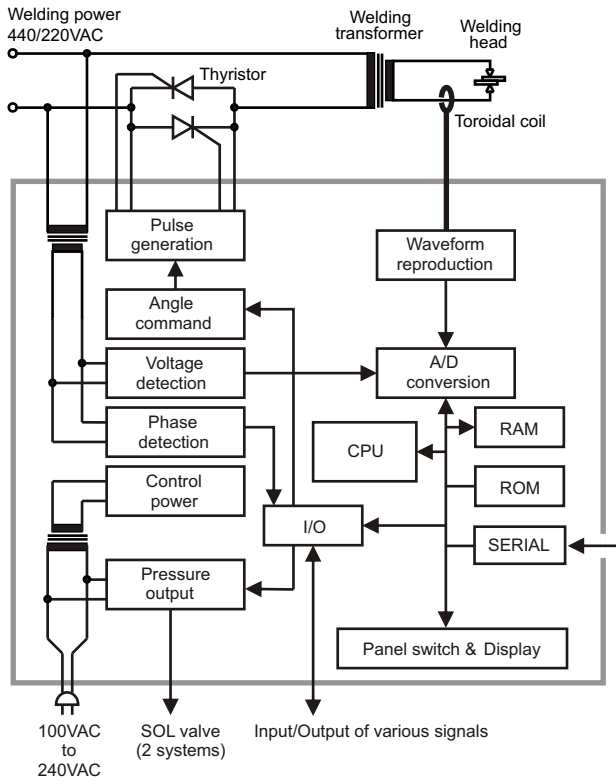
Applicable for
Spot, Twin head spot, Seam welders

Resistance Welding Controls

- Secondary feed-back constant current control
- Self-adjustment for maximum current
- 15 Weld schedules
- External schedule select
- Spot, Twin head spot and seam welder compatibility
- 3 Impulse weld schedules
- 9 Steppers / Linear stepper
- Up and Down slope
- 2 Pressure valve output and 7operations
- Current 1, 2, 3 monitor with high/low monitor
- 3 easy-to-operate counters to aid in systematic quality control and tip dressing schedules
- PC and RS485 network interface

FORWEL

Versatile, easy-to-operate, microcomputer control unit.

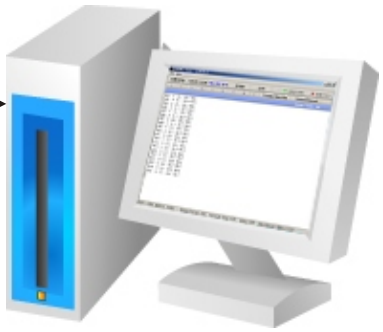


Constant current feed-back theory

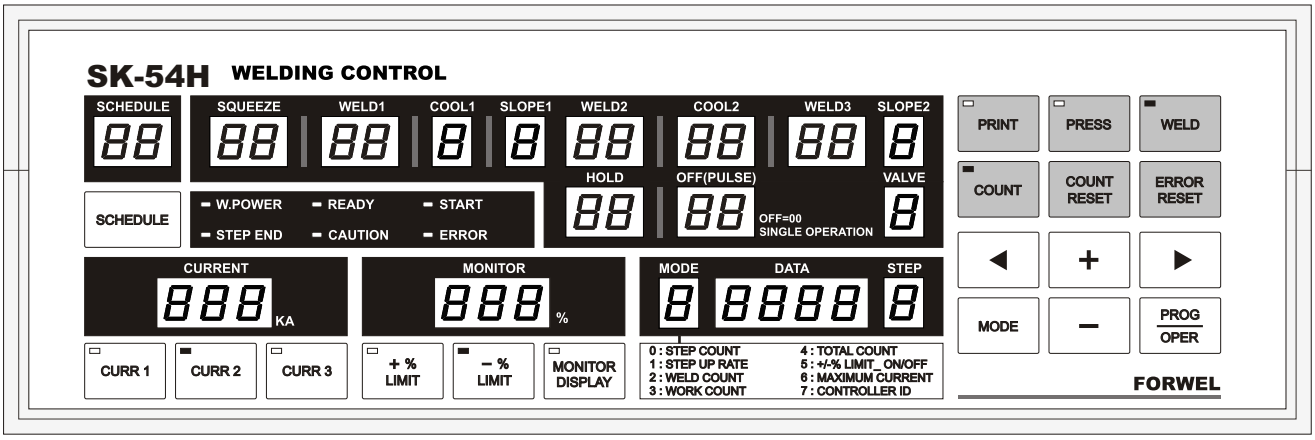
Using a toroidal coil, the current wave form is reconstructed from the output signal.
It is then transformed into an RMS effective value using the following formula:

$$RMS = \sqrt{\frac{1}{T}\int_0^T (i)^2 dt}$$

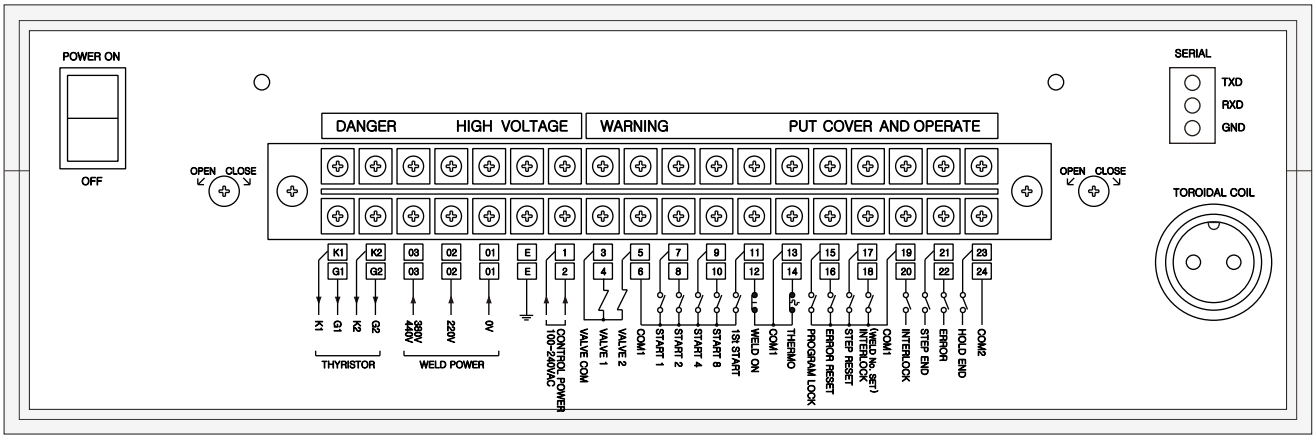
The control then compares this effective value with the set current value. The weld current is corrected with every half cycle through phase conversion and trigger pulse oscillation.
The result is smooth, consistent secondary welding current delivered at the weld regardless of the line voltage fluctuations.



FRONT VIEW



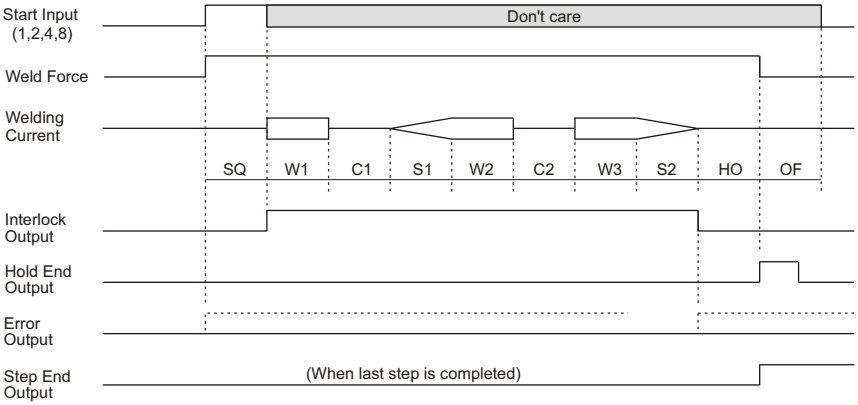
REAR VIEW



SPECIFICATIONS

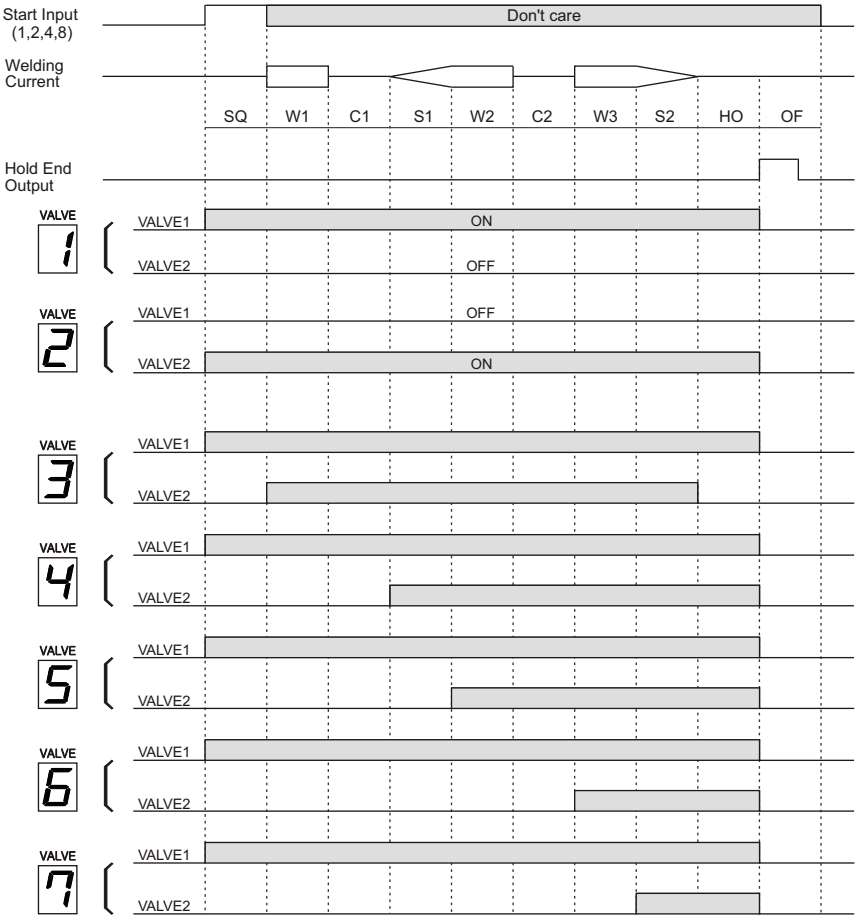
MODEL		SK-54V	SK-54H
Welding power source		200~240VAC and 380~480VAC	
Control power source		100~240VAC	
Frequency		50 /60Hz	
Control method		Secondary feed-back constant current control by phase control with thyristor	
Control speed		1/2 cycle	
Current accuracy		±2%	
Indication		7-Segment LED	
Program parameters	Schedule	15 schedules	
	Squeeze time	0..99 cycles	
	Weld1 time		
	Cool1 time	0..9 cycles	
	Up slope time		
	Weld2 time	0..99 cycles	
	Cool2 time	0..99 cycles(0..99 half cycles)	
	Weld3 time	0..99 cycles	
	Down slope time	0..9 cycles	
	Hold time	0..99 cycles	
	Off time / Pulsation	0..99 cycles / 0..9 times	
	Valve	7 operations	
Maximum current setting range		3.0 to 80.0KA	
Current setting range		15 Shedules Constant current control mode (0.3KA to 80.0KA) Current1,2,3 : 10% to 100% of maximum current setting	
Current monitor	Setting of upper limit	15 Schedules, ±0 to 49%	
	Setting of lower limit		
Valve output	System	Valve No.1 or 2 can be selected for 15 schedules and 7 operations	
	Output	Control Voltage Output or Free Valve	
Stepper up of current	Step No.	0..9	
	Step count	0..9999	
	Step up rate	50..200%	
Counter	Weld count	0..99	
	Work count	0..9999	
	Total count	0..9999	
External input (Dry contact or open collector)		Program lock switch	
		Start 1,2,4,8 switch	
		Weld ON/OFF switch	
		Weld transformer or SCR temperature limit switch	
		Step reset switch	
		Error reset switch	
		Interlock / Weld No. Switch	
		Hold end output	
External contact output (250V 0.5A Max.)		Error output	
		Step end output	
		Interlock / Weld No. error output	
Serial output (Optional)		RS232 / RS485 interface	
Memory retention		More than 10 years after power failure	
Dimensions		85mm(W)x260mm(H)x207mm(D) 3.3"(W)x10.2"(H)x8.1"(D)	260mm(W)x850mm(H)x207mm(D) 10.2"(W)x3.3"(H)x8.1"(D)
Toroidal coil		TC-450L, TC-600L(Optional)	

Time chart of basic operation

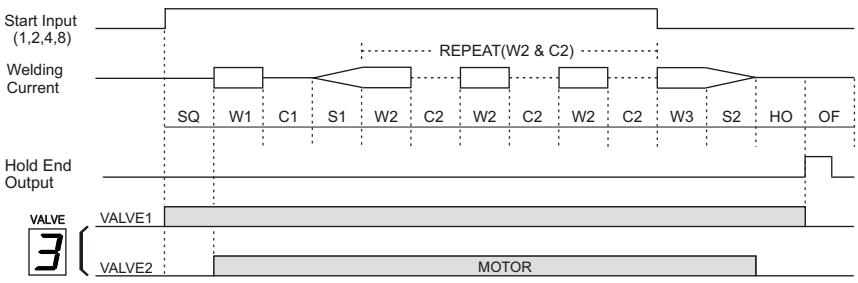


SQ_Squeeze W1_Weld1 C1_Cool1 S1_Up Slope W2_Weld2
C2_Cool2 W3_Weld3 S2_Down Slope HO_Hold OF_Off

Time chart of pressure valve1 and 2



Time chart of seam welding operation



• Printout of schedules

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SCHEDULE_01 ----------------------------
SQ_60    W1_05    C1_03    S1_05
W2_10    C2_00    W3_05    S2_05
HO_30    OF_60             VALVE_1

CURR1      :  40.0 KA    05 CY
CURR2      :  50.0 KA    10 CY
CURR3      :  30.0 KA    05 CY
HIGH LIMIT :  +01%
LOW LIMIT  :  - 01%

MODEL0,1_STEPPER ----------------------
No.   COUNT    UPRATE    CURRENT_KA
0     0500     100%      CURR2_ 50.0
1     0490     122%      CURR2_?61.0
2     0480     104%      CURR2_ 52.0
3     0470     106%      CURR2_ 53.0
4     0460     108%      CURR2_ 54.0
5     0450     110%      CURR2_ 55.0
6     0440     112%      CURR2_ 51.0
7     0430     144%      CURR2_?72.0
8     0420     116%      CURR2_ 58.0
9     9999     118%      CURR2_ 59.0

MODE2_PRESET WELD COUNT    : 0 0 0 0
MODE3_PRESET WORK COUNT    : 0 0 0 0
MODE4_PRESET TOTAL COUNT   : 0 0 0 0
MODE5_+/-% LIMIT ON/OFF    : 2 1 1 1
MODE6_MAXIMUM CURRENT(KA) : 60 . 0

DIP SWITCH1  :  00000000
DIP SWITCH2  :  00000000
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If the calculated value of step up rate by the highest value among Curr1,2,3 exceeds the maximum current, "?" is printed.

• Real-time printout of current1,2 and 3

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COUNT  SCH  CURR1  CURR2  CURR3
0001   01   39.9   50.0   29.9
0002   01   40.1   50.0   30.0
0003   01   40.0   50.0   30.0
0004   01   40.0   50.0   30.0
0005   01   40.0   50.0   30.0
0006   01   39.9   50.0   30.0
0007   01   40.0   50.0   29.9
0008   01   40.0   50.0   30.0
0009   01   40.0   50.0   30.0
0010   01   39.9   50.0   30.0
```

• Printout in case of current1,2 and 3 errors

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COUNT  SCH  CURR1  CURR2  CURR3
0056   01   ?40.8  50.0   30.0
1300   01   40.1   ?51.2  30.0
1512   01   40.0   50.0   ?30.7
1753   01   40.0   ?48.9  30.0
2800   01   40.0   50.0   ?29.3
3125   01   ?39.1  50.0   30.0
4300   01   40.0   50.0   ?31.0
4895   01   ?39.0  ?48.8  30.0
5230   01   40.0   50.0   ?30.8
6812   01   ?38.8  ?48.7  ?29.2
```

High Limit : +1%, Low Limit : -1%

Selection Table :

SK54V – AC

Pressure Valve output

AC : Control Voltage Output
FV : Free Valve

Product name

SK54V : Vertical type
SK54H : Horizontal type

- Control power : 100~240VAC
- Welding power : 200~240VAC and 380~480VAC