

## Transtig/Heliarc 252/352

### Calibration Procedure

Update 17.12.96

Main control PCB Dip Switch DS1 settings:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
252	ON	OFF	OFF	ON
352	ON	OFF	ON	OFF

(Note: Slope pcb can be eliminated by setting 1 to OFF & 2 to ON)

Shunt output is 50mV @ 300A (DC) adjustable by sliding take off point. After amplification on the main pcb, at TP5 (w.r.t. TP1) the shunt feedback is 2V/100A (6V @ 300A). Preset R11 compensates any offsets in the shunt amplifier circuit and should be adjusted at idle (or open circuit) conditions to give less than  $\pm 0.01V$  at TP5.

### Accuracy Requirements

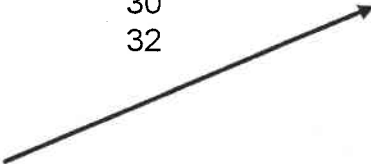
Things to remember:

1. The 252 output is not "infinitely steep" even in TIG mode and the current increases slightly as more load is applied. DC current increases by some 20A over the range 20V down to 0V (short circuit) at a nominal 150A setting for example.
2. The digital meter pcb in the 352 (and when fitted as an option in the 252) increases the "steepness" of the machine to provide a preset/actual type current display/function.
3. Installing an optional digital meter pcb in a 252 can result in differences between the scaling around the main current control knob and the digital current preset display (and hence the actual value). The error can be adjusted out if desired, see below.
4. The preset/actual facility on the 352 (optional on 252) is designed to maintain the welding current within 5A of the preset value over a wide range of current settings (10-250A) and output voltage range (5-25V). It is designed for use in TIG (DC & AC) mode only. In MMA mode the preset/actual relationship cannot be maintained even at minimum arc force setting.

5. The load lines in question are:

Either TIG  $V = 10 + 0.04A$  (DC!)  
Or MMA  $V = 20 + 0.04A$

ie.	CURRENT AMPS	TIG VOLTS	MMA VOLTS	FACTORY VOLTS
	10	10.4	20.4	14.4
	50	12	22	16
	100	14	24	18
	200	18	28	22
	250	20	30	24
	300	22	32	26



Note: In the factory a "compromised" line  $V = 14 + 0.04A$  is used.

6. Main current control dial calibration accuracy per BS 7570:

252:  $\pm 3$  to  $\pm 32A^*$  increasing with control setting (10 to 320A)  
352:  $\pm 4$  to  $\pm 38A^*$  increasing with control setting (10 to 380A)

7. Digital meter display accuracy:

Actual Amps:  $\pm 10A$  ( $\pm 2.5\%$  of 400A f.s.d.)  
(Actual) Volts:  $\pm 2.5V$  ( $\pm 2.5\%$  of 99.9V f.s.d.) on the load line

#### **IMPORTANT**

As supplied the digital meter meets the accuracy requirements for amps display mode only. When voltage display mode is selected the display circuitry is not accurate in both AC and DC modes at open circuit voltage levels ( $> 30V$ ). Consult WX for help if this causes problems.

8. Preset/actual accuracy on 352 (and 252 with fitted meter kit):-

- Preset digital amps should be within  $\pm 7.5A$  of current control dial
- Display actual amps \* should be within  $\pm 5A$  of preset digital setting

\* current must be measured at corresponding load voltage

## CALIBRATION PROCEDURE

1. **Idle Checks** (using accurate dvm)  
With the machine idling, no load, local current control mode, contactor off (switch in mid position), main current, balance and arc force controls at minimum, measure and if necessary adjust the following. TP1 is "Ov" signal ground.
  - 1.1 TP2, + 12 ± 0.5Vdc
  - 1.2 TP3, - 12 ± 0.5Vdc
  - 1.3 TP4, 0.1 ± 0.02Vdc, adjust R60 if required (minimum amps)
  - 1.4 TP5, < ± 0.01Vdc, adjust R11 if required (shunt offset)
  - 1.5 TP6, 5.3 ± 0.1Vdc, adjust R69 if required (ramp)
  - 1.6 Rotate the current control to precisely 150A and now adjust TP4 to read 3 ± 0.02Vdc using R102 (150A on digital meter if present)
2. **Resistive Load Tests (or DC TIG Arc)**
  - 2.1 **OCV** Set the polarity switch to DC +ve. With no load applied place the contactor switch in the up position. Measure the OCV between the work (-ve) and electrode holder (+ve) pins connections, +68 ± 5V DC. On a 352 the digital display can be set to read volts and will display the OCV (75 ± 5V DC). Set the contactor switch back to its middle position. Check the volts have reduced to zero.
  - 2.2 **Current Calibration**

**Notes:** On a 252 current is set by the calibration marks around the main current control. On a 352 (or a 252 with optional digital meter installed) current can be preset with the machine idling by setting the digital display to read amps, setting the Crater Current Control to 100% and hence setting the main current control to give the desired amps reading in the display.

Current can be validated (or calibrated) using a resistive load on either a TIG load line ( $V = 10 + 0.04 \times A$ ) or on an MMA load line ( $V = 20 + 0.04 \times A$ ) depending on the dominant application. In the factory a compromise is used based on  $V = 14 + 0.04 \times A$ . Note that the machine output characteristics are not perfectly constant current (vertical) and current will increase by roughly 20A as the load voltage reduces from 20V to OV.

For dominantly TIG welding uses, a DC TIG arc (3mm length) can be used but beware the HF system does not damage measuring instruments.

Using the factory method ( $V = 14 + 0.04 \times A$ ):

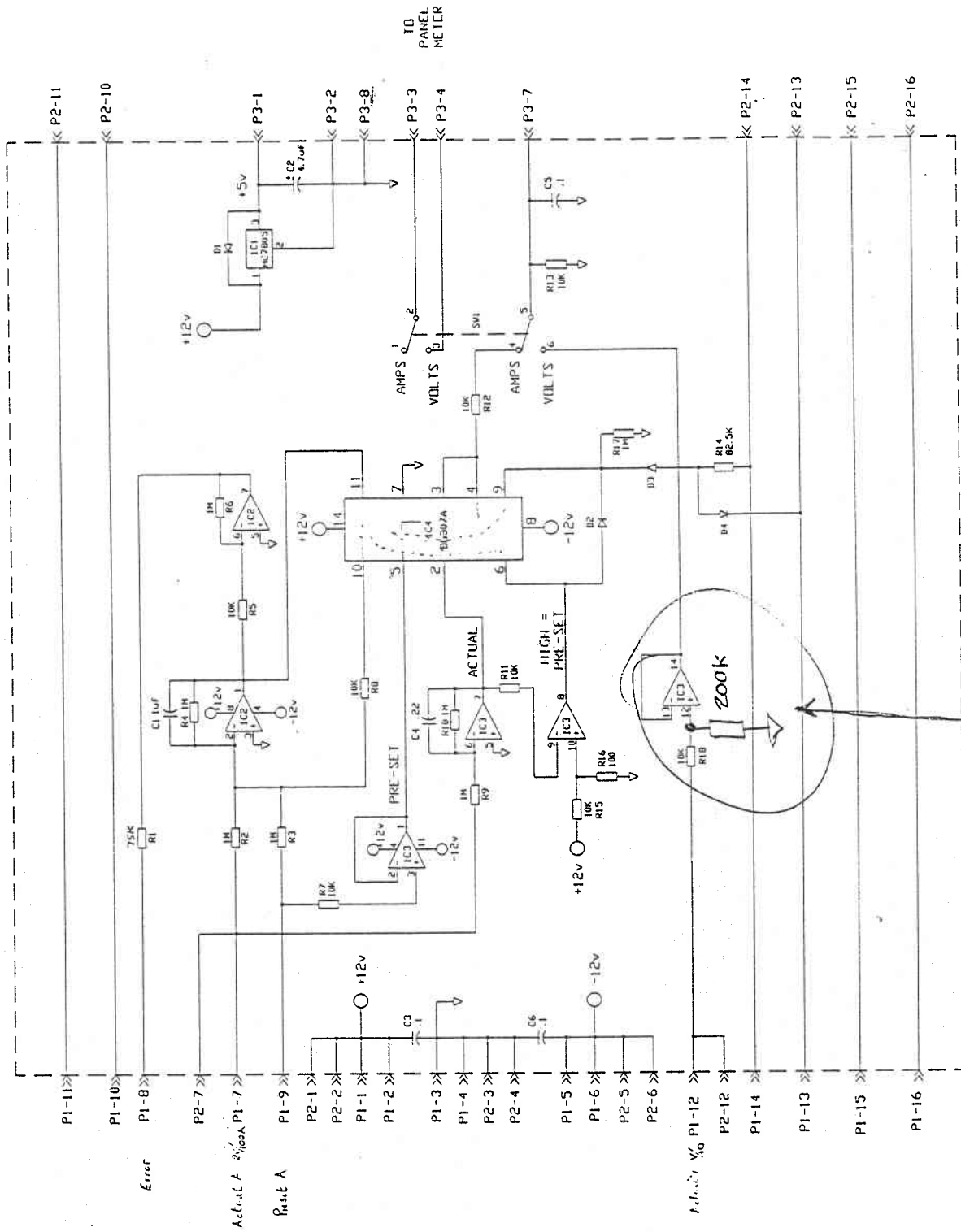
- a. Set the main current to 150A (see above), local control mode
- b. Set start and crater controls to 100%
- c. Set slope up and down controls to 0%
- d. Set the 2/4 stroke switch to 2 stroke (up)
- e. Set the HF switch to off (down)
- f. Set the polarity switch to DC +ve
- g. Set the arc force and balance controls to minimum
- h. Connect the test load bank/ammeter/voltmeter across the machine output. Adjust the load bank to an approximate value of  $0.13\Omega$  (150A @ 20V)
- i. Close the contactor by placing the contactor switch in the up/on position. Check that current is flowing, should be approximately 150A
- j. Monitor the DC voltage at TP5 (w.r.t. TP1) on the main control pcb, it should read on the basis of  $2V/100A$ , ie 3V at 150A. If necessary adjust the shunt sliding connection slightly so that the voltage at TP5 is exactly 0.02 times the load current as measured by the test ammeter
- k. Alternately adjust R65 and the load bank switches so that the load current/load voltage as measured by the test meters is as near as possible 150A/20V
- l. Open the contactor by placing the contactor switch back to its mid position

This completes the calibration. Note the current can be checked at other current/load settings:

50A @ 16V  
100A @ 18V  
200A @ 22V  
250A @ 24V  
etc



According to  $V = 14 + 0.04 \times A$



Transig AC/DC 252/352  
Digital Meter - PCB 5

200K ADDED  
TO IMPROVE DC ACCURACY  
(AND WORSEN AC ACCURACY!!!)

Sheet1 Chart 4

