

16 February, 1999

BULLETIN #156

CDT - ALL MODELS**CALIBRATION PROCEDURES**

The following procedures have been compiled to provide a guide into the calibration of

- (1) Synchro Pulse CDT350 CP34 Analog,
- (2) Synchro Pulse CDT350 CP34 Digital and
- (3) Synchro Pulse CDT450 CP38.

INTRODUCTION**Push Speed Calibration**

All models of the CDT require the wirefeed motor speed be calibrated to run at 126 rpm (or 16 metres/min) under a specified test condition.

If the wire calibration is 'out', the arc length would be either too long (speed too slow) or too short (speed too fast) and the operator will tend to compensate by setting the ARC LENGTH pot well away from the '0' position.

Pull Speed Calibration

To achieve correct operation of a CDT/Hulftegger push-pull wirefeed system, it is necessary to ensure the wirefeed rate of the pull motor slightly leads that of the push motor. In this way the wire within the cable assembly is held in tension, so reducing drag on the wire, but the push motor keeps control of the wirefeed speed.

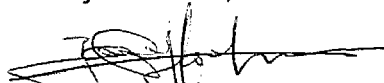
Current Amplifier Null

All models of the CDT include a current amplifier circuit connected to the shunt. When the machine is powered on but delivering no current, the output of this current amplifier should be as near to zero millivolts as possible. If the null calibration is 'out', it will cause the background current to be incorrect.

A positive null error reduces the actual background current and +100mV error can reduce the background current sufficiently to cause the background arc to extinguish. With no background arc, pulse welding at low current is impossible.

Current Amplifier Gain

The current amplifier gain is factory set and normally does not require any field adjustments, however a calibration procedures has been included in these notes.



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QUALITY WELDING PRODUCTS, SYSTEMS AND SERVICES

SYNCHRO-PULSE CP34 ANALOG

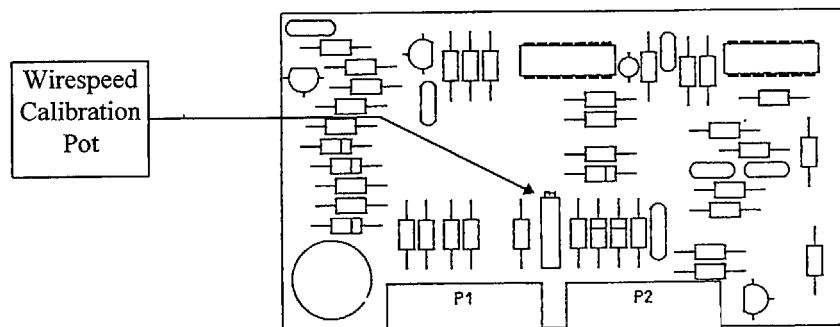
This is the first model of the CDT, identified by a 6 position program switch and internally a motherboard CP34-28 with plug in function & programme cards and a wirefeed board W16-21 with a plug-in speed board.

Calibration procedures involved with this machine are:

- 1) wirefeed push speed
- 2) wirefeed pull speed (if fitted with a Hulfegger push/pull system)
- 3) current amplifier null adjustment
- 4) current amplifier gain adjustment (factory set and sealed).

To set speed calibration

- 1) Turn the program switch to 0.9mm Mild Steel setting.
- 2) Turn the remote pendant CURRENT control to maximum.
- 3) Disengage wirefeed drive mechanism and set INCH on.
- 4) If the motor is cold, allow a couple minutes of running for it to warm slightly.
- 5) Apply an accurate tacho to the motor shaft.
- 6) Adjust the trimpot on the small plug-in wirefeed speed board to achieve 126rpm.



To set Hulfegger pull gun speed calibration

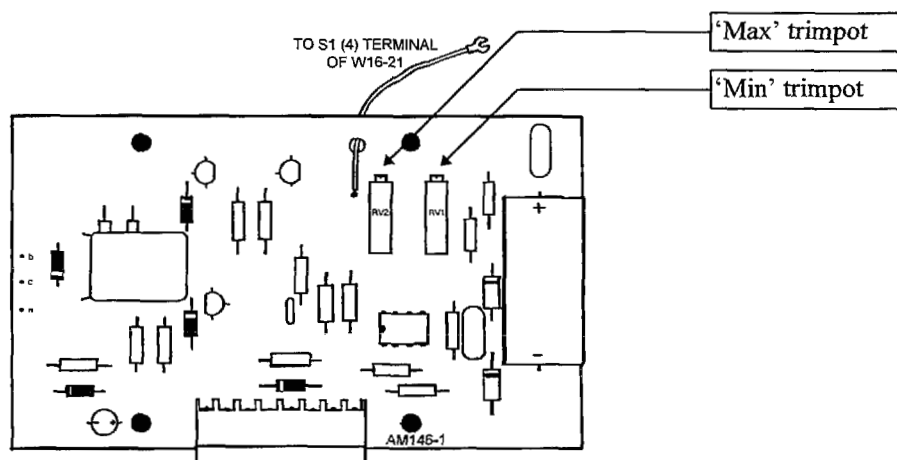
Two speed adjustment trimpots, marked 'Min' and 'Max', are part of the AM146-1 PCB. These are adjusted by the following method to obtain correct synchronisation of the push and pull feed motors. These steps require use of a digital tachometer and a 0-1 Amp DC ammeter.

- 1) Set remote pendant CURRENT control to minimum.
- 2) Without running welding wire in the gun cable, set INCH on and adjust 'Min' trimpot to obtain a pull motor speed of 46 rpm (or 2.6 metres/min).
- 3) Set remote pendant CURRENT control to maximum, which should be 126 rpm (or 16 metres/min) on push motor.
- 4) Set INCH on and adjust 'Max' trimpot to obtain a pull motor speed of 315 rpm (or 17.6 metres/min).

The push and pull motors may be further fine tuned by the following method.

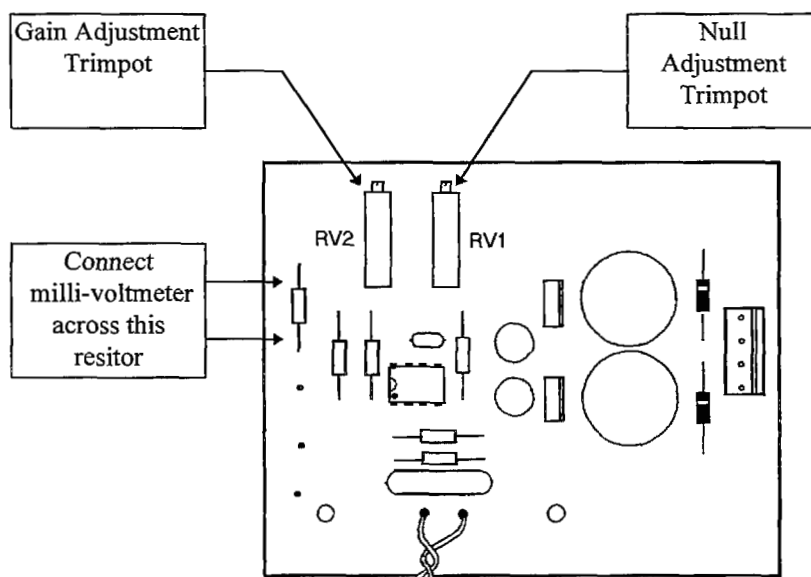
- 5) Lay the gun cable out straight, and feed wire through the complete wirefeed system.
- 6) Remove fuse from AM131-2 PCB and in its place, fit the DC ammeter in series with the pull motor.
- 7) Set remote pendant CURRENT control again to minimum and readjust 'Min' trimpot to obtain a pull motor current of approximately 400mA while feeding wire.

- 8) Set remote pendant CURRENT control again to maximum and readjust 'Max' trimpot to obtain a pull motor current of approximately 300mA while feeding wire.



To set Current Amplifier null:

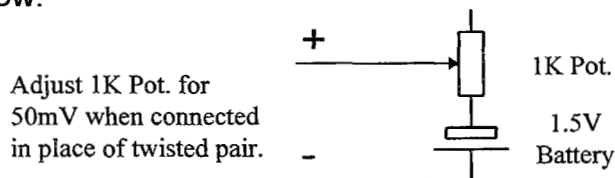
- 1) Turn machine on, press gunswitch but do not weld.
- 2) Connect a milli-voltmeter across resistor R6 of the shunt amplifier PCB CP34-41 which is mounted on the back of the ammeter.
- 3) Adjust RV1 to achieve as near as possible to 0mV reading on the meter.



To set Current Amplifier Gain

The gain trimpot is factory set and sealed for a gain of 160 and normally, should not need to be field adjusted. However, if the need to check the gain arises, the Current Amplifier Null has to be calibrated first before proceeding.

- 1) Disconnect the twisted red and black wires of the shunt from the shunt amplifier PCB.
- 2) In place of the twisted pair, connect a stable source of 50mV DC. Confirm this voltage using an accurate digital milli-voltmeter. A suitable battery based circuit is shown below.



- 3) Connect a milli-voltmeter between test points 'A' and 'C' and check for a 'current signal' of 8.00VDC. If necessary, adjust the Gain trimpot to establish 8.00VDC.
- 4) When finished, seal the Gain trimpot with a touch of paint.

SYNCHRO-PULSE CP34 DIGITAL

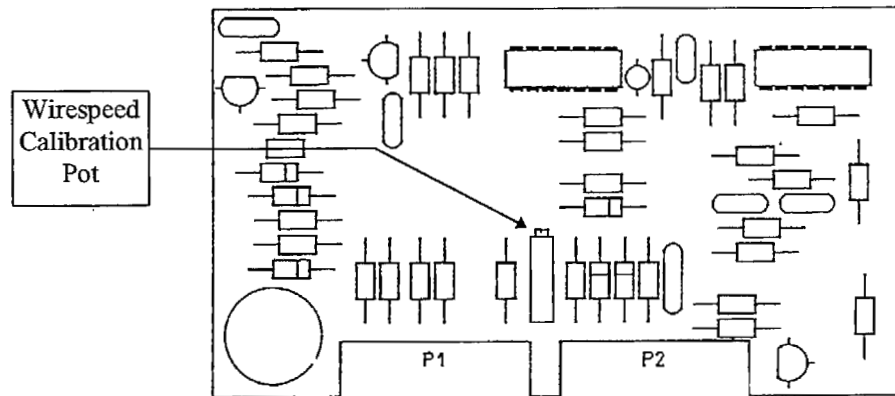
This is the second model of the CDT, identified by a 6 position program switch on the front panel and internally, a wirefeed motherboard W16-21 with a plug-in speed board CP34-43 and a microprocessor board CP34-52 (for local machines) or CP34-105 (for international machines).

Calibration procedures involved with this machine are:

- 1) wirefeed push speed
- 2) wirefeed pull speed (if fitted with a Hulftegger push/pull system)
- 3) current amplifier null adjustment
- 4) current amplifier gain adjustment (factory set and sealed).

To set push speed calibration

- 1) Select test program by unplugging the program switch loom from P2 connector of the CP34-52 microprocessor board.
- 2) Unplug the remote pendant from front of machine.
- 3) Disengage wirefeed drive mechanism and set INCH on.
- 4) If the motor is cold, allow a couple minutes of running for it to warm slightly.
- 5) Apply an accurate tachometer to the wirefeeder motor shaft.
- 6) Adjust the trimpot on the CP34-43 wirefeed speed board to achieve a speed of 126rpm on the motor shaft (or 16 metres/min on the roller surface).



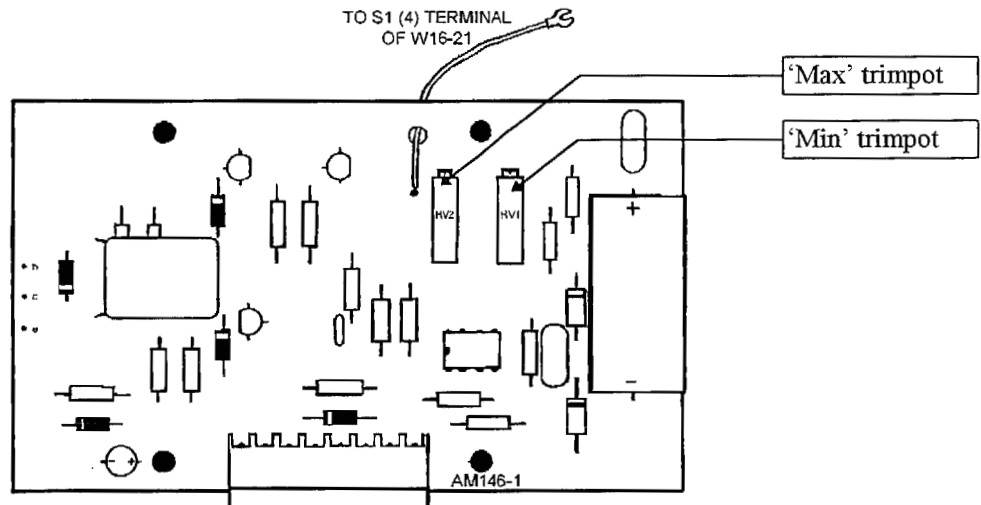
To set Hulftegger pull gun speed calibration

Two speed adjustment trimpots, marked 'Min' and 'Max', are part of the AM146-1 PCB. These are adjusted by the following method to obtain correct synchronisation of the push and pull feed motors. These steps require use of a digital tachometer and a 0-1 Amp DC ammeter.

- 1) Set remote pendant CURRENT control to minimum.
- 2) Without running welding wire in the gun cable, set INCH on and adjust 'Min' trimpot to obtain a pull motor speed of 46 rpm (or 2.6 metres/min).
- 3) Set remote pendant CURRENT control to maximum, which should be 126 rpm (or 16 metres/min) on push motor.
- 4) Set INCH on and adjust 'Max' trimpot to obtain a pull motor speed of 315 rpm (or 17.6 metres/min).

The push and pull motors may be further fine tuned by the following method.

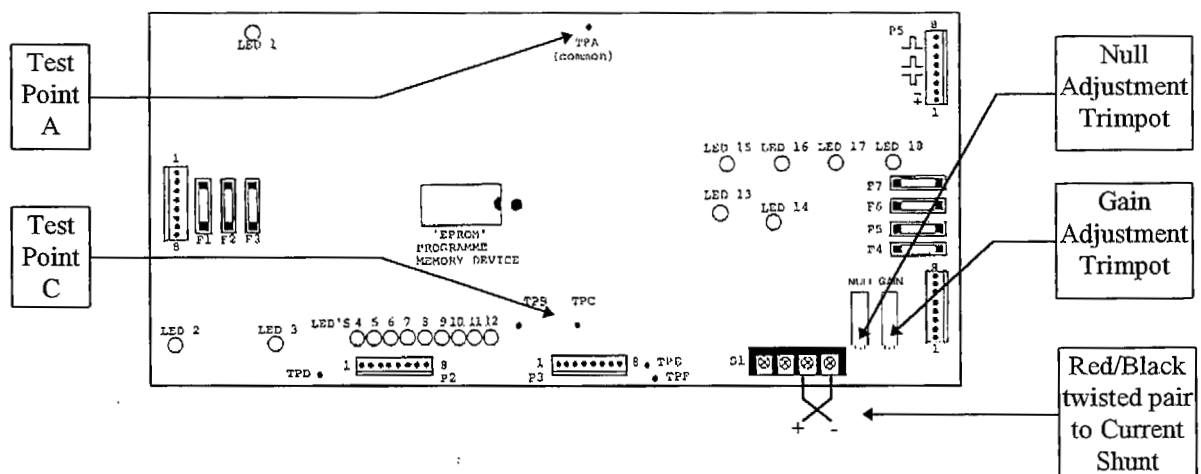
- 5) Lay the gun cable out straight, and feed wire through the complete wirefeed system.
- 6) Remove fuse from AM131-2 PCB and in its place, fit the DC ammeter in series with the pull motor.
- 7) Set remote pendant CURRENT control again to minimum and readjust 'Min' trimpot to obtain a pull motor current of approximately 400mA while feeding wire.
- 8) Set remote pendant CURRENT control again to maximum and readjust 'Max' trimpot to obtain a pull motor current of approximately 300mA while feeding wire.



To set Current Amplifier Null (CP34-52 OR CP34-105)

Note : For the CP34-105 motherboard, if the Current Amplifier Gain as well as the Current Amplifier Null has to be adjusted, calibrate the Gain first before proceeding with the Null.

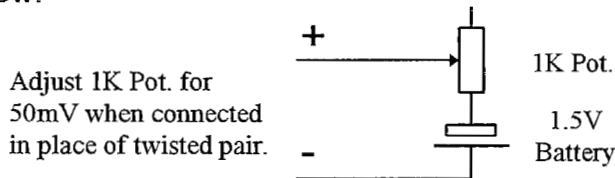
- 1) Turn machine on but do not weld.
- 2) Connect a DC milli-voltmeter between test point 'A' (common) and test point 'C'.
- 3) Adjust the Null potentiometer or RV1 on the CP34-52 microprocessor board to achieve as near as possible to 0mV.



To set Current Amplifier Gain (CP34-52)

The gain trimpot is factory set and sealed for a gain of 160 and normally, should not need to be field adjusted. However, if the need to check the gain arises, the Current Amplifier Null has to be calibrated first before proceeding.

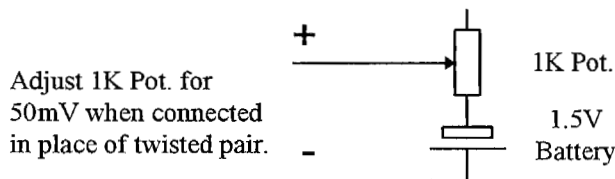
- 1) Disconnect the twisted red and black wires of the shunt from the terminal block S1.
- 2) In place of the twisted pair, connect a stable source of 50mV DC. Confirm this voltage using an accurate digital milli-voltmeter. A suitable battery based circuit is shown below.



- 3) Connect a milli-voltmeter between test points 'A' and 'C' and check for 8.00VDC. If necessary, adjust the Gain trimpot to establish 8.00VDC.
- 4) When finished, seal the Gain trimpot with a touch of paint.

To set Current Amplifier Gain (CP34-105)

- 1) Disconnect the twisted red and black wires of the shunt from the terminal block S1.
- 2) In place of the twisted pair, connect a bridge across the terminal block S1.
- 3) Connect a DC milli-voltmeter between test point 'A' (common) and test point 'C'.
- 4) Adjust the Null potentiometer or RV1 on the CP34-105 microprocessor board to achieve as near as possible to 0mV.
- 5) Remove bridge from the terminal block S1 and in its place, connect a stable source of 50mV DC. Confirm this voltage using an accurate digital milli-voltmeter. A suitable battery based circuit is shown below.



- 6) Using the milli-voltmeter check for 8.00VDC between test points 'A' and 'C'. If necessary, adjust the Gain trimpot to establish 8.00VDC.
- 7) Seal the Gain trimpot with a touch of paint.
- 8) Reconnect the twisted red and black wires of the shunt to the terminal block S1 and calibrate the Current Amplifier Null as shown in the previous page.

SYNCHRO-PULSE CP38 CDT450

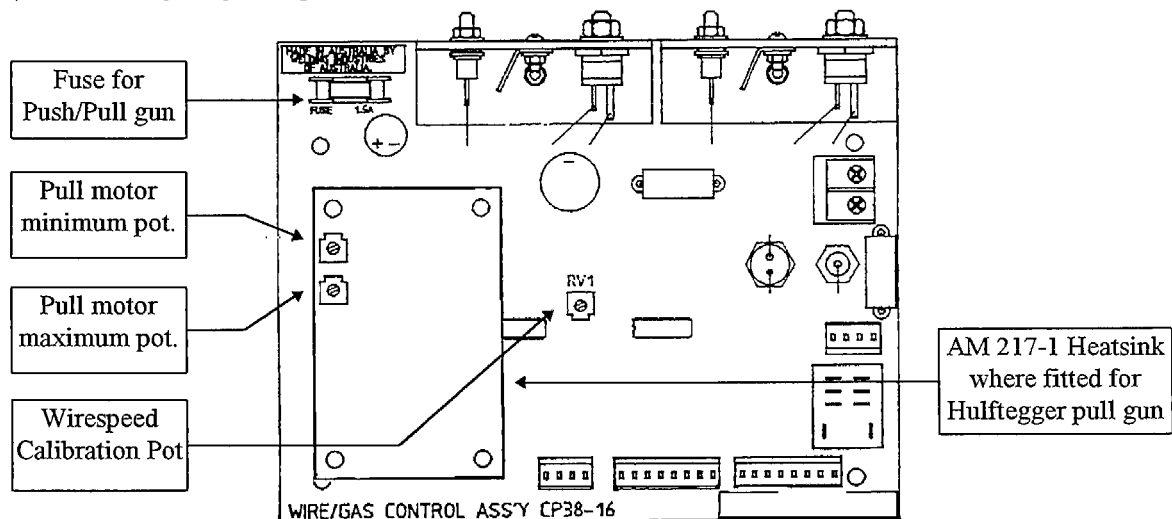
This is the current model of the CDT, identified by a digital display on the front panel and internally, a microprocessor board CP38-10 and a wirefeed control board CP38-16.

Calibration procedures involved in this machine are:

- 1) wirefeed push speed
- 2) wirefeed pull speed (if fitted with a Hulftegger push/pull system)
- 3) current amplifier null adjustment

To set push speed calibration:

- 1) Disengage wirefeed drive mechanism.
- 2) At the keypad, select OPTION > SERVICE > WIREFEED MAX.
- 3) If the wirefeeder motor is cold, allow a couple minutes of running for it to warm slightly.
- 4) Using a tachometer, adjust RV1 of the CP38-16 wirefeeder board to obtain 126 rpm on the motor shaft (or 16 metres/min on the roller surface).
- 5) Press any key or gun switch to exit this mode.



To set Hulftegger pull gun speed calibration

- 1) On the keypad, select OPTION > SERVICE > WIREFEED MIN.
- 2) Using a tachometer, adjust the 'Min' potentiometer on the CP38-16 wirefeed board to obtain 46 rpm on the motor shaft (or a surface speed of 2.6 metres/min on the pull motor drive roller).
- 3) Select OPTION > SERVICE > WIREFEED MAX.
- 4) Adjust the 'Max' potentiometer to obtain 315 rpm on the motor shaft (or a surface speed of 17.6 metres/min on the pull motor drive roller).

Note : The motor may be further fine tuned by the following method.

- 5) Lay the Hulftegger gun cable out straight and feed wire through the complete wirefeed system.
- 6) Fit a DC milli-ammeter in series with the pull motor using the red wire terminated on the pull gun terminal strip.
- 7) Select OPTION > SERVICE > WIREFEED MIN.
- 8) Adjust the 'Min' potentiometer to obtain a pull motor current of approximately 400mA while feeding wire.
- 9) Select OPTION > SERVICE > WIREFEED MAX.
- 10) Adjust the 'Max' potentiometer to obtain a pull motor current of approximately 300mA while feeding wire.

SYNCHRO-PULSE CP34 DIGITAL

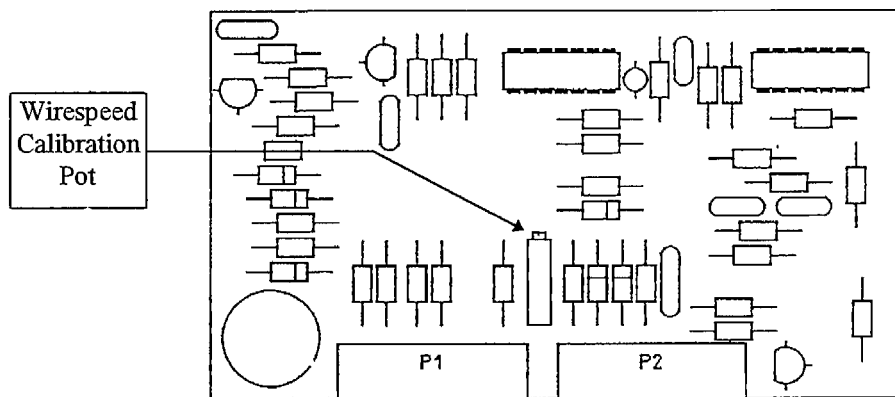
This is the second model of the CDT, identified by a 6 position program switch on the front panel and internally, a wirefeed motherboard W16-21 with a plug-in speed board CP34-43 and a microprocessor board CP34-52 (for local machines) or CP34-105 (for international machines).

Calibration procedures involved with this machine are:

- 1) wirefeed push speed
- 2) wirefeed pull speed (if fitted with a Hulftegger push/pull system)
- 3) current amplifier null adjustment
- 4) current amplifier gain adjustment (factory set and sealed).

To set push speed calibration

- 1) Select test program by unplugging the program switch loom from P2 connector of the CP34-52 microprocessor board.
- 2) Unplug the remote pendant from front of machine.
- 3) Disengage wirefeed drive mechanism and set INCH on.
- 4) If the motor is cold, allow a couple minutes of running for it to warm slightly.
- 5) Apply an accurate tachometer to the wirefeeder motor shaft.
- 6) Adjust the trimpot on the CP34-43 wirefeed speed board to achieve a speed of 126rpm on the motor shaft (or 16 metres/min on the roller surface).



To set Hulftegger pull gun speed calibration

Two speed adjustment trimpots, marked 'Min' and 'Max', are part of the AM146-1 PCB. These are adjusted by the following method to obtain correct synchronisation of the push and pull feed motors. These steps require use of a digital tachometer and a 0-1 Amp DC ammeter.

- 1) Set remote pendant CURRENT control to minimum.
- 2) Without running welding wire in the gun cable, set INCH on and adjust 'Min' trimpot to obtain a pull motor speed of 46 rpm (or 2.6 metres/min).
- 3) Set remote pendant CURRENT control to maximum, which should be 126 rpm (or 16 metres/min) on push motor.
- 4) Set INCH on and adjust 'Max' trimpot to obtain a pull motor speed of 315 rpm (or 17.6 metres/min).

To set Current Amplifier null

This adjustment must be made with the current shunt and the associated wiring loom connected.

- 1) Power on machine on but do not weld.
- 2) Connect a milli-voltmeter between test point 'A' (common) and test point 'C' of the microprocessor board.
- 3) Adjust RV1 to achieve as near as possible to 0mV reading on the meter.

