Voltech
AT Series
Transformer
Testers

AT
Fixture
Construction Guide

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The contents of this manual are believed to be accurate at the time of printing. Voltech reserves the right, however, to change the specification of the fixture system without notice. No liability is accepted for the inappropriate, negligent, or incorrect set-up of the fixture by the user via either manual or automated means.

HEALTH AND SAFETY

Only persons trained in the equipment, tools and materials they use should construct fixtures, and then only after reading and understanding this construction guide. All local regulations concerning the safety of machinery and chemical storage and use must be adhered to (especially, but not exclusively, the guarding of rotating machinery and the wearing of safety equipment including goggles).

1 Introduction

The Voltech series of AT Automatic transformer testers are able to perform a comprehensive series of tests on a wide variety of transformers. To utilize this capability fully it is recommended that test fixtures are constructed to suit each particular type of transformer to be tested.

Test fixtures provide the interface to the transformer tester via the tester node pins, allowing transformers to be quickly inserted and removed in a reliable manner taking full advantage of the high speed testing capability of the tester.

Test fixtures are not difficult to construct, and good test fixtures will minimize operator fatigue, ensure optimum repeatability, prevent unnecessary rejects and increase throughput of the transformer tester.

This guide provides advice on the construction of test fixtures for a number of different transformer styles.

A range of pre-drilled components, probes and clips are available from Voltech.

You can also make use of the free area behind the fixture, allowing you to mount other clamps, handling accessories, ink jet spray printers or even a scanning bar code reader close to the point of test.

2 Principles of Kelvin Connections

In testing many transformer parameters, such as winding resistance or inductance, it is necessary to measure an electrical impedance.

The normal method of measuring impedance is to pass a test current through the unknown component, and to measure the resulting voltage produced across it.

Dividing the voltage by the current gives the required value of impedance.
In making such measurements, great care must be taken not to include the impedance of the measuring leads in the result. A connection system which avoids such problems is shown in figure 2; it uses four wires and is often referred to as a Kelvin connection.

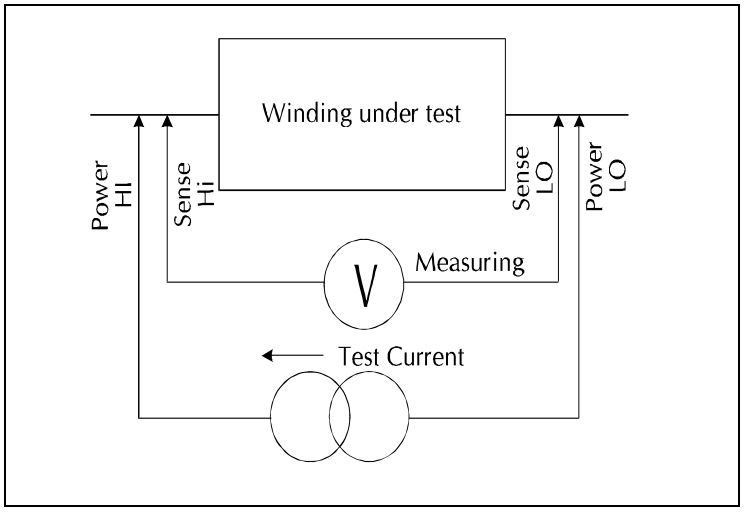


Figure 2

Measuring Impedance with Kelvin Connections

In this arrangement, the test current passes through the two "power" leads, and the voltage is measured using the two "sense" leads. Provided that the sense leads are connected as close as possible to the body of the device under test, any additional voltage drop produced by the test current flowing through the impedance of the power leads is not measured. The Kelvin connection therefore provides the most accurate means of sensing the voltage, and hence the impedance of the winding.

Ideally, all impedance measurements would be made using Kelvin connections. However, many terminals do not permit the use of four wires all the way to the body of the component under test. In such cases, separate power and sense leads are used up to the base of the terminal, and the length of "common" lead (from the junction of the power and sense leads, through the terminal and the component lead to the body of the component) should be kept to a minimum. The "common" lead length is shown as AA' and BB' in Figure 3.

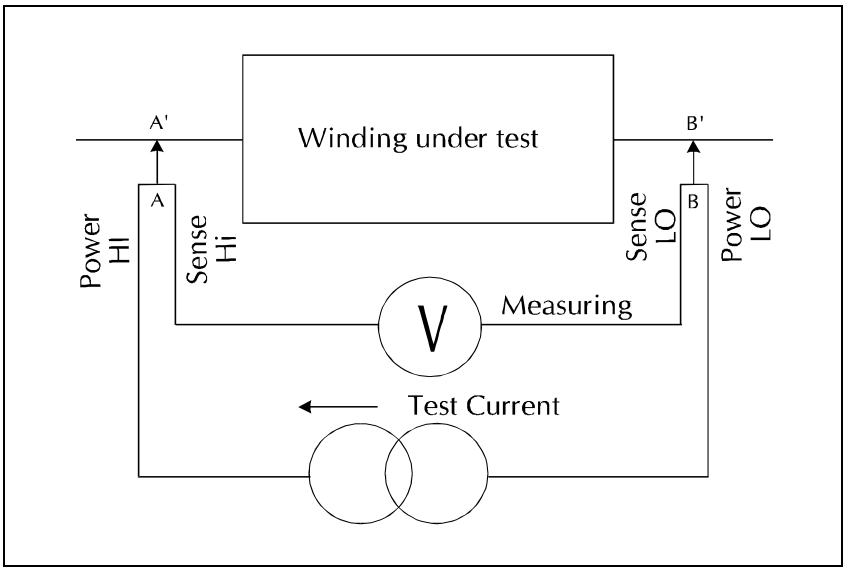


Figure 3

Kelvin four terminal connections are recommended for use with test fixtures for transformers whose winding impedances are less than 1 ohm.

The AT Series testers provide all the connections required to take advantage of Kelvin measurements.
A test node may be considered to be a pair of connections consisting of one power and one sense terminal. The following diagram indicates how to identify the node terminal function:

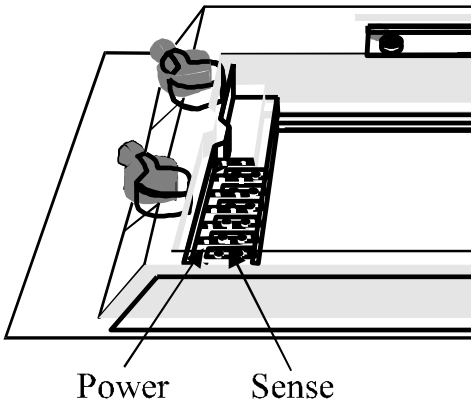


Figure 4

POWER terminals are all on the outside of the fixture area.
SENSE terminals are all on the inside of the fixture area.

IMPORTANT NOTE:

Kelvin four terminal connections are recommended for use in all test fixtures.

To ensure the specified accuracy of any test, Kelvin connections are essential when making a measurement on a winding impedance of less than 1Ω.

If in doubt, calculate the inductive impedance using:
$Z = 2 \times \pi \times$ (test frequency) x (nominal inductance)
and consult the transformer designer if required.

For optimum accuracy at low impedance levels, AT Series Testers have no internal connection between power and sense.

THE POWER AND SENSE TERMINALS MUST BE LINKED ON THE FIXTURE AS IN FIGURE 2 (KELVIN CONNECTORS) OR AS IN FIGURE 3.

3 Application And Specification

The fixture is designed to connect to wound components with the following characteristics:

- Size:
  - A footprint of up to 63.5mm square
  - A height of up to 63.5mm
  - A connection matrix up to 60mm square
- Connection Types:
  - Surface mount
  - Pin connection
  - Blade connection
  - Flying leads
- Pitches of:
  - 1.27mm
  - 1.962mm (0.156”)
  - 2.00mm
  - 2.5mm
  - 2.54mm (0.1”)
  - 3.81mm (0.15”)

There are some application limitations to the above. For example, the minimum pitch of the blade type that can be connected to is determined by the minimum pitch that the necessary connector can be put on.

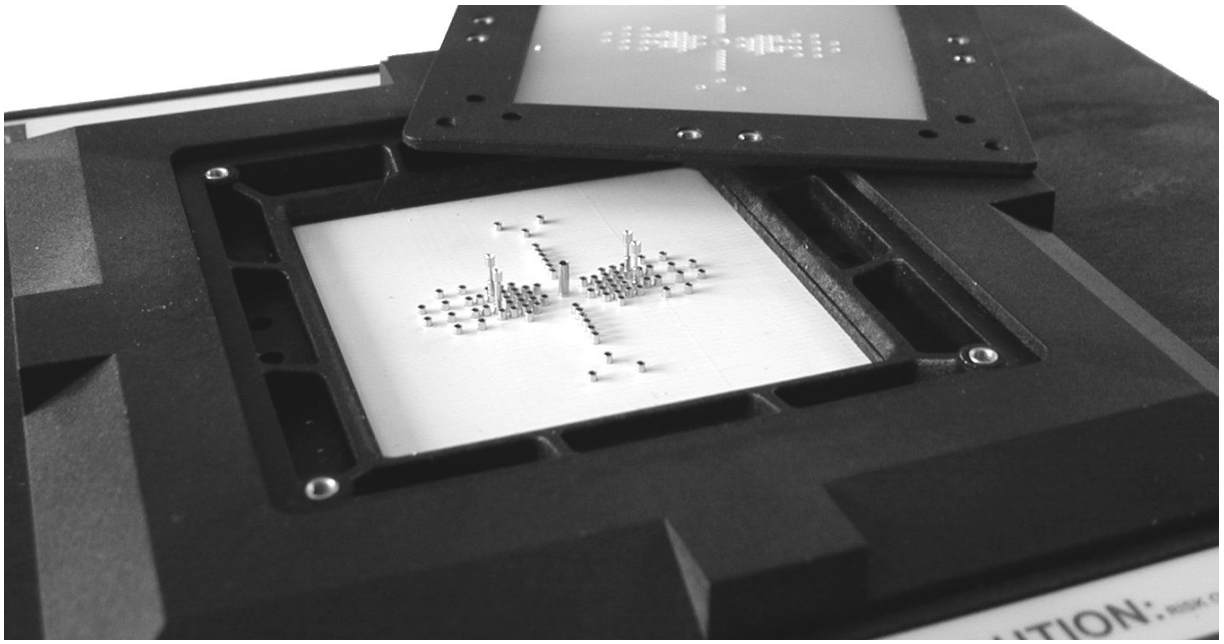
Compatible connection types:

- Kelvin clips
- Kelvin blades (Automech type)
- 4mm sockets
- ATE pin types
  - Rotary point
  - Castellated
  - Point
  - Cup
  - Crown

4 Fixture System Overview

4.1 Overview

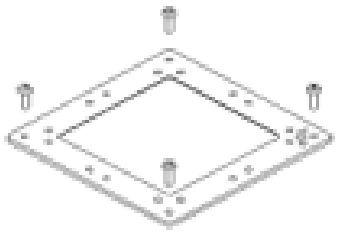
The Voltech AT Series fixture system allows you freedom and flexibility when considering your fixturing needs.
All fixtures are mounted on fixture boards, which are available as a blank fixture plate



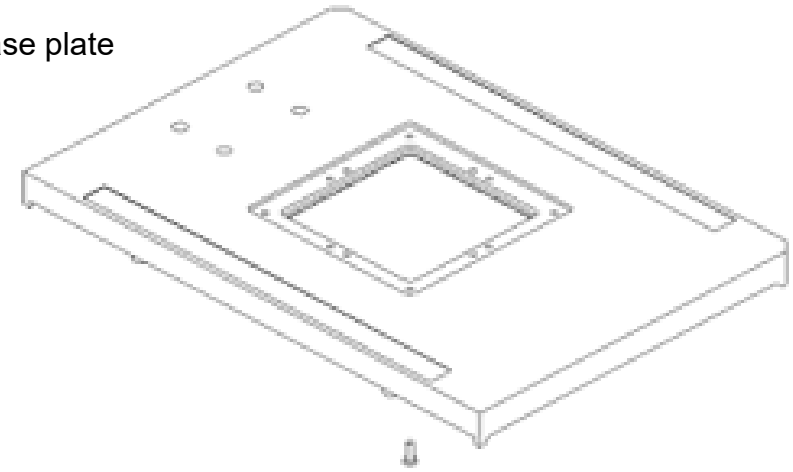
Base Plate
Already fitted with 20 pairs of contacts, the base plate fits into the top of the tester and makes electrical connection to the tester's 20 pairs of test nodes.
The base plate has moulded indents and guides to ease the fitting and wiring of larger test sockets and posts for flying leads.

4.2 Fixture System Components in Detail

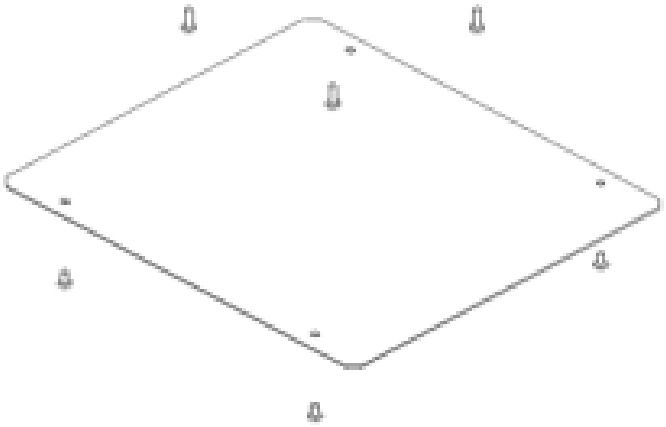
Interface Plate



Base plate



Rear Cover



4.2.1 Base Plate

This fits into the top of the transformer tester and has the following features:

Fitted with 40 node contacts which connect to the 40 test node pins on the top of the tester.
Moulded indents on the bottom surface to act as drill guide marks for ease of drilling to fit 4mm safety sockets
Provision for drilling through and fitting inserts for the attachment of a clamp in either the left or right hand position.
Slots moulded into the base to support wiring to the connection points from the nodes.
Four mounting pillars to hold the cover plate (supplied). The cover plate is attached on to the underside of the fixture by four screws to protect the wiring from accidental damage.
The fixture parts are made using a high-pressure injection moulding process in a material that is suitable for soldering temperatures and the high voltage that will exist during use.

4.2.2 Interface Plate

The interface plate is a glass fibre board with an injected plastic trim and fits into the bezel in close alignment with the probe housing box. The interface plate supports the body of the test piece during testing.
The bezel has 4 groups of 2 x M3 inserts for the attachment of the Guides.
The plate can accommodate a test piece of up to 63.5mm square, and can be drilled for probes over an area of 60mm square when using the drilling plates.

4.3 Fixture Parts Available From Voltech

A variety of items are available from Voltech in the form of the kits described below. Detailed descriptions follow.

Item	**Order Code**
Starter Fixture Plate	**91-184**
For mounting existing sockets	
40 Socket Fixture	**91-186**
Ideal for prototyping work	
Connection Lead Set	**78-030**
For use with the 40 Socket Fixture 91-186	
Kelvin Blades	
Pack of 10 Medium Kelvin Blades For use with 91-185	**MEDIUM KELVIN KIT**

4.3.1 Starter Fixture Plate (91-184)

Designed for mounting your existing fixtures or sockets to an AT series tester the fixture plate comprises:
Item 1,Base plate (including contact pins) with cover.
Item 2,Test piece interface plate.
Fixings for above.

4.3.2 40 Socket Fixture (91-186)

A fixture board pre fitted with 40 4mm sockets. 20 red (power) and 20 black (sense). The sockets are wired to the 40 contacts which align with the testers' 40 nodes.

This fixture may be used for convenient wiring to existing fixtures or as a means of connecting flying leads and clips for use in developing test programs or testing parts in a design laboratory.

4.3.3 Connection Lead Set (78-030)

Intended for use with the 40 socket fixture, the connection lead set provides a versatile method of connecting to sample parts for prototyping and evaluation. Custom fixtures are always recommended for production use.
The connection lead set comprises;

10 x Spring loaded connection posts	78-026
10 x Fine non-Kelvin clip to 4mm leads.	78-027
10 x Kelvin crocodile clip to 4mm plug leads.	78-028
10 x Non-Kelvin crocodile clip to 4mm plug leads.	78-029

4.3.4 Kevin Blades (Part No. "Medium Kelvin Kit")

This kit contains 10 blades suitable for use with the Voltech AT Fixture System.

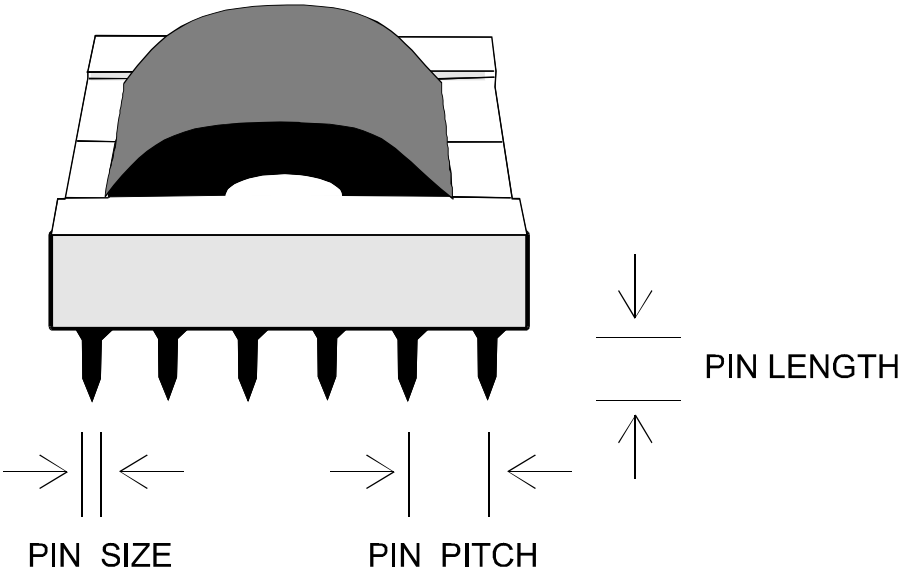
Specification:
Gold plated copper alloy blades mounted in a plastic sleeve.
Minimum pin pitch: 0.15" (3.81mm)
Minimum pin diameter: 0.025" (0.635mm)
Maximum pin diameter: 0.04" (1.016mm)

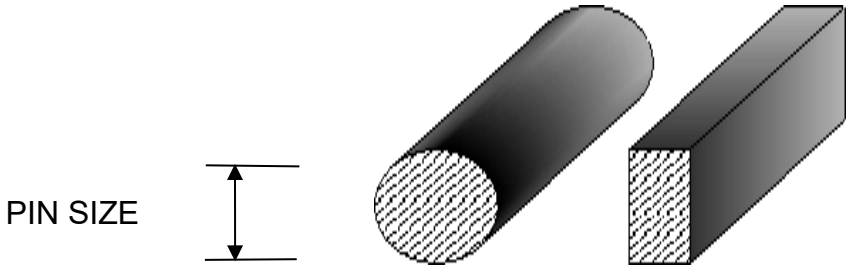
Drilling of the Probe Housing Box: Use 0.136" (3.4mm) dia. #29 drill.
Set Height: 7mm

5 Choosing Connecting Probes, Kelvin Pins and Clips

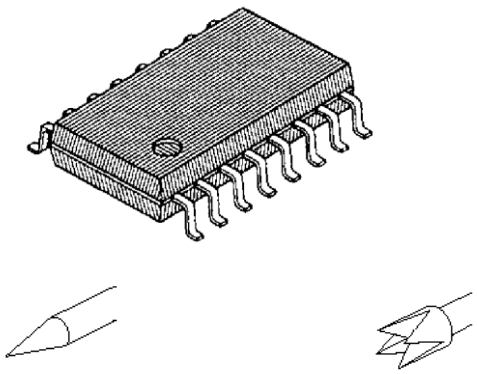
The choice of connector used to make contact with the component under test will depend on the type of component lead, its size, orientation, material and finish.
A list of suggested types and manufacturer's data is presented at the end of this section. Other types and manufacturers may be suitable. You are strongly advised to obtain the complete manufacturer's data before purchasing probes, pins or clips.

5.1 General Definition of Pin Sizes, Pitch and Length





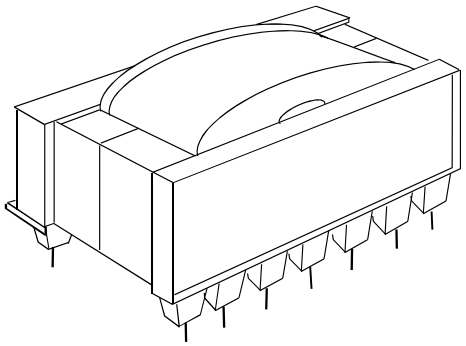
5.2 Surface Mounting Pads

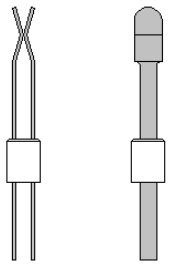


Point Spring Probe Crown Spring Probe

For pad sizes up to 5mm by 2mm, choose a spring probe with a point or crown.
Minimum connection pitch 2.54mm (0.1”).

5.3 PCB Mounting Transformers with Pin Sizes up to 1.5mm

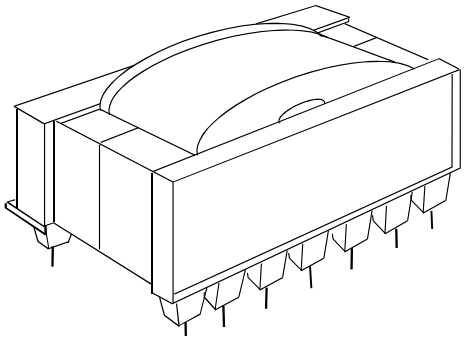




Kelvin Blades

For optimum accuracy, Kelvin blades are recommended.
The blades provide a four terminal contact direct to the transformer pin.
Minimum connection pitch 5mm (0.2”).
Pin length 3.0 to 10.00mm

5.4 PCB Mounting Transformers with Pin Sizes up to 3.0mm

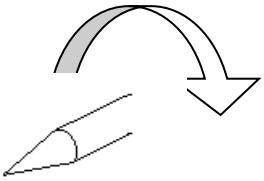


Serrated ***Crown*** ***Cup***

Spring Probes

Use serrated (sometimes called castellated), crown, or cup spring probes for larger pin sizes or if the pin length is short. Must be used with a clamp to hold the transformer against the probes during testing.
Minimum connection pitch 2.54mm (0.1”).
Pin length 2.0 to 5.00mm

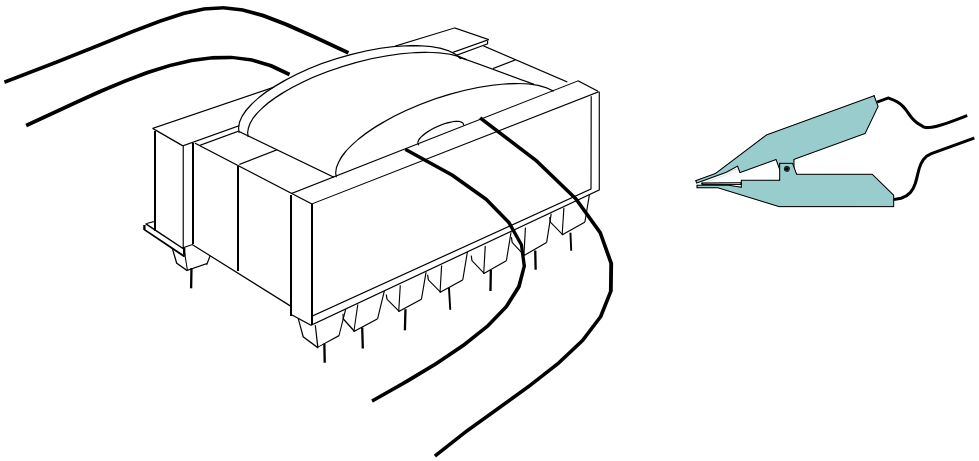
5.5 PCB Mounting Transformer Cores



Rotating Point Spring Probe

Rotating point spring probes are recommended so that good contact is made even through varnish coating or surface corrosion.

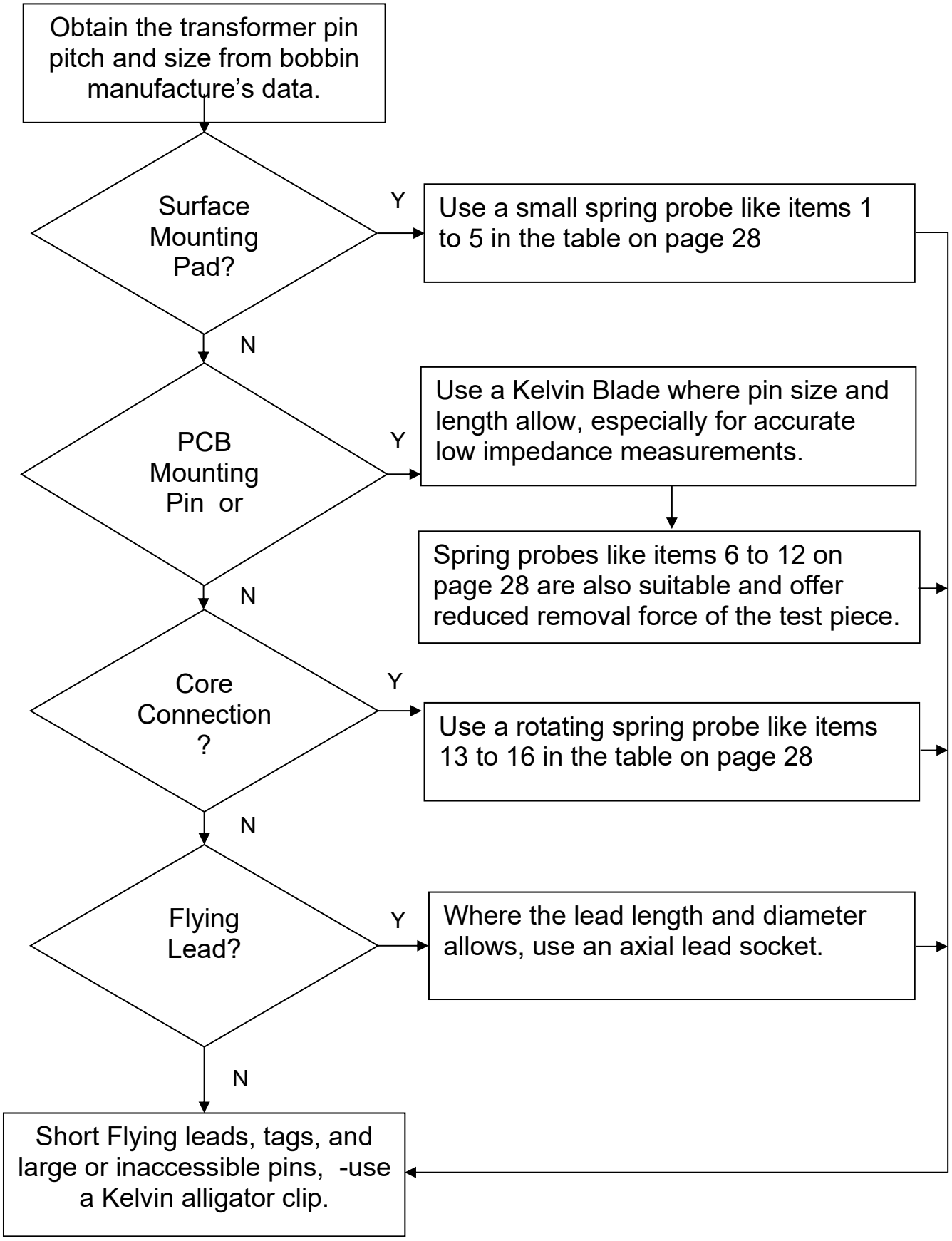
5.6 Connections to Flying Leads and Tags



Kelvin connected alligator clips can be used to make connections to larger leads, shorter leads, foil leadouts or tags or screen on the top or side of the transformer. Screw one face of the clip down against the fixture plate for a permanent, easy-to-use connection.

Other Connections
A wide variety of other connectors can be accommodated on the base plate to terminate flying leads. For example, 4mm sockets, spring terminals or multi-way headers could all be installed.

5.7 Pin / Probe / Clip Selection Summary



5.8 Spring Probe / Kelvin Pin Selection Chart

	PROBE TYPE												
No.	HEAD	ROTARY or FIXED	COMPONENT CONNECTION	CONNECTION PITCH (INCH)	MAX PAD SIZE (L) - (W)	MAX PIN DIA.	PIN LENGTH MIN - MAX		BLADE SIZE (W) - (T)		BLADE LENGTH MIN - MAX	
1	POINT	FIXED	SMD	(0.10) 2.54	5.0 X 2.0							
2	POINT	FIXED	SMD	(0.10) 2.54	5.0 X 2.0							
3	POINT	FIXED	SMD	(0.10) 2.54	5.0 X 2.0							
4	POINT	FIXED	SMD	(0.10) 2.54	5.0 X 2.0							
5	CROWN	FIXED	SMD	(0.10) 2.54	5.0 X 2.0							
6	CAST	FIXED	PIN	(0.10) 2.54		1.2	2.0	3.5				
7	CAST	FIXED	PIN	(0.10) 2.54		1.2	2.0	3.5				
8	CUP	FIXED	PIN	(0.10) 2.54		1.0	2.0	3.5				
9	CAST	FIXED	PIN / BLADE	(0.10) 2.54		2.0	0.0	1.0	2.0	2.0	2.0	2.0
10	CROWN	FIXED	PIN / BLADE	(0.15) 3.81		1.6	2.0	4.5	2.0	1.0	2.0	4.0
11	CROWN	FIXED	PIN / BLADE	(0.30) 7.62		3.0	2.5	5.0	3.5	1.5	2.5	5.0
12	CAST	FIXED	PIN / BLADE	(0.30) 7.62		3.0	2.5	5.0	3.5	1.5	2.5	5.0
13	CAST	FIXED	PIN / BLADE	(0.30) 7.62		3.0	2.0	3.0	3.0	1.0	2.5	4.0
14	POINT	ROTARY	CORE	(0.10) 2.54								
15	POINT	ROTARY	CORE	(0.10) 2.54								
16	POINT	ROTARY	CORE	(0.10) 2.54								
17	POINT	ROTARY	CORE	(0.20) 5.00								
18	POINT	ROTARY	CORE	(0.20) 5.00								
19	POINT	ROTARY	CORE	(0.10) 2.54								
20	KELVIN CONTACT		PIN / BLADE	(0.20) 5.00		1.5	3.5	10.0	3.5	1.0	3.0	10.0

Pin = round pin.
Blade = square or rectangular pin. Width and Thickness.
Cast = castellated or serrated probe tip.

IMPORTANT.
Recommended transformer pin length is based on the use of a ‘Custom Fixture Kit’.
If you are using a Voltech ‘Drilled Probe Box Kit’ which includes a 4mm spacer, please refer to the pin length and core probe heights given in that section.

5.9 Spring Probe / Kelvin Pin Technical Data

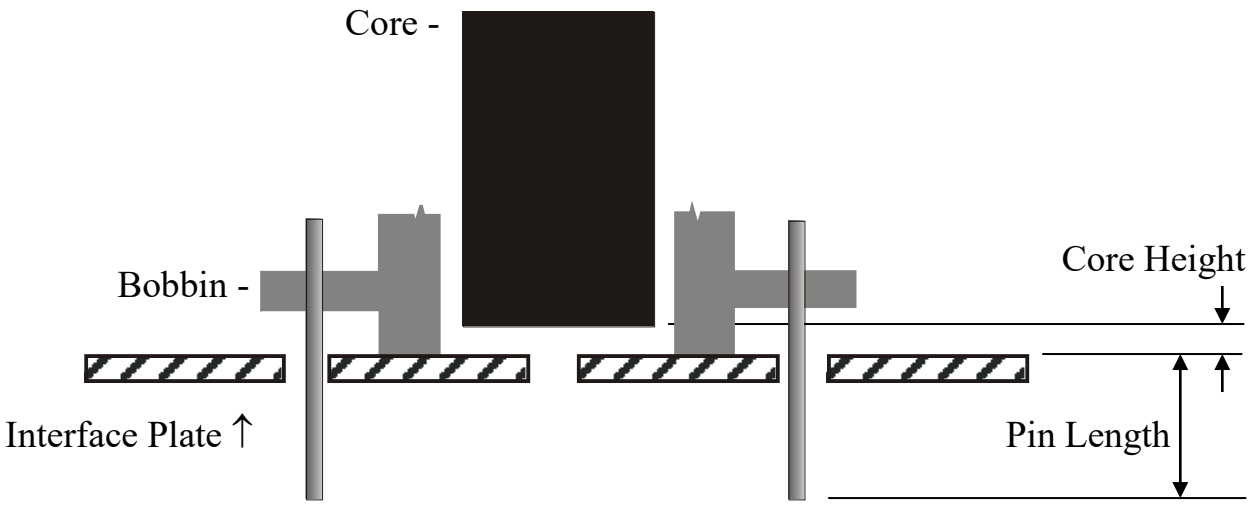
MAX UUT HOLE SIZE (PIN)	MAX UUT HOLE SIZE (BLADE)	PROBE HEAD SIZE	RECEPt. HOLE SIZE	RECEpt. SET HEIGHT	PROBE HEIGHT ABOVE INTERFACE PLATE SURFACE	**No.**
1.4		1.1	1.7	7.0	6.5	**1**
1.4		0.8	1.0	0.0	3.7	**2**
1.3		1.04	1.7	5.84	4.0	**3**
2.1		1.92	1.7	7.0	1.5	**4**
2		1.52	1.7	5.84	4.0	**5**
1.4		1.52	1.4	3.0		**6**
1.4		1.52	1.4	3.0		**7**
1.5		1.52	1.45	3.0		**8**
2.5	2.5	2.0	2.0	0.2	3.0	**9**
2.0	2.0	2.3	3.0	0.2		**10**
3.5	4.0	4.0	5.6	1.0		**11**
3.5	4.0	4.0	5.6	1.0		**12**
3.0	3.2	3.5	3.0	0.2		**13**
2.0		1.52	1.7	7.5	7.5	**14**
1.5		1.22	1.4	7.3	7.6	**15**
4.0		2.26	3.0	1.0	5.0	**16**
4.0		2.26	3.0	1.0	5.0	**17**
4.0		2.26	3.0	1.0	10.0	**18**
4.0		2.26	3.0	1.0	10.0	**19**
2.0	3.5		3.2	7.0		**20**

5.10 Spring Probe / Kelvin Pin Manufacturers' Details

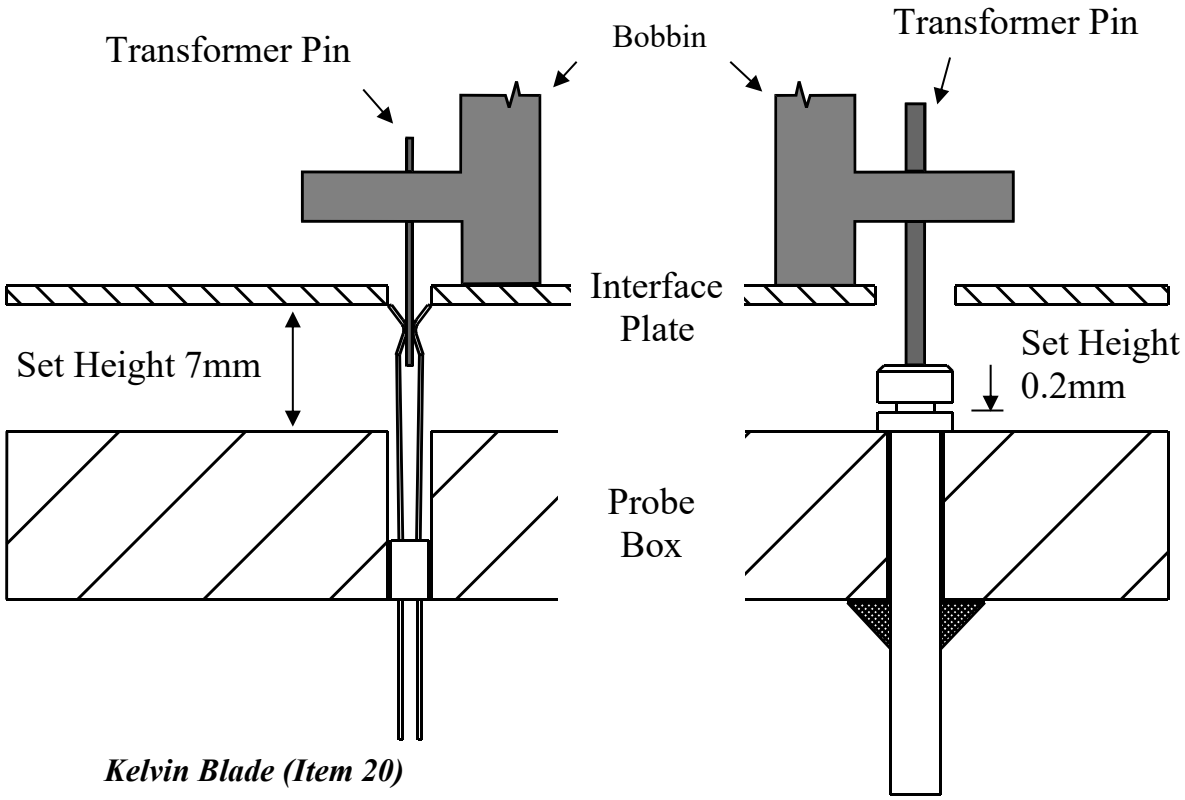
No.	MANUFACTURER	PROBE NUMBER	RECEPTACLE NUMBER
1	CODA/PYLON	P3158G-3C(X)S	S2664-2ETD
2	INGUN	GKS 080 301 035 R 08 05	KS - 080
3	CODA	PA3B(X)	RA3W
4	TEKNIS	P100PLPO563(X)	S2664-2EWWD
5	CODA	PA3Q(X)	RA3W
6	CODA	PA2HS	RA2W
7	CODA	PA2H(X)	RA2W
8	PROBUS	S-1-A-(X.X)-G	RA2W
9	INGUN	GKS-912-306-200-R-08-02	KS-112-23
10	INGUN	GKS-913-306-230-R-(XX)-02-1	KS-113-23
11	INGUN	GKS-364-204-400-N-(XX)-01	RKS-365-23
12	INGUN	GKS-365-206-400-A-(XX)-01	RKS-365-23
13	CODA	PC8HS-138	RC8S
14	IDI	SX25T-(X.X)-DGDRT	R-25-SC
15	IDI	SXL-1-LM-(X.X)-DRT	RL-1-SC
16	INGUN	GKS-725-257-100-R-1507-S	KS-925 30G
17	INGUN	GKS-713-257-225-R-5007	KS-113-23
18	INGUN	GKS-713-207-225-R-5007	KS-113-23
19	INGUN	GKS-725-207-100R-1507-S	KS-925 30G
20	WILCO OR VOLTECH		

Where (X) or (XX) denotes the manufacturers' code for probe force rating.

5.11 Pin Length and Core Height Definition

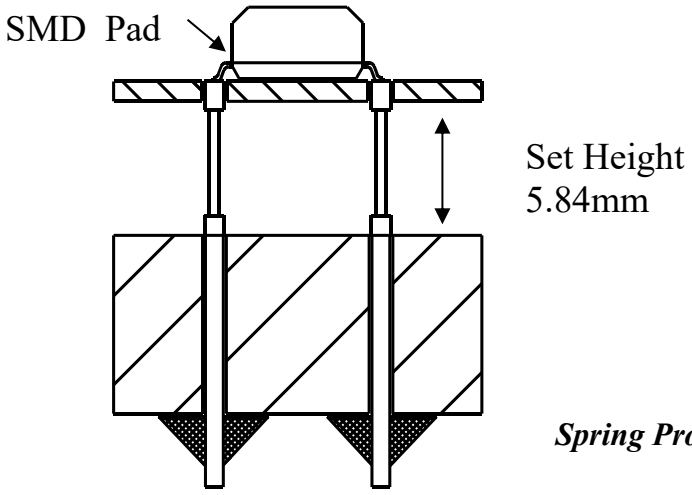


5.12 Example Installations Shown in their Working Positions



Kelvin Blade (Item 20)

Spring Probe (Item 9)



Spring Probe (Item 5)

5.13 Calculating Required Probe Force

For ideal conditions, the transformer should be just balanced in equilibrium before clamp pressure is applied.
That is, the downward force due to the weight of the transformer should be equal to the total spring probe force upwards.
This is often not practically possible, so choose probes with initial forces that total up to the transformer mass plus 20%.

$$\frac{\text{Transformer Mass}}{\text{Total No. of Probes}} = \text{Mass per Connection} = \text{Initial Probe Force}$$

Example where the probe force is specified in Newtons:
A Transformer weighs 200 grams (= 0.2 kilogrammes, Kg) and has a total of 10 connections (8 to windings + 1 screen and 1 core)

$$\text{Mass per connection} = \frac{0.2\text{ kg} \times 10}{10\text{ connections}}\ \text{(Newtons)} = 0.2\text{ Newtons}$$

Spring probes with an initial force of 0.2N *or slightly more* should be chosen.

Example where the probe force is specified in grams:
A Transformer weighs 200 grams and has a total of 10 connections (8 to windings + 1 screen and 1 core)

$$\text{Mass per connection} = \frac{200\text{g}}{10\text{ connections}} = 20\text{ grams}$$

Spring probes with an initial force of 20 grams *or slightly more* should be chosen.

Example using ounces:
A Transformer weighs 10 ounces and has a total of 10 connections (8 to windings + 1 screen and 1 core)

$$\text{Mass per connection} = \frac{10\text{ Oz}}{10\text{ connections}} = 1\text{ Oz}$$

Spring probes with an initial force of 1 Oz *or slightly more* should be chosen.

Notes:

Do not mix the formulae; use one of them only.

In the Metric formula using Newtons only, multiply the transformer weight by 10 to calculate its' downward force in Newtons due to gravity.

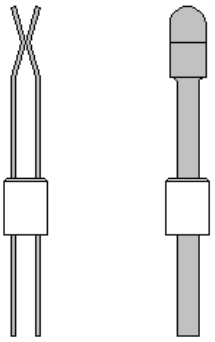
Rotating and other probes designed to make connections to cores should have significantly higher initial force (between 2 and 5 times higher) to ensure good contact to coated surfaces.

Remember that the fixture may be used for transformers with different combinations of windings on the same bobbin. Voltech recommends that if, for example, the bobbin has 10 pins then the fixture should be designed to connect to them all (using 10 probes) even if a particular sample has connections to only a few of the pins.

In this way the applied probe pressure is even across the bobbin and different winding designs can be tested without altering the fixture or constructing a new one.

5.14 Manufacturers' Contact Details

Kelvin Blades
USA:
Wilco Fixtures and Pins
http://www.wilcocontrol.com/



Spring Probes

As well as the probe, you must purchase the appropriate receptacle as detailed in the selection chart.
The receptacle is the fixed part of the spring probe assembly that is secured to the probe housing box.

USA

Everett Charles Technologies
www.ectinfo.com

Smiths Connectors
www.smithsconnectors.com

QA Technologies
www.qatech.com

Ingun
www.ingun.com

UK

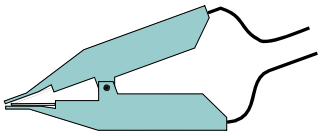
Coda Systems Ltd.
www.coda-systems.co.uk

Ingun
www.ingun.co.uk

Kelvin Alligator Clips

Part No CR006 are available from:

USA	Globtek	201 784 1000
UK	Bulgin	+44 (0) 181 594 5588



Interconnecting Wire

To complete the fixture, the probes, pins and clips will need to be wired to the contact pins on the bottom of the base plate as described later.

For safe and efficient wiring, Voltech recommends a single stranded wire with ‘triple insulation’ such as:

0.44mm TEX-E from Furukawa Electric Co.

USA	FENA	770 487 1234
UK	SEG Technologies	+44 (0) 1203 418 975

6 Fixture Construction

Having selected and purchased appropriate Kelvin blades and / or spring contact probes or and / or flying lead connectors you are ready to begin fixture assembly.

You will also need:
A Voltech custom fixture kit.
A suitable Voltech Drilled Box Kit
OR
A Voltech drilling template to suit the pitch of the transformer.

(Use the bobbin manufacturer's data for pitch where possible. The difference between 2.50mm and $^{1}/_{10}$" for example, is small and may be difficult to measure accurately from a sample.)

A small vertical pillar drill for drilling the probe box, interface plate and base plate will also be required if you do not have a pre-drilled kit.

Hand tools for assembling nuts and screws and making soldered connections.

Wire for making the electrical connections.
Wire is included within the Voltech probe starter kits.

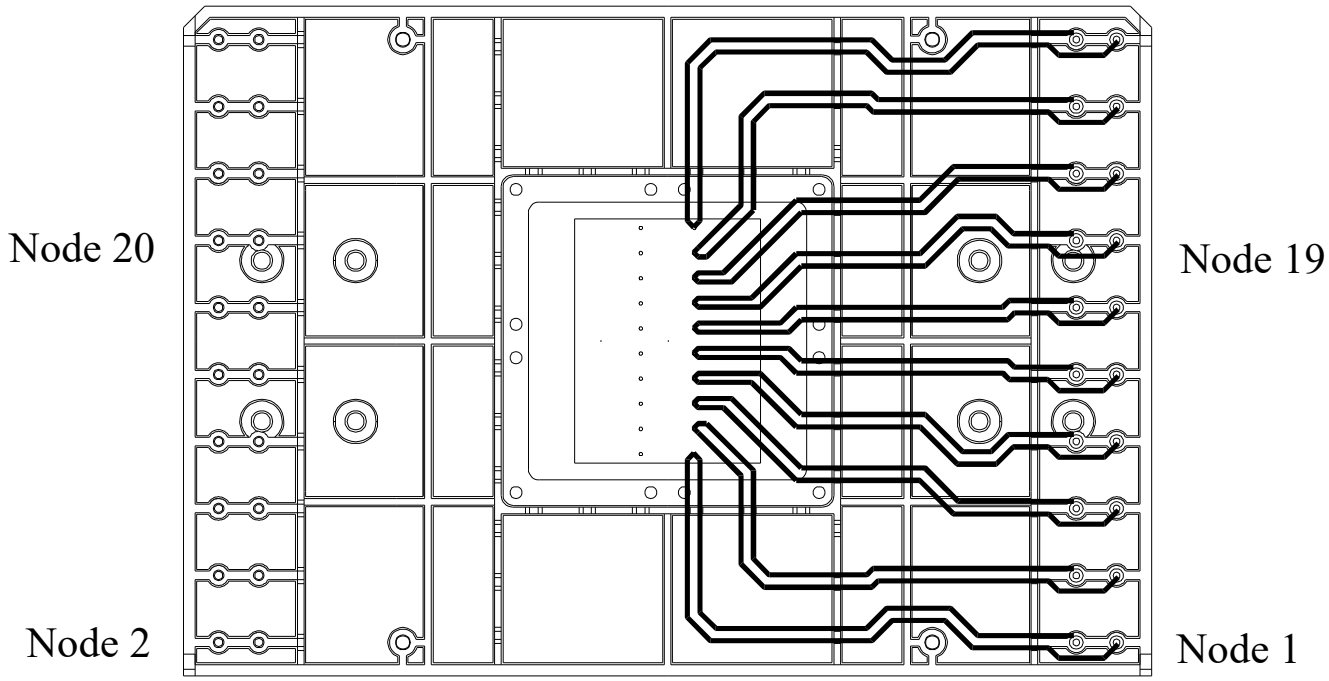
Low bloom cyanoacrylate adhesive such as Loctite Super Glue Gel.

6.1 Overall Layout

On the completed fixture, the transformer should be fitted centrally.
This will ease the layout of wiring and ensure the clamp (if used) lines up properly.

Consider also the position and lead length of flying leads or tags that will require an operator for connection. It may be easier if these can be brought out to the front or the free side of the fixture.

Then design the wiring of the fixture. That is the wiring from the Kelvin pins / spring probes / Kelvin clips to the 20 pairs of contacts fitted to the underside of the base plate. For best performance and longevity the wiring should be as short as possible and wires should not cross.



Ideal Wiring Layout from the UNDERSIDE

It is usual to line up a safety isolating transformer with primary and secondary pins on different sides of the fixture to minimise voltage stress on the wiring during HiPOT testing.

6.2 Drilling & Fitting of 4mm Safety Sockets

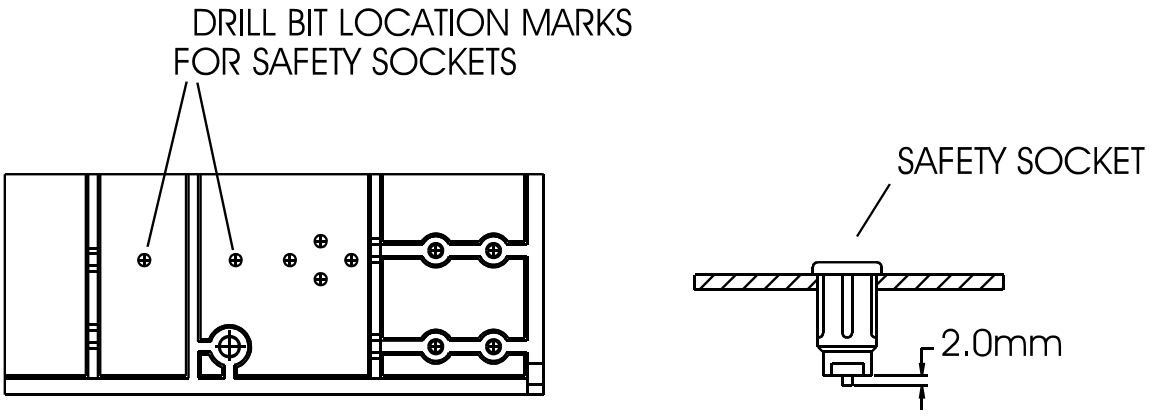
1 Select and mark the drill locations which require 4mm sockets out of the nearest two parallel rows of markings from the centre of the underside of the base plate.

2 Turn the plate over, and using the nominated drill bit location marks as guides, drill through with a 12.2mm ∅ drill bit to the top surface.

3 Remove all drilling swarf from both sides of the plate.

4 Cut down a socket connecting pin to 2mm from the socket body with heavy-duty side cutters or a hacksaw.

5 Press the modified safety sockets into the drilled holes in top face.



Notes:
To ensure that all holes are drilled perpendicular in the base plate, use a pillar drill.

Ensure that the base plate is fixed securely down at all times when drilling holes.

Ensure when pressing in the sockets that pressure is applied uniformly to the face of socket.

6.3 Wiring the Fixture

1 Always use Kelvin connections (i.e. separate power and sense leads) between each socket pin and the corresponding power and sense studs on the fixture plate.

2 Design the fixture so that the connections to the transformer can be made quickly and easily. For example, consider the wiring layout before starting, taking into account the high voltage and general notes below.

3 An AT Series tester can apply ac voltages up to 5000 Vrms (7000V peak) during the course of a test. Make sure that all the necessary precautions are taken for operation at high voltages:

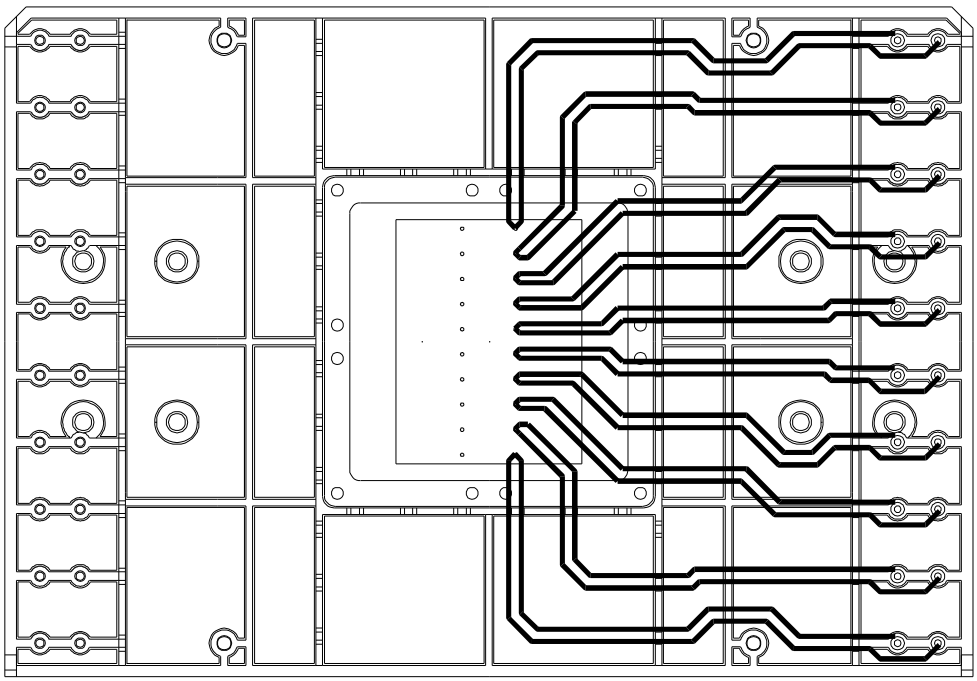
Check that:

Tracks do not cross each other.

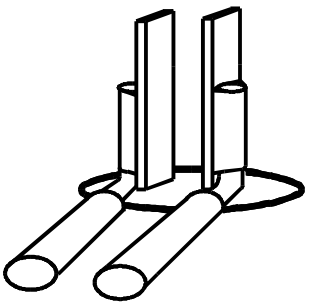
The likely voltages between adjacent bare contacts should not be too high (2.5mm per 1000 Volts max. is allowed).

All leads between the terminals should be covered with insulation capable of withstanding at least 3000 Vrms ac.
They should be kept as short as possible, and the leads from one power-sense pair of studs should not touch any bare metal associated with another power-sense pair.

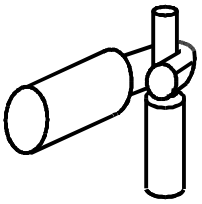
Ideal Wiring Layout from the UNDERSIDE



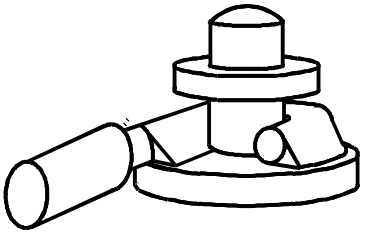
4 Start at the spring probe receptacle / Kelvin pin end and lay each wire neatly into the slots in the base plate walls.
Tack the wires down with adhesive and finish at the contact end.
Ensure adequate solder land around each joint.



KELVIN PIN SOLDER JOINTS



PROBE RECEPTACLE SOLDER JOINT



CONTACT SOLDER JOINT

5 The Kelvin pins, receptacles, contacts and recommended wire do not require pre-tinning before soldering. Other types of wire may need to be pre-tinned.

6 To ensure that the power and sense leads are not shorted, lay the wire on the outer side of the Kelvin pin blades.

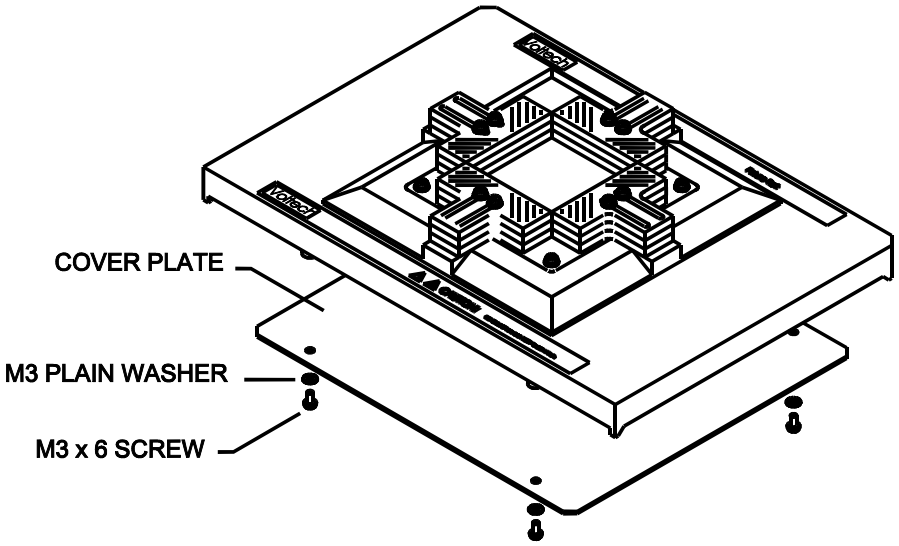
7 Do not attempt to shorten the Kelvin pin blades. They are brittle and can be easily damaged in this way.

8 Use a soldering iron with a tip temperature of 250 to 275°C for no more than three second to avoid deforming a Kelvin pin.

9 Non-Clean solders such as Multicore X38 are recommended.

6.4 Cover Plate Assembly

Fasten the Cover Plate to the underside of the base plate with four M3 x 6 Pan Head screws and four M3 Plain Washers



7 General Notes and Maintenance

1 Always use sockets or probes which are mechanically robust.
Poor mechanical connections can affect the measurements, and hence throughput and quality of the product.

2 Use a separate fixture for each transformer type, as this can improve the testing throughput.

3 Clean fixtures, sockets and probes regularly with isopropyl alcohol.
Unscrew the four screws holding the interface plate and lift out the plate to reveal the probes.
In this way the fixture can be cleaned without moving the guides.
Regular cleaning will maintain a high insulation resistance between contacts, and improve the quality of the connections to the transformer pins.

4 Spring Probe / Kelvin Blade replacement.
With proper installation and maintenance the probes and blades can last several millions of operations before wearing out.
Should it become necessary to replace any of the probes or blades, this is done by carrying out the assembly instructions in reverse.
If a spring probe head is damaged or worn this can be replaced separately.

8 Further Help and Advice

Further help and advice on the design, construction and maintenance of your fixture or any other Voltech product may be obtained from your local supplier or from a Voltech office