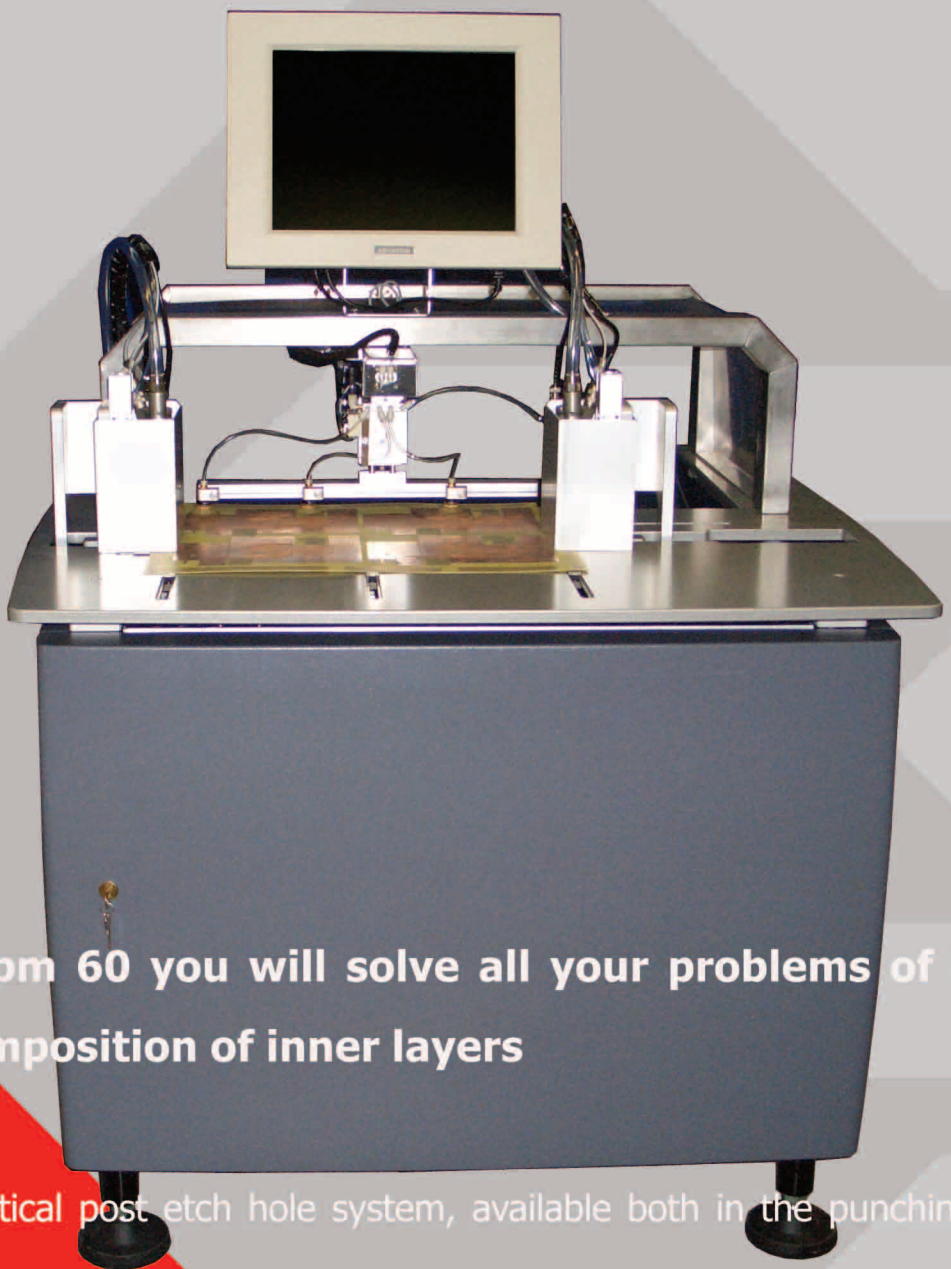
Ipm60

drilling and/or punching machine for **registration holes** on inner layers



With Ipm 60 you will solve all your problems of incorrect superimposition of inner layers

These optical post etch hole system, available both in the punching or drilling versions, is conceived to perform registration holes necessary for pin registration

PIERGIACOMI ROBOTICS Robotics division

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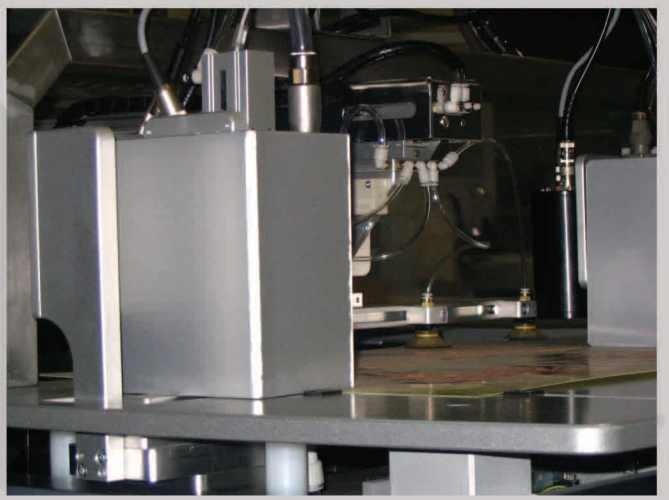
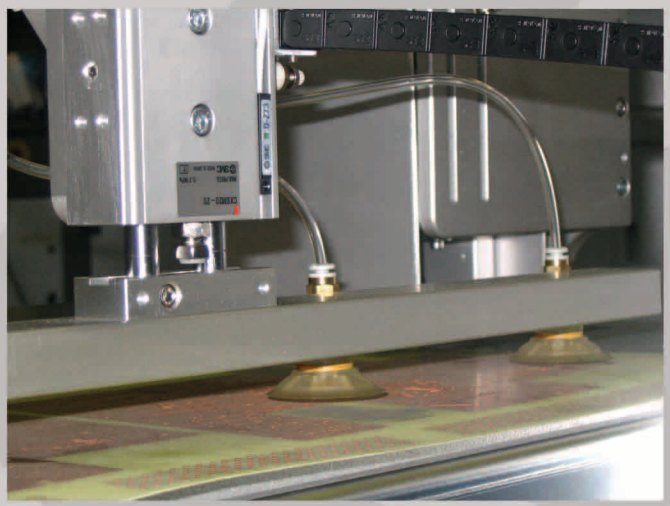
Why using the two round holes system?

When we talk about registration holes, many drilling or punching techniques can be used but the most common are basically three: four slot panel registration by punching; three slots panel registration by punching; 2 round holes panel registration by punching or drilling according to materials that have to be worked. The four slot registration surely does not look like the best hole system. Infact it seems to be constantly incorrect except for rare cases in which slot and pin position is perfect (unrealistic situation).

Infact, when books are inserted into the pins, all inner layers with dimensional errors, will be crushed towards an unpredictable direction. With such a distortion, the real position cannot be evaluated and inner layers could be wrongly placed and wavy once bonded.





Slightly better seems to be the three slot registration system considering that the panel can move in X - Y from central axis. Anyway even in this case, book registration cannot be considered optimal. The hole system for the registration of drill and rout operations recognized by operators as the most efficient since many years, is the one using the two round holes (plus eventually the anti-inversion one).

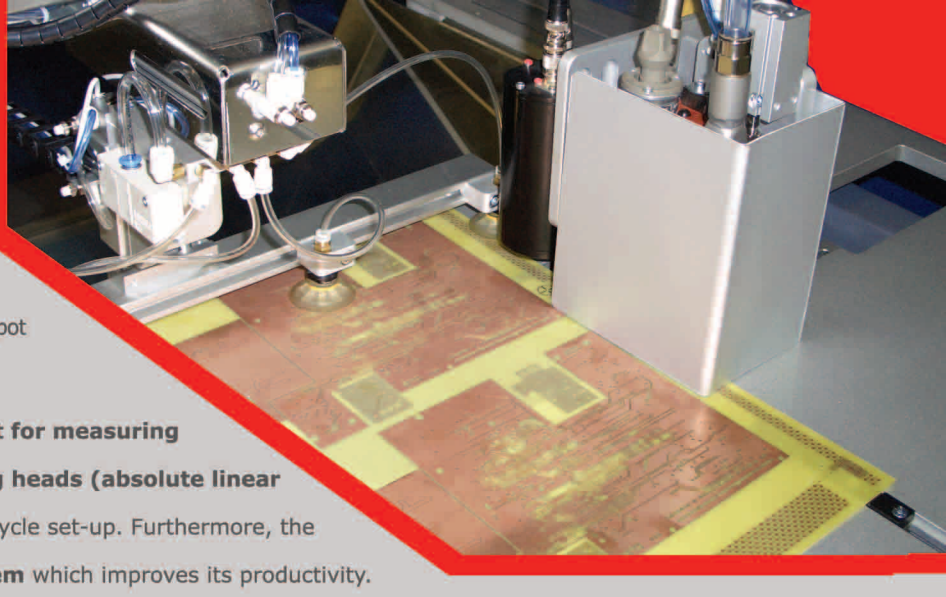
In this case no centering problems occur like it happens with other systems.

Furthermore, with the two holes, films and books can be mounted manually and quickly by the operator.

Punching or drilling?

To obtain an optimal multilayer, the execution of registration holes on inner layers is one of the most important task considering that their planarity, has a big impact on the accuracy of production. Once agreed that the best technique for the execution of registration holes is the one using two round holes, next step is to define when it is better to perfom holes by means of punches or using drills. As already mentioned, variables to be considered are kind of materials to be drilled or punched and most of all their thickness. We could easily assume that the smallest is the thickness of inners, the higher will be the convenience of using punches. On the contrary, when the thickness of inner layers, becomes more consistent, it is preferable the use of drills. This because when the registration holes has to be performed on very thin materials, like films for instance, the drilling causes distortion and an excessive enlargement of holes. On the other hand, when it is necessary to perform holes on inners with different thickness, the use of drills guarantees an higher constancy of holes dimensions compared to the one obtained by means of punches that will cause different diameters which vary according to materials' thickness. Therefore the following lay-up process on a spot welding machine will result more accurate and easy if the holes are executed by drills. Furthermore, when there is the need to perform holes with different diameters, drills tips can be easily changed; with punches this cannot be done. To solve these kind of problems, Piergiacomi conceived and realized the IPM 60 full optionals, with interchangeability of punching/drilling heads.

Ipm60



The IPM60 realizes **two** registration holes and the anti-reverse one necessary for the correct superimposition of inner layers performed, on a second step, by Piergiacomi's spot welding systems AMM10 or AMM20.

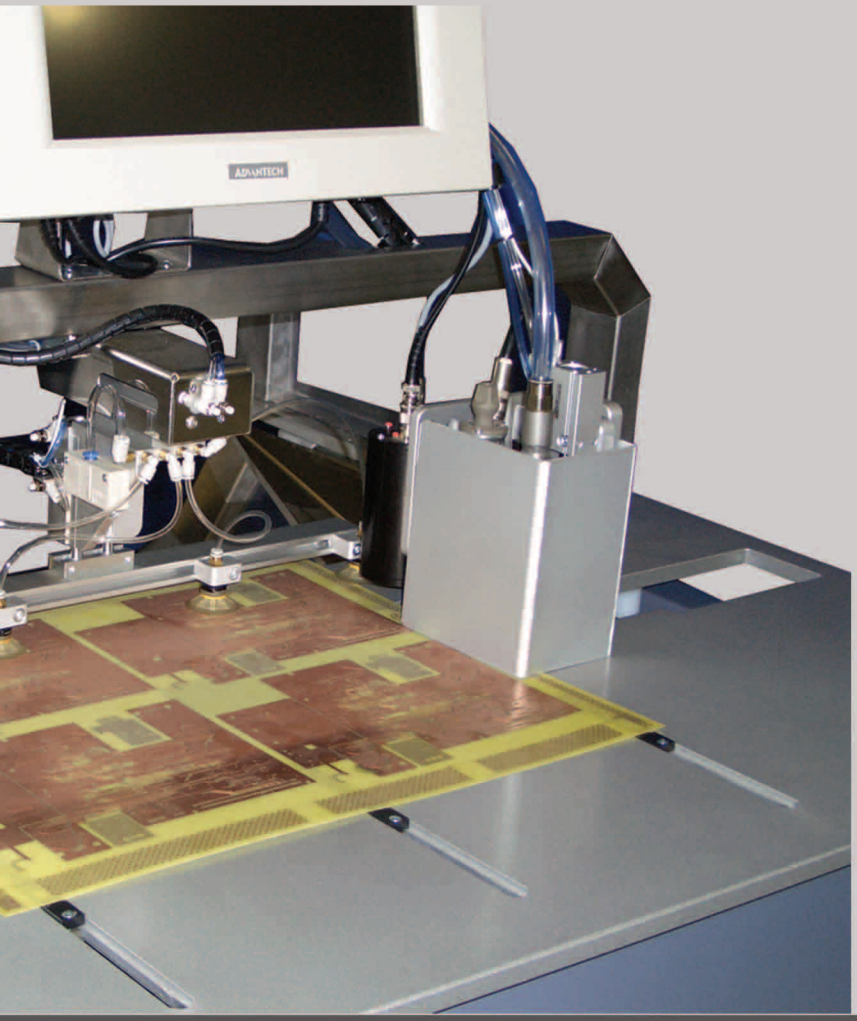
The **IPM 60** full optionals, is provided with an **instrument for measuring the distance between the two punching or drilling heads (absolute linear encoders)** in order to obtain a more precise working cycle set-up. Furthermore, the machine is equipped with **automatic unloading system** which improves its productivity.

If the customer asks for it, the IPM 60 can be supplied with the **heads interchangeability** option. In this way it will be possible to change drilling heads or punching heads according to materials that have to be drilled/punched.

By means of two video cameras and a special vision system, the IPM machine brings the markers, etched on the layer, on the right position and drives the punches (or drills) to make the holes that will be used, in a second step, on two centering pins.

It is also possible to perform the drilling of the reference holes on the multilayer after the copper foil has been removed.

Starting from one of the two basic models IPM 60/P with punching heads, IPM 60/D with drilling heads, it is possible to build up the machine as shown in the following table:



IPM60 configuration options:

E.g.: an IPM60 full optionals will have both drilling (D) and punching heads (P), automatic unloading (U) and absolute linear encoders (M). Therefore its code will be **IPM 60 P/D/U/M**

	IPM 60 P	IPM 60 D
AUTOMATIC UNLOADING (U)	☐	☐
LINEAR ENCODERS (M)	☐	☐
DRILLING HEADS (D)	☐	■
PUNCHING HEADS (P)	■	☐

■ BASIC

☐ OPTIONAL

PIERGIACOMI ROBOTICS Robotics division

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Piergiacomi Sud through its division "Piergiacomi Robotics" manufactures capital equipment for PCB and assembling industries. The range: punching and drilling machines for film, inner layers, multilayer and single side PCB; spot welding machines for multilayer book registration; inner layers and double side PCB inspection systems; PCB warping reduction machine; x-ray inspection systems for electronic circuits. To know more on other Piergiacomi's business lines: "Piergiacomi quality handtools" (manual handtools for electronics) and Piergiacomi Technology (instruments and equipment for the medical field), please visit the website: www.piergiacomi.com

Technical specifications	Ipm 60(P)	Ipm 60(D)
Maximum layer dimensions	760 x 610 mm	760 x 610 mm
Minimum layer dimensions	400 x 250 mm	400 x 250 mm
Maximum layer thickness	0,7 mm	3,2 mm
Work cycle	< 10 sec.	< 10 sec.
Maximum timer setting	< 2 min	< 2 min
Diameter of reference markers	< 2 mm	< 2 mm
Diameter of hole	max 2,3 mm	1 ÷ 5 mm
Repeatibility of positioning	±10 µm	±10 µm
Power consumption	< 1 kW	< 1 kW
Voltage	230 Volts	230 Volts
Compressed air consumption	< 80 Nl/min	< 80 Nl/min
Maximum pressure of air supply	0.6 - 0.7 MPa	0.6 - 0.7 MPa
Chuck rotation speed		5.000 - 24.000 rpm
Weight	245 Kg	245 Kg
Dimensions (LxDxH)	110 x 110 x 153cm	110 x 110 x 153cm
Working area	150 x 200 cm	150 x 200 cm
Working surface in anodized aluminium		
Vision field	5 x 5 mm	5 x 5 mm
More than one pixel resolution each 0.01 mm		
Patterns and circles recognition		
Recognition time	< 0.3 sec.	< 0.3 sec.

Illumination by trasparency or reflection (to be set) by means of infrared LED

CE Approved

Optionals

- Automatic unloading (U)
- Absolute linear encoders (M)
- Pneumatic drilling and punching heads interchangeability (F)

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