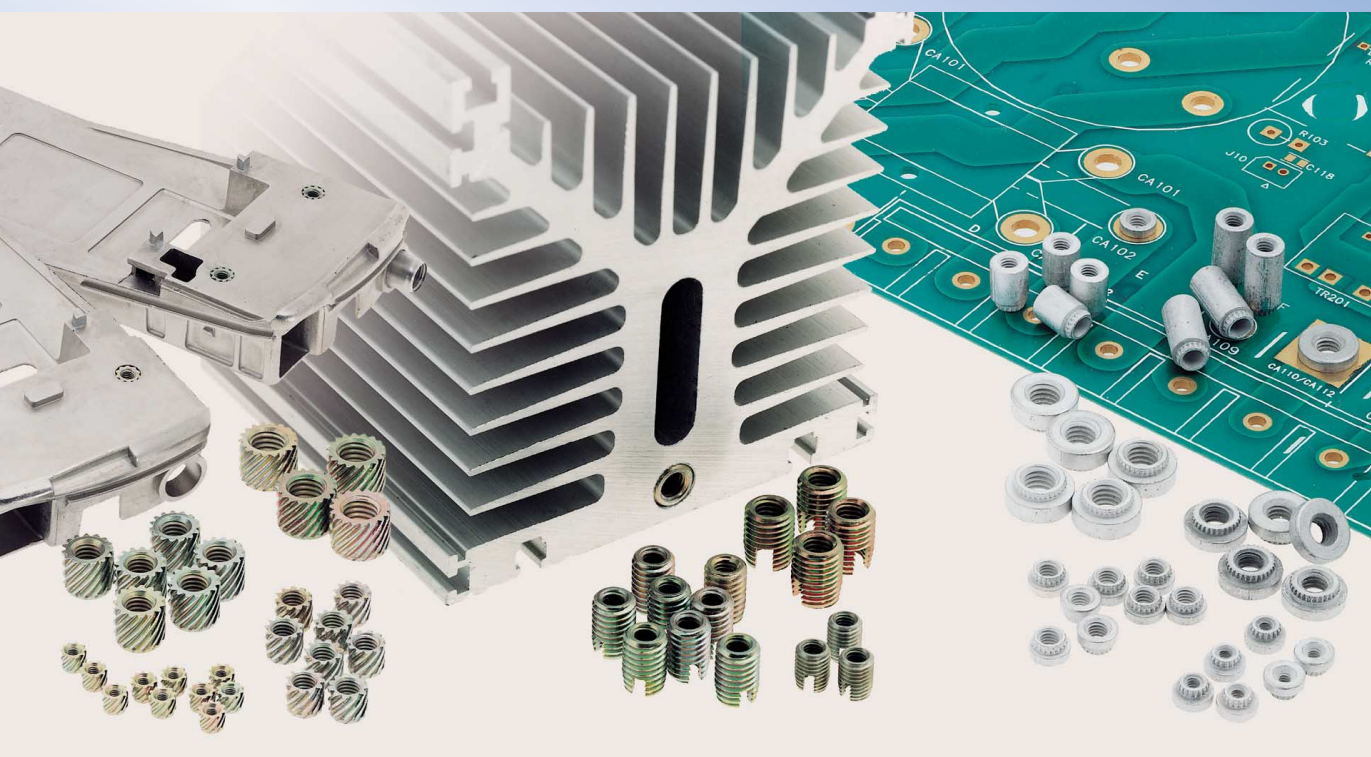


# FASTENERS FOR SPECIAL MATERIALS



P.S.M INTERNATIONAL



# **P.S.M** *the local fastener company . . .*

## **INTRODUCTION**



*PSM International is a global manufacturer and distributor of specialised fasteners and joining systems.*

*The Company has its origins in the heartland of British manufacturing - the so called “Black Country” in the English Midlands. The business was established in 1931 to supply special high precision, machine turned components for the lock industry for which the area is still famous.*

*The development of the Company’s present product range began in 1951 and by the 1960’s the business was almost entirely devoted to the manufacture and distribution of specialist fastener products.*

*Today PSM is focused solely on providing design engineers and manufacturers with engineered solutions to assembly problems which provide cost effective methods and enhance the performance of the finished item. PSM engineers are trained to high standards to assist design engineers in this specialised area. PSM manufacture over 100 different products in 10,000 variations.*

*The Company is a member of the McKechnie Group PLC and has global capabilities with manufacturing and distribution operations in 25 countries around the world.*

*Wherever manufactured goods are made PSM has local people providing technical support, application engineering, project management and customer service to a consistently high standard.*

**. . . Worldwide**

# INTRODUCTION

The introduction of new materials and their successful use by designers are usually dependant on a mechanical fastening system to allow dismantling for adjustment, servicing or repair.

The captive fasteners shown in this catalogue have been designed to meet the needs of designers who require the strength of a steel thread when using lightweight alloys such as magnesium and resin based printed circuit boards.

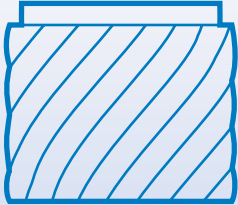
The information in this catalogue is intended as a general guide.

For further advice please consult your local PSM Sales Engineer or our Applications Engineers. The PSM Technology Centre can also provide pre-production test facilities for accurate performance data.

## PRECISION HARDENED INSERTS & STUDS

pages 4-5

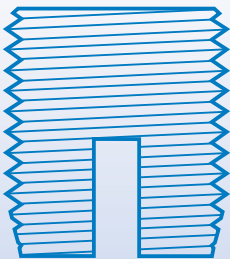
**PRECISION HARDENED INSERTS & STUDS** - These fasteners have been designed to provide a hardened steel thread to resist tensile and torsional loading in the softer aluminium and zinc based diecastings.



## HARDENED STEEL SCREW-SERTS

pages 6-7

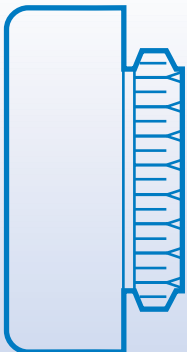
**HARDENED STEEL SCREW-SERTS** - The Screw-sert range of fasteners have been designed to provide a hardened steel thread in the softer aluminium and zinc based diecastings, magnesium and thermosetting plastics.



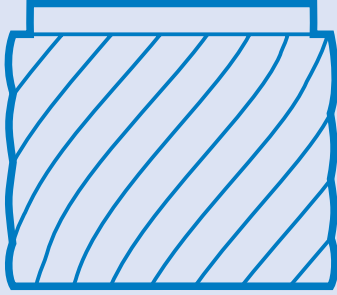
## PRINTED CIRCUIT BOARD FASTENERS

pages 8-9






**PRINTED CIRCUIT BOARD FASTENERS** - These fasteners have been designed to provide a metallic deep tapped thread into resin based printed circuit boards.



**PRECISION HARDENED INSERTS & STUDS** have been designed to provide a hardened steel thread to resist tensile and torsional loading in the softer aluminium and zinc based diecastings. The external spiral knurl cuts into the parent material reducing radial stresses in the casting.



## ADVANTAGES

-  EASY ASSEMBLY WITH ANY SQUEEZE PRESS
-  LOW BURSTING STRESS ALLOWS THE USE OF THINNER WALLED BOSSES
-  STEEL THREAD PROVIDES A HIGH DEGREE OF RE-USABILITY
-  INSTALLED INTO PLAIN CORED HOLE
-  ELIMINATES TAPPING OPERATIONS



## DESIGN GUIDE

### JOINT DESIGN

To achieve optimum pull-out performance the joint must be designed with a stationary mating component in contact with the face of the insert.

### HOLE PREPARATION

Holes may be cored or drilled. The taper on a cored hole should be 0.5° inclusive and the hole diameter recommended should apply at the point reached by the bottom of the insert.

### INSTALLATION

See page 10.

### WALL THICKNESS

The minimum wall thickness will vary with the ductility of the diecasting alloy, but as a general guide wall thickness should not be less than the nominal thread diameter.

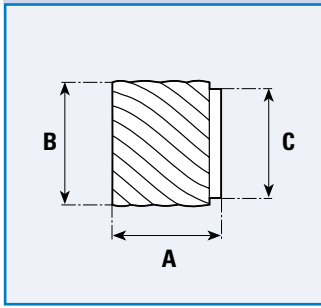
Specific use of materials like magnesium and applications requiring thinner boss walls may require subtle changes to the design of the insert. In either case consultation with the PSM Technology Centre or local Sales Office and pre-production testing is essential.

# TECHNICAL DATA

# PHI & PHS

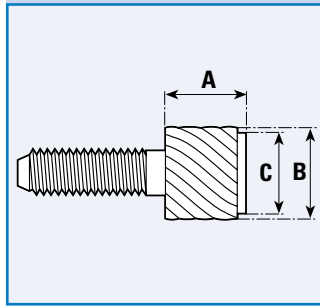
# PRECISION HARDENED INSERTS & STUDS

## INSERTS



Product Code PHI

## STUDS



Product Code PHS

**STANDARD MATERIAL** - Case Hardened Mild Steel

**STANDARD FINISH** - Zinc & Chromate

## DIMENSIONS

INTERNAL THREAD SIZES		A	B	C	Recommended
Unified	ISO Metric	Length	Knurl Diameter	Pilot Diameter	Hole Size
		mm	mm	mm	mm
4	2.5	4.5	5.3	4.8	4.85
-	3	4.5	5.3	4.8	4.85
6	3.5	5.6	6.2	5.5	5.60
8	4	6.9	7.7	7.1	7.20
10	5	6.9	7.7	7.1	7.20
1/4	6	9.5	10.3	9.5	9.60

## STUD LENGTHS - Lengths Available ('L')

MILLIMETRES	5	6	8	10	12	14	16	18	20
INCHES	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8

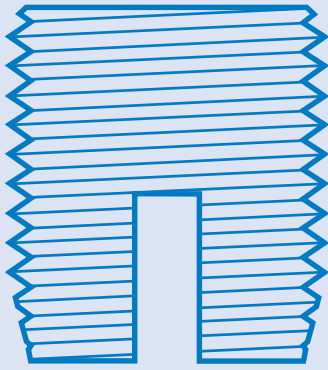
## HOW TO SPECIFY

### PHI

PRODUCT CODE	PHI-M3
THREAD SIZE	PHI-M3

### PHS

PRODUCT CODE	PHS-M3-10
THREAD SIZE	PHS-M3-10
LENGTH	PHS-M3-10



The PSM SCREW-SERT range of fasteners have been designed to provide a hardened steel thread in the softer aluminium and zinc based diecastings, magnesium and thermosetting plastics. The external thread cuts into the parent material reducing radial stresses in the casting.

## ADVANTAGES

- STEEL THREAD PROVIDES HIGH DEGREE OF RE-USABILITY
- ELIMINATES TAPPING OPERATIONS
- HIGH PULL-OUT RESISTANCE
- INSTALLED INTO PLAIN CORED HOLE
- HIGH MECHANICAL STRENGTH ENABLES USE OF REDUCED DIAMETER FASTENERS
- IDEAL WHERE JACK-OUT IS UNAVOIDABLE



## DESIGN GUIDE

### HOLE PREPARATION

Hole diameter will vary with the type of material used. For this reason the data table shows the hole size ranges for the different material classes.

Holes may be cored or drilled. The taper on a cored hole should be 1° inclusive and the hole diameter should apply at the point reached by the bottom of the insert.

A 60° countersink at the top of the hole is strongly recommended in order to avoid the risk of chipping to the surrounding surface. The depth of the countersink should be equal to the external thread pitch of the insert.

The depth of blind holes must be a minimum of 1.2 x insert length.

### TYPE OF LOADING

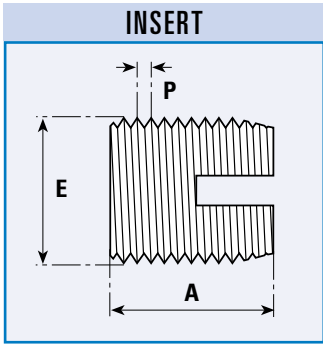
Direct torque loads should be avoided with this type of insert.

### INSTALLATION

See page 10.

### WALL THICKNESS

A general guide to minimum wall thickness is given in the table, but this will vary according to the ductility of the die casting alloy. Special modified inserts can be supplied to cater for applications where smaller bosses are required in certain materials such as magnesium. Please contact PSM Technology Centre or your local Sales Office for assistance.



Product Code SCT

STANDARD MATERIAL - Case Hardened Mild Steel

## DIMENSIONAL REFERENCES

INTERNAL THREAD SIZES		A	E	P	Minimum Wall Thickness
Unified	ISO Metric	mm	mm	mm	
4	2.5	6.0	4.5	0.50	8.0
-	3	6.0	5.0	0.50	8.0
6	3.5	8.0	6.0	0.75	10.0
8	4	8.0	6.5	0.75	10.0
10	5	10.0	8.0	1.00	13.0
-	6a*	12.0	9.0	1.00	15.0
1/4	6	14.0	10.0	1.50	17.0
5/16	8	15.0	12.0	1.50	18.0
3/8	10	18.0	14.0	1.50	22.0
1/2	12	22.0	16.0	1.50	26.0
-	14	24.0	18.0	1.50	28.0
-	16	22.0	20.0	1.50	27.0

6a\* = Special smaller bodied M6

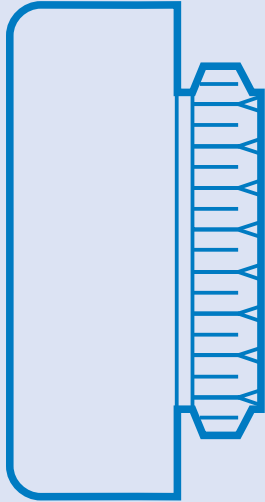
## HOLE SIZES

High Strength > 320 N/mm <sup>2</sup> (> 35 H.BAR)	MATERIAL CLASS	
	Medium Strength 235 - 320 N/mm <sup>2</sup> (25 - 35 H.BAR)	Low Strength < 235 N/mm <sup>2</sup> (< 25 H.BAR)
4.2 - 4.3	4.1 - 4.2	4.1 - 4.2
4.8 - 4.9	4.7 - 4.8	4.6 - 4.7
5.6 - 5.7	5.5 - 5.6	5.4 - 5.5
6.1 - 6.2	6.1 - 6.2	5.9 - 6.0
7.5 - 7.6	7.4 - 7.5	7.2 - 7.4
8.5 - 8.7	8.4 - 8.5	8.2 - 8.4
9.3 - 9.4	9.1 - 9.3	8.7 - 9.0
11.2 - 11.3	11.0 - 11.2	10.8 - 11.0
13.2 - 13.4	13.0 - 13.2	12.8 - 13.0
15.2 - 15.4	15.0 - 15.2	14.8 - 15.0
17.2 - 17.3	17.0 - 17.1	16.8 - 17.0
19.2 - 19.4	19.0 - 19.2	18.8 - 19.0

## HOW TO SPECIFY

### SCT

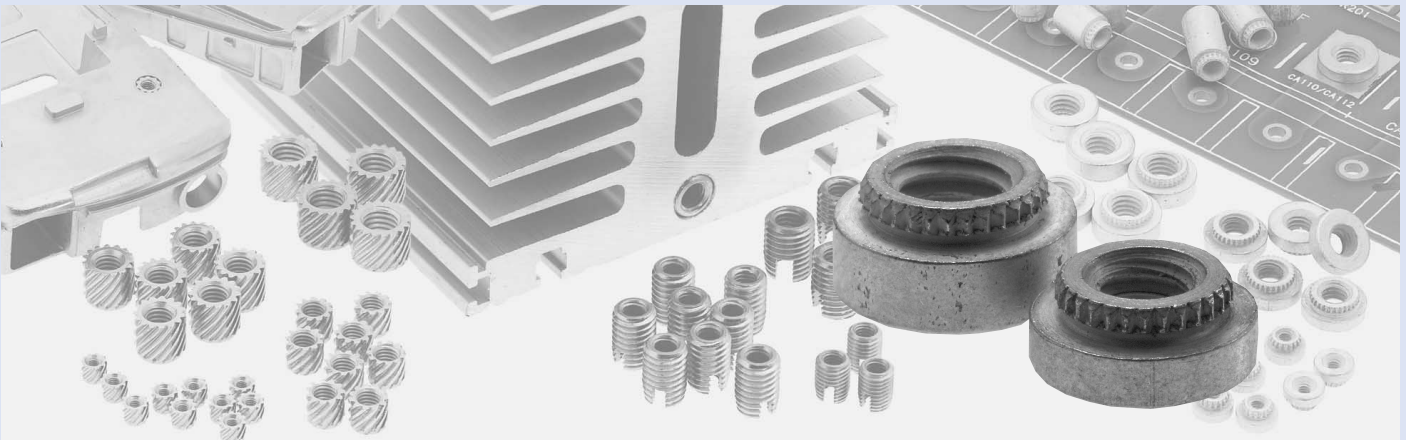
PRODUCT CODE	SCT-S-M3
MATERIAL	SCT-S-M3
THREAD SIZE	SCT-S-M3



**PRINTED CIRCUIT BOARD FASTENERS** have been designed to provide a metallic deep tapped thread into resin based printed circuit boards. They combine simple press-in installation with high retention properties and remove any danger of cracking or shattering of the board. A stand-off version is also available.

## ADVANTAGES

- ▣ SIMPLE PRESS-IN INSTALLATION
- ▣ HIGH PULL-OUT
- ▣ GUARANTEED NOT TO CRACK BRITTLE PCB



## DESIGN GUIDE

### HOLE PREPARATION

Holes must be held to a tolerance of  $-0.000 +0.075\text{mm}$ .

### INSTALLATION

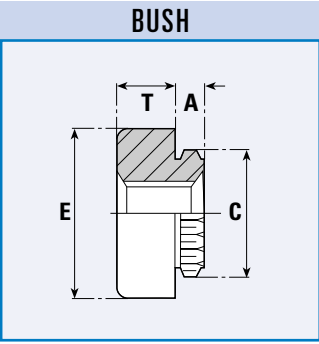
All Self-Broaching fasteners are easy to install as no special tooling is required. However - this must always be carried out using a squeeze action - never a shock load. (See page 10).

### POSITIONING THE FASTENER

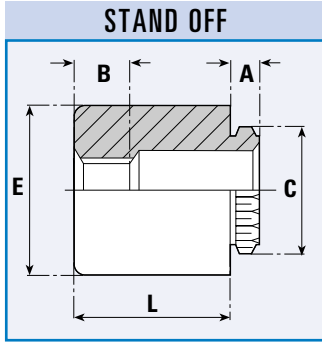
The recommendations given in the table must be closely followed to prevent chipping at the edge of the board.



## TECHNICAL DATA



Product Code PCBR



Product Code SCBR

**STANDARD MATERIAL** - Mild Steel (Electrotinned)

## DIMENSIONS

INTERNAL THREAD SIZES		A Max.	B	C	T	E	Hole size in board	Minimum distance from centre line to board edge
Unified	ISO Metric	mm	mm	mm	mm	mm	mm	mm
2	2	1.5	2.0	4.06	1.5	5.54	3.7	3.5
-	2.5	1.5	2.0	4.55	1.5	5.54	4.2	4.5
4	3	1.5	2.0	4.55	1.5	5.54	4.2	4.5
6	3.5	1.5	2.0	5.74	2.0	7.00	5.4	5.0
8	4	1.5	3.0	6.68	2.0	8.72	6.4	6.5
10	5	1.5	3.0	7.24	3.0	9.53	6.9	7.0
1/4	6	1.5	6.0	8.66	6.0	10.00	8.3	8.0

### STAND OFF - Lengths Available ('L')

MILLIMETRES	3	4	5	6	8	10	12	14	16	18	20	25
INCHES	1/8	5/32	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1

## HOW TO SPECIFY

PCBR	
PRODUCT CODE	PCBR-M3
THREAD SIZE	PCBR-M3

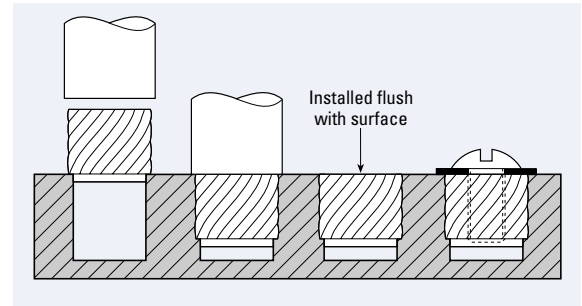
SCBR	
PRODUCT CODE	SCBR-M3
THREAD SIZE	SCBR-M3
LENGTH	SCBR-M3-10

## RECOMMENDED INSTALLATION SEQUENCES

### PRECISION HARDENED INSERTS & STUDS

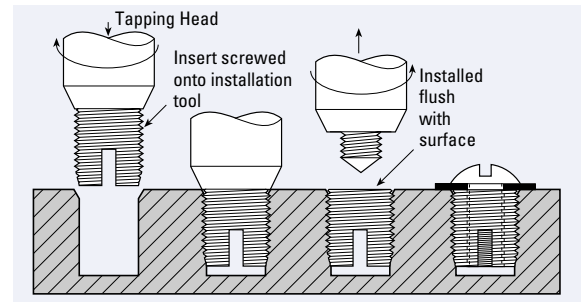
The insert must be installed by a steady squeeze action press with tooling that will allow the insert to rotate.

Care must be taken during installation to ensure that the insert is kept axially square, avoiding side loads that may damage the boss.

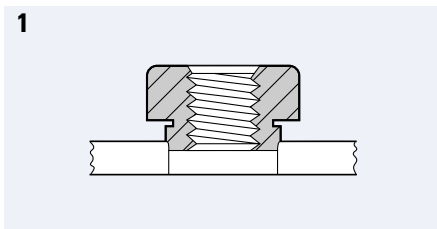


### SCREW-SERT INSERTS & STUDS

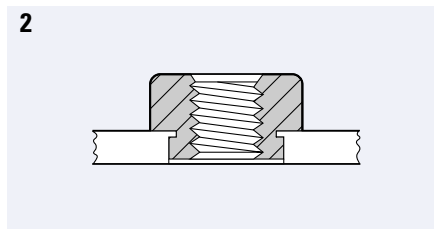
The insert is installed using traditional tapping principles. Installation can be carried out using a hand tool (for low volumes), a tapping head attachment for a pillar drill, a standard tapping machine or fully automatic installation equipment.



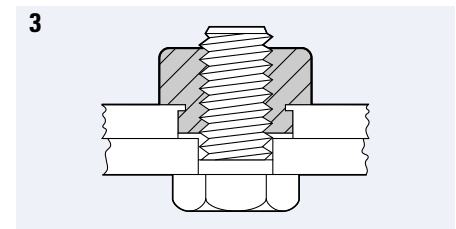
### PRINTED CIRCUIT BOARD FASTENERS



1. Form a hole in the material to size recommended and install the fastener square in the hole.



2. Apply pressure to the head of the fastener sufficient to totally install the broaching feature into the board, locking the fastener securely in place.



3. Insert fixing screw or bolt from side opposite to the fastener head.

## TOTAL ASSEMBLY SOLUTIONS

*PSM's philosophy is to provide a total package of fastener design, prototype production, application advice, installation systems and technical liaison for design and production engineers worldwide.*

*Playing a key role in this is PSM's ability - through it's company PSM Multi Automation of Redditch - to design*

*and manufacture a wide range of installation equipment, from a simple hand punch to the latest state-of-the-art computer controlled systems to feed and install components and fasteners. PSM Multi Automation has the expertise to handle the most complex assembly problems enabling PSM to provide a Total Assembly Solution.*

## INSERTS FOR PLASTICS



PSM offers the widest selection of inserts for plastics available anywhere. There is a PSM insert to suit every plastic and every installation technique. Press-Lok<sup>®</sup> and Fin-Lok<sup>®</sup> offer the simplicity of push-in installation. Miniature designs are made possible by Mini-Tech<sup>®</sup>. There is the high performance of Tech-Sonic<sup>®</sup> and the ultrasonic capability of Sonic-Lok<sup>®</sup>. Screw-Sert<sup>®</sup> is ideal for low strength materials whilst for thermosetting resins Banc-Lok<sup>®</sup> and Spiro<sup>®</sup> are recommended.

## FASTENERS FOR METAL



PSM's engineering pin range includes 'Hardened and Ground' pins in parallel and tapered format together with Grooved pins. Hardened steel Screw-Sert<sup>®</sup> and PHI<sup>®</sup> provide machine threads for cast alloys whilst PTDG<sup>®</sup> screws provide a high strength direct screw fixing.

## THREADED FASTENERS FOR THIN SHEET METAL

Both riveting and self-clinching types are available in a variety of styles including stand-offs, blind types, self locking and self piercing.

Whether the design calls for high performance or compact size there is a product specially designed to match the requirement.



## DIRECT SCREW FIXINGS FOR PLASTICS

Where a direct screw fixing into plastics is called for, the PT<sup>®</sup> range has no equal.

There are special forms for both thermoplastics and thermosets and a wide variety of drive systems can be accommodated. Where performance of the screw in dynamic conditions is important the PT<sup>®</sup> screw has been proven superior to all other types and is specified by leading automotive manufacturers.

PT<sup>®</sup> is a registered Trade Mark of EJOT Verbindungssysteme GmbH

## SPRING STEEL AND PLASTIC FASTENERS



The versatility of the spring steel fastener is unique and gives designers of complex parts the flexibility they need.

PSM manufactures specially designed items to meet specific design criteria, although standard parts are also available.

Complementing these parts is a range of corrosion resistant and lightweight plastic moulded fixings and components.

## THREAD LOCKING AND SEALING SYSTEMS



PSM offer a wide range of pre-applied processes for the locking and sealing of threaded components. These include the Tuf-Lok<sup>®</sup> Blue Nylon anti-vibration patch, a large range of Micro-encapsulated Adhesives and Non-curing Sealants supplied by Omni-Technik, Loctite, and 3M and also the Nyltite Nylon Collar for the under head sealing of thread forming/cutting screws.

*Please contact your local PSM Sales Office for more information on these products . . .*

OTHER PSM PRODUCTS

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### **CANNING BRETT**

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### **Automated Assembly Equipment**

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# P.S.M INTERNATIONAL



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McKechnie Group

