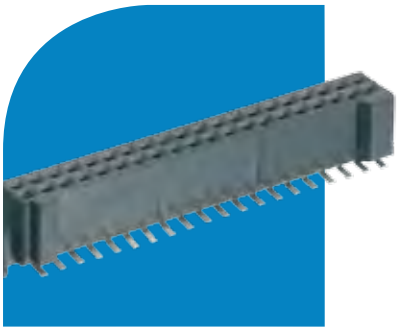
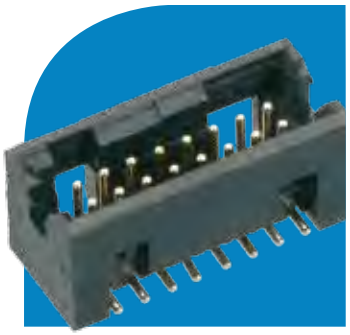
Connectors





CONTENTS

HARWiN

M60 Connectors

SPECIFICATION

Materials

Mouldings:	LCP, UL94V-0
Contacts:	Phosphor Bronze
Finish:	Gold

Environmental

Operating temperature:	-55°C to +100°C
Solderability:	245°C for 5 seconds
Soldering heat resistance:	260°C for 10 seconds

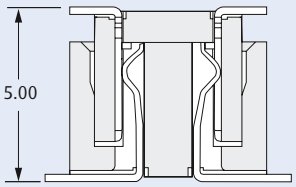
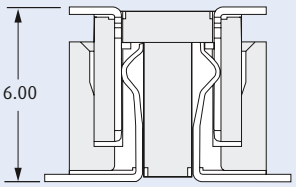
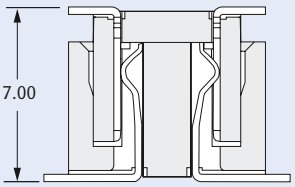
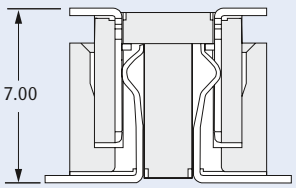
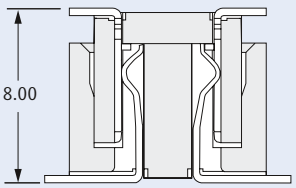
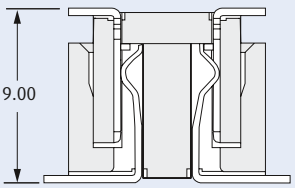
Electrical

Current rating:	0.5A per contact
Voltage rating:	100V AC
Voltage proof:	300V AC
Contact resistance:	40 mΩ max.
Insulation resistance:	1000 MΩ min.

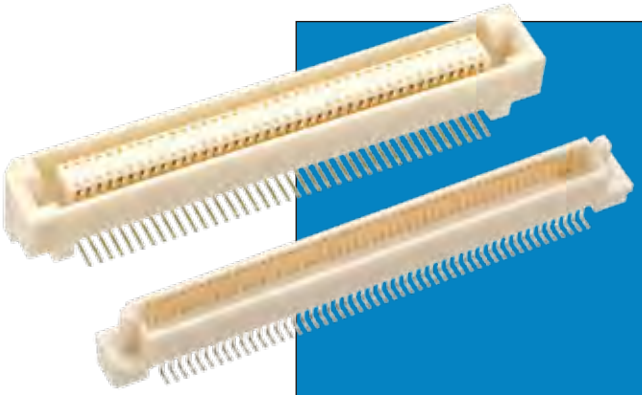
Mechanical

Durability:	30 operations
Insertion force (max.):	1.0N per contact
Withdrawal force (min.):	0.1N per contact
Vibration sensitivity:	10 – 55Hz, 1.5mm, 6 hours duration
Shock severity:	490m/s² (50G) for 11 ms

All preferred sizes of this range are held in stock.
Check www.harwin.com for availability.

	FEMALE		
MALE	M60-604  M60-614	M60-605  M60-614	M60-606  M60-614
	M60-604  M60-616	M60-605  M60-616	M60-606  M60-616

All dimensions in mm.

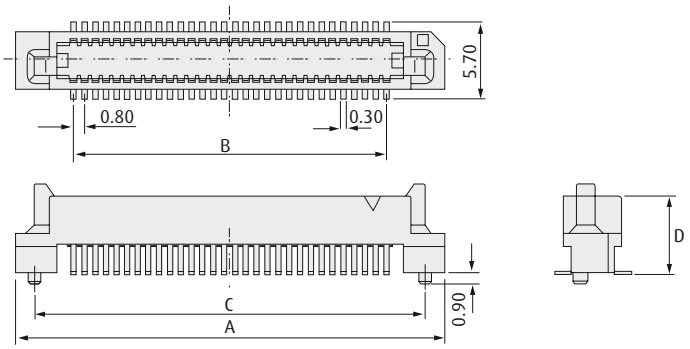


M60 Connectors
Vertical Surface Mount

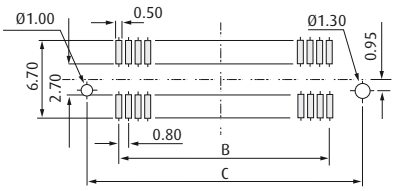
A range of double row 0.8mm pitch SMT male & female connectors for variable height board-to-board stacking.

- Locating pegs to ensure correct positioning onto the board.
- Polarised to prevent mis-mating.
- For tape and reel packaging contact technical@harwin.com.

FEMALE

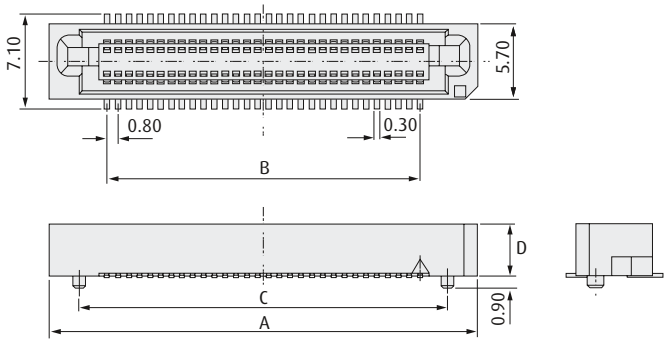


CALCULATION:	
A	B + 8.6
B	0.8 x (No. of ways per row – 1)
C	B + 5.6

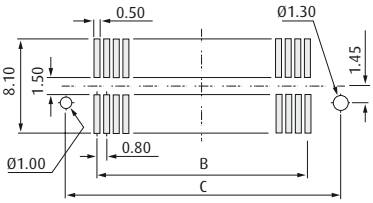


Recommended PC Board Pattern

MALE



CALCULATION:	
A	B + 8.6
B	0.8 x (No. Of ways per row - 1)
C	B + 4.0



Recommended PC Board Pattern

HOW TO ORDER

M60 – 6 X X XX XX

SERIES CODE

GENDER

0	Female
1	Male

CONNECTOR HEIGHT

4	D = 4mm
5	D = 5mm (Female only)
6	D = 6mm

FINISH

45	Gold (Pd)

NO. OF WAYS PER ROW

10, 15, 20, 25, 30, 40, 50

All dimensions in mm.

M40 Connectors

SPECIFICATION

Materials

Mouldings:	High Temp Thermoplastic, UL94V-0
Contacts:	Phosphor Bronze
Finish:	Tin

Electrical

Current rating:	0.5A per contact
Voltage rating:	100V AC
Voltage proof:	250V AC
Contact resistance:	50 mΩ max.
Insulation resistance:	500 MΩ min.

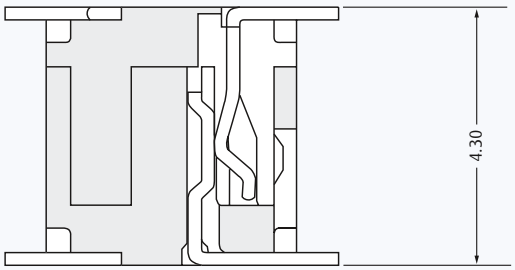
Environmental

Operating temperature:	-55°C to +100°C
Solderability:	210°C for 5 seconds
Soldering heat resistance:	260°C for 10 seconds

Mechanical

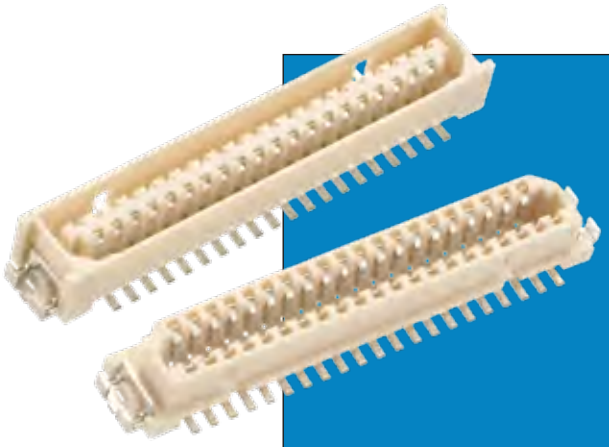
Durability:	30 operations
Insertion force (max.):	2.7N per contact
Withdrawal force (min.):	0.4N per contact
Vibration sensitivity:	10 – 55Hz, 1.5mm, 6 hours duration
Shock severity:	490m/s² (50G) for 11 ms

All preferred sizes of this range are held in stock.
Check www.harwin.com for availability.

FEMALE / MALE	M40-620
M40-600	

All dimensions in mm.

HARWiN



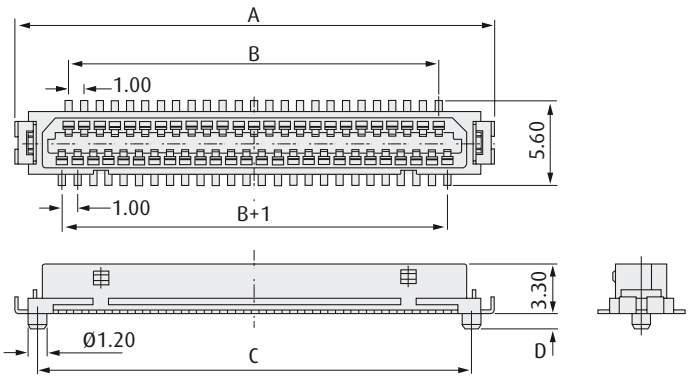
M40 Connectors

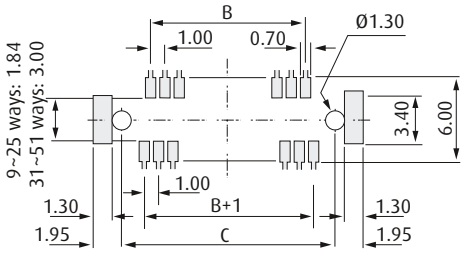
Vertical Surface Mount

A range of double row 1.00mm pitch SMT male and female connectors for board-to-board stacking.

- Locating pegs to ensure correct positioning onto the board.
- Polarised to prevent mis-mating.
- Staggered pin-out to help board layout.
- For tape and reel packaging contact technical@harwin.com.

FEMALE

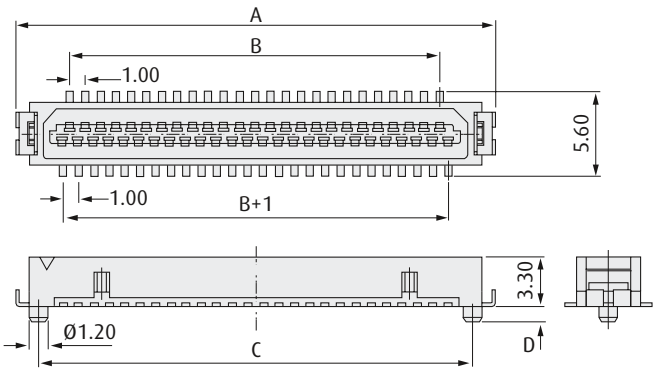


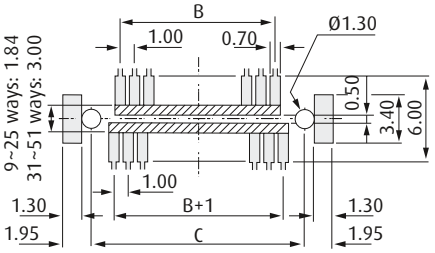


Recommended PC Board Pattern

CALCULATION	
A	B + 7.1
B	(Total No. Of Contacts – 3) / 2
C	B + 4.1
D	1.0mm for 9, 15, 21, 25 way, otherwise 0.8mm

MALE





Recommended PC Board Pattern

HOW TO ORDER

M40 – 6 X 0 XX XX

SERIES CODE

GENDER	
0	Male
2	Female

FINISH	
46	Tin

TOTAL NO. OF CONTACTS

09, 15, 21, 25, 31, 41, 51

www.harwin.com

All dimensions in mm.

M30 Connectors

SPECIFICATION

Material

Mouldings:	Male: Nylon 46, UL94V-0 Female: Nylon 66, UL94V-0
Contacts:	Male: Brass Female: Phosphor Bronze
Finish:	Tin

Electrical

Current rating:	1A per contact
Voltage rating:	150V AC
Voltage proof:	500V AC/DC
Contact resistance (initial):	30 mΩ max.
Contact resistance (after conditioning)	25 mΩ max.
Insulation resistance:	500 MΩ min.

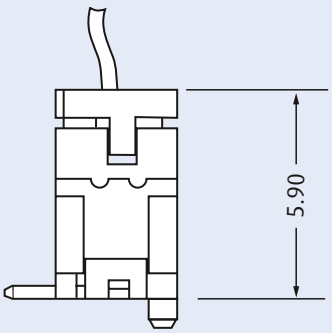
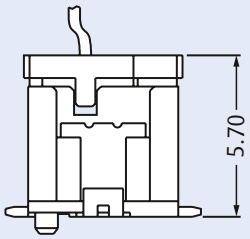
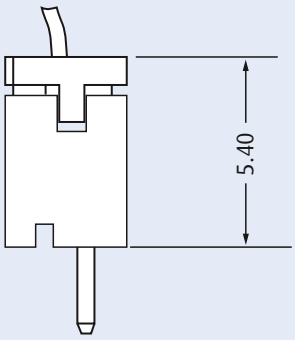
All preferred sizes of this range are held in stock.
Check www.harwin.com for availability.

Environmental

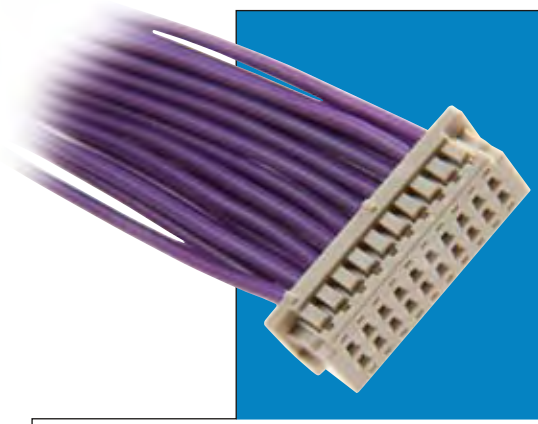
Operating temperature:	-55°C to +85°C
Solderability:	245°C for 5 seconds
Soldering heat resistance:	PC Tail: 260°C for 3 seconds SMT: 245°C for 5 seconds

Mechanical

Durability:	30 operations
Insertion force (max.):	4.9N per contact
Withdrawal force (min.):	0.5N per contact
Crimp retention (min.):	5.9N per contact
Crimped wire retention (min.):	26 AWG wire: 19.6N 28 AWG wire: 14.7N 30 AWG wire: 5.9N
Vibration sensitivity:	10 – 55Hz, 1.5mm, 6 hours duration
Shock severity:	490m/s² (50G) for 11 ms

FEMALE / MALE	CRIMP	
	SINGLE ROW	DOUBLE ROW
SMT	M30-110  M30-600	M30-120  M30-601
PC TAIL	M30-110  M30-610	Contact technical@harwin.com

All dimensions in mm.



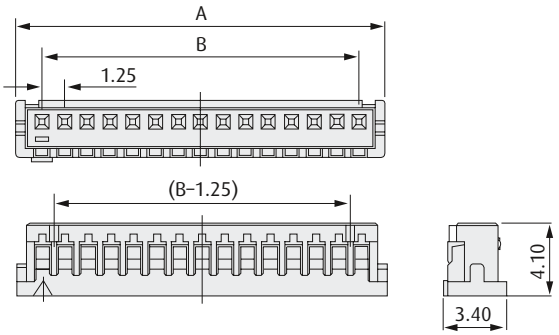
M30 Connectors

Female Crimp Housings and Contacts

- Single or double row options.
- Loose or reeled contacts.
- Suitable for use with male connectors shown on pages 88 to 89.
- Pre-crimped contacts or cable assembly service, contact technical@harwin.com.

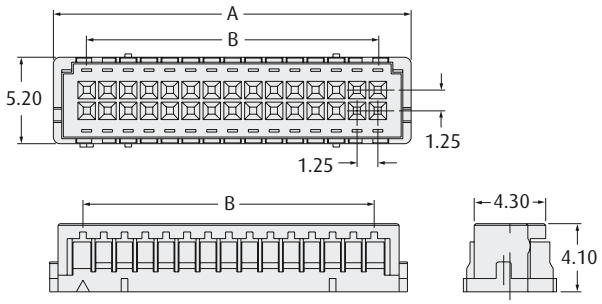
SINGLE ROW

CALCULATION	
A	B + 2.9
B	1.25 x (No. of ways per row – 1)

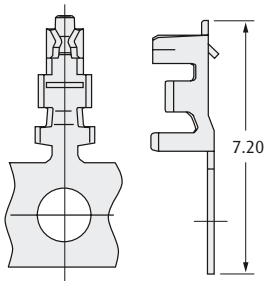


DOUBLE ROW

CALCULATION	
A	B + 4.0
B	1.25 x (No. of ways per row – 1)



CONTACTS



TYPE	AWG	ORDER CODE
Reeled	26 – 30	**M30-10000XX**
Loose	26 – 30	**M30-10100XX**

- **Order codes for reeled contacts refer to one reel of 20,000 contacts.**
- **Order codes for loose contacts refer to one strip of 100 contacts.**

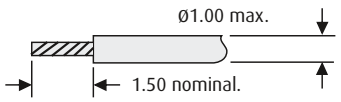
TOOLS

Hand Crimp Tool – Z30-020

See page 90

- **Instruction sheets available at www.harwin.com/downloads/instructions**

WIRE STRIPPING DETAILS



HOW TO ORDER

M30 – 1 XX XX XX

SERIES CODE

TYPE	
00	Reeled contact
01	Loose contact
10	Single Row Housing
20	Double Row Housing

NO. OF WAYS PER ROW	
02 to 15	Single Row Housing
10, 15, 20, 21	Double Row Housing
00	Contacts

FINISH	
00	Housings
46	Tin (Contacts)

www.harwin.com

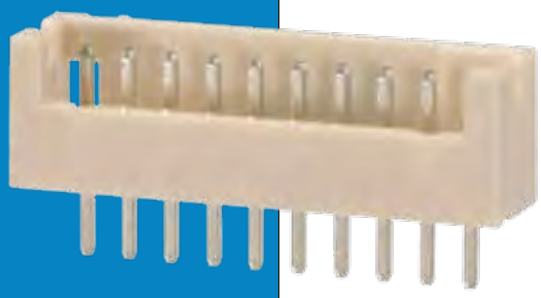
All dimensions in mm.

M30 Connectors

Male Vertical PC tail

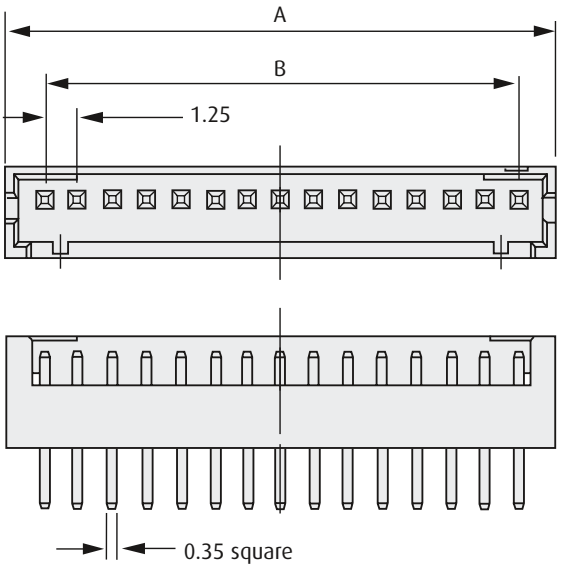
A range of 1.25mm pitch male and female connectors, for cable-to-board applications.

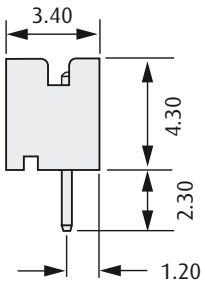
- Shrouded male connector.
- Suitable for use with female crimp connectors shown on page 87.

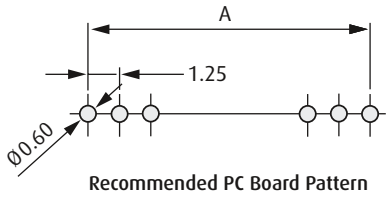


SINGLE ROW

CALCULATION	
A	B + 2.9
B	1.25 x (No. of ways per row - 1)







Recommended PC Board Pattern

HOW TO ORDER

M30 – 610 XX XX

SERIES CODE

NO. OF WAYS PER ROW

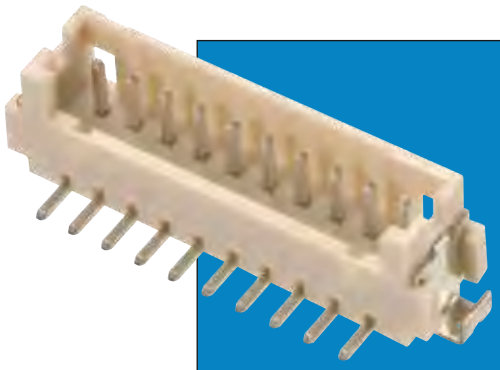
02 to 15

FINISH	
46	Tin

All dimensions in mm.

www.harwin.com

HARWiN

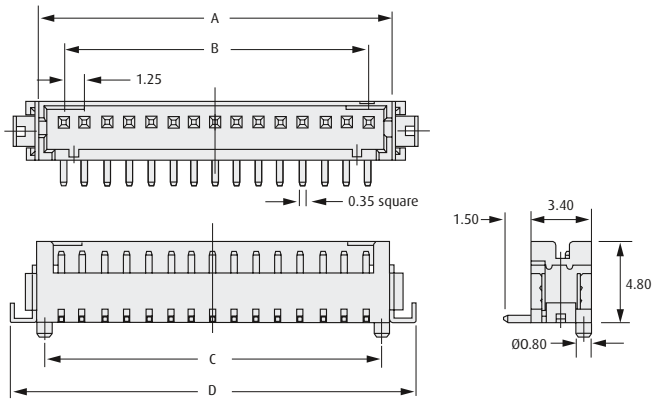


M30 Connectors

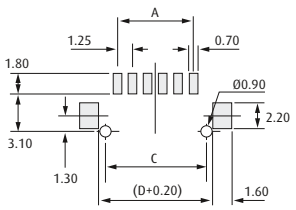
Male Vertical Surface Mount

- SMT, metal solder-down tabs.
- Suitable for use with connectors shown on page 87.
- Locating pegs to ensure correct positioning onto the board.

SINGLE ROW

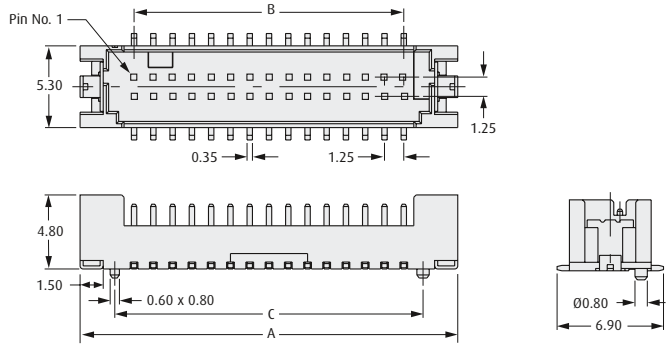


CALCULATION	
A	B + 2.9
B	1.25 x (No. of ways per row – 1)
C	B + 2.1
D	B + 5.9

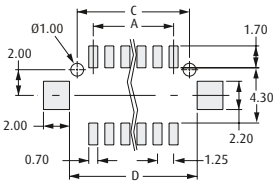


Recommended PC Board Pattern

DOUBLE ROW



CALCULATION	
A	B + 7.0
B	1.25 x (No. of ways per row – 1)
C	B + 2.5
D	B + 3.7



Recommended PC Board Pattern

HOW TO ORDER

M30 – 60 X XX XX

SERIES CODE

TYPE	
0	Single Row
1	Double Row

NO. OF WAYS PER ROW	
02 to 15	Single Row
10, 15, 20, 21	Double Row

FINISH	
46	Tin

www.harwin.com

All dimensions in mm.

Tools and Accessories

For loose contacts. Hand tool has a fixed ratchet cycle to ensure correct crimp form for repeatable use.

- Instruction sheet available at: www.harwin.com/downloads/instructions.
- For use with M30-101 contacts, see page 87.

HAND CRIMP TOOL

ORDER CODE
Z30-020

Materials

Mouldings:	High Temperature Plastic UL94V-0
Contacts:	Copper Alloy
Finish:	M50-3XX: Gold on contact area, Tin on tails M50-4XX: Gold

Electrical

Current rating:	1A per contact
Voltage rating:	150V AC
Voltage proof:	500V AC
Contact resistance:	40 mΩ max.
Insulation resistance:	1000 MΩ min.

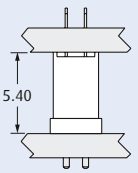
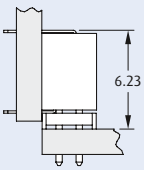
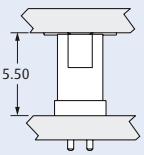
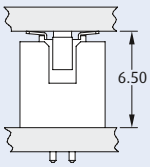
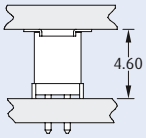
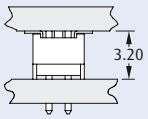
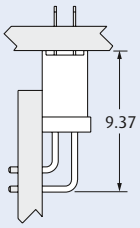
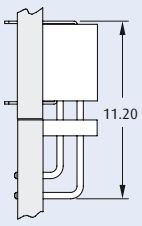
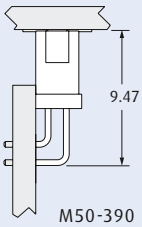
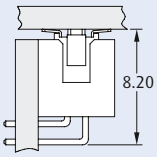
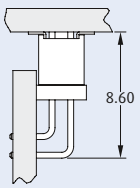
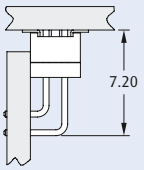
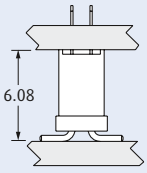
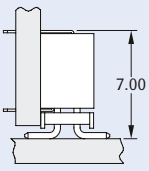
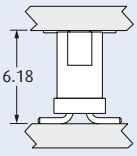
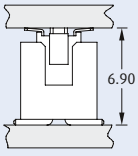
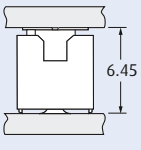
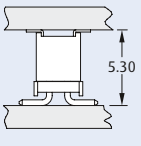
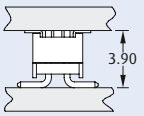
All preferred sizes of this range are held in stock.
Check www.harwin.com for availability.

Environmental

Operating temperature:	-40°C to +105°C
Solderability:	260°C for 3 seconds
Soldering heat resistance:	260°C for 5 seconds

Mechanical

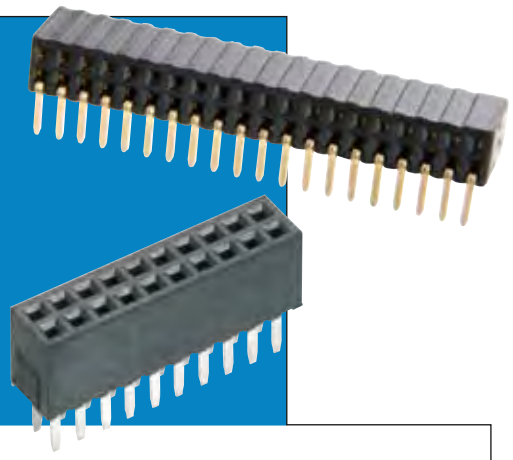
Durability:	M50-315: 600 operations M50-300, 311: 50 operations M50-4XX: 300 operations M50-3XX male: 600 operations
Insertion force (max.):	M50-3XX: 2.0N per contact M50-4XX: 0.6N per contact
Withdrawal force (min.):	M50-3XX: 0.3N per contact M50-4XX: 0.1N per contact
Vibration sensitivity:	10 – 55Hz, 1.5mm, 6 hours duration
Shock severity:	490m/s² (50G) for 11 ms

MALE	FEMALE						
	VERTICAL PC TAIL	HORIZONTAL PC TAIL	VERTICAL SMT	VERTICAL SMT Single polarised	VERTICAL SMT Double polarised	VERTICAL SMT Low Profile	
	DIL	DIL	DIL	DIL	DIL	DIL	DIL
VERTICAL PC TAIL	M50-300  M50-350	M50-320  M50-350	M50-310 M50-311  M50-350	M50-430  M50-470	Contact technical@ harwin.com	M50-312  M50-350	M50-315  M50-350
HORIZONTAL PC TAIL	M50-300  M50-390	M50-320  M50-390	M50-310 M50-311  M50-390	M50-430  M50-480	Contact technical@ harwin.com	M50-312  M50-390	M50-315  M50-390
VERTICAL SMT	M50-300  M50-360	M50-320  M50-360	M50-310 M50-311  M50-390	M50-430  M50-490	M50-432  M50-492	M50-312  M50-360	M50-315  M50-360

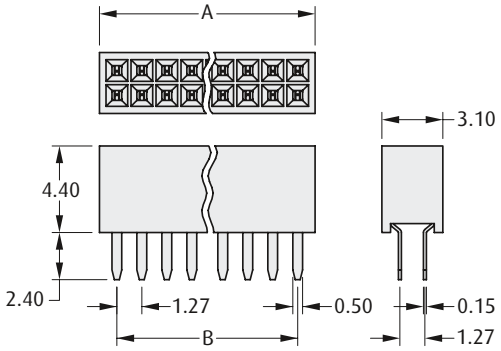
All dimensions in mm.

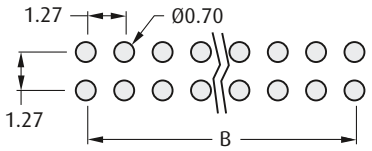
M50 Connectors
Female PC Tail

- A range of 1.27mm pitch female connectors, for vertical and horizontal board-to-board applications.
- Suitable for use with male connectors on pages 95 to 96.
- Horizontal connector has two point solder fixing for connector rigidity.



VERTICAL

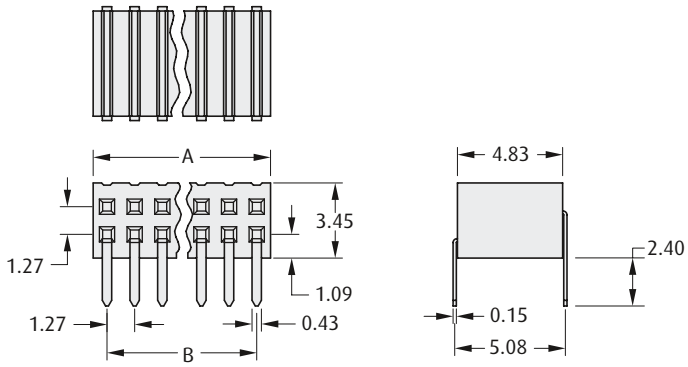


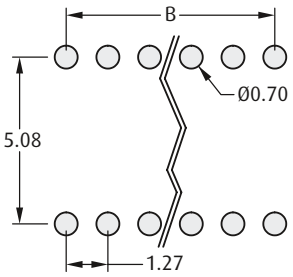


Recommended PC Board Pattern

CALCULATION	
A	B + 1.77
B	1.27 x (No. of ways per row – 1)

HORIZONTAL





Recommended PC Board Pattern

HOW TO ORDER

M50 – 3 X 0 XX 45

SERIES CODE

TYPE	
0	Vertical
2	Horizontal

NO. OF WAYS PER ROW	
03 to 50	Vertical
03 to 40	Horizontal

FINISH	
45	Gold (Pb)

All dimensions in mm.

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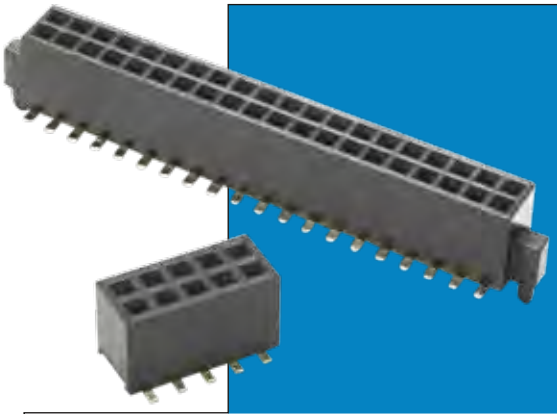
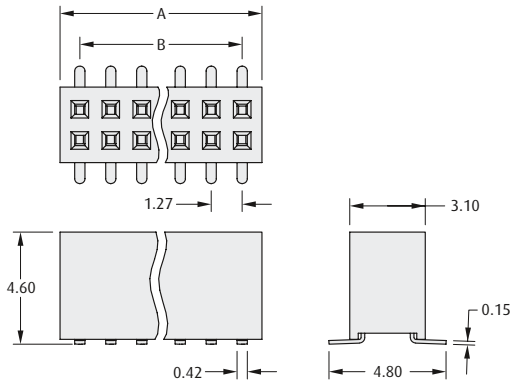


M50 Connectors

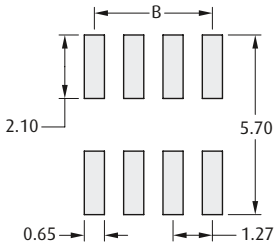
Female Vertical Surface Mount

- Locating pegs (posts) available to ensure correct positioning on the board.
- Suitable for use with male connectors on pages 95 to 96.
- Alternative height connectors available on page 94.

WITHOUT POST

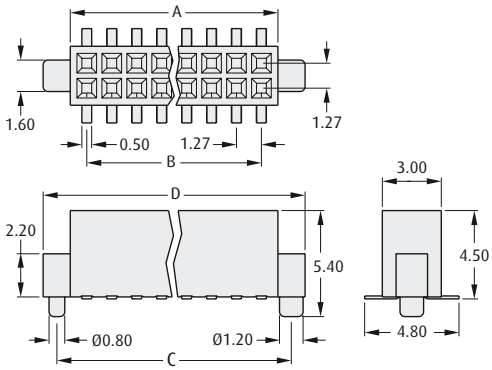


CALCULATION	
A	B + 1.62
B	1.27 x (No. of ways per row – 1)

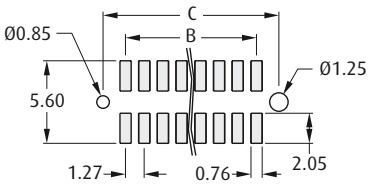


Recommended PC Board Pattern

WITH POST



CALCULATION	
A	B + 1.67
B	1.27 x (No. of ways per row – 1)
C	B + 3.04
D	B + 4.43



Recommended PC Board Pattern

HOW TO ORDER

M50 – 31 X XX XX

SERIES CODE

TYPE	
0	Without Posts
1	With Posts

NO OF WAYS PER ROW	
03 to 50	Without Posts
05 to 12, 15, 20, 25, 30, 35, 40, 45, 50	With Posts

FINISH	
42	Gold + Tin (M50-311)
45	Gold (M50-310)

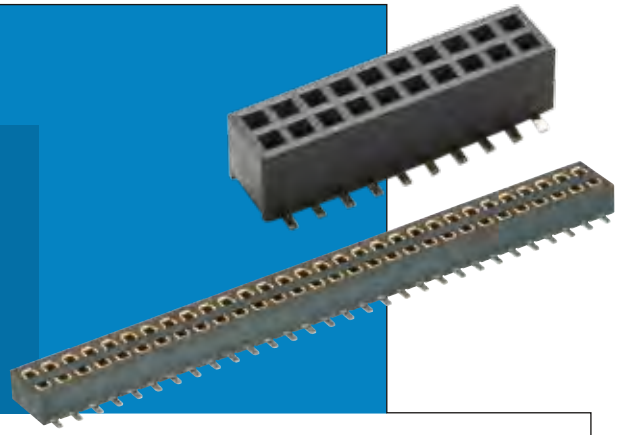
www.harwin.com

All dimensions in mm.

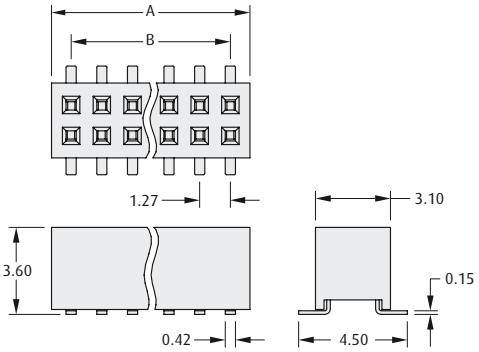
M50 Connectors

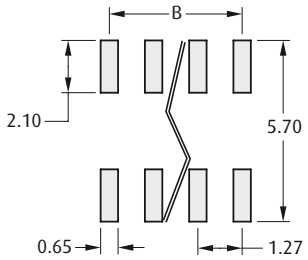
Female Vertical Surface Mount, Low Profile

- Suitable for use with male connectors on pages 95 to 96.
- Locating pegs (posts) available to ensure correct positioning on the board.
- Dual entry connector can be used as either top or bottom entry.



3.6mm HIGH WITHOUT POSTS

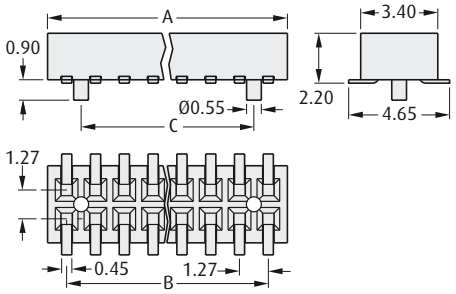


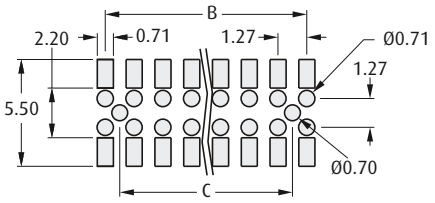


Recommended PC Board Pattern

CALCULATION	
A	B + 1.73
B	1.27 x (No. of ways per row – 1)

2.2mm HIGH WITH POSTS, DUAL ENTRY





Recommended PC Board Pattern

CALCULATION	
A	B + 1.67
B	1.27 x (No. of ways per row – 1)
C	B – 1.27

HOW TO ORDER

M50 – 31 X XX XX

SERIES CODE

TYPE	
2	3.6mm High without posts
5	2.2mm high with posts, dual entry

FINISH	
42	Gold + Tin (M50-315)
45	Gold (M50-312)

NO OF WAYS PER ROW	
03 to 50	M50-312
03 to 50	M50-315

All dimensions in mm.

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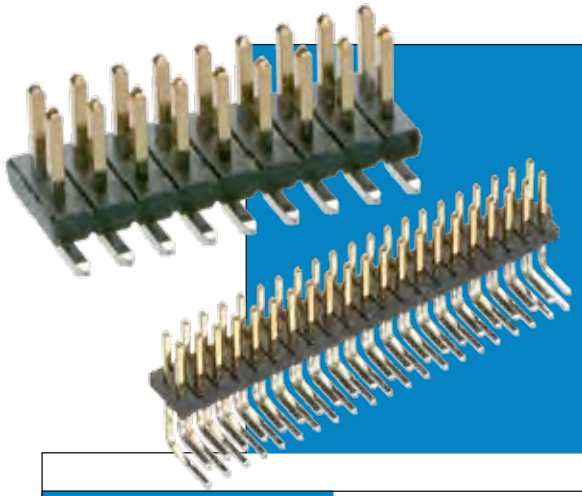
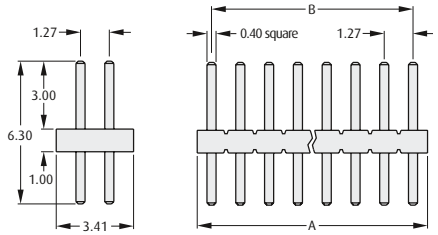


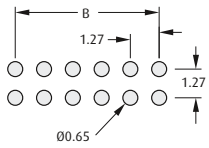
M50 Connectors

Male Vertical & Horizontal

- Suitable for use with female connectors on pages 92 to 94.
- Also available with variable dimensions, see page 96.
- Additional number of ways available on request.

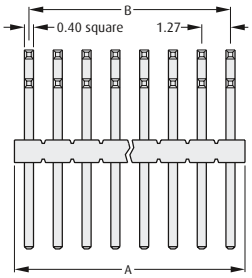
VERTICAL PC TAIL

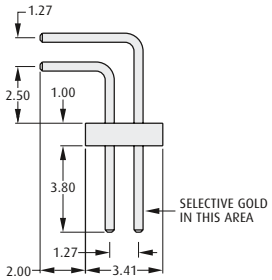


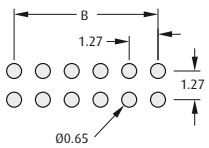


Recommended PC Board Pattern

HORIZONTAL PC TAIL



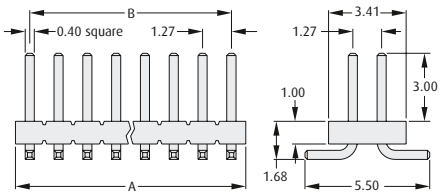


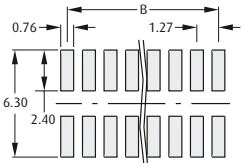


Recommended PC Board Pattern

CALCULATION	
A	1.27 x No. of ways per row
B	1.27 x (No. of ways per row – 1)

VERTICAL SMT





Recommended PC Board Pattern

HOW TO ORDER

M50 – 3 X 0 XX 42

SERIES CODE

TYPE	
5	Vertical PC Tail
6	Vertical SMT
9	Horizontal PC Tail

FINISH	
42	Gold + Tin

NO OF WAYS PER ROW

05 to 12, 15, 20, 25, 30, 35, 40, 45, 50

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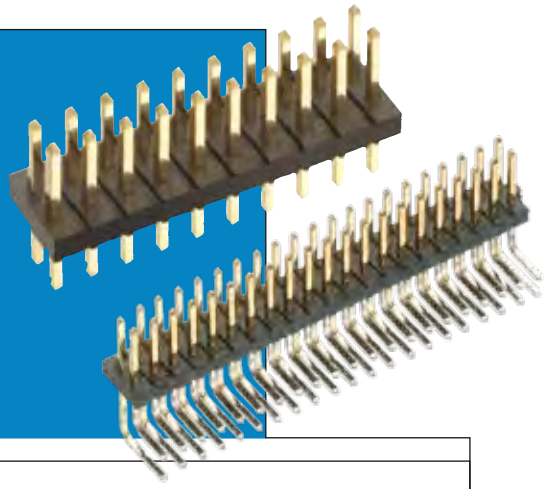
All dimensions in mm.

M50 Connectors
Pin Header Variants

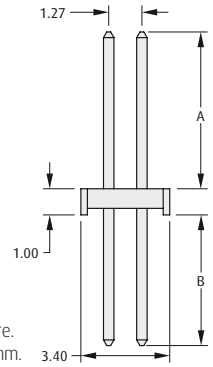


- Harwin offers the ultimate flexibility 'Standard Variant Pin Headers'. Use the order code below to create application-specific connectors.
- Contact technical@harwin.com for further information.
- Suitable for use with female connectors on pages 92 to 94.

TERMINATION STYLES

Vertical PC Tail

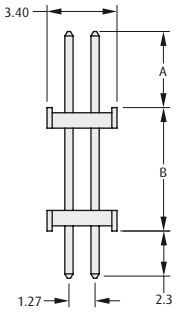
W SERIES



Pin section is 0.40mm square.
PCB mounting hole is Ø0.70mm.

Extended PC Tail

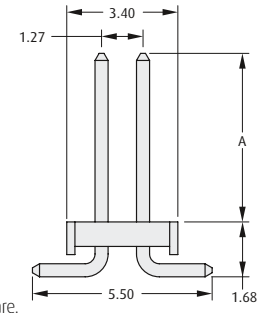
F SERIES



Pin section is 0.40mm square.
PCB mounting hole is Ø0.70mm.

Vertical SMT

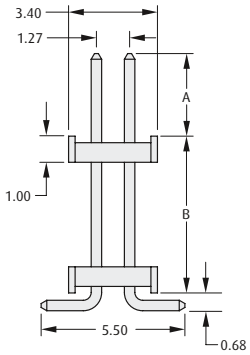
S SERIES



Pin section is 0.40mm square.
For PCB pad layout see page 93.
B dimension is '0'.

Extended SMT

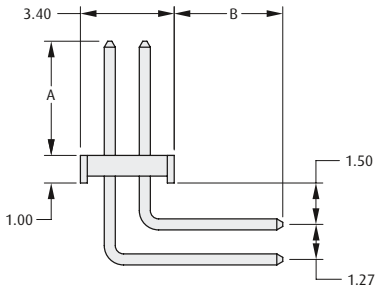
T SERIES



Pin section is 0.40mm square.
For PCB pad layout see page 93.

Horizontal PC Tail

J SERIES



Pin section is 0.40mm square.
PCB mounting hole is Ø0.70mm.

HOW TO ORDER

M50 - XXX XXX X XX 45

SERIES CODE

DIMENSION A
Eg. 7.8mm = 078

DIMENSION B
Eg. 5.0mm = 050

DOUBLE ROW	
W	Vertical PC Tail
F	Extended PC Tail
S	Vertical SMT
T	Extended SMT
J	Horizontal PC Tail

NO. OF WAYS PER ROW
02 to 40

FINISH	
45	Gold

All dimensions in mm.

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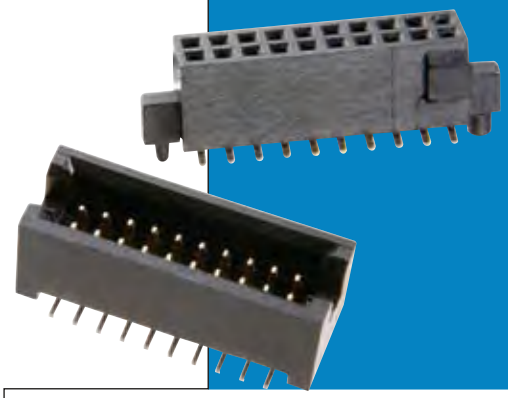
HARWiN

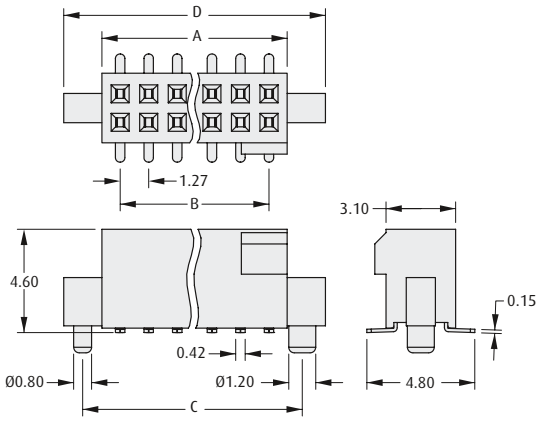


M50 Connectors

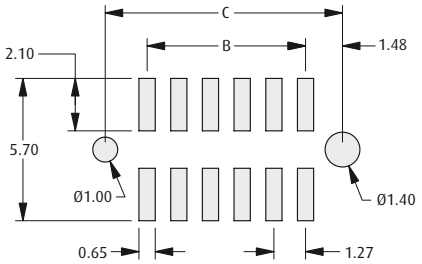
Vertical Surface Mount, Single Polarised

- Mating connectors in Surface Mount format.
- Female connector is also suitable for use with male connectors on page 98.
- Single Polarisation to prevent mis-mating.
- Female connector has locating pegs to ensure correct positioning on the board.
- Shrouded for additional pin protection.

FEMALE

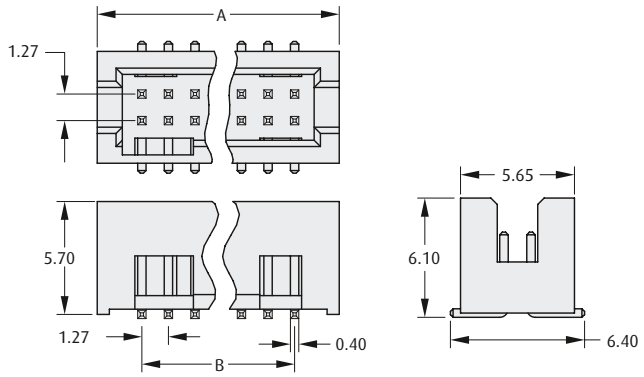


CALCULATION	
A	B + 1.62
B	1.27 x (No. of ways per row – 1)
C	B + 3.15
D	B + 5.02

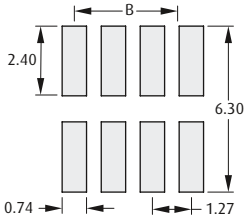


Recommended PC Board Pattern

MALE



CALCULATION	
A	B + 4.47
B	1.27 x (No. of ways per row – 1)



Recommended PC Board Pattern

HOW TO ORDER

M50 – 4 X 0 XX 45

SERIES CODE

TYPE	
3	Female
9	Male

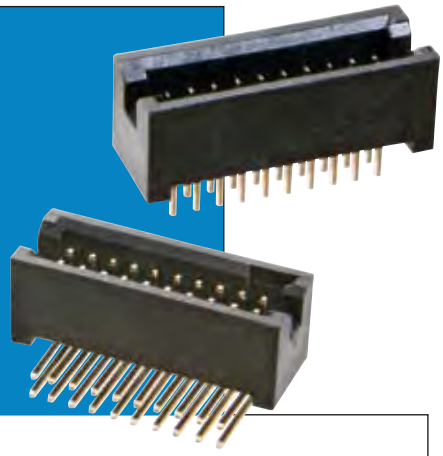
NO OF WAYS PER ROW	
03 to 50	Female
05 to 50	Male

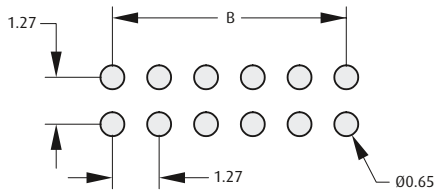
FINISH	
45	Gold

All dimensions in mm.

M50 Connectors
Male PC Tail, Single Polarised

- PC Tail male connectors suitable for use with female connector M50-430 (page 97).
- Single polarisation to prevent mis-mating.
- Shrouded for additional pin protection.

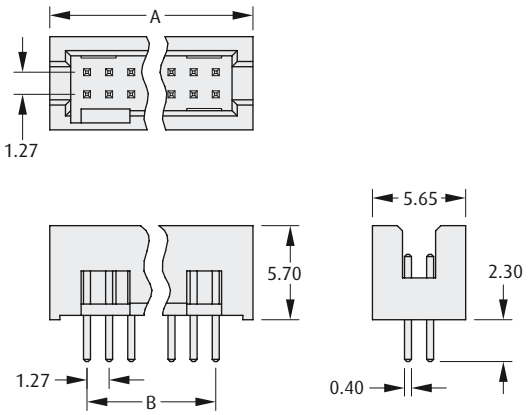




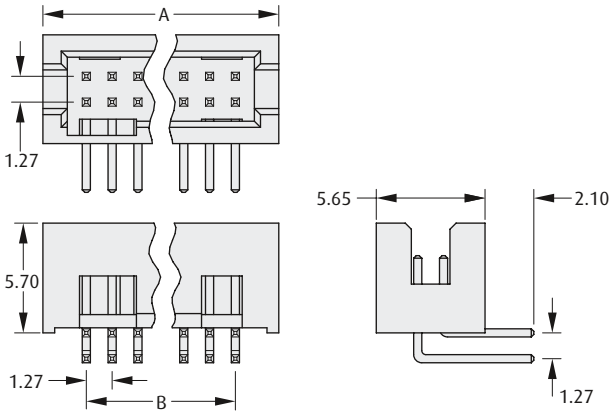
Recommended PC Board Pattern

CALCULATION	
A	B + 4.47
B	1.27 x (No. of ways per row – 1)

VERTICAL



HORIZONTAL



HOW TO ORDER

M50 – 4 X 0 XX 45

SERIES CODE

TYPE	
7	Vertical
8	Horizontal

NO OF WAYS PER ROW

05 to 40

FINISH	
45	Gold (Pb)

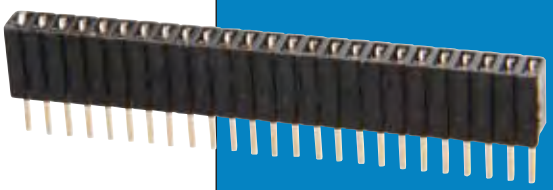
All dimensions in mm.

www.harwin.com

HARWiN

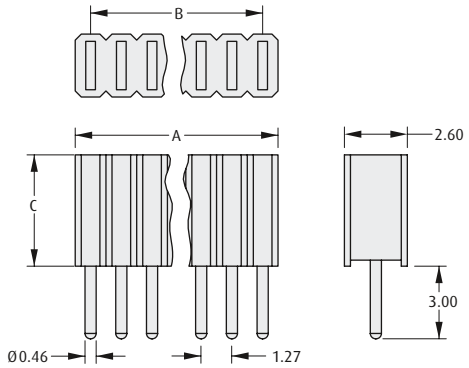
M52 Connectors

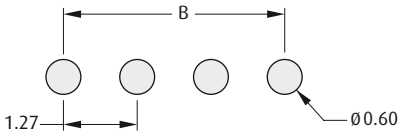
Female Vertical PC Tail



- A range of 1.27mm x 2.54mm male and female connectors, for vertical and horizontal board-to-board applications.
- Choice of connector height.
- Suitable for use with male pin header variants on page 101.

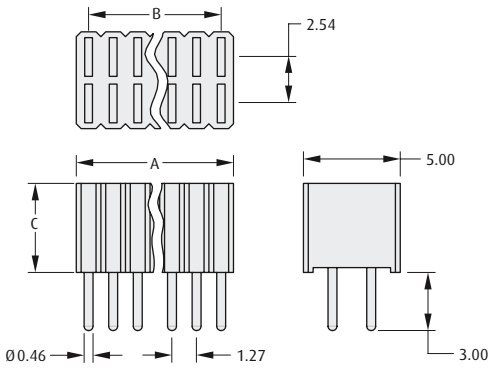
SINGLE ROW

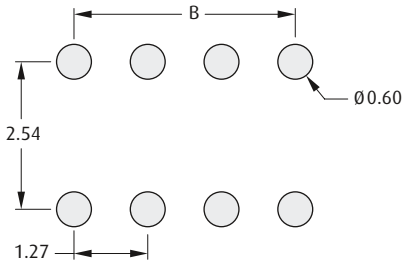




Recommended PC Board Pattern

DOUBLE ROW





Recommended PC Board Pattern

CALCULATION	
A	1.27 x No. of ways per row
B	1.27 x (No. of ways per row – 1)

HOW TO ORDER

M52 – 5 X X XX 45

SERIES CODE

NO. OF ROWS	
0	Single Row
1	Double Row

HEIGHT	
0	C = 4.6mm
1	C = 8.5mm

NO. OF WAYS PER ROW	
03 to 40	Single Row
03 to 50	Double Row

FINISH	
45	Gold

www.harwin.com

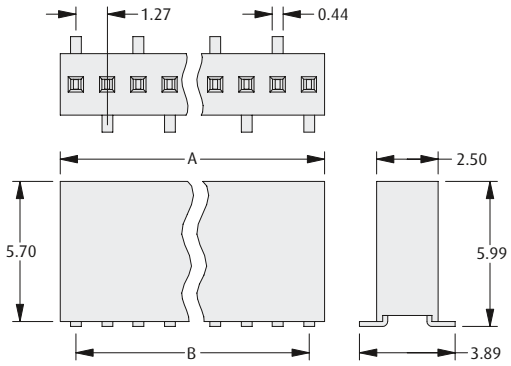
All dimensions in mm.

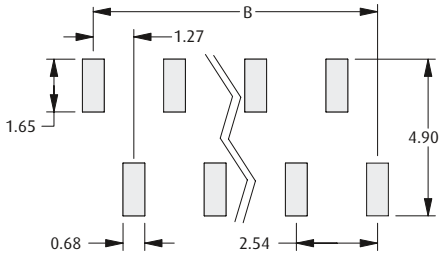
M52 Connectors

Female Vertical Surface Mount

- Suitable for use with male pin header variants on page 101.
- Twin beam contact for cost-effective reliability.
- Tape and reel option available. Contact technical@harwin.com.

SINGLE ROW

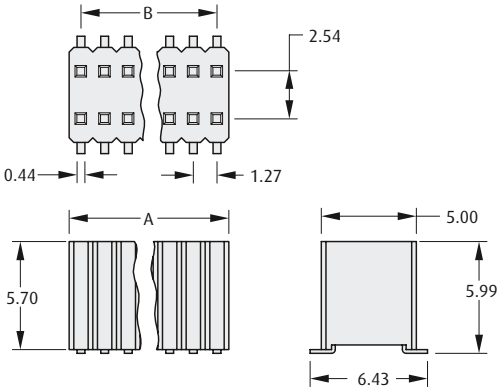


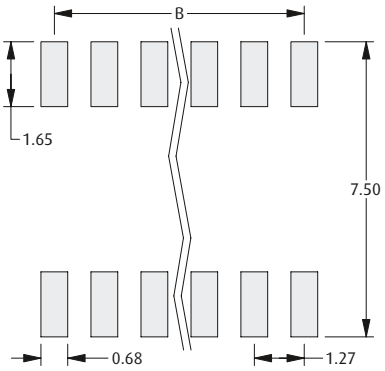


Recommended PC Board Pattern

CALCULATION	
A	B + 1.67
B	1.27 x (No. of ways per row – 1)

DOUBLE ROW





Recommended PC Board Pattern

HOW TO ORDER

M52 – 5 X 5 XX 45

SERIES CODE

NO. OF ROWS	
0	Single Row
1	Double Row

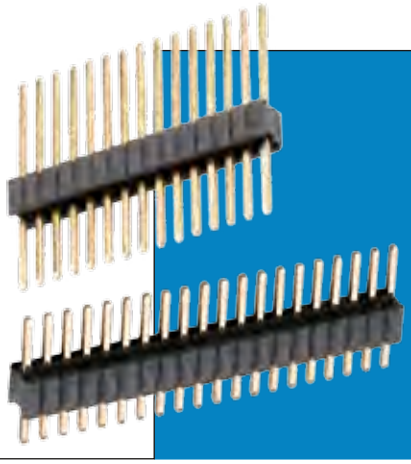
NO. OF WAYS PER ROW
03 to 50

FINISH	
45	Gold (PG)

All dimensions in mm.

www.harwin.com

HARWiN



M52 Connectors

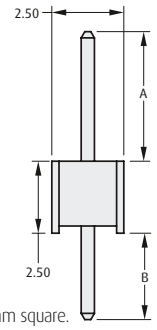
Pin Header Variants

- Harwin offers the ultimate flexibility 'Standard Variant Pin Headers'. Use the order code below to create application-specific connectors.
- Contact technical@harwin.com for further information.
- Suitable for use with female connectors on pages 99 to 100.

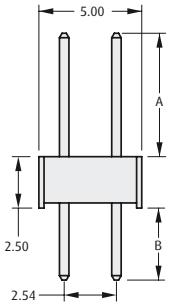
TERMINATION STYLES

Vertical PC Tail

V SERIES



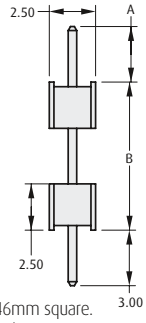
W SERIES



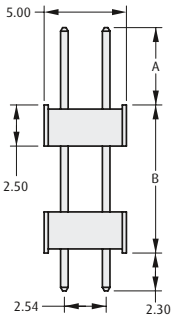
Pin section is 0.46mm square.
PCB mounting hole is Ø0.75mm.

Extended PC Tail

E SERIES



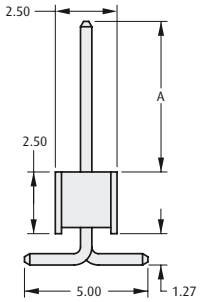
F SERIES



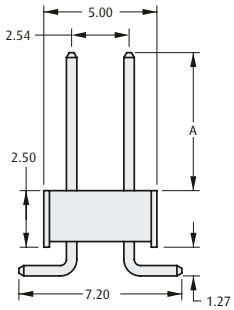
Pin section is 0.46mm square.
PCB mounting hole is Ø0.75mm.

Vertical SMT

P SERIES



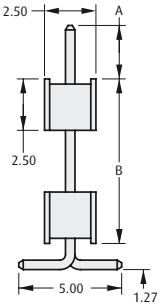
S SERIES



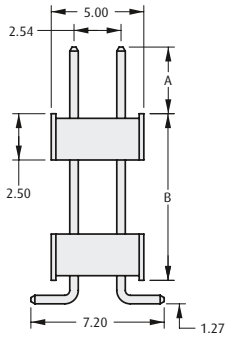
B dimension is 0.00mm.
Pin section is 0.46mm square.

Extended SMT

R SERIES



T SERIES



Pin section is 0.46mm square.

HOW TO ORDER

M52 – XXX XXX X XX 45

SERIES CODE

DIMENSION A
Eg. 7.8mm = 078

DIMENSION B
Eg. 5.0mm = 050

FINISH	
45	Gold

NO. OF WAYS PER ROW
02 to 40

SINGLE ROW	DOUBLE ROW	
V	W	Vertical
E	F	Extended
P	S	SMT
R	T	Extended SMT

All dimensions in mm.

M22 Connectors

SPECIFICATION

Materials

Mouldings:	Standard or High Temperature Plastic, UL94V-0
Contacts:	Male: Copper alloy Female: Phosphor Bronze Jumper sockets: Beryllium Copper
Finish:	See individual pages

Electrical

Current rating:	2A per single contact, 1A all contacts
Voltage rating:	250V AC/DC
Voltage proof:	650V AC
Contact resistance:	30 mΩ max.
Insulation resistance:	100 MΩ min.

All preferred sizes of this range are held in stock.
Check www.harwin.com for availability.

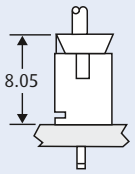
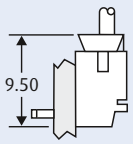
Environmental

Temperature Classification:	-40/+105/21 days 95% RH
Operating Temperature	-40ºC to 105ºC
Solderability:	235°C for 5 seconds
Soldering heat resistance:	SMT: 260°C for 5 seconds

Mechanical

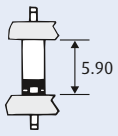
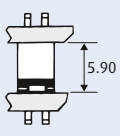
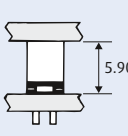
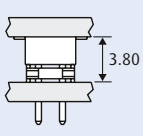
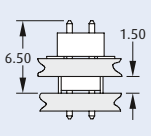
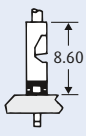
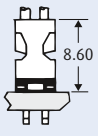
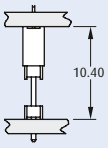
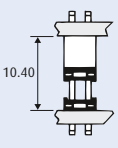
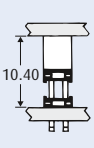
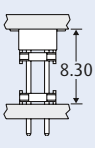
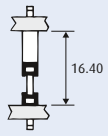
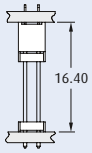
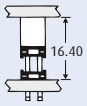
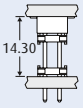
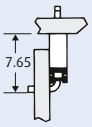
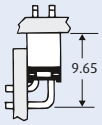
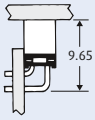
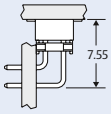
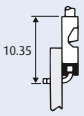
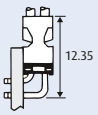
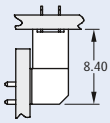
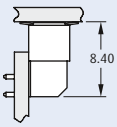
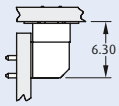
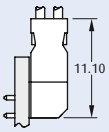
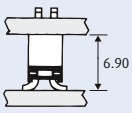
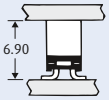
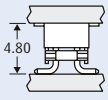
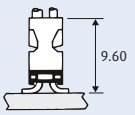
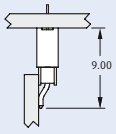
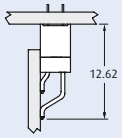
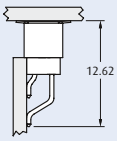
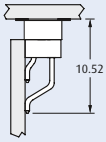
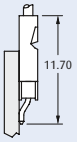
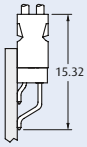
Durability:	Gold finish: 300 operations Tin finish: 50 operations
Insertion force (max.):	Female: 2.0N per contact Jumper sockets: 4.5N total
Withdrawal force (min.):	Female: 0.2N per contact Jumper sockets: 0.6N total
Vibration sensitivity:	10 – 55Hz, 1.5mm, 6 hours duration
Shock severity:	490m/s² (50G) for 11 ms

MATING PROFILES

FEMALE / MALE	CRIMP
Vertical PC Tail	M22-307  M22-220
Horizontal PC Tail	M22-307  M22-221

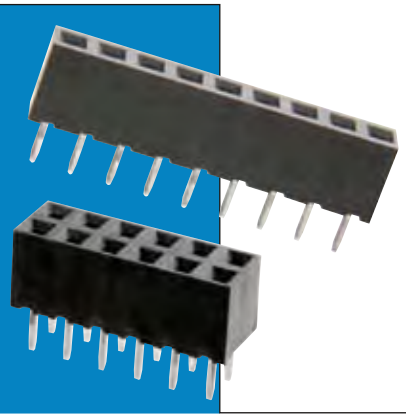
Latching product from pages 108 and 112 – further mating configurations are shown on the following page.

All dimensions in mm.

FEMALE / MALE	VERTICAL PC TAIL		VERTICAL SMT	VERTICAL SMT LOW PROFILE	VERTICAL SMT BOTTOM ENTRY	CRIMP	
	SIL	DIL	DIL	DIL	DIL	SIL	DIL
VERTICAL PC TAIL	M22-713  M22-251	M22-714  M22-252	M22-634  M22-252	M22-636  M22-252	M22-636  M22-258	M22-301  M22-251	M22-302  M22-252
VERTICAL EXTENDED PC TAIL (6mm STACK)	M22-713  M22-265	M22-714  M22-266	M22-634  M22-266	M22-636  M22-266	Contact: technical@ harwin.com	Contact: technical@ harwin.com	Contact: technical@ harwin.com
VERTICAL EXTENDED PC TAIL (12mm STACK)	M22-713  M22-267	M22-714  M22-268	M22-634  M22-268	M22-636  M22-268	Contact: technical@ harwin.com	Contact: technical@ harwin.com	Contact: technical@ harwin.com
HORIZONTAL PC TAIL	M22-713  M22-253	M22-714  M22-254	M22-634  M22-254	M22-636  M22-254	Contact: technical@ harwin.com	M22-301  M22-253	M22-302  M22-254
HORIZONTAL PC TAIL (STABLE MOULD)	Contact: technical@ harwin.com	M22-714  M22-241	M22-634  M22-241	M22-636  M22-241	Contact: technical@ harwin.com	Contact: technical@ harwin.com	M22-302  M22-241
VERTICAL SMT	Contact: technical@ harwin.com	M22-714  M22-532	M22-634  M22-532	M22-636  M22-532	Contact: technical@ harwin.com	Contact: technical@ harwin.com	M22-302  M22-532
HORIZONTAL SMT	M22-713  M22-533	M22-714  M22-543	M22-634  M22-543	M22-636  M22-543	Contact: technical@ harwin.com	M22-301  M22-533	M22-302  M22-543

All dimensions in mm.

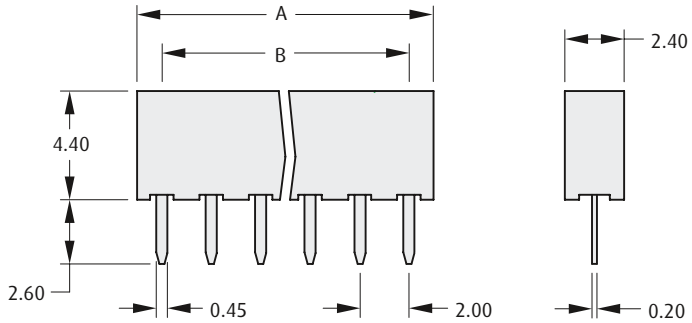
M22 Connectors
Female Vertical PC Tail

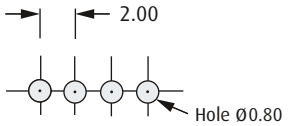


A range of 2mm pitch male and female connectors, with a variety of mating styles and finishes. For cable-to-board and board-to-board applications.

- Twin-leaf phosphor bronze contacts.
- Suitable for use with male connectors shown on pages 109 to 111 and 113 to 116.
- For Polarising Key use **order code M22-0340000**.

SINGLE ROW

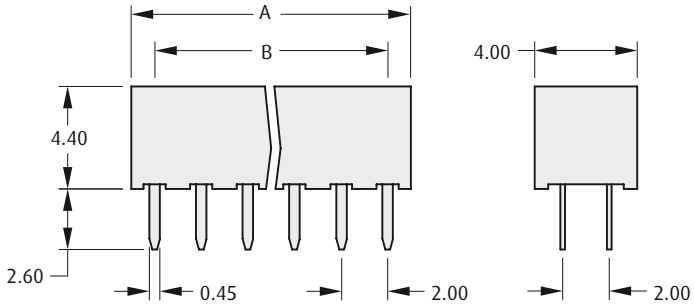


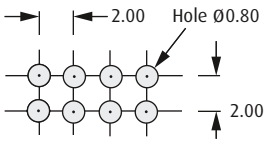


Recommended PC Board Pattern

CALCULATION	
A	2.00 x No. of ways per row
B	2.00 x (No. of ways per row – 1)

DOUBLE ROW





Recommended PC Board Pattern

HOW TO ORDER

M22 – 71 X XX XX

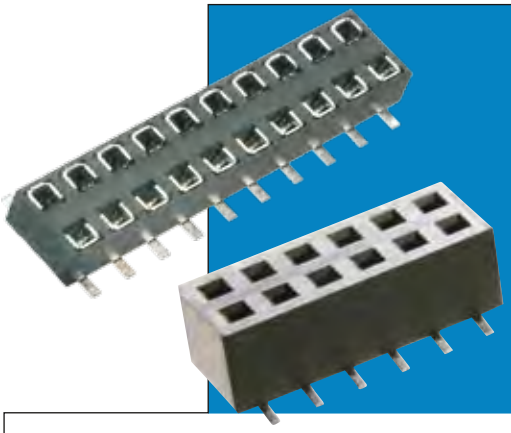
SERIES CODE

NO. OF ROWS	
3	Single Row
4	Double Row

FINISH	
42	Gold + Tin (PG)

NO. OF WAYS PER ROW
03 to 32

All dimensions in mm.



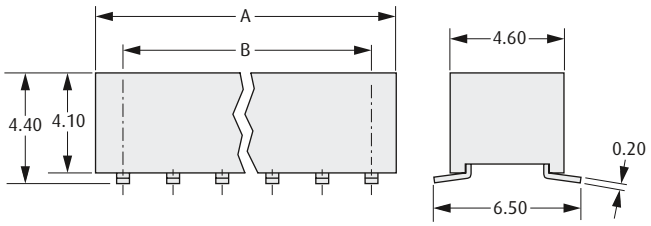
M22 Connectors

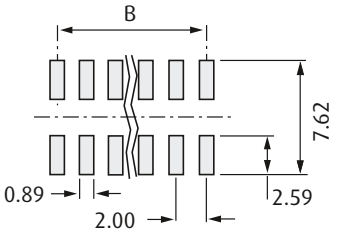
Female Vertical Surface Mount

- Dual entry socket can be used in either top or bottom entry applications and has locating pegs to ensure correct positioning onto the board.
- Suitable for use with male connectors shown on pages 109 to 111 and 113 to 116.
- Twin beam contact for cost-effective reliability.

SMT FEMALE – 4.40mm HEIGHT

CALCULATION	
A	B + 2.50
B	2.00 x (No. of ways per row – 1)

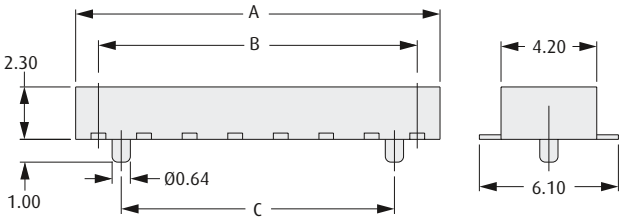


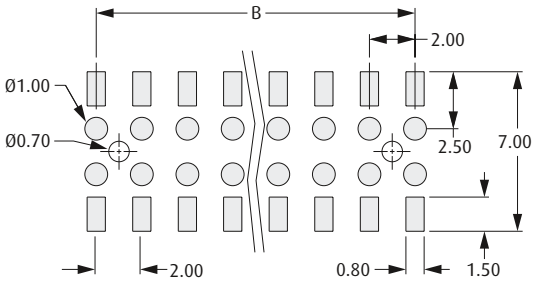


Recommended PC Board Patterns

DUAL ENTRY SMT FEMALE – 2.30mm HEIGHT

CALCULATION	
A	2.00 x No. of ways per row
B	2.00 x (No. of ways per row – 1)
C	B – 2.00





Recommended PC Board Patterns

HOW TO ORDER

M22 – 63 X XX XX

SERIES CODE

CONNECTOR TYPE	
4	4.4mm high
6	2.3mm high

FINISH		
42	Gold + Tin	Pb
46	Tin (M22-636 only)	Pb

NO. OF WAYS PER ROW
03 to 32

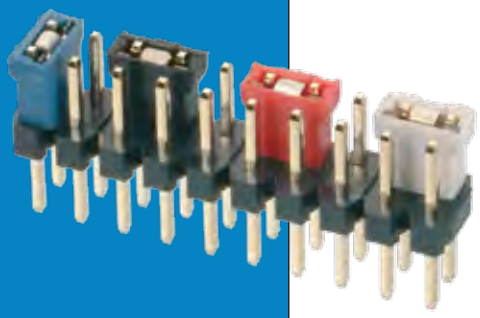
www.harwin.com

All dimensions in mm.

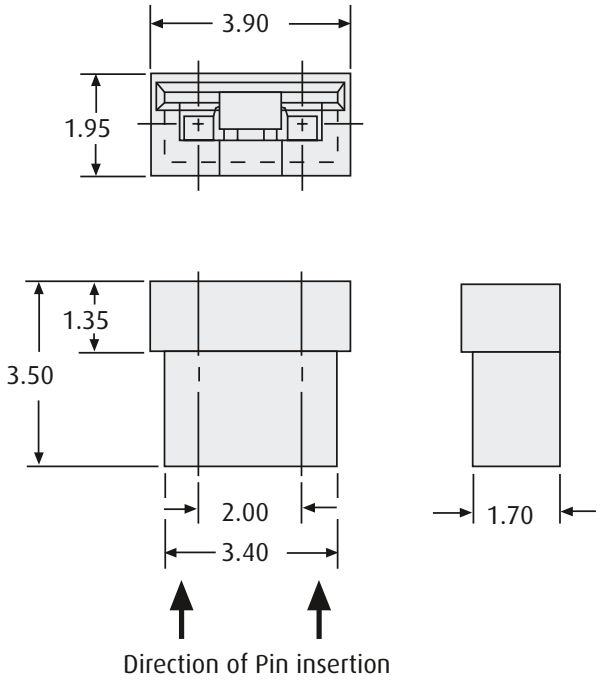
M22 Connectors

Jumper Socket Open Top

- Suitable for use with pin headers shown on pages 109 to 111 and 113 to 116.
- Can be fitted and removed by hand, giving an alternative on-board programming method to DIP switches.
- Open top for use with test probe.
- End and side stackable.
- Choice of colours available.



JUMPER SOCKET



HOW TO ORDER

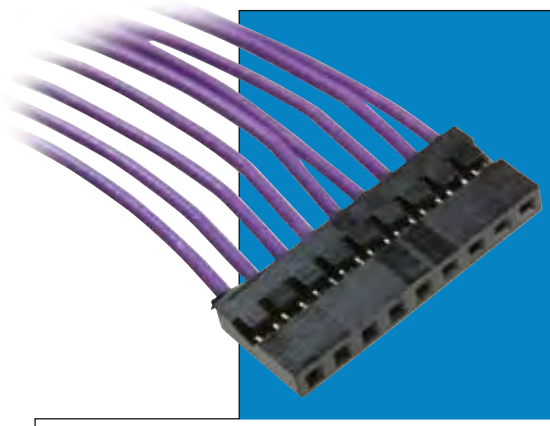
M22 – 19 X 00 XX

SERIES CODE

COLOUR	
0	Black
1	Blue
2	Red
3	Grey

FINISH	
05	Gold
46	Tin

All dimensions in mm.

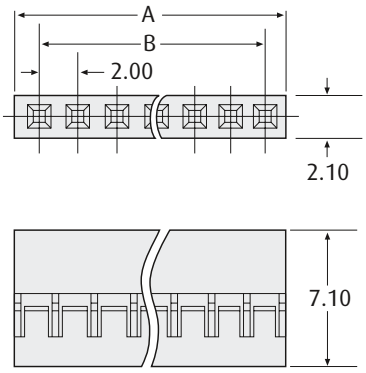


M22 Connectors

Female Crimp Housings and Contacts

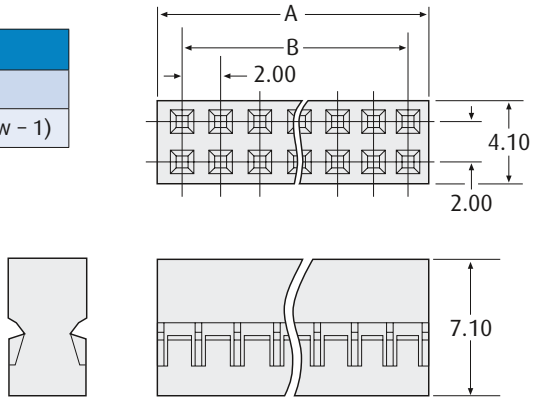
- Suitable for use with male connectors shown on pages 109 to 111 and 113 to 116.
- Twin-leaf phosphor bronze contacts, supplied loose or on reels, rear insertable into housing.
- For Polarising key use **order code M22-0340000.**
- Pre-crimped contacts and cable assembly service available, contact technical@harwin.com.

SINGLE ROW

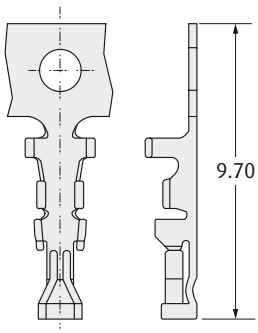


CALCULATION	
A	B + 2.40
B	2.00 x (No. of ways per row – 1)

DOUBLE ROW



CONTACTS



TYPE	AWG	ORDER CODE
Reeled	24 – 30	**M22-30400XX**
Loose	24 – 30	**M22-30500XX**

- Order codes for reeled contacts refer to one reel of 10,000 contacts.
- Order codes for loose contacts refer to one pack of 100 contacts.

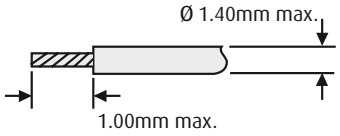
TOOLS

Hand Crimp Tool – Z22-020

See page 117

- Instruction sheets available at www.harwin.com/downloads/instructions

WIRE STRIPPING DETAILS



HOW TO ORDER

M22 – 30 X XX XX

SERIES CODE

TYPE	
1	Single Row Housing
2	Double Row Housing
4	Reeled Contacts
5	Loose Contacts

NO. OF WAYS PER ROW	
02 to 20	Housings
00	Contacts

FINISH		
00	Housings	Pb
42	Gold + Tin (Contacts)	Pb
46	Tin (Contacts)	Pb

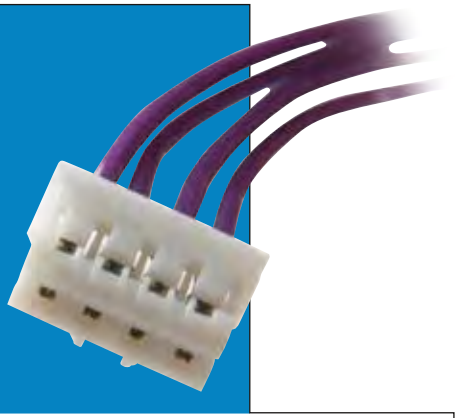
www.harwin.com

All dimensions in mm.

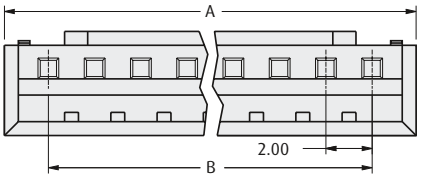
M22 Connectors

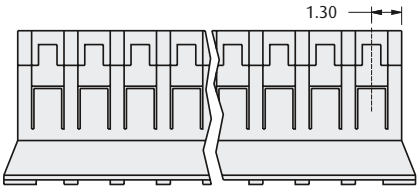
Latched Female Crimp Housing and Contacts

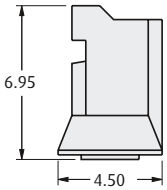
- Female crimp housings latch into male shrouded PC tail connectors.
- Pre-crimped contacts and cable assembly service available, contact technical@harwin.com.
- Mates with male connectors shown on page 112.



CRIMP HOUSING

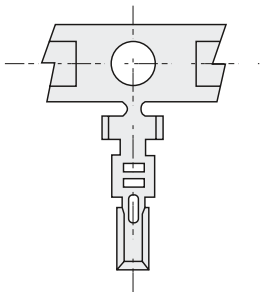


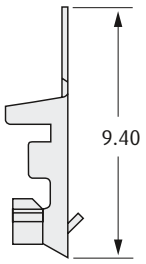




CALCULATION	
A	B + 3.80
B	2.00 x (No. of ways per row – 1)

CRIMP CONTACT





TYPE	AWG	ORDER CODE
Reeled	24 – 30	**M22-30600XX**
Loose	24 – 30	**M22-30800XX**

- Order codes for reeled contacts refer to one reel of 10,000 contacts.
- Order codes for loose contacts refer to one pack of 100 contacts.

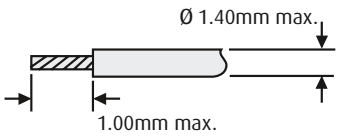
TOOLS

HAND CRIMP TOOL – Z22-020

See page 117

- Instruction sheets available at www.harwin.com/downloads/instructions

WIRE STRIPPING DETAILS



HOW TO ORDER

M22 – 30 X XX XX

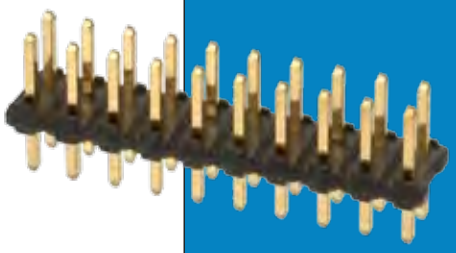
SERIES CODE

CONNECTOR TYPE	
6	Reeled Contact
7	Crimp Housing
8	Loose Contact

NO. OF WAYS PER ROW	
02 to 15	Housing
00	Contacts

FINISH	
00	Housing
46	Tin (Contacts)

All dimensions in mm.

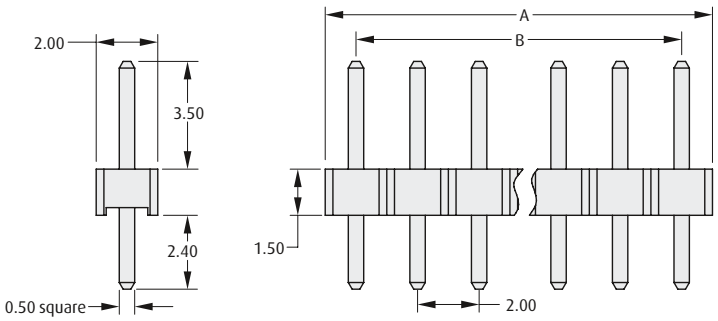


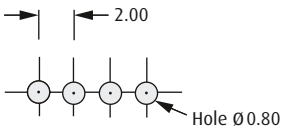
M22 Connectors

Male Vertical PC Tail

- Suitable for use with female connectors shown on pages 104 to 107.
- Pin headers can be cut into smaller sizes.
- For alternatives pin lengths, see pin header variants on page 116.
- Please contact technical@harwin.com for sizes above 25 ways per row, up to 50 ways per row.

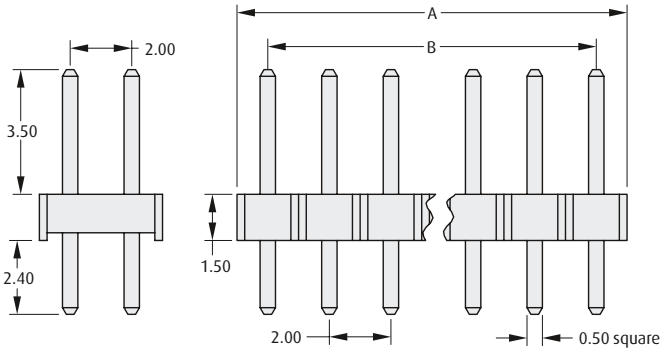
SINGLE ROW

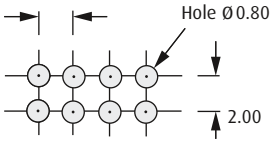




Recommended PC Board Pattern

DOUBLE ROW





Recommended PC Board Pattern

CALCULATION	
A	2.00 x No. of ways per row
B	2.00 x (No. of ways per row – 1)

HOW TO ORDER

M22 – 25 X XX XX

SERIES CODE

CONNECTOR TYPE

1	Single Row
2	Double Row

FINISH

05	Gold
46	Tin

NO. OF WAYS PER ROW

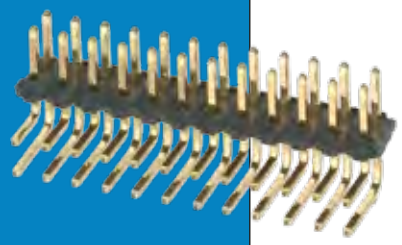
02 to 25

www.harwin.com

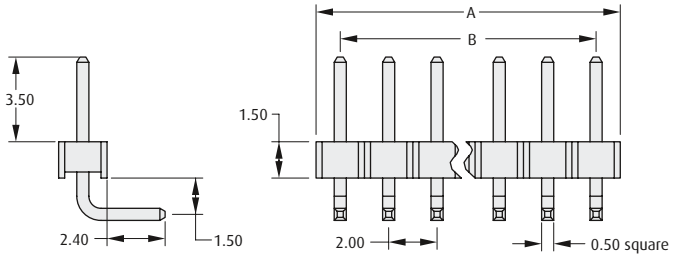
All dimensions in mm.

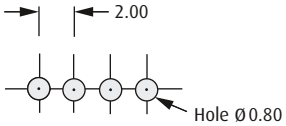
M22 Connectors
Male Horizontal PC Tail

- Suitable for use with female connectors shown on page 104 to 107.
- Pin headers can be cut into smaller sizes.
- For alternative pin lengths, see pin header variants on page 116.
- Please contact technical@harwin.com for sizes above 25 ways per row, up to 50 ways per row.



SINGLE ROW

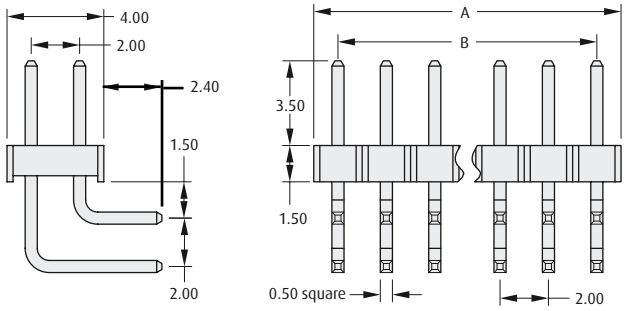


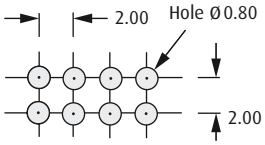


Recommended PC Board Pattern

CALCULATION	
A	2.00 x No. of ways per row
B	2.00 x (No. of ways per row – 1)

DOUBLE ROW





Recommended PC Board Pattern

HOW TO ORDER

M22 – 25 X XX XX

SERIES CODE

CONNECTOR TYPE	
3	Single Row
4	Double Row

NO. OF WAYS PER ROW

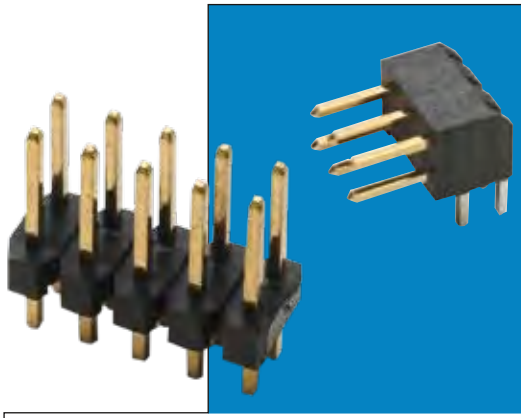
02 to 25

FINISH		
05	Gold	Pb
46	Tin	Pb

All dimensions in mm.

www.harwin.com

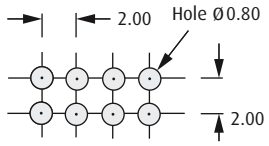
HARWiN



M22 Connectors

Male Vertical & Horizontal PC Tail

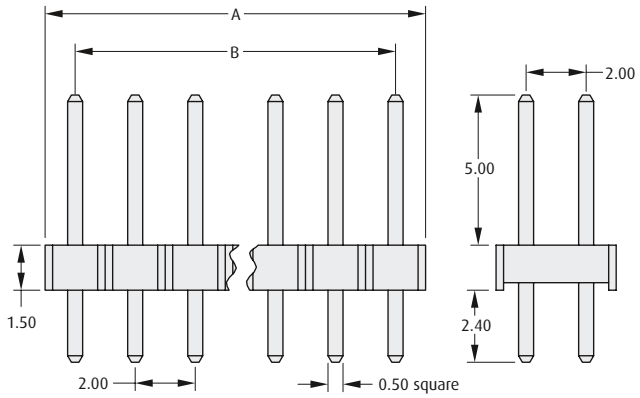
- Suitable for use with female connectors shown on pages 104 to 107.
- M22-258 can be cut into smaller sizes and is suitable for use with bottom entry sockets.
- Wide board footprint provides extra stability (M22-241).



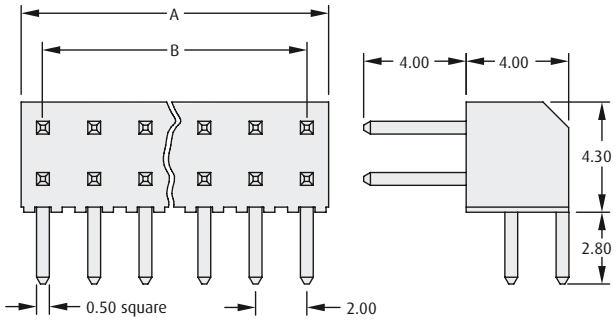
Recommended PC Board Pattern

CALCULATION	
A	2.00 x No. of ways per row
B	2.00 x (No. of ways per row – 1)

VERTICAL



HORIZONTAL



HOW TO ORDER

M22 – 2 XX XX XX

SERIES CODE

TYPE	
41	Horizontal
58	Vertical

NO. OF WAYS PER ROW	
02 to 25	Vertical
03 to 40	Horizontal

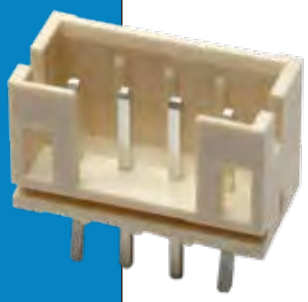
FINISH	
05	Gold (Vertical)
42	Gold & Tin (Horizontal)
46	Tin

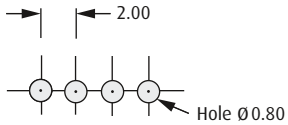
All dimensions in mm.

M22 Connectors

Latched Male PC Tail

- Shrouded connectors for added protection of male pins.
- Mates with female connectors shown on page 108.
- Female Crimp connector latches into both male connectors.

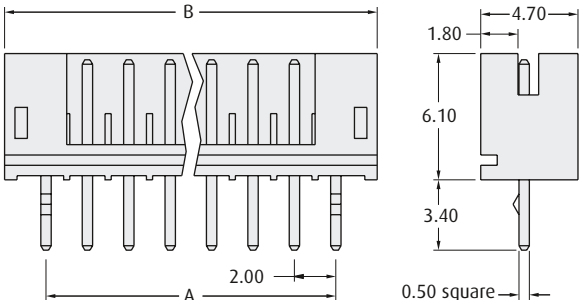




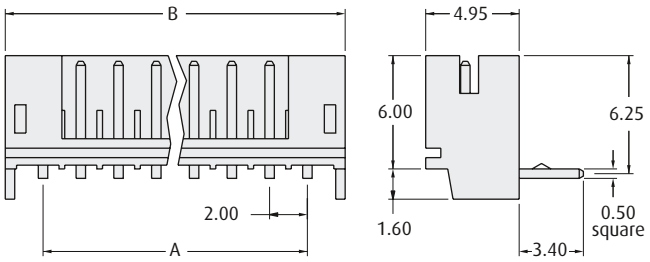
Recommended PC Board Pattern

CALCULATION	
A	2.00 x (No. of ways per row – 1)
B	A + 4.00

VERTICAL



HORIZONTAL



HOW TO ORDER

M22 – 22 X XX 46

SERIES CODE

TYPE	
0	Vertical
1	Horizontal

NO. OF WAYS PER ROW
02 to 15

FINISH	
46	Tin (P6)

All dimensions in mm.

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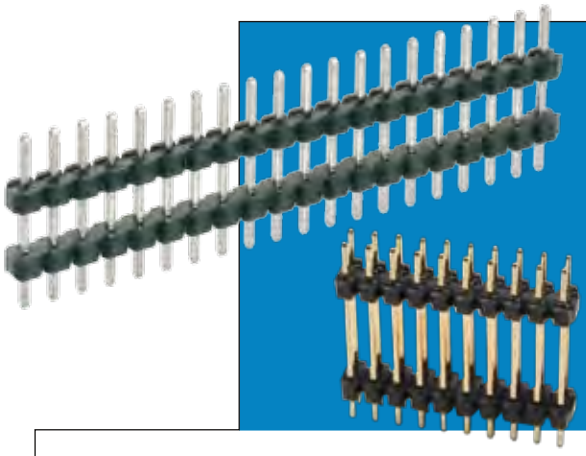
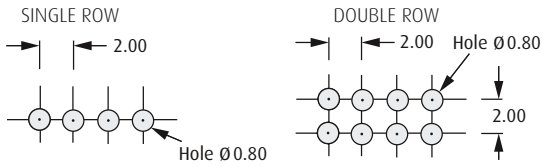


M22 Connectors

Male Vertical Extended PC Tail

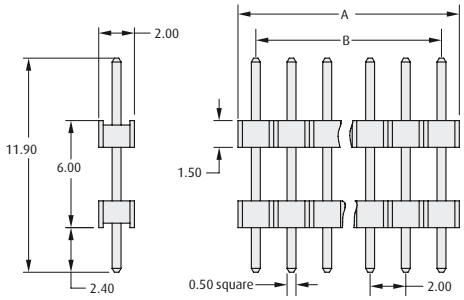
- Suitable for use with female connectors shown on pages 104 to 107.
- Un-shrouded pin headers can be cut into smaller sizes.
- For alternative pin lengths and stacking heights, see pin header variants on page 116.

CALCULATION	
A	2.00 x No. of ways per row
B	2.00 x (No. of ways per row – 1)

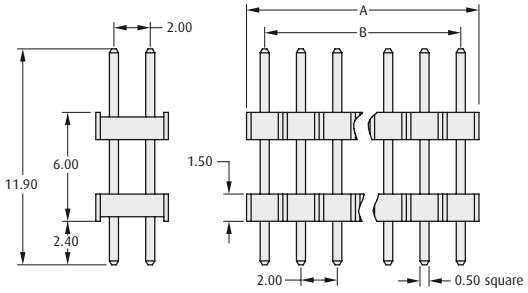


Recommended PC Board Patterns

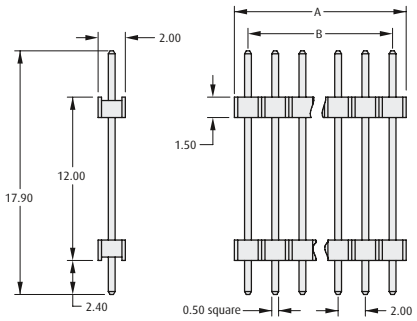
SINGLE ROW 6.0mm



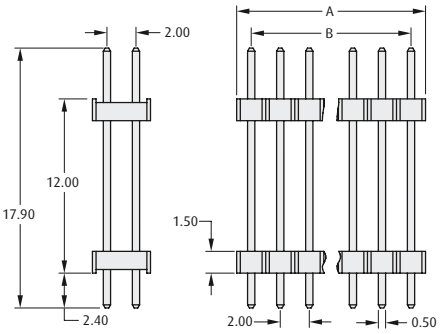
DOUBLE ROW 6.0mm



SINGLE ROW 12.0mm



DOUBLE ROW 12.0mm



HOW TO ORDER

M22 – 26 X XX XX

SERIES CODE

CONNECTOR TYPE	
5	Single Row 6mm Stack Height
6	Double Row 6mm Stack Height
7	Single Row 12mm Stack Height
8	Double Row 12mm Stack Height

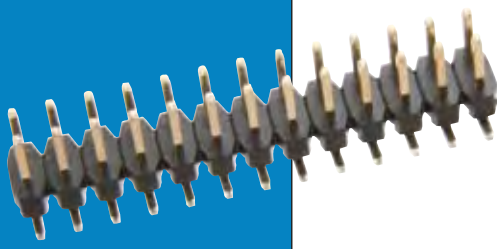
FINISH	
05	Gold (Pb)
46	Tin (Pb)

NO. OF WAYS PER ROW
02 to 25

All dimensions in mm.

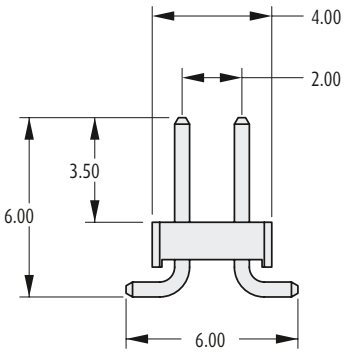
M22 Connectors
Male Vertical Surface Mount

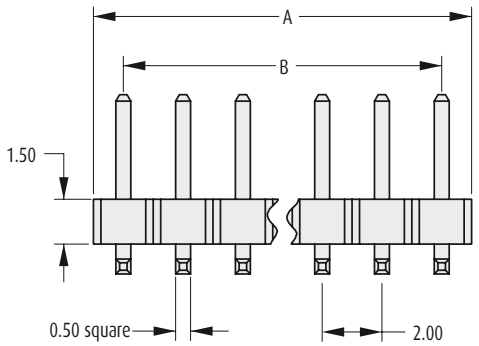
- Suitable for use with female connectors shown on pages 104 to 107.
- Un-shrouded pin headers can be cut into smaller sizes.
- For alternative pin lengths see pin header variants on page 116.
- For pick and place cap and packed in tube – add P to the end of the part number.
- For pick and place cap in tape & reel packaging – add R to the end of the part number.

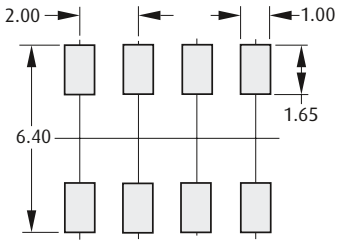


DOUBLE ROW

CALCULATION	
A	2.00 x No. of ways per row
B	2.00 x (No. of ways per row – 1)







Recommended PC Board Pattern

HOW TO ORDER

M22 – 532 XX XX

SERIES CODE

NO. OF WAYS PER ROW

02 to 25

FINISH		
05	Gold	Pb
46	Tin	Pb

All dimensions in mm.

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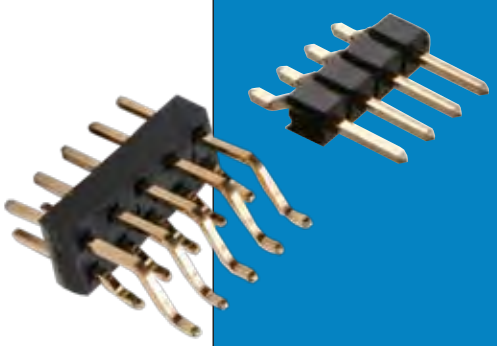
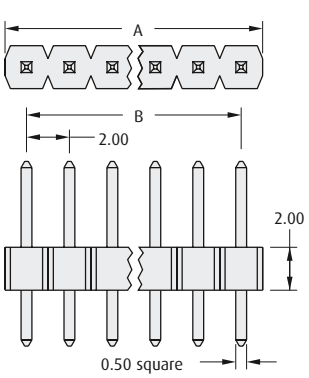


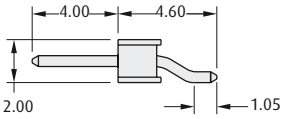
M22 Connectors

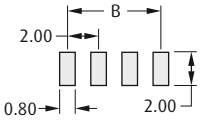
Male Horizontal Surface Mount

- Suitable for use with female connectors shown on pages 104 to 107.
- Single row pin headers can be cut into smaller sizes.
- Locating pegs on double row, to ensure correct positioning onto the board.
- For tape & reel packaging, contact technical@harwin.com.

SINGLE ROW



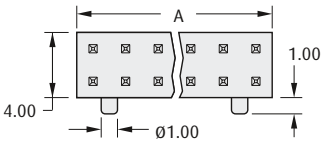


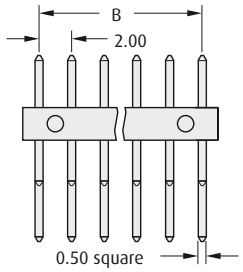


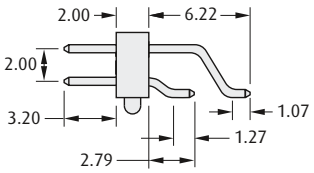
Recommended PC Board Pattern

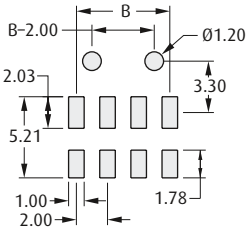
CALCULATION	
A	2.00 x No. of ways per row
B	2.00 x (No. of ways per row – 1)

DOUBLE ROW









Recommended PC Board Pattern

HOW TO ORDER

M22 – 5 X 3 XX 05

SERIES CODE

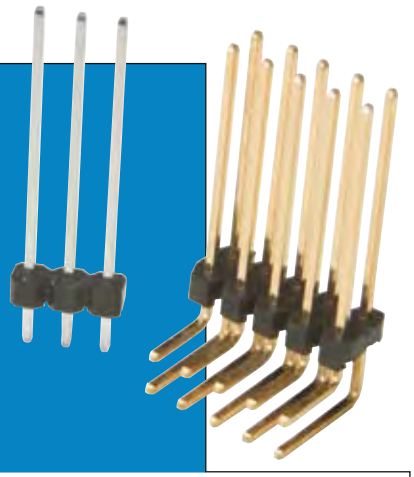
TYPE	
3	Single Row
4	Double Row

NO. OF WAYS PER ROW	
02 to 40	Single Row
03 to 25	Double Row

FINISH	
05	Gold

All dimensions in mm.

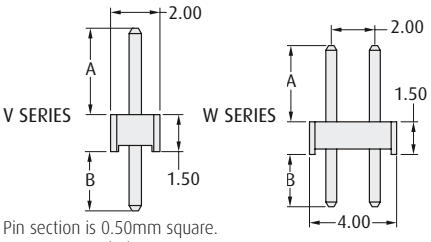
M22 Connectors
Pin Header Variants



- Harwin offers the ultimate flexibility 'Standard Variant Pin Headers'. Use the order code below to create application-specific connectors.
- Contact technical@harwin.com for further information.
- Suitable for use with female connectors on pages 104 to 107.

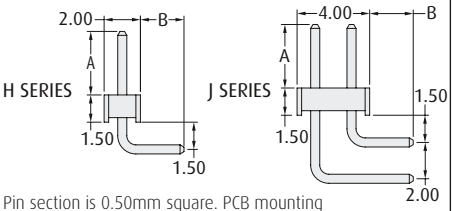
TERMINATION STYLES

Vertical PC Tail



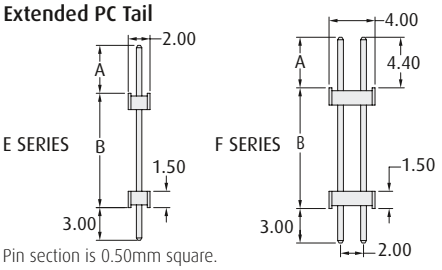
Pin section is 0.50mm square.
PCB mounting hole is Ø0.80mm

Horizontal PC Tail



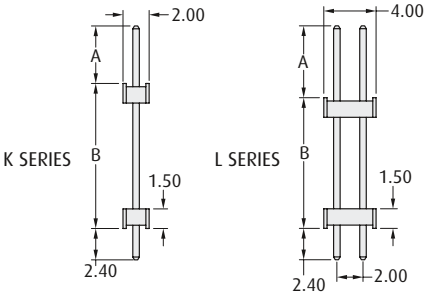
Pin section is 0.50mm square. PCB mounting hole is Ø0.80mm. Max. B dimension is 6.00mm

Extended PC Tail



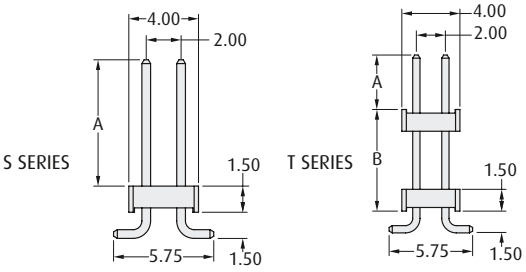
Pin section is 0.50mm square.
PCB mounting hole is Ø0.80mm

Extended PC Tail (2.4mm tail)



Pin section is 0.50mm square.
PCB mounting hole is Ø0.80mm

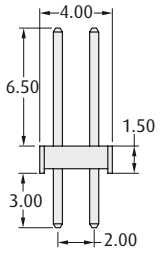
Vertical/Extended SMT



B dimension is 0.00mm,
Pin section is 0.50mm square.
PCB pad layout see page 114

Pin section is 0.50mm square.
PCB pad layout see page 114

EXAMPLE: M22-065030W0546



2mm Pitch vertical double row pin header with 5 pins per row. A dimension is 6.5 and B dimension is 3.0, in tin finish.

HOW TO ORDER

M22 – XXX XXX X XX XX

SERIES CODE

DIMENSION A
Eg. 7.8mm = 078

DIMENSION B
Eg. 5.0mm = 050

SINGLE ROW	DOUBLE ROW	
V	W	Vertical
H	J	Horizontal
E	F	Extended
K	L	Extended (2.4mm tail)
–	S	Surface Mount
–	T	Extended Surface Mount

FINISH

05	Gold (Pb)
46	Tin (Pb)

NO. OF WAYS PER ROW
02 to 50

All dimensions in mm.

www.harwin.com

HARWiN

Tools and Accessories

For loose contacts. Hand tool has a fixed ratchet cycle to ensure correct crimp form for repeatable use.

- Instruction sheet available at www.harwin.com/downloads/instructions.
- For use with both M22-305 and M22-308 contacts, see pages 107 and 108.

HAND CRIMP TOOL

ORDER CODE
Z22-020

M20 Connectors

SPECIFICATION

Materials

Mouldings:	Standard or High Temperature Plastic, UL94V-0
Contacts:	Male: Copper Alloy Female: Phosphor Bronze
Finish:	See individual pages

Electrical

Current rating:	3A per single contact, 2A all contacts
Voltage rating:	250V AC/DC
Voltage proof:	750V AC
Contact resistance:	30 mΩ max.
Insulation resistance:	1,000 MΩ min.

All preferred sizes of this range are held in stock.
Check www.harwin.com for availability.

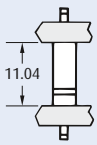
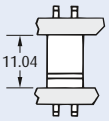
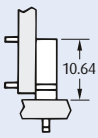
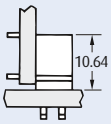
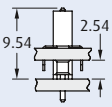
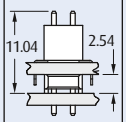
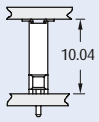
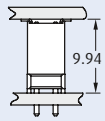
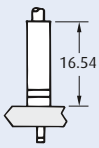
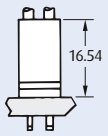
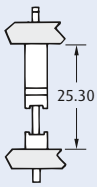
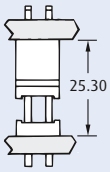
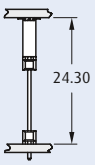
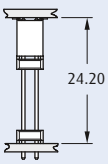
Environmental

Operating Temperature:	–40ºC to 105ºC
Solderability:	235°C for 5 seconds
Soldering heat resistance:	SMT: 260°C for 5 seconds

Mechanical

Durability:	Gold finish: 300 operations Tin finish: 50 operations
Insertion force (max.):	Female: 5.0N per contact Jumper sockets: 12.5N total
Withdrawal force (min.):	Female: 0.2N per contact Jumper sockets: 1.0N total
Vibration sensitivity:	10 - 55Hz, 1.5mm, 6 hours duration
Shock severity:	490m/s² (50G) for 11 ms

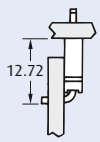
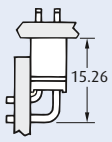
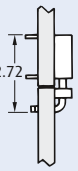
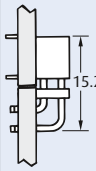
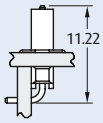
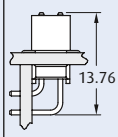
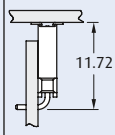
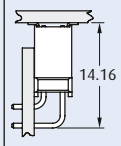
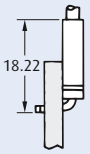
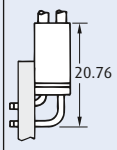
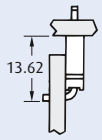
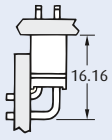
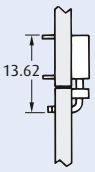
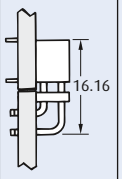
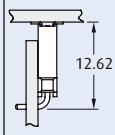
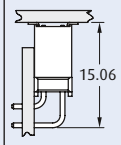
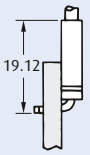
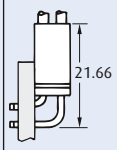
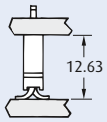
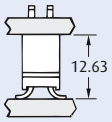
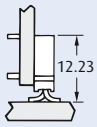
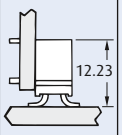
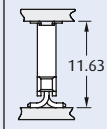
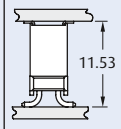
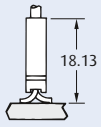
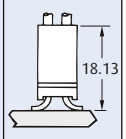
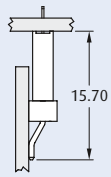
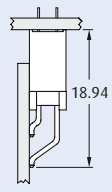
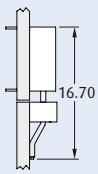
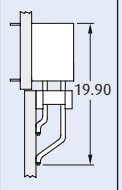
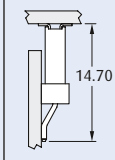
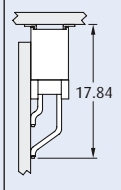
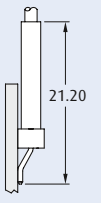
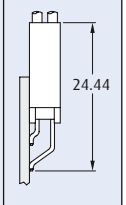
MATING PROFILES

FEMALE / MALE	VERTICAL PC TAIL		HORIZONTAL PC TAIL		VERTICAL PC TAIL BOTTOM ENTRY		VERTICAL SMT		CRIMP	
	SIL	DIL	SIL	DIL	SIL	DIL	SIL	DIL	SIL	DIL
VERTICAL PC TAIL	M20-782  M20-973 M20-977 M20-999	M20-783  M20-972 M20-976 M20-998	M20-789  M20-973 M20-977 M20-999	M20-788  M20-972 M20-976 M20-998	M20-784  M20-973	M20-785  M20-997	M20-786  M20-973 M20-977 M20-999	M20-787  M20-972 M20-976 M20-998	M20-106  M20-973 M20-977 M20-999	M20-107  M20-972 M20-976 M20-998
VERTICAL EXTENDED PC TAIL	M20-782  M20-961	M20-783  M20-960	Contact technical@ harwin.com	Contact technical@ harwin.com	Contact technical@ harwin.com	Contact technical@ harwin.com	M20-786  M20-961	M20-787  M20-960	Contact technical@ harwin.com	Contact technical@ harwin.com

All dimensions in mm.

www.harwin.com

HARWiN

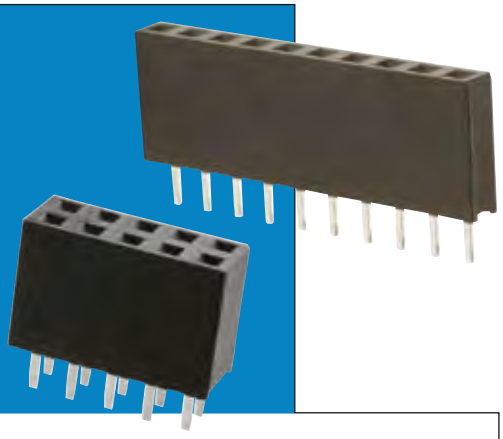
MALE \ FEMALE	VERTICAL PC TAIL		HORIZONTAL PC TAIL		VERTICAL PC TAIL BOTTOM ENTRY		VERTICAL SMT		CRIMP	
	SIL	DIL	SIL	DIL	SIL	DIL	SIL	DIL	SIL	DIL
HORIZONTAL PC TAIL	M20-782  M20-971 M20-975	M20-783  M20-970 M20-974	M20-789  M20-971 M20-975	M20-788  M20-970 M20-974	M20-784  M20-971	M20-785  M20-970	M20-786  M20-971 M20-975	M20-787  M20-970 M20-974	M20-106  M20-971 M20-975	M20-107  M20-970 M20-974
	M20-782  M20-996	M20-783  M20-995	M20-789  M20-996	M20-788  M20-995			M20-786  M20-996	M20-787  M20-995	M20-106  M20-996	M20-107  M20-995
VERTICAL SMT	M20-782  M20-877	M20-782  M20-876	M20-782  M20-877	M20-782  M20-876	Contact technical@ harwin.com	Contact technical@ harwin.com	M20-782  M20-877	M20-782  M20-876	M20-782  M20-877	M20-782  M20-876
HORIZONTAL SMT	M20-782  M20-890	M20-783  M20-891	M20-789  M20-890	M20-788  M20-891	Contact technical@ harwin.com	Contact technical@ harwin.com	M20-786  M20-890	M20-787  M20-891	M20-106  M20-890	M20-107  M20-891

All dimensions in mm.

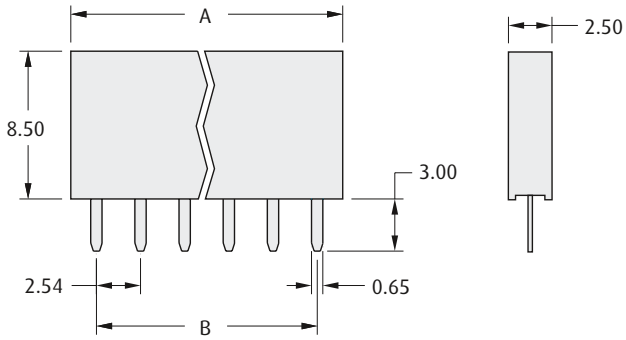
M20 Connectors
Female Vertical PC Tail

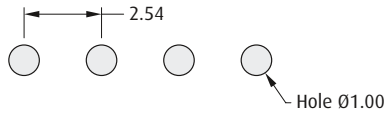
A comprehensive range of 2.54mm pitch connectors for board-to-board and cable-to-board applications.

- Twin-leaf phosphor bronze contacts.
- Suitable for use with male connectors on pages 127 to 134.



SINGLE ROW

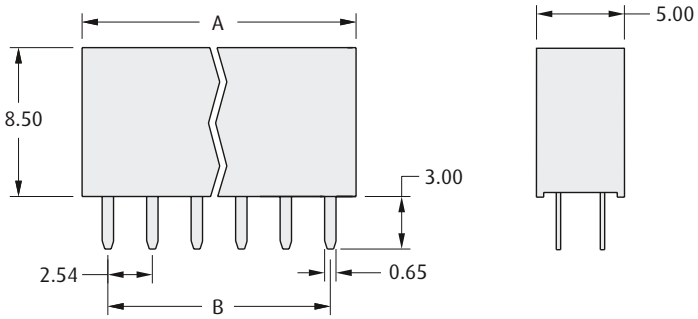


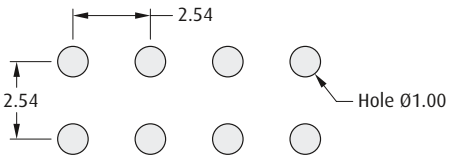


Recommended PC Board Pattern

CALCULATION	
A	(2.54 x No. of ways per row) + 0.4
B	2.54 x (No. of ways per row – 1)

DOUBLE ROW





Recommended PC Board Pattern

HOW TO ORDER

M20 – 78 X XX XX

SERIES CODE

NO. OF ROWS	
2	Single Row
3	Double Row

FINISH		
42	Gold + Tin	Pb
46	Tin	Pb

NO. OF WAYS PER ROW
02 to 40

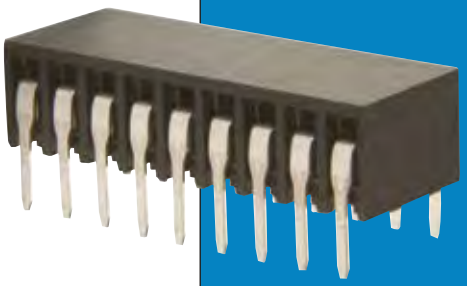
All dimensions in mm.

www.harwin.com

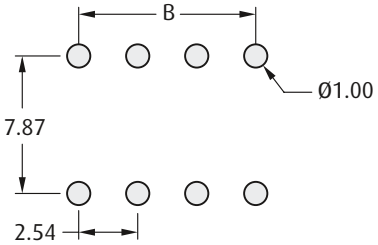
HARWiN

M20 Connectors

Female Horizontal PC Tail



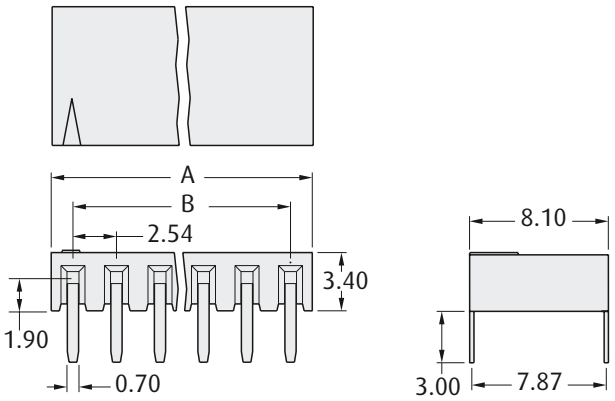
- Suitable for use with male connectors shown on pages 127 to 134.
- Two point solder fixing for connector rigidity.



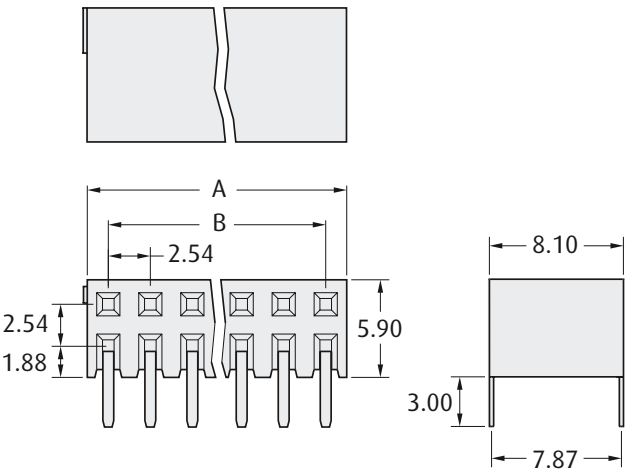
Recommended PC Board Pattern

CALCULATION	
A	(2.54 x No. of ways per row) + 0.2
B	2.54 x (No. of ways per row – 1)

SINGLE ROW



DOUBLE ROW



HOW TO ORDER

M20 – 78 X XX XX

SERIES CODE

NO. OF ROWS	
8	Double Row
9	Single Row

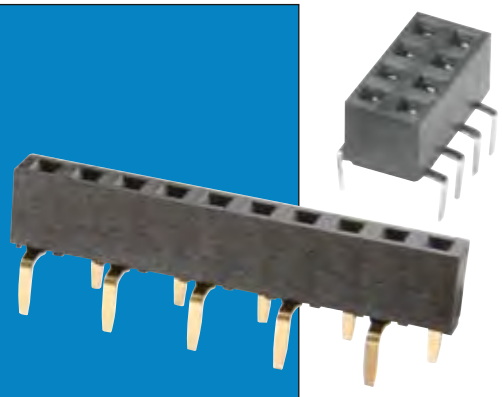
NO. OF WAYS PER ROW
02 to 40

FINISH		
42	Gold + Tin	PG
46	Tin	PG

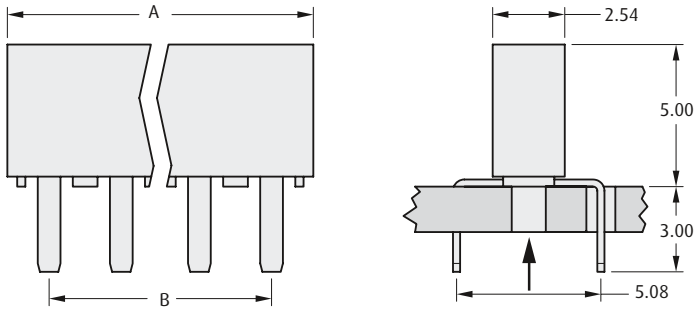
All dimensions in mm.

M20 Connectors
Female Dual Entry PC Tail

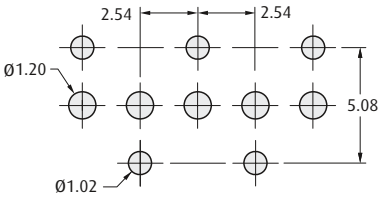
- Suitable for use with M20-997 bottom entry pin headers shown on page 133.
- Can be used as either top or bottom entry connectors.



SINGLE ROW



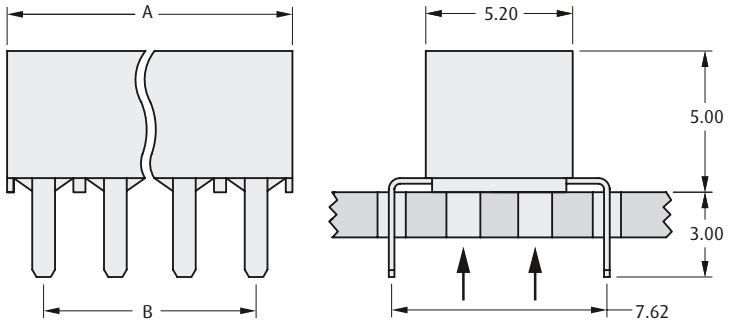
Direction of Pin for Bottom Entry



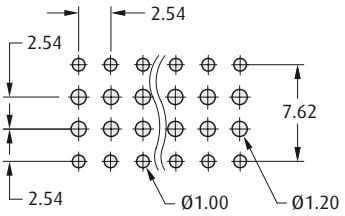
Recommended PC Board Pattern

CALCULATION	
A	(2.54 x No. of ways per row) + 0.5
B	2.54 x (No. of ways per row – 1)

DOUBLE ROW



Direction of Pin for Bottom Entry



Recommended PC Board Pattern

HOW TO ORDER

M20 – 78 X XX XX

SERIES CODE

TYPE	
4	Single Row
5	Double Row

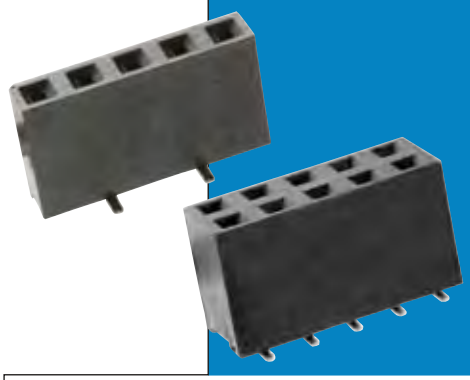
FINISH		
42	Gold + Tin	Pb
46	Tin	Pb

NO. OF WAYS PER ROW
02 to 40

All dimensions in mm.

www.harwin.com

HARWiN

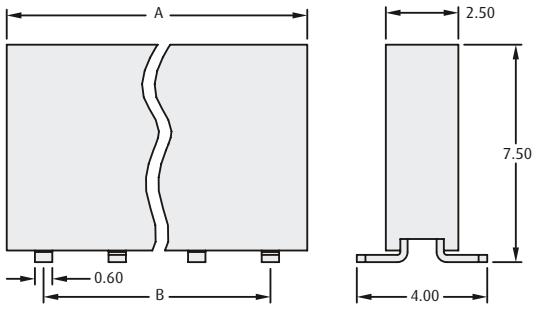


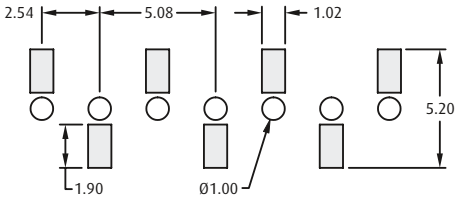
M20 Connectors

Female Vertical Surface Mount

- Suitable for use with male connectors shown on pages 127 to 134.
- Twin beam contact for cost-effective reliability.
- Tape and reel option available – contact technical@harwin.com.
- Dual Entry – connectors can be used for both top and bottom entry.

SINGLE ROW

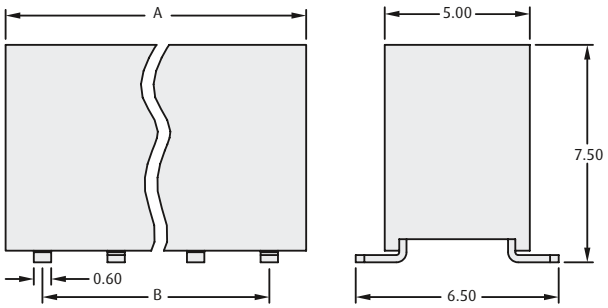


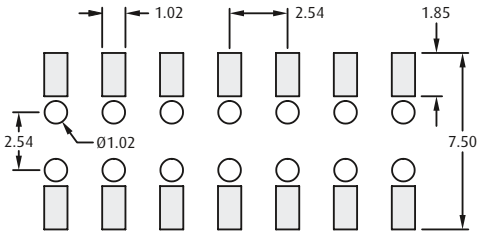


Recommended PC Board Pattern

CALCULATION	
A	(2.54 x No. of ways per row) + 0.3
B	2.54 x (No. of ways per row – 1)

DOUBLE ROW





Recommended PC Board Pattern

HOW TO ORDER

M20 – 78 X XX XX

SERIES CODE

TYPE	
6	Single Row
7	Double Row

FINISH		
42	Gold + Tin	PG
46	Tin	PG

NO. OF WAYS PER ROW
02 to 40

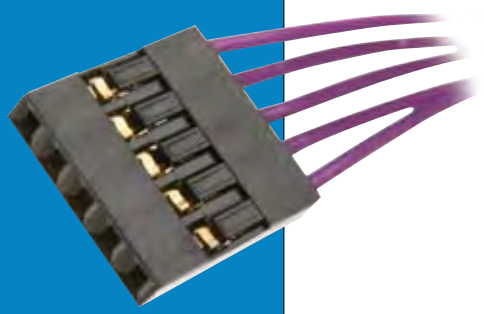
www.harwin.com

All dimensions in mm.

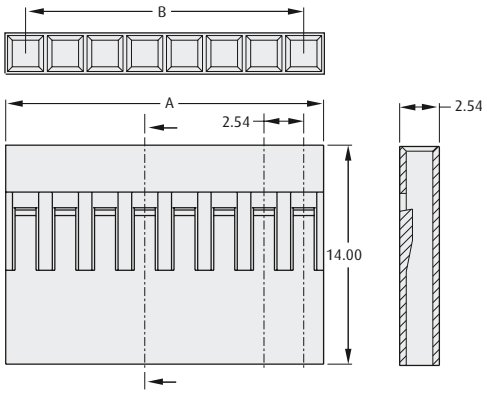
M20 Connectors

Female Crimp Housing and Contacts

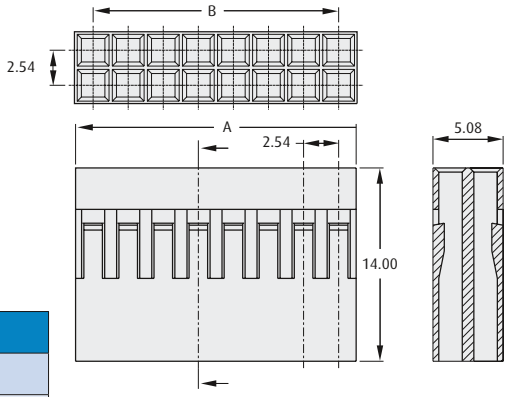
- Suitable for use with male connectors shown on pages 127 to 134.
- Twin-leaf phosphor bronze contacts supplied loose or on reels, rear insertable into housing.
- For Polarising Key use **order code M20-003**.
- Pre-crimped contacts and cable assembly service available, contact technical@harwin.com.



SINGLE ROW

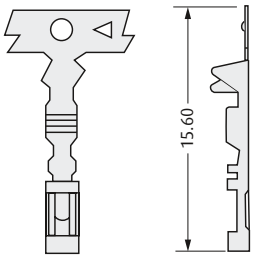


DOUBLE ROW



CALCULATION	
A	2.54 x No. of ways per row
B	2.54 x (No. of ways per row – 1)

CONTACTS



TYPE	AWG	ORDER CODE
Reeled	22 – 30	**M20-11600XX**
Loose	22 – 30	**M20-11800XX**

- **Order codes for reeled contacts refer to one reel of 10,000 contacts.**
- **Order codes for loose contacts refer to one pack of 100 contacts.**

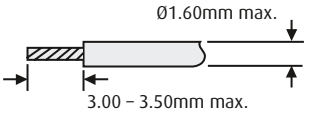
TOOLS

HAND CRIMP TOOL – Z20-320

See page 135

- **Instruction sheets available at www.harwin.com/downloads/instructions**

WIRE STRIPPING DETAILS



HOW TO ORDER

M20 – 1 XX XX XX

SERIES CODE

TYPE	
06	Single Row Housing
07	Double Row Housing
16	Reeled Contacts
18	Loose Contacts

NO. OF WAYS PER ROW	
00	Contacts
02 to 12	Housings

FINISH		
00	Housings	Pb
42	Gold + Tin (Contacts)	Pb
46	Tin (Contacts)	Pb

All dimensions in mm.

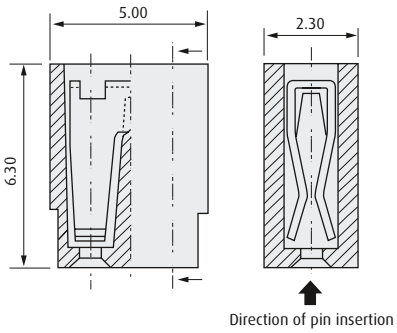
M20 Connectors

Jumper Sockets

- Suitable for use with pin headers shown on pages 127 to 134.
- Can be fitted by hand, giving an alternative on-board programming method to DIP switches.
- Open top for use with test probes.
- End and side stackable.
- Choice of colours available.
- Multi-usage socket provides up to 300 operations (Gold).
- Twin beam contact for cost-effective reliability.

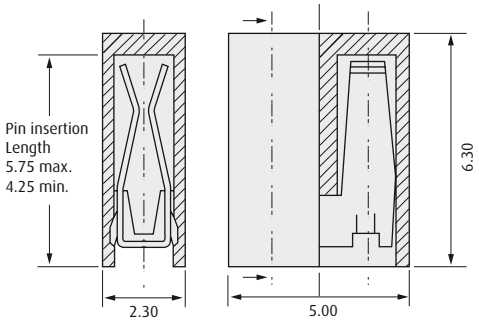
HIGH REL, MULTI-USAGE

OPEN TOP



Black, Grey, Red, Blue

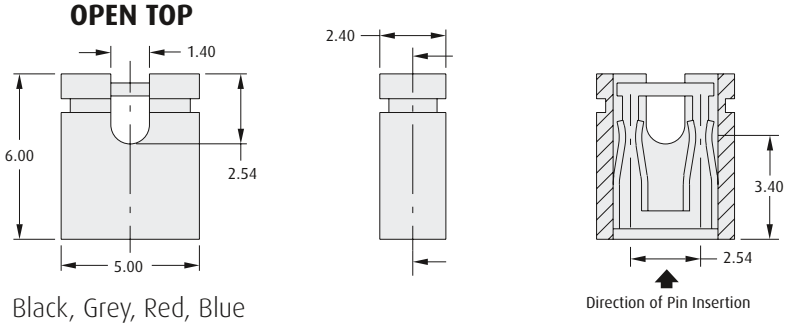
CLOSED TOP



Black, Grey

HIGH FORCE, SINGLE OPERATION

OPEN TOP



Black, Grey, Red, Blue

HOW TO ORDER

M7 X XX - XX

SERIES CODE

TYPE	
5	Open Top
7	Closed Top

HIGH REL		SINGLE OPERATION	
65	Grey	80	Grey
66	Red	81	Red
67	Black	82	Black
71	Blue	83	Blue

FINISH	
05	Gold (PG)
46	Tin (PG)

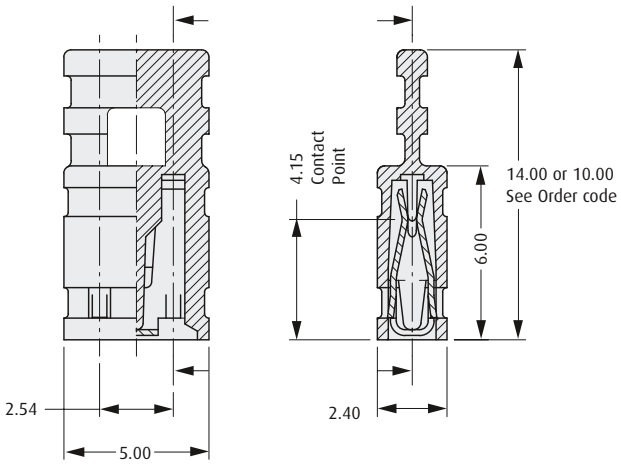
www.harwin.com

All dimensions in mm.

M20 Connectors
Jumper Sockets

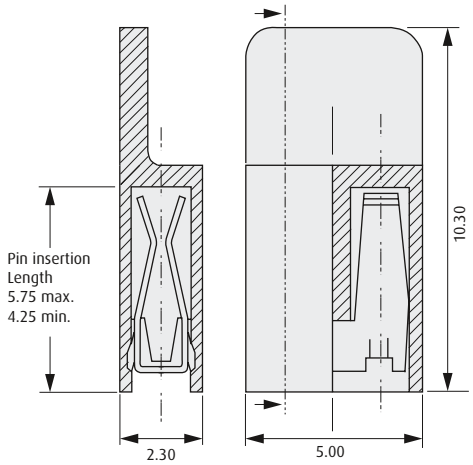
- Flexible handle for ease of location and withdrawal.
- Suitable for use with male connectors on pages 127 to 134.

CLOSED TOP WITH FLEXIBLE HANDLE



Black, Grey, Red, Blue

CLOSED TOP WITH HANDLE



Black, Grey, Red

HOW TO ORDER

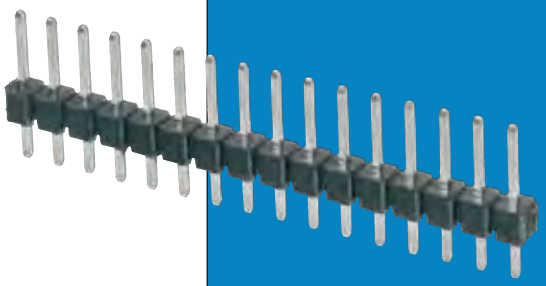
M XXXX – XX

SERIES CODE

FINISH	
05	Gold (Pd)
46	Tin (Pd)

TYPE					
14mm FLEXIBLE HANDLE		10mm FLEXIBLE HANDLE		SOLID HANDLE	
7680	Grey	**7684**	Grey	**7965**	Grey
7681	Red	**7685**	Red	**7966**	Red
7682	Black	**7686**	Black	**7967**	Black
7683	Blue	**7687**	Blue		

All dimensions in mm.

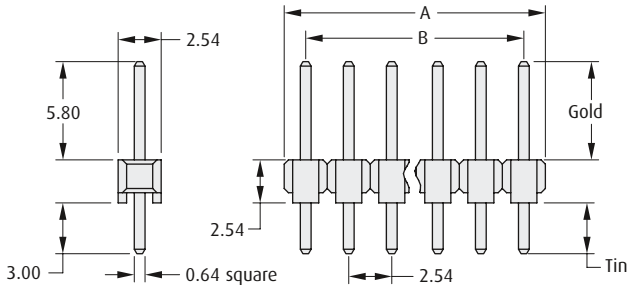


M20 Connectors

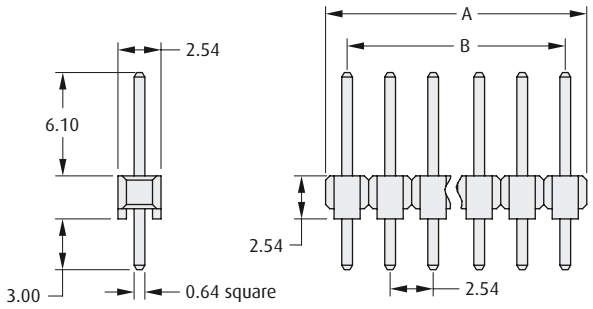
Male Vertical Single Row PC Tail

- Suitable for use with female connectors shown on pages 120 to 126.
- Choice of mating pin lengths or specify your own pin headers (see page 134).
- Pin headers can be cut to smaller sizes.

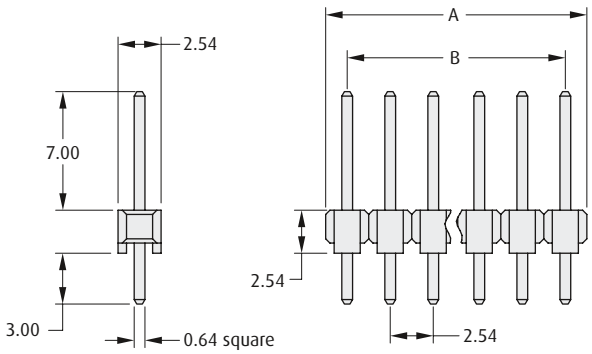
5.8mm

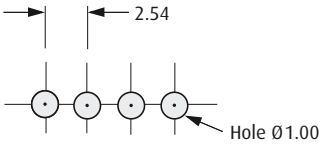


6.1mm



7.0mm





Recommended PC Board Pattern

CALCULATION	
A	2.54 x No. of ways per row
B	2.54 x (No. of ways per row – 1)

HOW TO ORDER

M20 – 9 XX XX XX

SERIES CODE

SIZE	
73	7.0mm Mating Height
77	5.8mm Mating Height
99	6.1mm Mating Height

NO. OF WAYS PER ROW

02 to 40

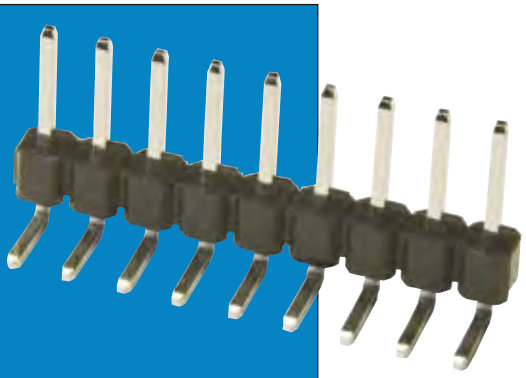
FINISH		
42	Gold + Tin (M20-977)	Pb
45	Gold (M20-973, 999)	Pb
46	Tin	Pb

All dimensions in mm.

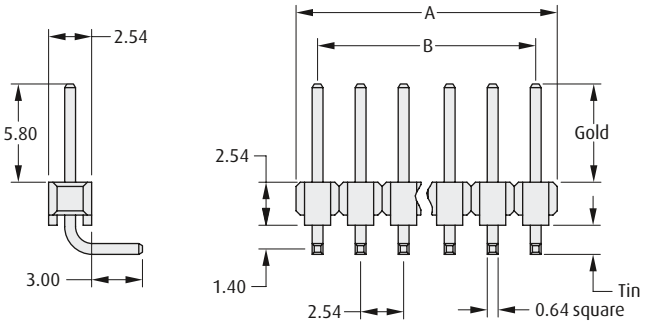
M20 Connectors

Male Horizontal Single Row PC Tail

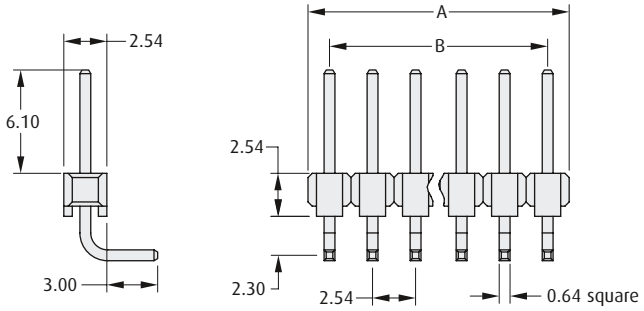
- Horizontal orientation for 90° board-to-board applications.
- Pin headers can be cut into smaller sizes.
- Choice of mating pin lengths or specify your own pin headers (see page 134).
- Suitable for use with female connectors shown on pages 120 to 126.



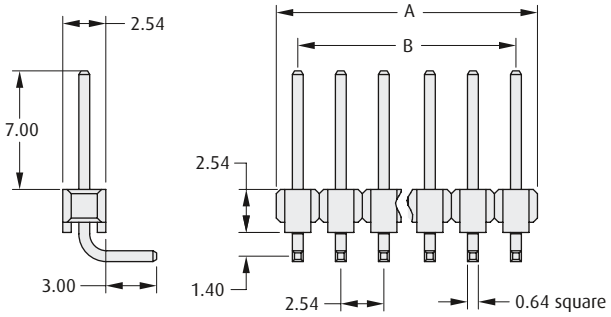
5.8mm

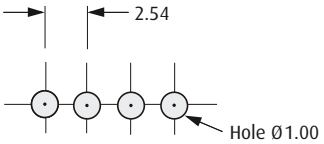


6.1mm



7.0mm





Recommended PC Board Pattern

CALCULATION	
A	2.54 x No. of ways per row
B	2.54 x (No. of ways per row – 1)

HOW TO ORDER

M20 – 9 XX XX XX

SERIES CODE

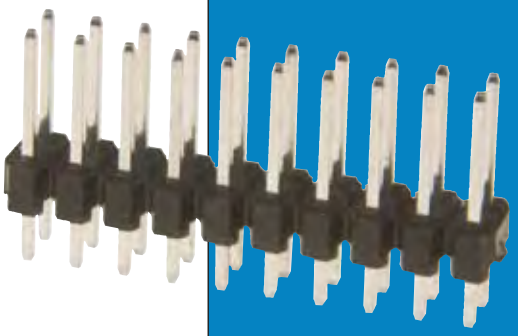
SIZE	
71	7.0mm Mating Height
75	5.8mm Mating Height
96	6.1mm Mating Height

NO. OF WAYS PER ROW

02 to 40

FINISH	
42	Gold + Tin (M20-975)
45	Gold (M20-971, 996)
46	Tin

All dimensions in mm.

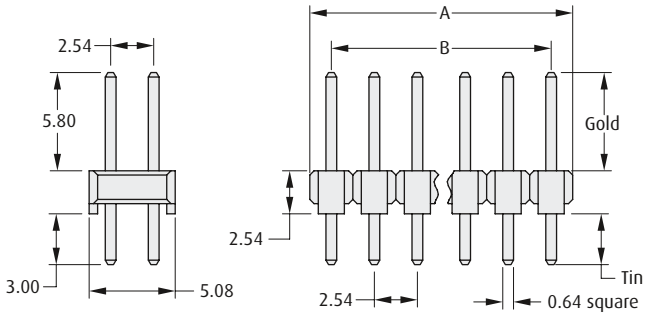


M20 Connectors

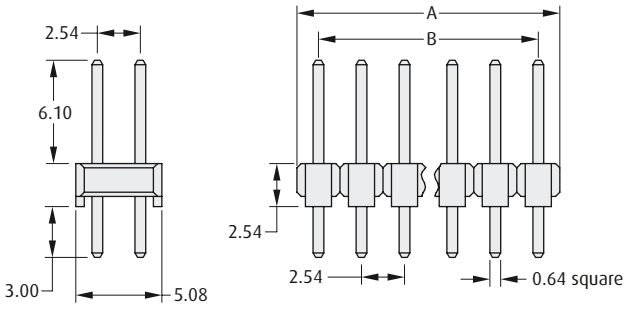
Male Vertical Double Row PC Tail

- Suitable for use with female connectors shown on pages 120 to 126.
- Choice of mating pin lengths – or specify your own pin header (see page 134).
- Pin headers can be cut into smaller sizes.

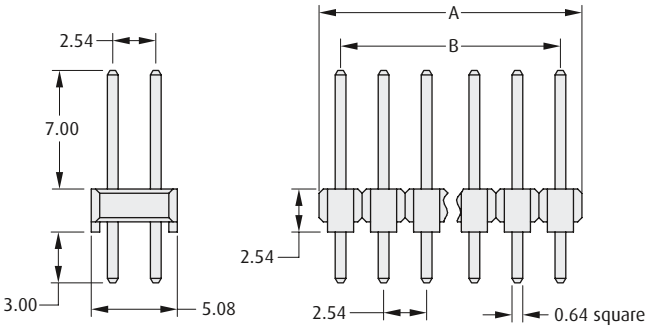
5.8mm

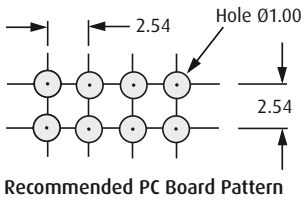


6.1mm



7.0mm





Recommended PC Board Pattern

CALCULATION	
A	2.54 x No. of ways per row
B	2.54 x (No. of ways per row – 1)

HOW TO ORDER

M20 – 9 XX XX XX

SERIES CODE

SIZE	
72	7.0mm Mating Height
76	5.8mm Mating Height
98	6.1mm Mating Height

NO. OF WAYS PER ROW

02 to 40

FINISH	
42	Gold + Tin (M20-976)
45	Gold (M20-972, 998)
46	Tin

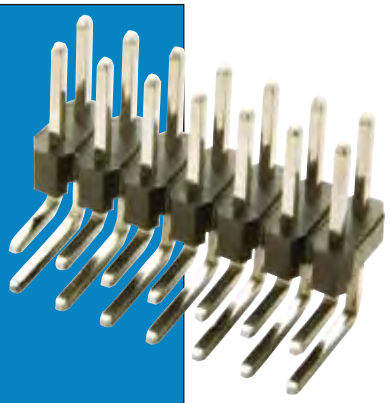
www.harwin.com

All dimensions in mm.

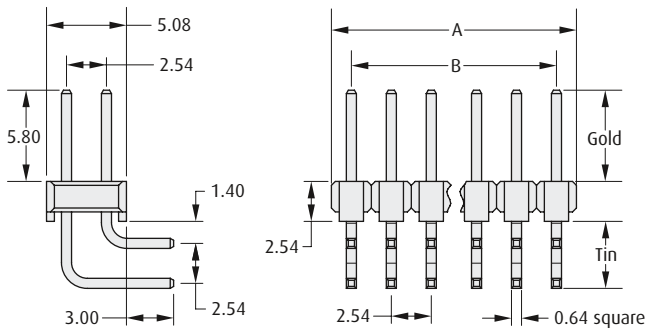
M20 Connectors

Male Horizontal Double Row PC Tail

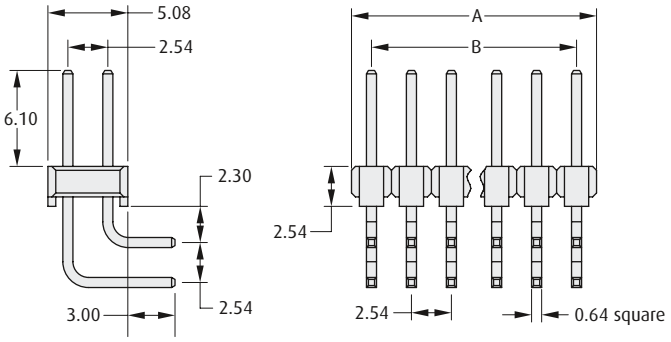
- Horizontal orientation for 90° board-to-board applications.
- Pin headers can be cut into smaller sizes.
- Choice of mating pin lengths or specify your own pin headers (see page 134).
- Suitable for use with female connectors shown on pages 120 to 126.



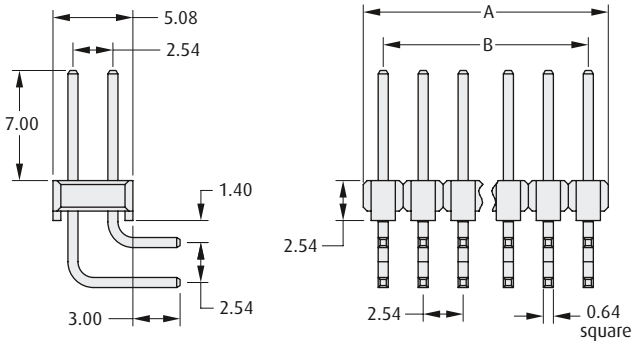
5.8mm

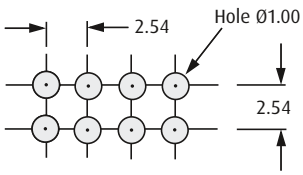


6.1mm



7.0mm





Recommended PC Board Pattern

CALCULATION	
A	2.54 x No. of ways per row
B	2.54 x (No. of ways per row – 1)

HOW TO ORDER

M20 – 9 XX XX XX

SERIES CODE

SIZE	
70	7.0mm Mating Height
74	5.8mm Mating Height
95	6.1mm Mating Height

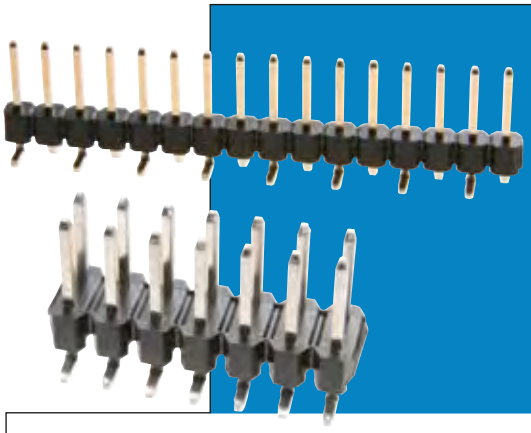
NO. OF WAYS PER ROW
02 to 40

FINISH		
42	Gold + Tin (M20-974)	PG
45	Gold (M20-970, 995)	PG
46	Tin	PG

All dimensions in mm.

www.harwin.com

HARWiN

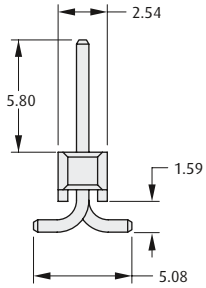


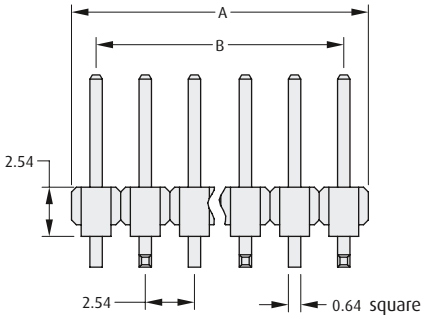
M20 Connectors

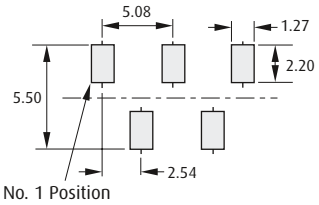
Male Vertical Surface Mount

- For pick and place cap and packed in tube – add P to the end of the part number.
- For pick and place cap in tape & reel packaging – add R to the end of the part number.
- For alternative pin lengths, see pin header variants on page 134.
- Suitable for use with female connectors shown on pages 120 to 126.

SINGLE ROW



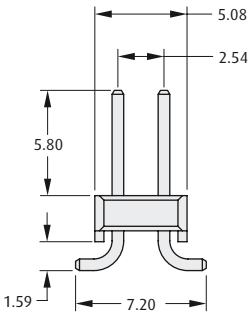


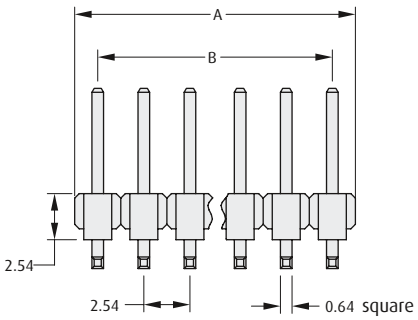


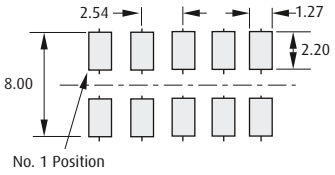
Recommended PC Board Pattern

CALCULATION	
A	2.54 x No. of ways per row
B	2.54 x (No. of ways per row – 1)

DOUBLE ROW







Recommended PC Board Pattern

HOW TO ORDER

M20 – 87 X XX XX

SERIES CODE

TAIL SPACING	
6	Double Row
7	Single Row

FINISH		
42	Gold + Tin	Pb
46	Tin	Pb

NO. OF WAYS PER ROW
02 to 40

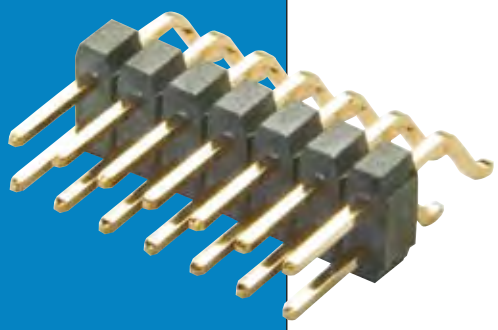
www.harwin.com

All dimensions in mm.

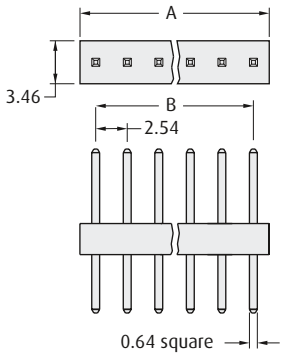
M20 Connectors

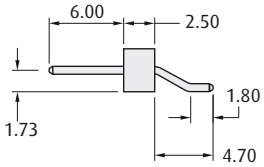
Male Horizontal Surface Mount

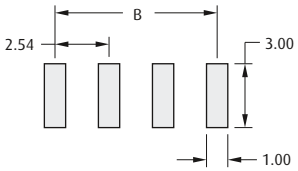
- Double row pin headers can be cut into smaller sizes.
- For tape and reel packaging, contact technical@harwin.com.
- Suitable for use with female connectors shown on pages 120 to 126.



SINGLE ROW

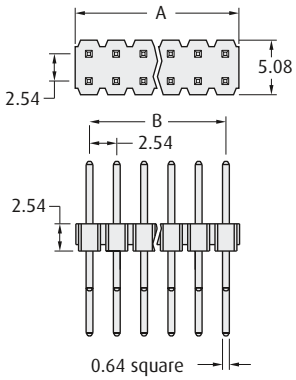


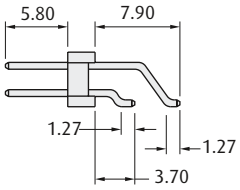


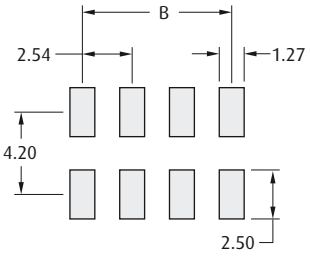


Recommended PC Board Pattern

DOUBLE ROW







Recommended PC Board Pattern

CALCULATION	
A	2.54 x No. of ways per row
B	2.54 x (No. of ways per row – 1)

HOW TO ORDER

M20 – 89 X XX 05

SERIES CODE

FINISH	
05	Gold (Pb)

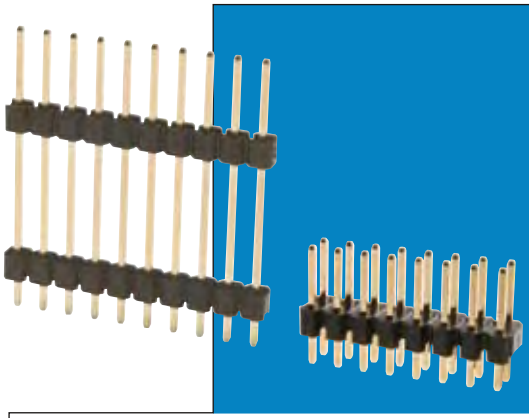
TAIL SPACING	
0	Single Row
1	Double Row

NO. OF WAYS PER ROW	
03 to 25	Single Row
02 to 36	Double Row

All dimensions in mm.

www.harwin.com

HARWiN

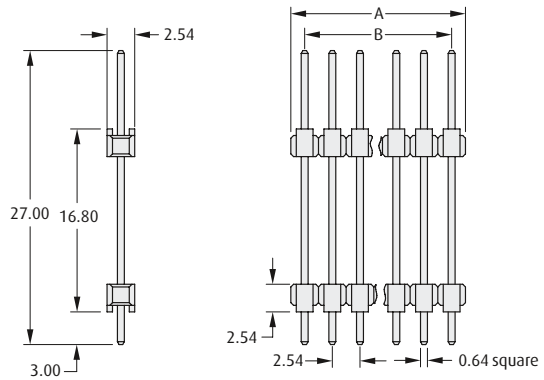


M20 Connectors

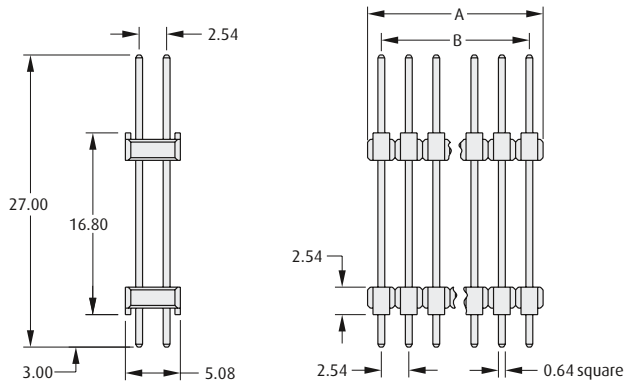
Male Vertical & Extended PC Tail

- Suitable for use with female connectors shown on pages 120 to 126.
- Unshrouded pin headers can be cut to smaller sizes.
- Additional Insulator on extended headers giving greater rigidity to ensure pin alignments and controls the board spacing.
- Contact technical@harwin.com for other size availability.

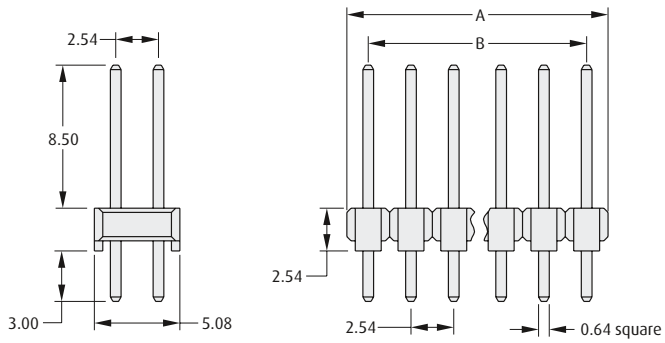
EXTENDED SINGLE ROW

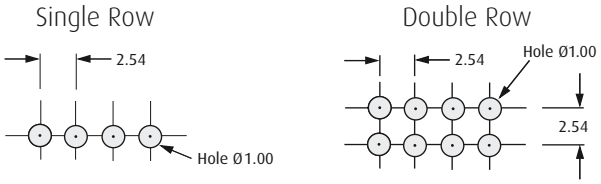


EXTENDED DOUBLE ROW



DOUBLE ROW (For Bottom Entry Sockets)





Recommended PC Board Patterns

CALCULATION	
A	2.54 x No. of ways per row
B	2.54 x (No. of ways per row – 1)

HOW TO ORDER

M20 – 9 XX XX XX

SERIES CODE

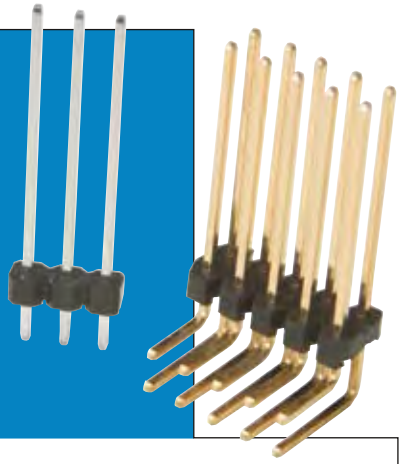
CONNECTOR TYPE	
60	Extended Double Row
61	Extended Single Row
97	Vertical Double Row

NO. OF WAYS PER ROW	
01 to 40	Vertical
02 to 40	Extended

FINISH		
45	Gold	Pb
46	Tin	Pb

All dimensions in mm.

M20 Connectors
Pin Header Variants

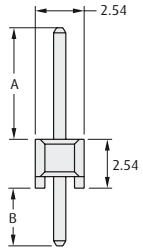


- Harwin offers the ultimate flexibility 'Standard Variant Pin Headers'. Use the order code below to create application-specific connectors.
- Contact technical@harwin.com for further information.
- Suitable for use with female connectors on pages 120 to 126.

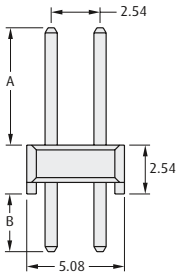
TERMINATION STYLES

Vertical PC Tail

V SERIES



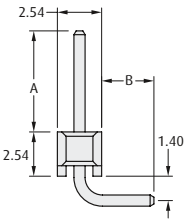
W SERIES



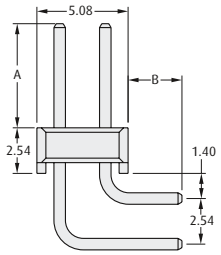
Pin section is 0.64 square.
PCB mounting hole is Ø1.00 mm

Horizontal PC Tail

H SERIES



J SERIES

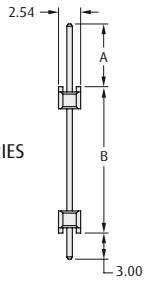


Pin section is 0.64 square.
PCB mounting hole is Ø1.00 mm

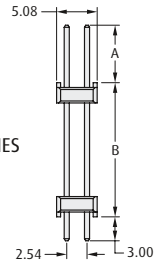
Max. B dimension is 6.00mm

Extended PC Tail

E SERIES



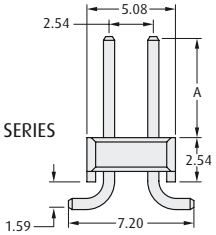
F SERIES



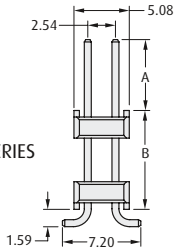
Pin section is 0.64 square.
PCB mounting hole is Ø1.00 mm

Vertical SMT

S SERIES

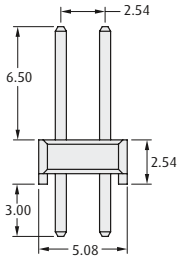


T SERIES



Pin section is 0.64 square. For PCB pad layout see page 131. S style only. B dimension is "0".

EXAMPLE: M20-065030W0546



2.54mm Pitch vertical double row pin header with 5 pins per row and A dimension is 6.5 and B dimension is 3.0 in tin finish.

HOW TO ORDER

M20 – XXX XXX X XX XX

SERIES CODE

DIMENSION A
Eg. 7.8mm = 078

DIMENSION B
Eg. 5.0mm = 050

SINGLE ROW	DOUBLE ROW	
V	W	Vertical
H	J	Horizontal
E	F	Extended
–	S	Surface Mount
–	T	Extended Surface Mount

FINISH		
45	Gold	Pb
46	Tin	Pb

NO. OF WAYS PER ROW
02 to 40

All dimensions in mm.

www.harwin.com

HARWiN

M20 Connectors
Tools and Accessories

For loose contacts. Hand tool has a fixed ratchet cycle to ensure correct crimp form for repeatable use.

- Instruction sheet available at www.harwin.com/downloads/instructions.
- For use with M20-118 contacts, see page 124.

HAND CRIMP TOOL

ORDER CODE
Z20-320

F05E SERIES – 0.5mm PITCH

Materials

Mouldings:	High Temp Thermoplastic, UL94V-0
Contacts:	Copper Alloy
Finish:	Tin

Electrical

Current rating:	0.4A max.
Voltage rating:	50V AC/DC
Contact resistance:	40 mΩ max.
Insulation resistance:	500 MΩ min.

Environmental

Temperature Range:	-25°C to +85°C
Solderability:	235°C for 5 seconds
Soldering heat resistance:	260°C for 10 seconds

Mechanical

Durability:	30 operations
FPC Retention force (min.):	0.3N per contact

All preferred sizes of this range are held in stock.
Check www.harwin.com for availability.

F10 SERIES – 1.0mm PITCH

Materials

Mouldings:	PPS, UL94V-0
Contacts:	Phosphor Bronze
Finish:	Tin

Electrical

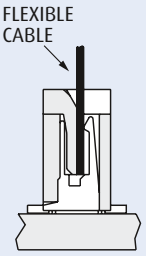
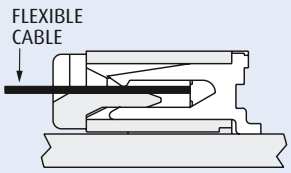
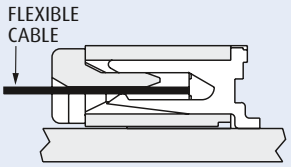
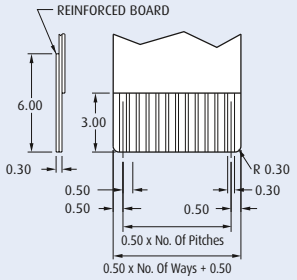
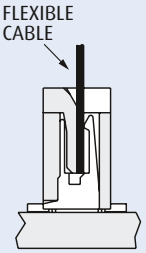
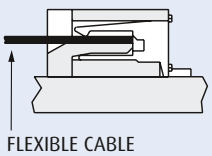
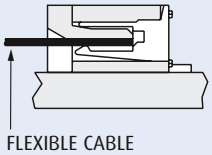
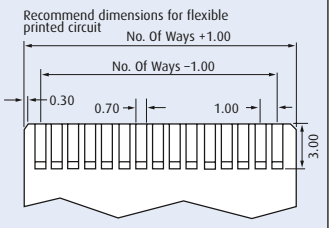
Current rating:	1A AC/DC
Voltage rating:	125V AC/DC
Voltage proof:	500V AC
Contact resistance:	20 mΩ max.
Insulation resistance:	100 MΩ min.

Environmental

Temperature Range:	-20°C to +85°C
Solderability:	235°C for 3 seconds
Soldering heat resistance:	260°C for 5 seconds

Mechanical

Durability:	30 operations
FPC Retention force (min.):	(0.5N per contact) +3.9N

	Surface Mount Vertical	Surface Mount Horizontal		Cable Specification
		Top Contact	Bottom Contact	
F05E 0.5mm Pitch				
F10 1.0mm Pitch				

All dimensions in mm.

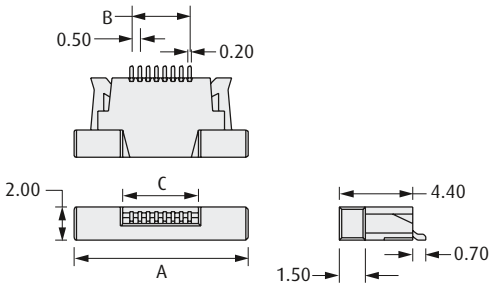
FPC Connectors

Surface Mount, 0.5mm (.020") Pitch

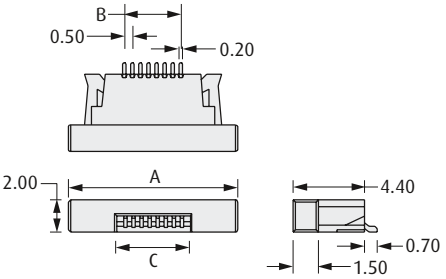
A range of 0.5mm pitch vertical and horizontal top & bottom contact FPC connectors, for use with flexible printed circuits or flat conductor planar cable.

- Zero insertion force.
- Supplied in Tape & Reel packaging.
- SMT metal solder-down tabs for additional strain relief on horizontal connectors.

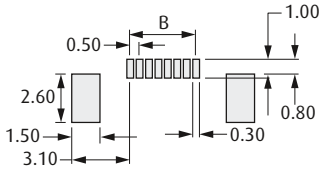
HORIZONTAL TOP CONTACT



HORIZONTAL BOTTOM CONTACT

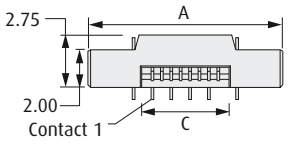


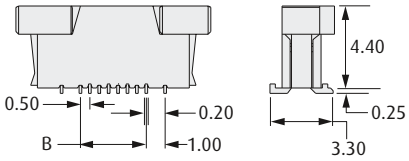
CALCULATION	
A	B + 5.00
B	0.50 x (Total no. of contacts - 1)
C	B + 2.50

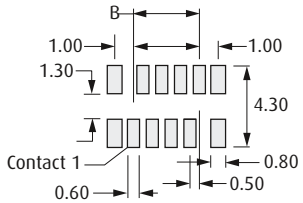


Recommended PC Board Pattern

VERTICAL







Recommended PC Board Pattern

CALCULATION	
A	B + 5.00
B	0.50 x (Total no. of contacts - 1)
C	B + 2.50

HOW TO ORDER

F05E – XX XX 46 R

SERIES CODE

TOTAL NO. OF CONTACTS

04-20, 22-28, 30, 32, 33, 34, 36, 38, 40, 41, 45, 50, 54, 56, 60	Horizontal
04, 06, 08, 09, 10, 15, 16, 20, 22, 24, 26, 28, 30, 32, 40, 45, 50	Vertical

TYPE

11	Horizontal, Top Contact
21	Horizontal, Bottom Contact
31	Vertical

FINISH

46	Tin

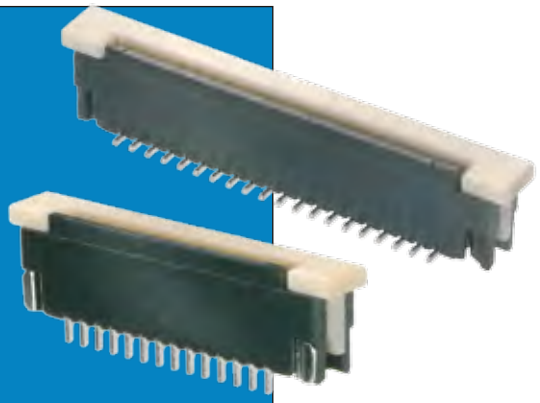
TAPE & REEL

All dimensions in mm.

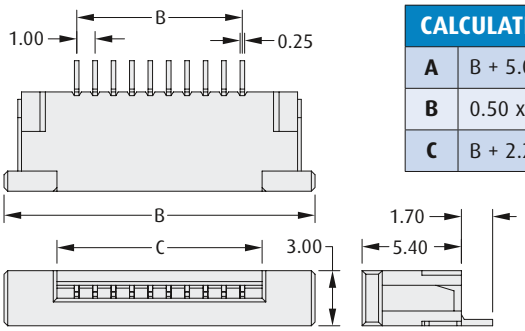
FPC Connectors

Surface Mount, 1.00mm (.040") Pitch

- 1mm Pitch available in three orientations.
- Zero insertion force.
- Metal solder-down tabs on horizontal connectors.
- Supplied in tape & reel packaging as standard.

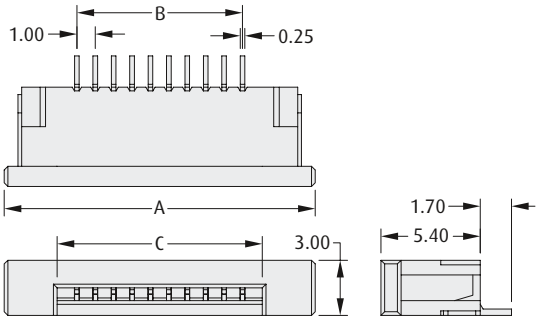


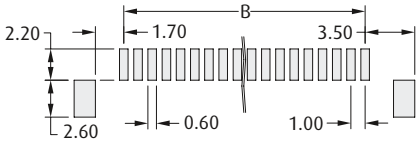
HORIZONTAL TOP CONTACT



CALCULATION	
A	B + 5.00
B	0.50 x (Total no. of contacts – 1)
C	B + 2.20

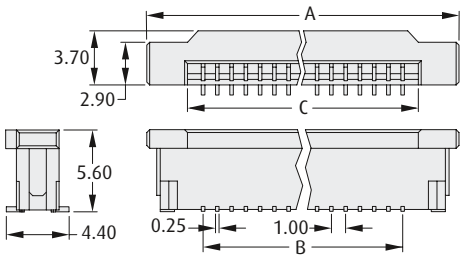
HORIZONTAL BOTTOM CONTACT

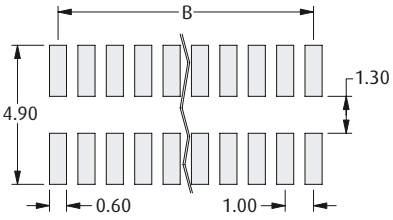




Recommended PC Board Pattern

VERTICAL





Recommended PC Board Pattern

CALCULATION	
A	B + 8.00
B	No. of ways per row – 1
C	B + 2.20

HOW TO ORDER

F10 – 2 XX XX XX R

SERIES CODE

TAPE & REELED

TYPE	
80	Horizontal, Bottom Contact
90	Horizontal, Top Contact
95	Vertical

NO. OF WAYS PER ROW
03 to 30

FINISH	
46	Tin

All dimensions in mm.

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