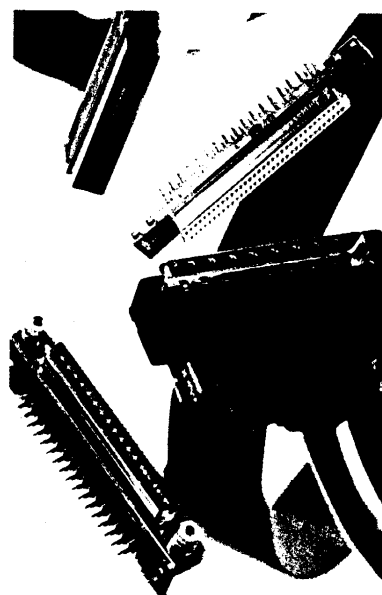


854-281  
854-293  
854-300  
854-311  
854-323  
854-335  
854-001  
854-013  
854-025  
854-037  
854-049  
854-050  
854-372  
854-384  
854-396  
854-402  
857-853  
857-865



**hartmik<sup>®</sup>**  
half pitch connector range



Certified according to DIN EN ISO 9001  
in design/development, production,  
installation and servicing

# Contents



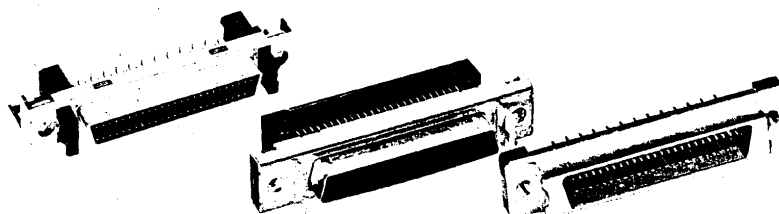
Series

Page

## I/O Connector

### Pin and Socket

Technical characteristics  
Male and female connectors  
Solder pins, straight  
Solder pins, right angled  
Press-in straight  
IDC flat cable  
IDC discrete wire  
Solder cup

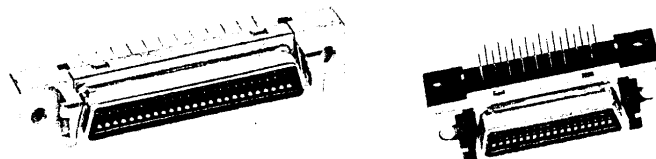


4

5

### Bellows

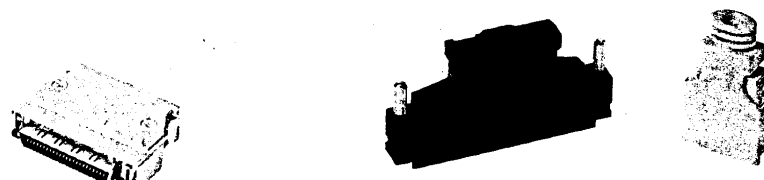
Technical characteristics  
Male and female connectors  
Solder pins, straight  
Solder pins, right angled  
IDC discrete wire  
Solder cup



16

### Hoods

Metal hoods  
Plastic hoods



22

### Terminators

24

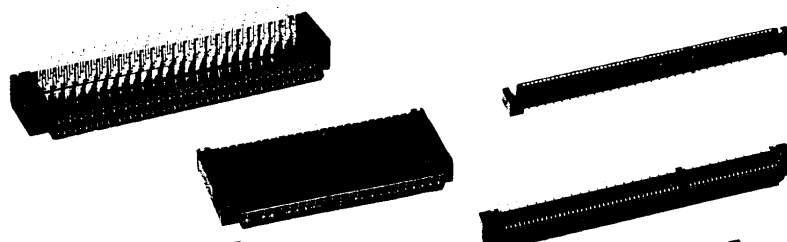
### Accessories

26

## Intra cabinet Connector

### Pin and socket

Technical characteristics  
Male and female connectors  
Solder pins, straight  
Solder pins, right angled  
Press-in straight  
IDC flat cable



27

28

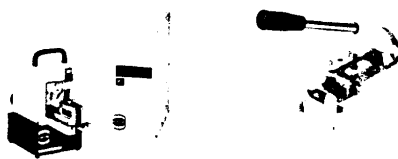
### Bellows

Technical characteristics  
Male and female connectors  
Solder pins, straight



34

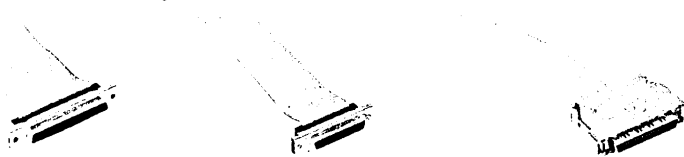
## Tools



36

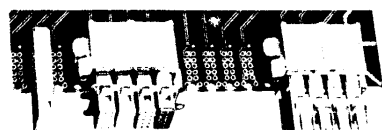
## Cables

Discrete wires  
IDC flat cable



41

## har-link®



44

## List of part numbers

46

Some of the components from the HARTING range



49

## Addresses

50

## The best connections world-wide – connect with quality – specify HARTING

HARTING was founded in 1945 and is  
100 % privately owned.

Approximately 2,000 people are  
employed worldwide including 150  
engineers and more than 100 sales  
engineers who provide the daily inter-  
face with our customers.

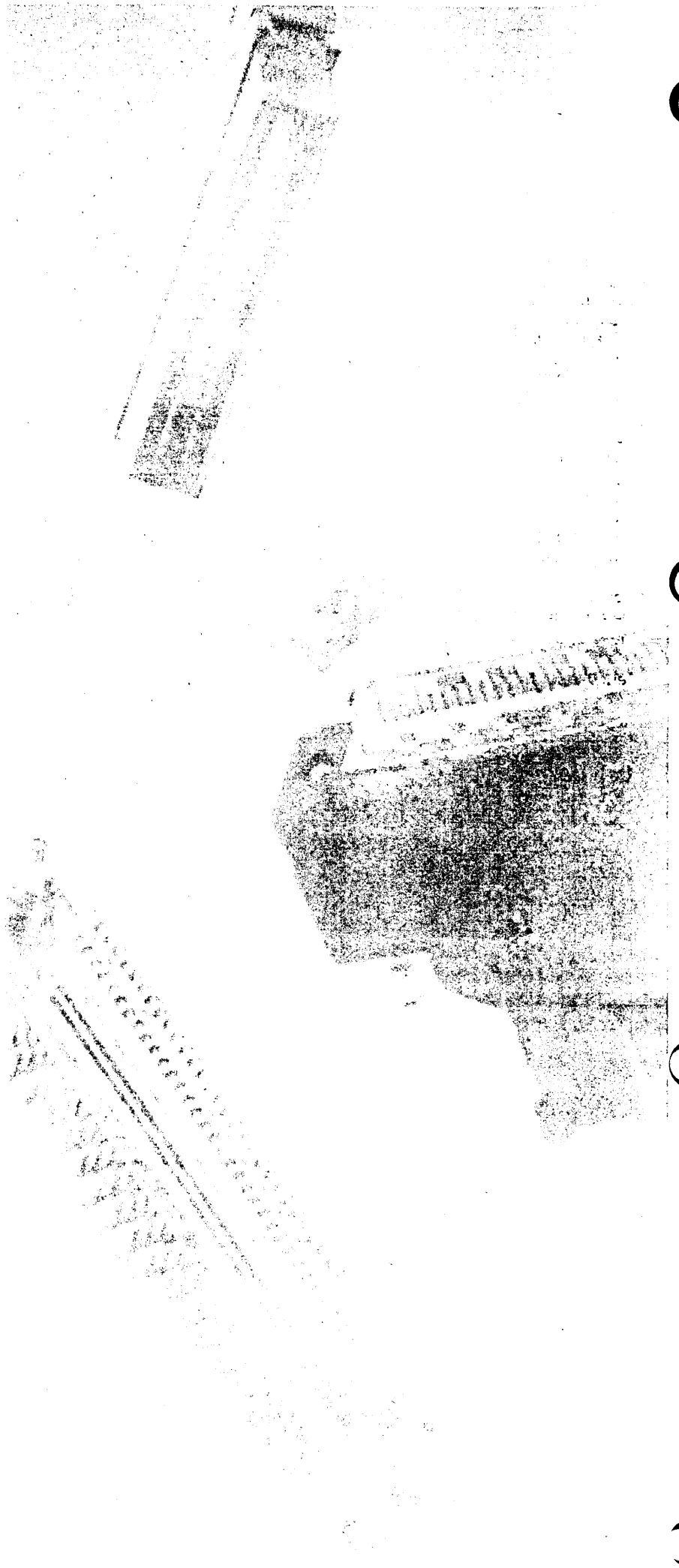
HARTING with its 23 subsidiaries in  
Europe, America and Asia is today one  
of the world's leading connector manu-  
facturers.

State of the art CAD-Systems are used  
both in the R & D department and the  
tool making department in order to  
bring new products to the market in the  
most efficient way.

It is HARTING's philosophy that the  
target of permanent zero defect  
production is only achievable by the  
integration of fully automatic in-line  
inspection processes. The implementa-  
tion of the above quality philosophy and  
associated processes are documented  
according to DIN EN ISO 9001 in the  
Quality Assurance Manual. In total  
approximately 60 quality control person-  
nel are employed. The majority of these  
engineers and technicians are trained  
and certified by the German (DCQ) or  
Swiss (SAQ) quality organisations. The  
divisions printed circuit board connec-  
tors, heavy duty connectors Han® and  
solenoids are certified according to DIN  
EN ISO 9001 for design/R & D, produc-  
tion, assembly and customer service.

The dedication to quality and the ability  
to deliver on a "Just in Time" basis have  
led to the development of strong rela-  
tionships with leading original equipment  
manufacturers on the world market.

HARTING is the market leader in  
several of its product ranges.



## for economical and reliable connections

A comprehensive range of high density interface connectors based on two mating design concepts:

- Blade and fork contact in the Pin/Socket range.
- Leaf contact in the Bellows range.

Available in a various number of contacts with options for secure locking of mated connectors in accordance with the following international standards:

- Small Computer System Interface  
SCSI-2  
SCSI-2 wide  
SCSI-3
- Intelligent Peripheral Interface  
IPI
- High Performance Peripheral  
Interface  
HIPPI
- High Speed Serial Interface  
HSSI
- Media Independent Interface  
MII
- Bi-directional Parallel Interface  
IEEE - 1284-C
- EIA - TIA  
232-E
- IEC  
1076-3-101

UL recognised

For Customer specific applications we can design and manufacture solutions to match your requirement.

Sales Department  
HARTING-Components



Certified according to DIN EN ISO 9001  
in design/development, production,  
installation and servicing

### General information

It is the user's responsibility to check whether the components illustrated in this catalogue comply with different regulations from those stated in special fields of application which we are unable to foresee.

We reserve the right to modify designs in order to improve quality, keep pace with technological advancement or meet particular requirements in production.

This catalogue must not be used in any form or manner without our prior approval in writing (Copyright Law, Fair Trading Law, Civil Code).  
We are bound by the French version only.

Number of contacts 20, 26, 28, 36, 40, 50, 68, 80, 100

Pitch 1.27 mm

Working current 1 A

Working voltage 240 V ~

Test voltage  $U_{r.m.s.}$  750 V

Contact resistance  $\leq 30 \text{ m}\Omega$

Insulation resistance  $\geq 10^3 \text{ M}\Omega$

Temperature range  $-55^\circ\text{C} \dots +105^\circ\text{C}$

### Terminations

Solder cup AWG 24  
Insulation max.  $\varnothing 1 \text{ mm}$

Solder pins Straight for PCB holes  
min.  $\varnothing 0.74 \text{ mm}$   
Angled  $90^\circ$  for PCB holes  
min.  $\varnothing 0.74 \text{ mm}$

Insulation displacement Discret wire  
AWG 28 to AWG 30  
max. section:  $0.089 \text{ mm}^2$   
min. section:  $0.050 \text{ mm}^2$   
Insulation  $\varnothing$  min.  $0.50 \text{ mm}$   
 $\varnothing$  max.  $0.88 \text{ mm}$

Flat cable  
AWG 30 pitch  $0.635 \text{ mm}$

### Materials

Moulding Thermoplastic resin  
glass-fibre filled UL 94-V0  
Liquid Crystal Polymer (LCP)  
for SCSI 3, straight

Contacts Copper alloy

Contact plating Selectively gold-plated

Metal shell Die cast zamac or stamped  
steel, nickel-plated

Hoods Die cast zamac, nickel-plated

Thermoplastic resin  
nickel-plated, steel insert

### Press-in

Insertion process Flat rock

Maximum press-in force  
per contact 100 N

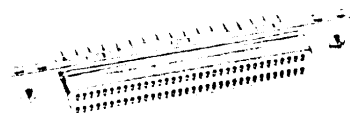
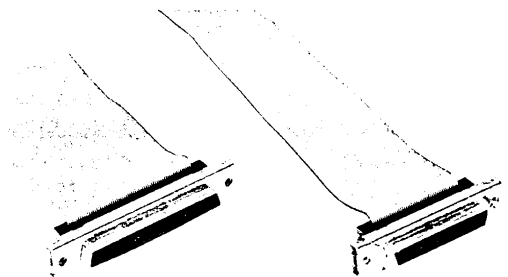
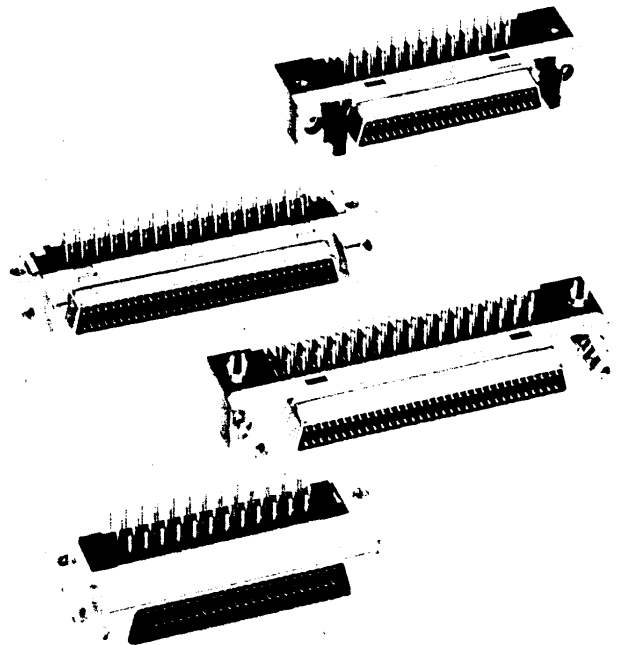
Minimum push out force  
per contact 15 N

Number of repairs 2

Recommended Board  
characteristics finished hole  $\varnothing 0.6 \begin{smallmatrix} +0.07 \\ -0.05 \end{smallmatrix} \text{ mm}$

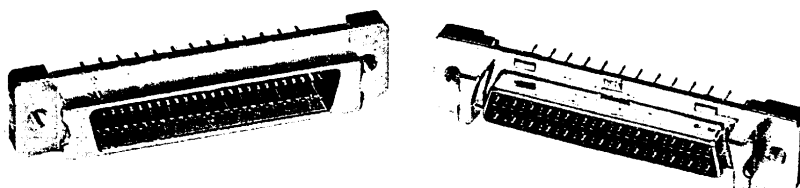
Drilled hole size  $\varnothing 0.7 / 0.74 \text{ mm}$   
Cu  $30 - 60 \text{ }\mu\text{m}$   
Sn  $5 - 20 \text{ }\mu\text{m}$

Board thickness  $1.6 - 3.2 \text{ mm}$



Number of contacts

## 20-68



Connector solder pins, straight

Identification

No. of contacts

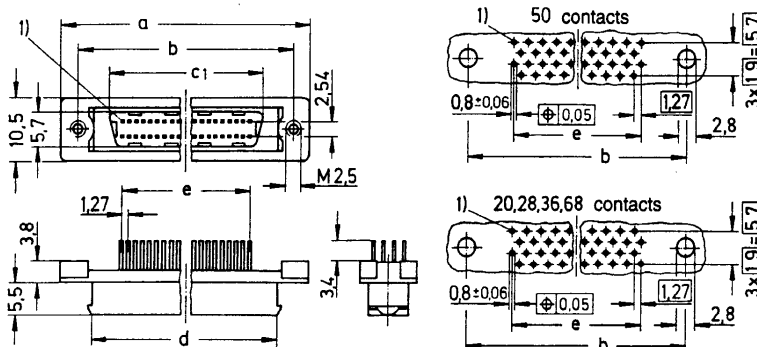
Part No.

Male and female connector with straight solder pins

|    | Male connector   | Female connector |
|----|------------------|------------------|
| 20 | 60 01 020 5202   | 60 01 020 5102   |
| 26 | 60 01 026 5202 * | 60 01 026 5102   |
| 28 | 60 01 028 5202   | 60 01 028 5102   |
| 36 | 60 01 036 5202   | 60 01 036 5102 * |
| 40 | 60 01 040 5202 * | 60 01 040 5102   |
| 50 | 60 01 050 5202   | 60 01 050 5102   |
| 68 | 60 01 068 5202   | 60 01 068 5102   |

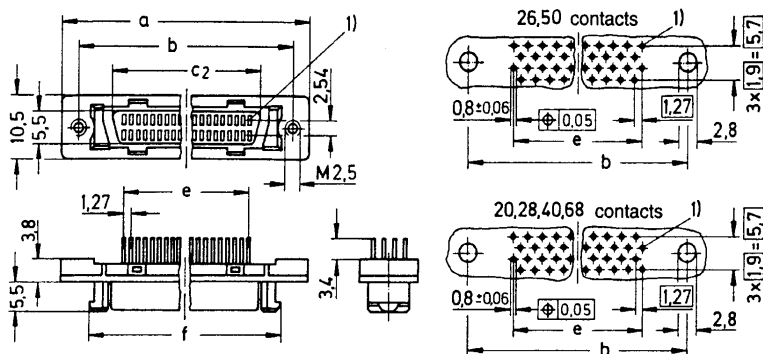
Male connector

Dimensions in mm

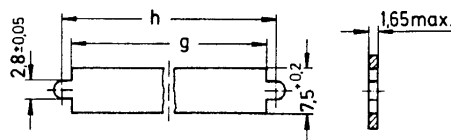


|    | a     | b $\pm 0.1$ | c <sub>1</sub> | c <sub>2</sub> | d     | e                 | f     | g     | h     |
|----|-------|-------------|----------------|----------------|-------|-------------------|-------|-------|-------|
| 20 | 33.40 | 27.43       | 15.80          | 15.60          | 21.60 | 9 x 1.27 = 11.43  | 23.24 | 23.70 | 27.45 |
| 26 | 37.21 | 31.24       | —              | 19.41          | —     | 12 x 1.27 = 15.24 | 27.05 | 27.50 | 31.25 |
| 28 | 38.48 | 32.51       | 20.88          | 20.68          | 26.68 | 13 x 1.27 = 16.51 | 28.32 | 28.80 | 32.50 |
| 36 | 43.56 | 37.56       | 25.96          | —              | 31.76 | 17 x 1.27 = 21.59 | —     | 33.90 | 37.60 |
| 40 | 46.10 | 40.13       | —              | 28.30          | —     | 19 x 1.27 = 24.13 | 35.94 | 36.40 | 40.15 |
| 50 | 52.45 | 46.48       | 34.85          | 34.65          | 40.65 | 24 x 1.27 = 30.48 | 42.29 | 42.80 | 46.50 |
| 68 | 63.88 | 57.91       | 46.28          | 46.08          | 52.08 | 33 x 1.27 = 41.91 | 53.72 | 54.20 | 57.90 |

Female connector

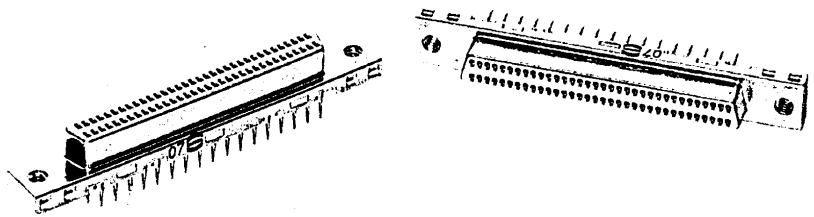


Panel cut out



Number of contacts

## 68

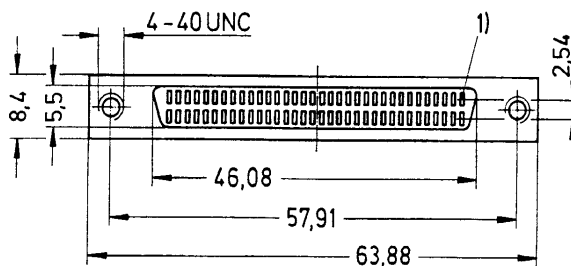
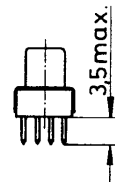
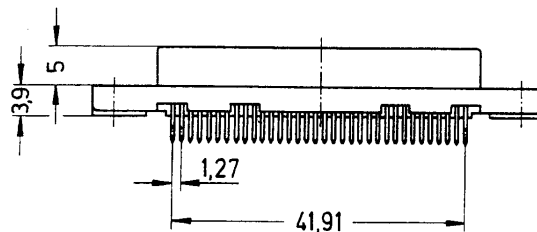


Female connector solder and Press-in pins, straight

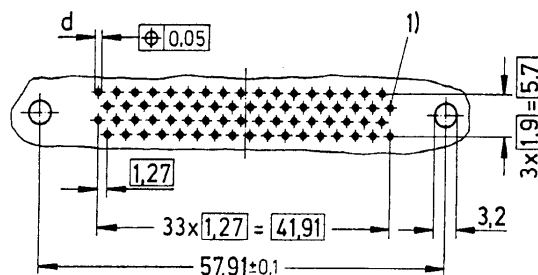
| Identification                      | No. of contacts | Solder         | Press-in       |
|-------------------------------------|-----------------|----------------|----------------|
| Female connector with straight pins | 68              | 60 02 068 5120 | 60 02 068 5320 |

Female connector

Dimensions in mm



Board drillings  
(Components side)



|          | d                                     |
|----------|---------------------------------------|
| Solder   | 0.8 <sup>+0.06</sup> <sub>-0.05</sub> |
| Press-in | 0.6 <sup>+0.07</sup> <sub>-0.05</sub> |

1) Contact number 1

Press in recommended characteristics finished hole Ø 0.6 <sup>+0.07</sup><sub>-0.05</sub> mm

Drilled hole size Ø 0.71 / 0.74 mm

Cu 30-60 µm

Sn 5-20 µm

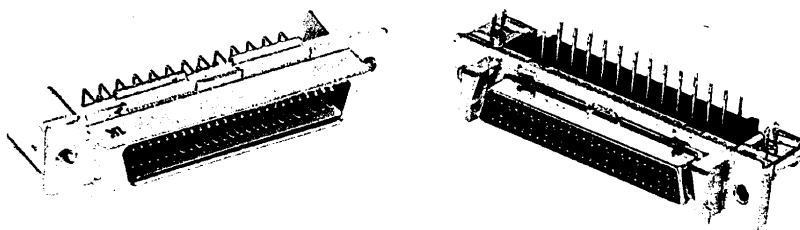
Board thickness 1.6-3.2 mm

Note: Moulding material LCP allowing reflow for SMC process

Tools see page 40

Number of contacts

## 20-80



Connector solder pins, angled

Identification

Male and female connector  
with angled solder pins

| Panel fixing | Board fixing |
|--------------|--------------|
| M 2.5        | M 2.5        |
| UNC 2-56     | UNC 2-56     |
| M 2.5        | Board lock   |
| UNC 2-56     | Board lock   |

No. of  
contacts

32  
33  
40  
41

| No. of<br>contacts |
|--------------------|
| 20                 |
| 26                 |
| 28                 |
| 36                 |
| 40                 |
| 50                 |
| 68                 |
| 80                 |

Male connector

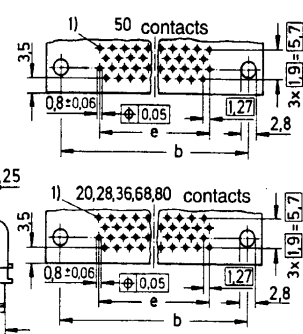
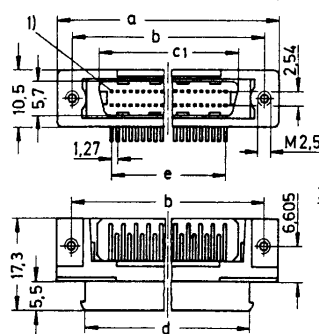
|                  |
|------------------|
| 60 01 020 5232   |
| 60 01 026 5232 * |
| 60 01 028 5232   |
| 60 01 036 5232   |
| 60 01 040 5232 * |
| 60 01 050 5232   |
| 60 01 068 5232   |
| 60 01 080 5232   |

Part No.

Female connector

|                   |
|-------------------|
| 60 01 020 51 ..   |
| 60 01 026 51 ..   |
| 60 01 028 51 ..   |
| 60 01 036 51 .. * |
| 60 01 040 51 ..   |
| 60 01 050 51 ..   |
| 60 01 068 51 ..   |
| 60 01 080 51 .. * |

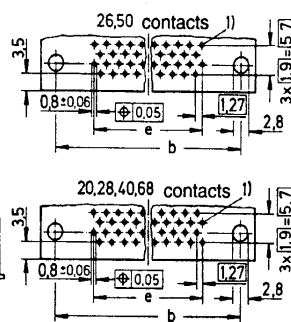
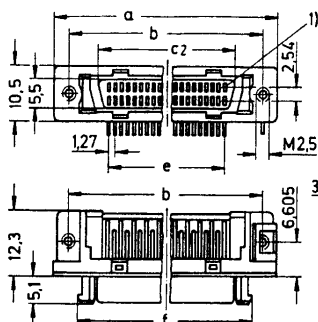
Male connector



Dimensions in mm

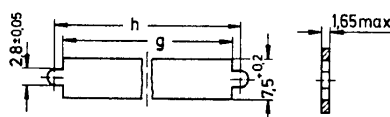
|    | a     | b <sub>±0.1</sub> | c <sub>1</sub> | c <sub>2</sub> | d     | e                 | f     | g     | h     |
|----|-------|-------------------|----------------|----------------|-------|-------------------|-------|-------|-------|
| 20 | 33.40 | 27.40             | 15.80          | 15.60          | 21.60 | 9 x 1.27 = 11.43  | 23.24 | 23.70 | 27.45 |
| 26 | 37.21 | 31.24             | —              | 19.41          | —     | 12 x 1.27 = 15.24 | 27.05 | 27.50 | 31.25 |
| 28 | 38.48 | 32.48             | 20.88          | 20.68          | 26.68 | 13 x 1.27 = 16.51 | 28.32 | 28.80 | 32.50 |
| 36 | 43.56 | 37.56             | 25.96          | —              | 31.76 | 17 x 1.27 = 21.59 | —     | 33.90 | 37.60 |
| 40 | 46.10 | 40.13             | —              | 28.30          | —     | 19 x 1.27 = 24.13 | 35.94 | 36.40 | 40.15 |
| 50 | 52.45 | 46.45             | 34.85          | 34.65          | 40.65 | 24 x 1.27 = 30.48 | 42.29 | 42.80 | 46.50 |
| 68 | 63.88 | 57.88             | 46.28          | 46.08          | 52.08 | 33 x 1.27 = 41.91 | 53.72 | 54.20 | 57.90 |
| 80 | 71.50 | 65.50             | 53.90          | —              | 59.70 | 39 x 1.27 = 49.53 | —     | 61.80 | 65.55 |

Female connector



without board lock with board lock

Panel cut out



1) Contact number 1

Number of contacts

## 50

Lightweight version



Female connector solder pins, angled

Identification

No. of contacts

Part No.

Female connector  
with angled solder pins

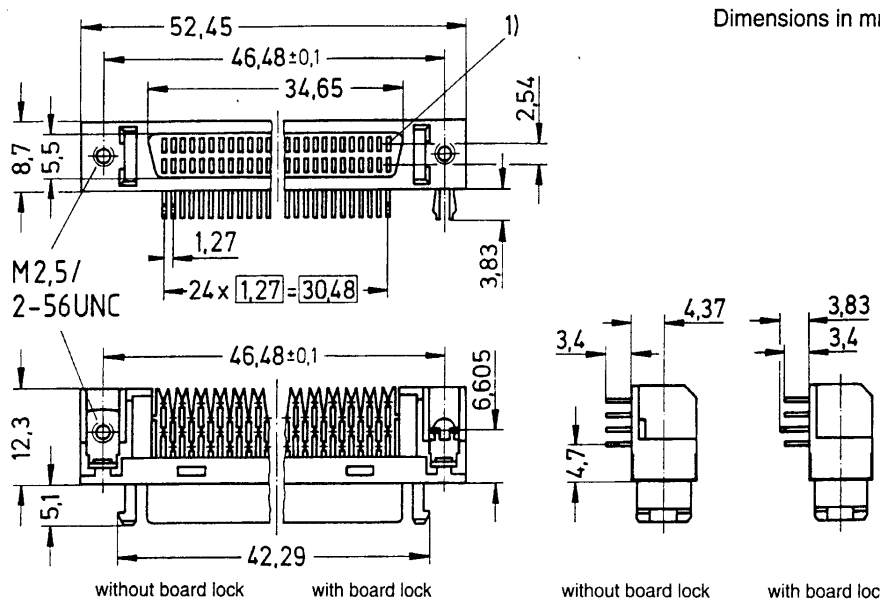
50

60 01 550 51 ..

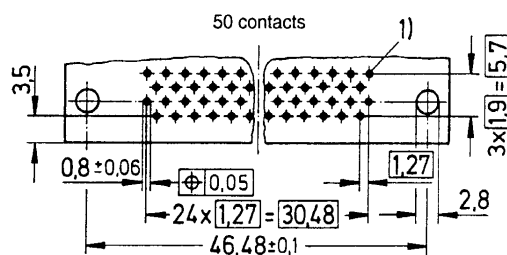
| Panel fixing | Board fixing |    |
|--------------|--------------|----|
| M 2.5        | M 2.5        | 32 |
| UNC 2-56     | UNC 2-56     | 33 |
| M 2.5        | Board lock   | 40 |
| UNC 2-56     | Board lock   | 41 |

Female connector

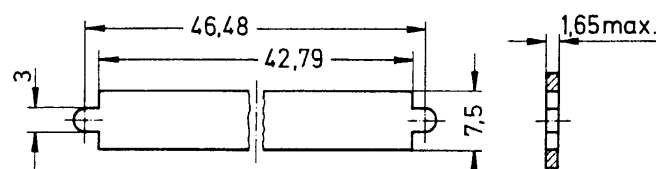
Dimensions in mm



Board drillings  
(Components side)

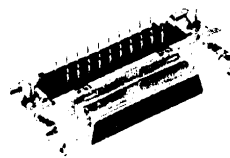


Panel cut out



Number of contacts

**40-68**



## Female connector solder pins, angled

Identification

No. of contacts

Part No.

Female connector  
with angled solder pins

40

60 02 040 51 ..

68

60 02 068 51 ..

With female screw lock

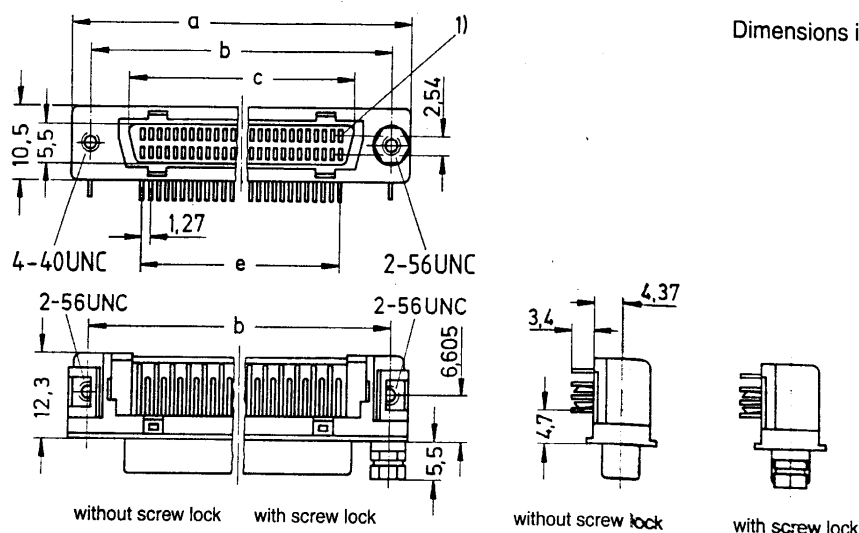
41

Without female screw lock

50

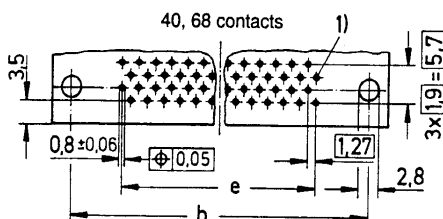
## Female connector

Dimensions in mm

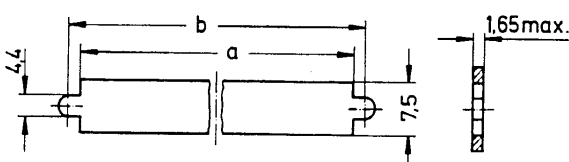


|    | a     | b $\pm 0.1$ | c     | e                 |
|----|-------|-------------|-------|-------------------|
| 40 | 46.10 | 40.13       | 28.30 | 19 x 1.27 = 24.13 |
| 68 | 63.88 | 57.91       | 46.08 | 33 x 1.27 = 41.91 |

## Board drillings (Components side)



## Panel cut out

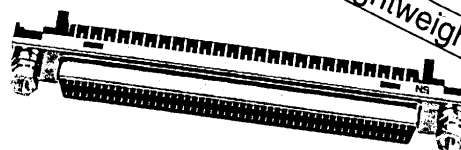
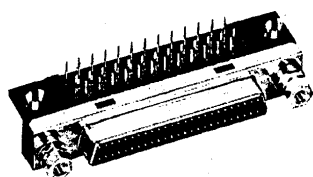


|    | a     | b     |
|----|-------|-------|
| 40 | 36.43 | 40.13 |
| 68 | 54.22 | 57.91 |

1) Contact number 1

Number of contacts

## 50-100



Lightweight version

Female connector solder pins, angled

Identification

No. of contacts

Part No.

Female connector  
with angled solder pins

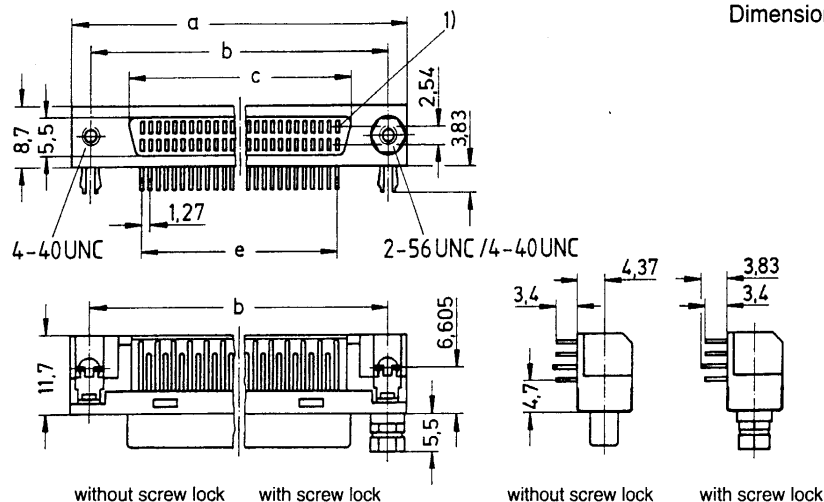
50  
68  
100

60 02 550 51 ..  
60 02 568 51 ..  
60 02 100 51 ..

With female screw lock 2-56 UNC 41  
With female screw lock 4-40 UNC 42  
Without female screw lock 50

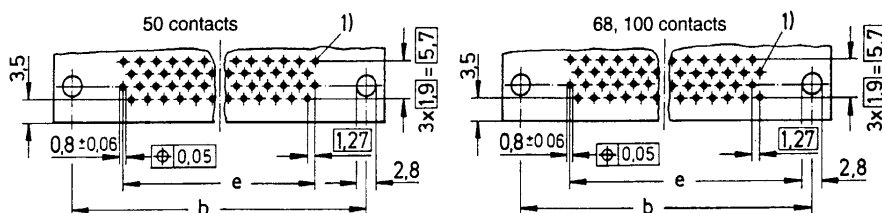
Female connector

Dimensions in mm

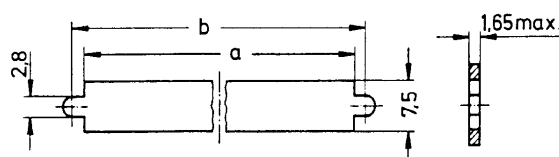


|     | a     | b <sub>±0.1</sub> | c     | e                 |
|-----|-------|-------------------|-------|-------------------|
| 50  | 52.45 | 46.48             | 34.65 | 24 x 1.27 = 30.48 |
| 68  | 63.88 | 57.91             | 46.08 | 33 x 1.27 = 41.91 |
| 100 | 84.20 | 78.23             | 66.40 | 49 x 1.27 = 62.23 |

Board drillings  
(Components side)



Panel cut out



|     | a     | b     |
|-----|-------|-------|
| 50  | 42.79 | 46.48 |
| 68  | 54.22 | 57.91 |
| 100 | 74.53 | 78.23 |

1) Contact number 1

Number of contacts

**50**



Male connector solder pins, angled

Identification

No. of contacts

Part No.

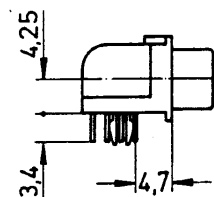
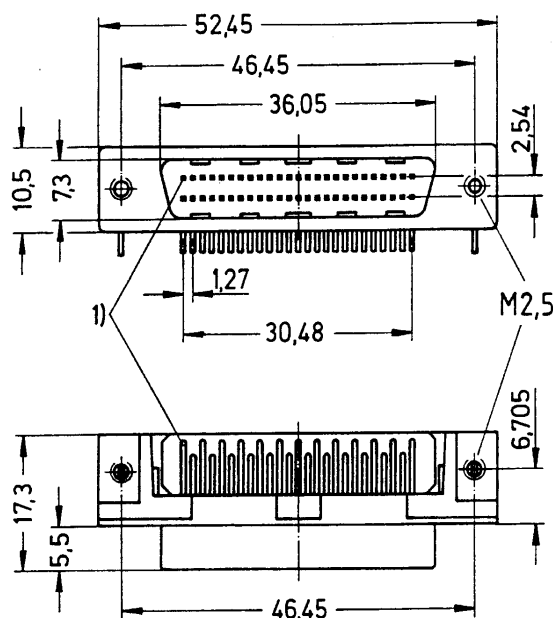
Male connector \*  
with angled solder pins

50

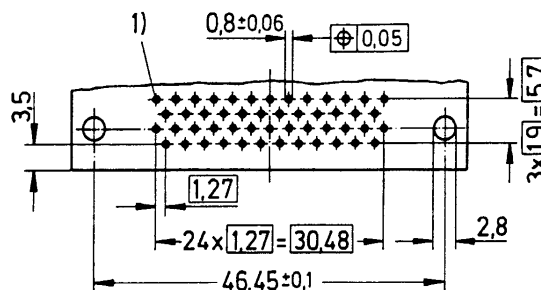
60 02 050 5252

Male connector

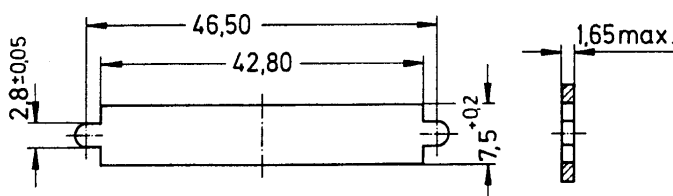
Dimensions in mm



Board drillings  
(Components side)

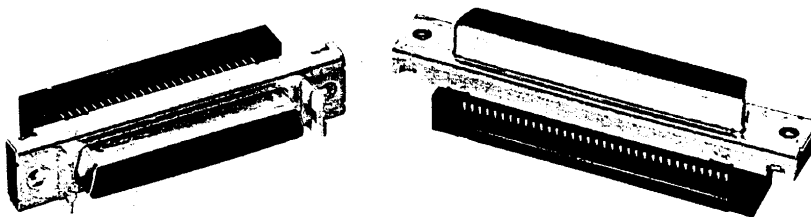


Panel cut out



Number of contacts

**50-68**



**Female connector for flat cable**

Identification

No. of contacts

Part No.

Female panel connector  
with insulation displacement  
termination

for flat cable pitch 0.635 mm  
AWG 30

with latch system

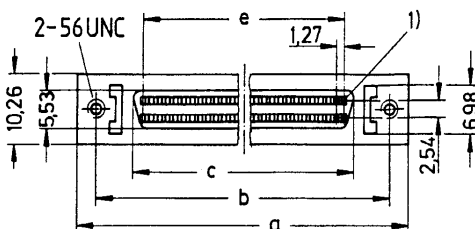
with screw lock system

50  
68

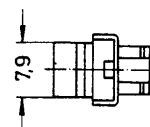
60 04 050 5343  
60 04 068 5343

60 04 050 5344  
60 04 068 5344

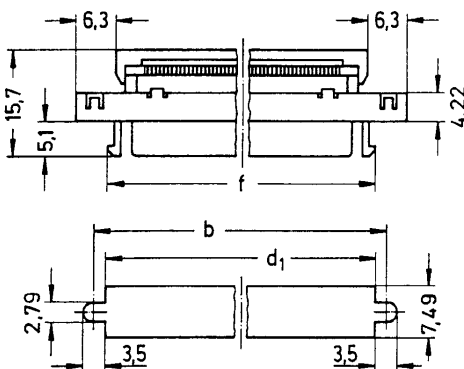
Female connector  
with latch system



Dimensions in mm.

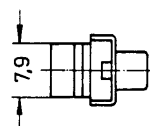
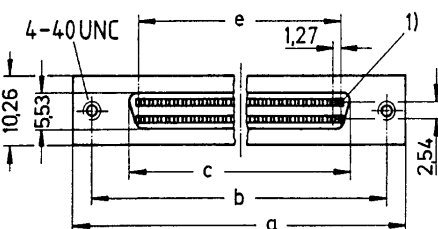


Panel cut out

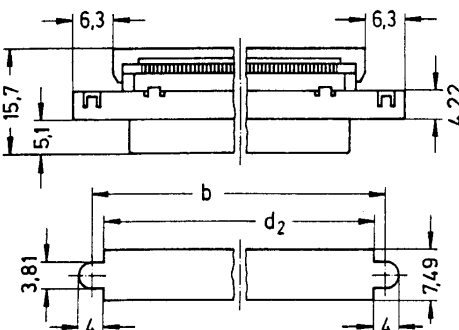


|    | a     | b     | c     | d <sub>1</sub> | d <sub>2</sub> | e     | f     |
|----|-------|-------|-------|----------------|----------------|-------|-------|
| 50 | 52.45 | 46.48 | 34.70 | 42.80          | 42.30          | 30.48 | 42.30 |
| 68 | 63.88 | 57.91 | 46.13 | 54.23          | 53.72          | 41.91 | 53.72 |

Female connector  
with screw lock system



Panel cut out



1) Contact number 1

Tools see page 40

## 20–100

Connector for discrete wire

Identification

Male and female connector  
with insulation displacement  
termination

for discrete wire  
AWG 28/30

Insulation Diameter (mm)

Ø = 0.50–0.65 00  
Ø = 0.65–0.80 10  
Ø = 0.80–0.88 20

No. of  
contacts

|     |
|-----|
| 20  |
| 26  |
| 28  |
| 36  |
| 40  |
| 50  |
| 68  |
| 80  |
| 100 |

Male connector

60 03 020 52 ..  
60 03 026 52 ..  
60 03 028 52 ..  
60 03 036 52 ..\*  
60 03 040 52 ..  
60 03 050 52 ..  
60 03 068 52 ..  
60 03 080 52 ..\*  
60 03 100 52 ..

Female connector

60 03 020 51 ..  
60 03 026 51 ..\*  
60 03 028 51 ..  
60 03 036 51 ..  
60 03 040 51 ..\*  
60 03 050 51 ..  
60 03 068 51 ..  
60 03 080 51 ..  
60 03 100 51 ..\*

Part No.

Available sizes

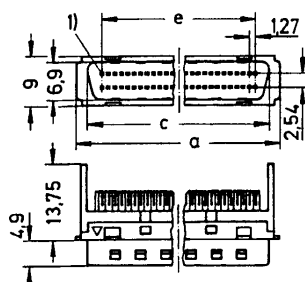
|   | Part No.       | Ø         | 20 | 26 | 28 | 36 | 40 | 50 | 68 | 80 | 100 |
|---|----------------|-----------|----|----|----|----|----|----|----|----|-----|
| M | 60 03 ... 5200 | 0.50–0.65 | ●  | ●  | ●  |    |    | ●  | ●  |    |     |
|   | 60 03 ... 5210 | 0.65–0.80 | ●  |    |    |    | ●  | ●  | ●  |    | ●   |
|   | 60 03 ... 5220 | 0.80–0.88 | ●  | ●  | ●  |    | ●  | ●  | ●  |    | ●   |
| F | 60 03 ... 5100 | 0.50–0.65 | ●  |    | ●  | ●  |    | ●  | ●  | ●  |     |
|   | 60 03 ... 5110 | 0.65–0.80 | ●  |    |    |    |    | ●  | ●  |    |     |
|   | 60 03 ... 5120 | 0.80–0.88 | ●  |    | ●  | ●  |    | ●  | ●  |    |     |

● = Available sizes

F = Female

M = Male

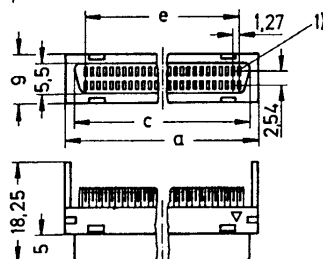
Male connector



Dimensions in mm

|     | a     | c     | d     | e     |
|-----|-------|-------|-------|-------|
| 20  | 21.25 | 17.00 | 16.75 | 11.43 |
| 26  | 25.06 | 20.81 | 20.56 | 15.24 |
| 28  | 26.33 | 22.08 | 21.83 | 16.51 |
| 40  | 33.95 | 29.70 | 29.45 | 24.13 |
| 50  | 40.30 | 36.05 | 35.80 | 30.48 |
| 68  | 51.73 | 47.48 | 47.23 | 41.91 |
| 100 | 72.05 | 67.80 | 67.55 | 62.23 |

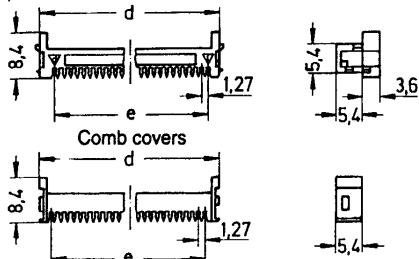
Female connector



|    | a     | c     | d     | e     |
|----|-------|-------|-------|-------|
| 20 | 19.25 | 15.60 | 16.75 | 11.43 |
| 28 | 24.33 | 20.68 | 21.83 | 16.51 |
| 36 | 29.41 | 25.76 | 26.91 | 21.59 |
| 50 | 38.30 | 34.65 | 35.80 | 30.48 |
| 68 | 49.73 | 46.08 | 47.23 | 41.91 |
| 80 | 57.35 | 53.70 | 54.85 | 49.53 |

Comb cover

(delivered with connectors)



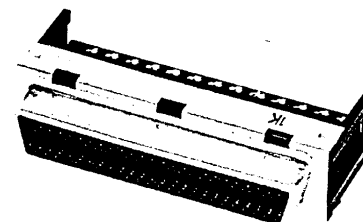
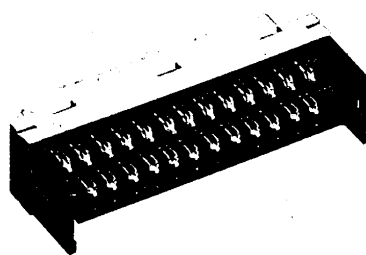
1) Contact number 1

Hoods see page 22, 23

Tools see page 37, 38, 39

Number of contacts

**20-68**

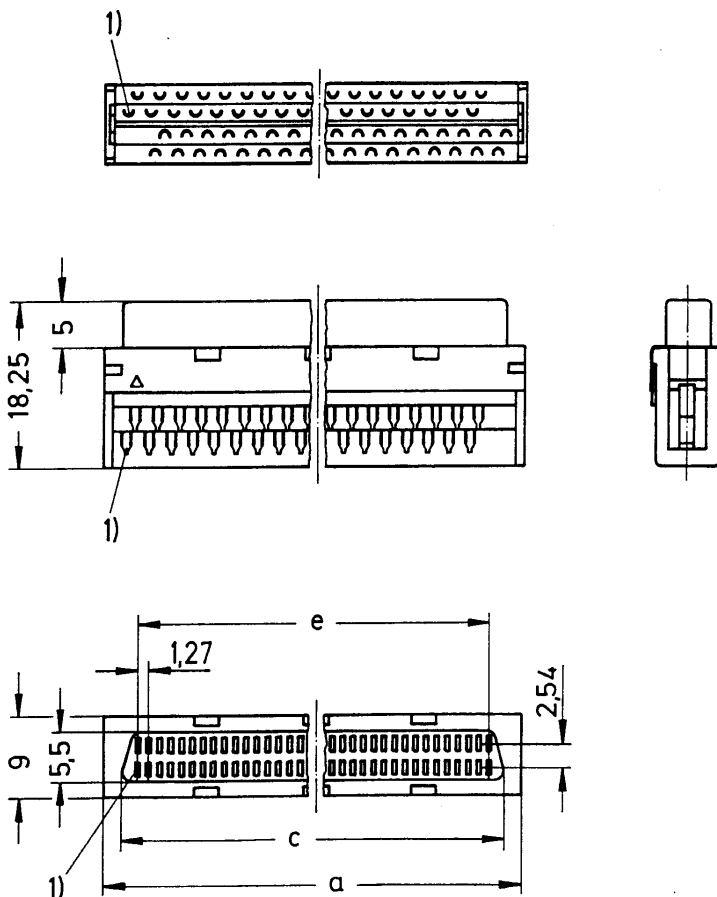


Female connector solder cup

| Identification                             | No. of contacts | Part No.       |
|--------------------------------------------|-----------------|----------------|
| Female connector with solder cup<br>AWG 24 | 20              | 60 03 020 5180 |
|                                            | 28              | 60 03 028 5180 |
|                                            | 36              | 60 03 036 5180 |
|                                            | 50              | 60 03 050 5180 |
|                                            | 68              | 60 03 068 5180 |

Female connector

Dimensions in mm.



1) Contact number 1

|    | a     | c     | e     |
|----|-------|-------|-------|
| 20 | 19.25 | 15.60 | 11.43 |
| 28 | 24.33 | 20.68 | 16.51 |
| 36 | 29.41 | 25.76 | 21.59 |
| 50 | 38.30 | 34.65 | 30.48 |
| 68 | 49.73 | 46.08 | 41.91 |

Number of contacts 20, 26, 28, 36, 50, 68, 80, 96

Pitch 1.27 mm

Working current 1 A

Working voltage 240 V ~

Test voltage  $U_{r.m.s.}$  750 V

Contact resistance  $\leq 40 \text{ m}\Omega$

Insulation resistance  $\geq 10^9 \text{ M}\Omega$

Temperature range  $-55^\circ\text{C} \dots +105^\circ\text{C}$

#### Terminations

Solder cup AWG 24  
Insulation max.  $\varnothing 1 \text{ mm}$

Solder pins Straight for PCB holes  
min.  $\varnothing 0.74 \text{ mm}$   
Angled  $90^\circ$  for PCB holes  
min.  $\varnothing 0.74 \text{ mm}$

Insulation displacement AWG 28 to AWG 30  
max. section:  $0.089 \text{ mm}^2$   
min. section:  $0.050 \text{ mm}^2$   
Insulation  $\varnothing$  min.  $0.50 \text{ mm}$   
 $\varnothing$  max.  $0.65 \text{ mm}$

#### Materials

Moulding Thermoplastic resin  
glass-fibre filled UL 94-V0

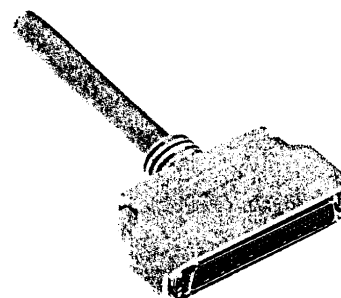
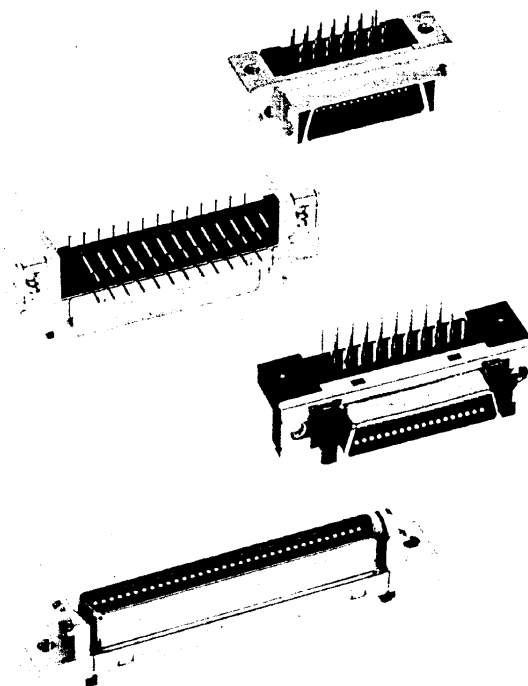
Contacts Copper alloy

Contact plating Selectively gold-plated

Metal shell Die cast zamac or stamped  
steel, nickel-plated

Hoods Die cast zamac, nickel-plated

Thermoplastic resin  
nickel-plated, steel insert

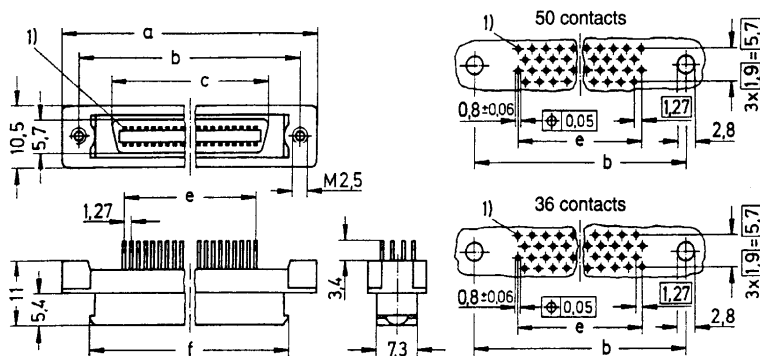


Connector solder pins, straight

| Identification                                      | No. of contacts | Part No.         |                  |
|-----------------------------------------------------|-----------------|------------------|------------------|
| Male and female connector with straight solder pins |                 | Male connector   | Female connector |
|                                                     | 20              | 60 11 020 5202 * | 60 11 020 5102   |
|                                                     | 26              | 60 11 026 5202 * | 60 11 026 5102   |
|                                                     | 36              | 60 11 036 5202   | 60 11 036 5102   |
|                                                     | 50              | 60 11 050 5202   | 60 11 050 5102   |
|                                                     | 68              | 60 11 068 5202 * | 60 11 068 5102   |
|                                                     | 80              | 60 11 080 5202 * | 60 11 080 5102   |

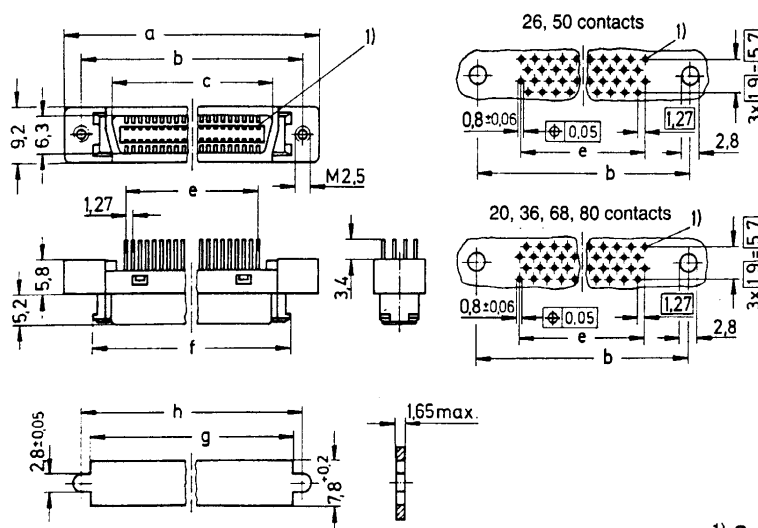
### Male connector

Dimensions in mm



|    | a     | b <sub>±0.1</sub> | c     | e                                | f     | g     | h     |
|----|-------|-------------------|-------|----------------------------------|-------|-------|-------|
| 20 | 33.35 | 27.45             | 16.45 | 9 x $\frac{1.27}{25.4} = 11.43$  | 23.30 | 23.70 | 27.45 |
| 26 | 37.16 | 31.26             | 20.26 | 12 x $\frac{1.27}{25.4} = 15.24$ | 27.11 | 27.50 | 31.25 |
| 36 | 43.51 | 37.61             | 26.61 | 17 x $\frac{1.27}{25.4} = 21.59$ | 33.46 | 33.90 | 37.60 |
| 50 | 52.40 | 46.50             | 35.50 | 24 x $\frac{1.27}{25.4} = 30.48$ | 42.35 | 42.80 | 46.50 |
| 68 | 63.83 | 57.93             | 46.93 | 33 x $\frac{1.27}{25.4} = 41.91$ | 53.78 | 54.20 | 57.90 |
| 80 | 71.45 | 65.55             | 54.55 | 39 x $\frac{1.27}{25.4} = 49.53$ | 61.40 | 61.80 | 65.55 |

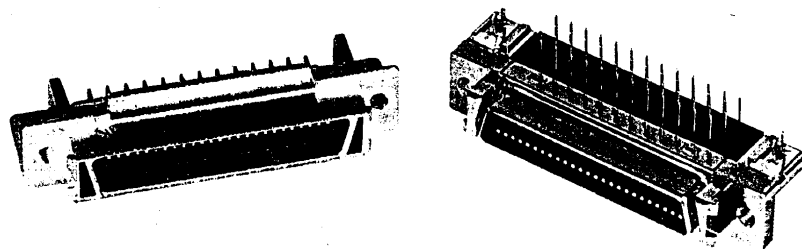
## Female connector



Panel cut out

Number of contacts

## 20-96



Connector solder pins, angled

Identification

Male and female connector  
with angled solder pins

No. of  
contacts

20  
26  
28  
36  
50  
68  
80  
96

Male connector

60 11 020 5232  
60 11 026 5232 \*  
60 11 028 5232  
60 11 036 5232  
60 11 050 5232  
60 11 068 5232  
60 11 080 5232  
60 11 096 5232

Part No.

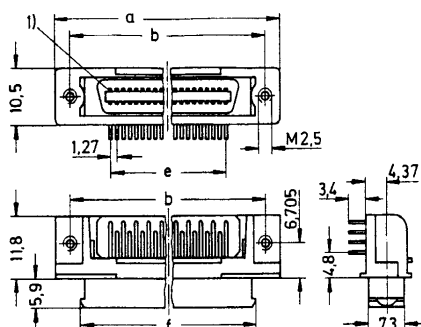
Female connector

60 11 020 51 ..  
60 11 026 51 ..  
60 11 028 51 .. \*  
60 11 036 51 ..  
60 11 050 51 ..  
60 11 068 51 ..  
60 11 080 51 ..  
60 11 096 51 .. \*

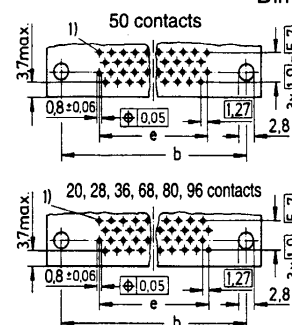
Without board lock  
With board lock

32  
40

Male connector

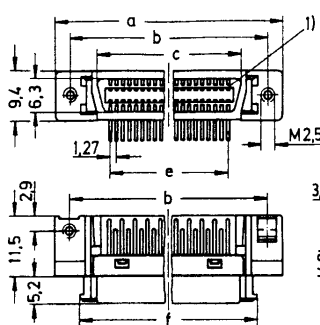


Dimensions in mm

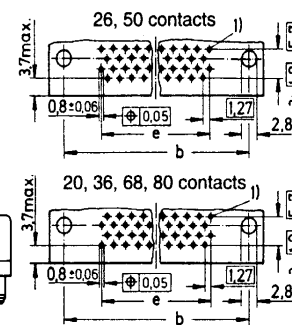


|    | a     | b $\pm 0.1$ | c     | e                 | f     | g     | h     |
|----|-------|-------------|-------|-------------------|-------|-------|-------|
| 20 | 33.40 | 27.40       | 16.45 | 9 x 1.27 = 11.43  | 23.30 | 23.70 | 27.45 |
| 26 | 37.16 | 31.26       | 20.26 | 12 x 1.27 = 15.24 | 27.11 | 27.50 | 31.25 |
| 28 | 38.48 | 32.48       | -     | 13 x 1.27 = 16.51 | 28.38 | 28.80 | 32.50 |
| 36 | 43.56 | 37.56       | 26.61 | 17 x 1.27 = 21.59 | 33.46 | 33.90 | 37.60 |
| 50 | 52.45 | 46.45       | 35.50 | 24 x 1.27 = 30.48 | 42.35 | 42.80 | 46.50 |
| 68 | 63.88 | 57.88       | 46.93 | 33 x 1.27 = 41.91 | 53.78 | 54.20 | 57.90 |
| 80 | 71.50 | 65.50       | 54.55 | 39 x 1.27 = 49.53 | 61.40 | 61.80 | 65.55 |
| 96 | 81.66 | 75.66       | -     | 47 x 1.27 = 59.69 | 71.56 | 72.00 | 75.65 |

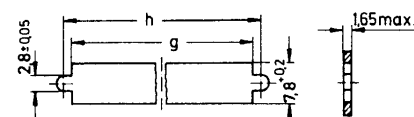
Female connector



without board lock \* with board lock



Panel cut out

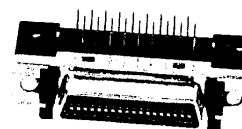
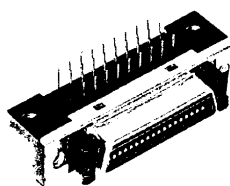


1) Contact number 1

Number of contacts

## 36-50

Lightweight version



Female connector solder pins, angled

Identification

Female connector  
with angled solder pins

No. of  
contacts

36  
50

Part No.

60 11 536 51 ..

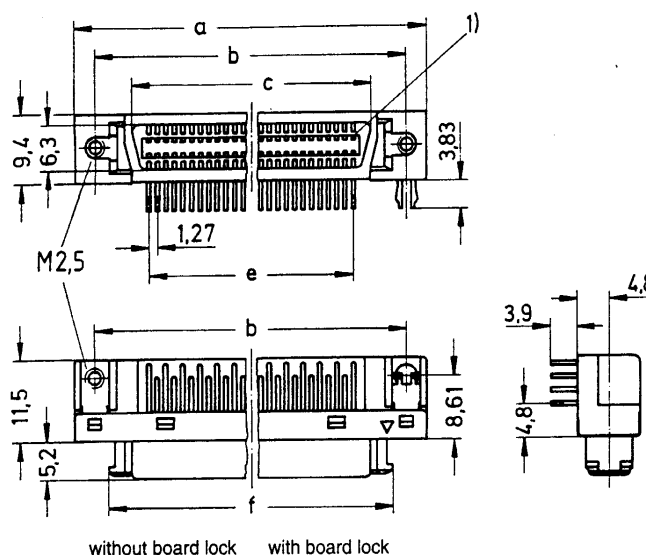
60 11 550 51 ..

Without board lock  
With board lock

32  
40

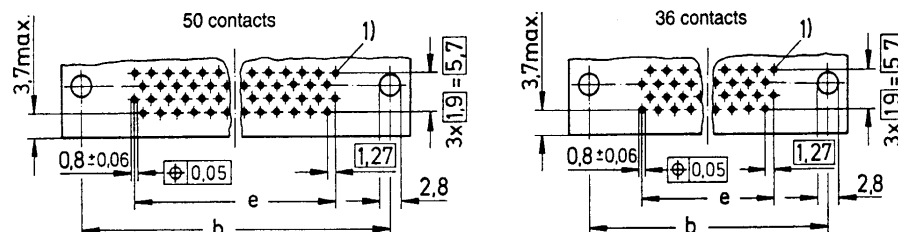
Female connector

Dimensions in mm

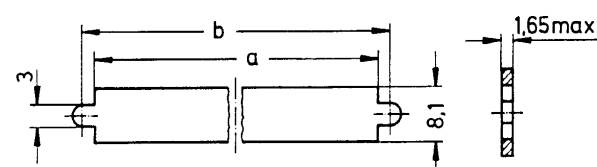


|    | a     | b <sub>±0.1</sub> | c     | e                 | f     |
|----|-------|-------------------|-------|-------------------|-------|
| 36 | 43.51 | 37.61             | 26.61 | 17 x 1.27 = 21.59 | 33.46 |
| 50 | 52.40 | 46.50             | 35.50 | 24 x 1.27 = 30.48 | 42.35 |

Board drillings  
(Components side)



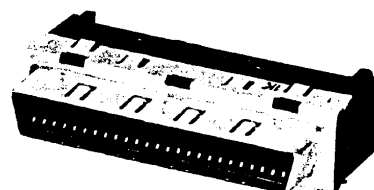
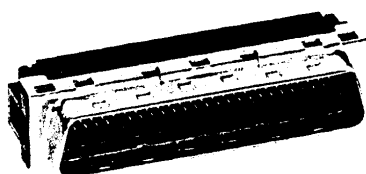
Panel cut out



|    | a     | b     |
|----|-------|-------|
| 36 | 33.96 | 37.61 |
| 50 | 42.85 | 46.48 |

1) Contact number 1

## 20-96



### Connector for discrete wire

#### Identification

Male and female connector  
with insulation displacement  
termination

for discrete wire  
AWG 28/30

Insulation Diameter (mm)  
Ø = 0.50-0.65

#### No. of contacts

20  
26  
28  
36  
50  
68  
80  
96

#### Male connector

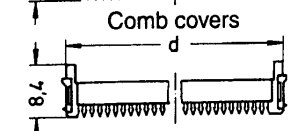
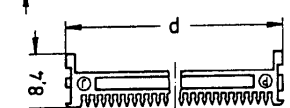
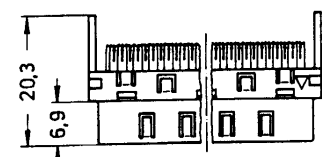
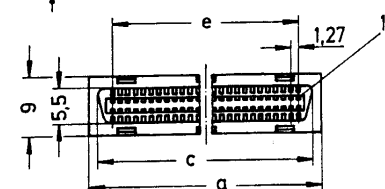
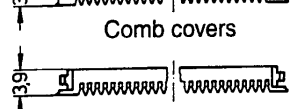
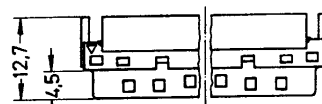
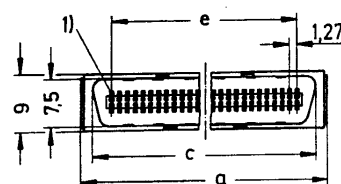
60 13 020 5200  
60 13 026 5200  
60 13 028 5200 \*  
60 13 036 5200  
60 13 050 5200  
60 13 068 5200  
60 13 080 5200  
60 13 096 5200 \*

#### Part No.

#### Female connector

60 13 020 5100  
60 13 026 5100 \*  
60 13 028 5100  
60 13 036 5100  
60 13 050 5100  
60 13 068 5100  
60 13 080 5100  
60 13 096 5100

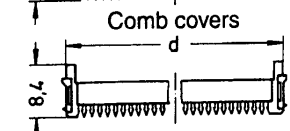
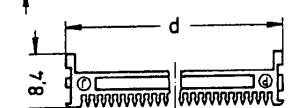
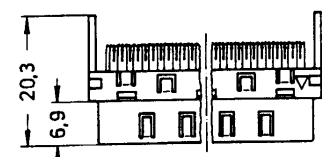
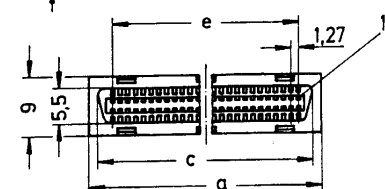
#### Male connector



#### Dimensions in mm

|    | a     | c     | e     |
|----|-------|-------|-------|
| 20 | 21.24 | 17.55 | 11.43 |
| 26 | 25.05 | 21.36 | 15.24 |
| 36 | 31.40 | 27.71 | 21.59 |
| 50 | 40.29 | 36.60 | 30.48 |
| 68 | 51.72 | 48.03 | 41.91 |
| 80 | 59.34 | 55.65 | 49.53 |

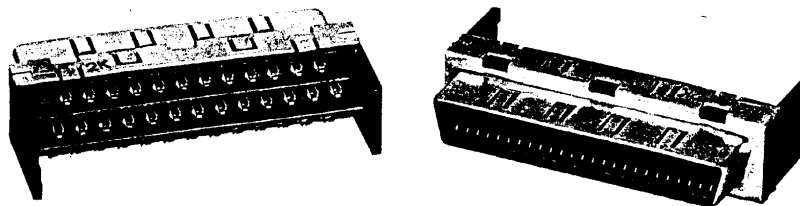
#### Female connector



|    | a     | c     | d     | e     |
|----|-------|-------|-------|-------|
| 20 | 19.25 | 16.25 | 16.75 | 11.43 |
| 28 | 24.33 | 21.33 | 21.83 | 16.51 |
| 36 | 29.41 | 26.41 | 26.91 | 21.59 |
| 50 | 38.30 | 35.30 | 35.80 | 30.48 |
| 68 | 49.73 | 46.73 | 47.23 | 41.91 |
| 80 | 57.35 | 54.35 | 54.85 | 49.53 |
| 96 | 67.51 | 64.51 | 65.01 | 59.69 |

Number of contacts

**20-50**



**Female connector solder cup**

Identification

Female connector  
with solder cup  
AWG 24

No. of  
contacts

20  
28  
36  
50

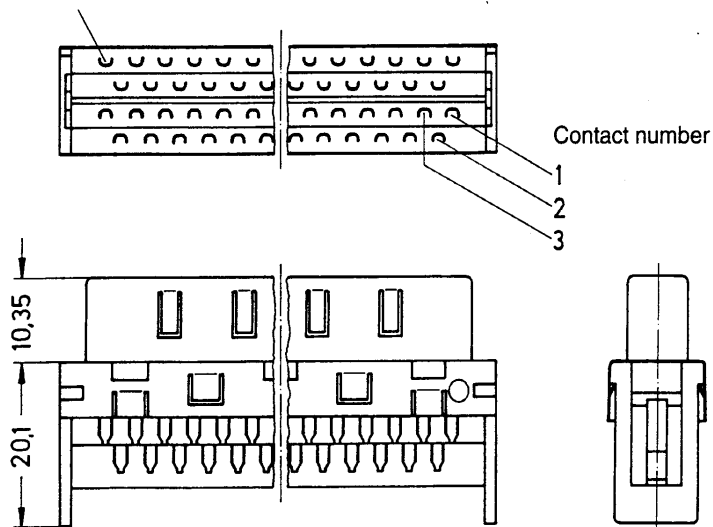
Part No.

60 13 020 5180  
60 13 028 5180  
60 13 036 5180  
60 13 050 5180

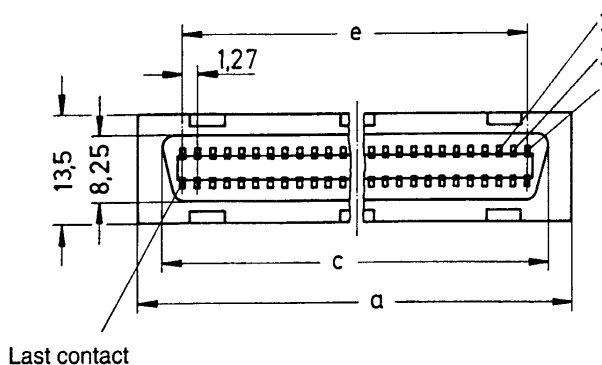
Female connector

Dimensions in mm

Last contact

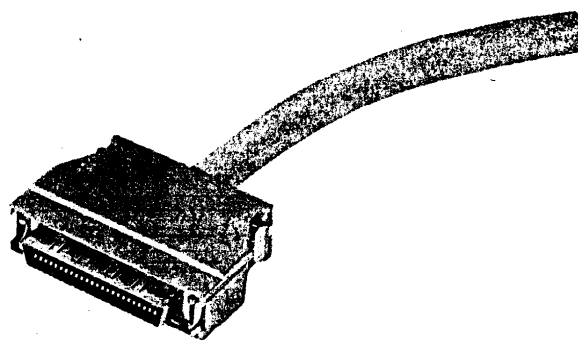


Contact number



|    | a     | c     | e     |
|----|-------|-------|-------|
| 20 | 19.25 | 16.25 | 11.43 |
| 28 | 24.33 | 21.33 | 16.51 |
| 36 | 29.41 | 26.41 | 21.59 |
| 50 | 38.30 | 35.30 | 30.48 |

**Metal hoods for male and female pin and socket and for female bellows connector**

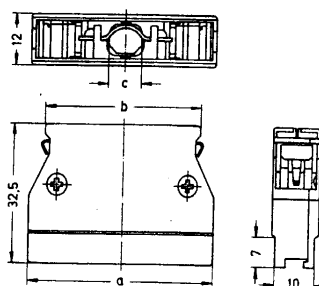


Identification      No. of contacts      Part No.      Drawing      Dimensions in mm

**Metal hood**

Standard cable entry

|    |                |
|----|----------------|
| 20 | 60 03 020 0155 |
| 28 | 60 03 028 0155 |
| 36 | 60 03 036 0155 |
| 50 | 60 03 050 0155 |
| 68 | 60 03 068 0155 |

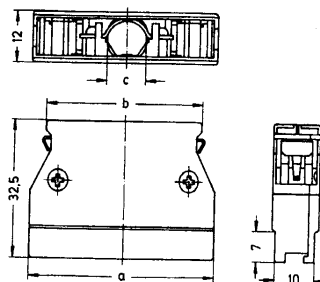


|    | a     | b     | c           |
|----|-------|-------|-------------|
| 20 | 28.95 | 21.15 | 6.50 x 4.50 |
| 28 | 34.03 | 26.23 | 6.50 x 6.00 |
| 36 | 39.11 | 31.31 | 9.50 x 8.00 |
| 50 | 48.00 | 40.20 | 8.50 x 7.00 |
| 68 | 59.43 | 51.63 | 9.00 x 8.00 |

**Metal hood**

Large cable entry

|    |                |
|----|----------------|
| 20 | 60 03 020 0255 |
| 26 | 60 03 026 0255 |
| 28 | 60 03 028 0255 |
| 36 | 60 03 036 0255 |
| 40 | 60 03 040 0255 |
| 50 | 60 03 050 0255 |
| 68 | 60 03 068 0255 |

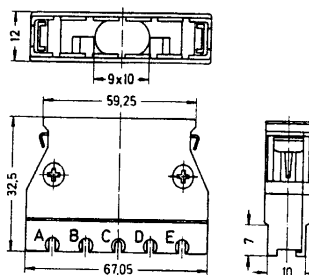


|    | a     | b     | c             |
|----|-------|-------|---------------|
| 20 | 28.95 | 21.15 | 8.00 x 8.50   |
| 26 | 32.76 | 24.96 | 8.00 x 6.75   |
| 28 | 34.03 | 26.23 | 8.50 x 7.20   |
| 36 | 39.11 | 31.31 | 9.00 x 10.00  |
| 40 | 41.65 | 33.85 | 9.00 x 10.00  |
| 50 | 48.00 | 40.20 | 9.00 x 10.00  |
| 68 | 59.43 | 51.63 | 9.00 x 10.00  |
| 96 | 77.21 | 69.41 | 10.00 x 11.00 |

**Metal hood with polarization**

Large cable entry

|    |                |
|----|----------------|
| 80 | 60 03 080 0455 |
|----|----------------|



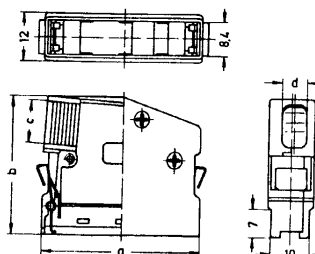
| A     | B     | C            |
|-------|-------|--------------|
| 67.05 | 59.25 | 9.00 x 10.00 |

For other size, please consult us.

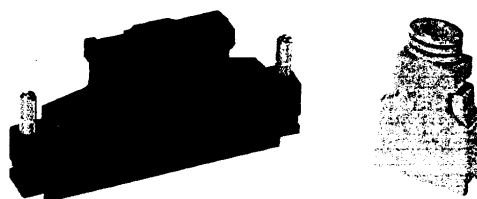
**Metal hood**

Right angled cable entry

|    |                |
|----|----------------|
| 40 | 60 03 040 0555 |
| 50 | 60 03 050 0555 |

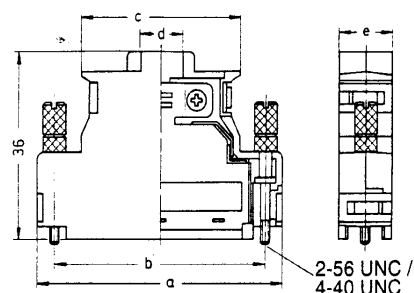


|    | a     | b    | c     | d    |
|----|-------|------|-------|------|
| 40 | 41.65 | 33.8 | 10.60 | 6.34 |
| 50 | 48.00 | 35.5 | 11.38 | 6.70 |



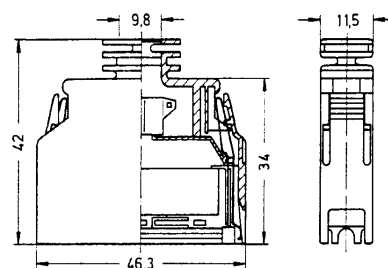
## Plastic hood with internal metal screen

| Identification                               | No. of contacts | Part No.        | Drawing | Dimensions in mm |
|----------------------------------------------|-----------------|-----------------|---------|------------------|
| Plastic hood with internal screen            |                 |                 |         |                  |
| for male and female pin and socket range and | 50              | 60 03 050 01 .. |         |                  |
| for female bellows range                     | 68              | 60 03 068 01 .. |         |                  |
|                                              | 100             | 60 03 100 01 .. |         |                  |
| With male jack screw 2-56 UNC                | 43              |                 |         |                  |
| With male jack screw 4-40 UNC                | 46              |                 |         |                  |



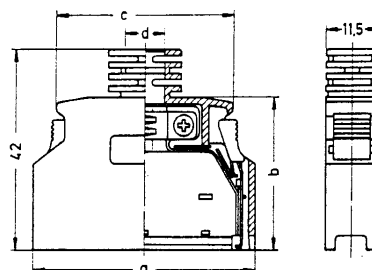
|     | a     | b     | c     | d     | e     |
|-----|-------|-------|-------|-------|-------|
| 50  | 54.00 | 46.48 | 35.00 | 10.50 | 15.00 |
| 68  | 65.41 | 57.91 | 38.40 | 14.00 | 16.00 |
| 100 | 85.73 | 78.23 | 42.00 | 13.00 | 17.00 |

|                                              |    |                |
|----------------------------------------------|----|----------------|
| Plastic hood with internal screen            |    |                |
| for male and female pin and socket range and | 50 | 60 03 050 0153 |
| for female bellows range                     |    |                |



Hand crimp tool for internal screen see page 39

|                                   |    |                |
|-----------------------------------|----|----------------|
| Plastic hood with internal screen |    |                |
| for male bellows range            |    |                |
|                                   | 20 | 60 13 020 0153 |
|                                   | 26 | 60 13 026 0153 |
|                                   | 36 | 60 13 036 0153 |
|                                   | 50 | 60 13 050 0153 |
|                                   | 68 | 60 13 068 0153 |
|                                   | 80 | 60 13 080 0153 |



|    | a     | b     | c     | d    |
|----|-------|-------|-------|------|
| 20 | 29.65 | 34.50 | 19.95 | 6.80 |
| 26 | 33.46 | 38.31 | 23.76 | 7.10 |
| 36 | 39.81 | 32.00 | 30.11 | 8.20 |
| 50 | 48.70 | 32.00 | 39.00 | 8.70 |
| 68 | 60.13 | 32.00 | 50.43 | 9.10 |
| 80 | 67.75 | 32.00 | 58.05 | 9.70 |

Identification

Single-end  
alternative 1

No. of  
contacts

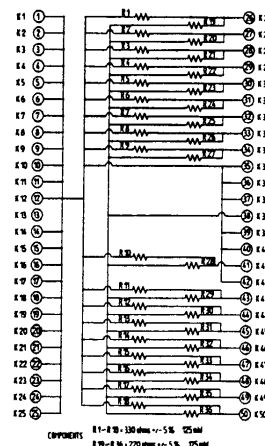
Part No.

Drawing

Dimensions in mm

50

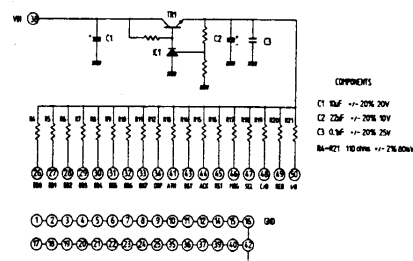
60 03 050 1001



Single-end  
alternative 2

50

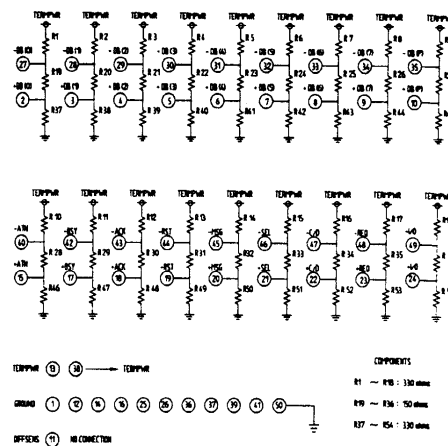
60 03 050 1002



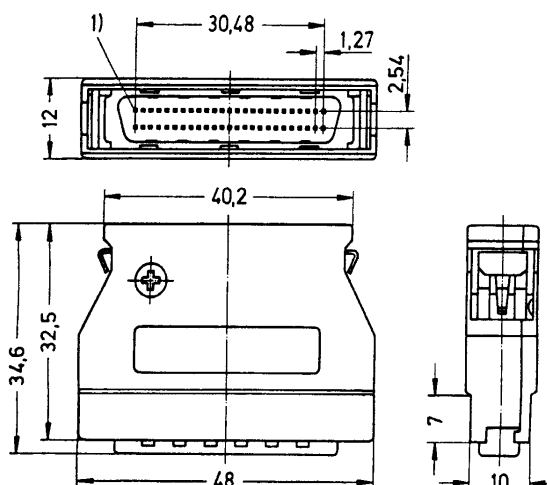
Differential

50

60 03 050 1003



Dimensions



Identification  
Differential

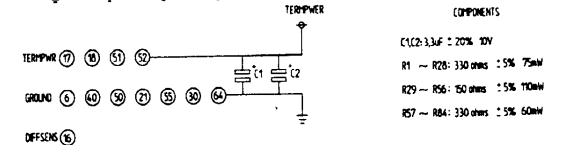
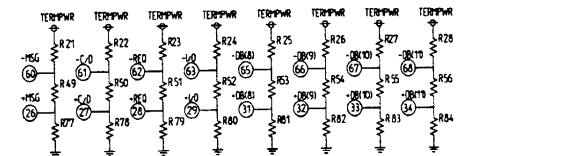
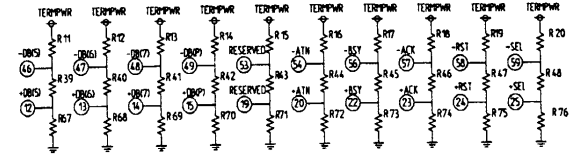
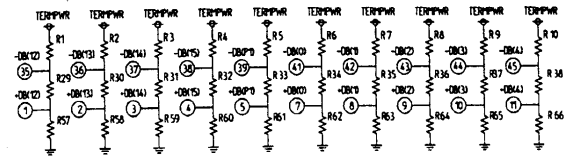
No. of  
contacts

Part No.

Drawing

Dimensions in mm

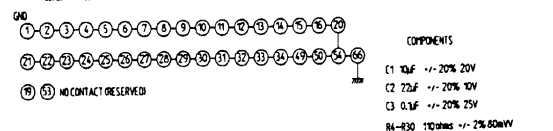
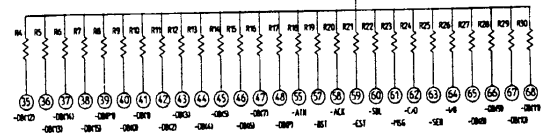
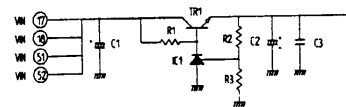
68 60 03 068 1004



COMPONENTS  
C1, C2: 3.3µF ± 20% 50V  
R1 ~ R28: 330 ohms ± 5% 75mW  
R29 ~ R56: 150 ohms ± 5% 100mW  
R57 ~ R84: 330 ohms ± 5% 50mW

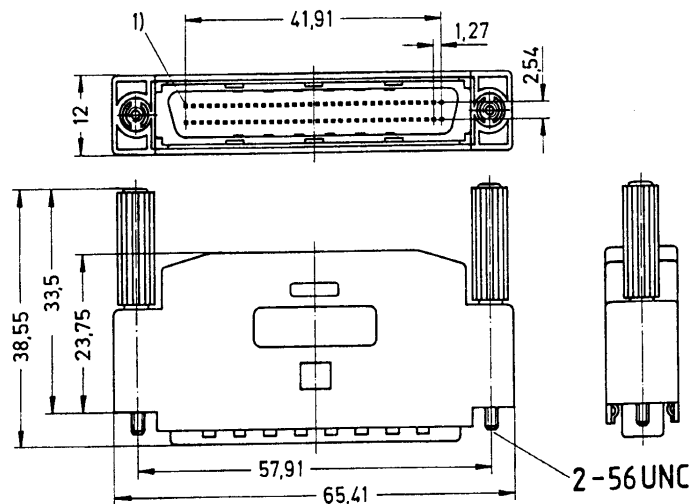
Single-end  
alternative 2

68 60 03 068 1005



COMPONENTS  
C1 10µF ± 20% 20V  
C2 22µF ± 20% 10V  
C3 0.1µF ± 20% 25V  
R1-R30 100 ohms ± 2% 50mW

Dimensions





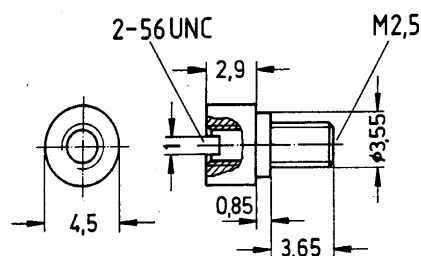
## Female screw lock

Identification      Part No.      Drawing      Dimensions in mm

### Screw lock

Thread: M 2.5 / 2-56 UNC  
Height: 2.9 mm

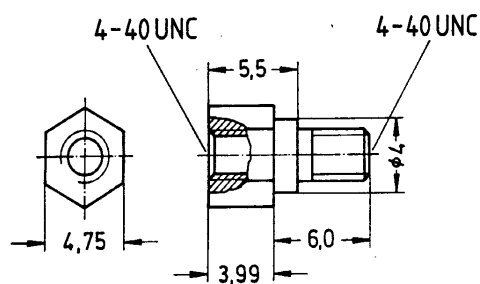
60 01 000 9013



### Screw lock

Thread: 4.40 UNC / 4.40 UNC  
Height: 3.99 mm

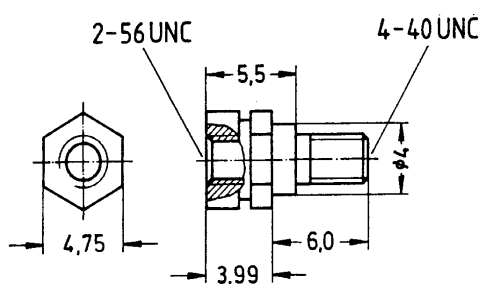
60 01 000 9018



### Screw lock

Thread: 4.40 UNC / 2-56 UNC  
Height: 3.99 mm

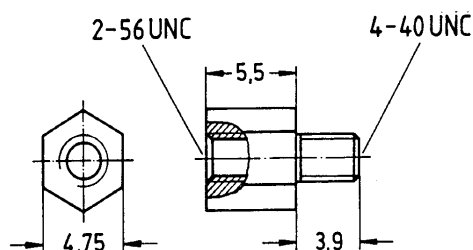
60 01 000 9019



### Screw lock

Thread: 4.40 UNC / 2-56 UNC  
Height: 5.5 mm

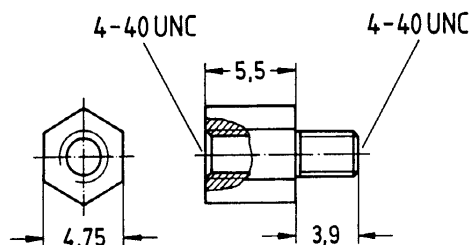
60 01 000 9020



### Screw lock

Thread: 4.40 UNC / 4.40 UNC  
Height: 5.5 mm

60 01 000 9021



**for economical  
and reliable  
connections**

A comprehensive range of high density Intra-Cabinet connectors based on two mating design concepts:

- Blade and fork contact in the Pin/Socket range.
- Leaf contact in the Bellows range.

Available in a various number of contacts according to the following international standards and applications:

- Small Computer System Interface  
SCSI-2  
SCSI-2 wide  
SCSI-3

- S Bus  
IEEE 1496

- Mezzanine/parallel stacking boards spaced at distances between 8 mm and 14 mm in 1 mm incremental steps.

- Internal Bus extension through "Daisy chain" inter-linking via 0.635 mm pitch flat cable. The 4-point design of the IDC contact provides accurate and reliable termination even with Teflon cable.

UL recognised

For Customer specific applications we can design and manufacture solutions to match your requirement.

Sales Department  
HARTING-Components

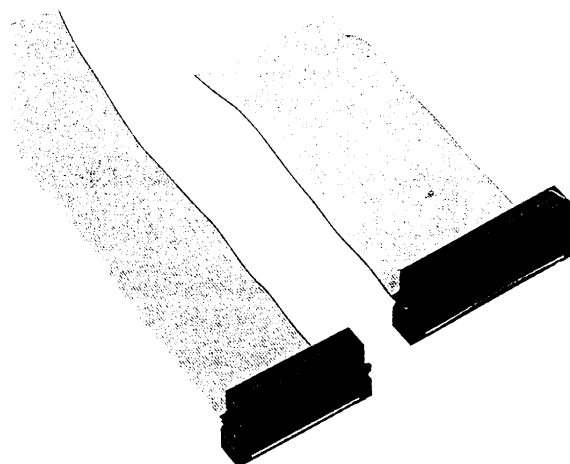
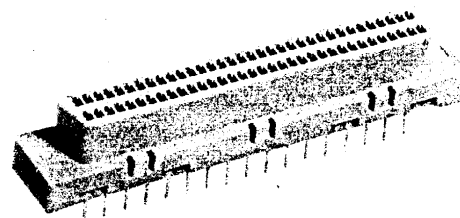
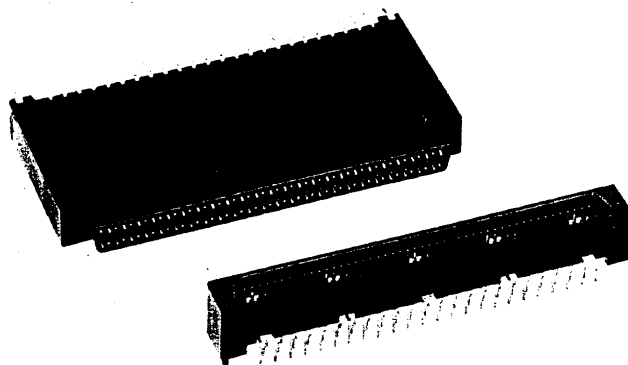


Certified according to DIN EN ISO 9001  
in design/development, production,  
installation and servicing

|                           |                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Pitch                     | 1.27 mm                                                                                                                               |
| Working current           |                                                                                                                                       |
| P.C.B. Connector          | 1 A                                                                                                                                   |
| Flat cable connector      | 0,5 A                                                                                                                                 |
| Working voltage           |                                                                                                                                       |
| P.C.B. Connector          | 240 V ~                                                                                                                               |
| Flat cable connector      | 100 V ~                                                                                                                               |
| Test voltage $U_{r.m.s.}$ |                                                                                                                                       |
| P.C.B. Connector          | 750 V                                                                                                                                 |
| Flat cable connector      | 500 V                                                                                                                                 |
| Contact resistance        | $\leq 25 \text{ m}\Omega$                                                                                                             |
| Insulation resistance     | $\geq 10^3 \text{ M}\Omega$                                                                                                           |
| Temperature range         | $-55 \text{ }^\circ\text{C} \dots +105 \text{ }^\circ\text{C}$                                                                        |
| Terminations              |                                                                                                                                       |
| Solder pins               | Straight for PCB holes<br>min. $\varnothing 0.74 \text{ mm}$<br>Angled $90^\circ$ for PCB holes<br>min. $\varnothing 0.74 \text{ mm}$ |
| Insulation displacement   | Flat cable<br>AWG 30 pitch 0.635 mm                                                                                                   |
| Materials                 |                                                                                                                                       |
| Moulding                  | Thermoplastic resin<br>glass-fibre filled UL 94-V0                                                                                    |
| Contacts                  |                                                                                                                                       |
| P.C.B. Connector          | Copper alloy                                                                                                                          |
| Flat cable connector      | Beryllium copper                                                                                                                      |
| Contact plating           | Selectively gold-plated                                                                                                               |

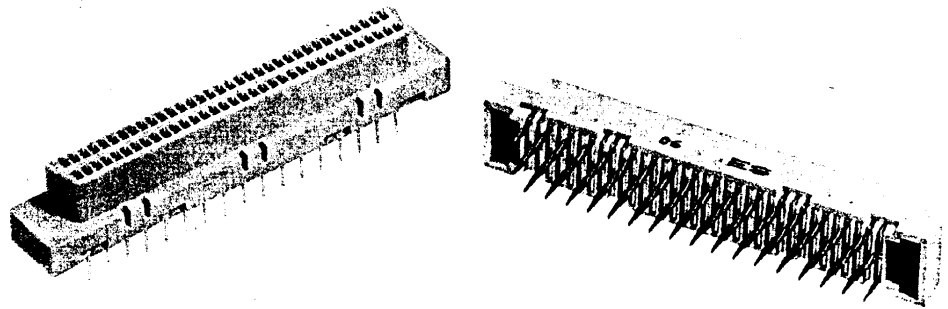
### Press-in

|                                                 |                                                                                   |
|-------------------------------------------------|-----------------------------------------------------------------------------------|
| Insertion process                               | Flat rock                                                                         |
| Maximum press-in force per contact              | 100 N                                                                             |
| Minimum push out force per contact              | 15 N                                                                              |
| Number of repairs                               | 2                                                                                 |
| Recommended Board characteristics finished hole | $\varnothing 0.6 \begin{smallmatrix} +0.07 \\ -0.05 \end{smallmatrix} \text{ mm}$ |
| Drilled hole size                               | $\varnothing 0.7 / 0.74 \text{ mm}$                                               |
| Cu                                              | 30 – 60 $\mu\text{m}$                                                             |
| Sn                                              | 5 – 20 $\mu\text{m}$                                                              |
| Board thickness                                 | 1.6 – 3.2 mm                                                                      |



Number of contacts

## 68



Female connector solder and Press-in pins, straight

Identification

Female connector  
with straight pins

No. of  
contacts

68

Solder

60 05 068 5100

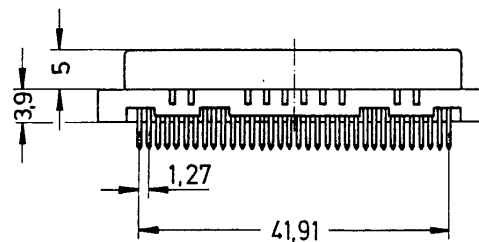
Part No.

Press-in

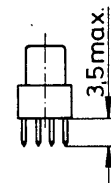
60 05 068 5300

Female connector

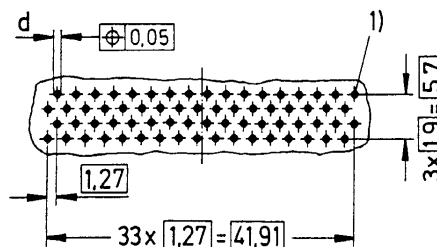
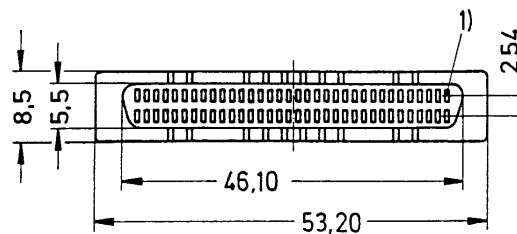
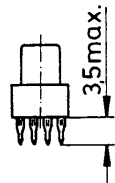
Dimensions in mm



Solder



Press-in



Board drillings  
(Components side)

|          | d              |
|----------|----------------|
| Solder   | 0.8 $\pm$ 0.06 |
| Press-in | 0.6 $\pm$ 0.07 |

1) Contact number 1

Press-in recommended  
characteristics finished hole

Drilled hole size

Cu  
Sn

Board thickness

Ø 0.6  $\pm$ 0.07  
-0.05 mm

Ø 0.71 / 0.74 mm

30-60  $\mu$ m  
5-20  $\mu$ m

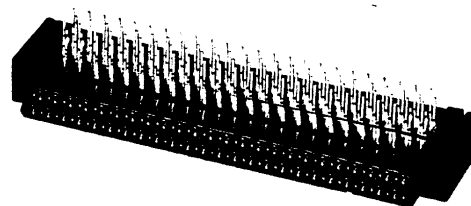
1.6-3.2 mm

Note: Moulding material LCP allowing  
reflow for SMC process

Tools see page 40

Number of contacts

**68**



Female connector solder pins, angled

Identification

No. of contacts

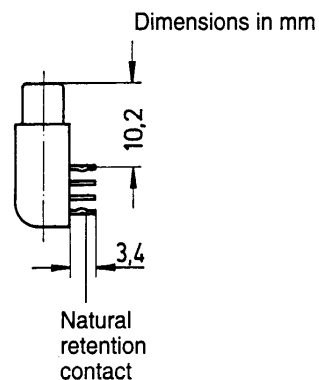
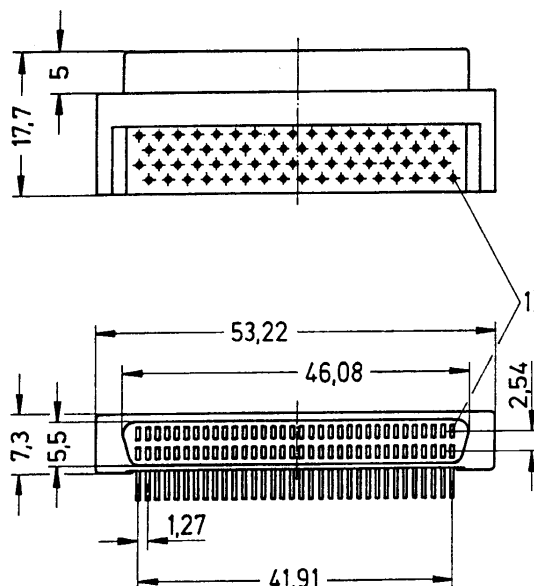
Part No.

Female connector angled  
with natural retention solder  
pins

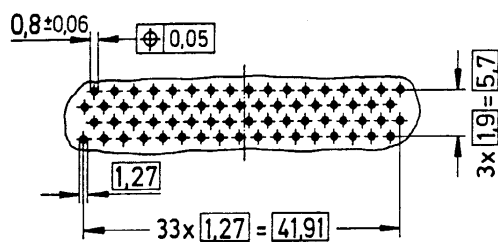
68

60 05 068 5143

Female connector

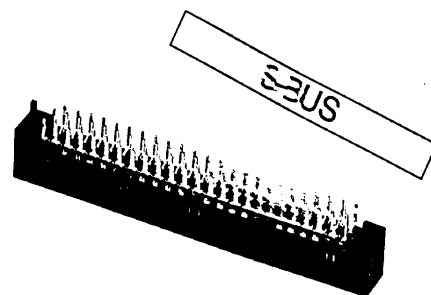


Board drillings  
(Components side)



Number of contacts

**96**



## Male connector natural retention solder pins

Identification

Male connector straight  
with natural retention solder  
pins

No. of  
contacts

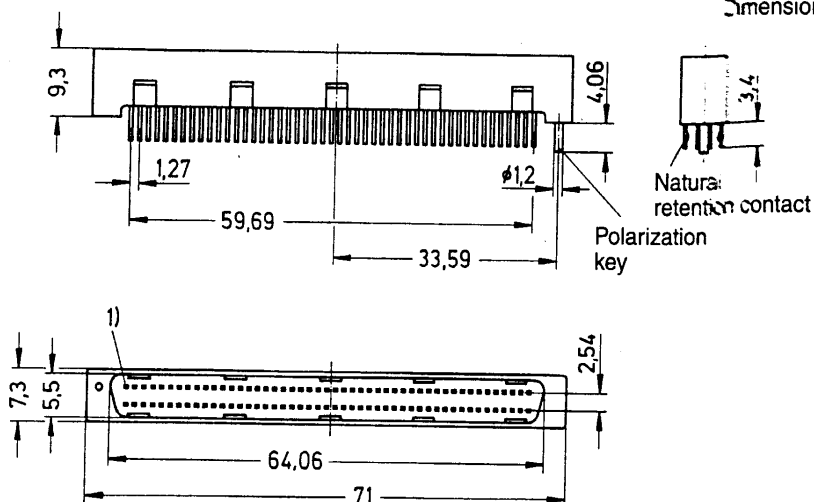
96

Part No.

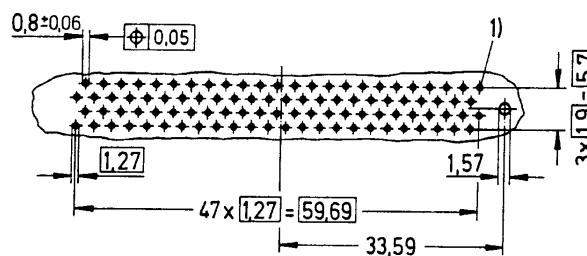
60 05 096 5218

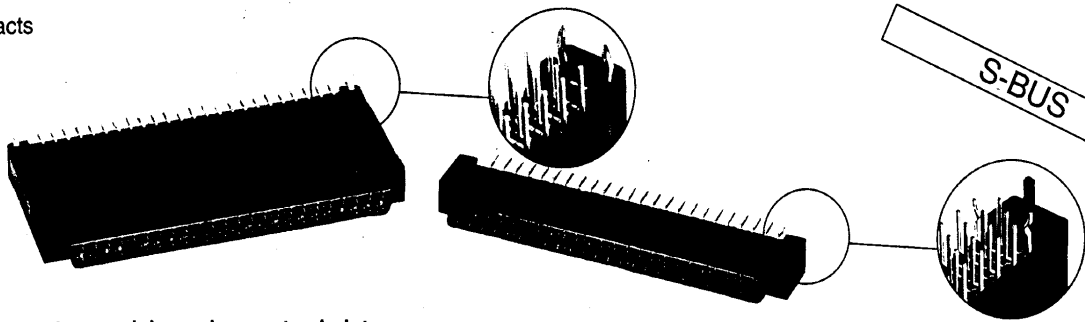
## Male connector

Dimensions in mm



## Board drillings (Components side)





Female connector solder pins, straight

Identification

Female connector  
with straight solder pins

No. of  
contacts

96

Part No.

34.80 mm high version

60 05 096 5121

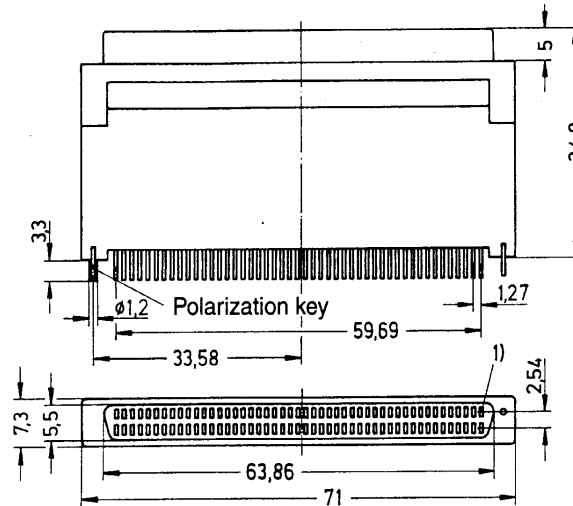
14.45 mm high version

60 05 096 5118

Female connector

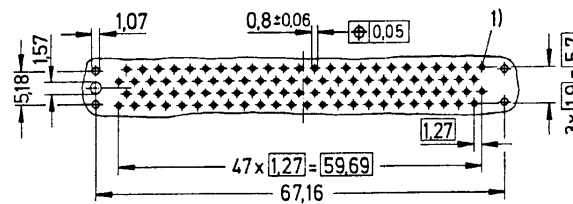
34.80 mm high version  
with board lock

Dimensions in mm

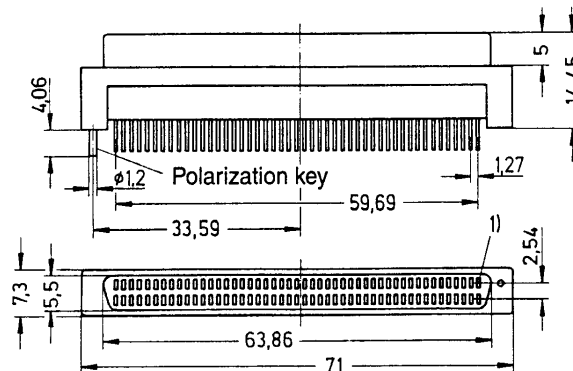


Board drillings

(Components side)

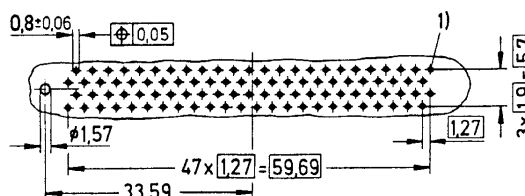


14.45 mm high version  
with natural retention pins

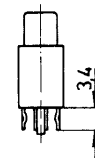


Board drillings

(Components side)



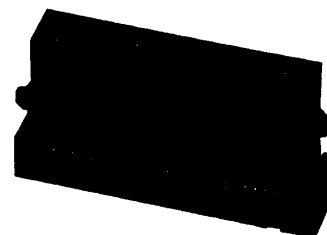
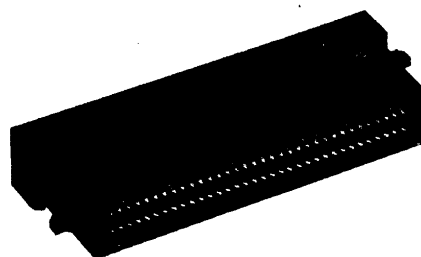
1) Contact number 1



1) Contact number 1

Number of contacts

## 50-68



### Male connector for flat cable

#### Identification

Male connector with insulation displacement termination

for flat cable pitch 0.635 mm  
AWG 30

Strain relief order separately

No. of contacts

50  
68

Male connector

60 06 050 5440

60 06 068 5440

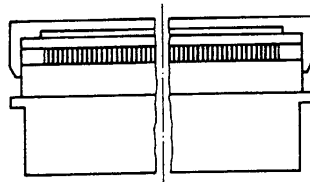
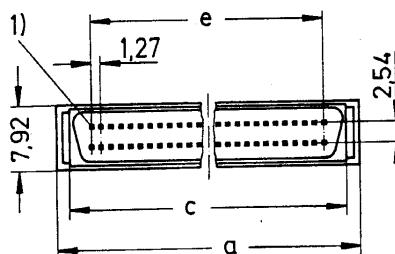
Part No.

Strain relief

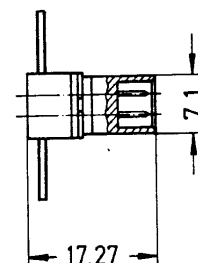
60 06 050 9001

60 06 068 9001

#### Male connector

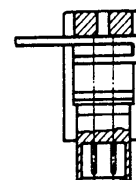
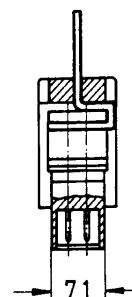
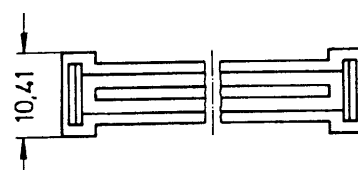
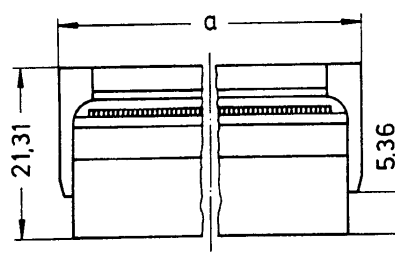


Dimensions in mm



|    | a     | c     | e     |
|----|-------|-------|-------|
| 50 | 39.75 | 36.19 | 30.48 |
| 68 | 51.18 | 47.62 | 41.91 |

#### Strain relief



|    | a     |
|----|-------|
| 50 | 39.83 |
| 68 | 53.44 |

1) Contact number 1

Tools see page 40

Number of contacts 20, 30, 40, 50, 60, 70, 80, 90, 100, 120

Distance between boards

Pitch 1.27 mm

Working current 1 A

Working voltage 240 V ~

Test voltage  $U_{r.m.s.}$  750 V

Contact resistance  $\leq 35 \text{ m}\Omega$

Insulation resistance  $\geq 10^3 \text{ M}\Omega$

Temperature range  $-55^\circ\text{C} \dots +105^\circ\text{C}$

### Terminations

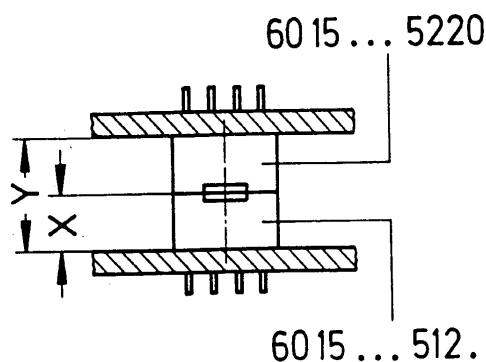
Solder pins Straight for PCB holes  
min.  $\varnothing 0.74 \text{ mm}$

### Materials

Moulding Thermoplastic resin  
glass-fibre filled UL 94-V0

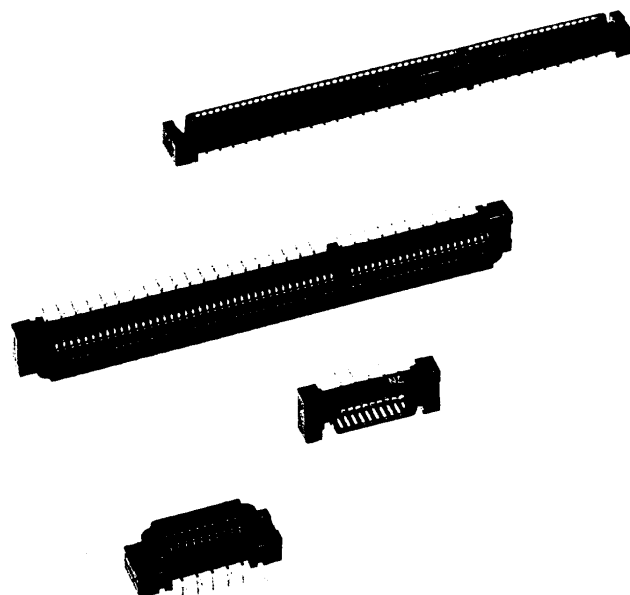
Contacts Copper alloy

Plating Selectively gold-plated



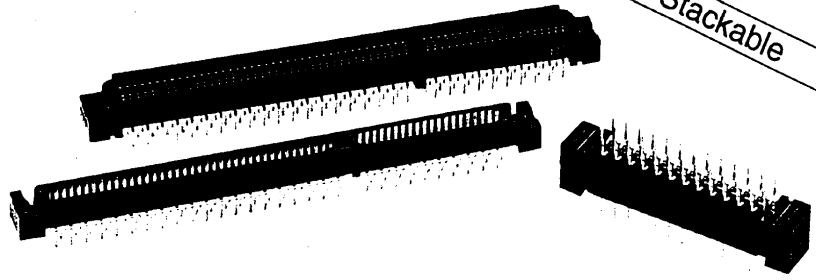
| Type            | X     | Y  |
|-----------------|-------|----|
| 60 15 ... 5122  | 4.10  | 8  |
| 60 15 ... 5123* | 5.10  | 9  |
| 60 15 ... 5124  | 6.10  | 10 |
| 60 15 ... 5125* | 7.10  | 11 |
| 60 15 ... 5126  | 8.10  | 12 |
| 60 15 ... 5127* | 9.10  | 13 |
| 60 15 ... 5128  | 10.10 | 14 |

\* Not kept in stock



## 20-120

Connector solder pins, straight



Stackable

Identification

Male and female connector with solder pins, straight

Distance between boards = Y  
see page 34

|       |     |
|-------|-----|
| 8 mm  | 2   |
| 9 mm  | 3 * |
| 10 mm | 4   |
| 11 mm | 5 * |
| 12 mm | 6   |
| 13 mm | 7 * |
| 14 mm | 8   |

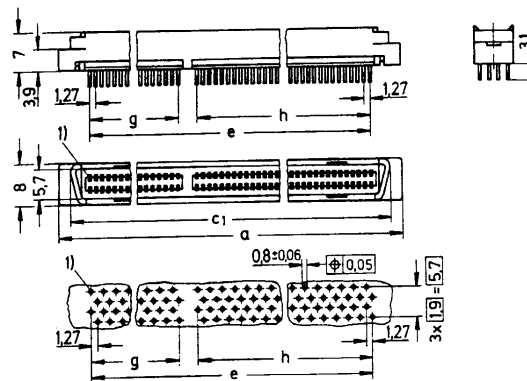
No. of contacts

Part No.

|     | Male connector   | Female connector  |
|-----|------------------|-------------------|
| 20  | 60 15 020 5220   | 60 15 020 512 .   |
| 30  | 60 15 030 5220 * | 60 15 030 512 . * |
| 40  | 60 15 040 5220   | 60 15 040 512 .   |
| 50  | 60 15 050 5220   | 60 15 050 512 .   |
| 60  | 60 15 060 5220   | 60 15 060 512 .   |
| 70  | 60 15 070 5220 * | 60 15 070 512 . * |
| 80  | 60 15 080 5220   | 60 15 080 512 .   |
| 90  | 60 15 090 5220 * | 60 15 090 512 . * |
| 100 | 60 15 100 5220   | 60 15 100 512 .   |
| 120 | 60 15 120 5220   | 60 15 120 512 .   |

Dimensions in mm

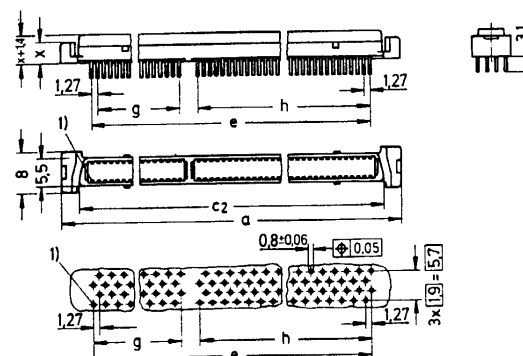
Male connector



Board drillings  
(Components side)

|     | a     | c <sub>1</sub> | c <sub>2</sub> | e                 | g                 | h                 |
|-----|-------|----------------|----------------|-------------------|-------------------|-------------------|
| 20  | 24.05 | 19.27          | 16.77          | 9 x 1.27 = 11.43  | —                 | —                 |
| 30  | 30.40 | 25.62          | 23.12          | 14 x 1.27 = 17.78 | —                 | —                 |
| 40  | 36.75 | 31.97          | 29.47          | 19 x 1.27 = 24.13 | —                 | —                 |
| 50  | 43.10 | 38.32          | 35.82          | 24 x 1.27 = 30.48 | —                 | —                 |
| 60  | 49.45 | 44.67          | 42.17          | 29 x 1.27 = 36.83 | —                 | —                 |
| 70  | 55.80 | 51.02          | 48.52          | 34 x 1.27 = 43.18 | —                 | —                 |
| 80  | 62.15 | 57.37          | 54.87          | 39 x 1.27 = 49.53 | —                 | —                 |
| 90  | 68.50 | 63.92          | 61.22          | 44 x 1.27 = 55.88 | —                 | —                 |
| 100 | 74.85 | 70.07          | 67.57          | 49 x 1.27 = 62.23 | —                 | —                 |
| 120 | 90.09 | 85.31          | 82.81          | 61 x 1.27 = 77.47 | 19 x 1.27 = 24.13 | 39 x 1.27 = 49.53 |

Female connector



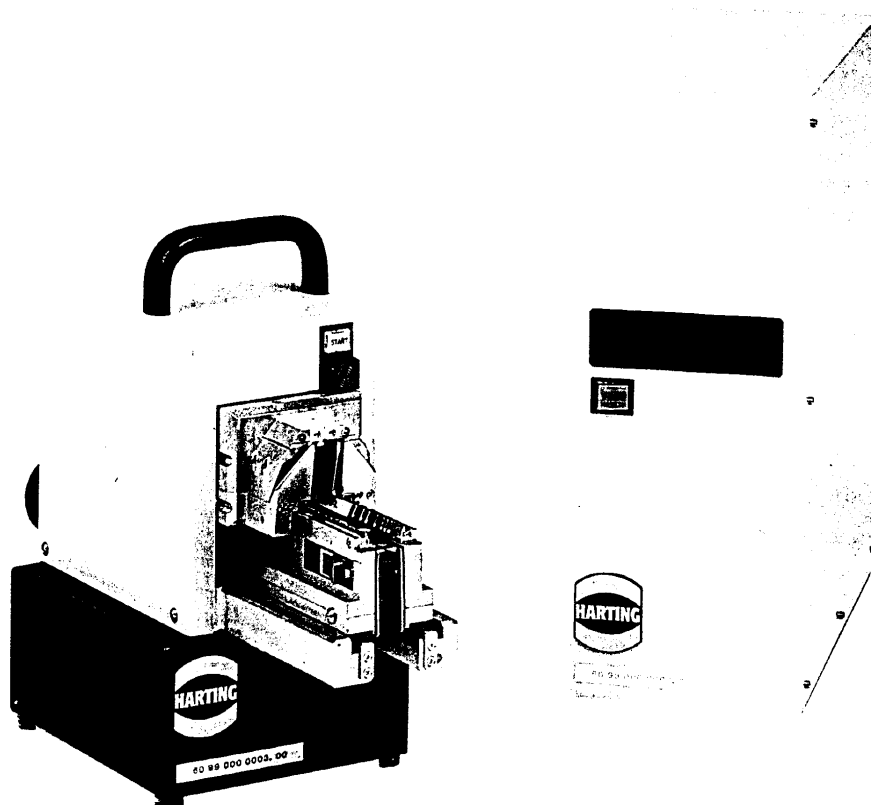
| X     | Type            |
|-------|-----------------|
| 4.10  | 60 15 ... 5122  |
| 5.10  | 60 15 ... 5123* |
| 6.10  | 60 15 ... 5124  |
| 7.10  | 60 15 ... 5125* |
| 8.10  | 60 15 ... 5126  |
| 9.10  | 60 15 ... 5127* |
| 10.10 | 60 15 ... 5128  |

Board drillings  
(Components side)

1) Contact number 1

## TOOLS

- A comprehensive range of high density Input/Output and Intra-Cabinet connectors is only useful if supported by adequate and efficient termination tooling.
- HARTING has therefore designed a range of tools to offer the most efficient processing solution to satisfy a Customer's manufacturing demand:
  - Small to medium size production volume.  
Managed with hand tool or semi-automatic tool.
  - Medium to large size production volume managed with highly efficient automatic machines.



Semi-automatic machine CAT 60

Tools for insulation displacement termination  
for Pin and socket and Bellows range

Selection chart for semi-automatic assembly machine CAT 60

| for Connector                                                               | Semi automatic machine | Support plates | Adaptator      | Head and table | Hand press     |
|-----------------------------------------------------------------------------|------------------------|----------------|----------------|----------------|----------------|
| Female Pin and socket<br>60 03 ... 5100<br>60 03 ... 5110<br>60 03 ... 5120 | 60 99 000 0003         | 60 99 000 0004 | 60 99 ... 0006 | 60 99 000 0008 | 60 99 000 0007 |
| Male Pin and socket<br>60 03 ... 5200<br>60 03 ... 5210<br>60 03 ... 5220   |                        |                | 60 99 ... 0005 | 60 99 000 0010 |                |
| Female Bellows<br>60 13 ... 5100                                            |                        |                | 60 99 ... 0014 | 60 99 000 0015 |                |
| Male Bellows<br>60 13 ... 5200                                              |                        | 60 99 000 0012 | 60 99 ... 0013 | 60 99 000 0016 |                |

Number of contacts

Tools for insulation displacement termination  
for Pin and socket and Bellows range

Selection chart for hand assembly

| for Connector                                                               | Hand cable aligner | Head and table | Hand press     |
|-----------------------------------------------------------------------------|--------------------|----------------|----------------|
| Female Pin and socket<br>60 03 ... 5100<br>60 03 ... 5110<br>60 03 ... 5120 | 60 99 000 0011     | 60 99 000 0008 | 60 99 000 0007 |
| Male Pin and socket<br>60 03 ... 5200<br>60 03 ... 5210<br>60 03 ... 5220   |                    | 60 99 000 0010 |                |
| Female Bellows<br>60 13 ... 5100                                            |                    | 60 99 000 0015 |                |
| Male Bellows<br>60 13 ... 5200                                              | 60 99 000 0017     | 60 99 000 0016 |                |

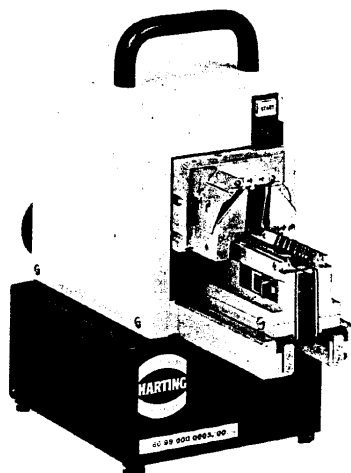
Number of contacts

Identification

Part No

Semi-automatic machine  
CAT 60

60 99 000 0003



CAT 60

Support plates  
for Pin and socket and female  
Bellows connector

60 99 000 0004

Support plates  
for male Bellows connector

60 99 000 0012



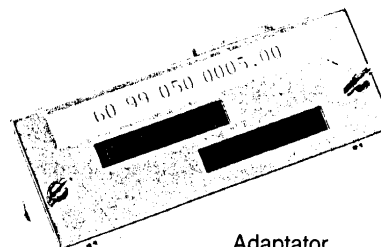
Support plates

Adaptor  
for female Pin and socket connector,  
page 14

60 99 ... 0006

Adaptor  
for male Pin and socket connector,  
page 14

60 99 ... 0005



Adaptator

Adaptor  
for female Bellows connector;  
page 20

60 99 ... 0014

Adaptor  
for male Bellows connector,  
page 20

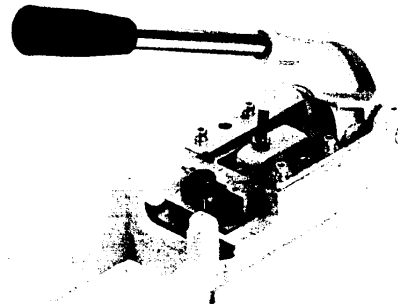
60 99 ... 0013

Identification

Part No

Hand press

60 99 000 0007



Head and table  
for female Pin and socket  
connector

60 99 000 0008

Hand press

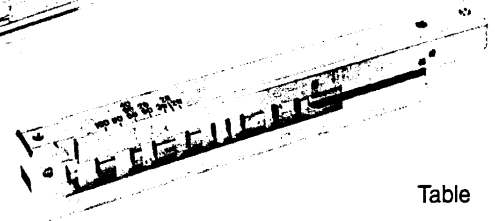
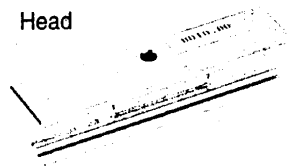
Head and table  
for male Pin and socket connector

60 99 000 0010

Head and table  
for female Bellows connector

60 99 000 0015

Head



Table

Head and table  
for male Bellows connector

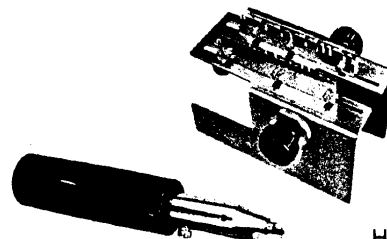
60 99 000 0016

Hand cable aligner  
for Pin and socket and  
female Bellows connector

60 99 000 0011

Hand cable aligner  
for male Bellows connector

60 99 000 0017



Hand cable aligner

Hand crimp tool  
for 60 03 050 0153

60 99 000 0029



Hand crimp tool

Identification

Part No

Hand press  
for Press-in connector

09 99 000 0201

Bottom tool  
for Press-in connector

60 99 000 0031

Top tool  
for Press-in connector

09 99 000 0197

Base plate  
for Press-in connector

09 99 000 0255

Press-out tool  
for Press-in connector

60 99 000 0032

Component Press-in Machine  
CPM 2000

on request

Microprocessor controlled automatic Press-in machine  
for technical detail please consult us

Bench press  
for IDC flat cable  
Pitch 0.635 mm

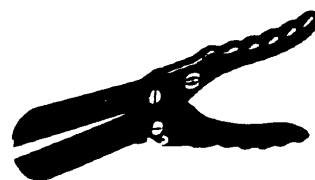
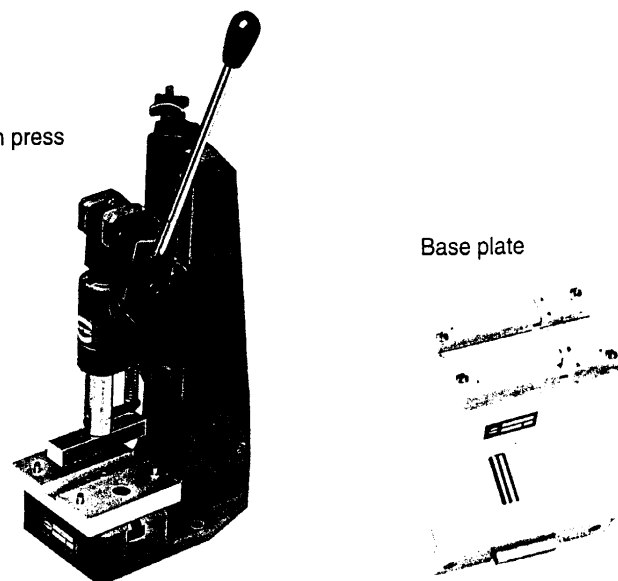
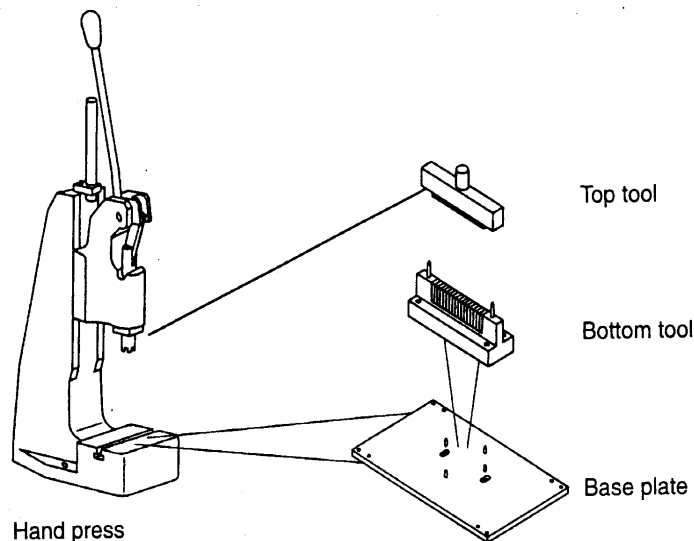
09 99 000 0114

Base plate  
for IDC flat cable  
Pitch 0.635 mm

60 99 000 0034

Cable cutter  
for IDC flat cable

09 99 000 0116



## CABLES

- A 0.635 mm flat cable range in PVC material for general requirements and in FEP material for high impedance matched SCSI-2/3 applications, both being compatible with Harting's 4-point insulation displacement contact design. UL recognised.
- An ultra flexible twisted pair shielded cable suitable for use with our *har-mik®* IDC discrete wire cable connector range. UL recognised.

### Cable assemblies

- HARTING can supply cable assemblies to customer specifications.
- A wide range of connector types available with various contact arrangements constitute the ideal solution to your wiring problems.
- A range of compatible cables are available in economic reel lengths.

### Quality

- Cables professionally assembled on HARTING harnessing machines ensure reliable termination.
- Finished harnesses are subject to 100% quality checks: eg.
- Insulation test
- Contact resistance test.

### Economy

- The tested assembly of connectors and cables from one manufacturer ensures high product reliability at the best possible price.
- Investment for harnessing machines and finished assembly test equipment is not required.
- Stocks of piece parts are not required.

## **Identification**

Twisted pair cable  
 with braid shield  
 AWG 28  
 Length per reel: 100 m

## **No. of pairs**

10  
 13  
 14  
 18  
 20  
 25  
 34  
 40  
 48  
 50

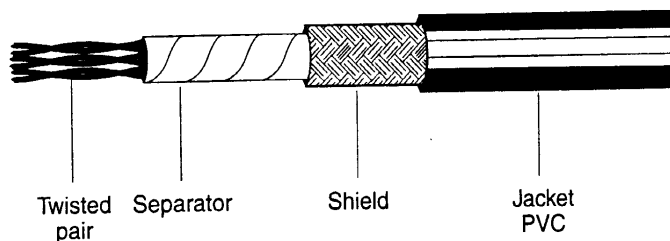
## **Part No.**

60 90 010 6003  
 60 90 013 6003  
 60 90 014 6003  
 60 90 018 6003  
 60 90 020 6003  
 60 90 025 6003  
 60 90 034 6003  
 60 90 040 6003  
 60 90 048 6003  
 60 90 050 6003

## **Drawing**

| No. of pairs | Outside diameter |      |
|--------------|------------------|------|
|              | Nominal          | Max  |
| 10           | 6.2              | 6.5  |
| 13           | 6.5              | 6.8  |
| 14           | 6.5              | 6.8  |
| 18           | 7.4              | 7.7  |
| 20           | 7.7              | 8.2  |
| 25           | 8.2              | 8.5  |
| 34           | 8.7              | 9.0  |
| 40           | 9.9              | 10.4 |
| 48           | 10.1             | 10.6 |
| 50           | 10.6             | 11.1 |

Dimensions in mm



## **Technical characteristics**

Number of pairs      10, 13, 14, 18, 20, 25, 34,  
                                  40, 48, 50

Propagation velocity      60 %

Voltage rating      30 V (UL 2789)

Temperature range      - 20 °C ... + 105 °C

Maximum conductor  
 resistance (20 °C)      233 Ω/km

## **Materials pairs**

Conductor      7 x 0.13 mm stranded  
                                  tinned copper

Minimum insulation  
 resistance (20 °C)      1 MΩ/km

Insulation (except 50 pairs)      PVC Ø 0.62 mm

Nominal differential  
 impedance (TDR)      85 Ω

Shield      Tinned copper braid,  
                                  covering ≥ 80 %

Nominal differential  
 capacitance (1 kHz)      110 pF/m

Jacket      PVC

## Identification

### Flat cable

for IDC connector  
Pitch 0.635 mm  
AWG 30  
Length per reel: 100 ft  
30.48 m

## No. of wires

|    |
|----|
| 50 |
| 68 |

## PVC

## Part No.

## FEP

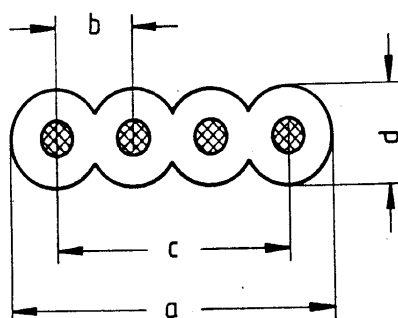
60 90 050 6008

60 90 068 6008

60 90 050 6007\*

60 90 068 6007\*

## Drawing



Dimensions in mm

|    | a<br>± 0.25 | b<br>± 0.05 | c<br>± 0.2 | d<br>± 0.05 |
|----|-------------|-------------|------------|-------------|
| 50 | 31.75       | 0.635       | 31.12      | 0.68        |
| 68 | 43.20       | 0.635       | 42.55      | 0.68        |

The tolerance B is not cumulative

## Technical characteristics

### PVC

### FEP

Number of wires

50, 68

50, 68

Voltage rating

150 V

150 V

Impedance

75 Ω

90 Ω (single end)  
130 Ω (differential)

Nominal differential capacitance (1 kHz)

27.5 pF/ft

14.7 pF/ft

Pitch

0.635 mm

0.635 mm

UL approval

2 962

20 726

Temperature range

- 30 °C ... + 105 °C

- 30 °C ... + 105 °C

## Materials pairs

Conductor

7 x 0.102 mm regular tinning  
or Z-bonding AWG 30

Silver plated copper AWG 30  
Solid bare copper

Insulation

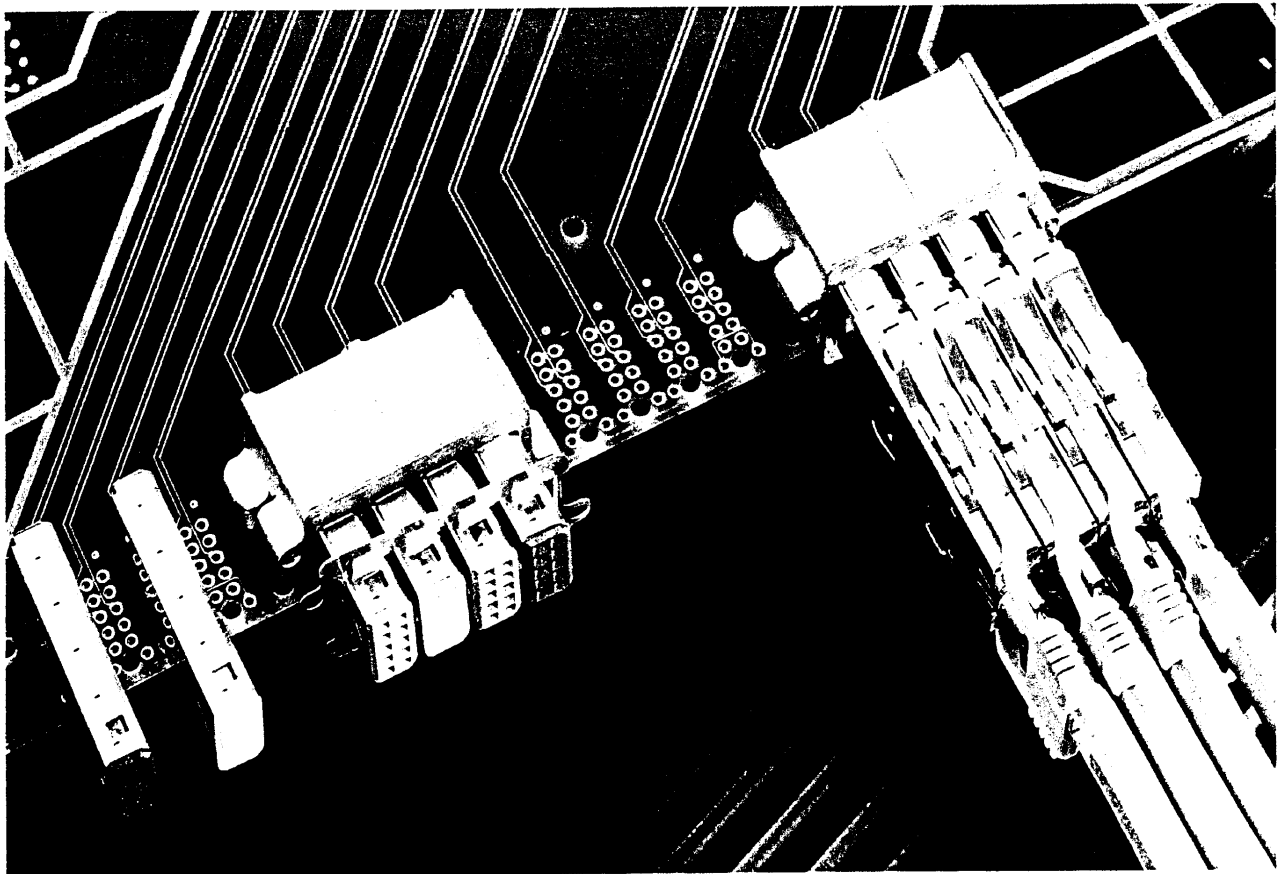
PVC

FEP

# System presentation according to IEEE P1355 · IEC 1076-4-107 (Draft)

## **har-link®** MODULAR METRIC I/O CONNECTOR SYSTEM

*har-link* supports the trend towards miniaturisation due to its space saving design. *har-link* offers more than twice the density of many other connector systems. *har-link* was designed to meet the requirements of high contact density, integrated board fixing, quick efficient locking devices, shielding with ground continuity and reliable wiring techniques. Also to provide a low installed cost. *har-link* is compatible with basic metric packaging systems acc. to IEC 917 / IEEE P 1301 as well as with major inch based adaptor board standards. To fulfil the demand throughout the entire electronics industry of having resistant systems against EMC emission or susceptibility *har-link* connectors are fully shielded. "Hot swapping", a further requirement of today's electronic systems, has also been taken into account by the inclusion of sequenced mating levels. Mechanical robustness is also guaranteed by the innovative design. *har-link* features a unique, reliable positive latch system. The easily operated "push pull" mechanism prevents free cable connectors from vibrating loose or being inadvertently unplugged. A simple but reliable polarisation system prevents the mating of connectors in the wrong orientation.

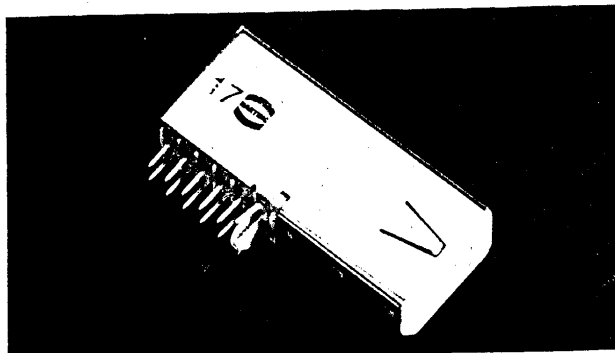


## **har-link®** in inch-based systems

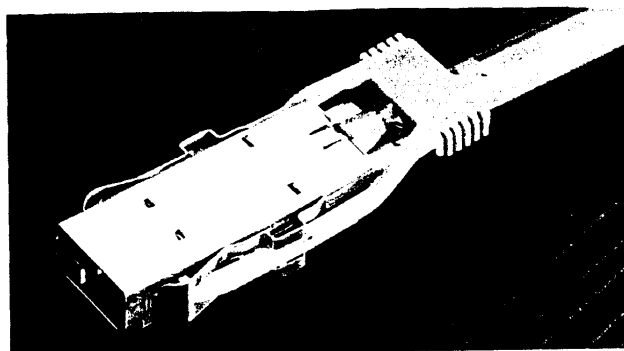
Initially *har-link* was developed especially for requirements in transputer based computer systems but the advantages of modern technology featured in the *har-link* product makes it suitable for use in the varied fields of computer communications as well as in all other fields of professional electronics and telecommunications. Even if the connector dimensions are "hard metric" (acc. to IEC 917 / IEEE P 1301) *har-link* connectors are also well suited for use in "inch based" packaging systems. The outside and co-ordination dimensions are matched to well known adaptor boards e.g. PC/PS2, SBus, VME. This allows the easy and uncomplicated replacement of existing I/O connector systems in the case that high contact density or small, space efficient connector modules are requested.

## **har-link®** is compatible with metric systems

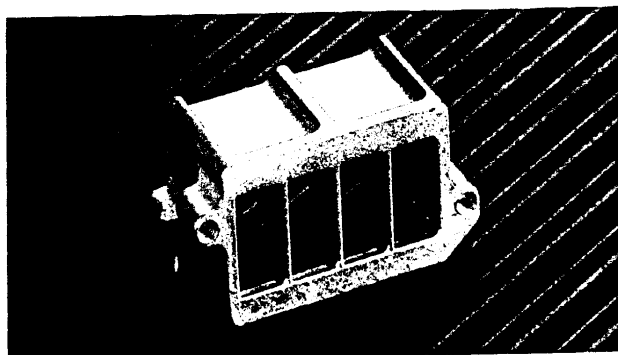
*har-link* supports the trend towards metrification but may also be used in conventional inch based systems. Especially for use in telecommunication and professional electronic applications. *har-link* design was aligned very closely to the metric connector standards IEC 1076-4-101 / IEEE P 1301.2 and therefore also to metric packaging standards IEC 917 / IEEE P 1301. Due to this reason it is possible to use *har-link* e.g. as an I/O connector in Futurebus + applications.



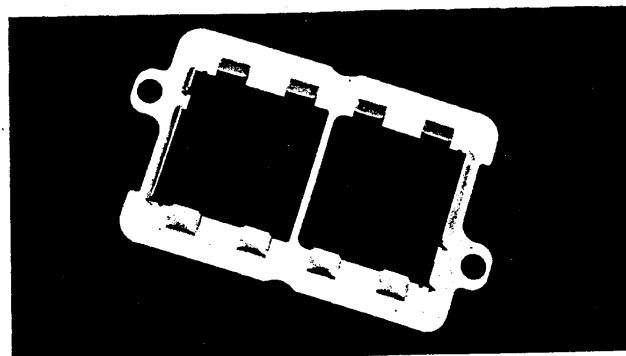
**Female connector** Part No.: 27 21 121 8000  
 - 360 degree EMC shielded right angle board mounting connector.  
 - 10 way high density solution, 6 mm width x 11.5 mm height.  
 - 2 mm grid pitch compatible with "hard metric" IEC 917 / IEEE P 1301 packaging standards.  
 - suitable for fixing in 1.6 mm thickness PCB, through a 0.6 mm minimum diameter through hole.  
 The connector shell housing has a positive polarised mating design and metal grounding pins that ensure continuity to the PCB. Each lateral face also has a grounding bump to ensure contact continuity between modules mounted on a 6 mm pitch, through a metal fixing bracket.



**Male connector** Part No.: 27 11 161 8001  
 360 degree EMC shielded cable connector with one pre-leading contact providing "hot-swapping" capability.  
 Designed for use with AWG 28/7 twisted pair cable through discrete wire termination for a maximum outer cable diameter of 5.7 mm. A push-pull latching system ensures positive mating.



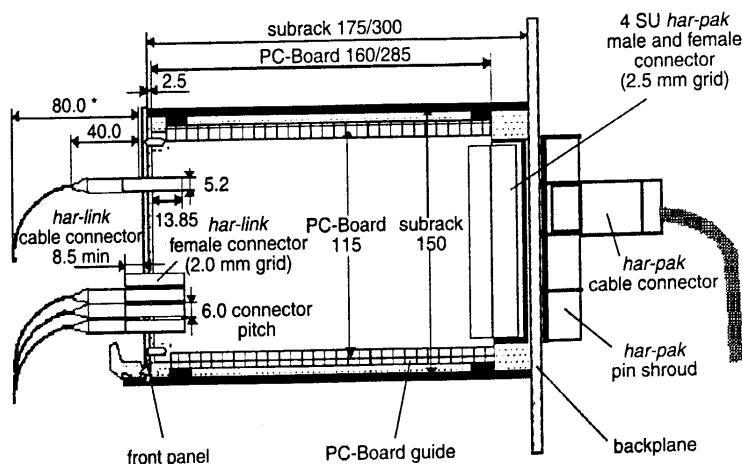
**Bracket** Part No.: 27 71 040 0001  
 In order to maximise the EMC shielding efficiency of an array of multiple connectors, a 4 way nickel plated Zammac bracket is available. It has been designed for high density series panel fixing on a 30 mm grid, in addition 1 to 3 way sized brackets are under development.



**EMC Gasket** Part No.: 27 71 040 0002  
 EMC shielding is completed through a panel via a 4 way matching gasket with grounding fingers, in addition 1 to 3 way sized gaskets are under development.

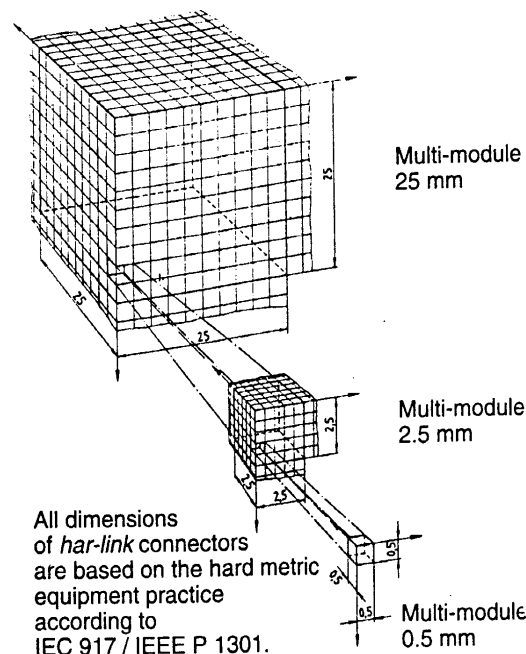
## TWIN MINICOAXIAL MODUL UNDER DEVELOPMENT PROCESS DUPLEX OPTICAL FIBER MODUL

Possible combination in metric systems



\* acc. to Madison cable No. 2791

2.0 mm har-link I/O connector system in combination with 2.5 mm har-pak backpanel connectors integrated in metric packaging system acc. to IEC 917 / IEEE P 1301.



# List of part numbers



| Part No.       | Page | Part No.       | Page | Part No.       | Page | Part No.       | Page |
|----------------|------|----------------|------|----------------|------|----------------|------|
| 09 99 000 0114 | 40   | 60 01 040 5102 | 6    | 60 02 550 5141 | 11   | 60 03 040 0255 | 22   |
| 09 99 000 0116 | 40   | 60 01 040 5132 | 8    | 60 02 550 5142 | 11   | 60 03 040 0555 | 22   |
| 09 99 000 0197 | 40   | 60 01 040 5133 | 8    | 60 02 550 5150 | 11   | 60 03 040 5100 | 14   |
| 09 99 000 0201 | 40   | 60 01 040 5140 | 8    |                |      | 60 03 040 5110 | 14   |
| 09 99 000 0255 | 40   | 60 01 040 5141 | 8    |                |      | 60 03 040 5120 | 14   |
|                |      | 60 01 040 5202 | 6    | 60 02 568 5141 | 11   | 60 03 040 5200 | 14   |
|                |      | 60 01 040 5232 | 8    | 60 02 568 5142 | 11   | 60 03 040 5210 | 14   |
|                |      |                |      | 60 02 568 5150 | 11   | 60 03 040 5220 | 14   |
| 27 11 161 8001 | 45   |                |      |                |      |                |      |
| 27 21 121 8000 | 45   | 60 01 050 5102 | 6    |                |      |                |      |
| 27 71 040 0001 | 45   | 60 01 050 5132 | 8    |                |      |                |      |
| 27 71 040 0002 | 45   | 60 01 050 5133 | 8    | 60 03 020 0155 | 22   | 60 03 050 0143 | 23   |
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|                |      | 60 01 068 5133 | 8    | 60 03 020 5220 | 14   | 60 03 050 1003 | 24   |
| 60 01 020 5102 | 6    | 60 01 068 5140 | 8    |                |      | 60 03 050 5100 | 14   |
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| 60 01 026 5133 | 8    |                |      |                |      | 60 03 068 0146 | 23   |
| 60 01 026 5140 | 8    |                |      | 60 03 028 0155 | 22   | 60 03 068 0155 | 22   |
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# List of part numbers

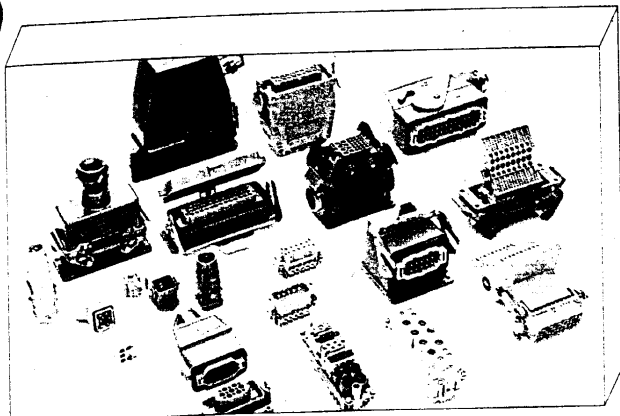


| Part No.       | Page | Part No.       | Page | Part No.       | Page | Part No.       | Page |
|----------------|------|----------------|------|----------------|------|----------------|------|
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| 60 05 068 5100 | 29   | 60 11 068 5202 | 17   | 60 13 080 5100 | 20   | 60 15 060 5127 | 35   |
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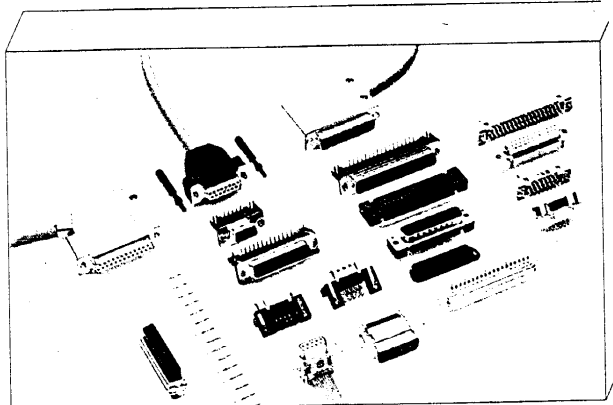
# List of part numbers

| Part No.       | Page | Part No.       | Page | Part No. | Page | Part No. | Page |
|----------------|------|----------------|------|----------|------|----------|------|
| 60 15 100 5122 | 35   | 60 99 ... 0005 | 38   |          |      |          |      |
| 60 15 100 5123 | 35   | 60 99 ... 0006 | 38   |          |      |          |      |
| 60 15 100 5124 | 35   | 60 99 ... 0013 | 38   |          |      |          |      |
| 60 15 100 5125 | 35   | 60 99 ... 0014 | 38   |          |      |          |      |
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| 60 15 100 5127 | 35   | 60 99 000 0003 | 38   |          |      |          |      |
| 60 15 100 5128 | 35   | 60 99 000 0004 | 38   |          |      |          |      |
| 60 15 100 5220 | 35   | 60 99 000 0007 | 39   |          |      |          |      |
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| 60 15 120 5123 | 35   | 60 99 000 0011 | 39   |          |      |          |      |
| 60 15 120 5124 | 35   | 60 99 000 0012 | 38   |          |      |          |      |
| 60 15 120 5125 | 35   | 60 99 000 0015 | 39   |          |      |          |      |
| 60 15 120 5126 | 35   | 60 99 000 0016 | 39   |          |      |          |      |
| 60 15 120 5127 | 35   | 60 99 000 0017 | 39   |          |      |          |      |
| 60 15 120 5128 | 35   | 60 99 000 0029 | 39   |          |      |          |      |
| 60 15 120 5220 | 35   | 60 99 000 0031 | 40   |          |      |          |      |
|                |      | 60 99 000 0032 | 40   |          |      |          |      |
|                |      | 60 99 000 0034 | 40   |          |      |          |      |
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| 60 90 013 6003 | 42   |                |      |          |      |          |      |
| 60 90 014 6003 | 42   |                |      |          |      |          |      |
| 60 90 018 6003 | 42   |                |      |          |      |          |      |
| 60 90 020 6003 | 42   |                |      |          |      |          |      |
| 60 90 025 6003 | 42   |                |      |          |      |          |      |
| 60 90 034 6003 | 42   |                |      |          |      |          |      |
| 60 90 040 6003 | 42   |                |      |          |      |          |      |
| 60 90 048 6003 | 42   |                |      |          |      |          |      |
| 60 90 050 6003 | 42   |                |      |          |      |          |      |
| 60 90 050 6007 | 43   |                |      |          |      |          |      |
| 60 90 050 6008 | 43   |                |      |          |      |          |      |
| 60 90 068 6007 | 43   |                |      |          |      |          |      |
| 60 90 068 6008 | 43   |                |      |          |      |          |      |

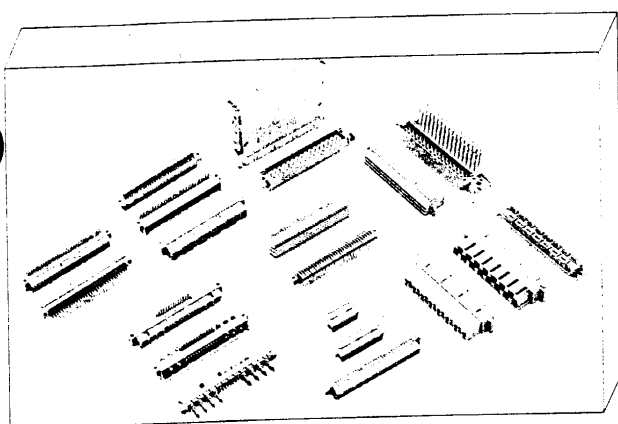
# Some of the components from the HARTING range



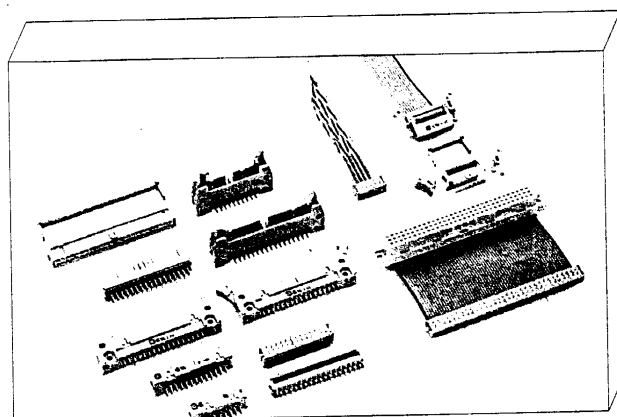
Heavy Duty Connectors  
for industrial engineering



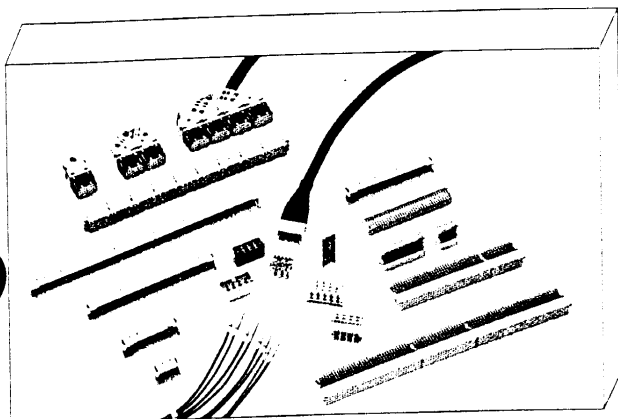
Subminiature D-Connectors  
DIN 41 652



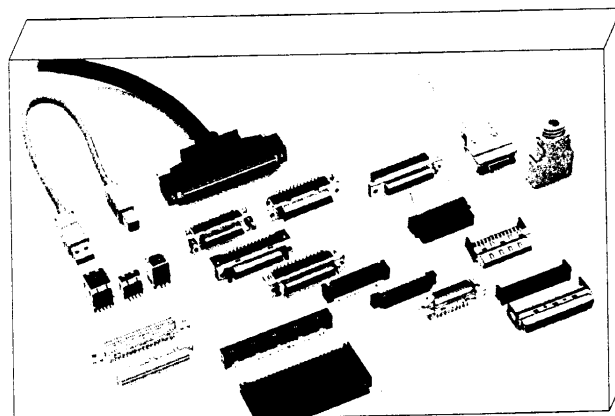
Printed Board Connectors  
DIN 41 612 · DIN 41 617



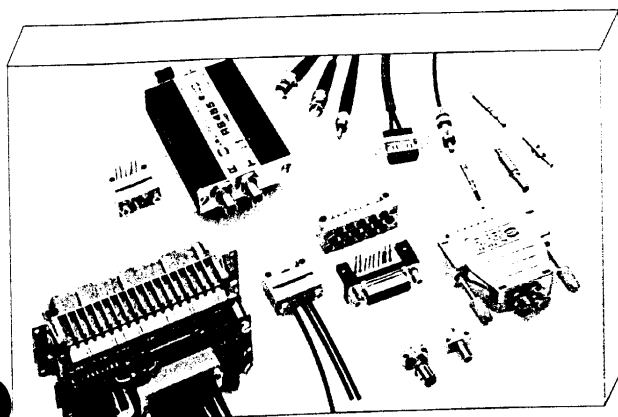
Flat Cable Connector System  
DIN 41 651



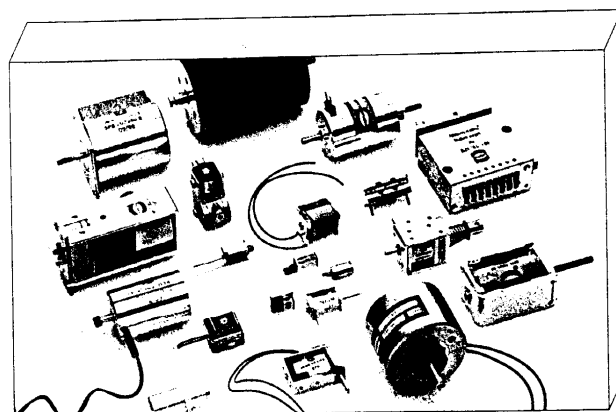
High density, metric printed  
board connectors 2.5 mm · DIN 41 642



Micro-Electronic-Connectors  
Contact spacing 1.27 mm



Fibre Optic  
Data Link Systems



Solenoids