

 ELECTRONICS

METRAL[®]

2 mm Modular Interconnect System

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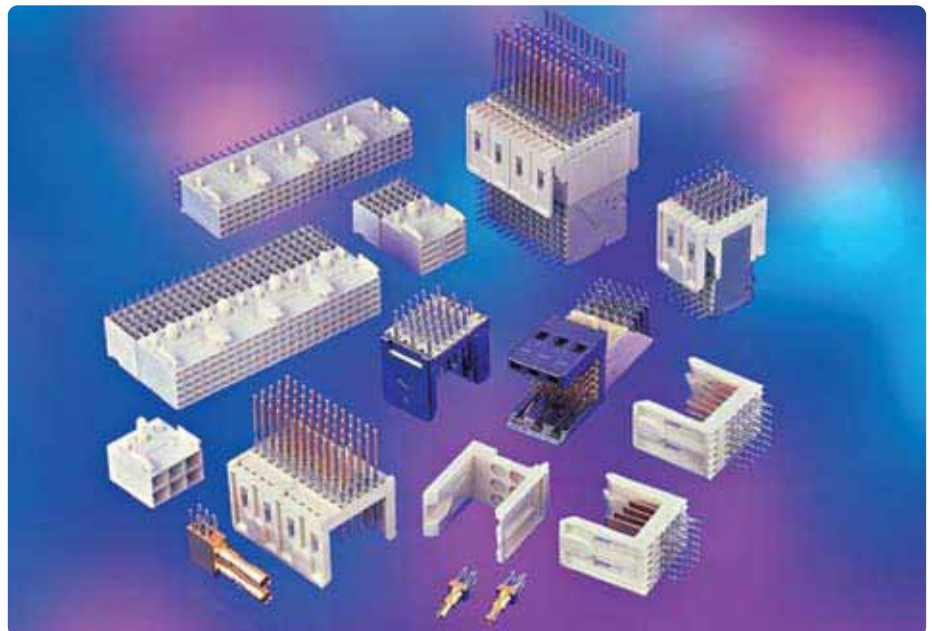
FCI: SETTING THE STANDARD FOR CONNECTORS

With operations in 30 countries, FCI is a leading manufacturer of connectors. Our 13,500 employees are committed to providing customers with high-quality, innovative products for a wide range of consumer and industrial applications.



GENERAL INFORMATION

- The METRAL® connector range is the standard 2 mm board-to-board and cable-to-board interconnect system designed in accordance with IEC 61076-4-104 and Telcordia® GR-1217-CORE.
- Connector system used for chassis based packaging in the communications, data, medical and Industrial and Instrumentation segments.
- The METRAL® connector system is applicable for low speed and high speed transmission and switching equipment. Signals from 2 up to 5 Gbp/s used in backplanes, mid-planes, extension cards, power (3 up to 60 amps) and I/O applications.
- The Catalog presents the full range of METRAL® connectors, signal, (high) power, shielded, cable and hybrid connectors, all with various choices in dimensions, features and options.
- For a quick solution you can select one of the products out of the METRAL® core product selector, a selection of the most popular products out of the METRAL® family range. (see page 5 to 7)



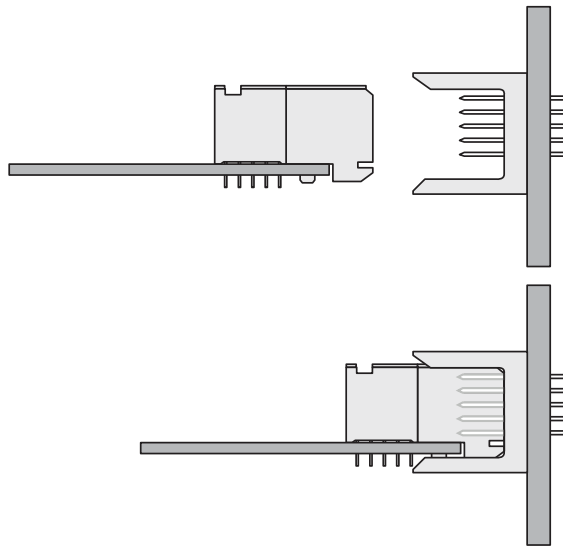
LIABILITY

We believe that the information contained in this publication is the best currently available on the subject. It is offered as a possible helpful suggestion in any experimentation you may care to undertake and is subject to revision as additional knowledge and experience is gained. FCI makes no guarantee of results and assumes no obligation or liability whatsoever in connection with this information. This publication is not a license to operate under, or intended to suggest infringement of, any existing patent. Information given on the drawings in this document is not suitable for tooling design and construction. To obtain the correct drawings for these purposes, contact your local FCI representative.

Catalog Main set-up

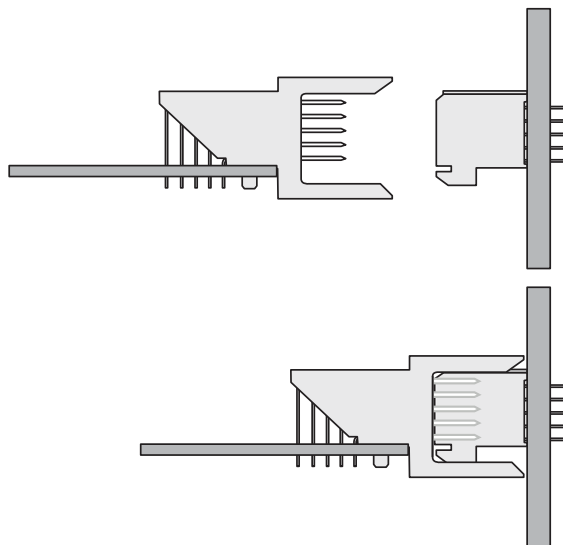
STANDARD CONNECTION

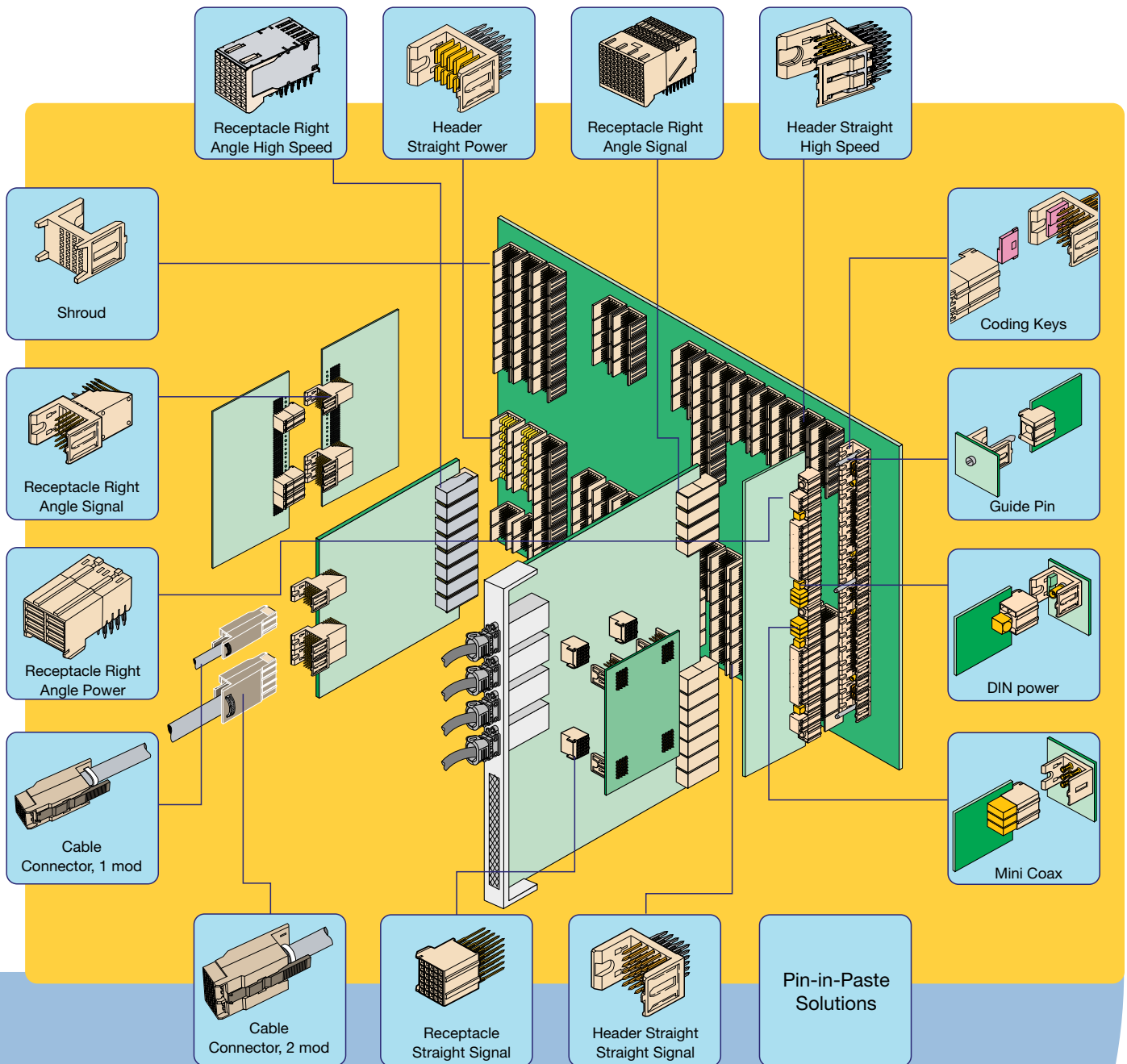
- Straight Header on backplane / motherboard
- Right Angle Receptacle on the daughter card
- Additional choices, 4 or 5 row and signal or power



REVERSED CONNECTION

- Straight Receptacle on backplane / motherboard
- Right Angle Header on the daughter card
- Additional choices, 4 or 5 row and signal or power



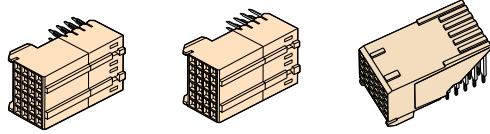


METRAL® Core Product Selector

Selection of the most popular connectors out of the METRAL® family

Signal Standard

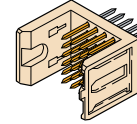
Receptacle, Right angle, Signal



press-fit solder to board pin in paste

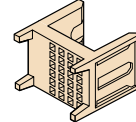
| Press Fit | | | |
|-----------------|-------------|-------------|-------------|
| Module | 4 row | 5 row | 8 row |
| 1 | 88945-102LF | 89047-102LF | - |
| 2 | 88946-102LF | 89093-102LF | 74770-102LF |
| 4 | 88947-102LF | 89094-102LF | - |
| 8 | 88948-102LF | 89095-102LF | - |
| Solder to Board | | | |
| 1 | 89035-102LF | 85863-102LF | |
| 2 | 89036-102LF | 85864-102LF | |
| 4 | 89037-102LF | 85865-102LF | |
| 8 | 89038-102LF | 85866-102LF | |
| Pin in Paste | | | |
| 1 | 52048-101LF | 52049-101LF | |

Header, Straight, Signal



| Press Fit, Wide body | | | |
|----------------------|-------------|-------------|----------------|
| Module | 4 row | 5 row | 8 row |
| 1 | 70232-116LF | 89006-116LF | - |
| 2 | 70233-116LF | 89007-116LF | 74771-102011LF |
| 4 | 70234-116LF | 89008-116LF | - |
| 8 | 70235-116LF | 89009-116LF | - |

Shroud



| Wide body | | | |
|-----------|-------------|-------------|-------------|
| Module | 4 row | 5 row | 8 row |
| 1 | 70203-111LF | 89055-111LF | - |
| 2 | 70203-112LF | 89055-112LF | 98173-102LF |
| 4 | 70203-113LF | 89055-113LF | - |
| 8 | 70203-114LF | 89055-114LF | - |

Signal Reversed

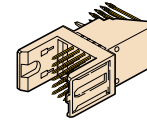
Receptacle, Straight, Signal



press-fit solder to board

| Press Fit | | |
|-----------------|-------------------|-------------------|
| Module | 4 row | 5 row |
| 1 | 85757-1101LF | 85761-1101LF |
| 2 | 85758-1101LF | - |
| 4 | 85759-1101LF | 85763-1101LF |
| 8 | 85760-1101LF | - |
| Solder to Board | | |
| 1 | HM1S41FRR000H6PLF | HM1S51FRR000H6PLF |
| 2 | HM1S42FRR000H6PLF | HM1S52FRR000H6PLF |
| 4 | HM1S43FRR000H6PLF | HM1S53FRR000H6PLF |
| 8 | HM1S44FRR000H6PLF | HM1S54FRR000H6PLF |

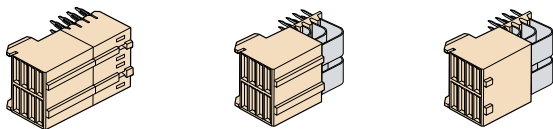
Header, Right angle, Signal



| Press Fit Wide Body | | |
|---------------------------|-------------------|-------------------|
| Module | 4 row | 5 row |
| 1 | HM1L41LDP000H6PLF | HM1L51LDP000H6PLF |
| 2 | HM1L42LDP000H6PLF | HM1L52LDP000H6PLF |
| 4 | HM1L43LDP000H6PLF | HM1L53LDP000H6PLF |
| 8 | HM1L44LDP000H6PLF | HM1L54LDP000H6PLF |
| Solder to Board Wide Body | | |
| 1 | HM1L41LAP000H6PLF | HM1L51LAP000H6PLF |
| 2 | HM1L42LAP000H6PLF | HM1L52LAP000H6PLF |
| 4 | HM1L43LAP000H6PLF | HM1L53LAP000H6PLF |
| 8 | HM1L44LAP000H6PLF | HM1L54LAP000H6PLF |
| Pin in Paste Wide Body | | |
| 1 | HM1L41LFP000H6PLF | HM1L51LFP000H6PLF |

Power Standard

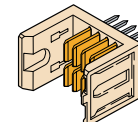
Receptacle, Right angle, Power



press-fit solder to board pin in paste

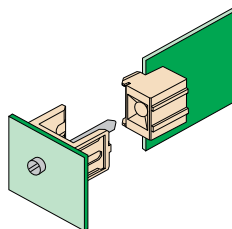
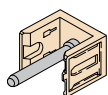
| Press Fit | | |
|-----------------|-------------|-------------|
| Module | 4 row | 5 row |
| 1 | 88949-102LF | 89096-102LF |
| Solder to Board | | |
| 1 | 89039-101LF | 85876-102LF |
| Pin in Paste | | |
| 1 | 72651-101LF | 63793-101LF |

Header, Straight, Power



| Press Fit, Wide Body | | |
|----------------------|-------------|-------------|
| Module | 4 row | 5 row |
| 1 | 70236-101LF | 89099-111LF |

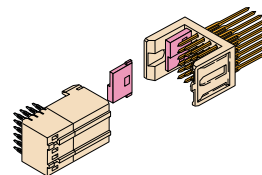
Guide Pin



| Guide Pin | |
|---------------------|-------------|
| short, single-sided | 70295-001LF |
| long, single-sided | 70295-002LF |

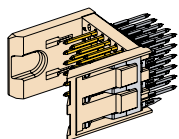
| Required Header housing Wide Body | Required Receptacle housing |
|-----------------------------------|-----------------------------|
| 88911-101LF | 70292-101LF |

Extended Coding Keys



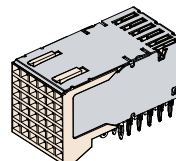
| Colour | Header | Receptacle |
|--------|-------------|-------------|
| Blue | 85813-101LF | 85814-101LF |
| Pink | 85813-102LF | 85814-102LF |
| Green | 85811-101LF | 85812-101LF |

Header, Straight, Signal, High Speed



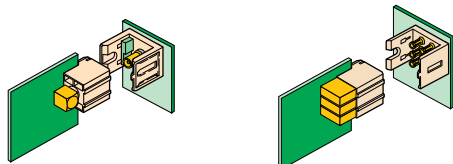
| 1 Module, High Speed, Press Fit | | |
|---------------------------------|----------------|----------------|
| | 5 row | 8 row |
| Signal 1000 | 84817-101001LF | 74983-102011LF |
| Signal 2000 | 74977-101002LF | 74978-102001LF |
| Signal 4000 | 55003-101004LF | 55004-102002LF |

Receptacle, Right Angle, High Speed



| 1 Module, High Speed, Press Fit | | |
|---------------------------------|-------------|-------------|
| | 5 row | 8 row |
| Signal 1000 | 73981-102LF | 74981-102LF |
| Signal 4000 | 52057-102LF | - |

| | 1000 Series Header | 2000 Series Header | 4000 Series Header |
|------------------------|--------------------|--------------------|--------------------|
| 1000 Series Receptacle | 622Mb/s | 1.25 Gb/s | 2.5 Gb/s |
| 4000 Series Receptacle | 1.25 Gb/s | 2.5 Gb/s | 5 Gb/s |



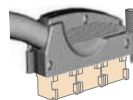
| DIN Standard High Power | |
|-------------------------|-------------|
| Receptacle RA housing | 89092-101LF |
| Receptacle contact | 85995-103LF |
| Housing wide body | 88911-101LF |
| Contact screw pcb | 91570-001LF |
| Mini Coax | |
| Receptacle RA housing | 70244-102LF |
| Receptacle contact stb | 70239-002LF |
| Housing wide body | 88913-101LF |
| Contact stb | 88980-002LF |

Cable Connector, Signal

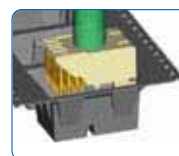
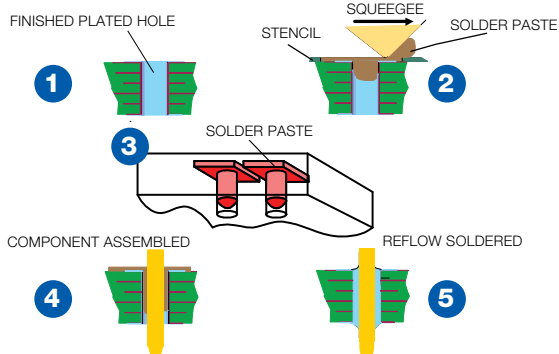


| Module | 4 row | 5 row |
|--------|--------------|--------------|
| 1 | 72476-1111LF | 72478-1111LF |
| 2 | 72477-1111LF | 72479-1111LF |

Cable Connector, Shielded

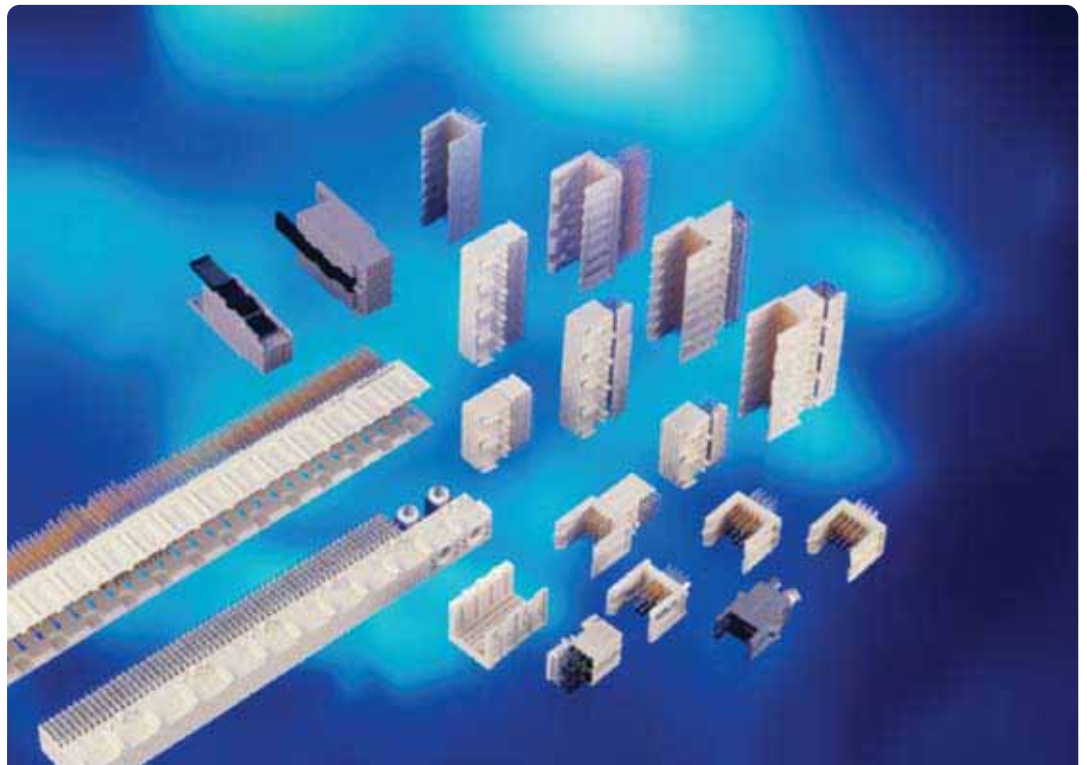


| positions | 4 row |
|-----------|----------------|
| 72 | 10013881-231LF |





| Description | 4 row | 5 row |
|------------------------|-------------------|-------------------|
| Receptacle, RA, Signal | 52048-101LF | 52049-101LF |
| Receptacle, RA, Power | - | 63793-101LF |
| Header, RA, Signal | 58361-101LF | HM1L51LFP000H6PLF |
| Header, RA, Power | HM1K41DFP000H6PLF | HM1K51DFP000H6PLF |
| Sofix®, RA, Signal | 72850-101LF | - |





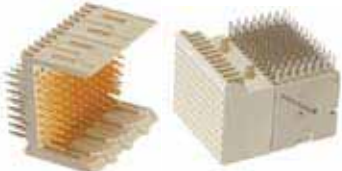




METRAL® PRODUCT FINDER





-  Easy access to select product
-  Diversity on application examples

METRAL® SIGNAL CONNECTORS STANDARD

| product | description | | | | | housing size | | | | page |
|---|-------------|----------|-----|--------|-------------|--------------|--------|--------|--------|------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
| | | | | | | | | | | |
|  | Header | Straight | STB | Signal | wide body | 4 x 6 | 4 x 12 | 4 x 24 | 4 x 48 | 24 |
| | Header | Straight | PF | Signal | wide body | 4 x 6 | 4 x 12 | 4 x 24 | 4 x 48 | 26 |
| | Header | Straight | STB | Signal | narrow body | 4 x 6 | | | | 28 |
| | Header | Straight | PF | Signal | narrow body | 4 x 6 | | | | 30 |
|  | Receptacle | RA | STB | Signal | - | 4 x 6 | 4 x 12 | 4 x 24 | 4 x 48 | 32 |
| | Receptacle | RA | PF | Signal | - | 4 x 6 | 4 x 12 | 4 x 24 | 4 x 48 | 34 |
| | Receptacle | RA | PIP | Signal | - | 4 x 6 | | | | 36 |
|  | Header | Straight | STB | Signal | wide body | 5 x 6 | | | | 38 |
| | Header | Straight | PF | Signal | wide body | 5 x 6 | 5 x 12 | 5 x 24 | 5 x 48 | 40 |
|  | Receptacle | RA | STB | Signal | - | 5 x 6 | 5 x 12 | 5 x 24 | 5 x 48 | 42 |
| | Receptacle | RA | PF | Signal | - | 5 x 6 | 5 x 12 | 5 x 24 | 5 x 48 | 44 |
| | Receptacle | RA | PIP | Signal | - | 5 x 6 | | | | 46 |
|  | Header | Straight | PF | Signal | wide body | | 8 x 12 | | | 48 |
| | Receptacle | RA | PF | Signal | - | | 8 x 12 | | | 50 |


RA = right angle, STB = solder-to-board, PF = press-fit

METRAL® SIGNAL CONNECTORS REVERSED





| product | description | | | | | housing size | | | | page |
|---|-------------|----------|-----|--------|-------------|-----------------|--------|--------|--------|------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
| | | | | | | number of lines | | | | |
|  | Header | RA | STB | Signal | wide body | 4 x 6 | 4 x 12 | 4 x 24 | 4 x 48 | 54 |
| | Header | RA | PF | Signal | wide body | 4 x 6 | 4 x 12 | 4 x 24 | 4 x 48 | 56 |
| | Header | RA | PIP | Signal | wide body | 4 x 6 | | | | 58 |
| | Header | RA | STB | Signal | narrow body | 4 x 6 | | | | 60 |
| | Header | RA | PF | Signal | narrow body | 4 x 6 | | | | 62 |
| | Header | RA | PIP | Signal | narrow body | 4 x 6 | | | | 64 |
|  | Receptacle | Straight | STB | Signal | - | 4 x 6 | 4 x 12 | 4 x 24 | 4 x 48 | 66 |
| | Receptacle | Straight | PF | Signal | - | 4 x 6 | 4 x 12 | 4 x 24 | 4 x 48 | 68 |
|  | Header | RA | STB | Signal | wide body | 5 x 6 | 5 x 12 | 5 x 24 | 5 x 48 | 70 |
| | Header | RA | PF | Signal | wide body | 5 x 6 | 5 x 12 | 5 x 24 | 5 x 48 | 72 |
| | Header | RA | PIP | Signal | wide body | 5 x 6 | | | | 74 |
|  | Receptacle | Straight | STB | Signal | - | 5 x 6 | 5 x 12 | 5 x 24 | 5 x 48 | 76 |
| | Receptacle | Straight | PF | Signal | - | 5 x 6 | | 5 x 24 | | 78 |

RA = right angle, STB = solder-to-board, PF = press-fit

METRAL® SHROUDS

| product | description | | | | | housing size | | | | page |
|---|-------------|---|---|---|-----------|-----------------|--------|--------|--------|------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
| | | | | | | number of lines | | | | |
|  | Shroud | - | - | - | wide body | 4 x 6 | 4 x 12 | 4 x 24 | 4 x 48 | 82 |
| | Shroud | - | - | - | wide body | 5 x 6 | 5 x 12 | 5 x 24 | 5 x 48 | 84 |
| | Shroud | - | - | | wide body | | 8 x 12 | | | 86 |

METRAL® POWER CONNECTORS STANDARD

| product | description | | | | | housing size | | | | page |
|---|-------------|----------|-----|-------|-------------|--------------|-------|-------|-------|------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
|  | Header | Straight | STB | Power | wide body | 4 x 2 | | | | 90 |
| | Header | Straight | PF | Power | wide body | 4 x 2 | | | | 92 |
| | Header | Straight | STB | Power | narrow body | 4 x 2 | | | | 94 |
| | Header | Straight | PF | Power | narrow body | 4 x 2 | | | | 96 |
|  | Receptacle | RA | STB | Power | - | 4 x 2 | | | | 98 |
| | Receptacle | RA | PF | Power | - | 4 x 2 | | | | 100 |
| | Receptacle | RA | PIP | Power | - | 4 x 2 | | | | 102 |
|  | Header | Straight | STB | Power | wide body | 5 x 2 | | | | 104 |
| | Header | Straight | PF | Power | wide body | 5 x 2 | | | | 106 |
|  | Receptacle | RA | STB | Power | - | 5 x 2 | | | | 108 |
| | Receptacle | RA | PF | Power | - | 5 x 2 | | | | 110 |
| | Receptacle | RA | PIP | Power | - | 5 x 2 | | | | 112 |

RA = right angle, STB = solder-to-board, PF = press-fit

METRAL® POWER CONNECTORS REVERSED

| product | description | | | | | housing size | | | | page |
|---------|-------------|----------|-----|-------|-----------|--------------|-------|-------|-------|------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
| | Header | RA | STB | Power | wide body | 4 x 2 | | | | 116 |
| | Header | RA | PF | Power | wide body | 4 x 2 | | | | 118 |
| | Header | RA | PIP | Power | wide body | 4 x 2 | | | | 120 |
| | Receptacle | Straight | STB | Power | - | 4 x 2 | | | | 122 |
| | Header | RA | STB | Power | wide body | 5 x 2 | | | | 124 |
| | Header | RA | PF | Power | wide body | 5 x 2 | | | | 126 |
| | Header | RA | PIP | Power | wide body | 5 x 2 | | | | 128 |
| | Receptacle | Straight | STB | Power | - | 5 x 2 | | | | 130 |



RA = right angle, STB = solder-to-board, PF = press-fit

METRAL® ELECTRICAL ENHANCED CONNECTORS

| product | description | | | | | housing size | | | | page |
|---------|-------------|----------|----|--------|-----------|--------------|-------|-------|-------|------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
| | Header | Straight | PF | Signal | wide body | 5 + 2 | | | | 134 |
| | Shroud | - | - | - | wide body | 5 + 2 | | | | 136 |
| | Receptacle | RA | PF | Signal | - | 5 + 2 | | | | 138 |


RA = right angle, STB = solder-to-board, PF = press-fit

METRAL® SHIELDED SIGNAL CONNECTORS

| product | description | | | | | housing size | | | | page |
|---|-----------------|----------|-----|--------|----------|--------------|-------|-------|-------|------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
|  | Header | Straight | STB | Signal | shielded | 5 x 6 | | | | 142 |
|  | Cable connector | | | Signal | shielded | 5 x 6 | | | | 144 |

RA = right angle, STB = solder-to-board, PF = press-fit

METRAL® HIGH POWER CONNECTORS

| product | description | | | | | housing size | | | | page |
|---|-------------|----------|----|-------|------------|----------------|-------|-------|-------|------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
|  | Header | RA | PF | Power | high power | 1 x 2 2 x 2 | | | | 148 |
| | Receptacle | Straight | PF | Power | high power | 1 x 2 2 x 2 | | | | 150 |

RA = right angle, STB = solder-to-board, PF = press-fit

METRAL® HYBRID CONNECTORS

| product | description | | | | | housing size | | | | page |
|---------|----------------------------|-----------------|---|-------|------------|--------------|-------|-------|-------|------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
| | Header DIN standard | Straight | - | Power | high power | 1 | | | | 154 |
| | Receptacle DIN standard | RA | - | Power | high power | 1 | | | | 156 |
| | Header Mini Power | RA/ Straight | | Power | mini power | 6 | | | | 158 |
| | Receptacle Mini power | RA | - | Power | mini power | 6 | | | | 160 |
| | Header DIN standard | Straight | - | Coax | coax | 1 | | | | 162 |
| | Receptacle DIN standard | RA | - | Coax | coax | 1 | | | | 164 |
| | Header Mini Coax | RA/ Straight | | Coax | mini coax | 6 | | | | 166 |
| | Receptacle Mini Coax | RA | - | Coax | mini coax | 6 | | | | 168 |

RA = right angle, STB = solder-to-board, PF = press-fit

METRAL® CABLE CONNECTORS

| product | description | | | | | housing size | | | | page |
|--|-----------------|---|---|--------|----------|--------------|--------|--------|-------|------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
|  | Cable Connector | - | - | Signal | - | 4 x 6 | 4 x 12 | | | 172 |
|  | Cable Connector | - | - | Signal | - | 5 x 6 | 5 x 12 | | | 174 |
|  | Cable Connector | - | - | Signal | Shielded | | | 3 x 24 | | 176 |

METRAL® ACCESSORIES

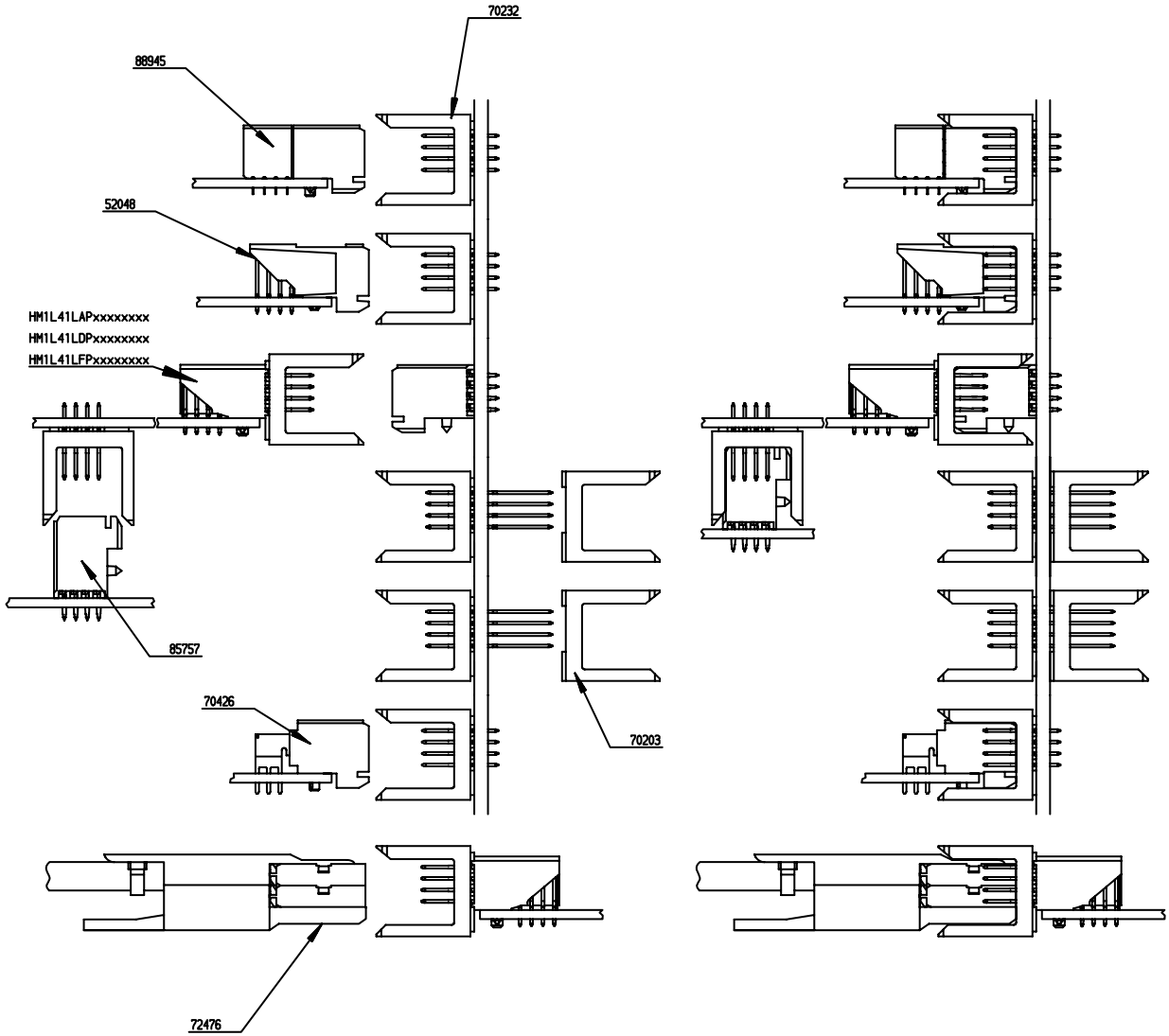
| product | description | | | | | housing size | | | | page |
|---------|--------------------------------|----------|----|--------|-----------|--------------|--------|--------|--------|------------|
| | | | | | | 12 mm | 24 mm | 48 mm | 96 mm | |
| | Coding Keys Header Cable conn. | - | - | - | - | - | - | - | - | 180 182 |
| | Guide Pin | - | - | - | - | 1 | | | | 184 |
| | Board to Board Keying system | - | - | - | - | 6 | | | | 186 |
| | Ramping module | - | - | - | - | 1 | | | | 188 |
| | Shorting Clip Header | Straight | PF | Signal | wide body | - | 4 x 12 | 4 x 24 | 4 x 48 | 190 |
| | Shorting Clip Header | Straight | PF | Signal | wide body | 5 x 6 | - | - | - | 192 |
| | End wall | - | - | - | - | | | | | 194 |
| | Hybrid Housing | | | | | 1 | | | | 196 |

RA = right angle, STB = solder-to-board, PF = press-fit

METRAL® 4 row assemblies

UNMATED

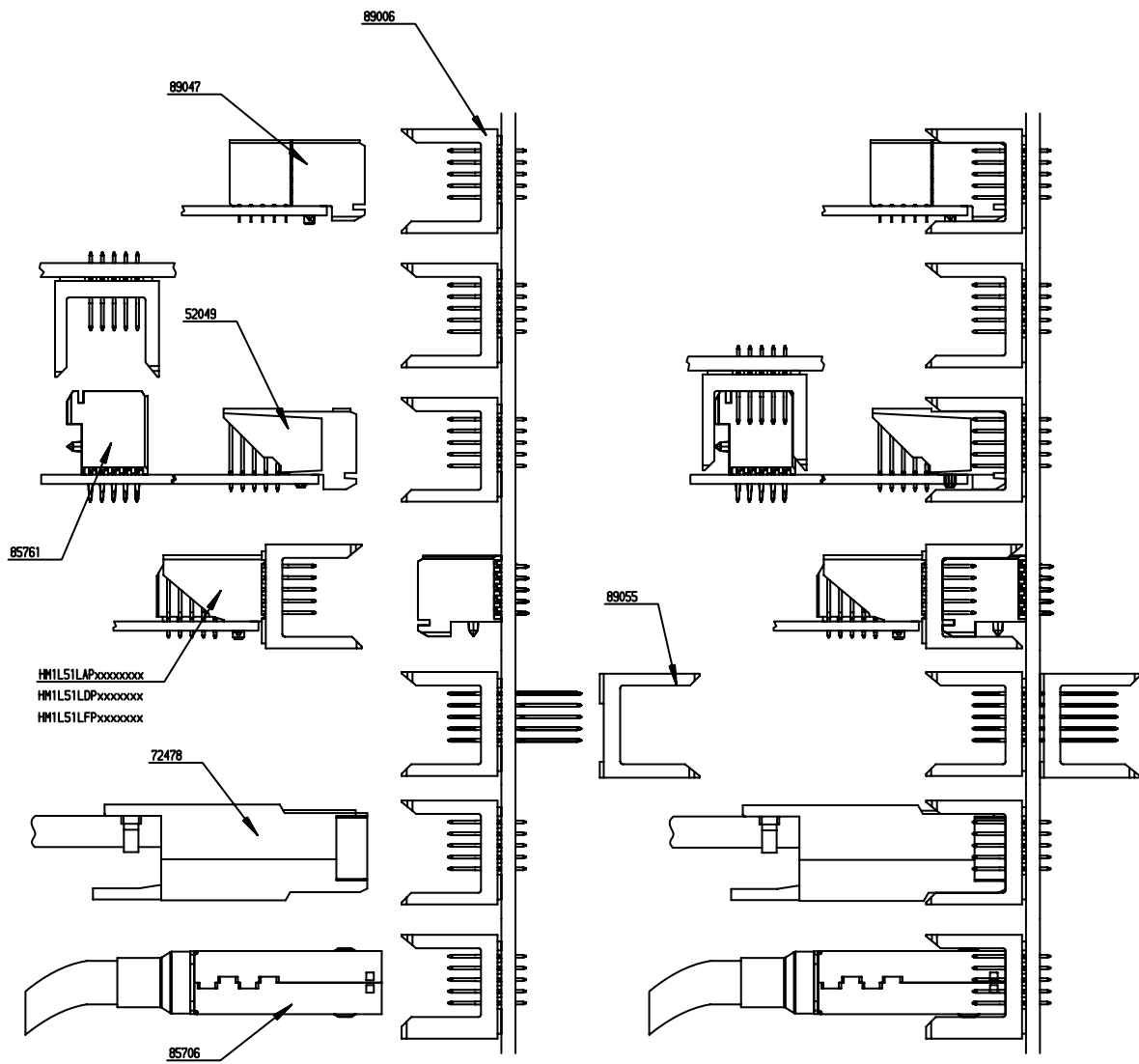
MATED



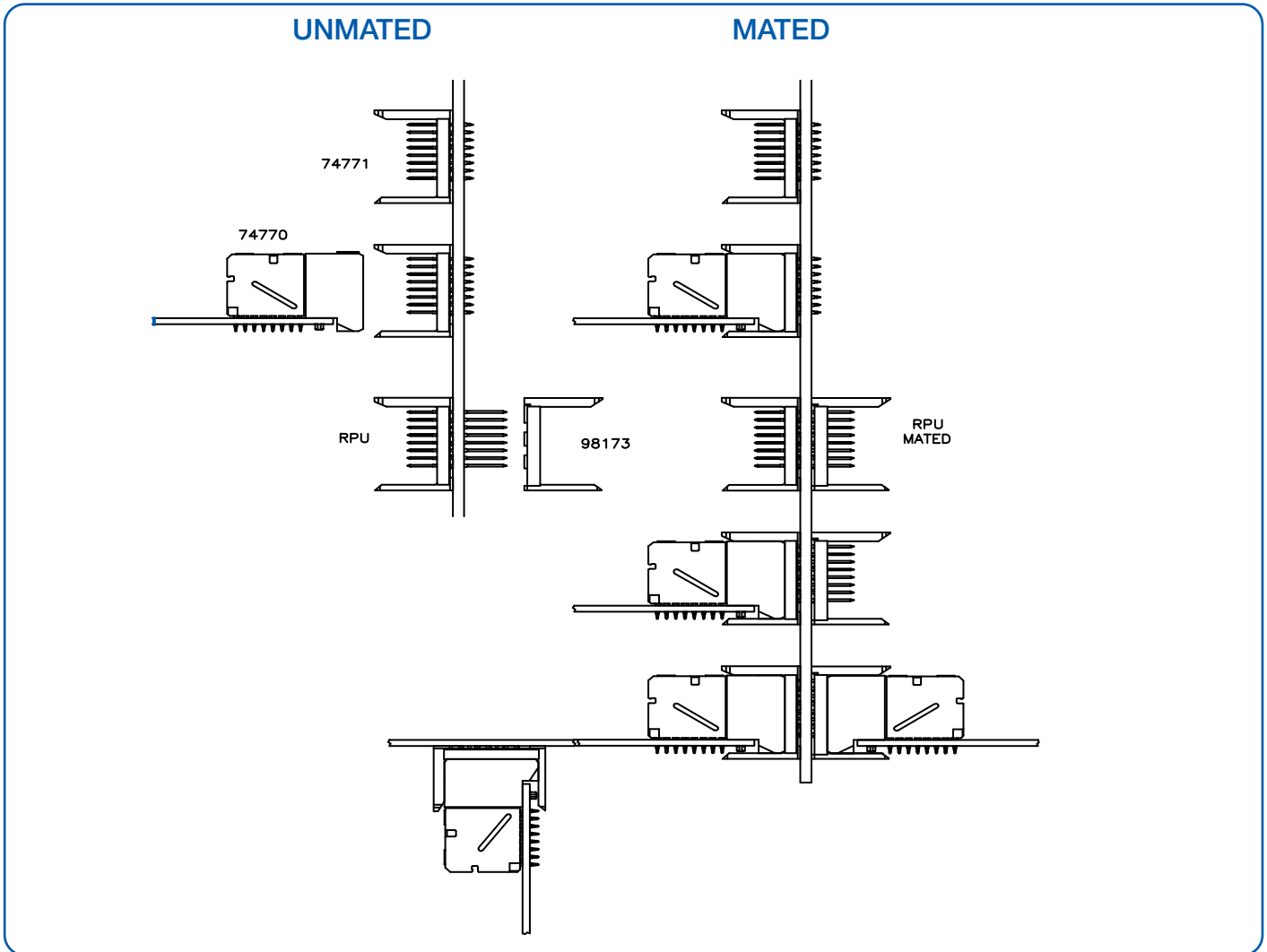
METRAL® 5 row assemblies

UNMATED

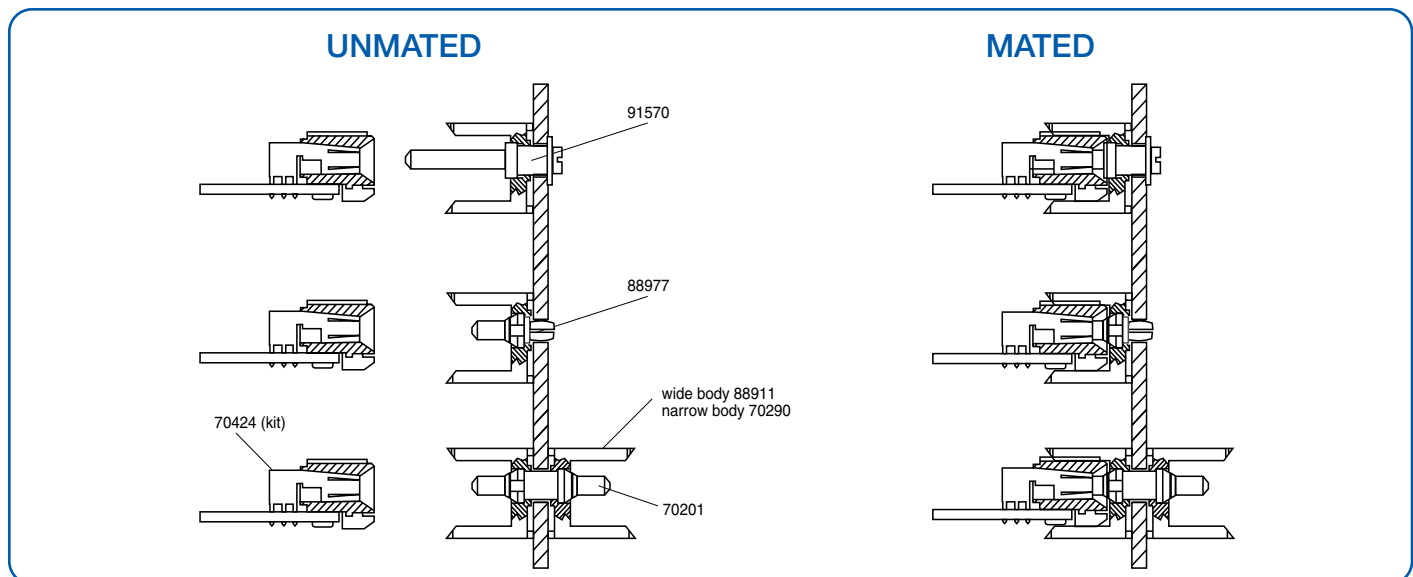
MATED



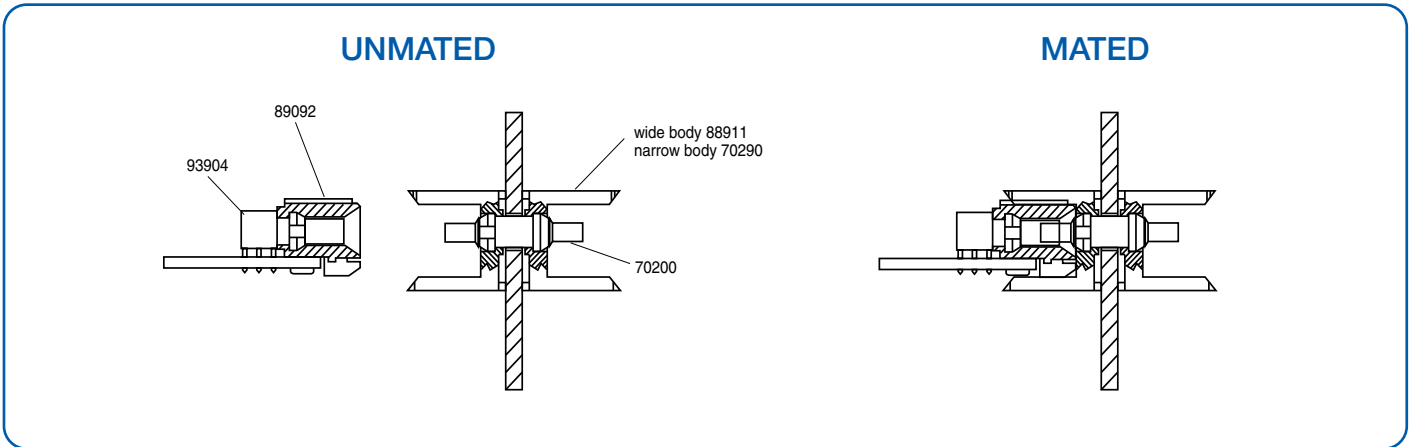
METRAL® 8 row assemblies



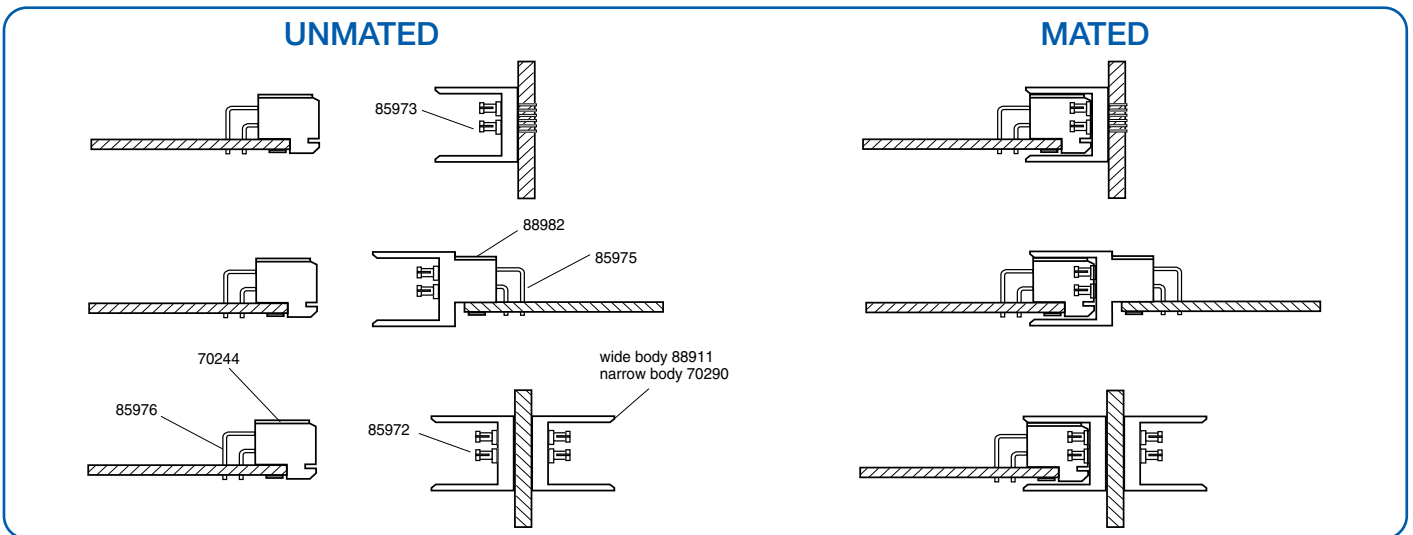
METRAL® DIN High Power assemblies



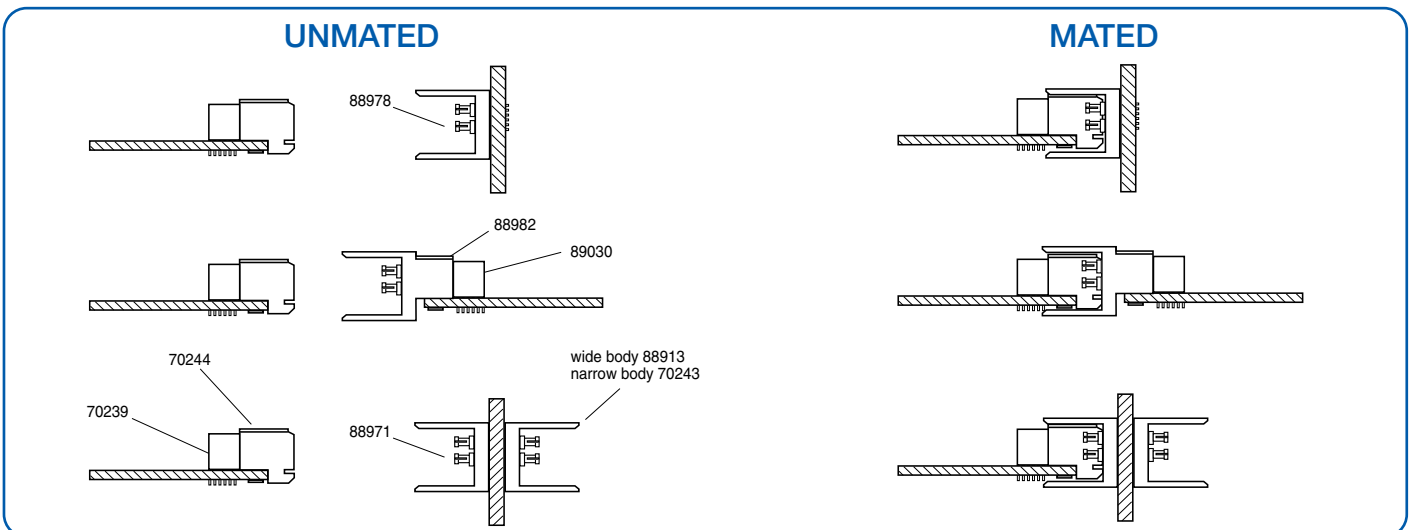
METRAL® DIN standard Coax assemblies



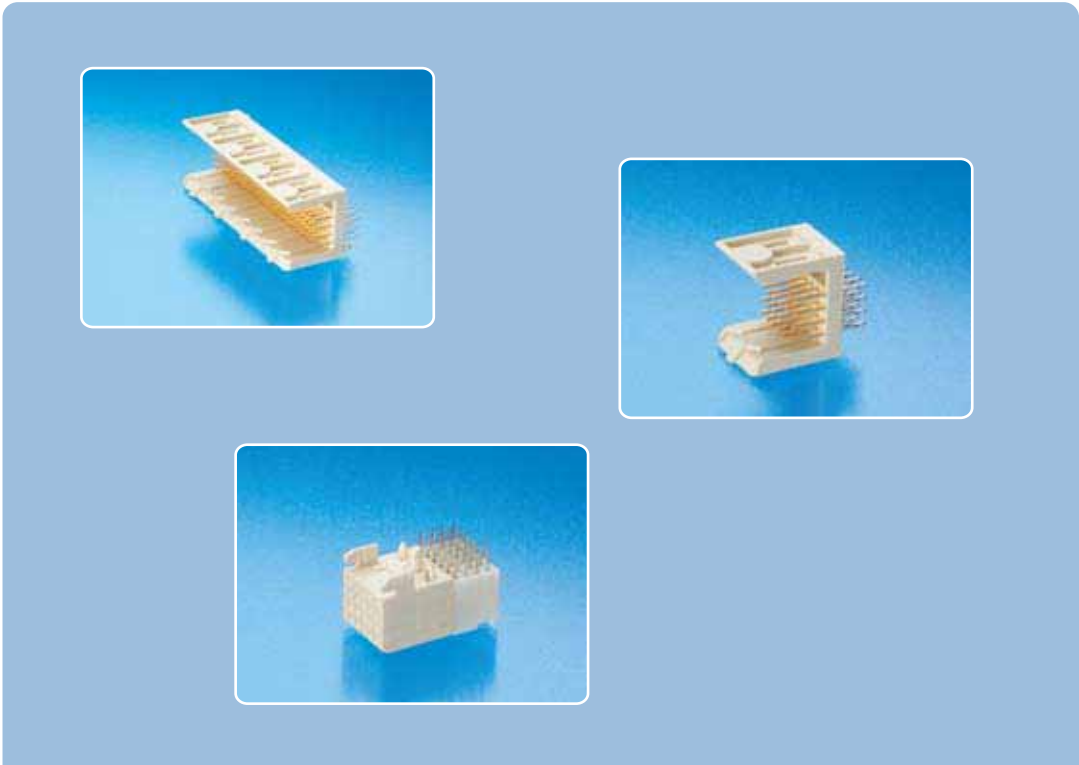
METRAL® Mini Power assemblies



METRAL® Mini Coax assemblies







METRAL® SIGNAL CONNECTORS STANDARD

- Header, 4 row, straight, wide body
- Header, 4 row, straight, narrow body
- Receptacle, 4 row, right angle
- Header, 5 row, straight, wide body
- Header, 5 row, straight, narrow body
- Receptacle, 5 row, right angle
- Header, 8 row, straight, wide body
- Receptacle, 8 row, right angle

Header, 4 row, signal, straight, solder to board, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 Rows and 2 mm pitch permit high signal density (200 contacts per 100 mm connector length).
- Stackable end-to-end without loss of positions.
- Stackable with other METRAL™ function modules (e.g. power, coax, guide pin).
- First Make Last Break options.

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- applicable soldering process: wave, IR, vapor phase

REFERENCE DATA

- product specification.: GS-12-180

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

Receptacle, right angle, press-fit, page 34

- 1 mod – part number 88945-102LF
- 2 mod – part number 88946-102LF
- 4 mod – part number 88947-102LF
- 8 mod – part number 88948-102LF

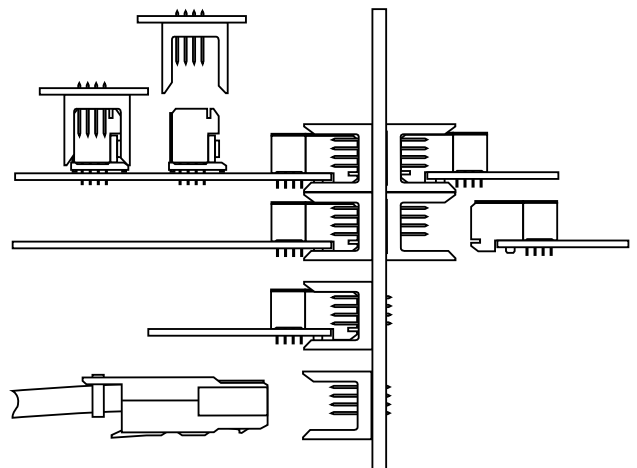
Receptacle, right angle, solder-to-board, page 32

- 1 mod – part numbers 89035-102LF
- 2 mod – part numbers 89036-102LF
- 4 mod – part numbers 89037-102LF
- 8 mod - part numbers 89038-102LF

Receptacle, right angle, Pin-in-Paste, page 36

- 1 mod – part numbers 52048-101LF

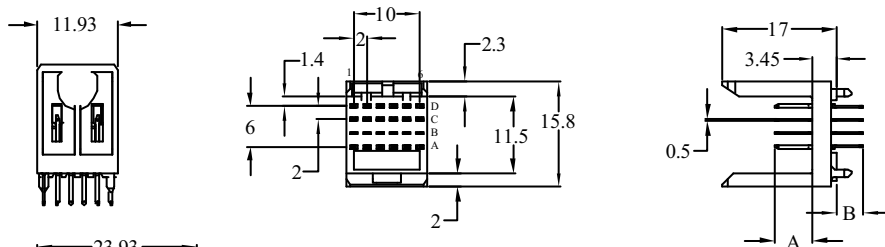
TYPICAL APPLICATIONS



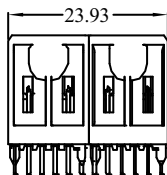
Header, 4 row, signal, straight, solder to board, wide body

PRODUCT

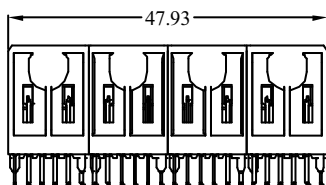
1 Module
88951-1yyLF



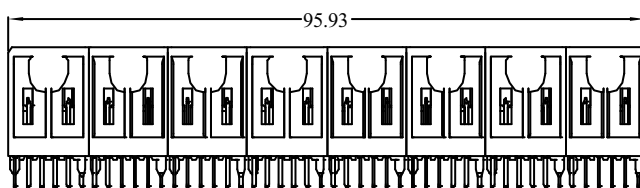
2 Module
88952-1yyLF



4 Module
88953-1yyLF



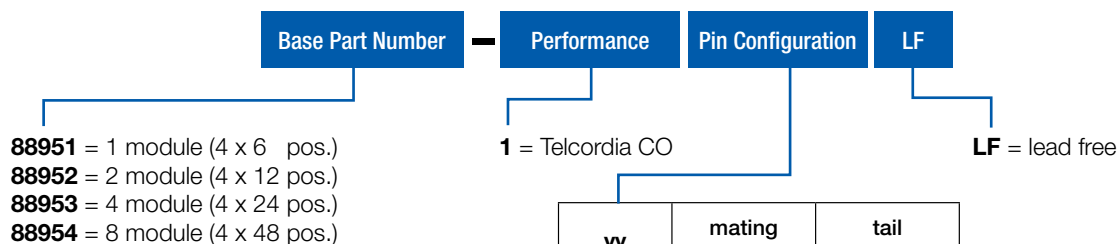
8 Module
88954-1yyLF



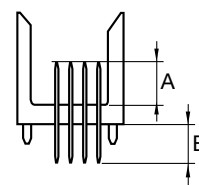
PCB pattern P5, see chapter PCB layouts

PARTNUMBERS

8895x - 1yyLF



| yy | mating length (A) | tail length(B) |
|----|-------------------|----------------|
| 01 | 5,00 mm | 4,25 mm |
| 05 | 6,50 mm | 4,25 mm |
| 31 | 5,00 mm | 3,30 mm |
| 35 | 6,50 mm | 3,30 mm |
| 61 | 5,00 mm | 2,65 mm |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, signal, straight, press-fit, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density (200 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Eye of the needle press-fit contact

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5×10^3 M Ω initially, 1×10^3 M Ω after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 65 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- Applicable process: press-fit

REFERENCE DATA

- product specification.: GS-12-180

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223.



MATING DATA

■ Receptacle, right angle, press-fit, page 34

- 1 mod – part number 88945-102LF
- 2 mod – part number 88946-102LF
- 4 mod – part number 88947-102LF
- 8 mod – part number 88948-102LF

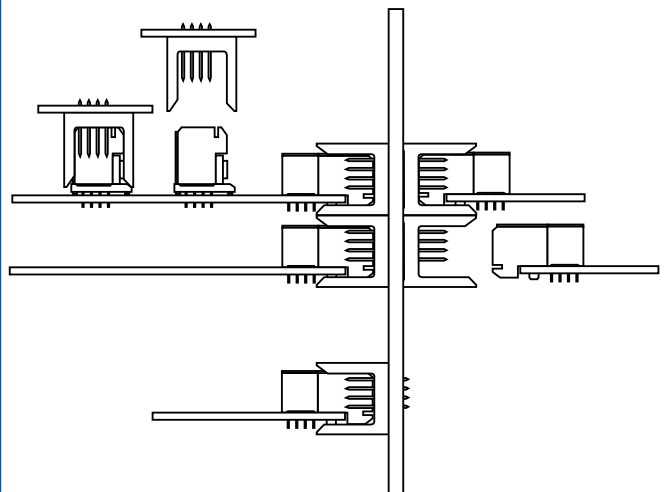
■ Receptacle, right angle, solder-to-board, page 32

- 1 mod – part numbers 89035-101LF
- 2 mod – part numbers 89036-101LF
- 4 mod – part numbers 89037-101LF
- 8 mod - part numbers 89038-101LF

■ Receptacle right angle, Pin-in-Paste, page 36

- 1 mod – part numbers 52048-101LF

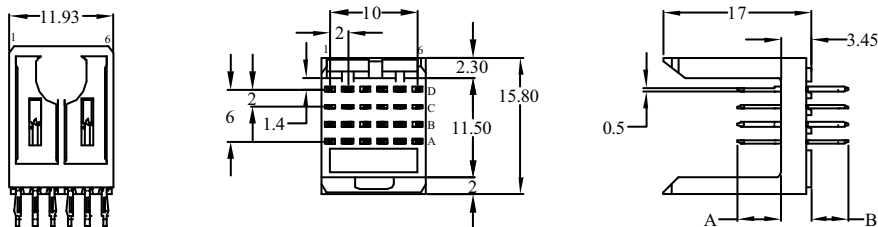
TYPICAL APPLICATIONS



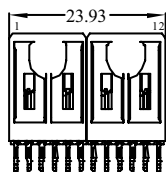
Header, 4 row, signal, straight, press-fit, wide body

PRODUCT

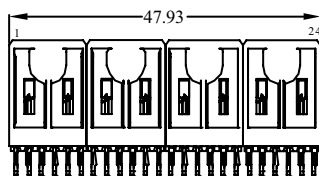
1 Module
70232-1yyLF



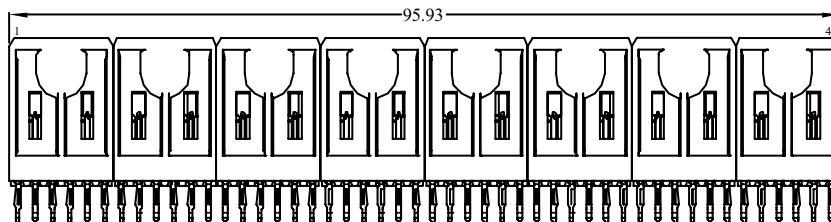
2 Module
70233-1yyLF



4 Module
70234-1yyLF



8 Module
70235-1yyLF



PCB pattern P6, see chapter PCB layouts

PARTNUMBERS

7023x - 1yyLF

Base Part Number

Performance

Pin Configuration

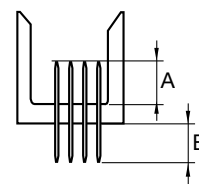
LF

70232 = 1 module (4 x 6 pos.)
70233 = 2 module (4 x 12 pos.)
70234 = 4 module (4 x 24 pos.)
70235 = 8 module (4 x 48 pos.)

1 = Telcordia CO

LF = lead free

| yy | mating length (A) | tail length (B) |
|----|-------------------|-----------------|
| 11 | 5,00 mm | 4,30 mm |
| 16 | 5,75 mm | 4,30 mm |
| 15 | 6,50 mm | 4,30 mm |
| 21 | 5,00 mm | 13,60 mm |
| 26 | 5,75 mm | 13,60 mm |
| 25 | 6,50 mm | 13,60 mm |



Note: blue marked in **pin configuration** is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, signal, straight, solder to board, narrow body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 Rows and 2 mm pitch permit high signal density (200 contacts per 100 mm connector length).
- Stackable end-to-end without loss of positions.
- Stackable with other METRAL™ function modules (e.g. power, coax, guide pin).
- First Make Last Break options.

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- applicable soldering process: wave, IR, vapor phase

REFERENCE DATA

- product specification.: GS-12-180

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

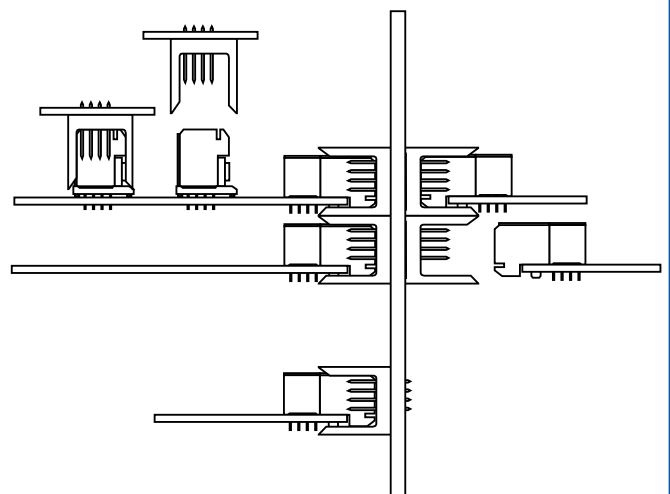
Receptacle, straight

- 1 mod – pf - part number 85757-1101LF, page 69
- 1 mod – stb -part nr HM1S41FRR000H6PLF, page 67

Receptacle, right angle

- 1 mod – pf - part number 88945-102LF, page 35
- 1 mod – stb -part number 89035-102LF, page 33
- 1 mod – pip -part number 52048-101LF, page 37

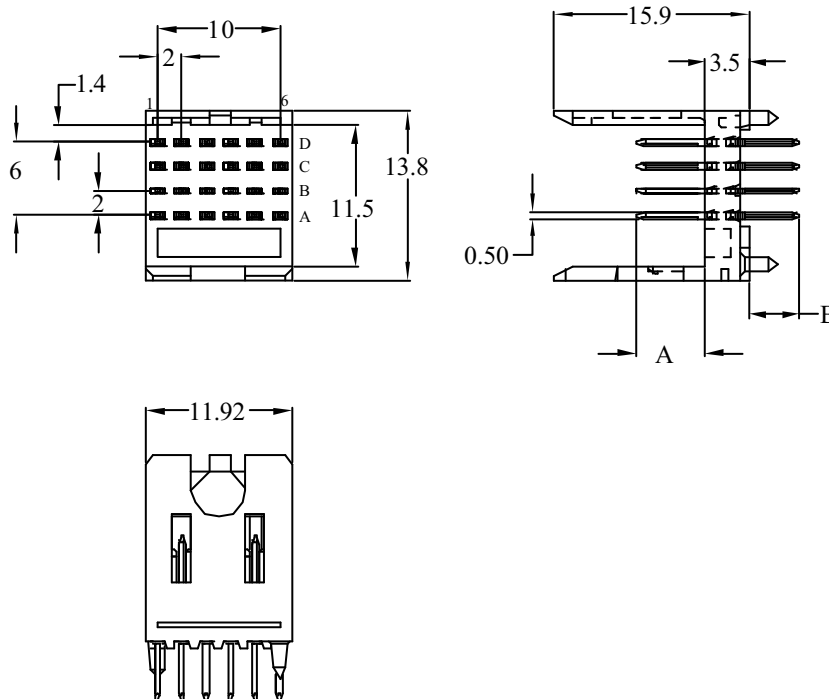
TYPICAL APPLICATIONS



Header, 4 row, signal, straight, solder to board, narrow body

PRODUCT

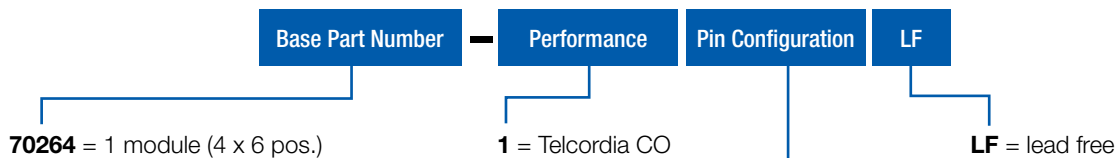
1 Module
70264-1yyLF



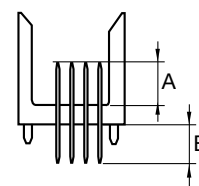
PCB pattern P3, see chapter PCB layouts

PARTNUMBERS

70264 - 1yyLF



| yy | mating length (A) | tail length (B) |
|----|-------------------|-----------------|
| 01 | 5,00 mm | 4,25 mm |
| 05 | 6,50 mm | 4,25 mm |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, signal, straight, press-fit, narrow body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 Rows and 2 mm pitch permit high signal density (200 contacts per 100 mm connector length).
- Stackable end-to-end without loss of positions.
- Stackable with other METRAL™ function modules (e.g. power, coax, guide pin).
- First Make Last Break options.
- Eye the needle press-fit contact

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 65 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- product specification.: GS-12-180

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

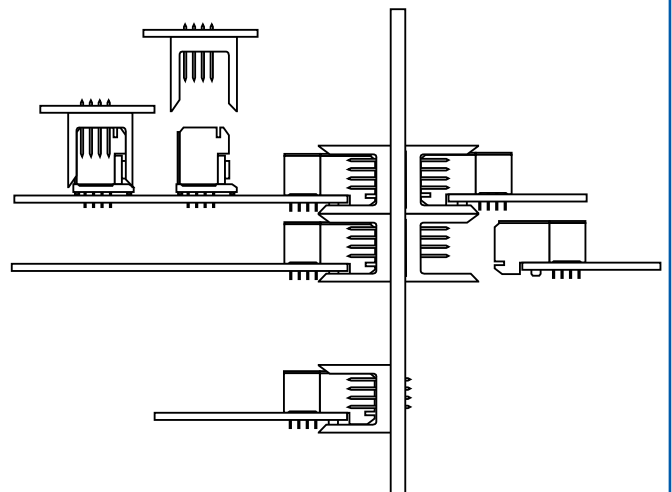
Receptacle, straight

- 1 mod – pf - part number 85757-1101LF, page 69
- 1 mod – stb -part nr HM1S41FRR000H6PLF, page 67

Receptacle, right angle

- 1 mod – pf - part number 88945-102LF, page 35
- 1 mod – stb -part number 89035-102LF, page 33
- 1 mod – pip -part number 52048-101LF, page 37

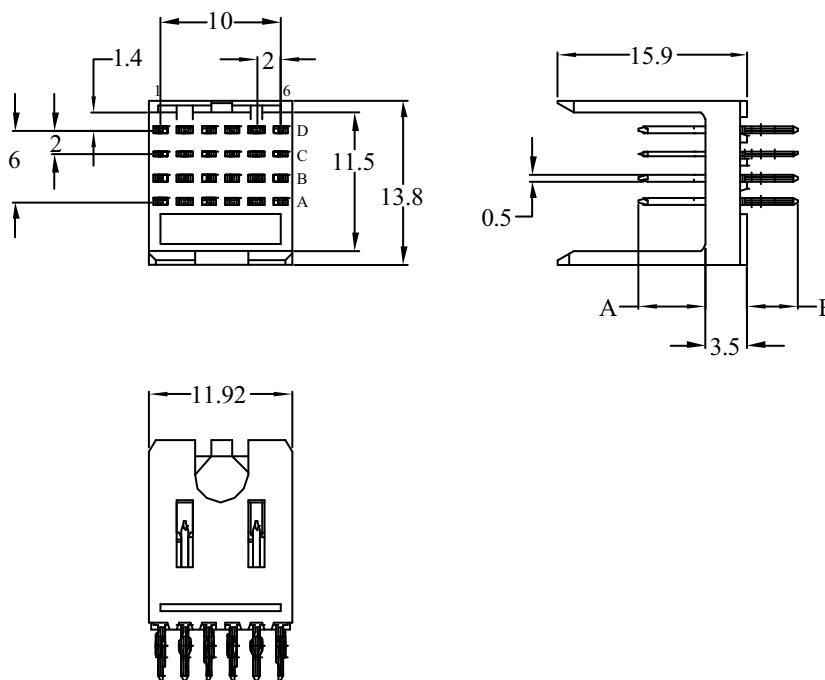
TYPICAL APPLICATIONS



Header, 4 row, signal, straight, press-fit, narrow body

PRODUCT

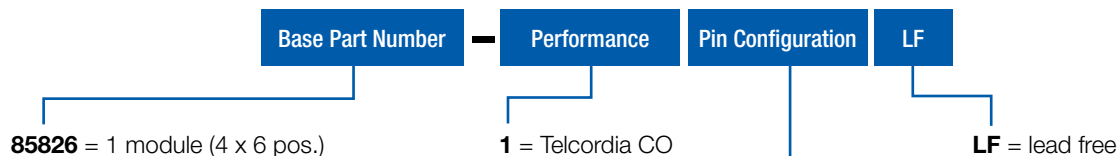
1 Module
85826-1yyLF



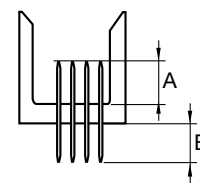
PCB pattern P4, see chapter PCB layouts

PARTNUMBERS

85826 - 1yyLF



| yy | mating length (A) | tail length (B) |
|----|-------------------|-----------------|
| 01 | 5,00 mm | 4,25 mm |

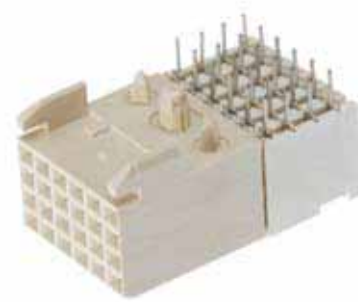


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 4 row, signal, right angle, solder to board

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density (200 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)
- Reliable dual beam box contact
- Stable PCB fixation device
- Low profile allows PCB spacing of 14mm



TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- Recommended hole diameter: 0,65 – 0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Press-peg application, TA-0941
- product specification.: GS-12-453

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

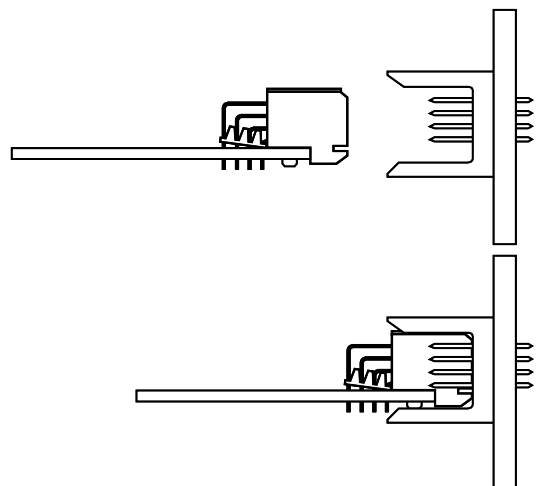
Header, straight, press-fit, page 27

- 1 module – part number 70232-116LF
- 2 modules – part number 70233-116LF
- 4 modules – part number 70234-116LF
- 8 modules – part number 70235-116LF

Headerstraight, solder-to-board, page 25

- 1 module – part number 88951-101LF
- 2 modules – part number 88952-101LF
- 4 modules – part number 88953-101LF
- 8 modules – part number 88954-101LF

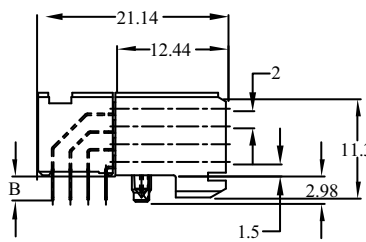
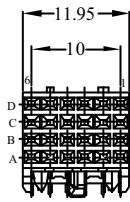
TYPICAL APPLICATIONS



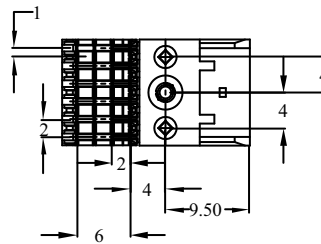
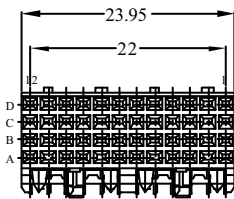
Receptacle, 4 row, signal, right angle, solder to board

PRODUCT

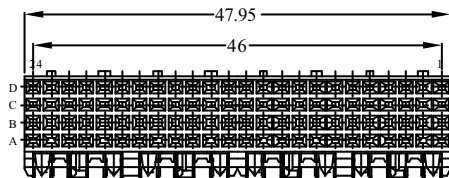
1 Module
89035-1yyLF



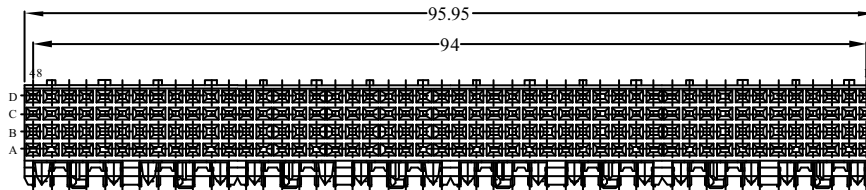
2 Module
89036-1yyLF



4 Module
89037-1yyLF



8 Module
89038-1yyLF



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

8903x - 1yyLF

Base Part Number

Performance

Pin Configuration

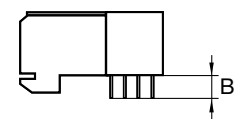
LF

89035 = 1 module (4 x 6 pos.)
89036 = 2 module (4 x 12 pos.)
89037 = 4 module (4 x 24 pos.)
89038 = 8 module (4 x 48 pos.)

1 = Telcordia CO

LF = lead free

| yy | tail length (B) | PCB thickness |
|----|-----------------|---------------|
| 02 | 2,90 mm | 1,60 mm |
| 12 | 3,53 mm | 2,40 mm |



Receptacle, 4 row, signal, right angle, press fit

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density (200 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)
- Reliable dual beam box contact
- Stable PCB fixation device
- Press block ensures accurate position of press-fit tails for easy mounting
- Eye the needle press-fit contact
- Low profile allows PCB spacing of 14mm



TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- Press-peg application, TA-0941
- product specification.: GS-12-453

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

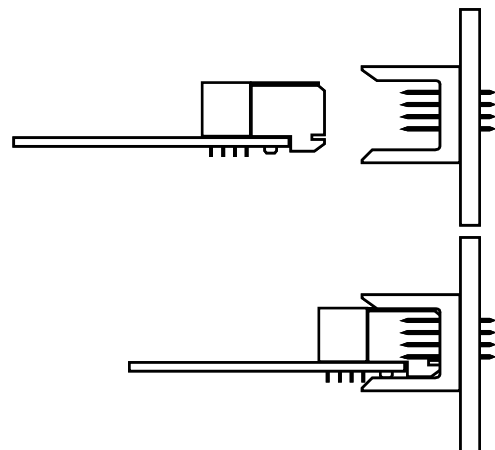
Header, straight, press-fit, page 27

- 1 module – part number 70232-116LF
- 2 modules – part number 70233-116LF
- 4 modules – part number 70234-116LF
- 8 modules – part number 70235-116LF

Header, straight, solder-to-board, page 25

- 1 module – part number 88951-101LF
- 2 modules – part number 88952-101LF
- 4 modules – part number 88953-101LF
- 8 modules – part number 88954-101LF

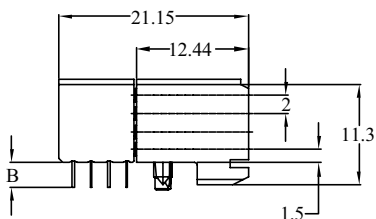
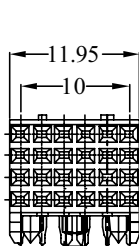
TYPICAL APPLICATIONS



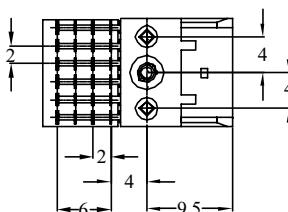
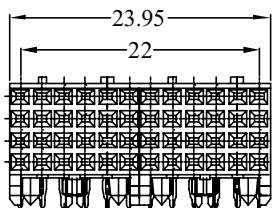
Receptacle, 4 row, signal, right angle, press fit

PRODUCT

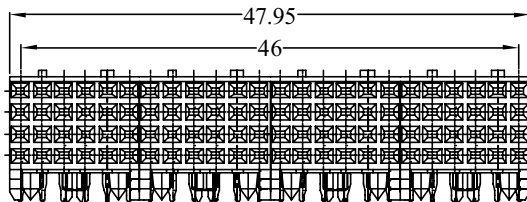
1 Module
88945-1yyLF



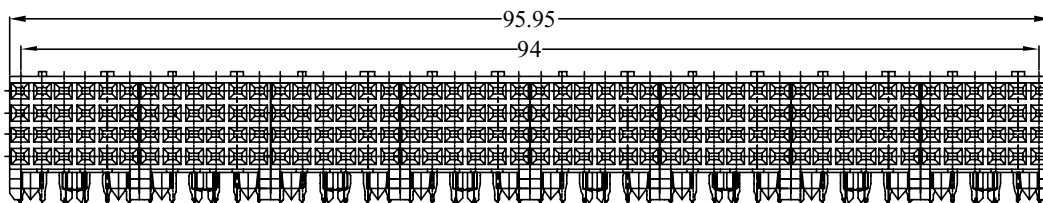
2 Module
88946-1yyLF



4 Module
88947-1yyLF



8 Module
88948-1yyLF



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

8894x - 1yyLF

Base Part Number

Performance

Pin Configuration

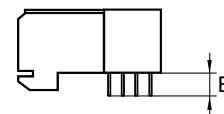
LF

88945 = 1 module (4 x 6 pos.)
88946 = 2 module (4 x 12 pos.)
88947 = 4 module (4 x 24 pos.)
88948 = 8 module (4 x 48 pos.)

1 = Telcordia CO

LF = lead free

| yy | tail length (B) | PCB thickness |
|----|-----------------|---------------|
| 02 | 2,90 mm | 1,60 mm |
| 12 | 3,53 mm | 2,40 mm |



Note: blue marked in pin configuration is the preferred recommended standard
for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 4 row, signal, right angle, pin-in-paste

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density, 1 module (4 x 6 positions)
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)
- Tuning fork, forced controlled contact
- Stable PCB fixation device
- Low profile allows PCB spacing of 14mm



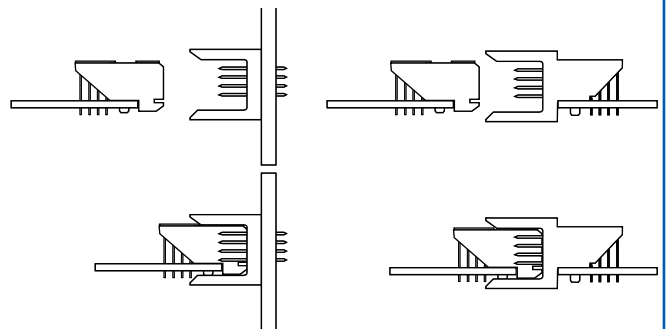
TECHNICAL DATA

- **PHYSICAL**
 - spacing: 2,00 mm x 2,00 mm
 - housing: glass-filled LCP (30% glass), colour natural
 - flammability rating: UL 94 V-0
 - contact material: phosphor bronze
 - performance level: Telcordia CO
- **ELECTRICAL**
 - current rating: 1 A
 - insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
 - withstanding voltage: 1000 V rms (sea level)
- **MECHANICAL PERFORMANCE**
 - Maximum mounting force, 20 N per connector
 - insertion force: 0,45 N max. per individual signal contact (mating)
 - withdrawal force: 0,15 N max. per individual signal contact (unmating)
 - Recommended hole diameter: 0,65 – 0,80 mm
- **ENVIRONMENTAL**
 - Operating temperature -55°C to + 125°C
 - Max. temperature 260°C for 30 seconds
 - RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC
- **PACKAGING**
 - Tape&reel
- **PROCESSING INFORMATION**
 - Pick&place by vacuum nozzle or mechanical gripper
 - automatic Surface-mount reflow process, resistance for Lead Free reflow temperature
- **REFERENCE DATA**
 - Product specification GS-12-215
- **APPLICATION EQUIPMENT**
 - for application equipment, check out the application equipment table on page 217-223

MATING DATA

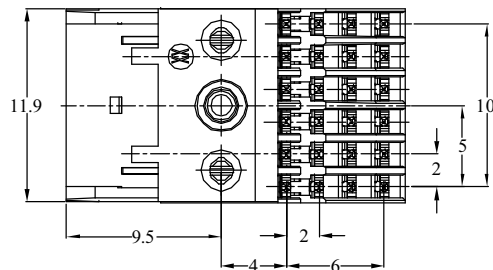
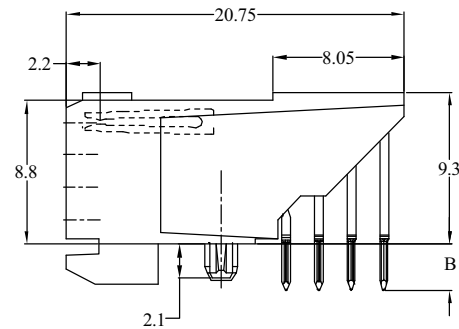
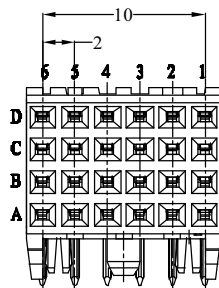
- Header, straight, press-fit, page 27
 - 1 module – part number 70232-116LF
- Header, straight, solder-to-board, page 25
 - 1 module – part number 88951-101LF

TYPICAL APPLICATIONS



Receptacle, 4 row, signal, right angle, pin-in-paste

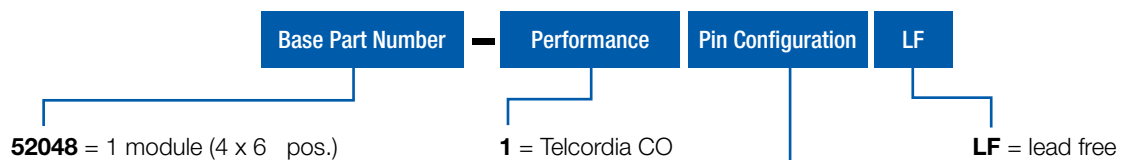
PRODUCT



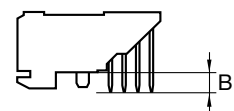
PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

52048 - 1yyLF



| yy | tail length (B) | PCB thickness |
|----|-----------------|---------------|
| 01 | 2,80 mm | 1,60 mm |



Note: blue marked in **pin configuration** is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 5 row, signal, straight, solder to board, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 Rows and 2 mm pitch permit high signal density (200 contacts per 100 mm connector length).
- Stackable end-to-end without loss of positions.
- Stackable with other METRAL™ function modules (e.g. power, coax, guide pin).
- First Make Last Break options.

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5×10^3 M Ω initially, 1×10^3 M Ω after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

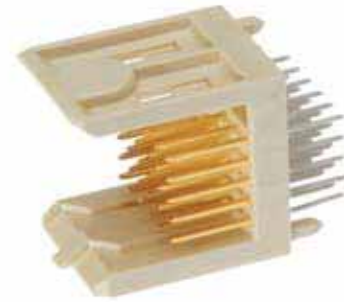
- applicable soldering process: wave, IR, vapor phase

REFERENCE DATA

- product specification.: GS-12-180

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

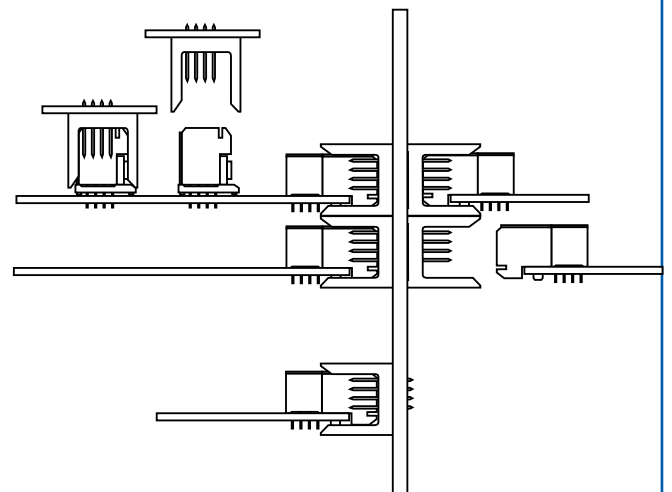
■ Receptacle, right angle, press-fit, page 45

- 1 mod – part number 89047-102LF
- 2 mod – part number 89093-102LF
- 4 mod – part number 89094-102LF
- 8 mod – part number 89095-102LF

■ Receptacle, right angle, solder-to-board, page 43

- 1 mod – part numbers 85863-102LF
- 2 mod – part numbers 85864-102LF
- 4 mod – part numbers 85865-102LF
- 8 mod - part numbers 85866-102LF

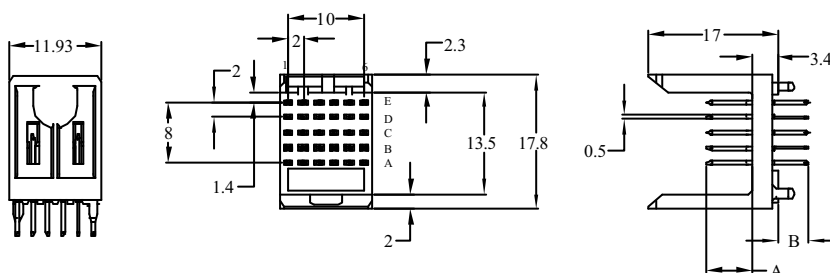
TYPICAL APPLICATIONS



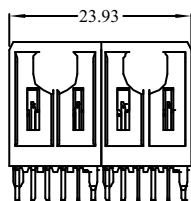
Header, 5 row, signal, straight, solder to board, wide body

PRODUCT

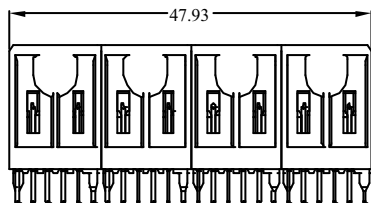
1 Module
74741-1yyLF



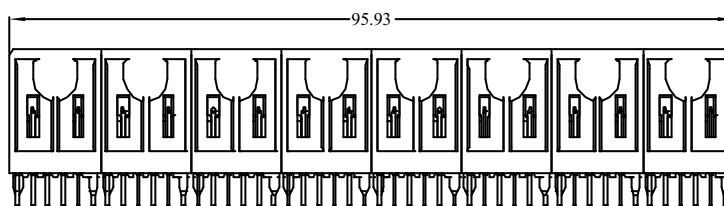
2 Module
7474x-1yyLF
on request only



4 Module
7474x-1yyLF
on request only



8 Module
7474x-1yyLF
on request only



PCB pattern P16, see chapter PCB layouts

PARTNUMBERS

74741 - 1yyLF

Base Part Number

Performance

Pin Configuration

LF

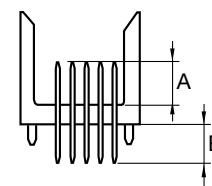
74741
on request only
on request only
on request only
on request only

- = 1 module (5 x 6 pos.)
- = 2 module (5 x 12 pos.)
- = 4 module (5 x 24 pos.)
- = 8 module (5 x 48 pos.)

1 = Telcordia CO

LF = lead free

| yy | mating length (A) | tail length (B) |
|----|-------------------|-----------------|
| 63 | 5,00 mm | 4,25 mm |
| 01 | 6,50 mm | 4,25 mm |
| 79 | 5,00 mm | 3,30 mm |
| 31 | 6,50 mm | 3,30 mm |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 5 row, signal, straight, press-fit, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+).
- 5 Rows and 2 mm pitch permit high signal density (200 contacts per 100 mm connector length).
- Stackable end-to-end without loss of positions.
- Stackable with other METRAL™ function modules (e.g. power, coax, guide pin).
- First Make Last Break options.
- Eye the needle press-fit contact

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 65 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- product specification.: GS-12-180

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

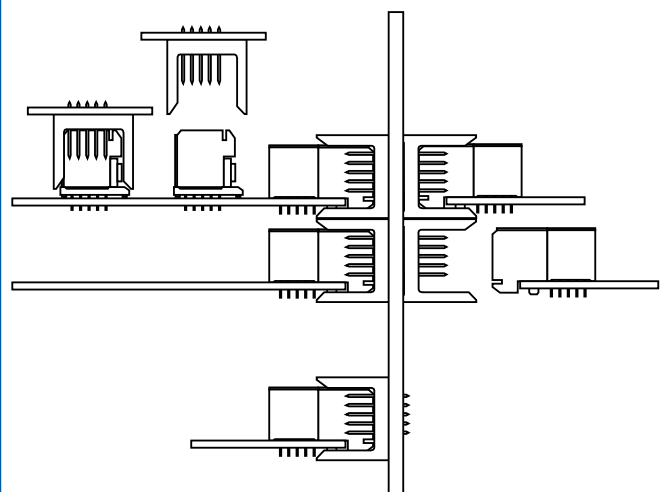
■ Receptacle, right angle, press-fit, page 45

- 1 mod – part number 89047-102LF
- 2 mod – part number 89093-102LF
- 4 mod – part number 89094-102LF
- 8 mod – part number 89095-102LF

■ Receptacle, right angle, solder-to-board, page 43

- 1 mod – part numbers 85863-102LF
- 2 mod – part numbers 85864-102LF
- 4 mod – part numbers 85865-102LF
- 8 mod - part numbers 85866-102LF

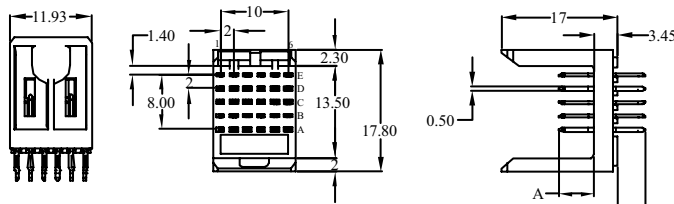
TYPICAL APPLICATIONS



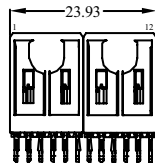
Header, 5 row, signal, straight, press-fit, wide body

PRODUCT

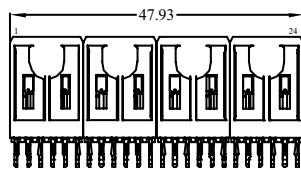
1 Module
89006-1yyLF



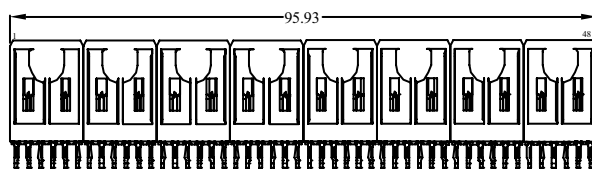
2 Module
89007-1yyLF



4 Module
89008-1yyLF



8 Module
89009-1yyLF



PCB pattern P7, see chapter PCB layouts

PARTNUMBERS

8900x - 1yyLF

Base Part Number

Performance

Pin Configuration

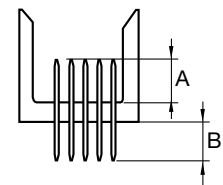
LF

89006 = 1 module (5 x 6 pos.)
89007 = 2 module (5 x 12 pos.)
89008 = 4 module (5 x 24 pos.)
89009 = 8 module (5 x 48 pos.)

1 = Telcordia CO

LF = lead free

| yy | mating length (A) | tail length (B) |
|---------------------------------------|-------------------|-----------------|
| 11 | 5,00 mm | 4,30 mm |
| 16 | 5,75 mm | 4,30 mm |
| 15 | 6,50 mm | 4,30 mm |
| 21 | 5,00 mm | 13,60 mm |
| 26 | 5,75 mm | 13,60 mm |
| 25 | 6,50 mm | 13,60 mm |
| first-make last-brake 44 | row A = 5,00 mm | 4,30 mm |
| | row B = 6,50 mm | 4,30 mm |
| | row C = 7,25 mm | 4,30 mm |
| | row D = 6,50 mm | 4,30 mm |
| | row E = 5,00 mm | 4,30 mm |



Note: blue marked in **pin configuration** is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 5 row, signal, right angle, solder to board

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 row and 2 mm pitch permit high signal density (250 contacts per 100 mm connector length)
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)
- Reliable dual beam box contact
- Stable PCB fixation device

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- Recommended hole diameter: 0,65 – 0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

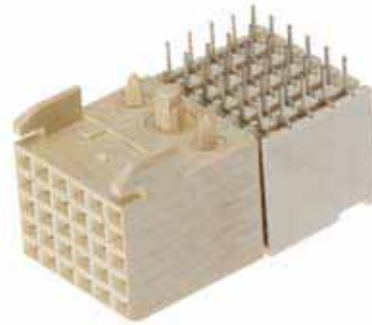
- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Press-peg application, TA-0941
- product specification.: GS-12-453

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

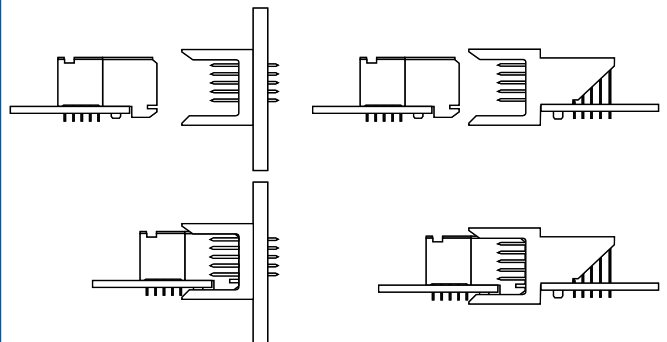
Header straight, press-fit, page 41

- 1 module – part number 89006-116LF
- 2 modules – part number 89007-116LF
- 4 modules – part number 89008-116LF
- 8 modules – part number 89009-116LF

Header straight, solder-to-board, page 39

- 1 module – part number 74741-101LF
- 2 modules – *on request only*
- 4 modules – *on request only*
- 8 modules – *on request only*

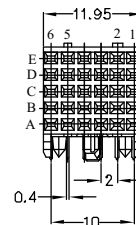
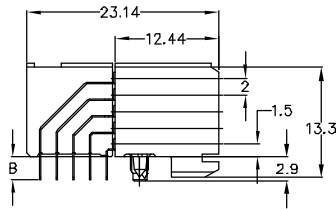
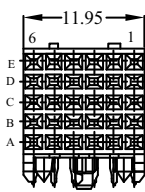
TYPICAL APPLICATIONS



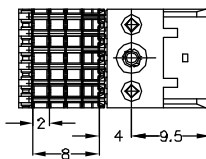
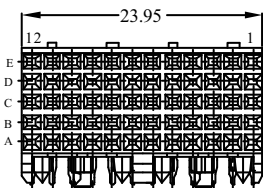
Receptacle, 5 row, signal, right angle, solder to board

PRODUCT

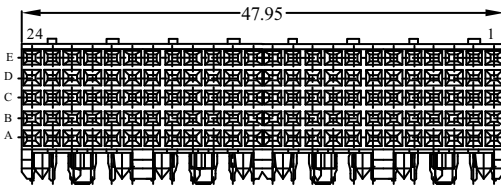
1 Module
85863-1yyLF



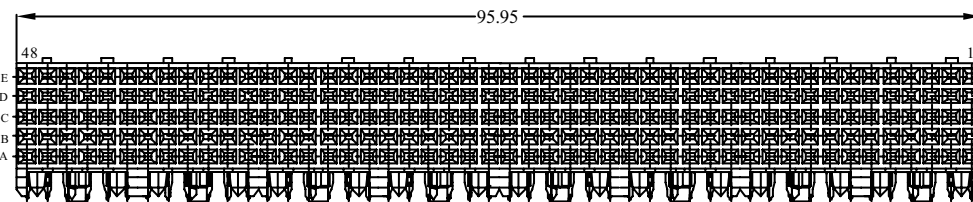
2 Module
85864-1yyLF



4 Module
85865-1yyLF



8 Module
85866-1yyLF



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

8586x - 1yyLF

Base Part Number

Performance

Pin Configuration

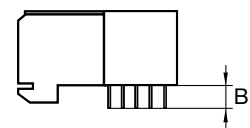
LF

85863 = 1 module (5 x 6 pos.)
85864 = 2 module (5 x 12 pos.)
85865 = 4 module (5 x 24 pos.)
85866 = 8 module (5 x 48 pos.)

1 = Telcordia CO

LF = lead free

| yy | tail length (B) | PCB thickness |
|----|-----------------|---------------|
| 02 | 2,90 mm | 1,60 mm |
| 12 | 3,53 mm | 2,40 mm |



Receptacle, 5 row, signal, right angle, press fit

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 row and 2 mm pitch permit high signal density (250 contacts per 100 mm connector length)
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)
- Reliable dual beam box contact
- Stable PCB fixation device
- Press block ensures accurate position of press-fit tails for easy mounting
- Eye the needle press-fit contact



TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- Press-peg application, TA-0941
- product specification.: GS-12-453

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223.

MATING DATA

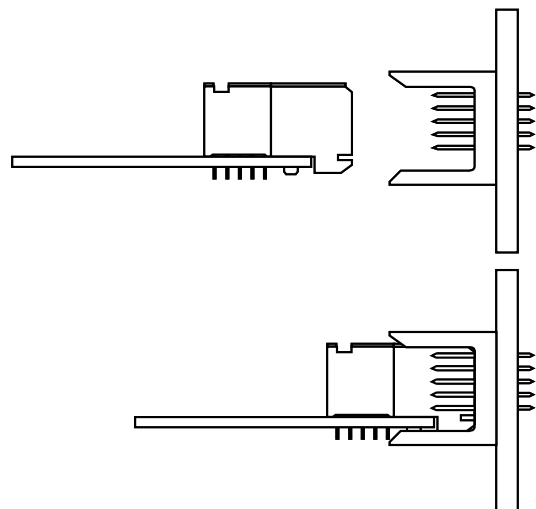
Header straight, press-fit, page 41

- 1 module – part number 89006-116LF
- 2 modules – part number 89007-116LF
- 4 modules – part number 89008-116LF
- 8 modules – part number 89009-116LF

Header straight, solder-to-board, page 39

- 1 module – part number 74741-101LF
- 2 modules – *on request only*
- 4 modules – *on request only*
- 8 modules – *on request only*

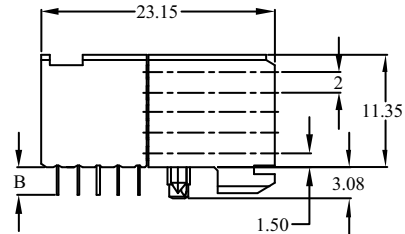
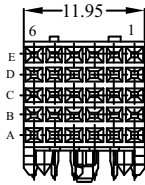
TYPICAL APPLICATIONS



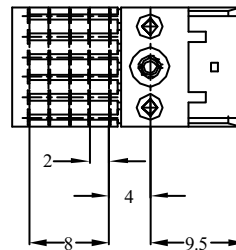
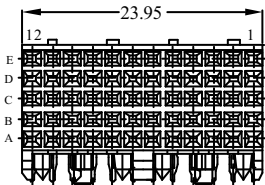
Receptacle, 5 row, signal, right angle, press fit

PRODUCT

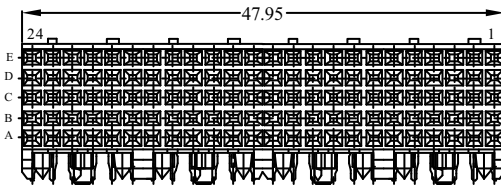
1 Module
89047-1yyLF



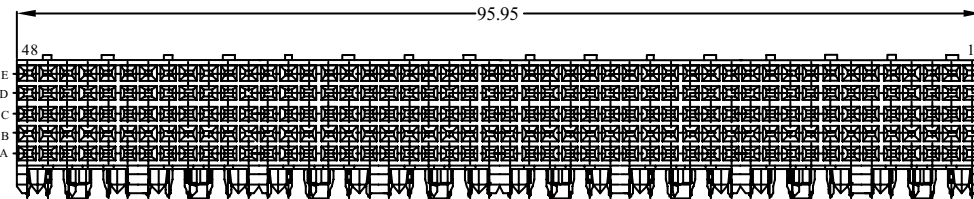
2 Module
89093-1yyLF



4 Module
89094-1yyLF



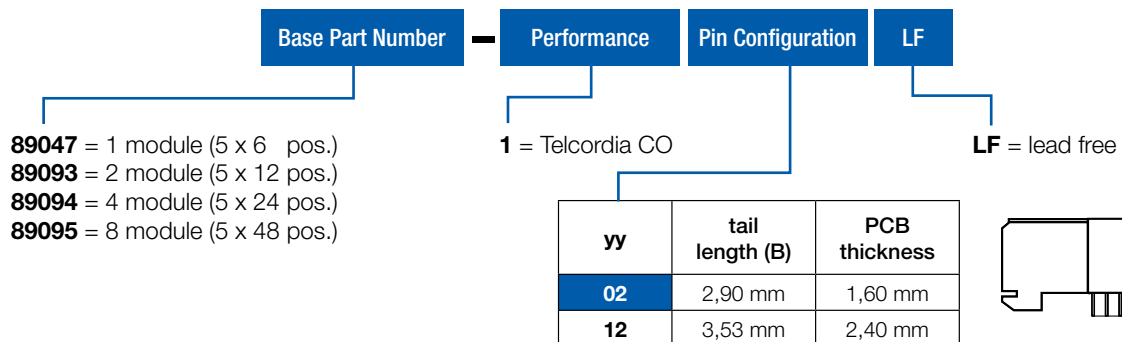
8 Module
89095-1yyLF



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

8904x - 1yyLF



Note: blue marked in pin configuration is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 5 row, signal, right angle, pin-in-paste

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 row and 2 mm pitch permit high signal density, 1 module (5 x 6 positions)
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)
- Tuning fork, forced controlled contact
- Stable PCB fixation device
- Low profile allows PCB spacing of 14mm



TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- Maximum mounting force, 20 N per connector
- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- Recommended hole diameter: 0,65 – 0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- Max. temperature 260°C for 30 seconds
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Tape&reel

PROCESSING INFORMATION

- Pick&place by vacuum nozzle or mechanical gripper
- automatic Surface-mount reflow process, resistance for Lead Free reflow temperature

REFERENCE DATA

- Product specification GS-12-215

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

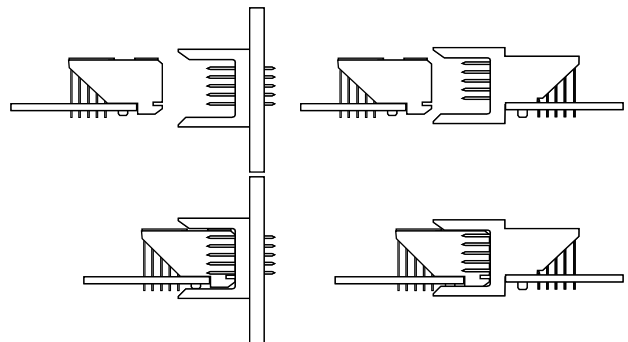
- Header, straight, press-fit, page 41

- 1 module – part number 89006-116LF

- Header, straight, solder-to-board, page 39

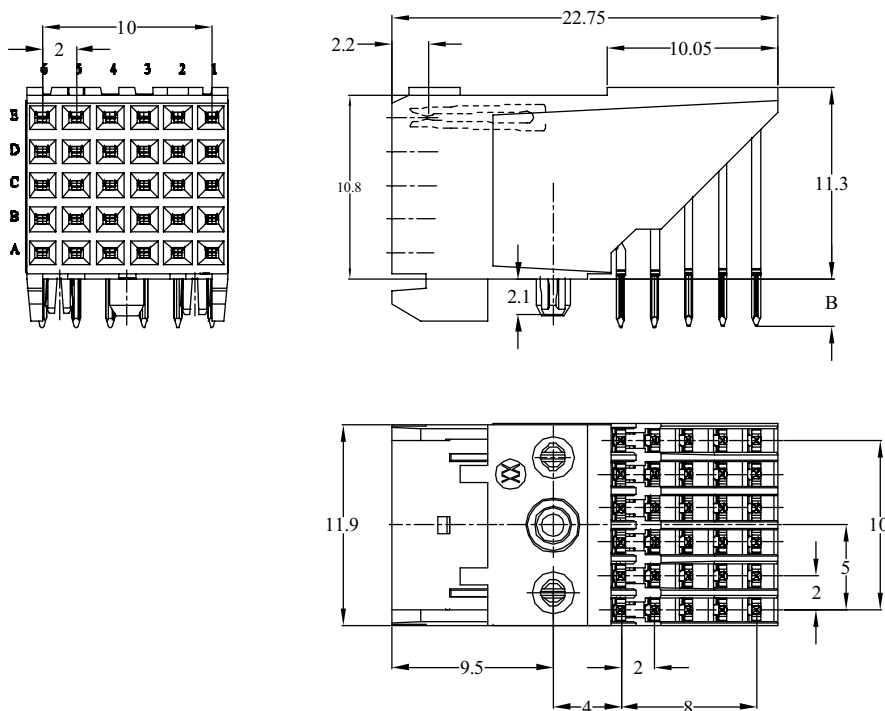
- 1 module – part number 74741-101LF

TYPICAL APPLICATIONS



Receptacle, 5 row, signal, right angle, pin-in-paste

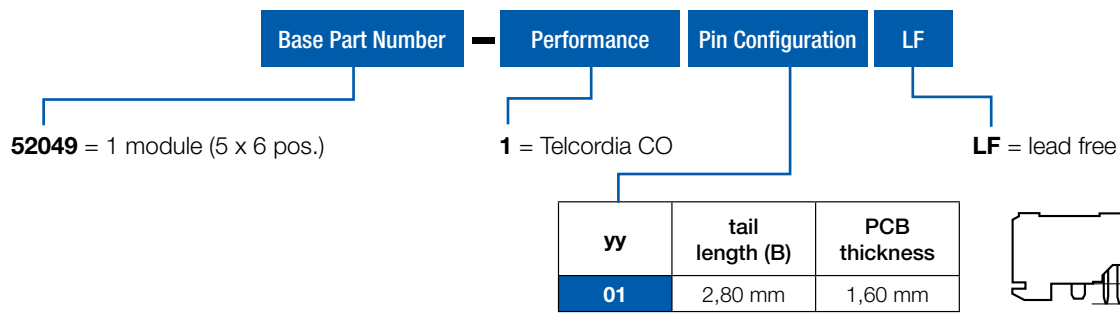
PRODUCT



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

52049 - 101LF



Note: blue marked in **pin configuration** is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 8 row, signal, straight, press fit, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 8 row and 2 mm pitch permit high signal density (800 contacts per 100mm connector length)
- 2 modules header, 8 rows by 6 position
- Baby H-shape press-fit contact

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)

- press-fit contact insertion: 65 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- product specification.: GS-12-134
- application specification: GS-20-010

APPLICATION EQUIPMENT

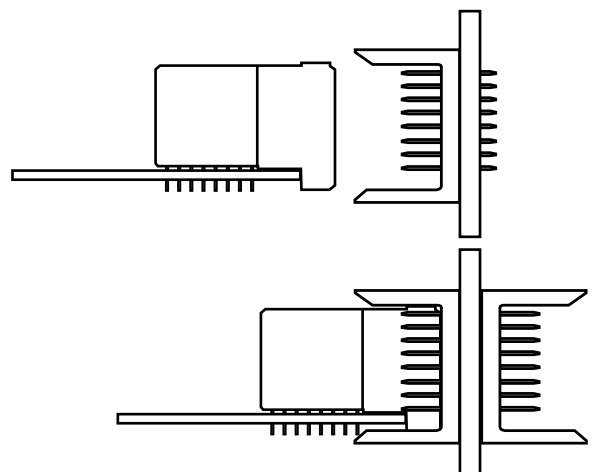
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

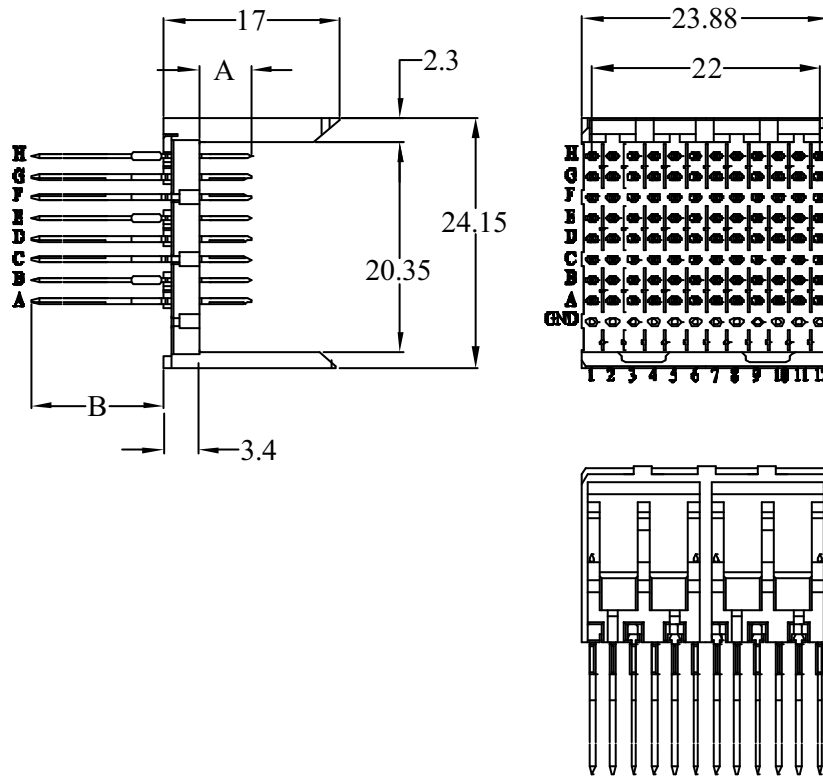
- Receptacle, right angle, press-fit, page 51
- part number 74770-102LF

TYPICAL APPLICATIONS



Header, 8 row, signal, straight, press fit, wide body

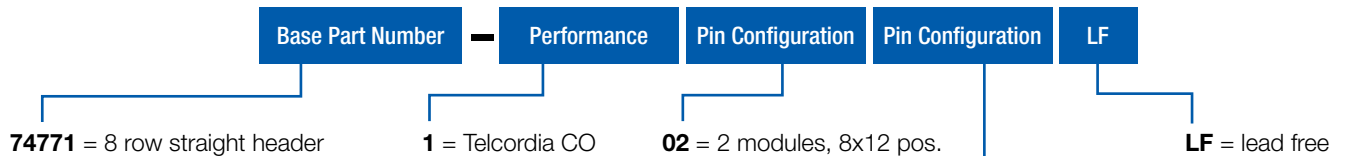
PRODUCT



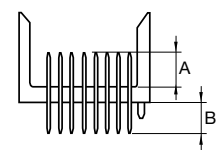
PCB pattern P21, see chapter PCB layouts

PARTNUMBERS

74771 - 102011LF



| yyy | mating length (A) | tail length (B) |
|-----|-------------------|-----------------|
| 011 | 6,50 mm | 17,10 mm |



Note: blue marked in **pin configuration** is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 8 row, signal, right angle, press fit

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 8 row and 2 mm pitch permit high signal density (800 contacts per 100mm connector length)
- 2 modules header, 8 rows by 6 position
- Eye of the needle press-fit contact
- Tuning fork, forced controlled contact

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5×10^3 M Ω initially, 1×10^3 M Ω after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- product spec.: GS-12-134
- application specification: GS-20-010

APPLICATION EQUIPMENT

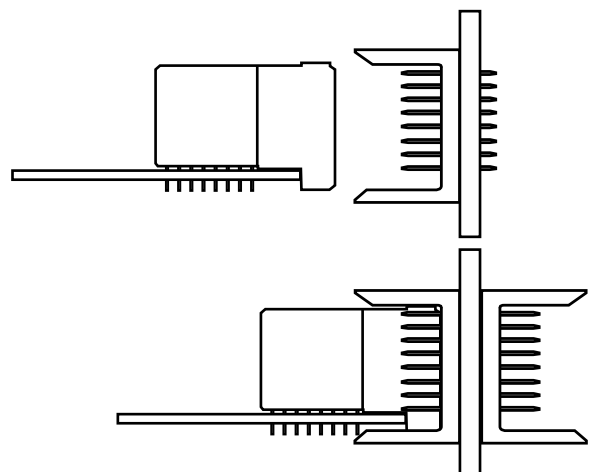
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

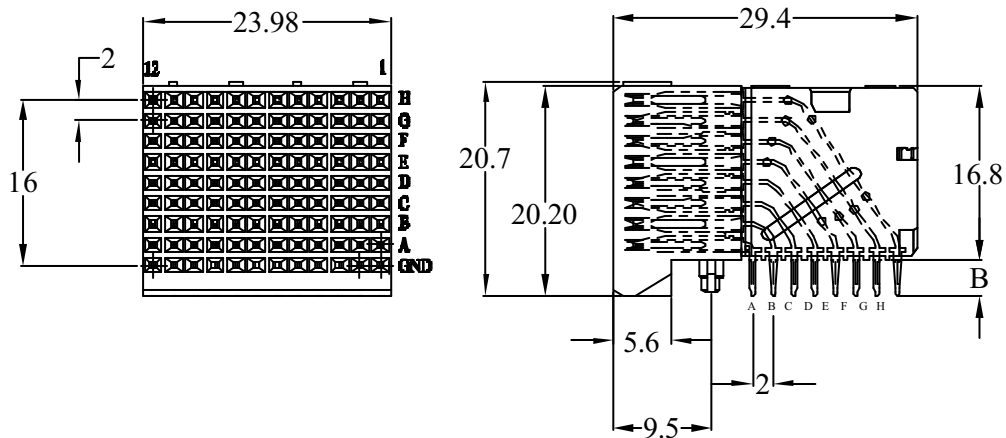
- Receptacle, right angle, press-fit, page 49
- part number 74771-102011LF

TYPICAL APPLICATIONS



Receptacle, 8 row, signal, right angle, press fit

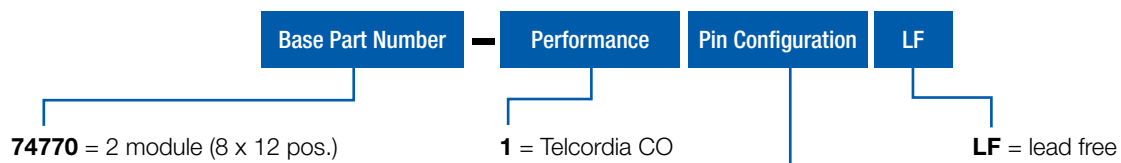
PRODUCT



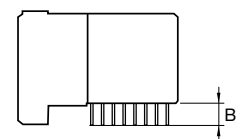
PCB pattern P22, see chapter PCB layouts

PARTNUMBERS

74770 - 102LF



| yy | tail length (B) | PCB thickness |
|----|-----------------|-----------------|
| 02 | 3,53 mm | 1,30 to 3,40 mm |



Note: blue marked in **pin configuration** is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only



■ METRAL® SIGNAL CONNECTORS REVERSED

- Header, 4 row, right angle, wide body
- Header, 4 row, right angle, narrow body
- Receptacle, 4 row, straight
- Header, 5 row, right angle, wide body
- Header, 5 row, right angle, narrow body
- Receptacle, 4 row, straight

Header, 4 row, signal, right angle, solder to board, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density (200 contacts per 100mm connector length)
- Modular design guarantees flexibility

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5×10^3 M Ω initially, 1×10^3 M Ω after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: trays

PROCESSING INFORMATION

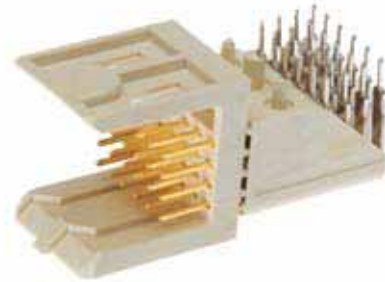
- applicable soldering process: wave, IR, vapor phase

REFERENCE DATA

- Product specification: GS-12-446

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

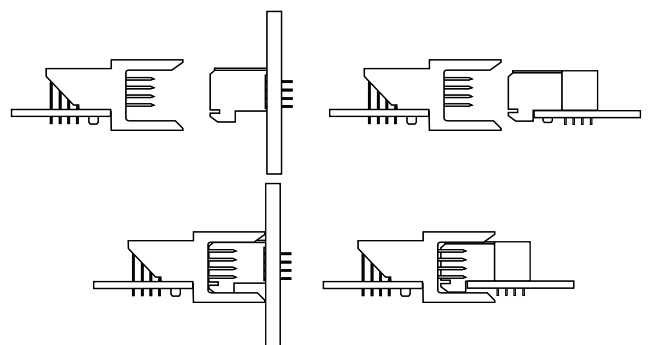
■ Receptacle, straight, press-fit, page 69

- 1 mod – part number 85757-1101LF
- 2 mod – part number 85758-1101LF
- 4 mod – part number 85759-1101LF
- 8 mod – part number 85760-1101LF

■ Receptacle, straight, solder-to-board, page 67

- 1 mod – part numbers HM1S41FRR000H6PLF
- 2 mod – part numbers HM1S42FRR000H6PLF
- 4 mod – part numbers HM1S43FRR000H6PLF
- 8 mod - part numbers HM1S44FRR000H6PLF

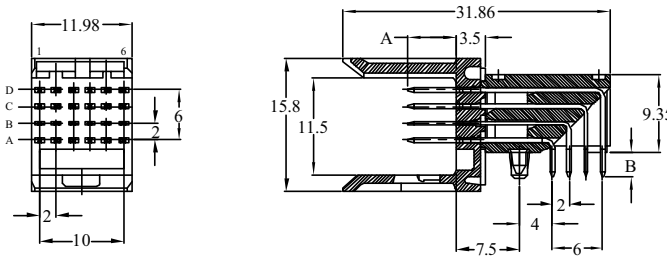
TYPICAL APPLICATIONS



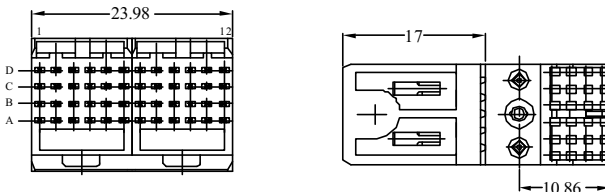
Header, 4 row, signal, right angle, solder to board, wide body

PRODUCT

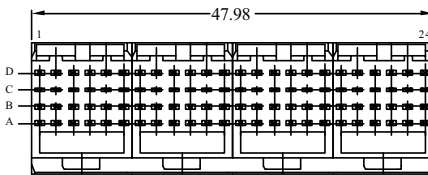
1 Module



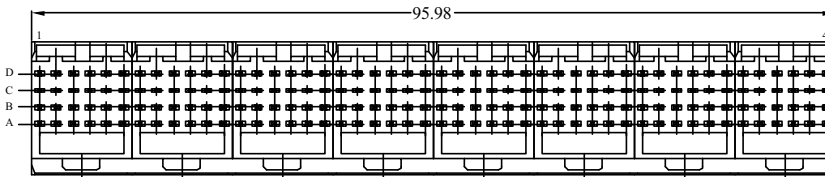
2 Module



4 Module



8 Module



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

HM1L4 x LAP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF |
|------------------|---|-------------|-------------|-----------------------|-----|-------------------|-----------|----------------|
| HM1 | L = Signal header right angle, wide body | 4 = 4 row | | LAP = solder to board | | H6 = Telcordia CO | | LF = lead free |
| | | | | | | | P = trays | |
| | | | | | | | | |

| mating length (A) | tail length (B) |
|----------------------|-----------------|
| 5,75 mm | 2,90 mm |
| 1,6 mm PCB thickness | |

Note: For other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, signal, right angle, press fit, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density (200 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Eye of the needle press-fit contact

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: trays

PROCESSING INFORMATION

- press-fit

REFERENCE DATA

- Product specification: GS-12-445

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

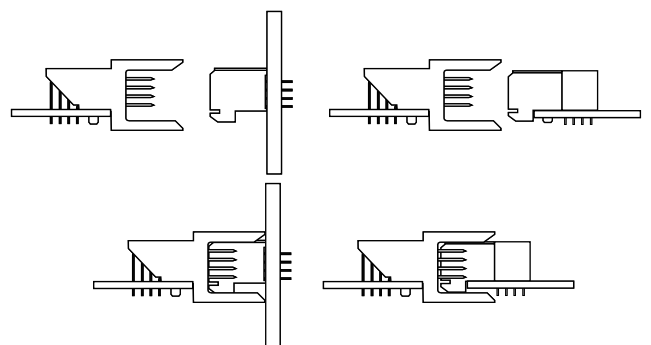
■ Receptacle, press-fit, page 69

- 1 mod – part number 85757-1101LF
- 2 mod – part number 85758-1101LF
- 4 mod – part number 85759-1101LF
- 8 mod – part number 85760-1101LF

■ Receptacle, solder-to-board, page 67

- 1 mod – part numbers HM1S41FRR000H6PLF
- 2 mod – part numbers HM1S42FRR000H6PLF
- 4 mod – part numbers HM1S43FRR000H6PLF
- 8 mod - part numbers HM1S44FRR000H6PLF

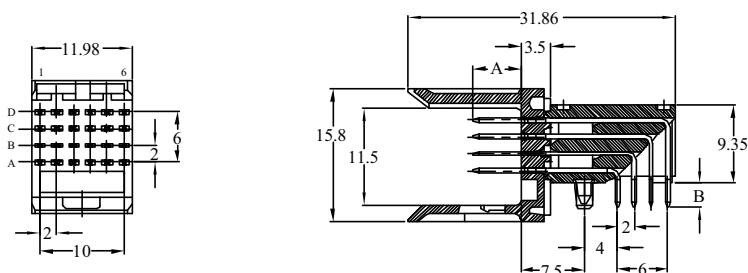
TYPICAL APPLICATIONS



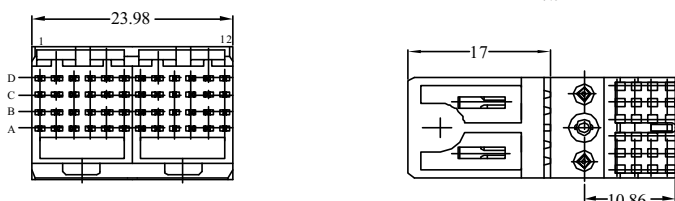
Header, 4 row, signal, right angle, press fit, wide body

PRODUCT

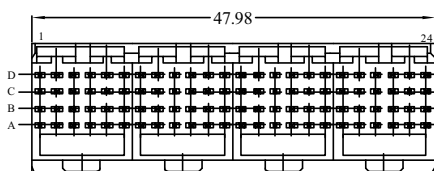
1 Module



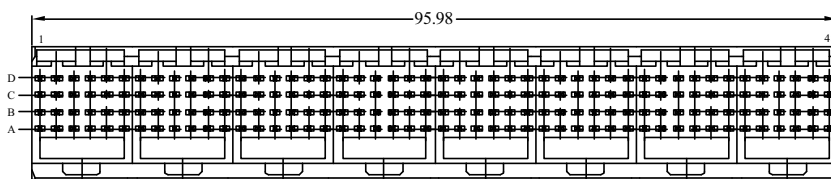
2 Module



4 Module



8 Module



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

HM1L4 x LDP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF | | | | | | |
|----------------------|--|---|-----------------|--|-------------------|-----------------|-----------|---------|----------------------|--|--|-------------------|-----------|----------------|
| HM1 | L = Signal header right angle, wide body | 4 = 4 row | LDP = Press fit | <table border="1"> <thead> <tr> <th>mating length (A)</th> <th>tail length (B)</th> </tr> </thead> <tbody> <tr> <td>5,75 mm</td> <td>2,90 mm</td> </tr> <tr> <td colspan="2">1,6 mm PCB thickness</td> </tr> </tbody> </table> | mating length (A) | tail length (B) | 5,75 mm | 2,90 mm | 1,6 mm PCB thickness | | | H6 = Telcordia CO | P = trays | LF = lead free |
| mating length (A) | tail length (B) | | | | | | | | | | | | | |
| 5,75 mm | 2,90 mm | | | | | | | | | | | | | |
| 1,6 mm PCB thickness | | | | | | | | | | | | | | |
| | | 1 = 1 module (4 x 6 pos.) 2 = 2 module (4 x 12 pos.) 3 = 4 module (4 x 24 pos.) 4 = 8 module (4 x 48 pos.) | | | | | | | | | | | | |

Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, signal, right angle, pin-in-paste, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density (200 contacts per 100mm connector length)
- Modular design guarantees flexibility

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: trays

PROCESSING INFORMATION

- Pick&place by vacuum nozzle or mechanical gripper
- automatic Surface-mount reflow process, resistance for Lead Free reflow temperature

REFERENCE DATA

- Product specification: GS-12-446

APPLICATION EQUIPMENT

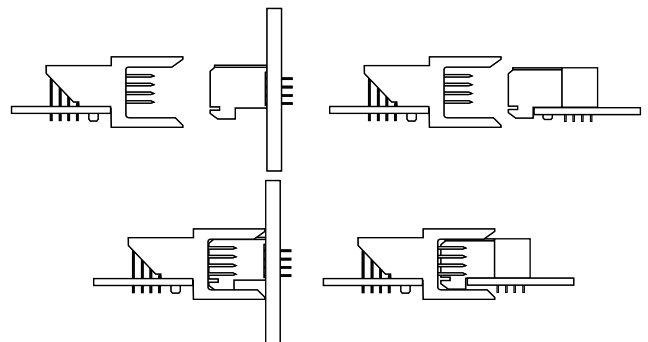
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

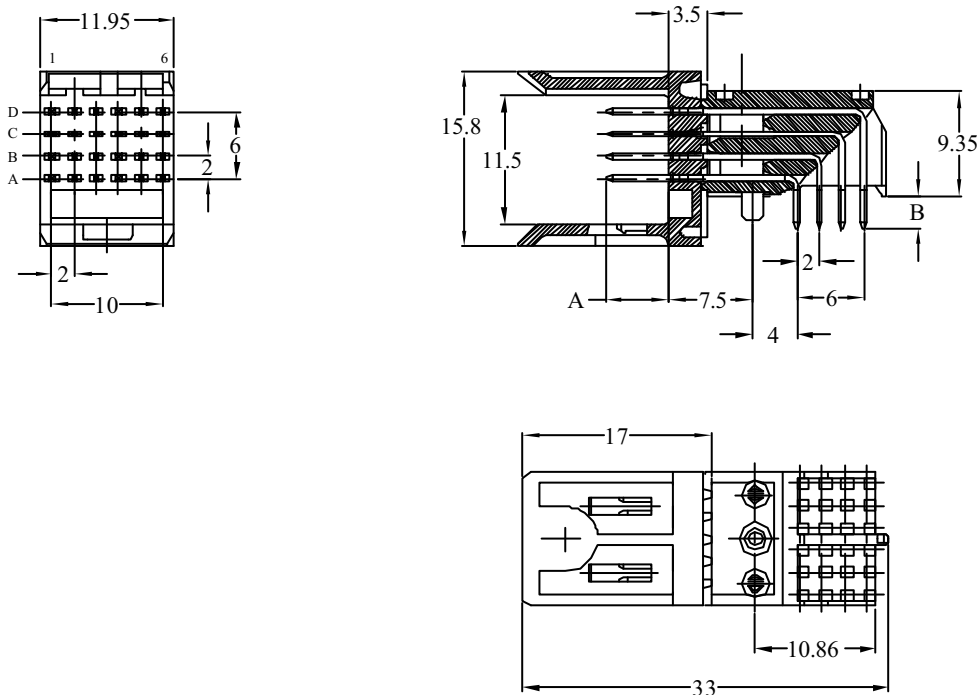
- Receptacle, straight, press-fit, page 69
 - 1 mod – part number 85757-101LF
- Receptacle, straight, solder-to-board, page 67
 - 1 mod – part numbers HM1S41FRR000H6PLF

TYPICAL APPLICATIONS



Header, 4 row, signal, right angle, pin-in-paste, wide body

PRODUCT



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

HM1L4 x LFP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF | | | | | | |
|----------------------|---|------------------|----------------------------------|---|-------------------|-----------------|-----------|---------|----------------------|--|--|--------------------------|------------------|-----------------------|
| HM1 | L = Signal header right angle, wide body | 4 = 4 row | 1 = 1 module (4 x 6 pos.) | LFP = Pin-in-Paste <table border="1"> <thead> <tr> <th>mating length (A)</th> <th>tail length (B)</th> </tr> </thead> <tbody> <tr> <td>5,75 mm</td> <td>2,90 mm</td> </tr> <tr> <td colspan="2">1,6 mm PCB thickness</td> </tr> </tbody> </table> | mating length (A) | tail length (B) | 5,75 mm | 2,90 mm | 1,6 mm PCB thickness | | | H6 = Telcordia CO | P = trays | LF = lead free |
| mating length (A) | tail length (B) | | | | | | | | | | | | | |
| 5,75 mm | 2,90 mm | | | | | | | | | | | | | |
| 1,6 mm PCB thickness | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, signal, right angle, solder to board, narrow body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density (200 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Narrow body housing

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5×10^3 M Ω initially, 1×10^3 M Ω after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

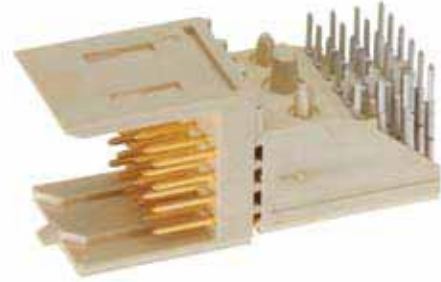
- applicable soldering process: wave, IR, vapor phase

REFERENCE DATA

- Product specification: GS-12-446

APPLICATION EQUIPMENT

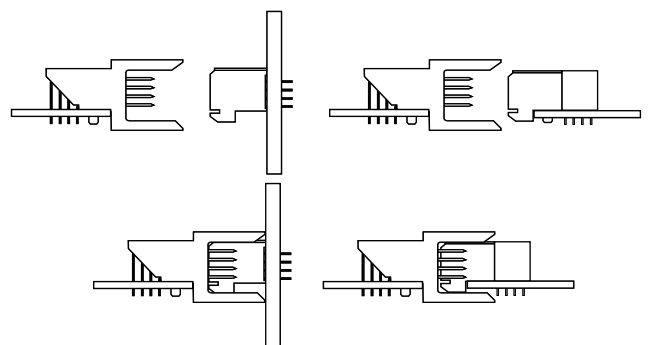
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

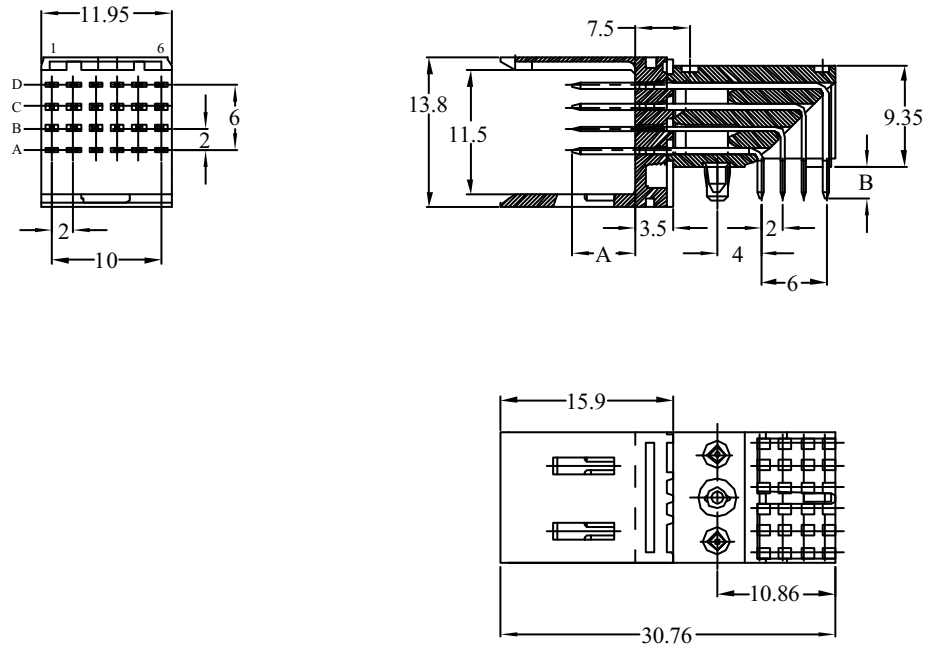
- Receptacle, straight, press-fit, page 69
 - 1 mod – part number 85757-1101LF
- Receptacle, straight, solder-to-board, page 67
 - 1 mod – part numbers HM1S41FRR000H6PLF

TYPICAL APPLICATIONS



Header, 4 row, signal, right angle, solder to board, narrow body

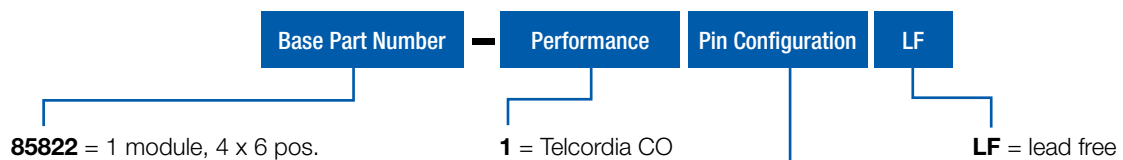
PRODUCT



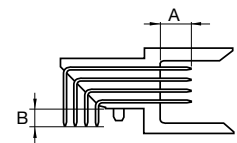
PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

85822 - 1yyLF



| yy | mating length (A) | tail length (B) |
|----|-------------------|-----------------|
| 01 | 5,00 mm | 2,90 mm |
| 05 | 5,75 mm | 2,90 mm |
| 10 | 5,75 mm | 3,70 mm |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, signal, right angle, press fit, narrow body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 row and 2 mm pitch permit high signal density (250 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Narrow body housing
- Eye of the needle press-fit contact



TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- Product specification: GS-12-445

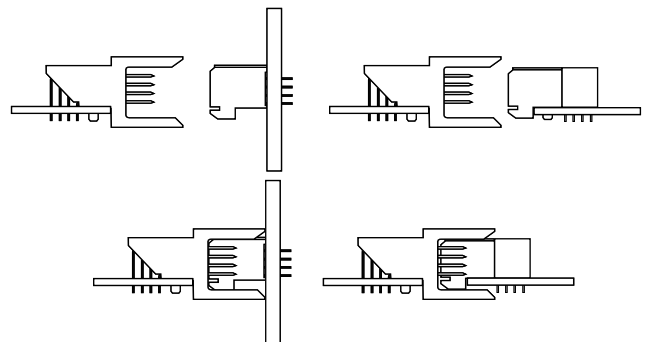
APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

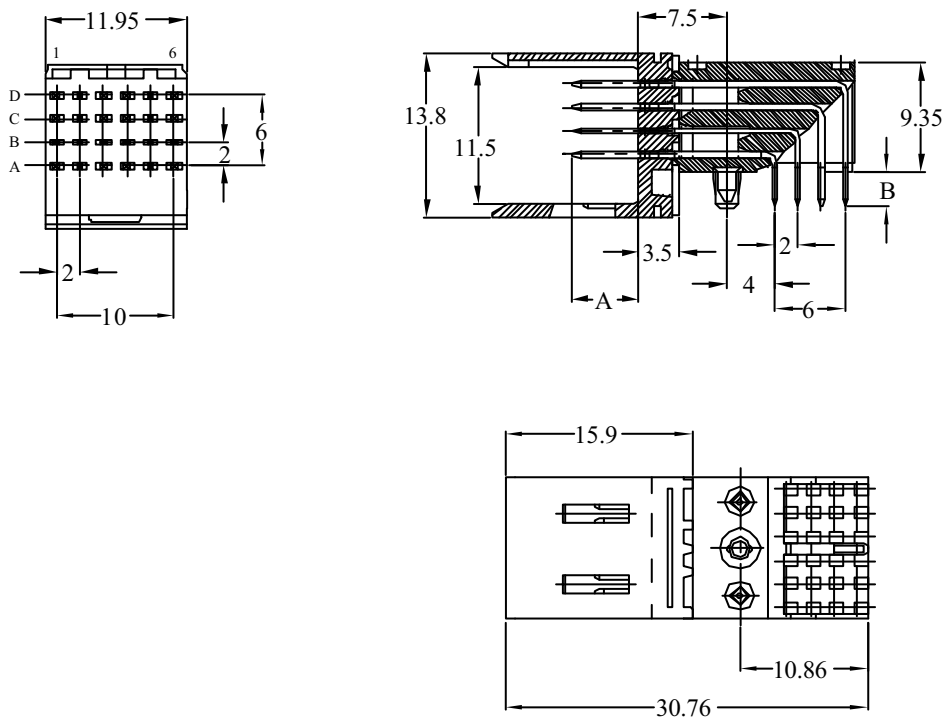
- Receptacle, straight, press-fit, page 69
 - 1 mod – part number 85757-1101LF
- Receptacle, straight, solder-to-board, page 67
 - 1 mod – part numbers HM1S41FRR000H6PLF

TYPICAL APPLICATIONS



Header, 4 row, signal, right angle, press fit, narrow body

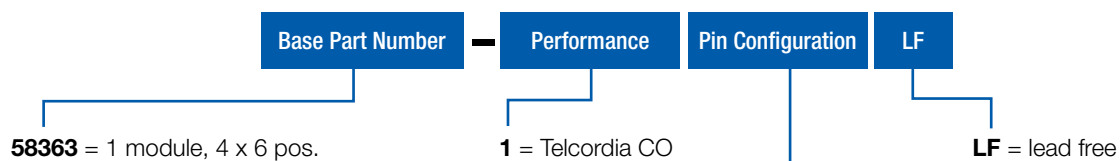
PRODUCT



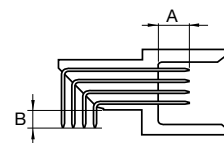
PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

58363 - 1yyLF



| yy | mating length (A) | tail length (B) |
|----|-------------------|-----------------|
| 01 | 5,00 mm | 2,90 mm |
| 05 | 5,75 mm | 2,90 mm |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, signal, right angle, pin-in-paste, narrow body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density (200 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Narrow body housing

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tape&reel

PROCESSING INFORMATION

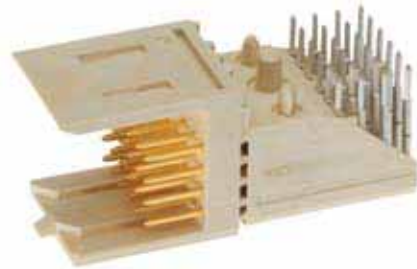
- Pick&place by vacuum nozzle or mechanical gripper
- automatic Surface-mount reflow process, resistance for Lead Free reflow temperature

REFERENCE DATA

- Product specification: GS-12-446

APPLICATION EQUIPMENT

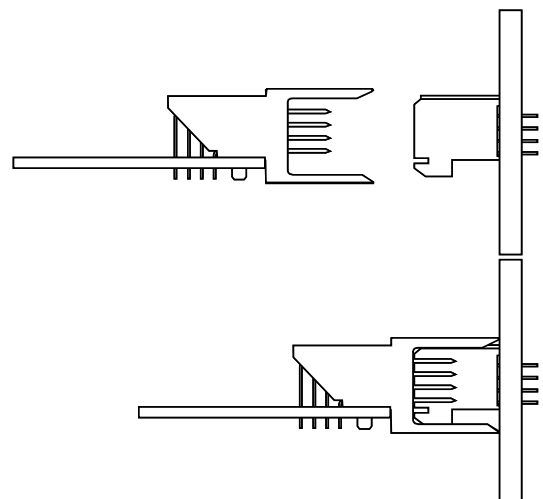
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

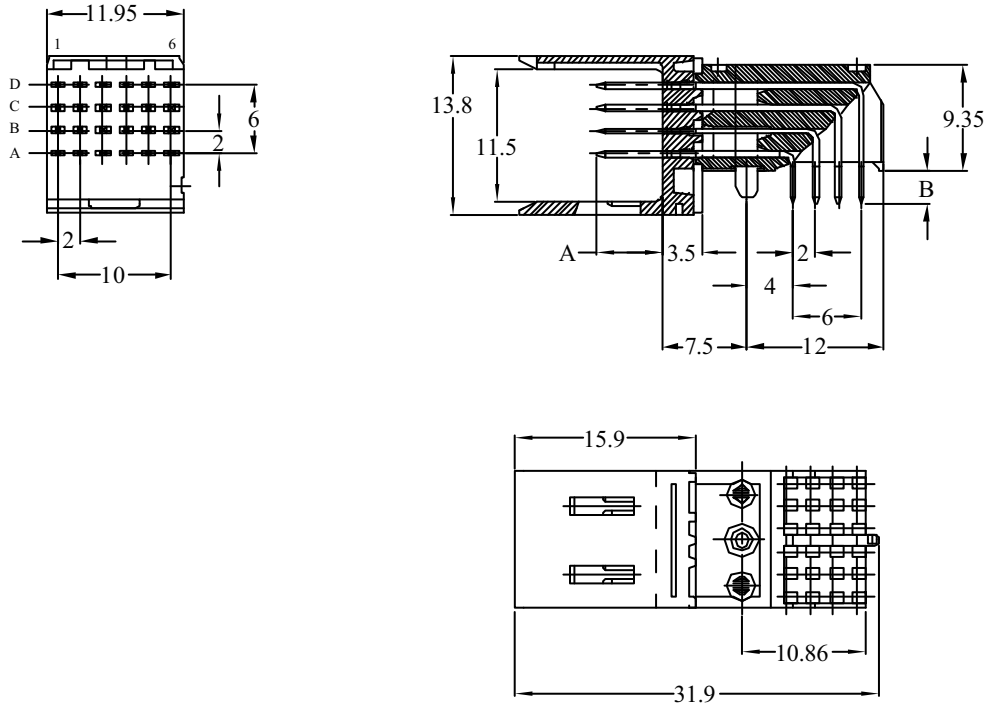
- Receptacle, straight, press-fit, page 69
 - 1 mod – part number 85757-1101LF
- Receptacle, straight, solder-to-board, page 67
 - 1 mod – part numbers HM1S41FRR000H6PLF

TYPICAL APPLICATIONS



Header, 4 row, signal, right angle, pin-in-paste, narrow body

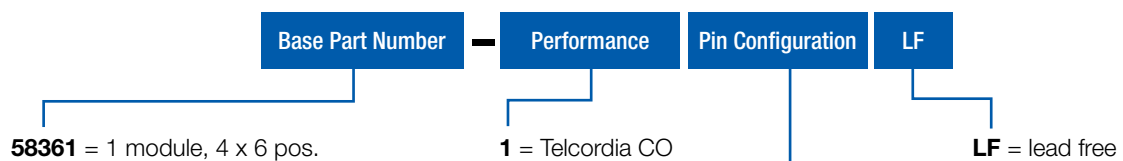
PRODUCT



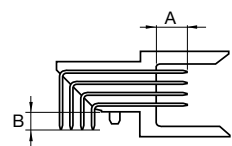
PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

58361 - 101LF



| yy | mating length (A) | tail length (B) |
|----|-------------------|-----------------|
| 01 | 5,75 mm | 2,90 mm |

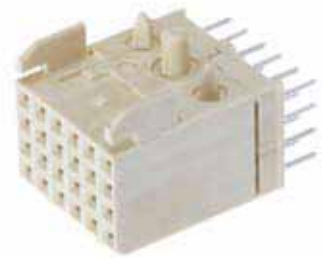


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 4 row, signal, straight, solder to board

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density (200 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Parallel board applications
- Tuning fork contact



TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: trays

PROCESSING INFORMATION

- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product specification: GS-12-448

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Header, right angle, press-fit, page 57

- 1 module-part number HM1L41LDP000H6PLF
- 2 module-part number HM1L42LDP000H6PLF
- 4 module-part number HM1L43LDP000H6PLF
- 8 module-part number HM1L44LDP000H6PLF

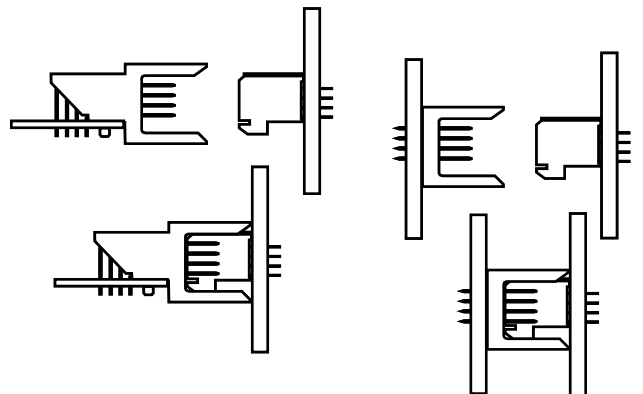
Header, right angle, solder-to-board, page 55

- 1 module-part number HM1L41LAP000H6PLF
- 2 module-part number HM1L42LAP000H6PLF
- 4 module-part number HM1L43LAP000H6PLF
- 8 module-part number HM1L44LAP000H6PLF

Header, right angle, Pin-in-Paste, page 59

- 1 module-part number HM1L41LFP000H6PLF

TYPICAL APPLICATIONS



Receptacle, 4 row, signal, straight, press fit

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row and 2 mm pitch permit high signal density (200 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Parallel board applications
- Tuning fork contact
- Baby H-shape press-fit contact
- Flat rock design; can be pressed on PCB with flat press block

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 100 N max. per pin
- press-fit pin withdrawal: 20 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- Product specification: GS-12-447

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

Header, right angle, press-fit, page 57

- 1 module-part number HM1L41LDP000H6PLF
- 2 module-part number HM1L42LDP000H6PLF
- 4 module-part number HM1L43LDP000H6PLF
- 8 module-part number HM1L44LDP000H6PLF

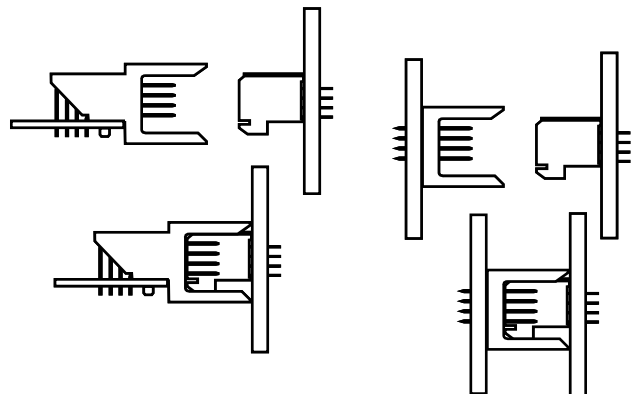
Header, right angle, solder-to-board, page 55

- 1 module-part number HM1L41LAP000H6PLF
- 2 module-part number HM1L42LAP000H6PLF
- 4 module-part number HM1L43LAP000H6PLF
- 8 module-part number HM1L44LAP000H6PLF

Header, right angle, Pin-in-Paste, page 59

- 1 module-part number HM1L41LFP000H6PLF

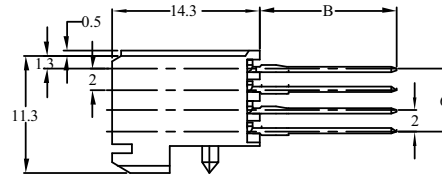
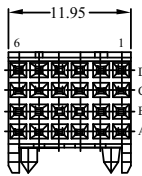
TYPICAL APPLICATIONS



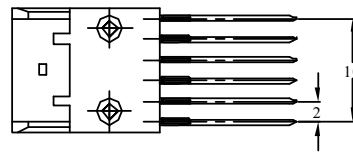
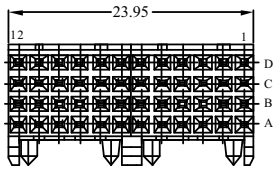
Receptacle, 4 row, signal, straight, press fit

PRODUCT

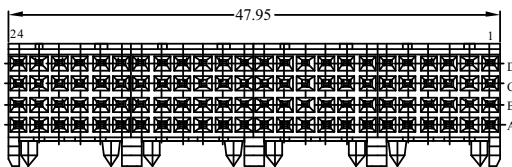
1 Module



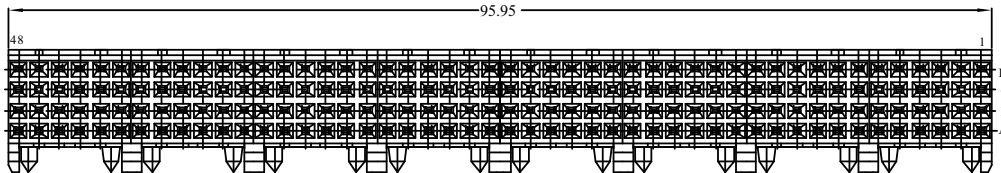
2 Module



4 Module



8 Module



PCB pattern P6, see chapter PCB layouts

PARTNUMBERS

8575x - 1y01LF



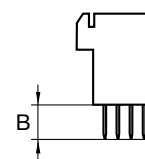
85757 = 1 module (4 x 6 pos.)
85758 = 2 module (4 x 12 pos.)
85759 = 4 module (4 x 24 pos.)
85760 = 8 module (4 x 48 pos.)

1 = Telcordia CO

01 = fully loaded

LF = lead free

| y | tail length (B) |
|----------|-----------------|
| 1 | 4,3 mm |
| 2 | 13,6 mm |
| 3 | 17,1 mm |



Note: blue marked in **tail length** is the preferred recommended standard
for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 5 row, signal, right angle, solder to board, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 row and 2 mm pitch permit high signal density (250 contacts per 100mm connector length)
- Modular design guarantees flexibility

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: trays

PROCESSING INFORMATION

- applicable soldering process: wave, IR, vapor phase

REFERENCE DATA

- Product specification: GS-12-446

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

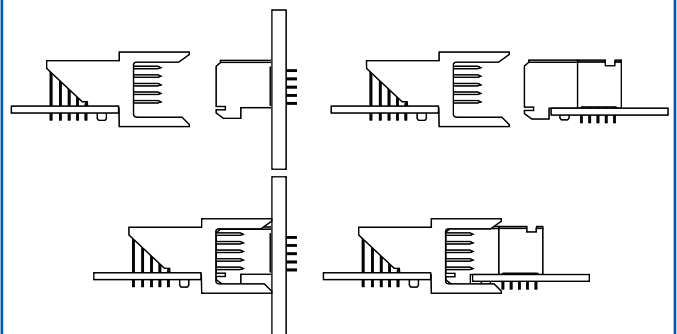
■ Receptacle, straight, press-fit, page 79

- 1 mod – part number 85761-1101LF
- 2 mod – on request only
- 4 mod – part number 85763-1101LF
- 8 mod – on request only

■ Receptacle, straight, solder-to-board, page 77

- 1 mod – part numbers HM1S51FRR000H6PLF
- 2 mod – part numbers HM1S52FRR000H6PLF
- 4 mod – part numbers HM1S53FRR000H6PLF
- 8 mod - part numbers HM1S54FRR000H6PLF

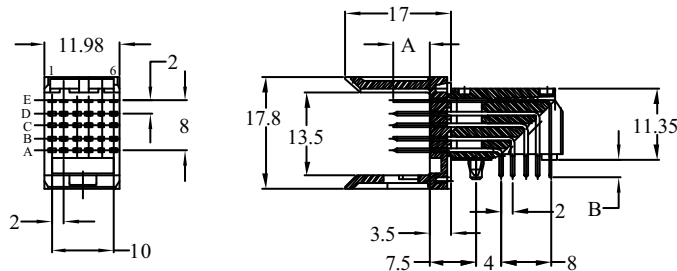
TYPICAL APPLICATIONS



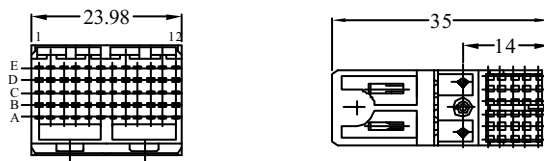
Header, 5 row, signal, right angle, solder to board, wide body

PRODUCT

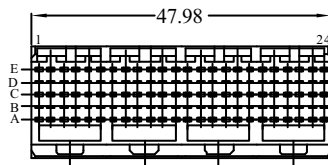
1 Module



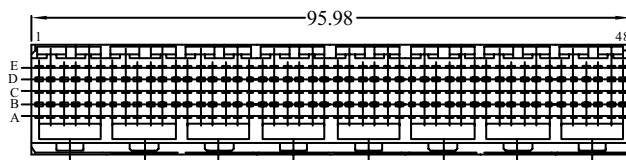
2 Module



4 Module



8 Module



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

HM1L5 x LAP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF | | | | | | |
|----------------------|--|---|---|-------------------|-----------------|-------------|-----------|----------------------|--|--|--|-------------------|-----------|----------------|
| HM1 | L = Signal header right angle, wide body | 5 = 5 row | LAP = solder to board <table border="1"> <thead> <tr> <th>mating length (A)</th> <th>tail length (B)</th> </tr> </thead> <tbody> <tr> <td>5,75 mm</td> <td>2,90 mm</td> </tr> <tr> <td colspan="2">1,6 mm PCB thickness</td> </tr> </tbody> </table> | mating length (A) | tail length (B) | 5,75 mm | 2,90 mm | 1,6 mm PCB thickness | | | | H6 = Telcordia CO | P = trays | LF = lead free |
| mating length (A) | tail length (B) | | | | | | | | | | | | | |
| 5,75 mm | 2,90 mm | | | | | | | | | | | | | |
| 1,6 mm PCB thickness | | | | | | | | | | | | | | |
| | | 1 = 1 module (5 x 6 pos.) 2 = 2 module (5 x 12 pos.) 3 = 4 module (5 x 24 pos.) 4 = 8 module (5 x 48 pos.) | | | | | | | | | | | | |

Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 5 row, signal, right angle, press fit, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 row and 2 mm pitch permit high signal density (250 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Eye of the needle press-fit contact

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: trays

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- Product specification: GS-12-445

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

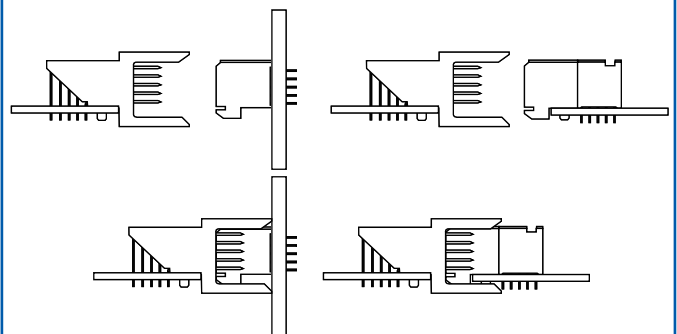
■ Receptacle, straight, press-fit, page 79

- 1 mod – part number 85761-1101LF
- 2 mod – on request only
- 4 mod – part number 85763-1101LF
- 8 mod – on request only

■ Receptacle, straight, solder-to-board, page 77

- 1 mod – part numbers HM1S51FRR000H6PLF
- 2 mod – part numbers HM1S52FRR000H6PLF
- 4 mod – part numbers HM1S53FRR000H6PLF
- 8 mod - part numbers HM1S54FRR000H6PLF

TYPICAL APPLICATIONS



Header, 5 row, signal, right angle, pin-in-paste, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 row and 2 mm pitch permit high signal density (250 contacts per 100mm connector length)
- Modular design guarantees flexibility

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: trays

PROCESSING INFORMATION

- Pick&place by vacuum nozzle or mechanical gripper
- automatic Surface-mount reflow process, resistance for Lead Free reflow temperature

REFERENCE DATA

- Product specification: GS-12-446

APPLICATION EQUIPMENT

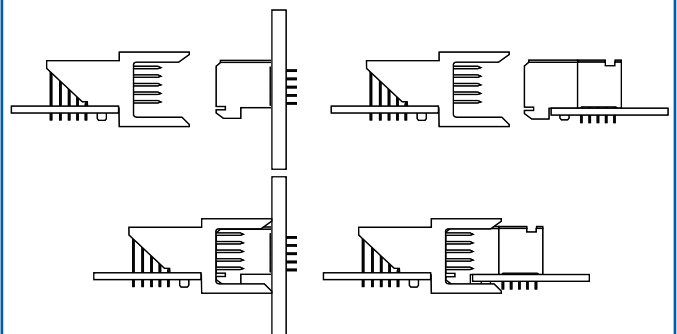
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

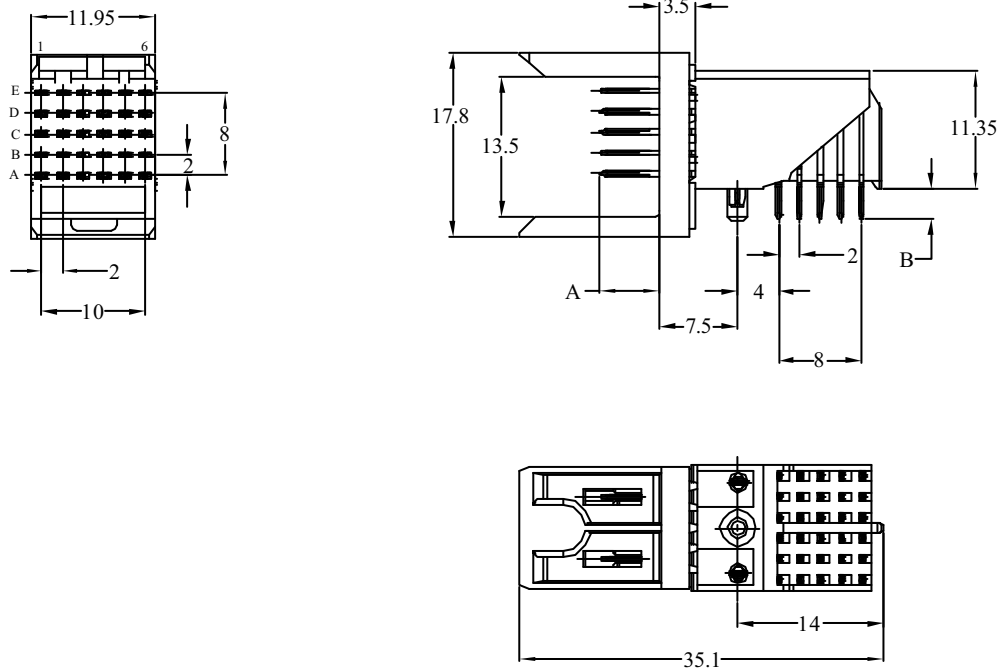
- Receptacle, straight, press-fit, page 79
 - 1 mod – part number 85761-1101LF
- Receptacle, straight, solder-to-board, page 77
 - 1 mod – part numbers HM1S51FRR000H6PLF

TYPICAL APPLICATIONS



Header, 5 row, signal, right angle, pin-in-paste, wide body

PRODUCT



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

HM1L5 x LFP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF | | | | | | |
|----------------------|---|-------------|---------------------------|--|-------------------|-------------------|-----------|----------------|----------------------|--|--|--|--|--|
| HM1 | L = Signal header right angle, wide body | 5 = 5 row | 1 = 1 module (5 x 6 pos.) | LFP = Pin-in-Paste | | H6 = Telcordia CO | P = trays | LF = lead free | | | | | | |
| | | | | <table border="1"> <thead> <tr> <th>mating length (A)</th> <th>tail length (B)</th> </tr> </thead> <tbody> <tr> <td>5,75 mm</td> <td>2,90 mm</td> </tr> <tr> <td colspan="2">1,6 mm PCB thickness</td> </tr> </tbody> </table> | mating length (A) | tail length (B) | 5,75 mm | 2,90 mm | 1,6 mm PCB thickness | | | | | |
| mating length (A) | tail length (B) | | | | | | | | | | | | | |
| 5,75 mm | 2,90 mm | | | | | | | | | | | | | |
| 1,6 mm PCB thickness | | | | | | | | | | | | | | |

Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 5 row, signal, straight, solder to board

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 row and 2 mm pitch permit high signal density (250 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Parallel board applications
- Tuning fork contact



TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5×10^3 M Ω initially, 1×10^3 M Ω after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: trays

PROCESSING INFORMATION

- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product specification: GS-12-448

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Header, right angle, press-fit, page 73

- 1 module-part number HM1L51LDP000H6PLF
- 2 module-part number HM1L52LDP000H6PLF
- 4 module-part number HM1L53LDP000H6PLF
- 8 module-part number HM1L54LDP000H6PLF

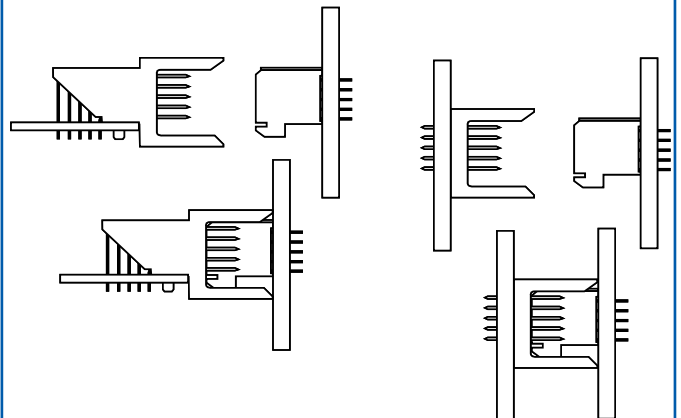
Header, right angle, solder-to-board, page 71

- 1 module-part number HM1L51LAP000H6PLF
- 2 module-part number HM1L52LAP000H6PLF
- 4 module-part number HM1L53LAP000H6PLF
- 8 module-part number HM1L54LAP000H6PLF

Header, right angle, Pin-in-Paste, page 75

- 1 module-part number HM1L51LFP000H6PLF

TYPICAL APPLICATIONS



Receptacle, 5 row, signal, straight, press fit

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 row and 2 mm pitch permit high signal density (250 contacts per 100mm connector length)
- Modular design guarantees flexibility
- Parallel board applications
- Tuning fork contact
- baby H-shape press-fit contact
- Flat rock design; can be pressed on PCB with flat press block



TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 100 N max. per pin
- press-fit pin withdrawal: 20 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- Product specification: GS-12-447

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Header, right angle, press-fit, page 73

- 1 module-part number HM1L51LDP000H6PLF
- 2 module-part number HM1L52LDP000H6PLF
- 4 module-part number HM1L53LDP000H6PLF
- 8 module-part number HM1L54LDP000H6PLF

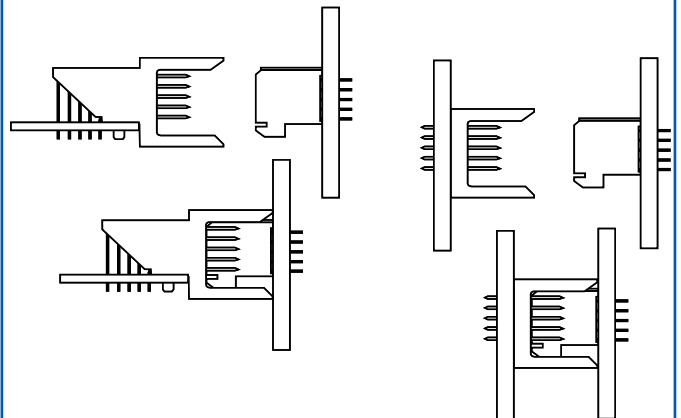
Header, right angle, solder-to-board, page 71

- 1 module-part number HM1L51LAP000H6PLF
- 2 module-part number HM1L52LAP000H6PLF
- 4 module-part number HM1L53LAP000H6PLF
- 8 module-part number HM1L54LAP000H6PLF

Header, right angle, Pin-in-Paste, page 75

- 1 module-part number HM1L51LFP000H6PLF

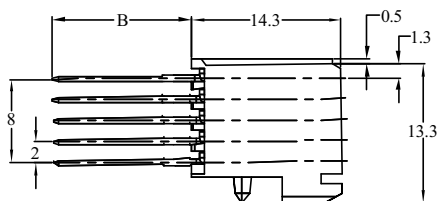
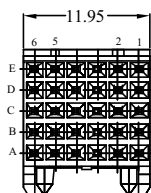
TYPICAL APPLICATIONS



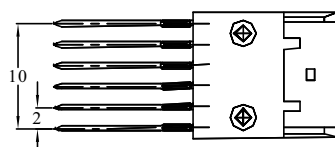
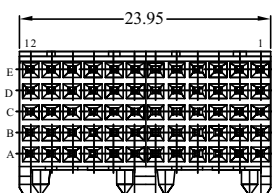
Receptacle, 5 row, signal, straight, press fit

PRODUCT

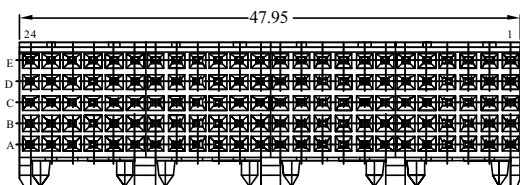
1 Module



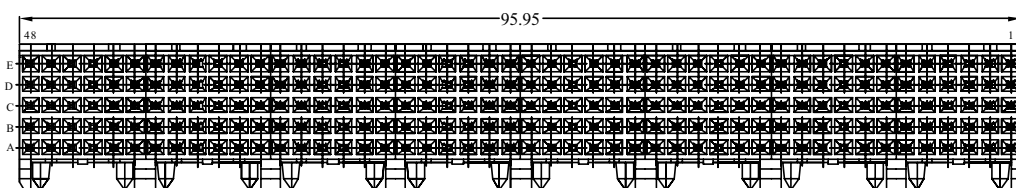
2 Module



4 Module



8 Module



PCB pattern P7, see chapter PCB layouts

PARTNUMBERS

8576x - 1y01LF

Base Part Number

Performance

Tail length

Pin Configuration

LF

85761

= 1 module (5 x 6 pos.)

on request only

= 2 module (5 x 12 pos.)

85763

= 4 module (5 x 24 pos.)

on request only

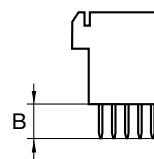
= 8 module (5 x 48 pos.)

1 = Telcordia CO

01 = fully loaded

LF = lead free

| y | tail length (B) |
|----------|-----------------|
| 1 | 4,3 mm |
| 2 | 13,6 mm |
| 3 | 17,1 mm |






Note: blue marked in **tail length** is the preferred recommended standard

for other special patterns or loadings, please check drawings, all other configurations on request only





METRAL® SHROUDS

-  Shroud, 4 row, wide body
-  Shroud, 5 row, wide body
-  Shroud, 8 row, wide body

Shroud, 4 row, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- Different stand-off versions for rear-plug-up
- Easy direct mounting of the shroud on the pins without need of mounting shroud to PCB.
- Retention force from the shroud on the press-connector is on the non-contact side of the pin.
- Wide lead-in for easy mating of female connectors
- Designed-in polarization.
- Optional coding.



TECHNICAL DATA

PHYSICAL

- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0

ELECTRICAL

- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)

ENVIRONMENTAL

- Operating temperature range: -55°C to +105°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PROCESSING INFORMATION

- used over pins previously staked into the pc board

REFERENCE DATA

- product specification: GS-12-180

APPLICATION EQUIPMENT

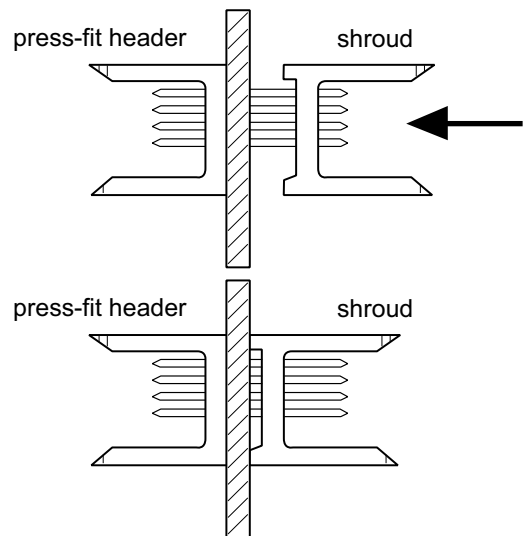
- for application equipment, check out the application equipment table on page 217-223.

MATING DATA

- 4 row Header, straight, press-fit, page 27

- 1 mod 70232-116LF
- 2 mod 70233-116LF
- 4 mod 70234-116LF
- 8 mod 70235-116LF

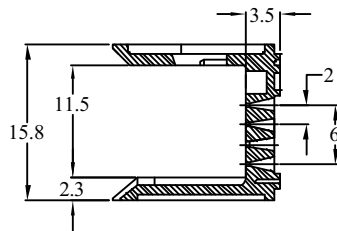
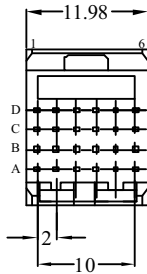
TYPICAL APPLICATIONS



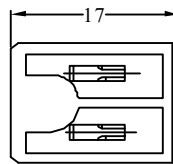
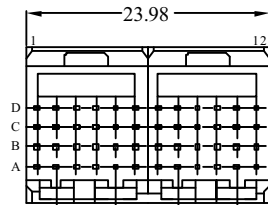
Shroud, 4 row, wide body

PRODUCT

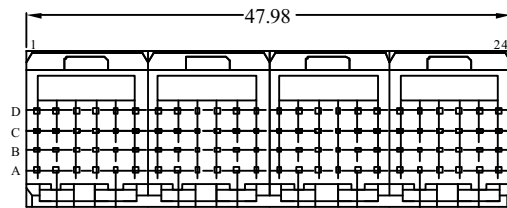
1 Module
70203-111LF



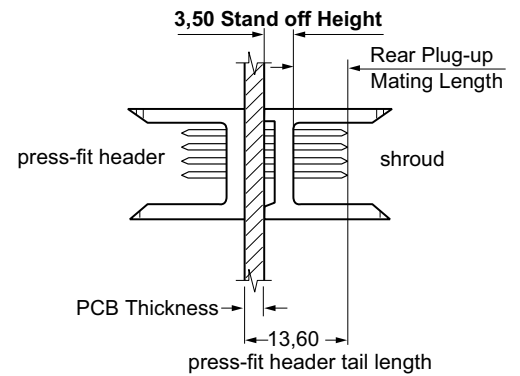
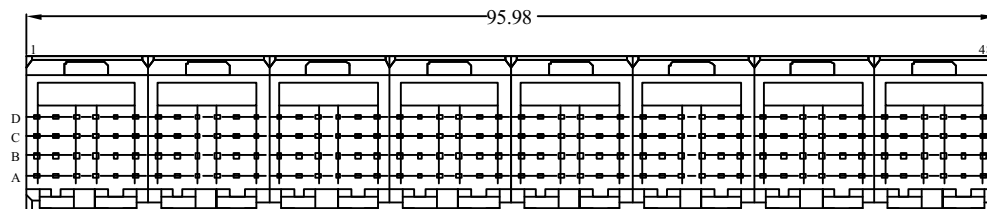
2 Module
70203-112LF



4 Module
70203-113LF

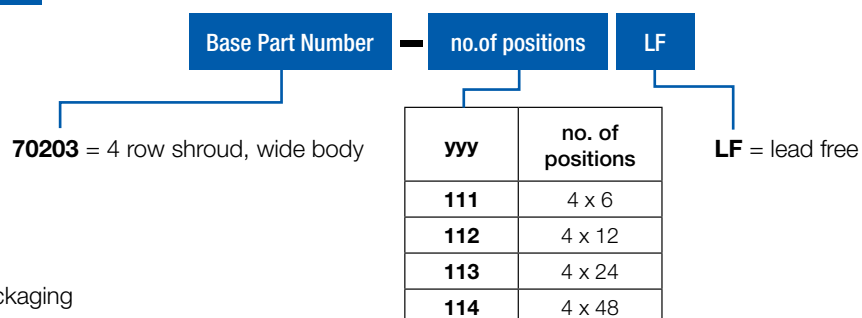


8 Module
70203-114LF



PARTNUMBERS

70203 - yyyLF



Note: Box packaging

Shroud, 5 row, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- Different stand-off versions for rear-plug-up
- Easy direct mounting of the shroud on the pins without need of mounting shroud to PCB.
- Retention force from the shroud on the press-connector is on the non-contact side of the pin.
- Wide lead-in for easy mating of female connectors
- Designed-in polarization.
- Optional coding.



TECHNICAL DATA

PHYSICAL

- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0

ELECTRICAL

- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)

ENVIRONMENTAL

- Operating temperature range: -55°C to +105°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PROCESSING INFORMATION

- used over pins previously staked into the pc board

REFERENCE DATA

- product specification: GS-12-180

APPLICATION EQUIPMENT

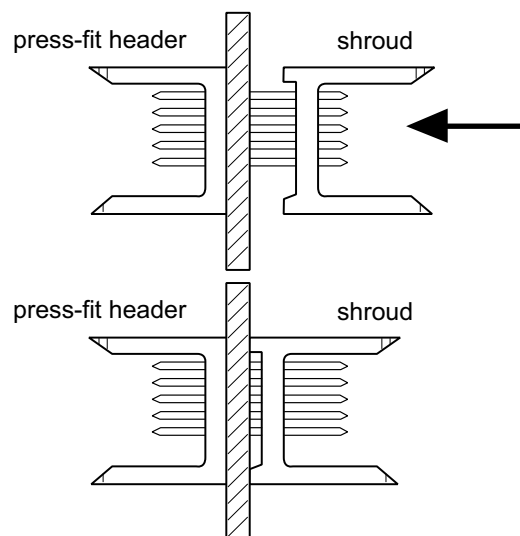
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

- 4 row Header, straight, press-fit, page 41

- 1 mod 89006-116LF
- 2 mod 89007-116LF
- 4 mod 89008-116LF
- 8 mod 89009-116LF

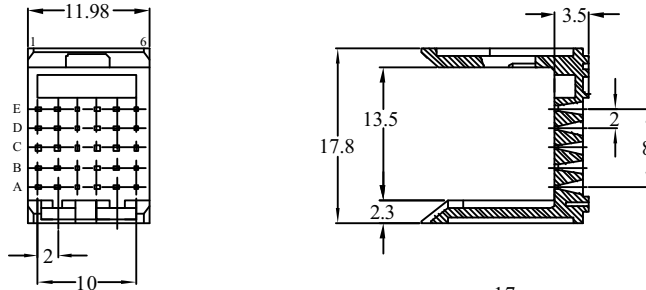
TYPICAL APPLICATIONS



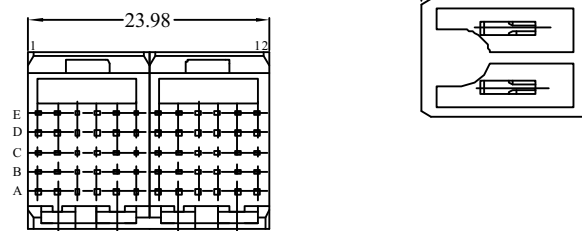
Shroud, 5 row, wide body

PRODUCT

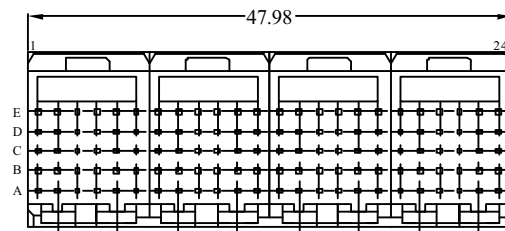
1 Module
89055-111LF



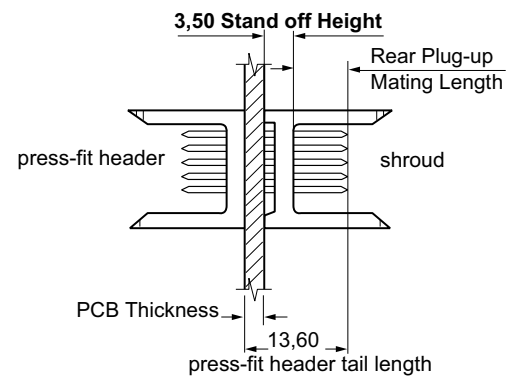
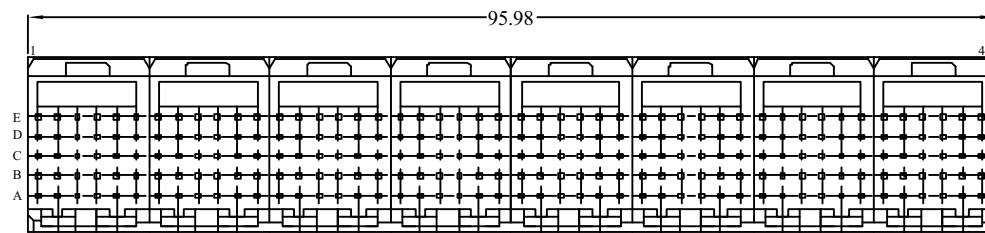
2 Module
89055-112LF



4 Module
89055-113LF

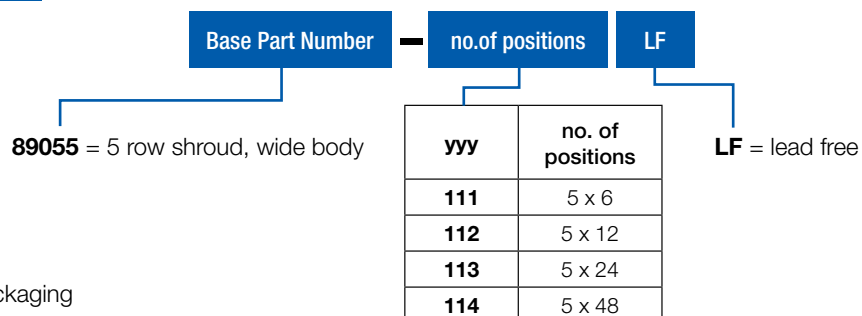


8 Module
89055-114LF



PARTNUMBERS

89055 - yyLF



Note: Box packaging

Shroud, 8 row, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 8 row and 2 mm pitch permit high signal density (800 contacts per 100mm connector length)
- Stackable with other METRAL® function modules (power, I/O)
- 2 modules shroud, 8 rows by 6 position

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)

ENVIRONMENTAL

- Operating temperature range: -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- used over pins previously staked into the pc board

REFERENCE DATA

- Product specification: GS-12-134

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

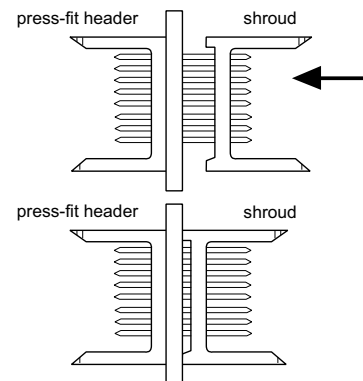
- Header, straight, press-fit, page 49

- part number 74771-102011LF (used opposite board side)

- Receptacle, straight, press-fit, page 51

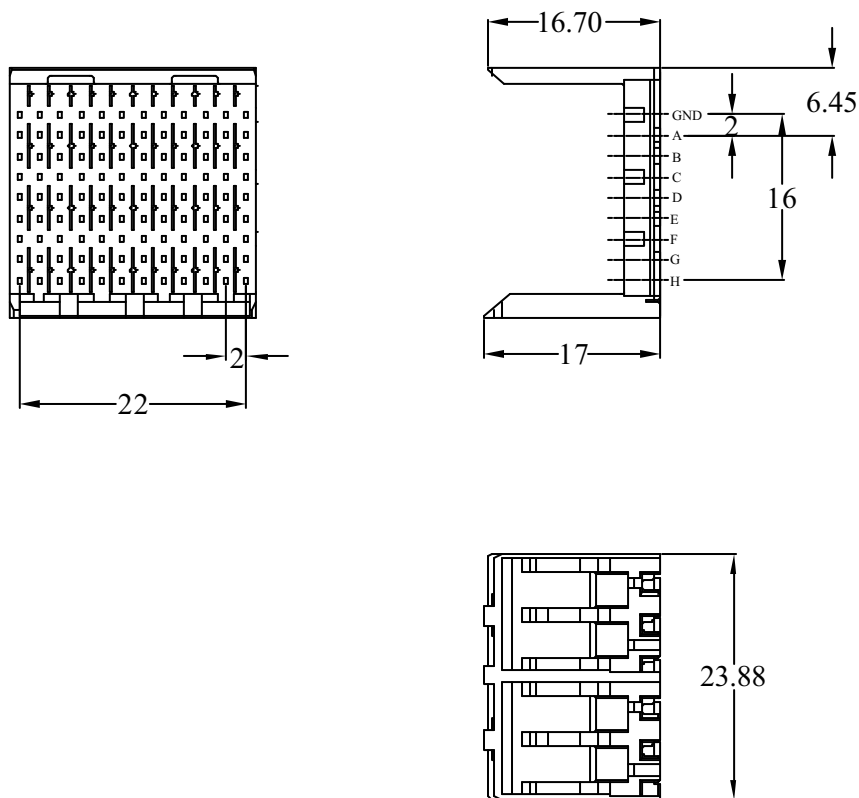
- part number 74770-102LF

TYPICAL APPLICATIONS



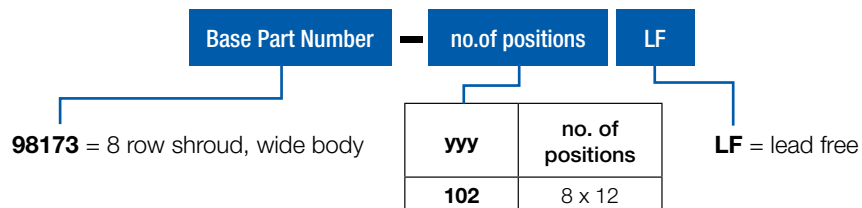
Shroud, 8 row, wide body

PRODUCT



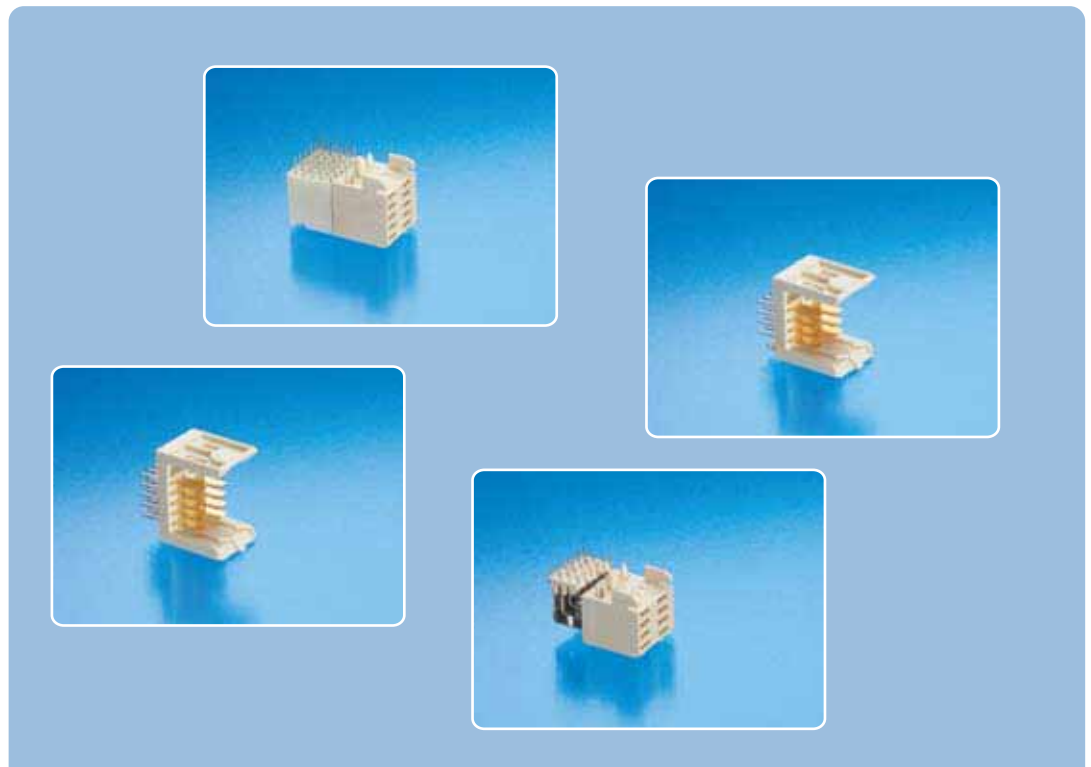
PARTNUMBERS

98173 - 102LF








Note: Box packaging





METRAL® POWER CONNECTORS STANDARD

-  Header, 4 row, straight, wide body
-  Header, 4 row, straight, narrow body
-  Receptacle, 4 row, right angle
-  Header, 5 row, straight, wide body
-  Receptacle, 5 row, right angle

Header, 4 row power, straight, solder to board, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 x 2 power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

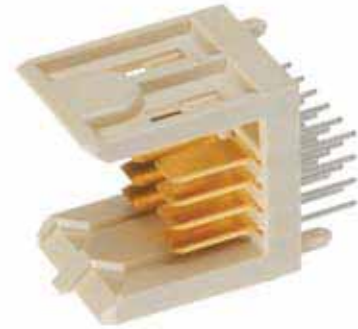
- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product Specification GS-12-180
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

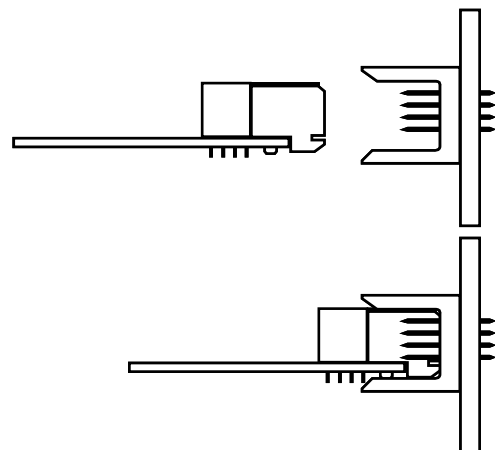
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

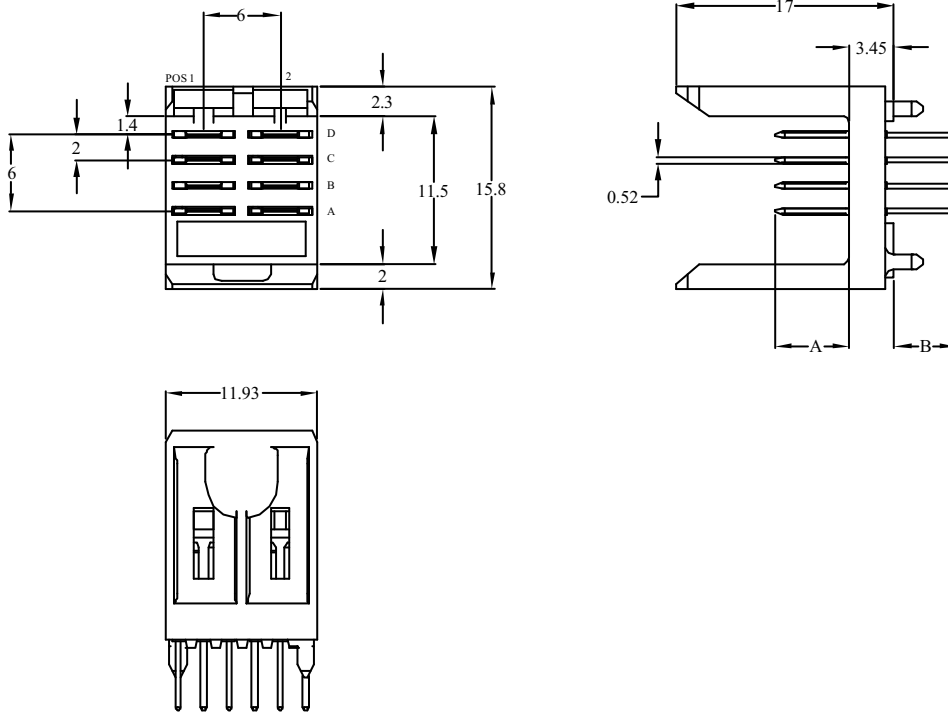
- Receptacle, right angle, press-fit, page 101
 - part number 88949-102LF
- Receptacle, right angle, solder-to-board, page 99
 - part number 89039-101LF
- Receptacle, right angle, Pin-in-Paste, page 103
 - part number 72651-101LF

TYPICAL APPLICATIONS



Header, 4 row power, straight, solder to board, wide body

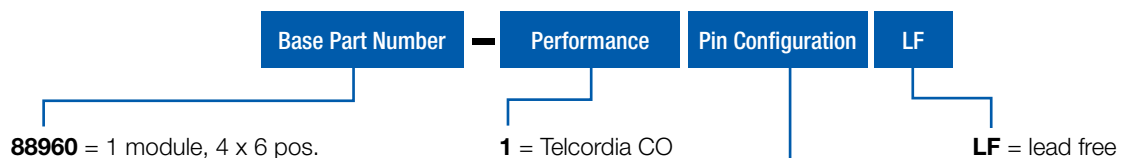
PRODUCT



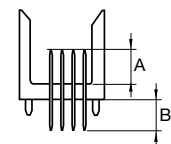
PCB pattern P5, see chapter PCB layouts

PARTNUMBERS

88960 - 101LF



| yy | mating length (A) | tail length (B) |
|----|-------------------|-----------------|
| 01 | 6,50 mm | 4,25 mm |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row power, straight, press-fit, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 x 2 power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Eye the needle press-fit contac

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- press-fit contact insertion: 65 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

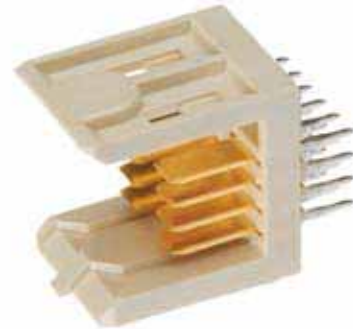
- Applicable process: press fit

REFERENCE DATA

- Product Specification GS-12-180
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

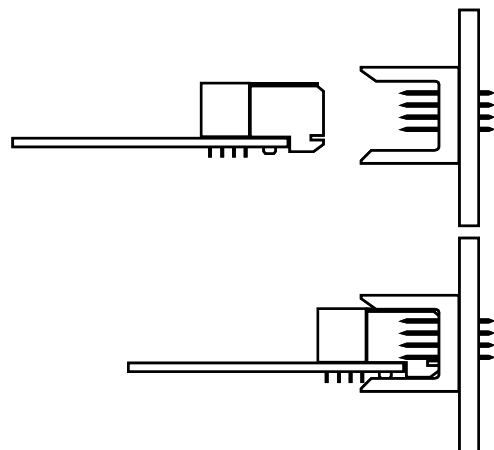
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

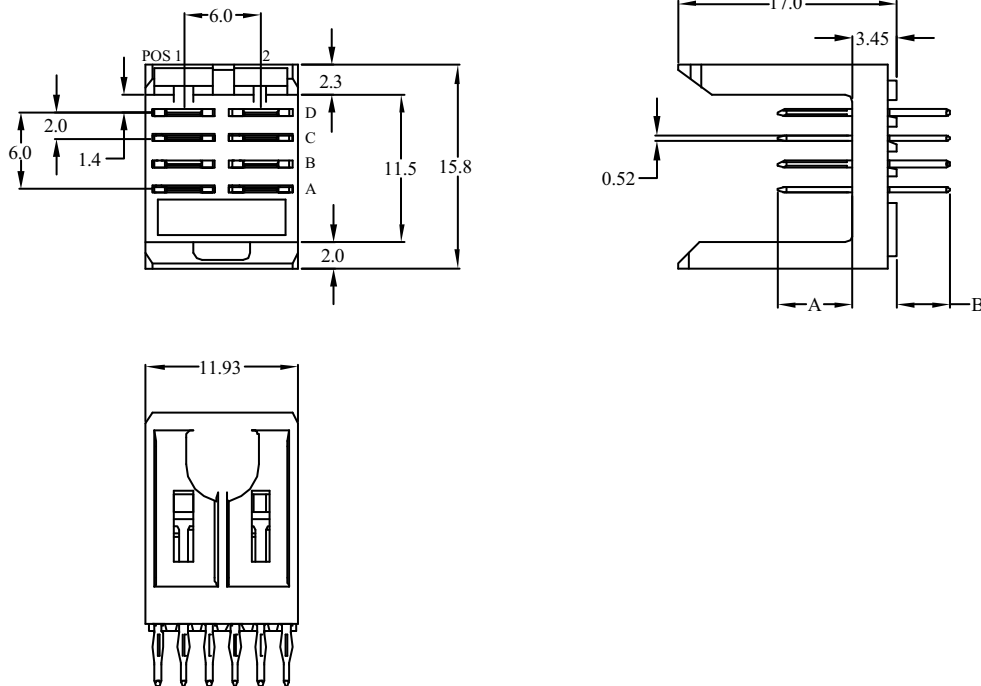
- Receptacle, right angle, press-fit, page 101
 - part number 88949-102LF
- Receptacle, right angle, solder-to-board, page 99
 - part number 89039-101LF
- Receptacle, right angle, Pin-in-Paste, page 103
 - part number 72651-101LF

TYPICAL APPLICATIONS



Header, 4 row power, straight, press-fit, wide body

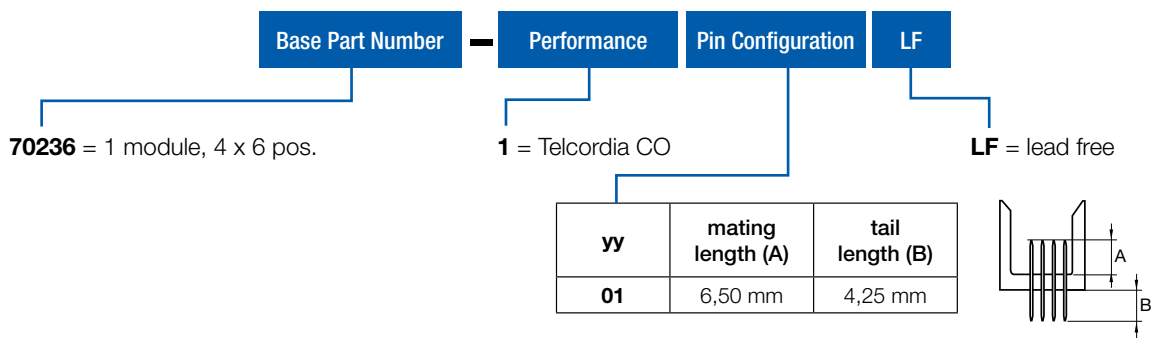
PRODUCT



PCB pattern P6, see chapter PCB layouts

PARTNUMBERS

70236 - 101LF



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, power, straight, solder to board, narrow body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 row 2 power blades contacts
- Narrow body housing
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

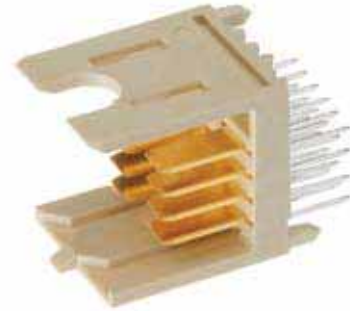
- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product Specification GS-12-180
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

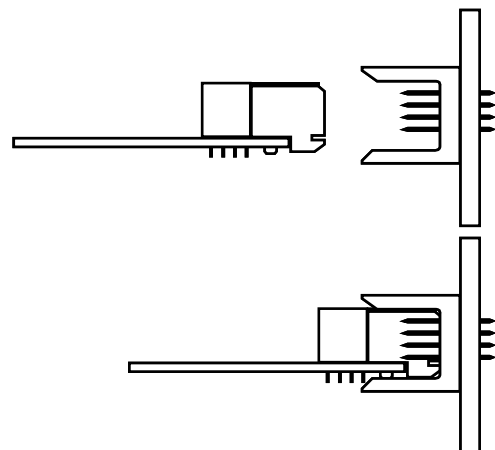
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

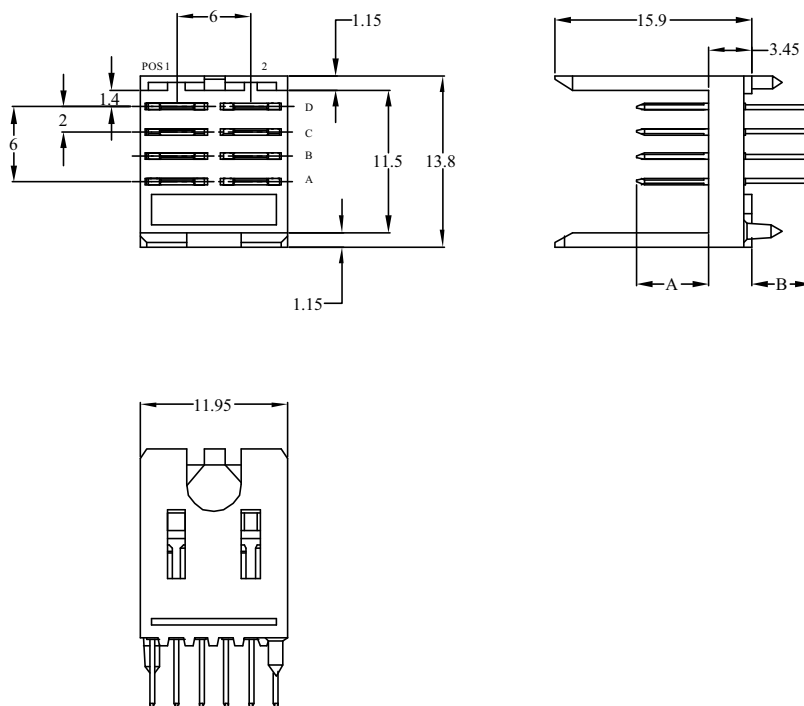
- Receptacle, right angle, press-fit, page 101
 - part number 88949-102LF
- Receptacle, right angle, solder-to-board, page 99
 - part number 89039-101LF
- Receptacle, right angle, Pin-in-Paste, page 103
 - part number 72651-101LF

TYPICAL APPLICATIONS



Header, 4 row, power, straight, solder to board, narrow body

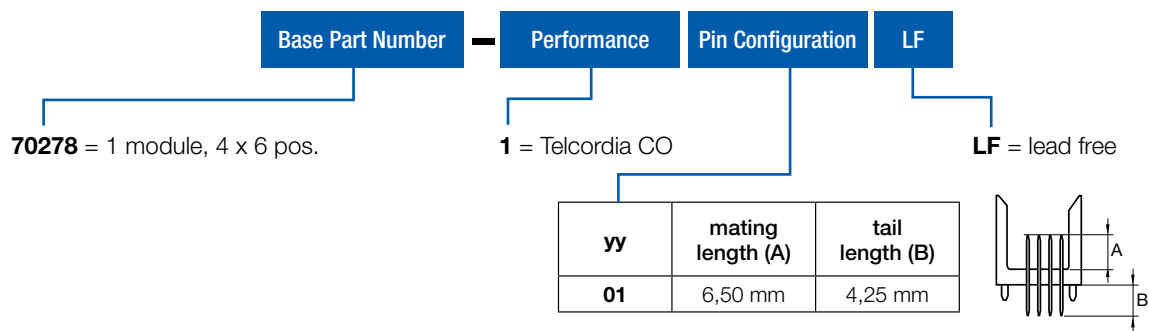
PRODUCT



PCB pattern P3, see chapter PCB layouts

PARTNUMBERS

70278 - 101LF



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, power, straight, press-fit, narrow body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 x 2 power blades contacts
- Narrow body housing
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Eye the needle press-fit contact

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- press-fit contact insertion: 65 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

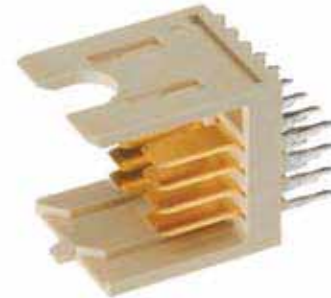
- Applicable process: press fit

REFERENCE DATA

- Product Specification GS-12-180
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

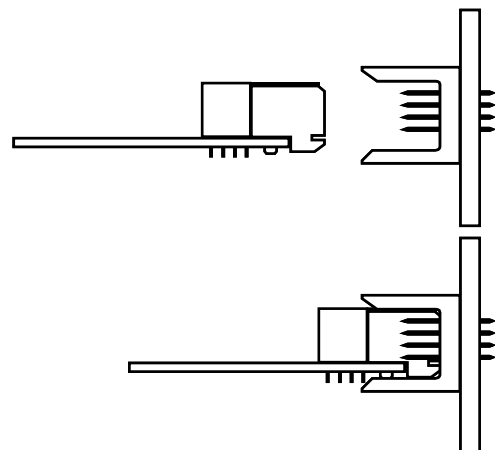
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

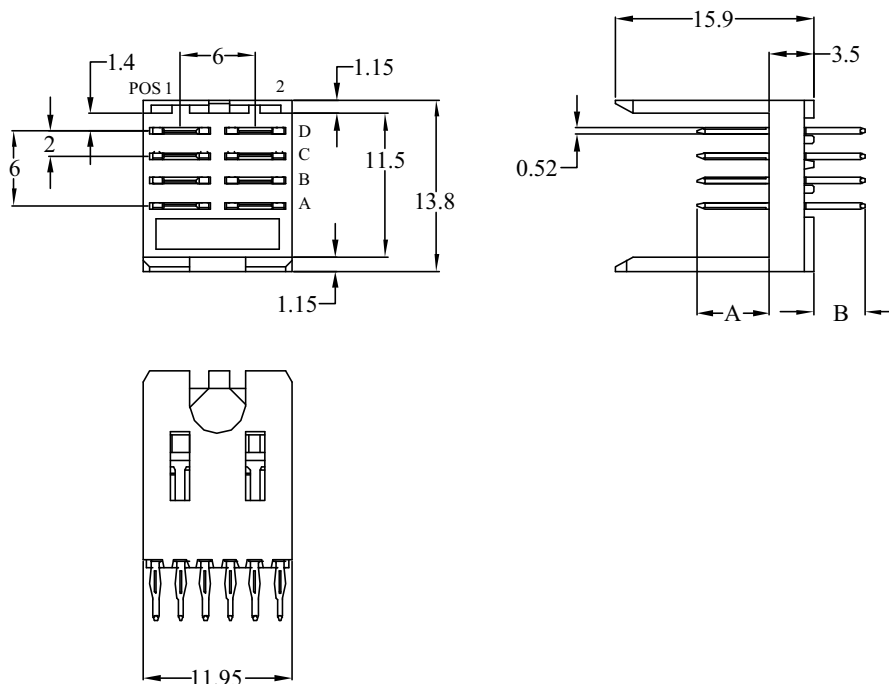
- Receptacle, right angle, press-fit, page 101
 - part number 88949-102LF
- Receptacle, right angle, solder-to-board, page 99
 - part number 89039-101LF
- Receptacle, right angle, Pin-in-Paste, page 103
 - part number 72651-101LF

TYPICAL APPLICATIONS



Header, 4 row, power, straight, press-fit, narrow body

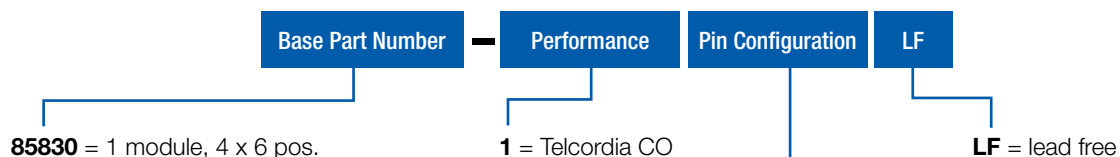
PRODUCT



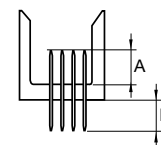
PCB pattern P4, see chapter PCB layouts

PARTNUMBERS

85830 - 101LF



| yy | mating length (A) | tail length (B) |
|----|-------------------|-----------------|
| 01 | 6,50 mm | 4,30 mm |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 4 row, power, right angle, solder to board

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 x 2 dual beam power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

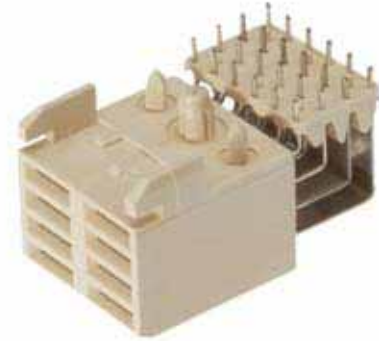
- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product Specification GS-12-453

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

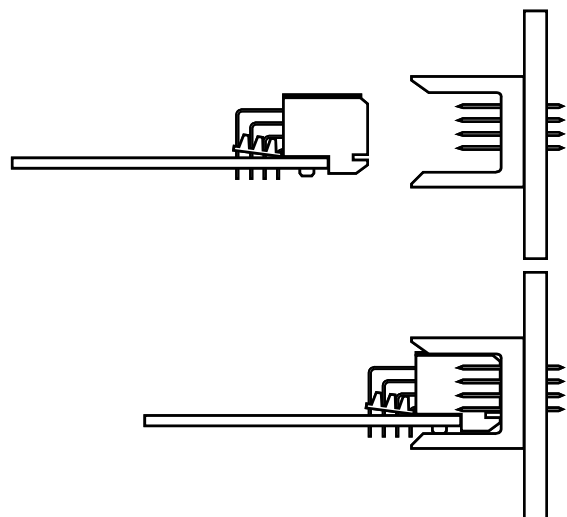
Header, straight, press-fit, page 93

- 1 module – part number 70236-101LF

Header, straight, solder-to-board, page 91

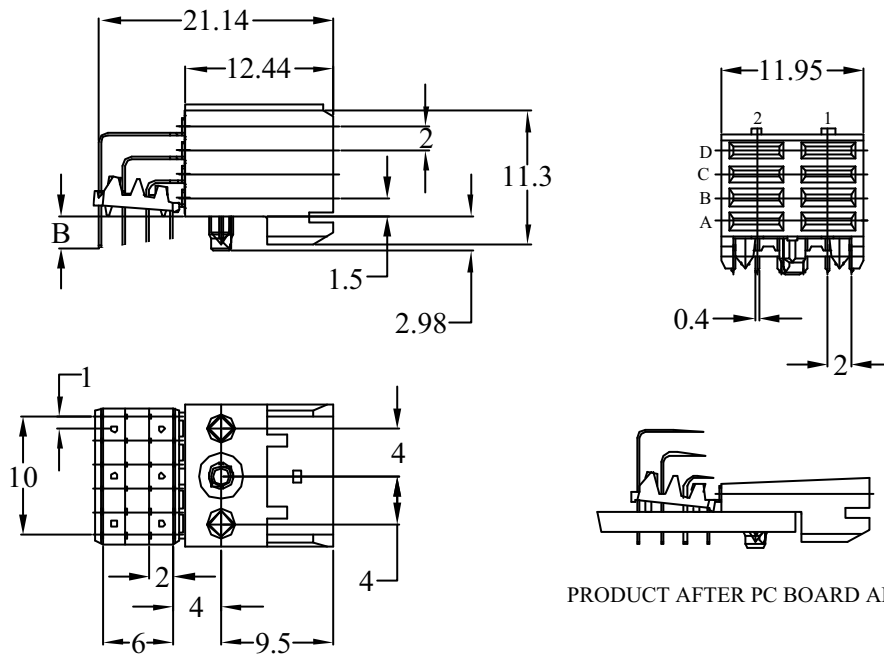
- 1 module – part number 88960-101LF

TYPICAL APPLICATIONS



Receptacle, 4 row, power, right angle, solder to board

PRODUCT

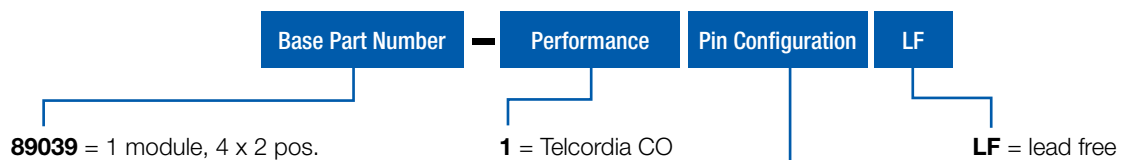


PRODUCT AFTER PC BOARD APPLICATION.

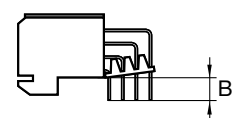
PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

89039 - 1yyLF



| yy | Tail length (B) | PCB Thickness |
|----|-----------------|---------------|
| 02 | 2,73 mm | 1,60 mm |
| 11 | 3,53 mm | 2,40 mm |

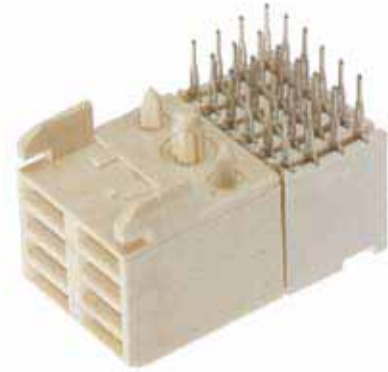


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 4 row, power, right angle, press-fit

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 x 2 dual beam power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)
- Press block ensures accurate position of press-fit tails for easy mounting
- Eye the needle press-fit contact



TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

- Applicable process: press fit

REFERENCE DATA

- Press-peg application, TA-0941
- Product Specification GS-12-453

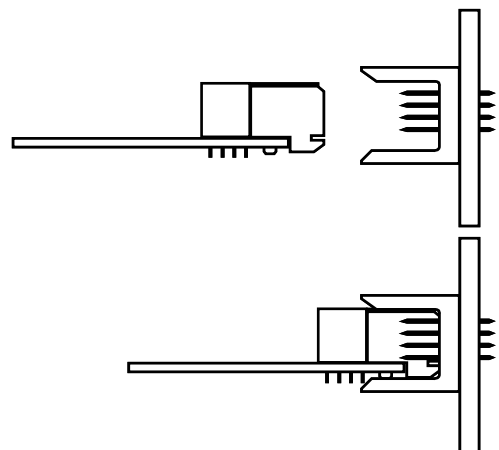
APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

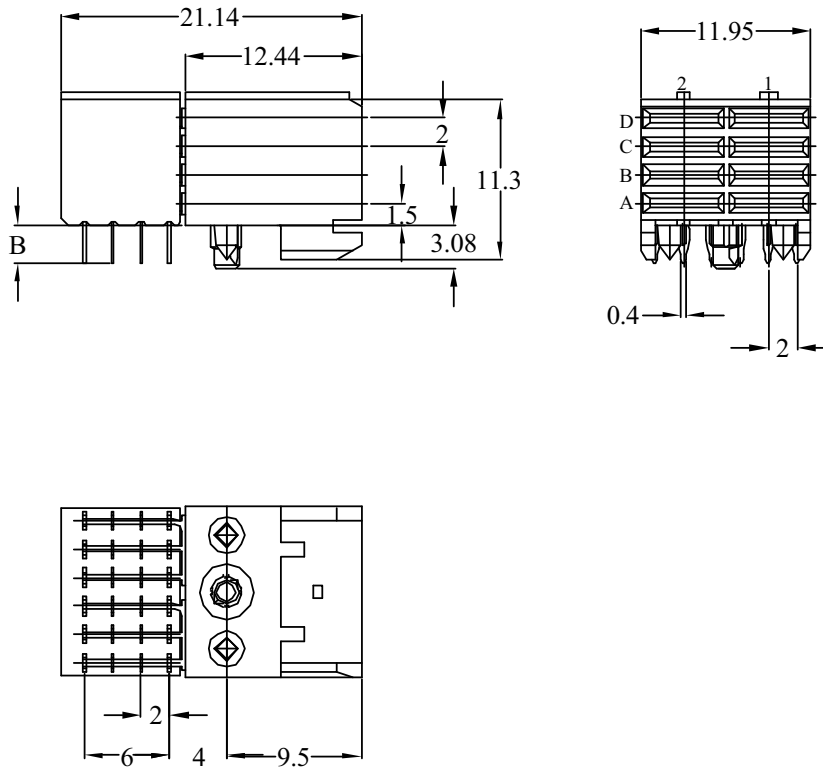
- Header, straight, press-fit, page 93
 - 1 module – part number 70236-101LF
- Header, straight, solder-to-board, page 91
 - 1 module – part number 88960-101LF

TYPICAL APPLICATIONS



Receptacle, 4 row, power, right angle, press-fit

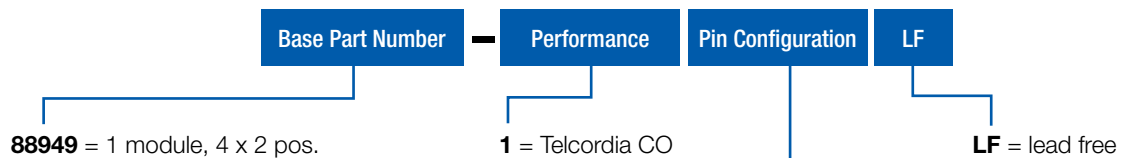
PRODUCT



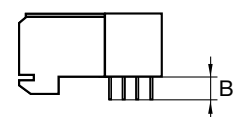
PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

88949 - 1yyLF



| yy | Tail length (B) | PCB Thickness |
|-----------|-----------------|---------------|
| 02 | 2,73 mm | 1,60 mm |
| 12 | 3,53 mm | 2,40 mm |



Note: blue marked in **tail length** is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 4 row, power, right angle, pin-in-paste

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 x 2 dual beam power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

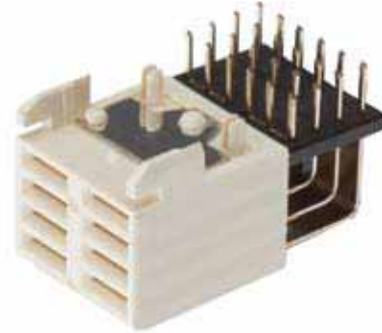
- automatic Surface-mount reflow process, resistance for Lead Free reflow temperature

REFERENCE DATA

- Packaging specification GS-14-920
- Product Specification GS-12-453

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

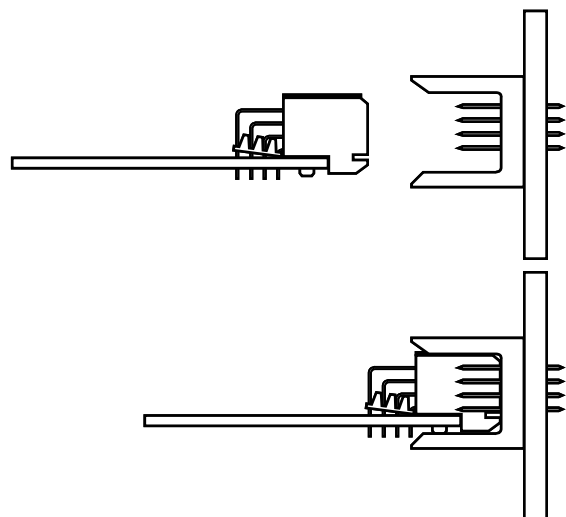
Header, straight, press-fit, page 93

- 1 module – part number 70236-101LF

Header, straight, solder-to-board, page 91

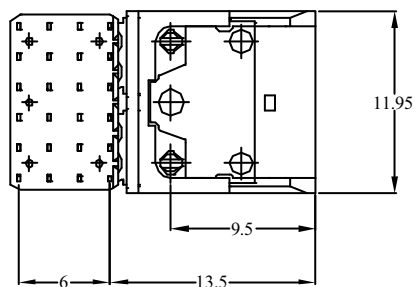
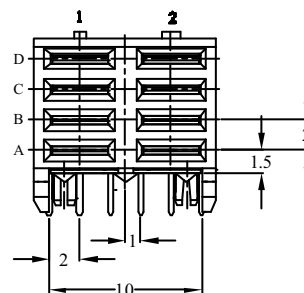
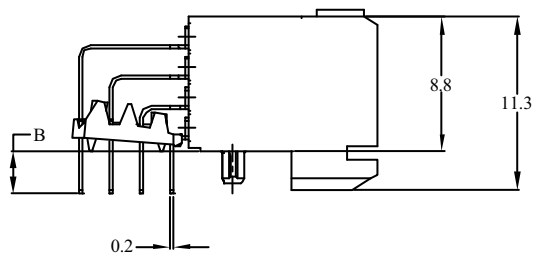
- 1 module – part number 88960-101LF

TYPICAL APPLICATIONS



Receptacle, 4 row, power, right angle, pin-in-paste

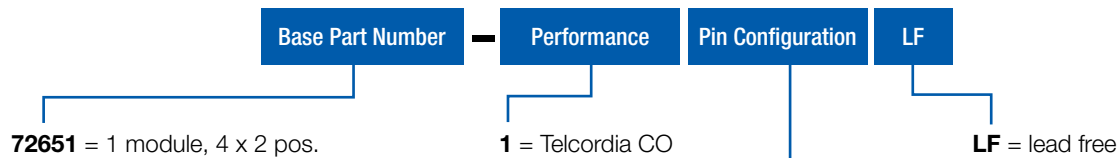
PRODUCT



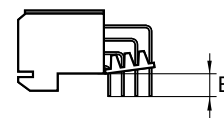
PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

72651 - 1yyLF



| yy | Tail length (B) | PCB Thickness |
|----|-----------------|---------------|
| 02 | 2,73 mm | 1,60 mm |
| 11 | 3,53 mm | 2,40 mm |



Note: blue marked in **tail length** is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 5 row, power, straight, solder to board, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 x 2 power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product Specification GS-12-180
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

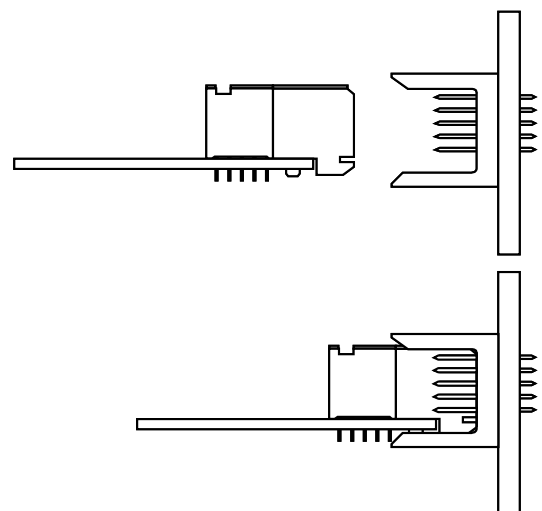
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

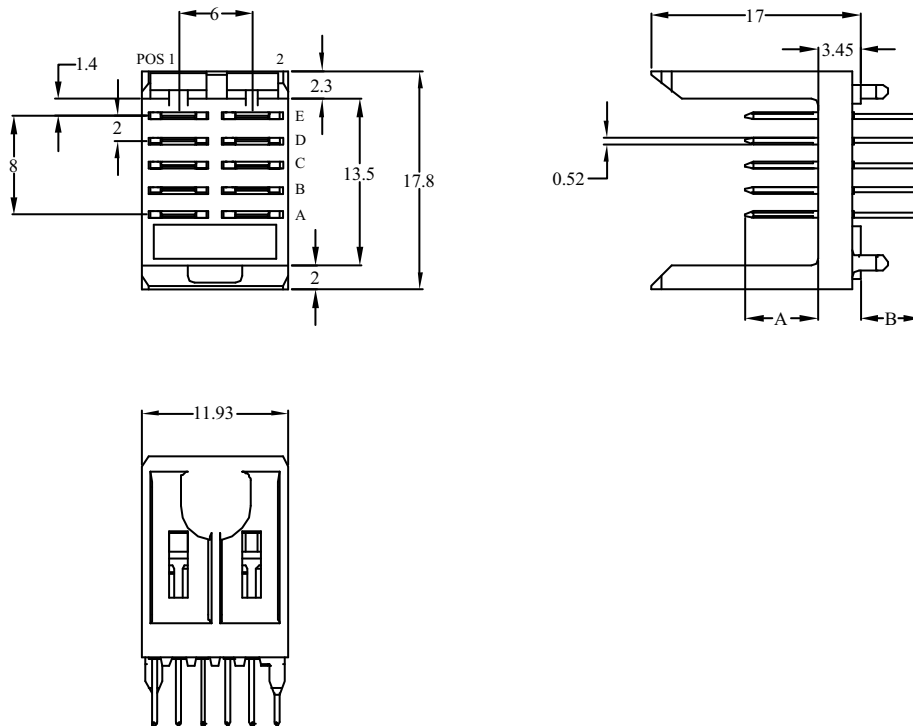
- Receptacle, right angle, press-fit, page 109
 - part number 85876-1yyLF
- Receptacle, right angle, solder-to-board, page 111
 - part number 89096-1yyLF
- Receptacle, right angle, Pin-in-Paste, page 113
 - part number 63793-101LF

TYPICAL APPLICATIONS



Header, 5 row, power, straight, solder to board, wide body

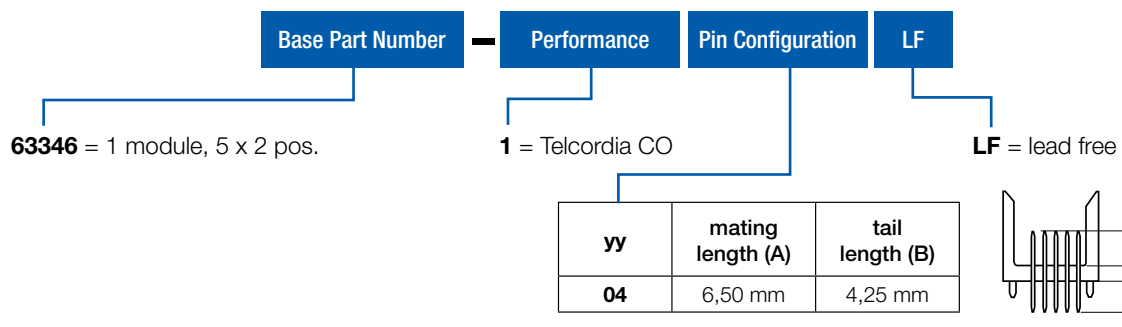
PRODUCT



PCB pattern P16, see chapter PCB layouts

PARTNUMBERS

63346 - 104LF



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 5 row, power, straight, press-fit, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 x 2 power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Eye the needle press-fit contac

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- press-fit contact insertion: 65 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

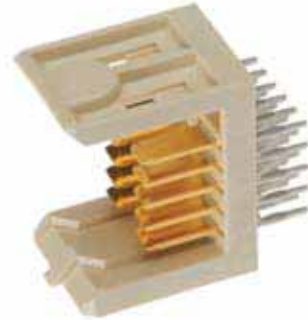
- Applicable process: press fit

REFERENCE DATA

- Product Specification GS-12-180
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

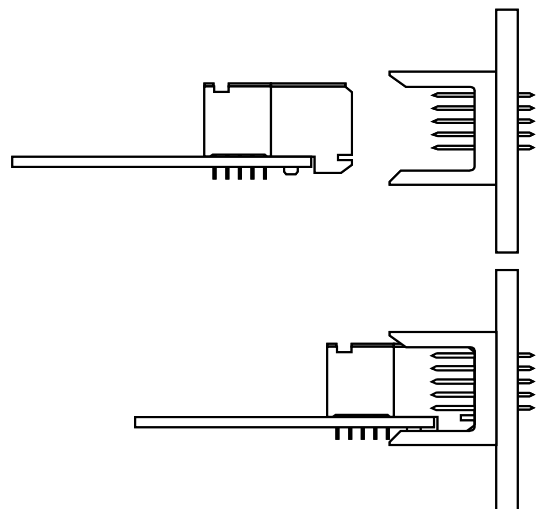
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

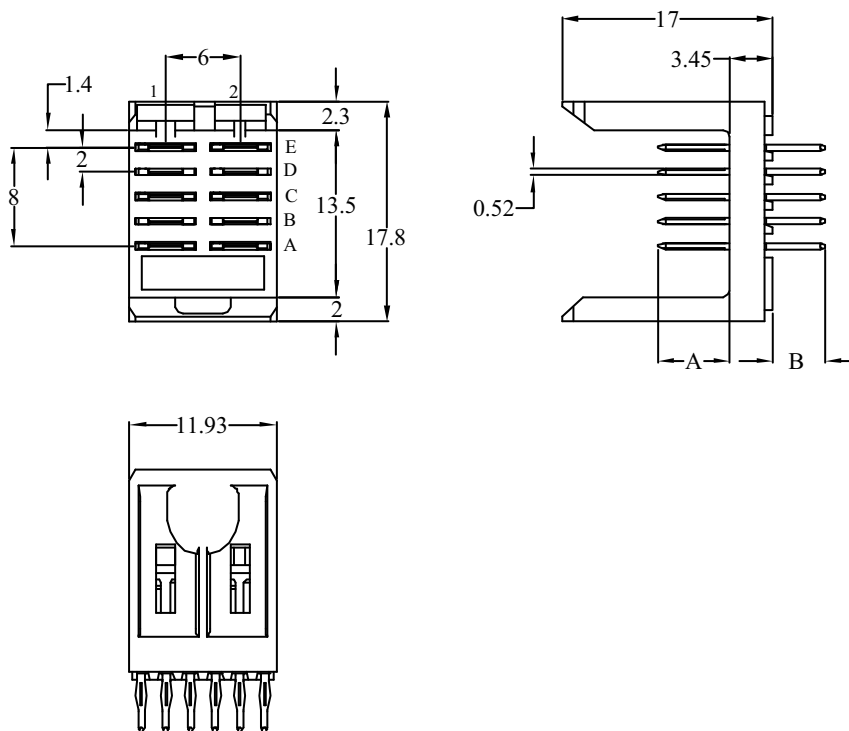
- Receptacle, right angle, press-fit, page 109
 - part number 85876-1yyLF
- Receptacle, right angle, solder-to-board, page 111
 - part number 89096-1yyLF
- Receptacle, right angle, Pin-in-Paste, page 113
 - part number 63793-101LF

TYPICAL APPLICATIONS



Header, 5 row, power, straight, press-fit, wide body

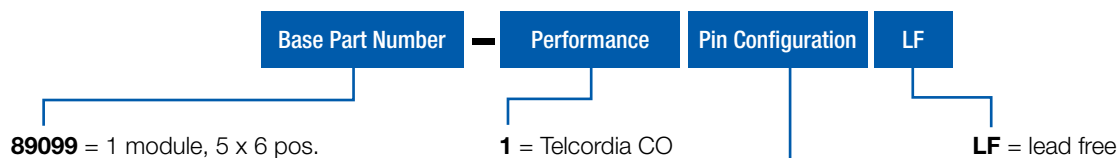
PRODUCT



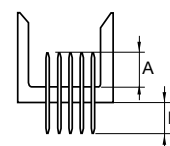
PCB pattern P7, see chapter PCB layouts

PARTNUMBERS

89099 - 111LF



| yy | mating length (A) | tail length (B) |
|----|-------------------|-----------------|
| 11 | 6,50 mm | 4,30 mm |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 5 row, power, right angle, solder to board

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 x 2 dual beam power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

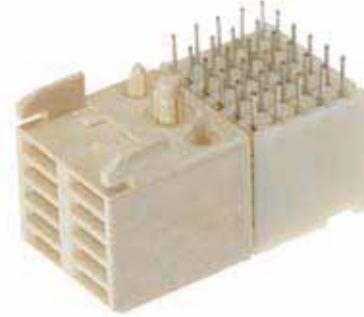
- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product Specification GS-12-453

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

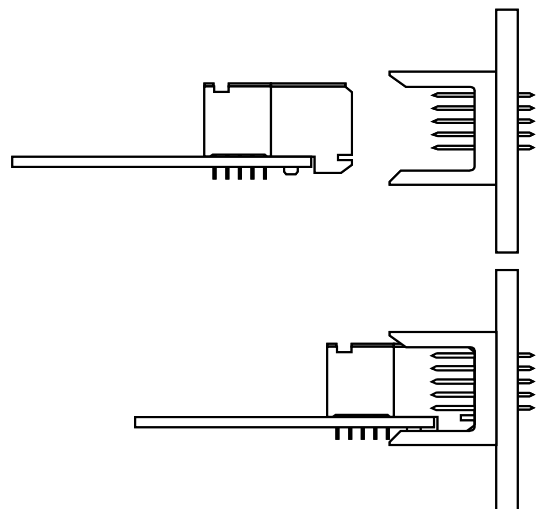
- Header, straight, press-fit, page 107

- 1 module – part number 89099-111LF

- Header, straight, solder-to-board, page 105

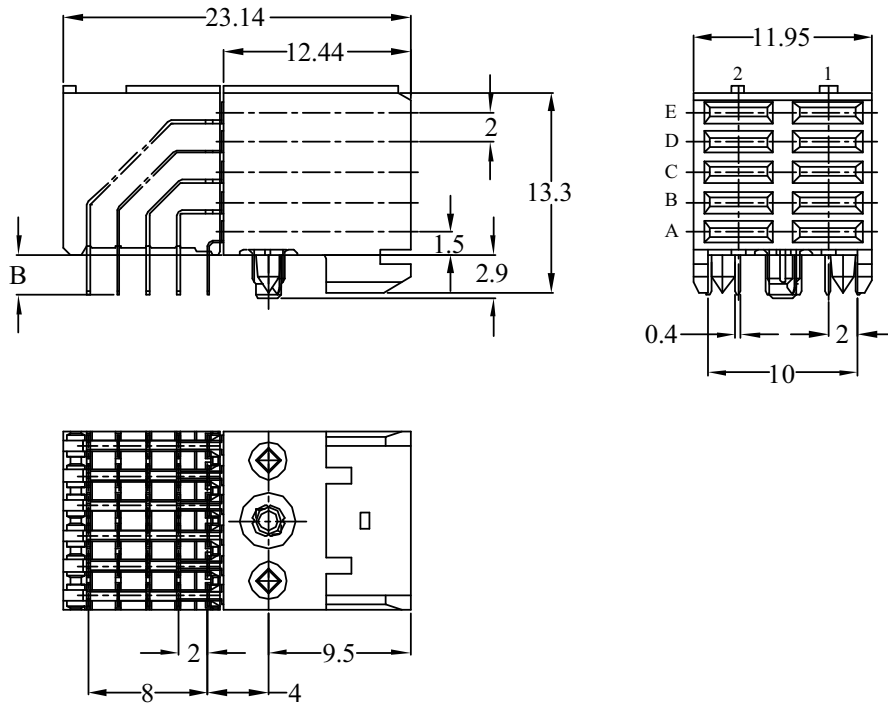
- 1 module – part number 63346-104LF

TYPICAL APPLICATIONS



Receptacle, 5 row, power, right angle, solder to board

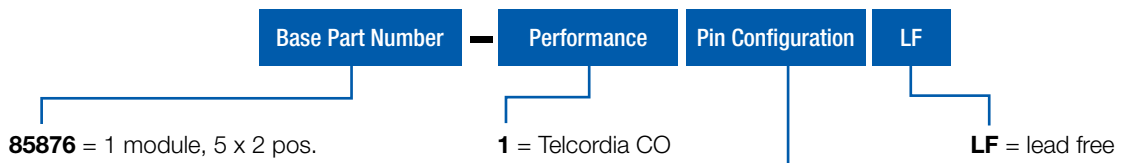
PRODUCT



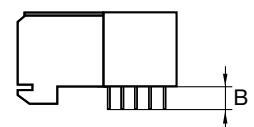
PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

85876 - 1yyLF



| yy | Tail length (B) | PCB Thickness |
|----|-----------------|---------------|
| 02 | 2,73 mm | 1,60 mm |
| 12 | 3,53 | 2,40 |

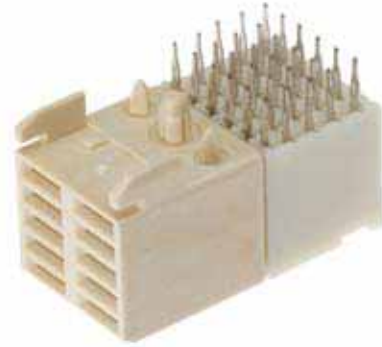


Note: blue marked in **tail length** is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 5 row, power, right angle, press-fit

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 x 2 dual beam power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)
- Press block ensures accurate position of press-fit tails for easy mounting
- Eye the needle press-fit contact



TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)

- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

- Applicable process: press fit

REFERENCE DATA

- Press-peg application, TA-0941
- Product Specification GS-12-453

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

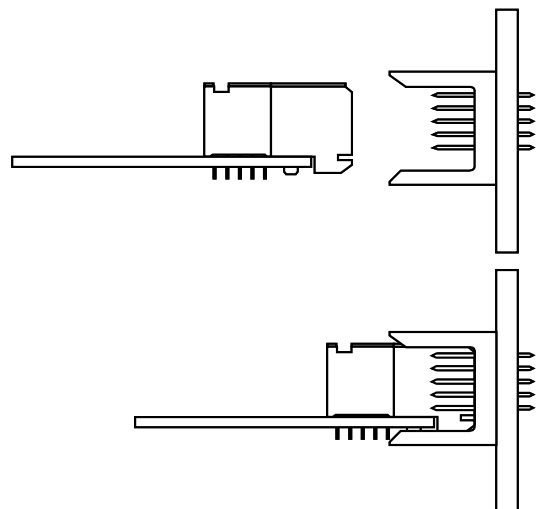
- Header, straight, press-fit, page 107

- 1 module – part number 89099-111LF

- Header, straight, solder-to-board, page 105

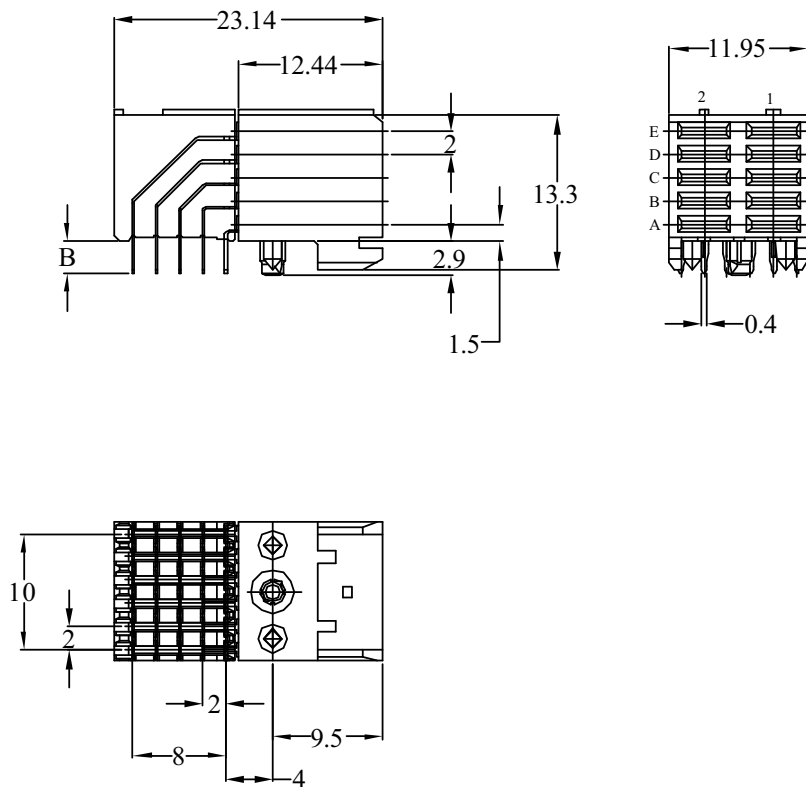
- 1 module – part number 63346-104LF

TYPICAL APPLICATIONS



Receptacle, 5 row, power, right angle, press-fit

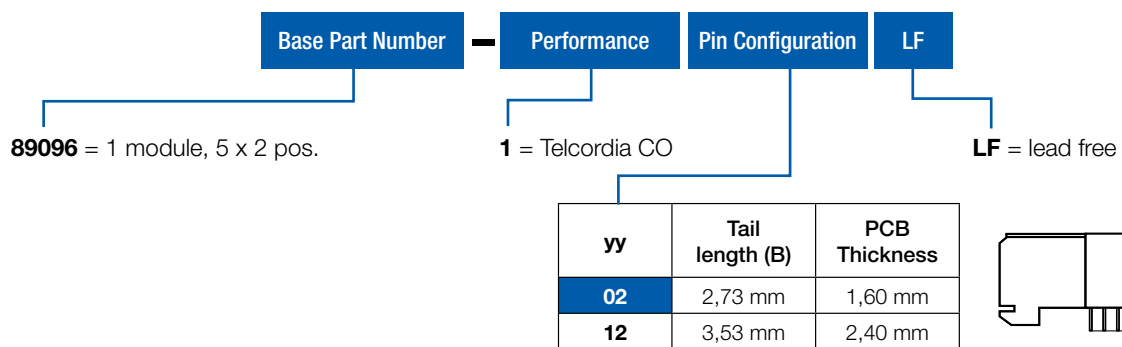
PRODUCT



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

89096 - 1yyLF



Note: blue marked in **tail length** is the preferred recommended standard for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 5 row, power, right angle, pin-in-paste

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 x 2 dual beam power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

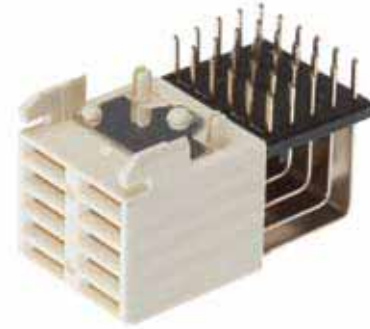
- automatic Surface-mount reflow process, resistance for Lead Free reflow temperature

REFERENCE DATA

- Packaging specification GS-14-920
- Product Specification GS-12-453

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

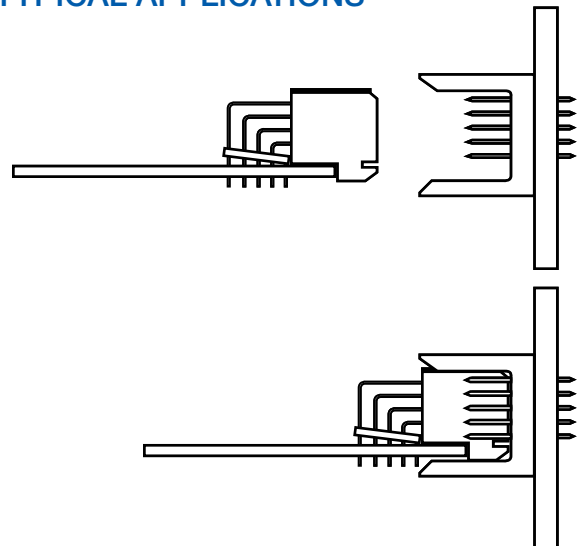
Header, straight, press-fit, page 107

- 1 module – part number 89099-111LF

Header, straight, solder-to-board, page 105

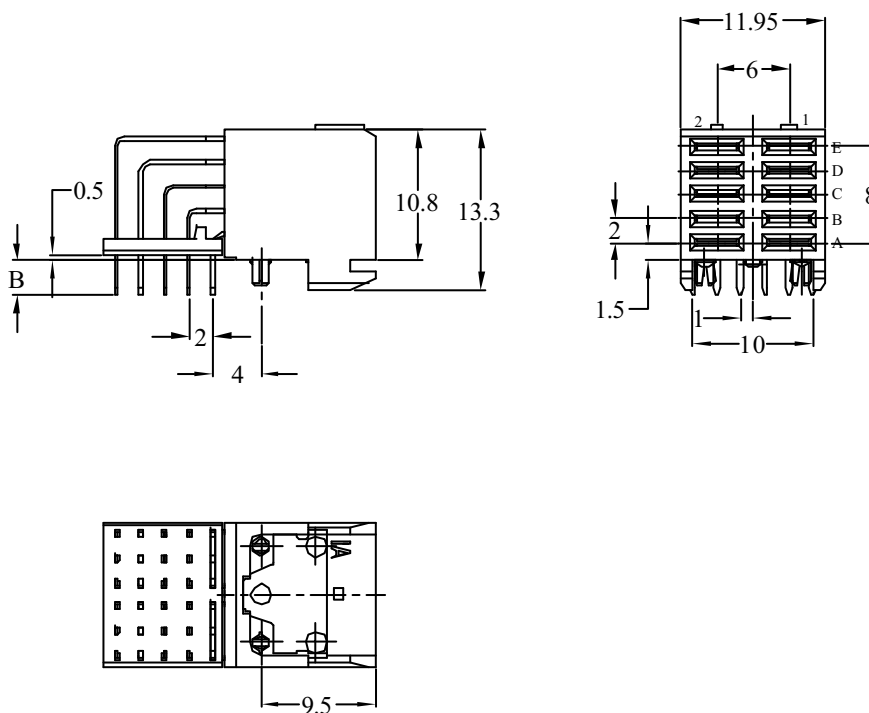
- 1 module – part number 63346-104LF

TYPICAL APPLICATIONS



Receptacle, 5 row, power, right angle, pin-in-paste

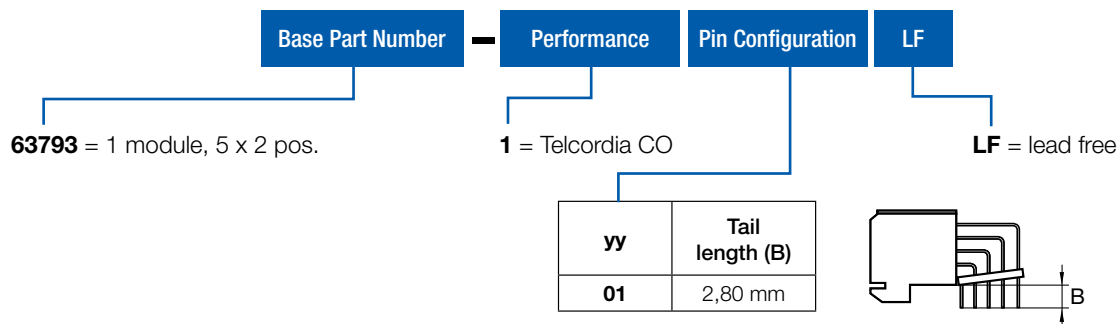
PRODUCT



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS






63793 - 101LF



Note: for other special patterns or loadings, please check drawings, all other configurations on request only



METRAL® POWER CONNECTORS REVERSED

-  Header, 4 row, right angle, wide body
-  Header, 4 row, right angle, narrow body
-  Receptacle, 4 row, straight
-  Header, 5 row, right angle, wide body
-  Receptacle, 5 row, straight

Header, 4 row, power, right angle, solder to board, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 x 2 power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product specification: GS-12-446
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

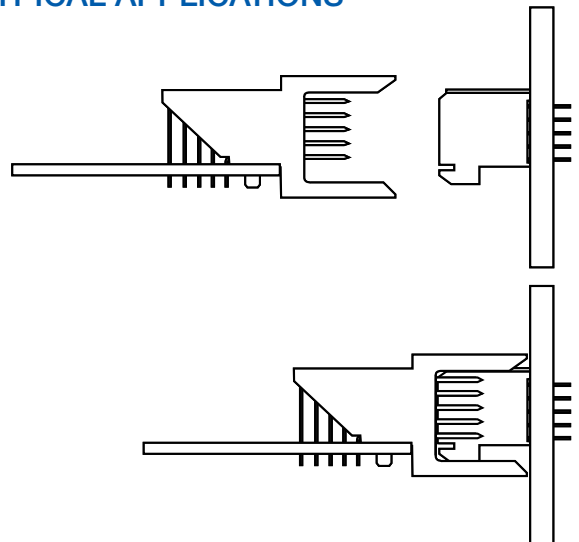
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

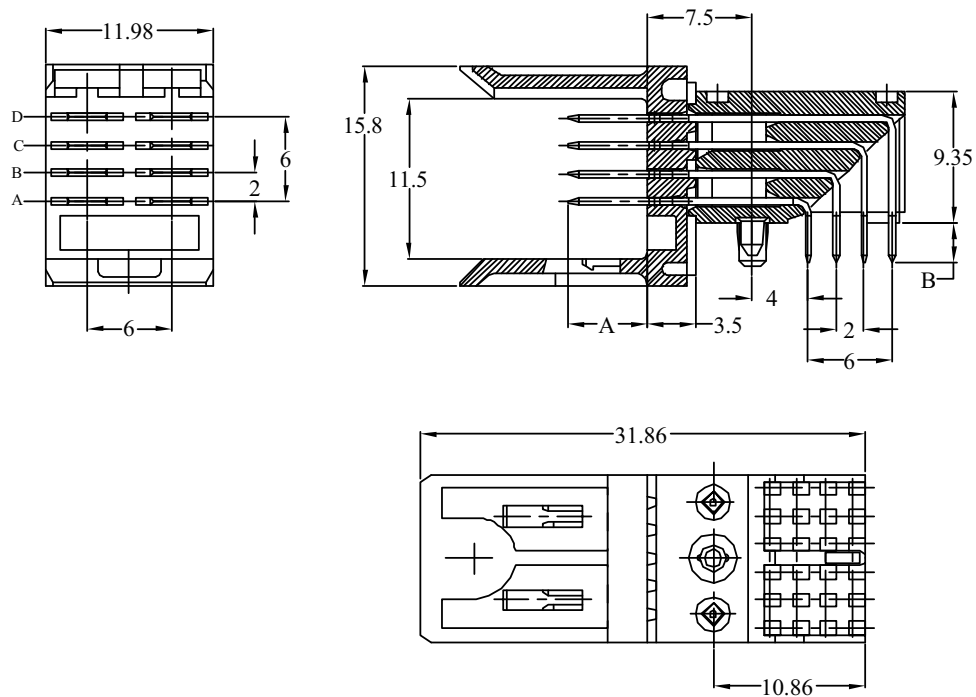
- Receptacle, straight, solder-to-board, page 123
- part number 85968-101LF

TYPICAL APPLICATIONS



Header, 4 row, power, right angle, solder to board, wide body

PRODUCT



PCB pattern P1, see chapter PCB layouts

POWER CONNECTORS

PARTNUMBERS

HM1K4 1 DAP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF |
|------------------|------|-------------|-------------|---------------|-----|-------------|-----------|----|
|------------------|------|-------------|-------------|---------------|-----|-------------|-----------|----|

HM1

K = power header right angle

4 = 4 row

DAP = solder to board

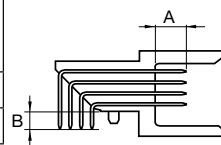
| mating length (A) | tail length (B) |
|----------------------|-----------------|
| 6,50 mm | 2,90 mm |
| 1,6 mm PCB thickness | |

1 = 1 module (4 x 2 pos.)

H6 = Telcordia CO

LF = lead free

P = trays



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, power, right angle, press-fit, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 x 2 power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Eye the needle press-fit contact

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Trays

PROCESSING INFORMATION

- Applicable process: press fit

REFERENCE DATA

- Product specification: GS-12-445
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

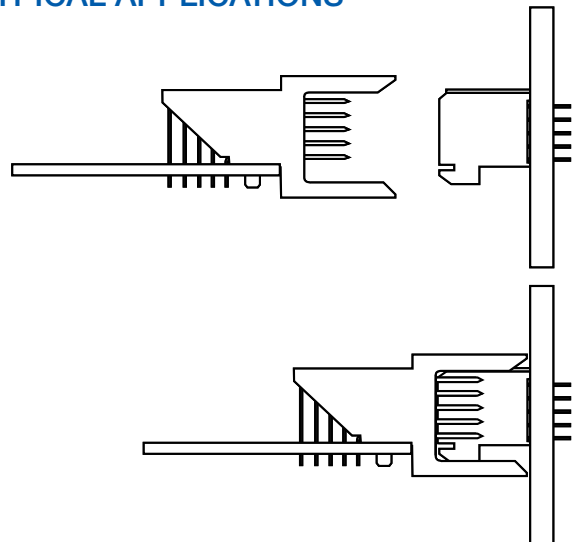
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

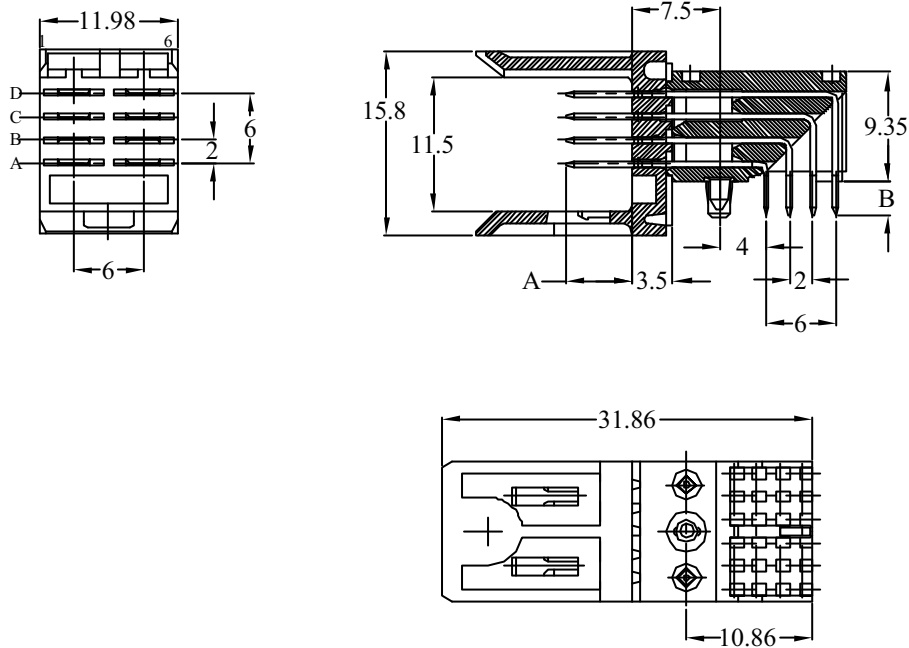
- Receptacle, straight, solder-to-board, page 123
- part number 85968-101LF

TYPICAL APPLICATIONS



Header, 4 row, power, right angle, press-fit, wide body

PRODUCT



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

HM1K4 1 DDP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF |
|------------------|-------------------------------------|------------------|----------------------------------|------------------------|-----|--------------------------|------------------|-----------------------|
| HM1 | K = power header right angle | 4 = 4 row | 1 = 1 module (4 x 2 pos.) | DDP = press fit | | H6 = Telcordia CO | P = trays | LF = lead free |

| mating length (A) | tail length (B) |
|----------------------|-----------------|
| 6,50 mm | 2,90 mm |
| 1,6 mm PCB thickness | |

Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, power, right angle, pin-in-paste, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 x 2 power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Trays

PROCESSING INFORMATION

- Pick&place by vacuum nozzle or mechanical gripper
- automatic Surface-mount reflow process, resistance for Lead Free reflow temperature

REFERENCE DATA

- Product specification: GS-12-446
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

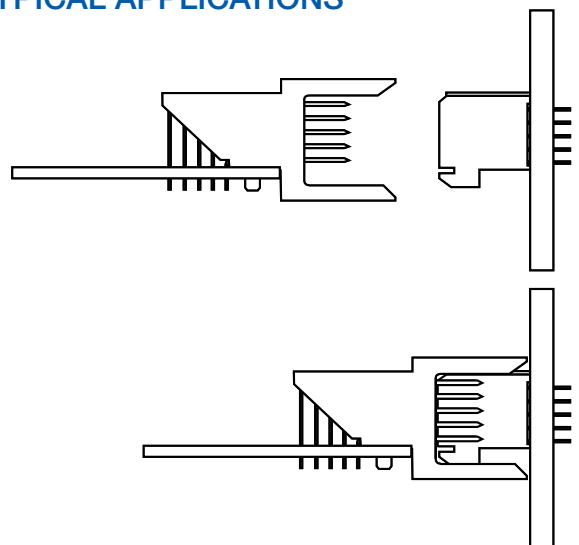
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

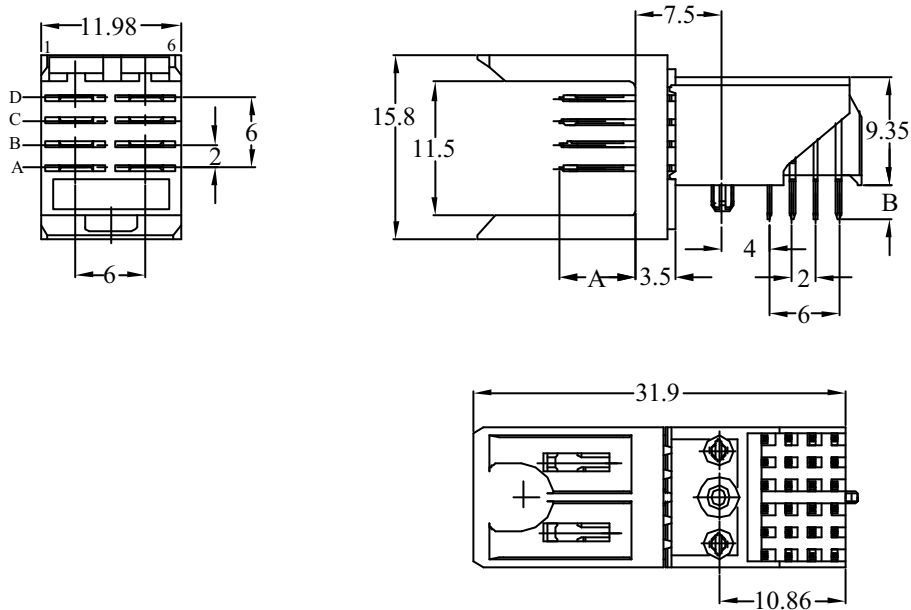
- Receptacle, straight, solder-to-board, page 123
- part number 85968-101LF

TYPICAL APPLICATIONS



Header, 4 row, power, right angle, pin-in-paste, wide body

PRODUCT



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

HM1K4 1 DFP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF | | | | | | |
|----------------------|------------------------------|-------------|---------------------------|--|-------------------|-------------------|-----------|----------------|----------------------|--|--|--|--|--|
| HM1 | K = power header right angle | 4 = 4 row | 1 = 1 module (4 x 2 pos.) | DFP = Pin-in-Paste | | H6 = Telcordia CO | P = trays | LF = lead free | | | | | | |
| | | | | <table border="1"> <thead> <tr> <th>mating length (A)</th> <th>tail length (B)</th> </tr> </thead> <tbody> <tr> <td>6,50 mm</td> <td>2,90 mm</td> </tr> <tr> <td colspan="2">1,6 mm PCB thickness</td> </tr> </tbody> </table> | mating length (A) | tail length (B) | 6,50 mm | 2,90 mm | 1,6 mm PCB thickness | | | | | |
| mating length (A) | tail length (B) | | | | | | | | | | | | | |
| 6,50 mm | 2,90 mm | | | | | | | | | | | | | |
| 1,6 mm PCB thickness | | | | | | | | | | | | | | |

Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 4 row, power, straight, solder to board

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 4 x 2 dual beam power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Trays

PROCESSING INFORMATION

- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product Specification GS-12-453

APPLICATION EQUIPMENT

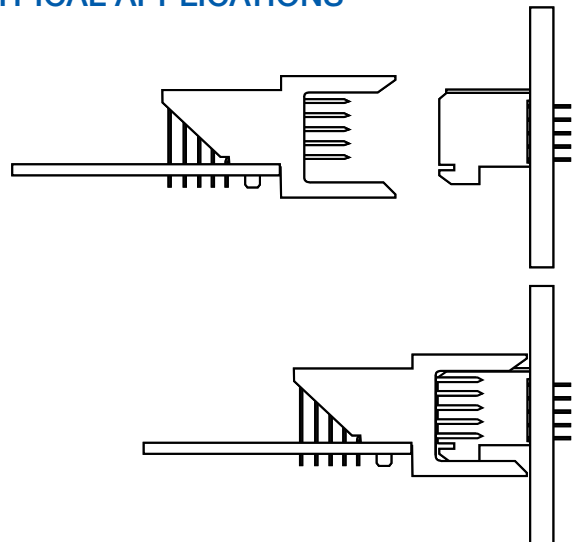
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

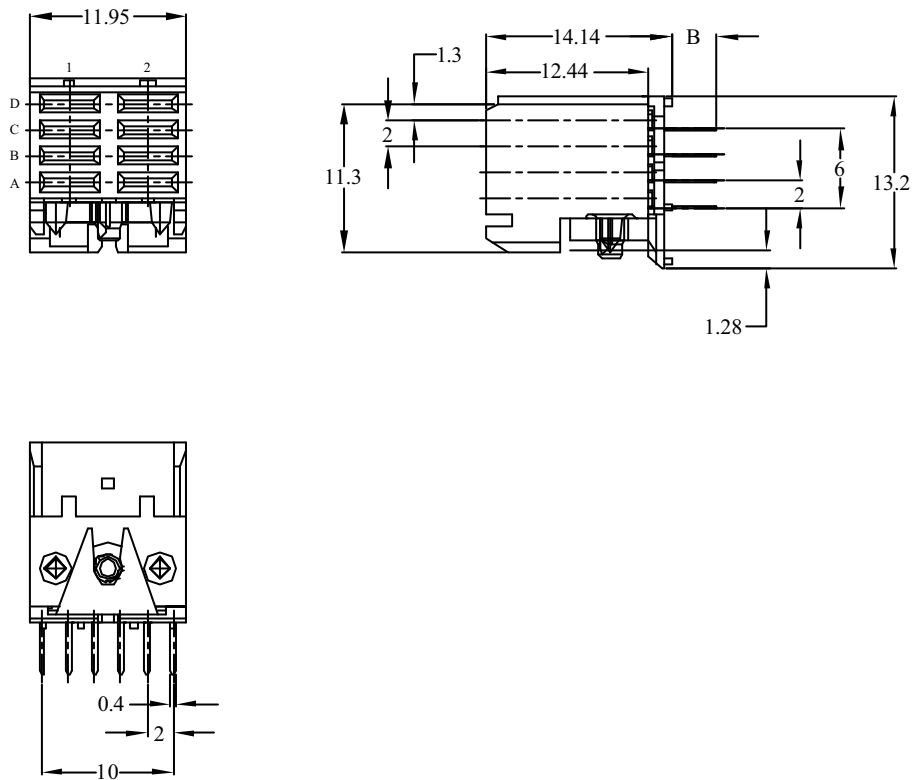
- Header, right angle, press-fit, page 119
 - part number HM1K41DDP000H6PLF
- Header, right angle, solder-to-board, page 117
 - part number HM1K41DAP000H6PLF
- Header, right angle, Pin-in-Paste, page 121
 - part number HM1K41DFP000H6PLF

TYPICAL APPLICATIONS



Receptacle, 4 row, power, straight, solder to board

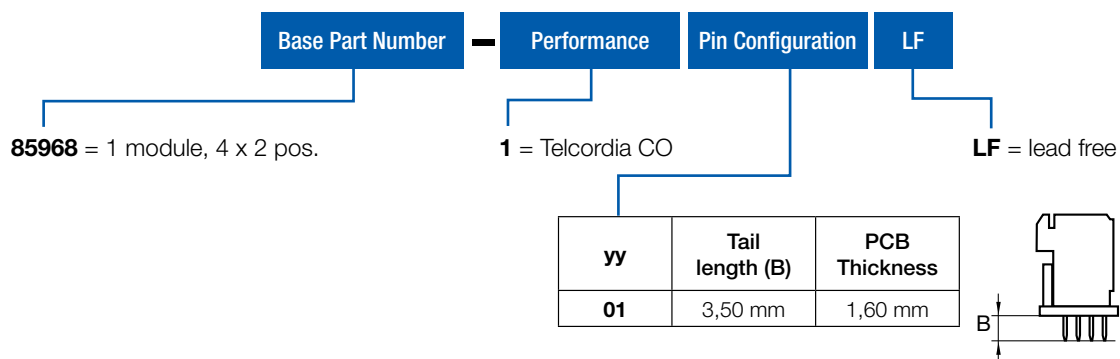
PRODUCT



PCB pattern P5, see chapter PCB layouts

PARTNUMBERS

85968 - 101LF



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 5 row, power, right angle, solder to board, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 x 2 power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Trays

PROCESSING INFORMATION

- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product specification: GS-12-446
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

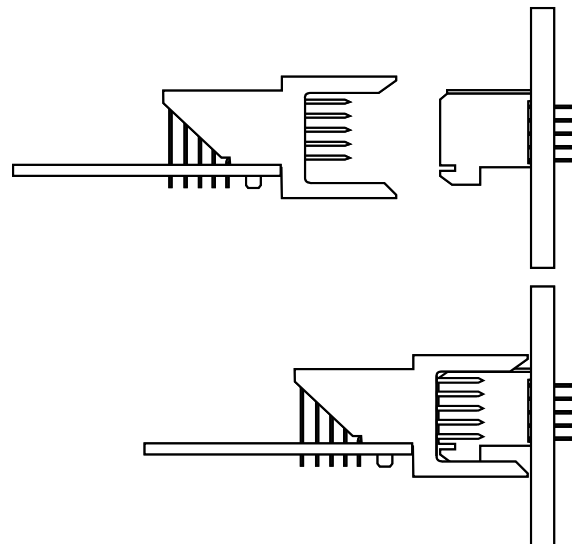
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

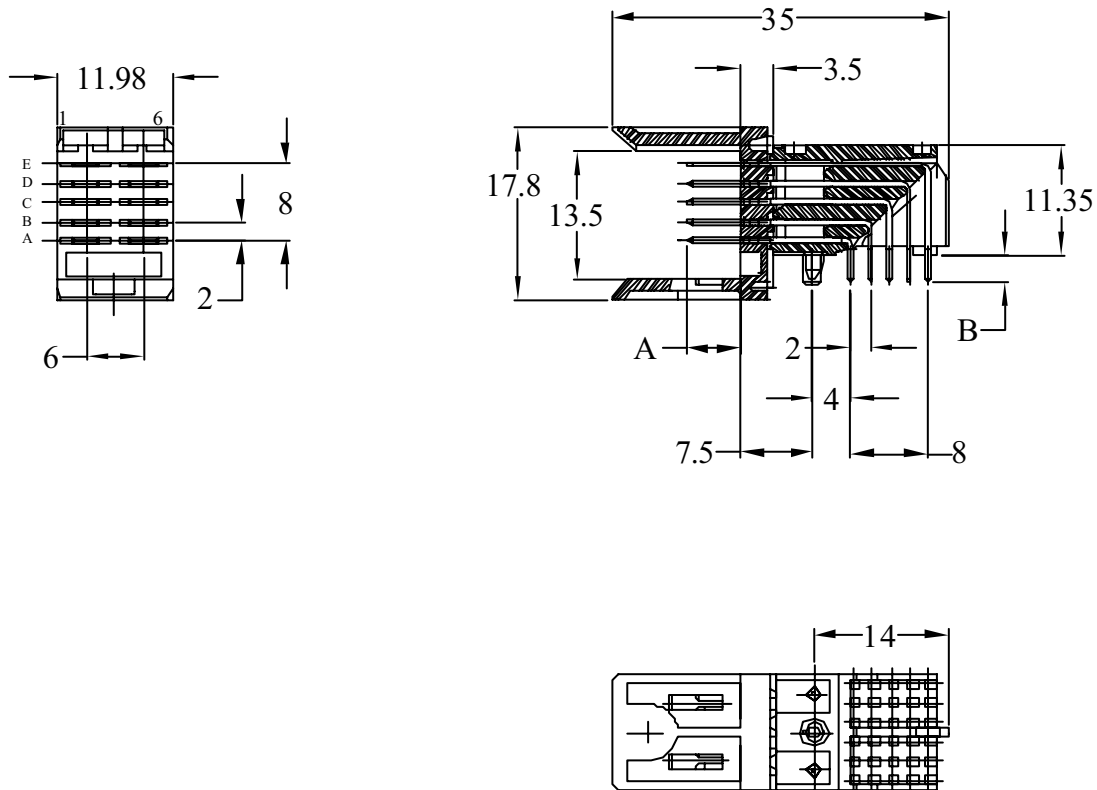
- Receptacle, straight, solder-to-board, page 131
- part number 94561-112LF

TYPICAL APPLICATIONS



Header, 5 row, power, right angle, solder to board, wide body

PRODUCT



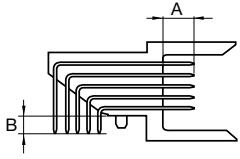
PCB pattern P2, see chapter PCB layouts

POWER CONNECTORS

PARTNUMBERS

HM1K5 1 DAP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF | | | | | | |
|----------------------|------------------------------|-------------|---------------------------|--|-------------------|-----------------|-----------|---------|----------------------|--|--|-------------------|-----------|----------------|
| HM1 | K = power header right angle | 5 = 5 row | 1 = 1 module (5 x 2 pos.) | DAP = solder to board <table border="1"> <thead> <tr> <th>mating length (A)</th> <th>tail length (B)</th> </tr> </thead> <tbody> <tr> <td>6,50 mm</td> <td>2,90 mm</td> </tr> <tr> <td colspan="2">1,6 mm PCB thickness</td> </tr> </tbody> </table> | mating length (A) | tail length (B) | 6,50 mm | 2,90 mm | 1,6 mm PCB thickness | | | H6 = Telcordia CO | P = trays | LF = lead free |
| mating length (A) | tail length (B) | | | | | | | | | | | | | |
| 6,50 mm | 2,90 mm | | | | | | | | | | | | | |
| 1,6 mm PCB thickness | | | | | | | | | | | | | | |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 5 row, power, right angle, press-fit, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 x 2 power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Eye the needle press-fit contac

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- press-fit contact insertion: 55 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Trays

PROCESSING INFORMATION

- Applicable process: press fit

REFERENCE DATA

- Product specification: GS-12-445
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

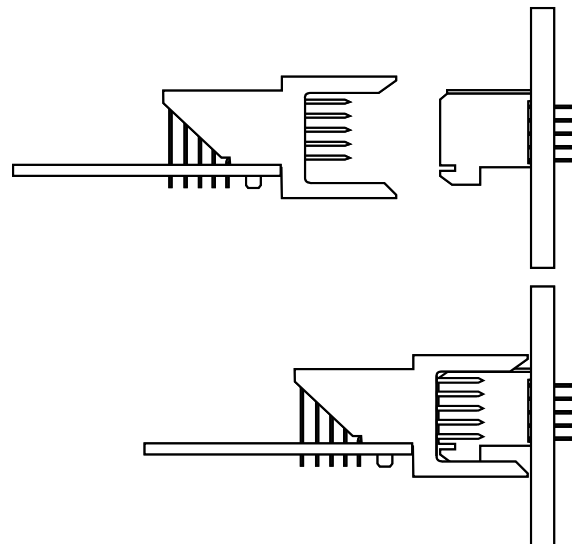
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

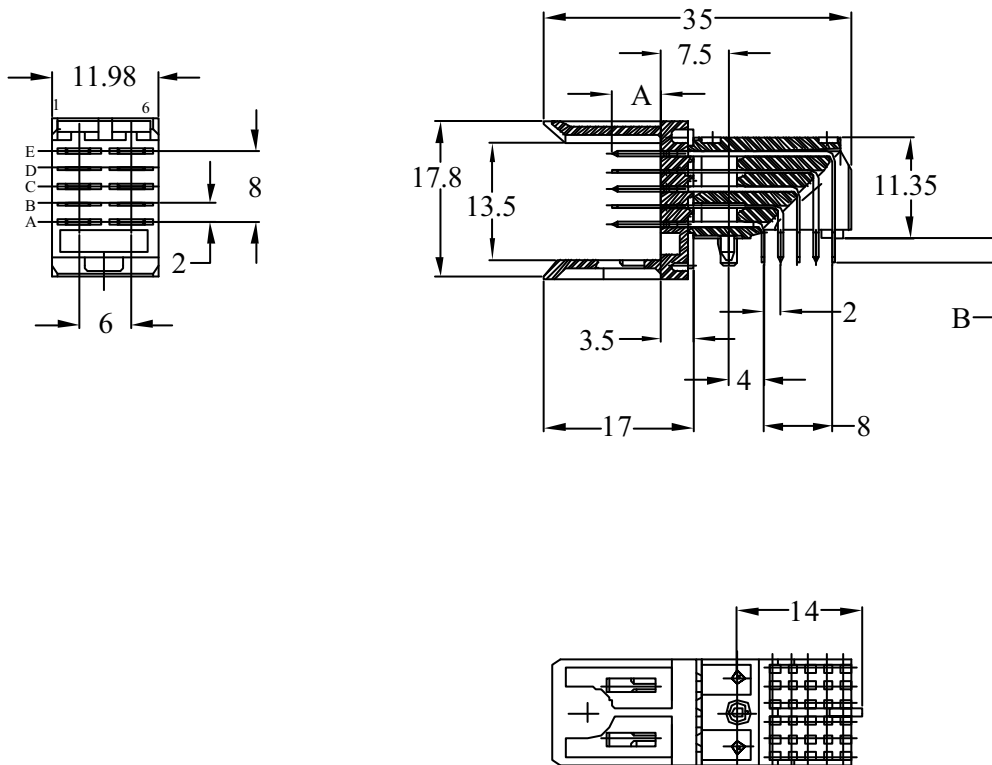
- Receptacle, straight, solder-to-board, page 131
- part number 94561-112LF

TYPICAL APPLICATIONS



Header, 5 row, power, right angle, press-fit, wide body

PRODUCT



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

HM1K5 1 DDP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF |
|------------------|------|-------------|-------------|---------------|-----|-------------|-----------|----|
|------------------|------|-------------|-------------|---------------|-----|-------------|-----------|----|

HM1

K = power header right angle

5 = 5 row

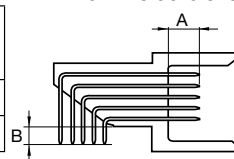
DDP = press fit

| mating length (A) | tail length (B) |
|----------------------|-----------------|
| 6,50 mm | 2,90 mm |
| 1,6 mm PCB thickness | |

H6 = Telcordia CO

LF = lead free

P = trays



1 = 1 module (5 x 2 pos.)

Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 5 row, power, right angle, pin-in-paste, wide body

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 x 2 power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Trays

PROCESSING INFORMATION

- Pick&place by vacuum nozzle or mechanical gripper
- automatic Surface-mount reflow process, resistance for Lead Free reflow temperature

REFERENCE DATA

- Product specification: GS-12-446
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

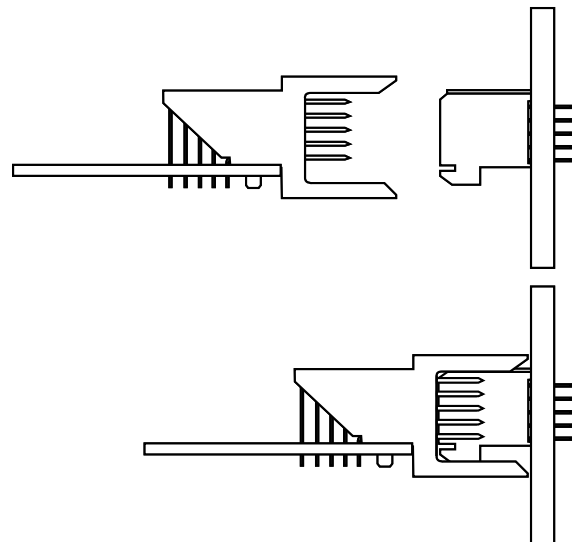
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

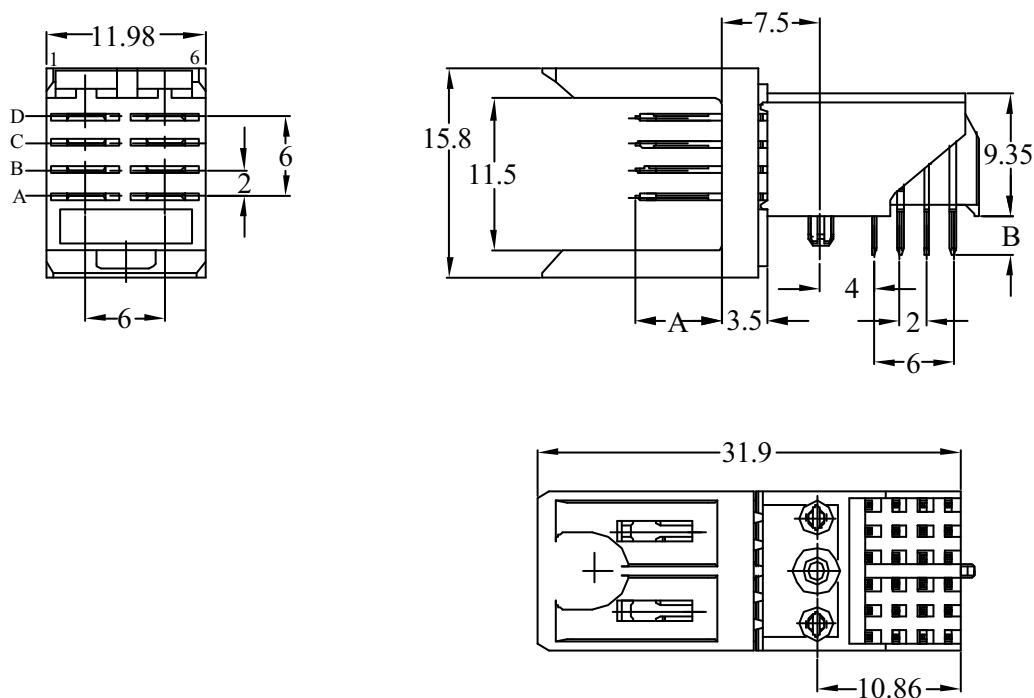
- Receptacle, straight, solder-to-board, page 131
- part number 94561-112LF

TYPICAL APPLICATIONS



Header, 5 row, power, right angle, pin-in-paste, wide body

PRODUCT

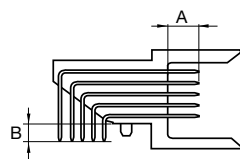


PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

HM1K5 1 DFP000H6PLF

| Base Part Number | Type | no. of rows | no. of pos. | Configuration | 000 | Performance | Packaging | LF | | | | | | |
|----------------------|-------------------------------------|------------------|----------------------------------|---|-------------------|-----------------|-----------|---------|----------------------|--|--|--------------------------|------------------|-----------------------|
| HM1 | K = power header right angle | 5 = 5 row | 1 = 1 module (5 x 2 pos.) | DFP = Pin-in-Paste <table border="1"> <thead> <tr> <th>mating length (A)</th> <th>tail length (B)</th> </tr> </thead> <tbody> <tr> <td>6,50 mm</td> <td>2,90 mm</td> </tr> <tr> <td colspan="2">1,6 mm PCB thickness</td> </tr> </tbody> </table> | mating length (A) | tail length (B) | 6,50 mm | 2,90 mm | 1,6 mm PCB thickness | | | H6 = Telcordia CO | P = trays | LF = lead free |
| mating length (A) | tail length (B) | | | | | | | | | | | | | |
| 6,50 mm | 2,90 mm | | | | | | | | | | | | | |
| 1,6 mm PCB thickness | | | | | | | | | | | | | | |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 5 row, power, straight, solder to board

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- 5 x 2 dual beam power blades contacts
- 12 mm power modules are form- and fit interchangeable with signal modules on same footprint
- Modular design guarantees flexibility
- Stackable end-to-end without loss of position
- Stackable with other METRAL® function modules (power, I/O)

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP (30% glass), colour natural
- flammability rating: UL 94 V-0
- contact material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 3 A
- insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 1,50 N max. per individual power contact (mating)
- withdrawal force: 0,30 N max. per individual power contact (unmating)
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature -55°C to + 125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard Tubes

PROCESSING INFORMATION

- Applicable process: wave, IR, vapor phase

REFERENCE DATA

- Product Specification GS-12-453

APPLICATION EQUIPMENT

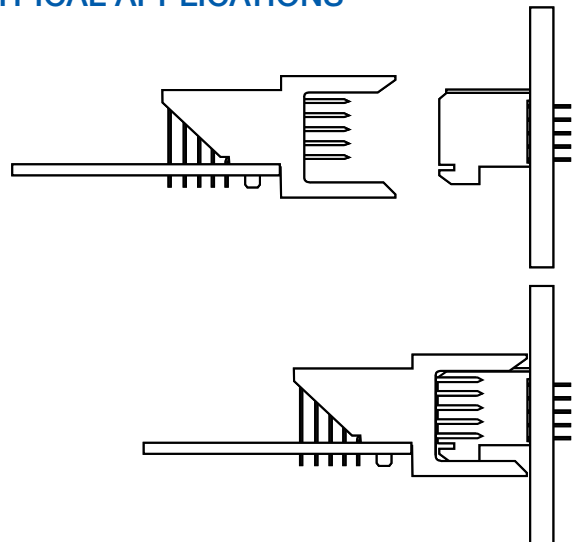
- for application equipment, check out the application equipment table on page 217-223



MATING DATA

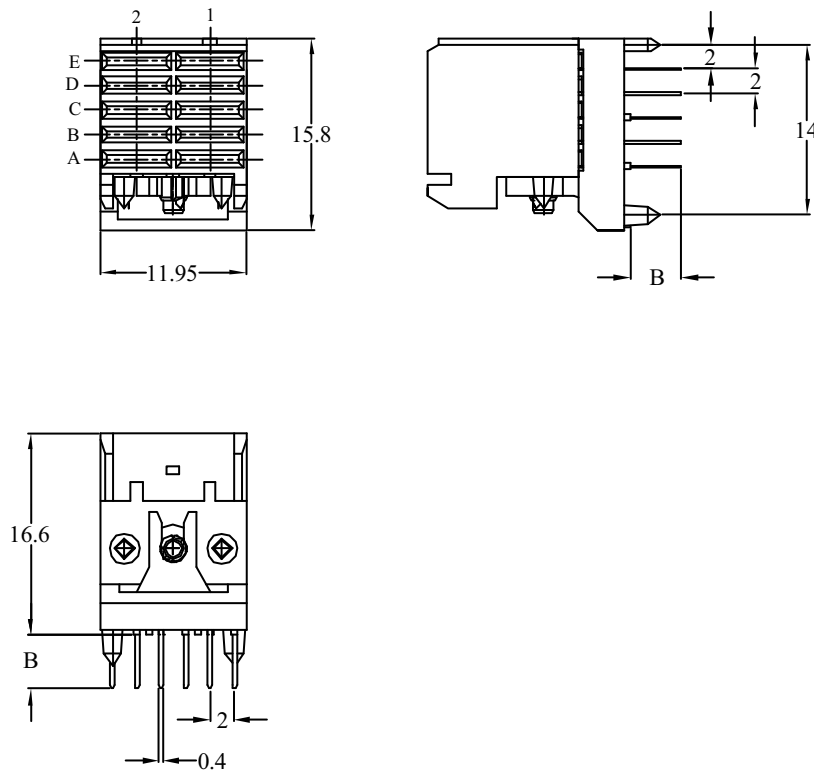
- Header, right angle, press-fit, page 127
 - part number HM1K451DDP000H6PLF
- Header, right angle, solder-to-board, page 125
 - part number HM1K51DAP000H6PLF
- Header, right angle, Pin-in-Paste, page 129
 - part number HM1K51DFP000H6PLF

TYPICAL APPLICATIONS



Receptacle, 5 row, power, straight, solder to board

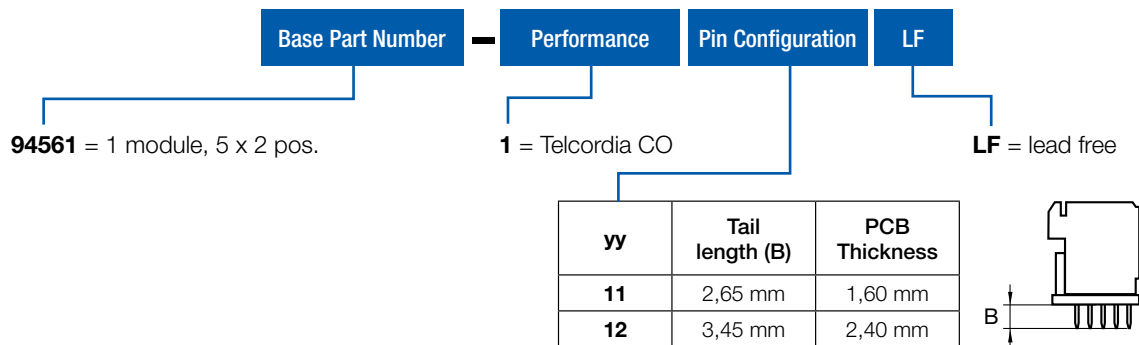
PRODUCT



PCB pattern P16, see chapter PCB layouts

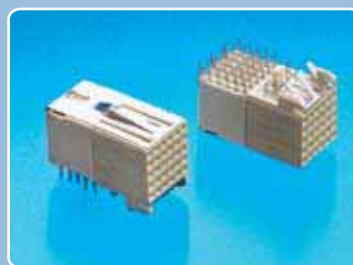
PARTNUMBERS

94561 - 1yyLF






Note: for other special patterns or loadings, please check drawings, all other configurations on request only





METRAL® ELECTRICAL ENHANCED SIGNAL CONNECTORS

-  Header, Straight, 5 row
-  Shroud, 5 row
-  Receptacle, Right Angle, 5 row

Header, 5+2 row, signal, straight, press-fit, wide body

FEATURES

- ▶ 5 row Header
- ▶ 2 row Shielding, because of die-cast housing all signal pins are surrounded by a ground path, consequently reducing crosstalk and ground bounce.
- ▶ EMI of 15 dB
- ▶ Press-fit, eye of the needle contact



TECHNICAL DATA

PHYSICAL

- ▶ Housing: Die-cast zinc alloy
- ▶ Wafer material: glass filled LCP, UL 94 V-0, color natural
- ▶ Contact material: Phosphor bronze
- ▶ Performance level: Telcordia CO

ELECTRICAL

- ▶ current rating: 1 A
- ▶ withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- ▶ insertion force: 0,45 N max. per individual signal contact (mating)
- ▶ withdrawal force: 0,15 N max. per individual signal contact (unmating)
- ▶ press-fit contact insertion: 65 N max. per pin
- ▶ press-fit pin withdrawal: 20 N min. per pin
- ▶ recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- ▶ Operating temperature range: -55°C to +125°C
- ▶ RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- ▶ standard: tubes

PROCESSING INFORMATION

- ▶ press fit

REFERENCE DATA

- ▶ Product specification GS-12-074
- ▶ Application specification TA-941

APPLICATION EQUIPMENT

- ▶ for application equipment, check out the application equipment table on page 217-223

MATING DATA

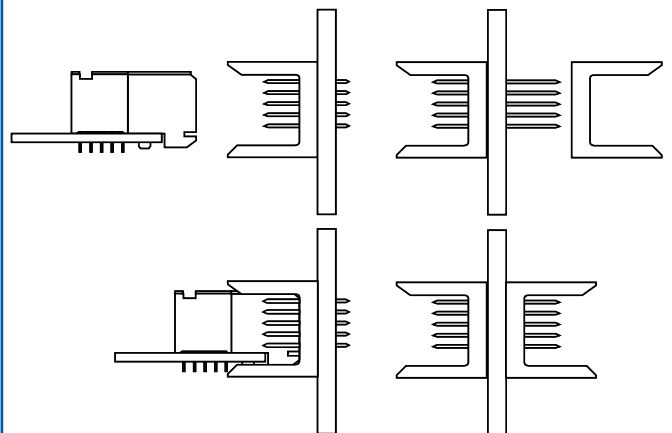
Electrical Enhanced Receptacle, Signal, right angle

- ▶ part number 85847-102LF, page 139

Electrical Enhanced Shroud, wide body

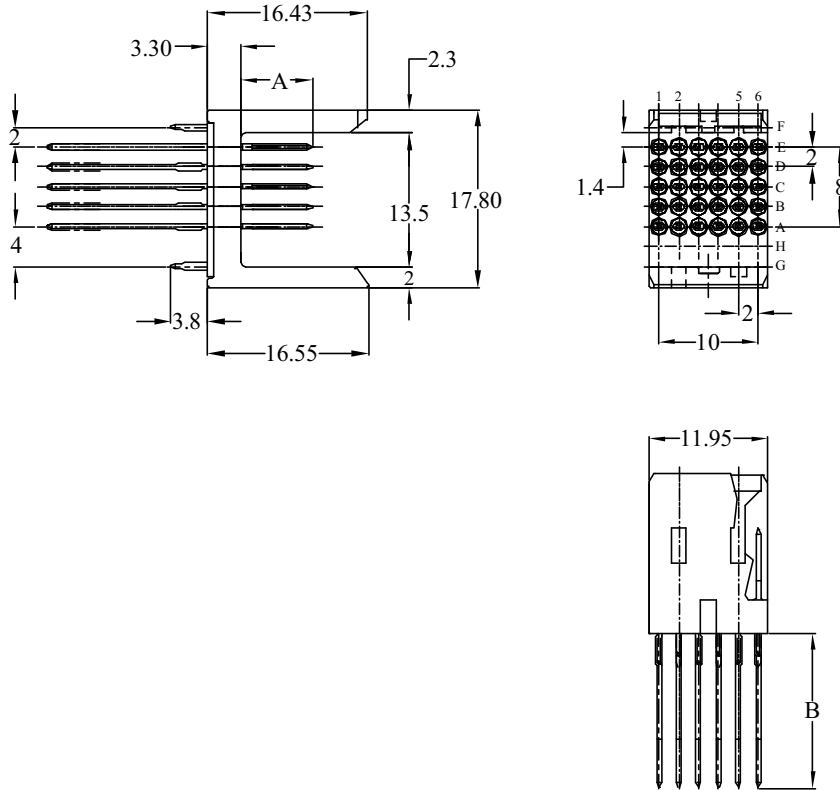
- ▶ part numbers 70438-111LF, page 137

TYPICAL APPLICATIONS



Header, 5+2 row, signal, straight, press-fit, wide body

PRODUCT

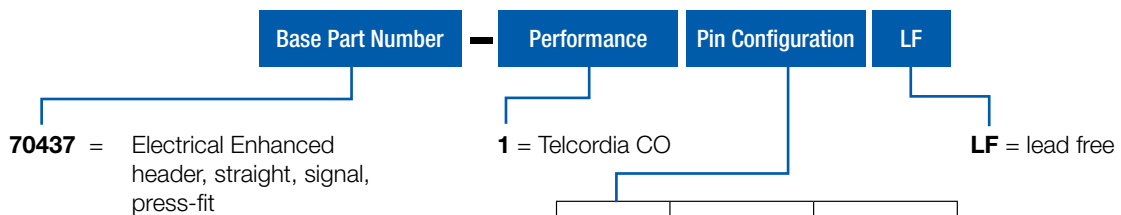


PCB pattern P15, see chapter PCB layouts

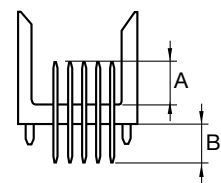
ELECTRICAL ENHANCED

PARTNUMBERS

70437 - 1yyLF



| yy | mating length (A) | rear plug up length (B) |
|----|-------------------|-------------------------|
| 11 | 6,50 mm | 4,30 mm |
| 16 | 5,75 mm | 4,30 mm |
| 18 | 5,00 mm | 4,30 mm |
| 21 | 6,50 mm | 13,60 mm |
| 26 | 5,75 mm | 13,60 mm |
| 28 | 5,00 mm | 13,60 mm |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Shroud, 5+2 row, wide body

FEATURES

- 5 row Shroud
- 2 row Shielding, because of die-cast housing all signal pins are surrounded by a ground path, consequently reducing crosstalk and ground bounce.
- EMI of 15 dB



TECHNICAL DATA

PHYSICAL

- Housing: Die-cast zinc alloy
- Wafer material: glass filled LCP, UL 94 V-0, color natural

ELECTRICAL

- current rating: 1 A
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- Product specification GS-12-074

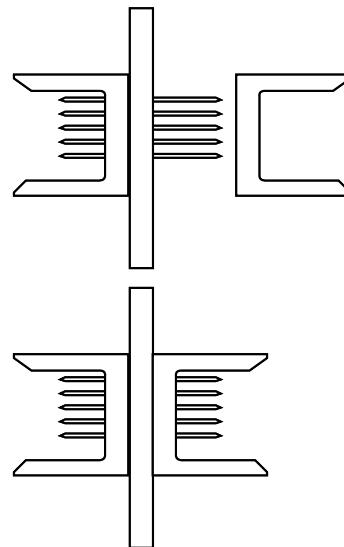
APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

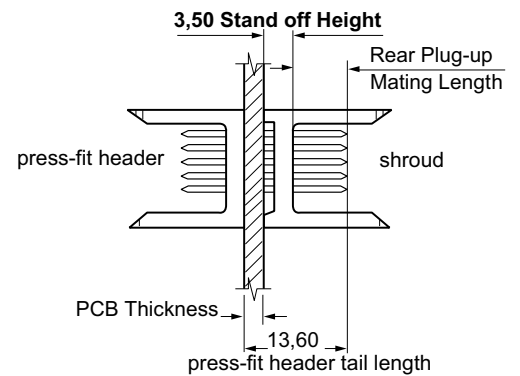
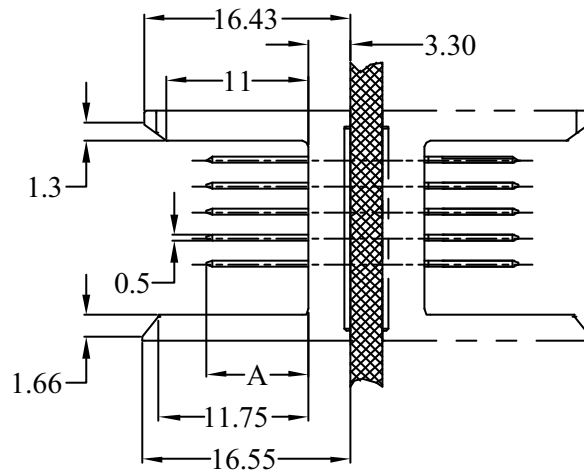
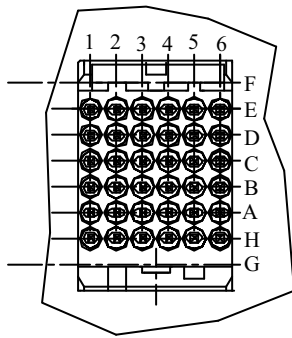
- Rear plug up- Header, Signal, straight, press-fit, page 135
- partnumber 70437-121LF
- partnumber 70437-126LF
- partnumber 70437-128LF

TYPICAL APPLICATIONS



Shroud, 5+2 row, wide body

PRODUCT



ELECTRICAL ENHANCED

PARTNUMBERS

70438 - 111LF

Base Part Number - **no.of positions** **LF**

70438 = Electrical Enhanced Shroud, wide body

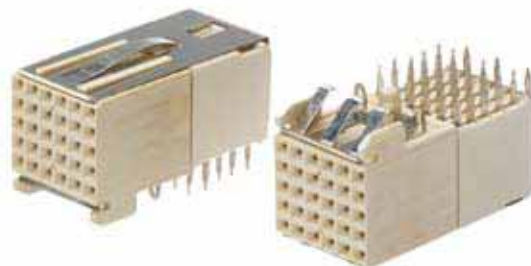
111 = 1 module, 5 x 6 positions

LF = lead free

Receptacle, 5+2 row, signal, right angle, press fit

FEATURES

- 5 row Receptacle
- 2 row Shielding, because of die-cast housing all signal pins are surrounded by a ground path, consequently reducing crosstalk and ground bounce.
- EMI of 15 dB
- Press-fit, eye of the needle contact



TECHNICAL DATA

PHYSICAL

- Housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- Contact material: Phosphor bronze
- Shielding material: Phosphor bronze
- Performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 65 N max. per pin
- press-fit pin withdrawal: 20 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to +125°C
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- Product specification GS-12-074
- Application specification TA-941

APPLICATION EQUIPMENT

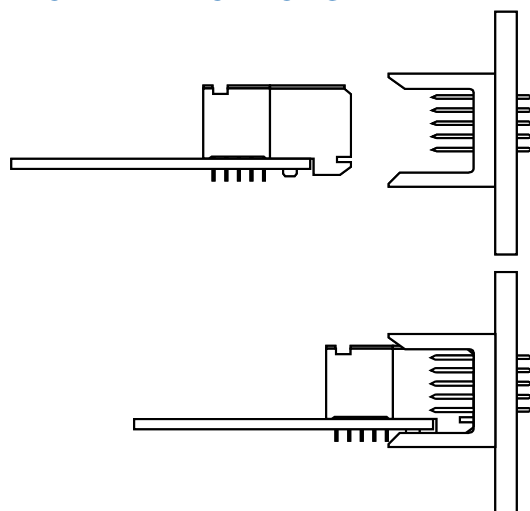
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

- Electrical Enhanced Header, Signal, straight, page 135

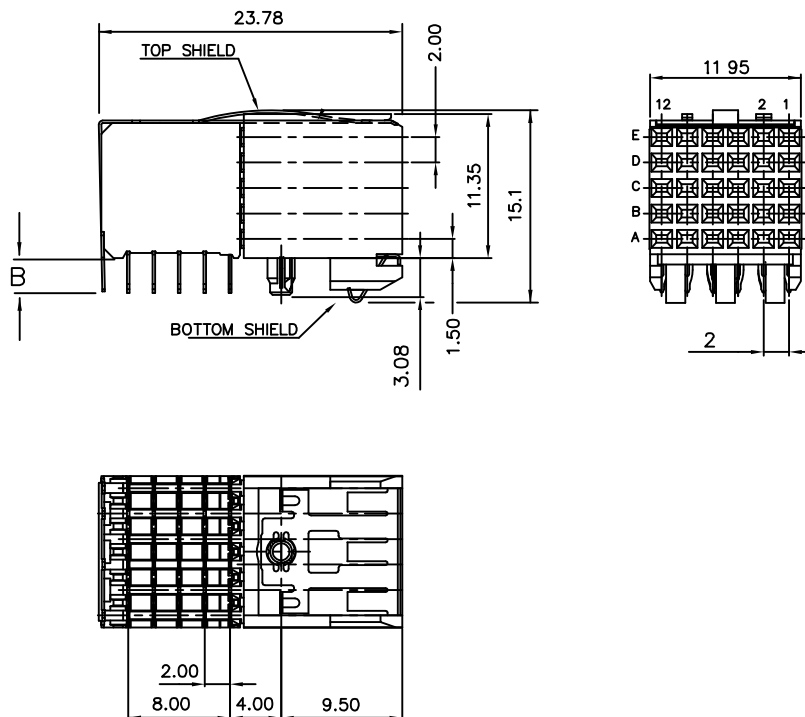
- part number 70437-111LF
- part number 70437-116LF
- part number 70437-118LF

TYPICAL APPLICATIONS



Receptacle, 5+2 row, signal, right angle, press fit

PRODUCT

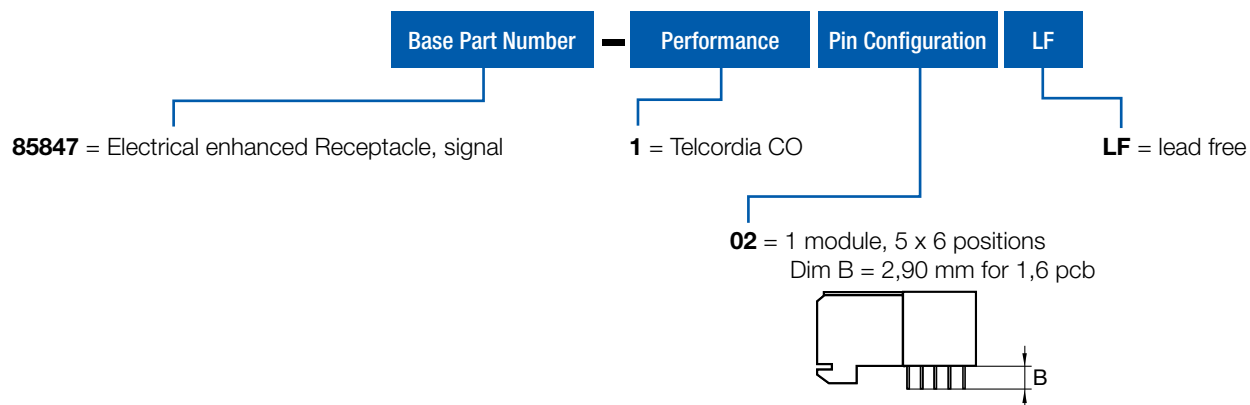


PCB pattern P2, see chapter PCB layouts

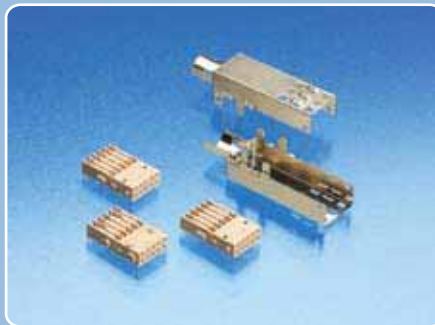
ELECTRICAL ENHANCED

PARTNUMBERS



85847 - 102LF







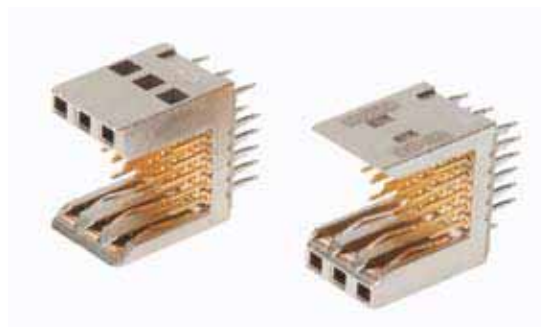
METRAL® SHIELDED SIGNAL CONNECTORS

-  Header, Straight, 5 row
-  Round cable connector

Shielded Header, 5 row, signal, straight, press-fit

FEATURES

- ▶ Because of die-cast housing all signal pins are surrounded by a ground path.
- ▶ EMI improved
- ▶ 5 row Header, 1 module
- ▶ active latching system
- ▶ Press-fit, eye of the needle contact



TECHNICAL DATA

PHYSICAL

- ▶ Housing: Die-cast zinc alloy
- ▶ Wafer material: glass filled LCP, UL 94 V-0, color natural
- ▶ Contact material: Phosphor bronze
- ▶ Ground spring material : copper-nickel-tin alloy
- ▶ Performance level: Telcordia CO

ELECTRICAL

- ▶ current rating: 1 A
- ▶ withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- ▶ insertion force: 0,45 N max. per individual signal contact (mating)
- ▶ withdrawal force: 0,15 N max. per individual signal contact (unmating)
- ▶ press-fit contact insertion: 65 N max. per pin
- ▶ press-fit pin withdrawal: 20 N min. per pin
- ▶ recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- ▶ Operating temperature range: -55°C to +125°C
- ▶ RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- ▶ standard: tubes

PROCESSING INFORMATION

- ▶ press fit

REFERENCE DATA

- ▶ Product specification GS-12-135

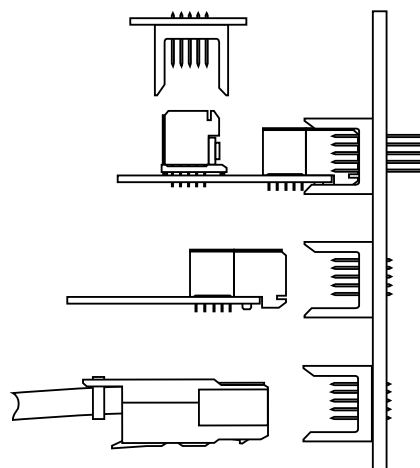
APPLICATION EQUIPMENT

- ▶ for application equipment, check out the application equipment table on page 217-223

MATING DATA

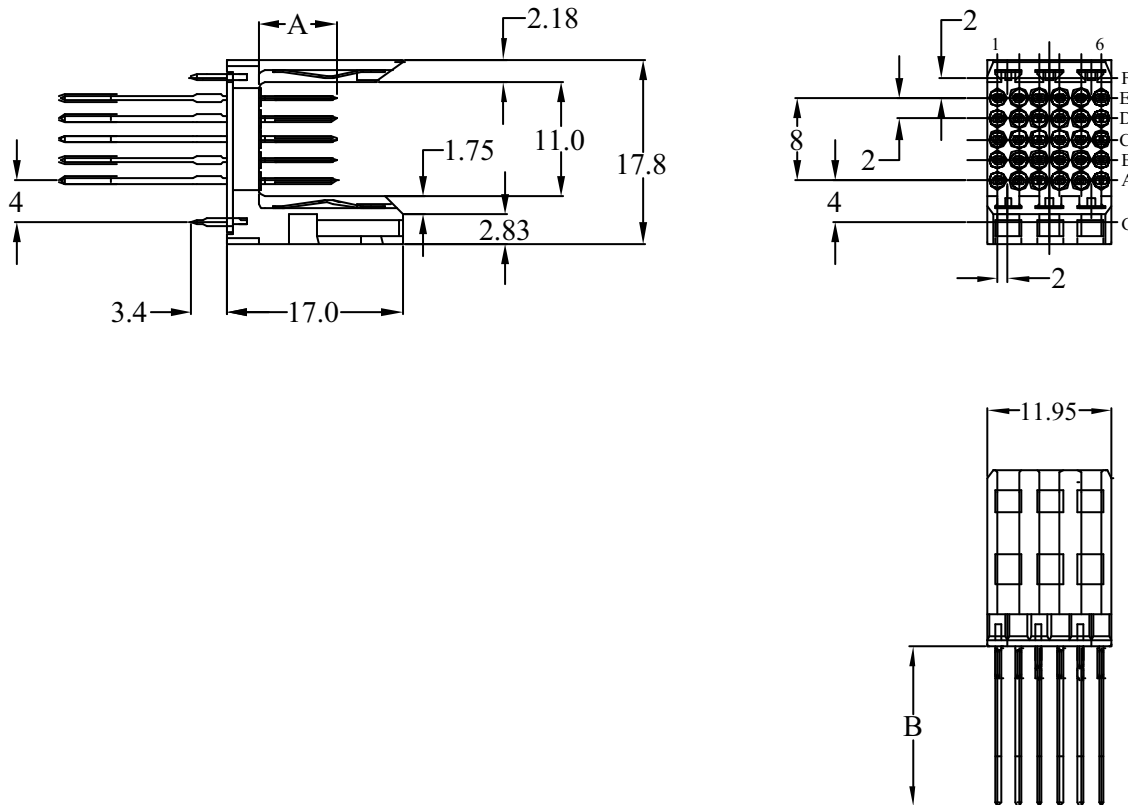
- ▶ **Round Cable connector, Shielded**
 - ▶ 5 x 6 pos. part number 85706-xxxxLF, page 145
- ▶ **Cable Connector**
 - ▶ 5 row, part number 72478-1111LF, page 175
- ▶ **Receptacle, 5 row**
 - ▶ Right angle, press-fit, part number 89047-102LF, page 45
 - ▶ Straight, press-fit, part number 85761-1101LF, page 79

TYPICAL APPLICATIONS



Header, 5 row, signal, straight, press-fit

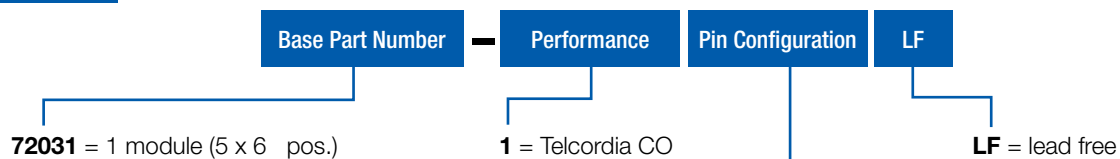
PRODUCT



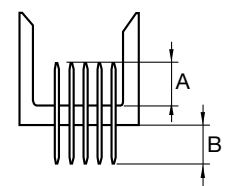
PCB pattern P15, see chapter PCB layouts

PARTNUMBERS

72031 - 1yyLF



| yy | mating length (A) | tail length (B) |
|--------------------------------|-------------------|-----------------|
| 11 | 6,50 mm | 4,30 mm |
| 16 | 5,75 mm | 4,30 mm |
| first-make last-brake 14 | row A = 5,75 mm | 4,30 mm |
| | row B = 5,75 mm | 4,30 mm |
| | row C = 7,25 mm | 4,30 mm |
| | row D = 5,75 mm | 4,30 mm |
| | row E = 5,75 mm | 4,30 mm |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Shielded Cable Connector, 5 row, signal

FEATURES

- ▶ 5 row , 1 module Round Cable Connector
- ▶ Heat Shrink or Crimp Ring version
- ▶ EMI improved
- ▶ Active latching system
- ▶ AWG size 24,26,28 and 30
- ▶ Reliable dual beam contact
- ▶ IDC wire termination

TECHNICAL DATA

PHYSICAL

- ▶ Housing: glass filled thermoplastic polyester, color grey
- ▶ Latch: polycarbonate, color black, UL 94 V-0
- ▶ Cover: copper-nickel-tin alloy
- ▶ Contact material: Phosphor bronze
- ▶ Performance level: Telcordia CO

ELECTRICAL

- ▶ current rating: 1 A
- ▶ withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- ▶ insertion force: 0,645 N max. per individual signal contact (mating)
- ▶ withdrawal force: 0,36 N max. per individual signal contact (unmating)

ENVIRONMENTAL

- ▶ Operating temperature range: -55°C to +125°C
- ▶ RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

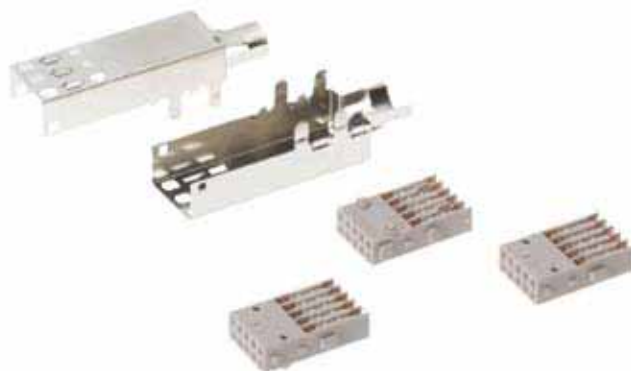
- ▶ Kits, bags of 100 pcs

REFERENCE DATA

- ▶ application specification GES-20-003

APPLICATION EQUIPMENT

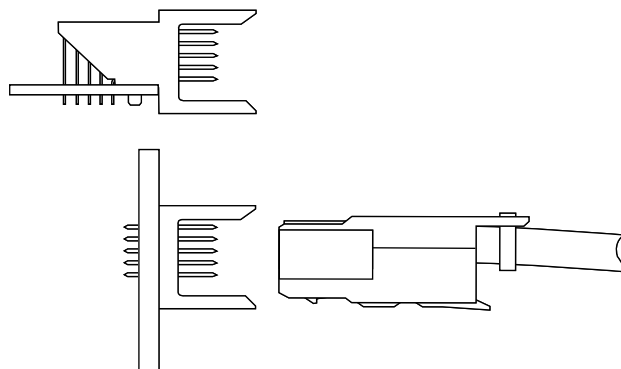
- ▶ for application equipment, check out the application equipment table on page 217-223



MATING DATA

- ▶ Shielded Header, straight, press-fit, wide body, page 143
 - ▶ part number 72031-116LF
- ▶ Header, straight, press-fit, wide body, page 41
 - ▶ part number 89006-116LF
- ▶ Header, right angle, press-fit, wide body, page 73
 - ▶ part number HM151LDP000H6PLF

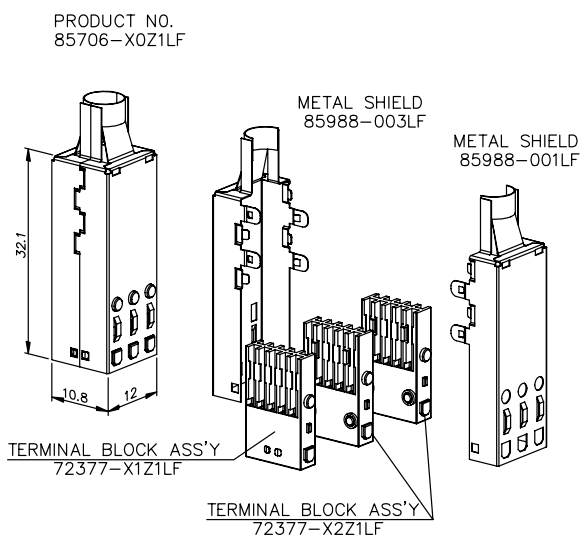
TYPICAL APPLICATIONS



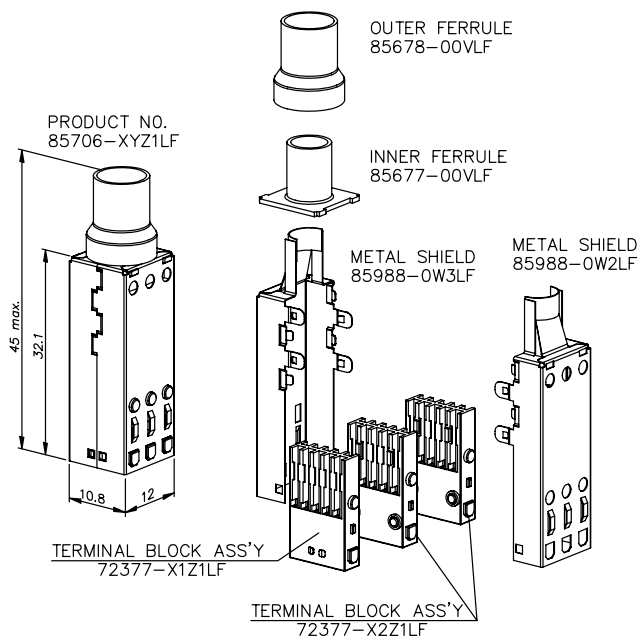
Shielded Cable Connector, 5 row, signal

PRODUCT

Heat shrink version

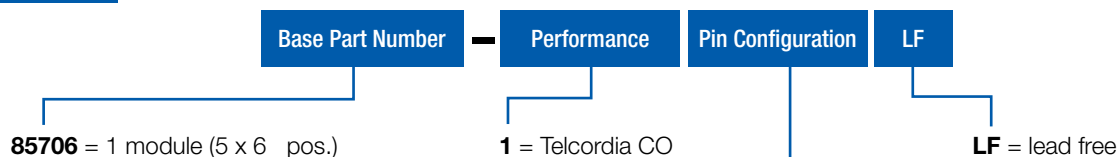


Crimped version



PARTNUMBERS

85706 - 1yz1LF





| | |
|--------------|--|
| yz1 | |
| y = 0 | heat shrink version |
| y = 2 | crimped version inner ferrule 8 mm dia. outer ferrule 10 mm dia. |
| z = 1 | AWG size: 26 to 24 AWG |
| z = 2 | AWG size: 30 to 28 AWG |





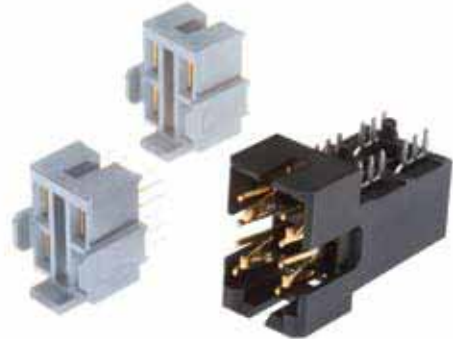
METRAL® HIGH POWER CONNECTORS

-  Header, High Power
-  Receptacle, High Power

Header, High Power

FEATURES

- Available in 1x2 or 2x2 contact configurations
- Rated for up to 80 Amps current for a single module
- Voltage Rating: 150V
- Receptacle connectors can be provided with two contact lengths to enable first-mate/last break sequencing
- Protected backplane receptacle connector is UL 60950 (Finger Probe) compliant
- Layout compatible with Metral 2mm backplane connector family
- Press-fit termination



TECHNICAL DATA

PHYSICAL

- Contacts: Copper Alloy
- Plating:
 - Gold over nickel on separable interface
 - Tin-lead over nickel on press-fit tails
- Housing: High temperature thermoplastic, UL 94V-0 compliant
- Performance level Telcordia CO

ELECTRICAL (see table below)

MECHANICAL PERFORMANCE

- Mating force: 31.2N max per connector
- Unmating force: 9.0N min per connector
- Press-fit insertion force: 67N max per individual contact tail

PACKAGING

- Tubes

PROCESSING INFORMATION

- Applicable process: wave/IR / vapor phase

REFERENCE DATA

- Product Specification GS-12-220
- Application Specification GS-20-023
- Safety UL 60950 & IEC 60950-1 Prevention of Operator Access to Energized Parts

MATING DATA

Receptacle, page 151

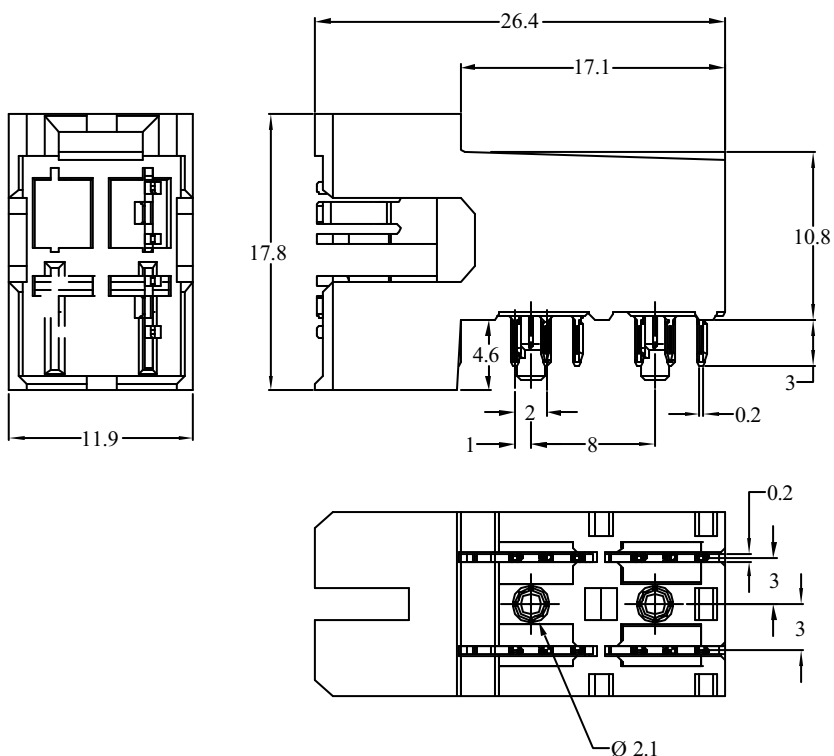
- Vertical receptacle, 8,0 mm mating length, 10009536-001
- Vertical receptacle, 6,5 mm mating length, 10009536-002
- Vertical receptacle, fmlb, 10025058-XXXX

ELECTRICAL

| number of connectors, Fully powered | copper pad weight | Current ratings (max. Amps per contact) | |
|--|--------------------|---|-------|
| | | 1 x 2 | 2 x 2 |
| 1 | 5 oz, double sided | 40 | 20 |
| up to 5 adjacent | 5 oz, double sided | 32 | 14 |
| 1 | 2 oz, double sided | 32 | 15 |
| up to 5 adjacent | 2 oz, double sided | 27 | 12 |

Header, High Power

PRODUCT



PCB pattern P23, see chapter PCB layouts

PARTNUMBERS

10009542-001LF

10009556-001LF

Base Part Number

Configuration

LF

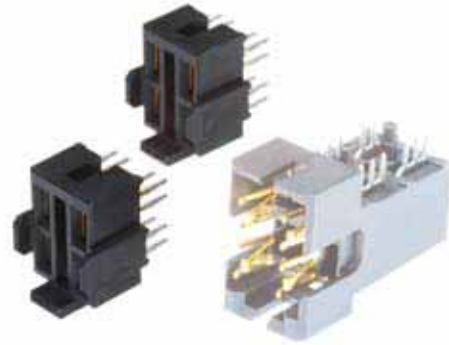
LF = lead free

| part number | Description |
|----------------|----------------------------------|
| 10009542-001LF | Right-angle header, 2x2 Contacts |
| 10009556-001LF | Right-angle header, 1x2 Contacts |

Receptacle, High Power

FEATURES

- Available in 1x2 or 2x2 contact configurations
- Rated for up to 80 Amps current for a single module
- Voltage Rating: 150V
- Receptacle connectors can be provided with two contact lengths to enable first-mate/last break sequencing
- Protected backplane receptacle connector is UL 60950 (Finger Probe) compliant
- Layout compatible with Metral 2mm backplane connector family
- Press-fit termination



TECHNICAL DATA

PHYSICAL

- Contacts: Copper Alloy
- Plating:
 - Gold over nickel on separable interface
 - Tin-lead over nickel on press-fit tails
- Housing: High temperature thermoplastic, UL 94V-0 compliant
- Performance level Telcordia CO

ELECTRICAL (see table below)

MECHANICAL PERFORMANCE

- Mating force: 31.2N max per connector
- Unmating force: 9.0N min per connector
- Press-fit insertion force: 67N max per individual contact tail

PACKAGING

- Tubes

PROCESSING INFORMATION

- Applicable process: wave/IR / vapor phase

REFERENCE DATA

- Product Specification GS-12-220
- Application Specification GS-20-023
- Safety UL 60950 & IEC 60950-1 Prevention of Operator Access to Energized Parts

MATING DATA

Header, page 149

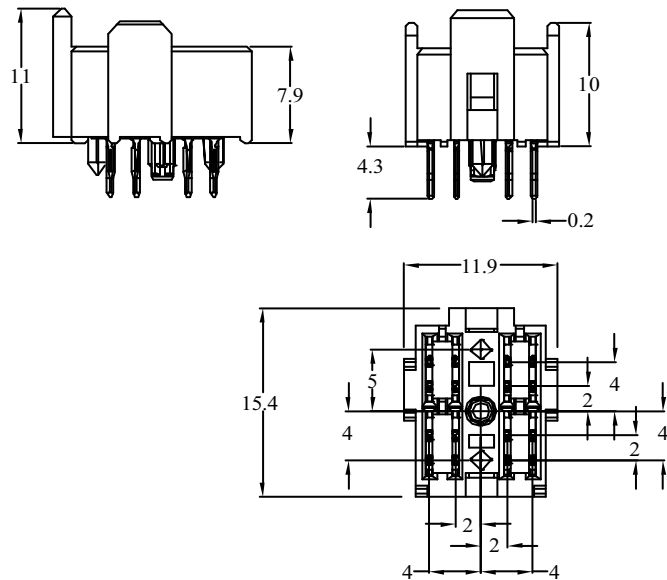
- right angle header, 2 x 2 contacts, partnumber, 10009452-001
- right angle header, 1 x 2 contacts, partnumber, 10009556-001

ELECTRICAL

| number of connectors, Fully powered | copper pad weight | Current ratings (max. Amps per contact) | |
|-------------------------------------|--------------------|---|-------|
| | | 1 x 2 | 2 x 2 |
| 1 | 5 oz, double sided | 40 | 20 |
| up to 5 adjacent | 5 oz, double sided | 32 | 14 |
| 1 | 2 oz, double sided | 32 | 15 |
| up to 5 adjacent | 2 oz, double sided | 27 | 12 |

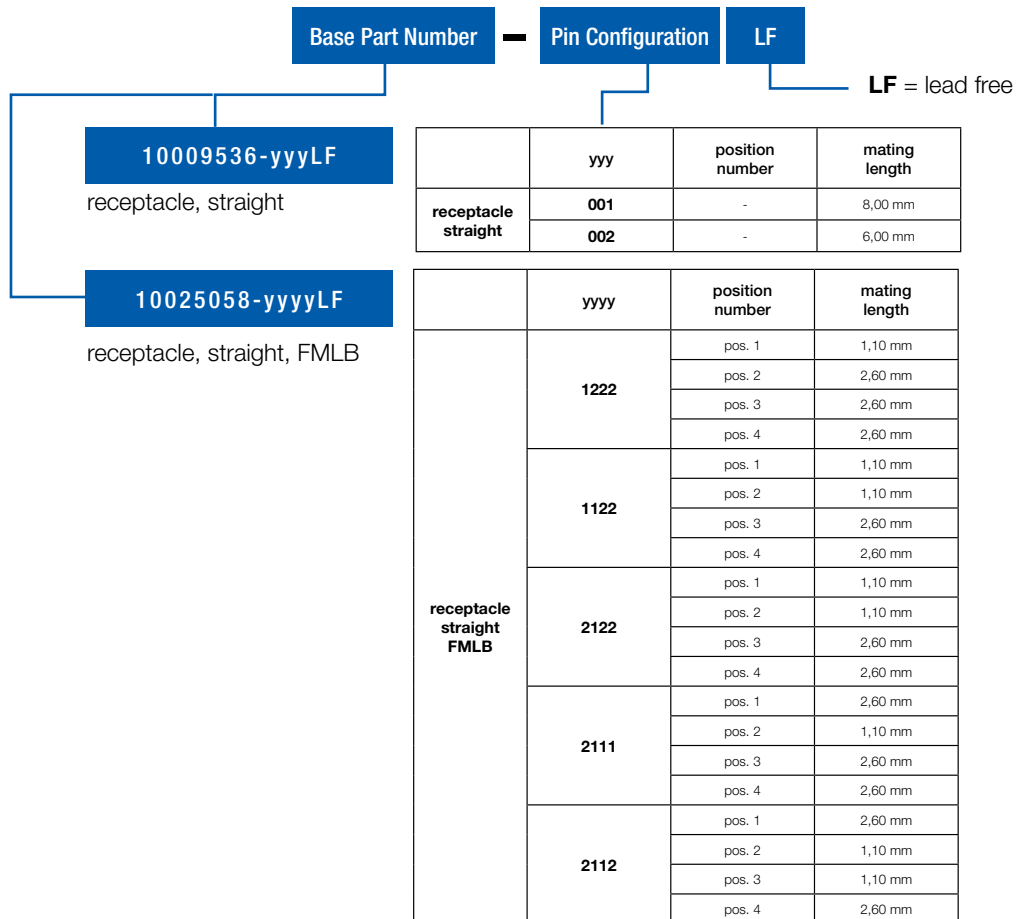
Receptacle, High Power

PRODUCT

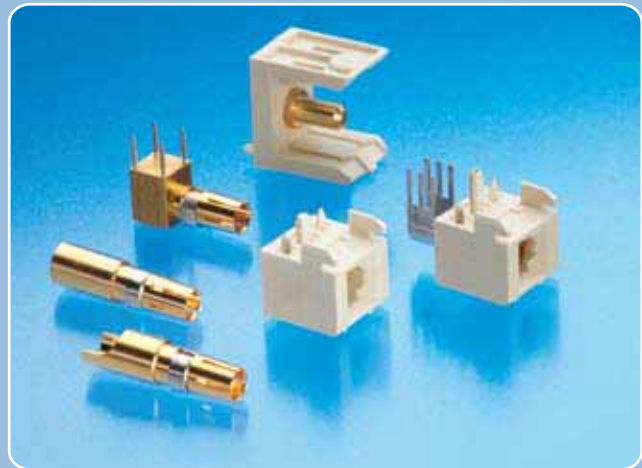


PCB pattern P24, see chapter PCB layouts

PARTNUMBERS







METRAL® HYBRID CONNECTORS

-  DIN Standard High Power
-  Mini Power
-  DIN Standard Coax
-  Mini Coax

Header, straight, DIN standard, High Power

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- Insert according to DIN 41626
- Insert quality tested according to MIL-Std-202 and BS 9525 F0011



TECHNICAL DATA

PHYSICAL

- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- contact material: Beryllium Copper
- performance level: Telcordia CO

ELECTRICAL

- current rating: up to 40 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- Recommended hole diameter: $1,00 \pm 0,1 \text{ mm}$

ENVIRONMENTAL

- Operating temperature -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard boxes/bags

PROCESSING INFORMATION

- Applicable process: assemble to board

APPLICATION EQUIPMENT

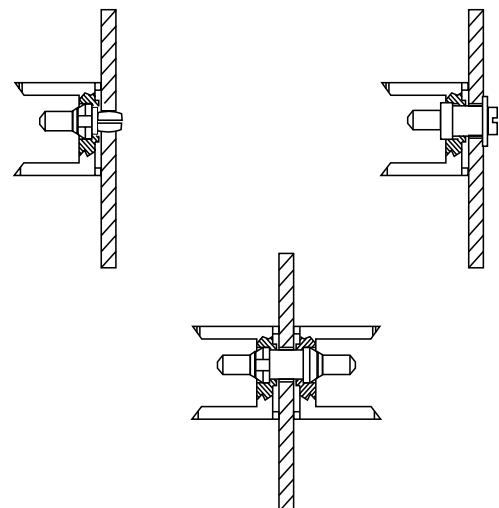
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

- Hybrid DIN standard receptacle, High power right angle, page 157

- Receptacle power insert right angle, solder to board 85995-103LF
- Receptacle power insert, right angle, solder to board , feed-through 70424-003LF

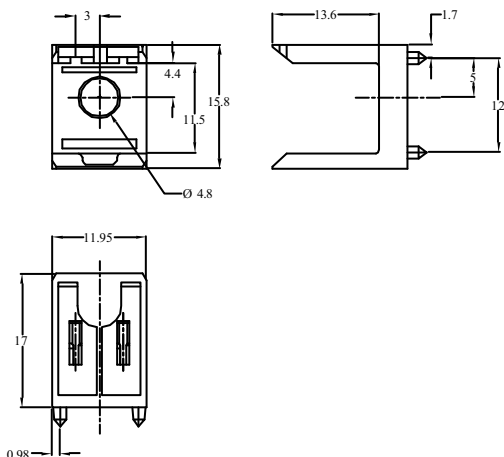
TYPICAL APPLICATIONS



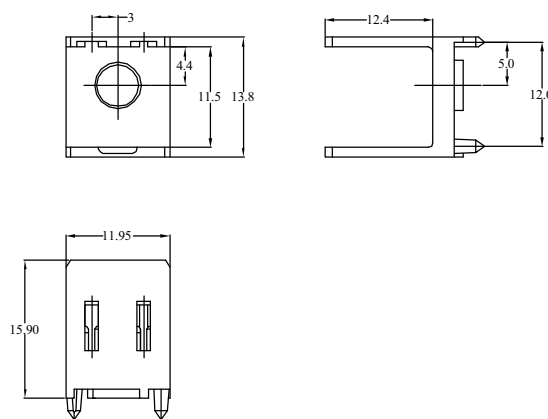
Header, straight, DIN standard, High Power

PRODUCT

Wide Body Housing

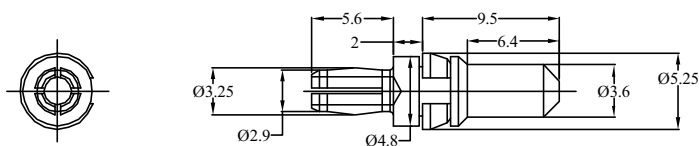


Narrow Body Housing

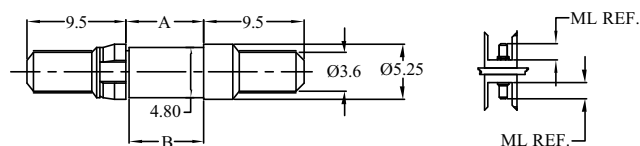


PCB pattern P9, see chapter PCB layouts

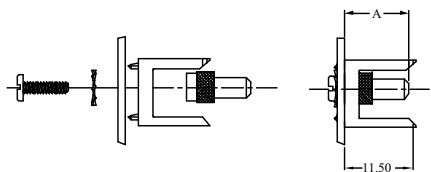
Power insert, straight, press fit



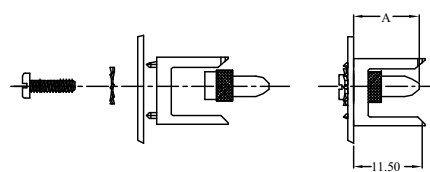
Power coupler



Screw to board, high power straight plug



POWER PIN ASSEMBLY
STYLE A



POWER PIN ASSEMBLY
STYLE B

PARTNUMBERS

Housings

| Partnumber | Description |
|-------------|---------------------|
| 70290-001LF | narrow body housing |
| 88911-101LF | wide body housing |

Power inserts

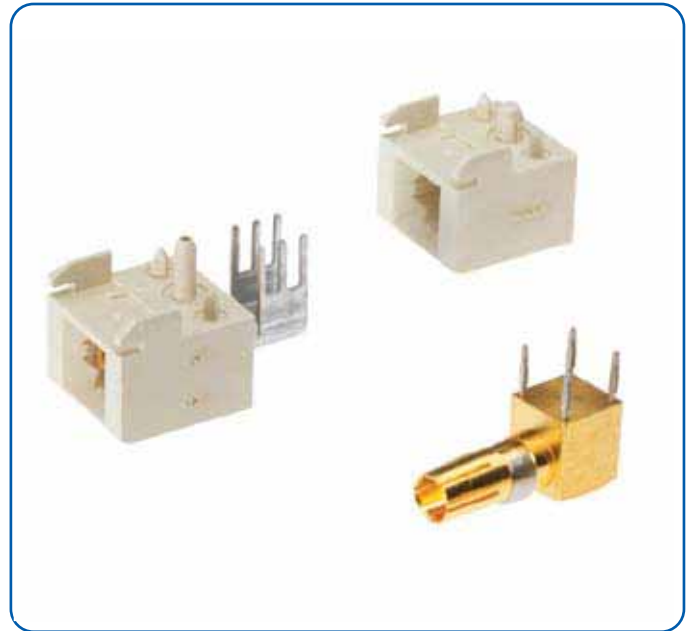
| Partnumber | Description | Current rating | PCB thickness |
|-------------|---------------------------------|----------------|---------------|
| 85977-001LF | power insert straight press-fit | 30 A | - |
| 70201-001LF | power coupler | 40 A | 1,6 mm |

| Partnumber | Description | mating length | dimension A |
|-------------|---|---------------|-------------|
| 91570-001LF | screw to board high power straight plug | 8,00 mm | 11,50 mm |

Receptacle, Right angle, DIN standard, High Power

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- Insert according to DIN 41626
- Insert quality tested according to MIL-Std-202 and BS 9525 F0011



TECHNICAL DATA

PHYSICAL

- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- contact material: Beryllium Copper
- performance level: Telcordia CO

ELECTRICAL

- current rating: up to 40 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- Recommended hole diameter: $1,00 \pm 0,1 \text{ mm}$

ENVIRONMENTAL

- Operating temperature -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- Standard boxes/bags

PROCESSING INFORMATION

- Applicable process: wave / IR / vapor phase / press-fit

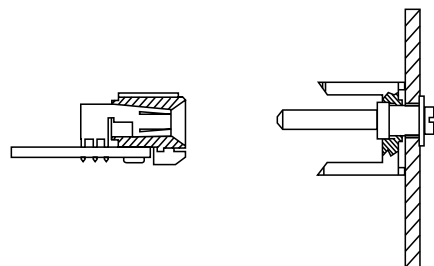
APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

- High power plug insert, page 155
- partnumber, 91570-001LF

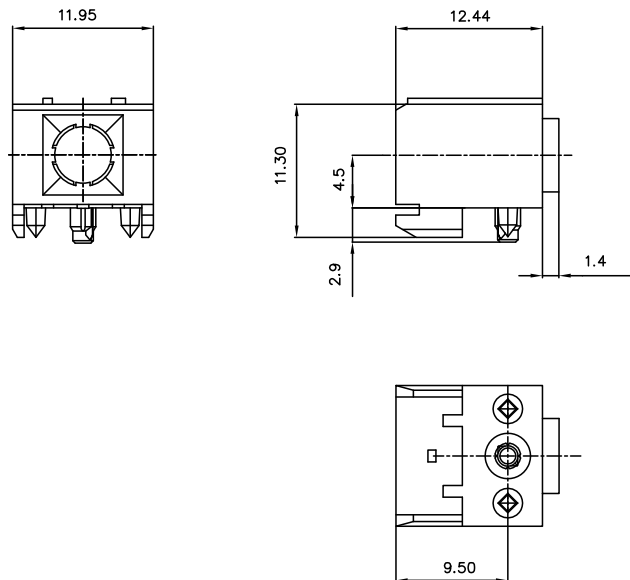
TYPICAL APPLICATIONS



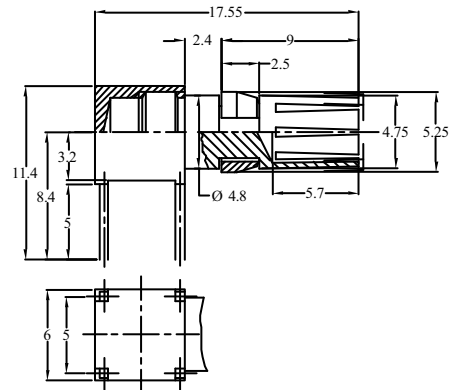
Receptacle, Right angle, DIN standard, High Power

PRODUCT

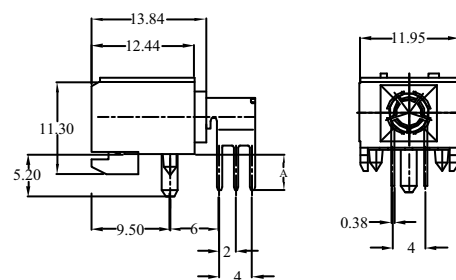
Housings



Power inserts



KIT, pre-assembled housings & inserts



PCB pattern P8 / P10, see chapter PCB layouts

PARTNUMBERS

Housings

| Partnumber | Description | Feature |
|-------------|--------------------|-----------|
| 89092-101LF | receptacle housing | press-peg |

Power inserts

| Partnumber | Description | Current rating | PCB thickness |
|-------------|--|----------------|---------------|
| 85995-103LF | receptacle power insert right angle solder to board | 40 A | - |

KIT, pre-assembled housings & inserts

| Partnumber | Description | Current rating | PCB thickness |
|-------------|---|----------------|---------------|
| 70424-003LF | receptacle power insert RA solder to board, feed through | 30 A | 1,6 mm |

Header, Mini power

FEATURES

- ▶ In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- ▶ Insert according to DIN 41626
- ▶ Insert quality tested according to MIL-Std-202 and BS 9525 F0011

TECHNICAL DATA

PHYSICAL

- ▶ Housing material: glass filled LCP
- ▶ Flammability rating: UL 94 V-0
- ▶ Insert material shell Copper zinc 39 Pb 2
- ▶ Spring : Beryllium copper
- ▶ Insulator: PTFE Teflon
- ▶ Clip: BerylliumCopper
- ▶ Performance level Telcordia CO

ELECTRICAL (see table below)

MECHANICAL PERFORMANCE

- ▶ Insertion force, 0.9 N
- ▶ Extraction Force 0.9 N

PACKAGING

- ▶ Standard boxes/bags

PROCESSING INFORMATION

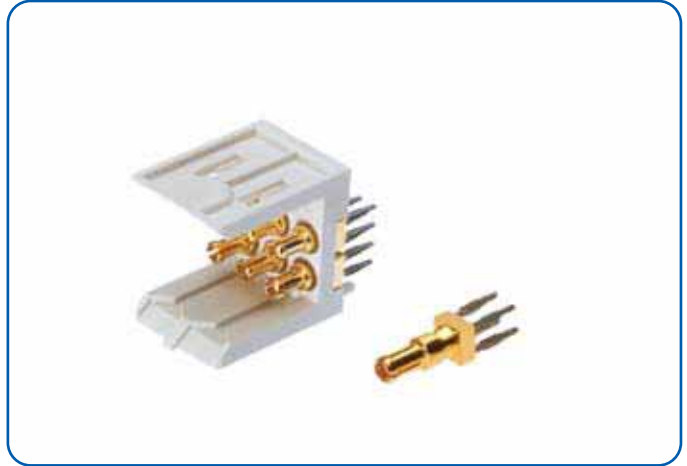
- ▶ Applicable process: wave/IR / vapor phase / press-fit

REFERENCE DATA

- ▶ Application Specification TA-0941

APPLICATION EQUIPMENT

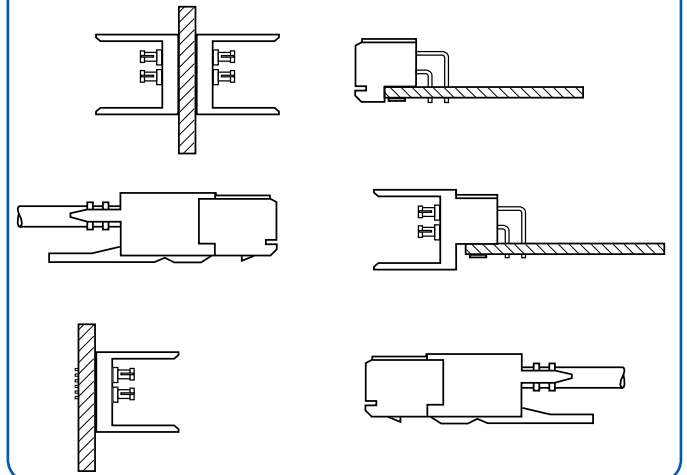
- ▶ for application equipment, check out the application equipment table on page 217-223



MATING DATA

- ▶ Housing, page 161
 - ▶ partnumber 70244-102
- ▶ Insert, page 161
 - ▶ partnumber 85976-001LF
 - ▶ partnumber 85976-002 LF

TYPICAL APPLICATIONS



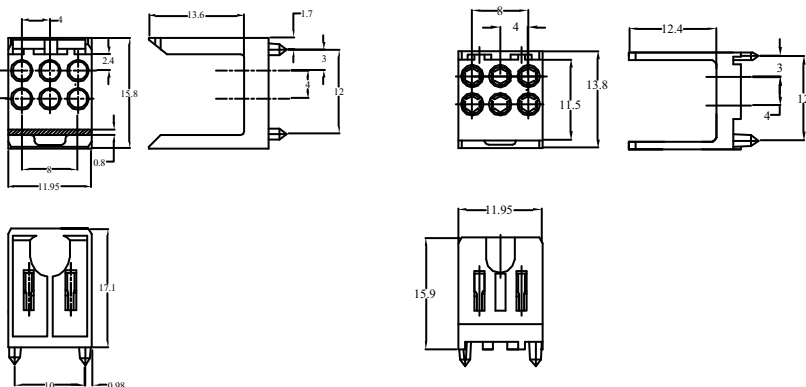
ELECTRICAL

| | | |
|--|--|-----------------------------------|
| Electrical characteristic impedance | 50 Ω | 75 Ω |
| Working frequency | 0 - 10 GHz | 0 - 1,5 GHz |
| Reflection coefficient | max.0,05 up to 1 GHz; max. 0,01 up to 10 Ghz | max.0,01 up to 1,5 GHz |
| Peak voltage | 750 V eff. | 750 V eff. |
| Operating voltage | 250 V eff. | 250 V eff. |
| Insulation resistance | 1 x 10 ³ MΩ initially, | 1 x 10 ³ MΩ initially, |
| Temperature range | -65°C to +165°C | -65°C to +165°C |

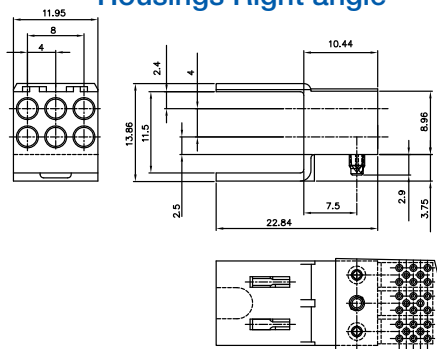
Header, Mini power

PRODUCT

Housings Straight

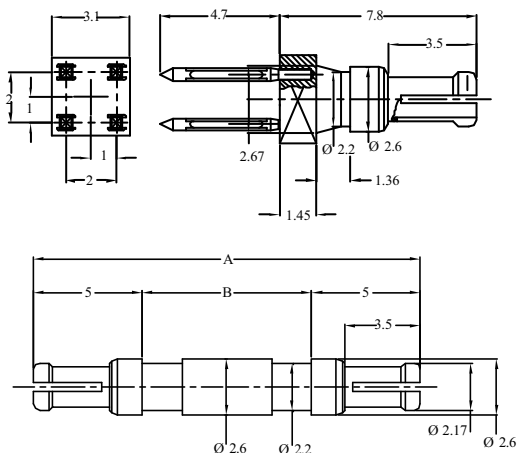


Housings Right angle

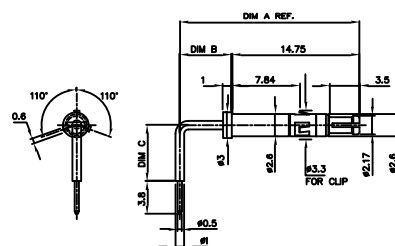


PCB pattern P12, see chapter PCB layouts

Inserts Straight



Inserts Right angle



PARTNUMBERS

Housings Straight

| Partnumber | Description |
|--------------------|---------------------------------------|
| 88913-111LF | 6 position STR header-wide body-STB |
| 70243-111LF | 6 position STR header-narrow body-STB |

Inserts Straight

| Partnumber | Description | (tail) length | PCB thickness |
|--------------------|---------------------------|---------------|---------------|
| 85973-001LF | Mini power STR insert- PF | 4,45 mm | - |
| 85972-001LF | Mini power plug/coupler | 17,40 mm | 1,6 mm |

Housings Right angle

| Partnumber | Description |
|--------------------|--------------------------------|
| 88982-102LF | 6 position RA header-press peg |

Inserts Right angle

| Partnumber | Description | Tail length | PCB thickness |
|--------------------|-----------------------------|-------------|---------------|
| 85975-001LF | Mini power RA insert, row A | 3,8 mm | 2,4 mm |
| 85975-002LF | Mini power RA insert, row B | 3,8 mm | 2,4 mm |

RA = right angle, STR = straight, STB = solder-to-board, PF = press-fit

Receptacle, Mini Power

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- Insert according to DIN 41626
- Insert quality tested according to MIL-Std-202 and BS 9525 F0011



TECHNICAL DATA

PHYSICAL

- Housing material: glass filled LCP
- Flammability rating: UL 94 V-0
- Insert material shell Copper zinc 39 Pb 2
- Spring : Beryllium copper
- Insulator: PTFE Teflon
- Clip: BerylliumCopper
- Performance level Telcordia CO

ELECTRICAL (see table below)

MECHANICAL PERFORMANCE

- Insertion force, 0.9 N
- Extraction Force 0.9 N

PACKAGING

- Standard boxes/bags

PROCESSING INFORMATION

- Applicable process: wave/IR / vapor phase

REFERENCE DATA

- Application Specification TA-0941

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

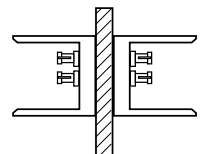
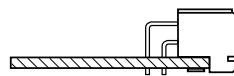
■ Straight, page 159

- housing, partnumber 88913-111LF
- insert, partnumber 85973-001LF

■ Right angle, page 159

- housing, partnumber 88982-102LF
- insert, partnumber 85975-001LF
- insert, partnumber 85975-002LF

TYPICAL APPLICATIONS



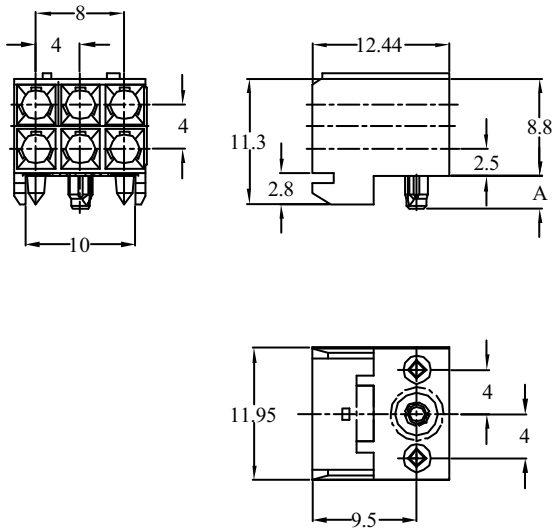
ELECTRICAL

| | | |
|--|--|-----------------------------------|
| Electrical characteristic impedance | 50 Ω | 75 Ω |
| Working frequency | 0 - 10 GHz | 0 - 1,5 GHz |
| Reflection coefficient | max.0,05 up to 1 GHz; max. 0,01 up to 10 Ghz | max.0,01 up to 1,5 GHz |
| Peak voltage | 750 V eff. | 750 V eff. |
| Operating voltage | 250 V eff. | 250 V eff. |
| Insulation resistance | 1 x 10 ³ MΩ initially, | 1 x 10 ³ MΩ initially, |
| Temperature range | -65°C to +165°C | -65°C to +165°C |

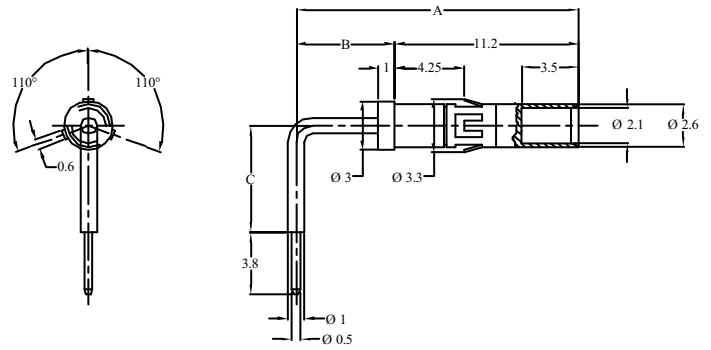
Receptacle, Mini Power

PRODUCT

Housings



Inserts



PCB pattern P20, see chapter PCB layouts

PARTNUMBERS

Housings

| Partnumber | Description |
|-------------|-----------------------|
| 70244-102LF | 6 position RA housing |

Inserts

| Partnumber | Description | tail length | PCB thickness |
|-------------|---|-------------|---------------|
| 85976-001LF | Mini power RA insert- 2 position, row A | 3,8 mm | 2,6 mm |
| 85976-002LF | Mini power RA insert- 2 position, row B | 3,8 mm | 2,4 mm |

RA = right angle, STR = straight, STB = solder-to-board, PF = press-fit

Header, straight, DIN standard, Coax

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- Insert according to DIN 41626
- Insert quality tested according to MIL-Std-202 and BS 9525 F0011



TECHNICAL DATA

PHYSICAL

- Housing material: glass filled LCP
- Flammability rating: UL 94 V-0
- Insert material shell Copper zinc 39 Pb 2
- Spring : Beryllium copper
- Insulator: PTFE Teflon
- Clip: BerylliumCopper
- Performance level Telcordia CO

ELECTRICAL (see table below)

MECHANICAL PERFORMANCE

- Insertion force, 0.9 N
- Extraction Force 0.9 N

PACKAGING

- Standard boxes/bags

PROCESSING INFORMATION

- Applicable process: assemble to board

REFERENCE DATA

- Application Specification TA-0941

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

MATING DATA

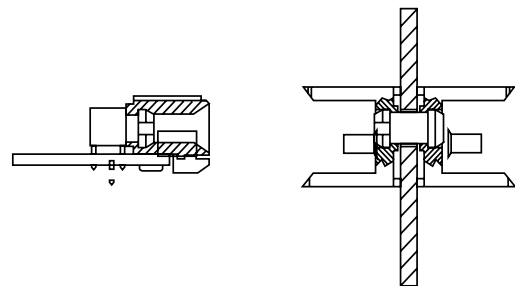
Right angle, solder to board, page 165

- housing, partnumber 89092-101LF
- insert, partnumber 93904-001LF

Right angle, press-fit, page 165

- housing, partnumber 89082-101LF
- insert, partnumber 72096-101LF

TYPICAL APPLICATIONS



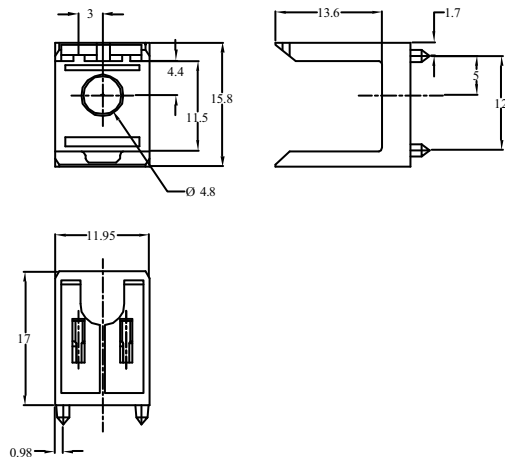
ELECTRICAL

| | | |
|--|--|-----------------------------------|
| Electrical characteristic impedance | 50 Ω | 75 Ω |
| Working frequency | 0 - 10 GHz | 0 - 1,5 GHz |
| Reflection coefficient | max.0,05 up to 1 GHz; max. 0,01 up to 10 Ghz | max.0,01 up to 1,5 GHz |
| Peak voltage | 750 V eff. | 750 V eff. |
| Operating voltage | 250 V eff. | 250 V eff. |
| Insulation resistance | 1 x 10 ³ MΩ initially, | 1 x 10 ³ MΩ initially, |
| Temperature range | -65°C to +165°C | -65°C to +165°C |

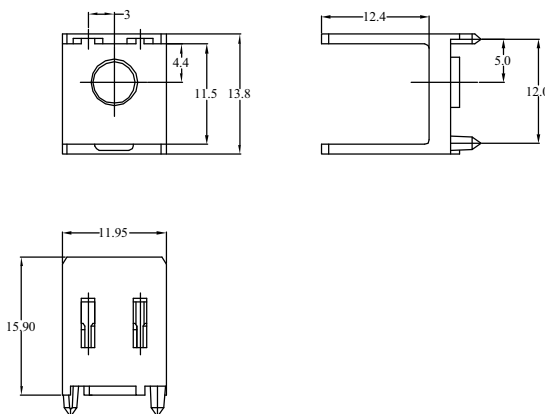
Header, straight, DIN standard, Coax

PRODUCT

Wide Body Housing

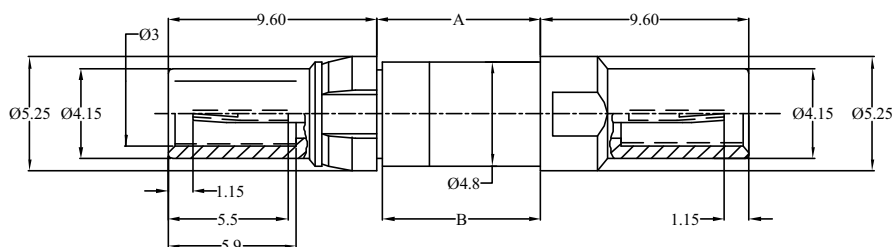


Narrow Body Housing



PCB pattern P9, see chapter PCB layouts

Coax inserts



PARTNUMBERS

Housings

| Partnumber | Description |
|--------------------|------------------------|
| 70290-001LF | Header STR-narrow body |
| 88911-101LF | Header STR-wide body |

Coax inserts

| Partnumber | Description | impedance | length | PCB thickness |
|--------------------|------------------------------------|-----------|---------|---------------|
| 70200-005LF | receptacle/receptacle coax coupler | 50 Ω | 28,4 mm | 4,8 mm |
| 70212-005LF | receptacle/receptacle coax coupler | 75 Ω | 28,3 mm | 4,8 mm |

RA = right angle, STR = straight, STB = solder-to-board, PF = press-fit

Receptacle, right angle, DIN standard, Coax

FEATURES

- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- Insert according to DIN 41626
- Insert quality tested according to MIL-Std-202 and BS 9525 F0011

TECHNICAL DATA

PHYSICAL

- Housing material: glass filled LCP
- Flammability rating: UL 94 V-0
- Insert material shell Copper zinc 39 Pb 2
- Spring : Beryllium copper
- Insulator: PTFE Teflon
- Clip: BerylliumCopper
- Performance level Telcordia CO

ELECTRICAL (see table below)

MECHANICAL PERFORMANCE

- Insertion force, 0.9 N
- Extraction Force 0.9 N

PACKAGING

- Standard boxes/bags

PROCESSING INFORMATION

- Applicable process: wave/IR / vapor phase / press-fit

REFERENCE DATA

- Application Specification TA-0941

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223

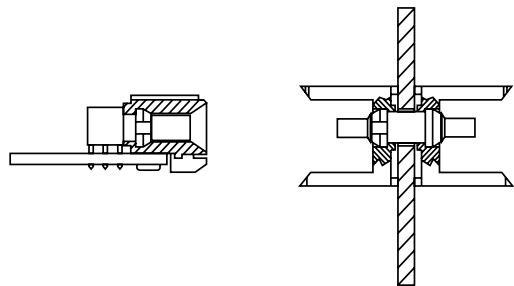


MATING DATA

- Hybrid DIN standard receptacle, coax, page 163

- housing, partnumber 88911-101LF
- coupler, partnumber 70200-001LF

TYPICAL APPLICATIONS



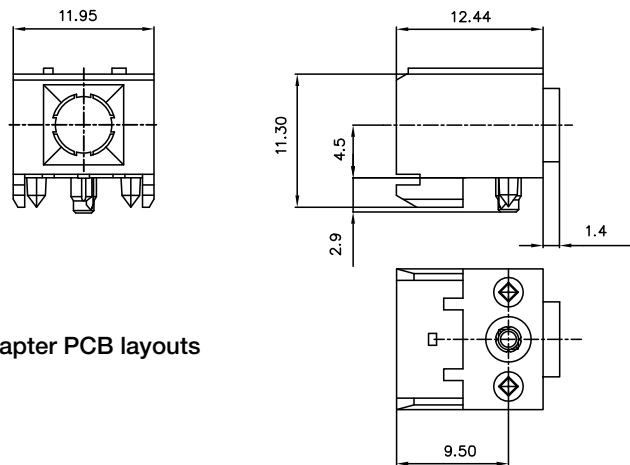
ELECTRICAL

| | | |
|--|--|-----------------------------------|
| Electrical characteristic impedance | 50 Ω | 75 Ω |
| Working frequency | 0 - 10 GHz | 0 - 1,5 GHz |
| Reflection coefficient | max.0,05 up to 1 GHz; max. 0,01 up to 10 Ghz | max.0,01 up to 1,5 GHz |
| Peak voltage | 750 V eff. | 750 V eff. |
| Operating voltage | 250 V eff. | 250 V eff. |
| Insulation resistance | 1 x 10 ³ MΩ initially, | 1 x 10 ³ MΩ initially, |
| Temperature range | -65°C to +165°C | -65°C to +165°C |

Receptacle, right angle, DIN standard, Coax

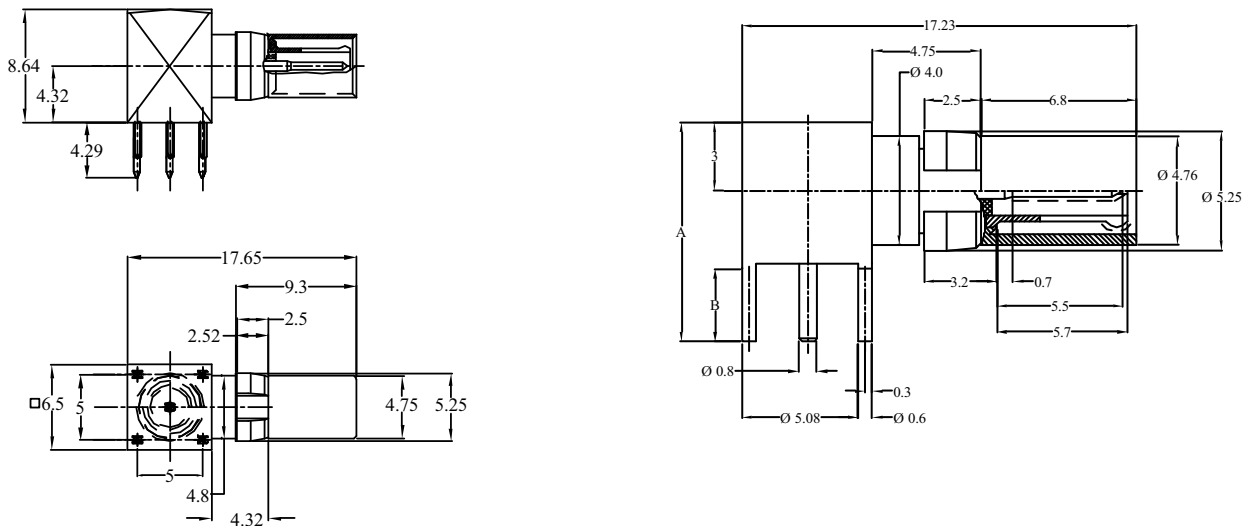
PRODUCT

Housings



PCB pattern P10, see chapter PCB layouts

Coax inserts



PARTNUMBERS

Housings

| Partnumber | Description |
|-------------|------------------------|
| 89092-101LF | receptacle housing STR |

Coax inserts

| Partnumber | Description | impedance |
|-------------|----------------------------|-----------|
| 93904-001LF | header coax insert STR stb | 50 Ω |
| 93903-001LF | header coax insert STR stb | 75 Ω |
| 72096-101LF | header coax insert STR pf | 50 Ω |

RA = right angle, STR = straight, STB = solder-to-board, PF = press-fit

Header, Mini Coax

FEATURES

- ▶ In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- ▶ Insert according to DIN 41626
- ▶ Insert quality tested according to MIL-Std-202 and BS 9525 F0011

TECHNICAL DATA

PHYSICAL

- ▶ Housing material: glass filled LCP
- ▶ Flammability rating: UL 94 V-0
- ▶ Insert material shell Copper zinc 39 Pb 2
- ▶ Spring : Beryllium copper
- ▶ Insulator: PTFE Teflon
- ▶ Clip: BerylliumCopper
- ▶ Performance level Telcordia CO

ELECTRICAL (see table below)

MECHANICAL PERFORMANCE

- ▶ Insertion force, 0.9 N
- ▶ Extraction Force 0.9 N

PACKAGING

- ▶ Standard boxes/bags

PROCESSING INFORMATION

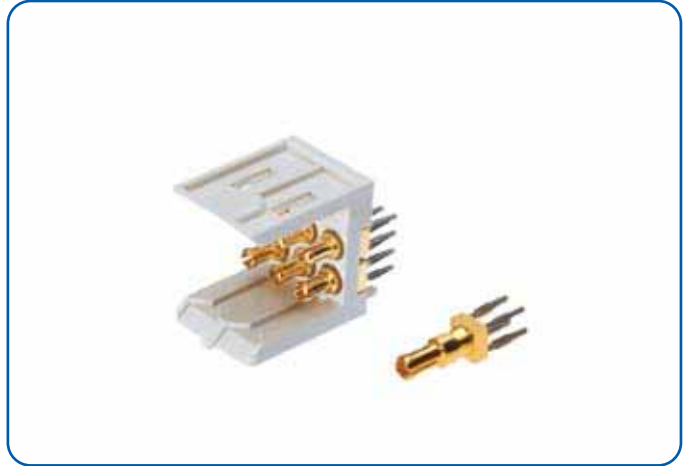
- ▶ Applicable process: wave/IR / vapor phase / press-fit

REFERENCE DATA

- ▶ Application Specification TA-0941

APPLICATION EQUIPMENT

- ▶ for application equipment, check out the application equipment table on page 217-223

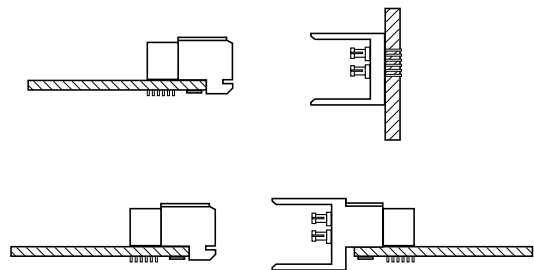


MATING DATA

▶ Right angle, page 169

- ▶ housing, partnumber 70244-102LF
- ▶ insert, partnumber 70239-001LF

TYPICAL APPLICATIONS



ELECTRICAL

| | | |
|--|--|-----------------------------------|
| Electrical characteristic impedance | 50 Ω | 75 Ω |
| Working frequency | 0 - 10 GHz | 0 - 1,5 GHz |
| Reflection coefficient | max.0,05 up to 1 GHz; max. 0,01 up to 10 Ghz | max.0,01 up to 1,5 GHz |
| Peak voltage | 750 V eff. | 750 V eff. |
| Operating voltage | 250 V eff. | 250 V eff. |
| Insulation resistance | 1 x 10 ³ MΩ initially, | 1 x 10 ³ MΩ initially, |
| Temperature range | -65°C to +165°C | -65°C to +165°C |

Receptacle, Mini Coax

FEATURES

- ▶ In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- ▶ Insert according to DIN 41626
- ▶ Insert quality tested according to MIL-Std-202 and BS 9525 F0011

TECHNICAL DATA

PHYSICAL

- ▶ Housing material: glass filled LCP
- ▶ Flammability rating: UL 94 V-0
- ▶ Insert material shell Copper zinc 39 Pb 2
- ▶ Spring : Beryllium copper
- ▶ Insulator: PTFE Teflon
- ▶ Clip: BerylliumCopper
- ▶ Performance level Telcordia CO

ELECTRICAL (see table below)

MECHANICAL PERFORMANCE

- ▶ Insertion force, 0.9 N
- ▶ Extraction Force 0.9 N

PACKAGING

- ▶ Standard boxes/bags

PROCESSING INFORMATION

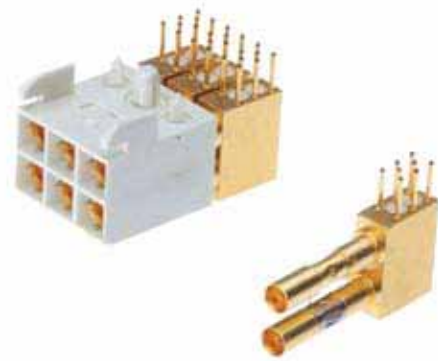
- ▶ Applicable process: wave/IR / vapor phase

REFERENCE DATA

- ▶ Application Specification TA-0941

APPLICATION EQUIPMENT

- ▶ for application equipment, check out the application equipment table on page 217-223



MATING DATA

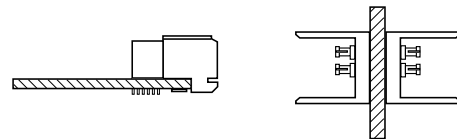
▶ Straight, page 167

- ▶ housing, partnumber 88913-111LF
- ▶ insert, partnumber 88978-001LF

▶ Right angle, page 167

- ▶ housing, partnumber 88982-102LF
- ▶ insert, partnumber 89030-001LF

TYPICAL APPLICATIONS



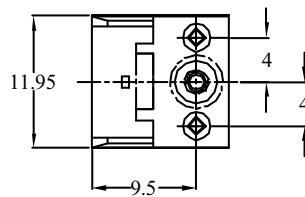
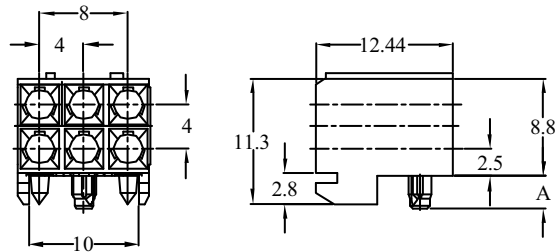
ELECTRICAL

| | | |
|--|--|-----------------------------------|
| Electrical characteristic impedance | 50 Ω | 75 Ω |
| Working frequency | 0 - 10 GHz | 0 - 1,5 GHz |
| Reflection coefficient | max.0,05 up to 1 GHz; max. 0,01 up to 10 Ghz | max.0,01 up to 1,5 GHz |
| Peak voltage | 750 V eff. | 750 V eff. |
| Operating voltage | 250 V eff. | 250 V eff. |
| Insulation resistance | 1 x 10 ³ MΩ initially, | 1 x 10 ³ MΩ initially, |
| Temperature range | -65°C to +165°C | -65°C to +165°C |

Receptacle, Mini Coax

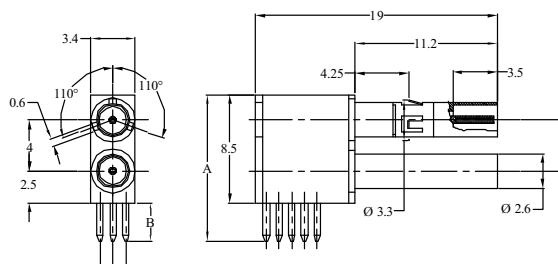
PRODUCT

Housings



PCB pattern P12, see chapter PCB layouts

Inserts



PARTNUMBERS

Housings

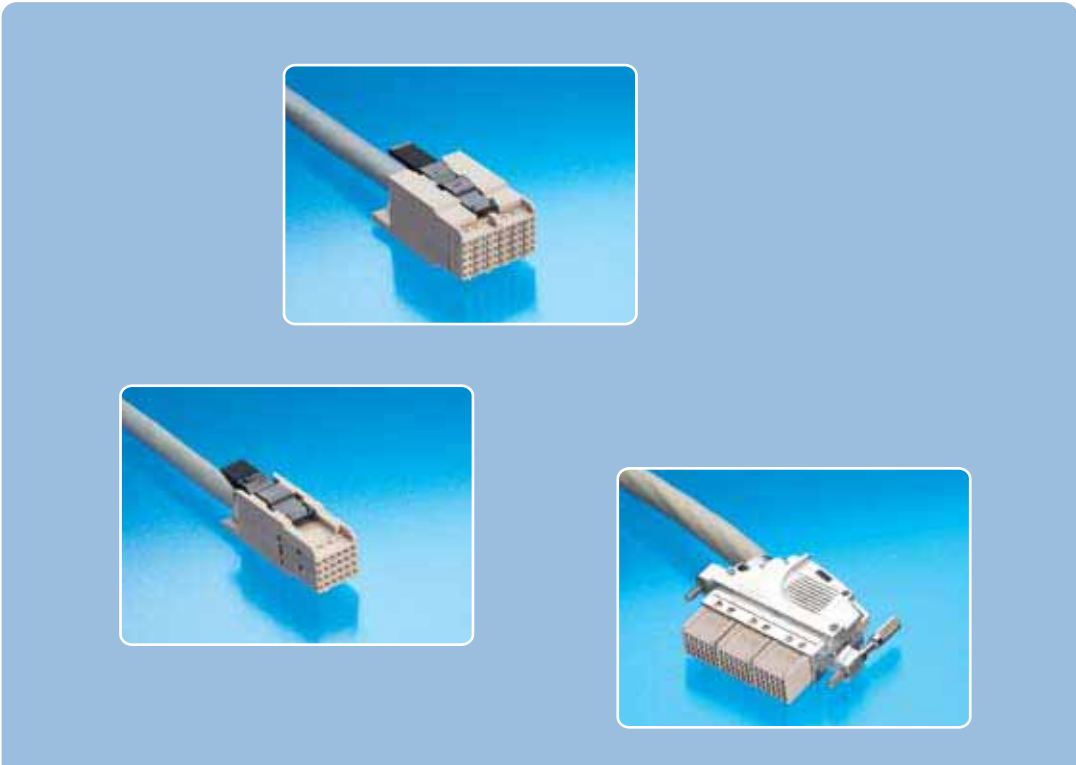
| Partnumber | Description |
|-------------|-----------------------|
| 70244-102LF | 6 position RA housing |

Inserts



| Partnumber | Description | type | PCB thickness |
|-------------|---------------------------------|------|---------------|
| 70239-001LF | Mini Coax RA insert- 2 position | STB | 1,6 mm |

RA = right angle, STR = straight, STB = solder-to-board, PF = press-fit





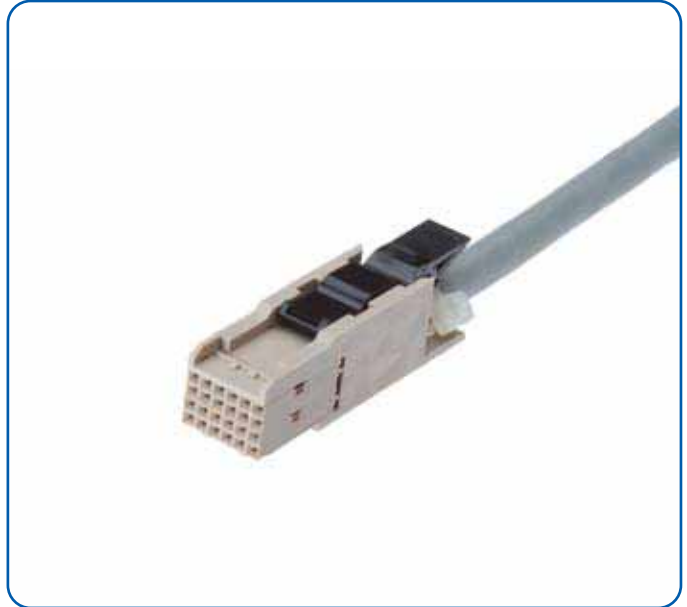
METRAL® CABLE CONNECTORS

-  Cable connectors, Signal
-  Cable connectors, Shielded

Cable Connectors, 4 row, signal

FEATURES

- ▶ Interface compatible with IEC 61076-4-104 backpanel connectors
- ▶ Next generation design offers easy and fast cable assembly
- ▶ Four Row versions provide 24 or 48 dual beam contacts
- ▶ Insulation displacement design offers quick termination without the need to strip conductors
- ▶ Active backshell latches securely connect assembled cable connectors to standard Metral® headers
- ▶ Different latch designs are available to satisfy ergonomic and mechanical requirements
- ▶ End-stackable cable connectors enable adjacent connectors to plug to headers without loss of positions
- ▶ Application tooling supported by FCI



TECHNICAL DATA

PHYSICAL

- ▶ spacing: 2,00 mm x 2,00 mm
- ▶ contact material: Phosphor bronze
- ▶ contact plating: Gold over nickel on mating face; pure tin over nickel in termination area
- ▶ housing Material: Glass filled 612 Polyamide UL 94-V0
- ▶ performance level: Telcordia CO

ELECTRICAL

- ▶ current Rating: 1.0A per contact
- ▶ withstanding Voltage: 1000 VDC
- ▶ insulation resistance: >1000 mega ohms after environmental exposure

MECHANICAL PERFORMANCE

- ▶ mating force: <1.0 Newtons per contact
- ▶ un-mating force: >.2 Newtons per contact; <1.13 Newtons per contact
- ▶ IDC termination retention: <.89 Newtons per contact
- ▶ durability: 200 cycles (Telcordia)
- ▶ temperature: -55C to +105 C

ENVIRONMENTAL

- ▶ meets Telcordia Central Office and IEC Class 1 requirements. Additional platings are also available to meet uncontrolled environmental requirements; consult product drawings and product specifications for the cable connectors and mating headers.

PACKAGING

- ▶ kits

REFERENCE DATA

- ▶ UL E66906, CSA LR46923
- ▶ Product Specifications: GS-12-015 (4 Row)
- ▶ Application Specifications: GS-20-002 (4 Row)
- ▶ Application tooling: GS-20-003 (4 Row)

APPLICATION EQUIPMENT

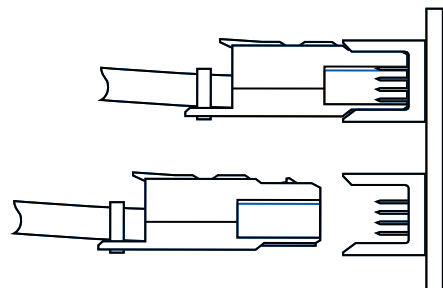
- ▶ for application equipment, check out the application equipment table on page 217-223

MATING DATA

- ▶ Header, straight, press-fit, page 27

- ▶ 1 module – part number 70232-116LF
- ▶ 2 modules – part number 70233-116LF
- ▶ 4 modules – part number 70234-116LF
- ▶ 8 modules – part number 70235-116LF

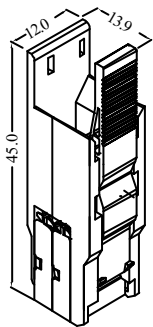
TYPICAL APPLICATIONS



Cable Connectors, 4 row, signal

PRODUCT

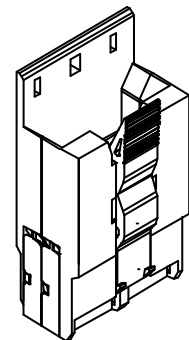
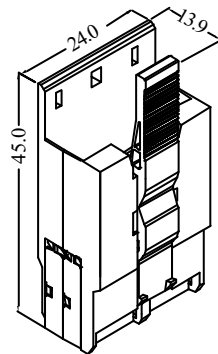
1 Module
72476-1yx1LF



STANDARD LATCH FINGER
FOR CABLE TIE BELOW
LATCH FINGER AND EASIEST
ACCESS TO LATCH FINGER

SHORT LATCH FINGER
FOR CABLE TIE ABOVE
LATCH FINGER AND LARGER
CABLE SIZE CAPACITY

2 Module
72477-1yx1LF



STANDARD LATCH FINGER
FOR CABLE TIE BELOW
LATCH FINGER AND EASIEST
ACCESS TO LATCH FINGER

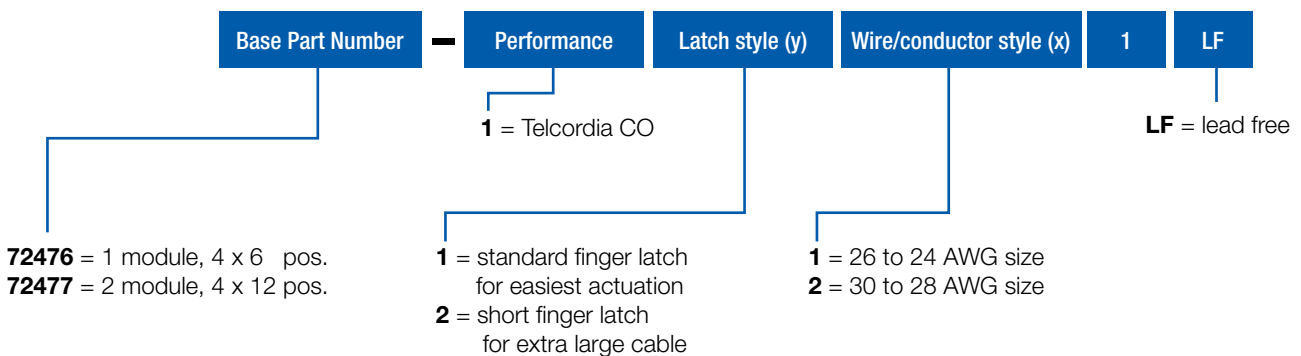
SHORT LATCH FINGER
FOR CABLE TIE ABOVE
LATCH FINGER AND LARGER
CABLE SIZE CAPACITY

standard latch = for cable up to 6.00mm diameter
short latch = for cable up to 9.00mm diameter

PARTNUMBERS

72476 - 1yx1LF

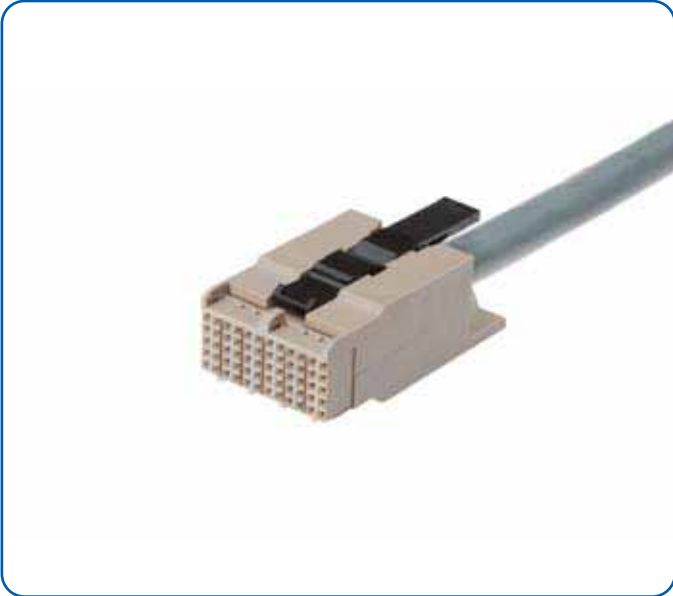
72477 - 1yx1LF



Cable Connectors, 5 row, signal

FEATURES

- ▶ Interface compatible with IEC 61076-4-104 backpanel connectors
- ▶ Next generation design offers easy and fast cable assembly
- ▶ Five Row versions provide 30 or 60 dual beam contacts
- ▶ Insulation displacement design offers quick termination without the need to strip conductors
- ▶ Active backshell latches securely connect assembled cable connectors to standard Metral® headers
- ▶ Different latch designs are available to satisfy ergonomic and mechanical requirements
- ▶ End-stackable cable connectors enable adjacent connectors to plug to headers without loss of positions
- ▶ Application tooling supported by FCI



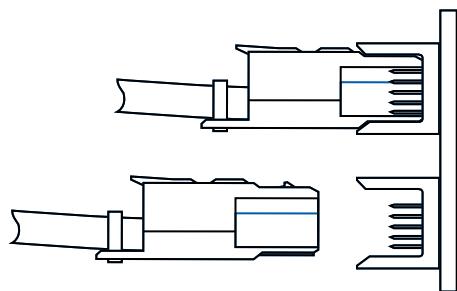
TECHNICAL DATA

- ▶ **PHYSICAL**
 - ▶ spacing: 2,00 mm x 2,00 mm
 - ▶ contact material: Phosphor bronze
 - ▶ contact plating: Gold over nickel on mating face; pure tin over nickel in termination area
 - ▶ housing Material: Glass filled 612 Polyamide UL 94-V0
 - ▶ performance level: Telcordia CO
- ▶ **ELECTRICAL**
 - ▶ current Rating: 1.0A per contact
 - ▶ withstanding Voltage: 1000 VDC
 - ▶ insulation resistance: >1000 mega ohms after environmental exposure
- ▶ **MECHANICAL PERFORMANCE**
 - ▶ mating force: <1.0 Newtons per contact
 - ▶ un-mating force: >.2 Newtons per contact; <1.13 Newtons per contact
 - ▶ IDC termination retention: <.89 Newtons per contact
 - ▶ durability: 200 cycles (Telcordia)
 - ▶ temperature: -55C to +105 C
- ▶ **ENVIRONMENTAL**
 - ▶ meets Telcordia Central Office and IEC Class 1 requirements. Additional platings are also available to meet uncontrolled environmental requirements; consult product drawings and product specifications for the cable connectors and mating headers.
- ▶ **PACKAGING**
 - ▶ kits
- ▶ **REFERENCE DATA**
 - ▶ UL E66906, CSA LR46923
 - ▶ Product Specifications: GS-12-016 (5 Row)
 - ▶ Applicationspecification: GS-20-003 (5 Row)
 - ▶ Application tooling : GS-20-003 (5 Row)
- ▶ **APPLICATION EQUIPMENT**
 - ▶ for application equipment, check out the application equipment table on page 217-223

MATING DATA

- ▶ Header straight, press-fit, page 41
- ▶ 1 module – part number 89006-116LF
- ▶ 2 modules – part number 89007-116LF
- ▶ 4 modules – part number 89008-116LF
- ▶ 8 modules – part number 89009-116LF

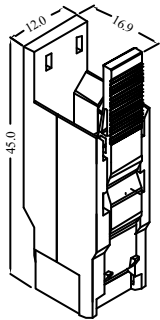
TYPICAL APPLICATIONS



Cable Connectors, 5 row, signal

PRODUCT

1 Module
72478-1yx1LF

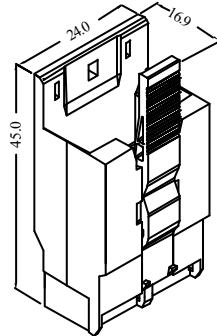


STANDARD LATCH FINGER
FOR CABLE TIE BELOW
LATCH FINGER AND EASIEST
ACCESS TO LATCH FINGER

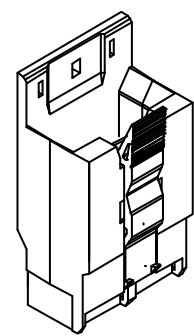


SHORT LATCH FINGER
FOR CABLE TIE ABOVE
LATCH FINGER AND LARGER
CABLE SIZE CAPACITY

2 Module
72479-1yx1LF



STANDARD LATCH FINGER
FOR CABLE TIE BELOW
LATCH FINGER AND EASIEST
ACCESS TO LATCH FINGER



SHORT LATCH FINGER
FOR CABLE TIE ABOVE
LATCH FINGER AND LARGER
CABLE SIZE CAPACITY

standard latch = for cable up to 6.00mm diameter
short latch = for cable up to 9.00mm diameter

PARTNUMBERS

72478 - 1yx1LF

72479 - 1yx1LF



72478 = 1 module, 5 x 6 pos.
72479 = 2 module, 5 x 12 pos.

1 = standard finger latch
for easiest actuation
2 = short finger latch
for extra large cable

1 = 26 to 24 AWG size
2 = 30 to 28 AWG size

Cable connectors, shielded

FEATURES

- Contact type Signal - Shielded
- Number of contacts (per row) 24
- Number of contacts (Total) 72
- Number of rows 3
- Orientation Straight
- Product Type Receptacle
- Termination Style IDC - Crimp
- Mating half 10022805-201LF
- Quantity 96
- Dimensional
- Size (Wire) AWG 26

TECHNICAL DATA

PHYSICAL

- contact material: Phosphor bronze
- plating Telecom class Gold
- plating (Contact area) 2 µm (79 µin.) Gold
- plating Specification (Tail area) Telecom class Gold
- housing Material: Glass - Filled Thermoplastic Polyester
- performance level: Telcordia CO

ELECTRICAL

- current Rating: 1.0A per contact
- withstanding Voltage: 1000 rms
- insulation resistance: >1000 mega ohms after
- environmental exposure

MECHANICAL PERFORMANCE

- Insertion force (max per contact) 1.1N max. per contact
- withdrawal Force 0.15N min. per contact
- retention force 5N
- durability: 100 cycles (Telcordia)
- temperature: -55C to +105 C

ENVIRONMENTAL

- meets Telcordia Central Office and IEC Class 1 requirements. Additional platings are also available to meet uncontrolled environmental requirements; consult product drawings and product specifications for the cable connectors and mating headers.

PACKAGING

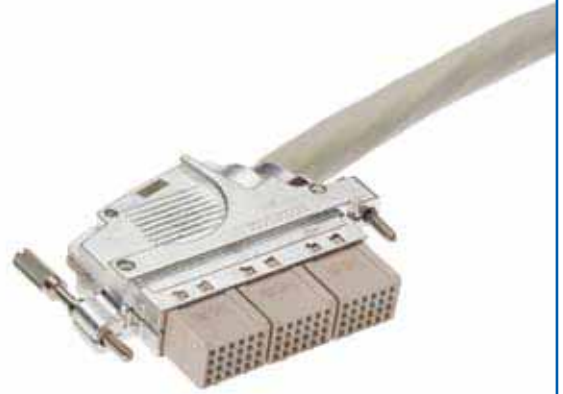
- bags

REFERENCE DATA

- Literature 950511-001
- product specification: GS-12-308
- Packaging specification: GS-14-008

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



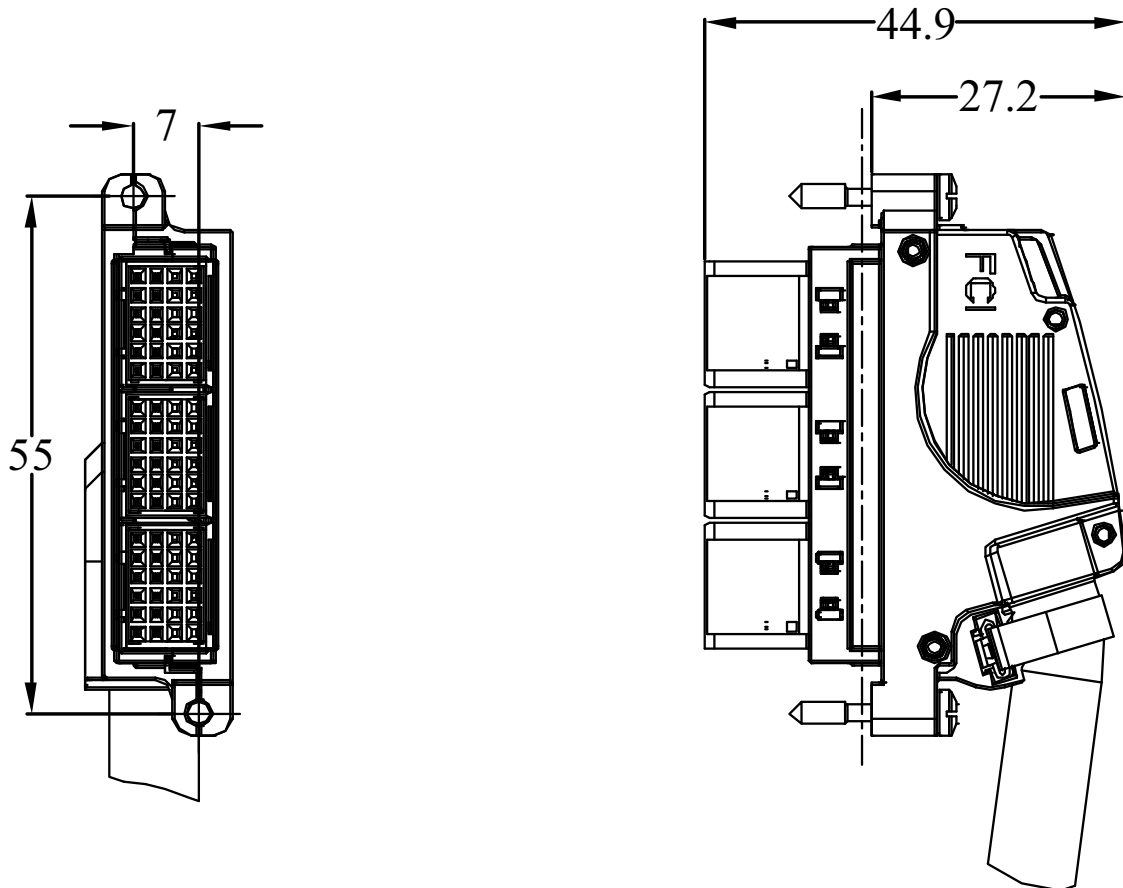
MATING DATA

- mating part, page 200

- Mating half 10022805-101LF

Cable connectors, shielded

PRODUCT



PARTNUMBERS

10013881 - 231LF = 72 position IDC cable connector





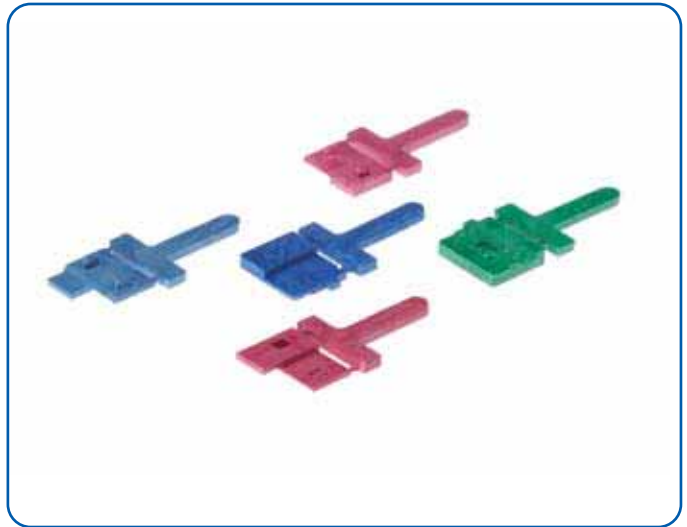
METRAL® ACCESSORIES

- Coding Keys
- Guide Pin
- Ramping Module
- Shorting Clip
- End wall
- Hybrid housing

Coding Keys

FEATURES

- ▶ designed in accordance with IEC 61076-4-104
- ▶ User friendly system, easy application.
- ▶ No additional space required.
- ▶ Provides infinite number of coding possibilities for board to board connection.
- ▶ Extended keys for early engagement (for 5 row only).
- ▶ Standard coding, codes all METRAL connectors when mating length is not exceeding 6,5 mm.
- ▶ Extended keys codes from 5 up to 8 mm mating length.



TECHNICAL DATA

PHYSICAL

- ▶ Material: Glass - Filled Thermoplastic Polyester

MECHANICAL PERFORMANCE

- ▶ temperature: -55 °C to +125 °C

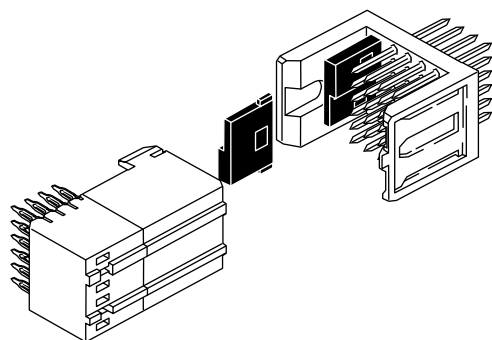
ENVIRONMENTAL

- ▶ RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

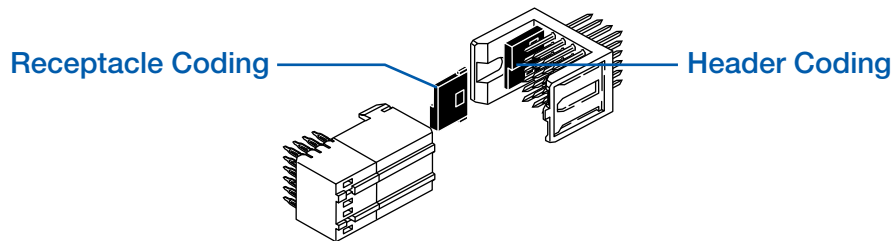
PACKAGING

- ▶ 100 parts, min. order quantity 100 parts

TYPICAL APPLICATIONS



Coding Keys



PARTNUMBERS

| | | Receptacle Coding | | Header Coding | |
|-------------|--|--|--|--|--|
| mating pair | IEC standardized | Extended | IEC standardized | Extended | |
| | 6,3 up to 6,5 mm pin length | 8,3 up to 8,0 mm pin length | 6,3 up to 6,5 mm pin length | 8,3 up to 8,0 mm pin length | |
| Full | | | Full Header Key 90837-102LF green | Full Header Key 85811-101LF green | |
| Full | Full Receptacle Key 91210-101LF green | Full Receptacle Key 85812-101LF green | | | |
| Left | Left Receptacle Key 91290-102LF pink | Left Receptacle Key 85814-102LF pink | Right Header Key 91289-102LF pink | Right Header Key 85813-102LF pink | |
| Middle | Middle Receptacle Key 91290-103LF brown | Middle Receptacle Key 85814-103LF brown | Middle Header Key 91289-103LF brown | Middle Header Key 85813-103LF brown | |
| Right | Right Receptacle Key 91290-101LF blue | Right Receptacle Key 85814-101LF blue | Left Header Key 91289-101LF blue | Left Header Key 85813-101LF blue | |

Note: blue marked part numbers are product selector parts

Cable Connector Coding Keys

FEATURES

- designed in accordance with IEC 61076-4-104
- User friendly system, easy application.
- No additional space required.
- Applicable for 4 and 5 row cable connectors.
- Provides 18 coding possibilities for cable to board connections.



TECHNICAL DATA

PHYSICAL

- Material: Glass - Filled polyamide

MECHANICAL PERFORMANCE

- temperature: -55 °C to +125 °C

ENVIRONMENTAL

- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

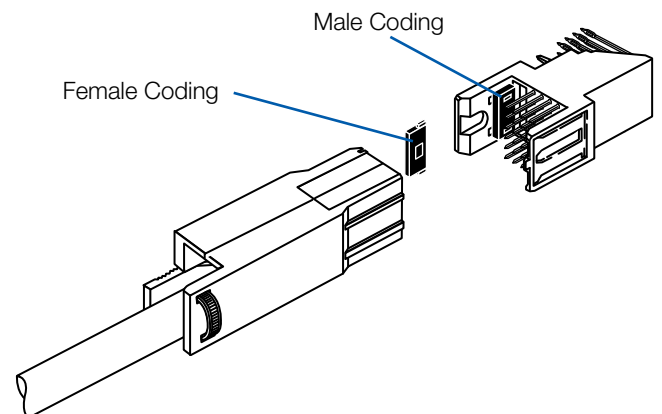
PACKAGING

- 100 parts, packed by bags

REFERENCE DATA

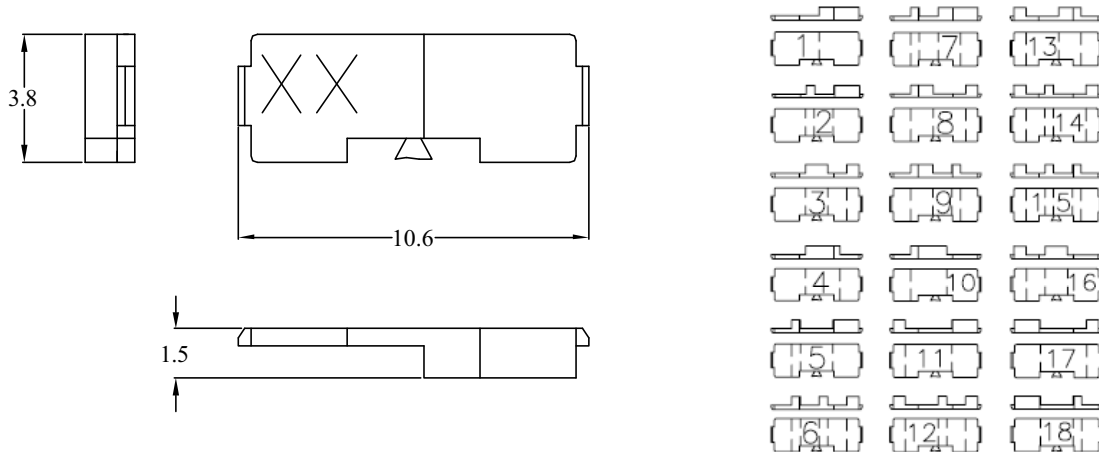
- Application Specifications: GS-20-002 (4 Row)
GS-20-003 (5 Row)

TYPICAL APPLICATIONS



Cable Connector Coding Keys

PRODUCT



PARTNUMBERS

72388 - yyyyLF

Base Part Number

Configuration

LF

72388 = Coding Key Cable connector

LF = lead free

| yyyy | Key number |
|------|------------|
| 0011 | 1 |
| 0021 | 2 |
| 0031 | 3 |
| 0041 | 4 |
| 0051 | 5 |
| 0061 | 6 |
| 0071 | 7 |
| 0081 | 8 |
| 0091 | 9 |
| 0101 | 10 |
| 0111 | 11 |
| 0121 | 12 |
| 0131 | 13 |
| 0141 | 14 |
| 0151 | 15 |
| 0161 | 16 |
| 0171 | 17 |
| 0181 | 18 |

Guide Pin

FEATURES

- ▶ Early capture of daughter card.
- ▶ Stackable end-to-end without loss of position.
- ▶ Stackable with other METRAL function modules (e.g. signal, power, coax).
- ▶ Front and/or rear guiding.
- ▶ Plug polarization by design.

TECHNICAL DATA

PHYSICAL

- ▶ Guide pin material: stainless steel

ENVIRONMENTAL

- ▶ RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- ▶ 100 parts, min. order quantity 100 parts

APPLICATION EQUIPMENT

- ▶ for application equipment, check out the application equipment table on page 217-223

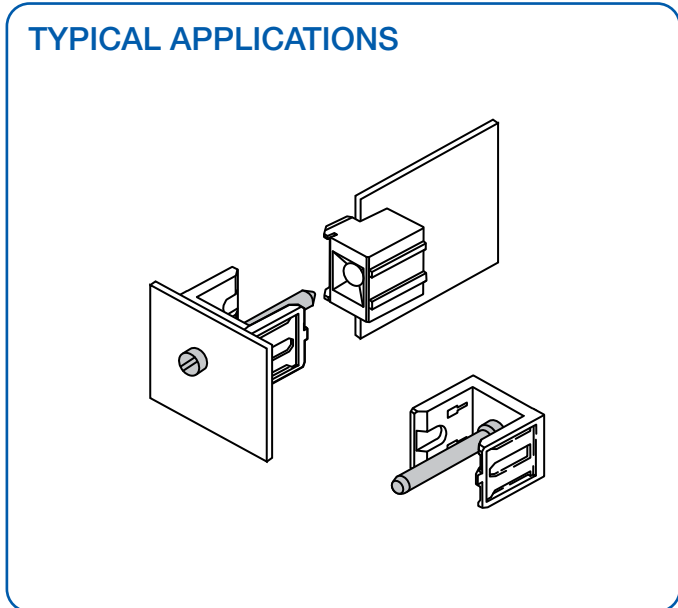


MATING DATA

- ▶ mating part, page

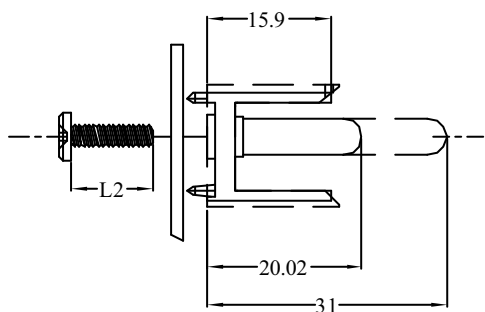
- ▶ Receptacle housing: part no 70292-101LF, page 157
- ▶ Header housing, narrow body: part no 70290-101LF, page 155
- ▶ wide body: part no 88911-101LF, page 155

TYPICAL APPLICATIONS

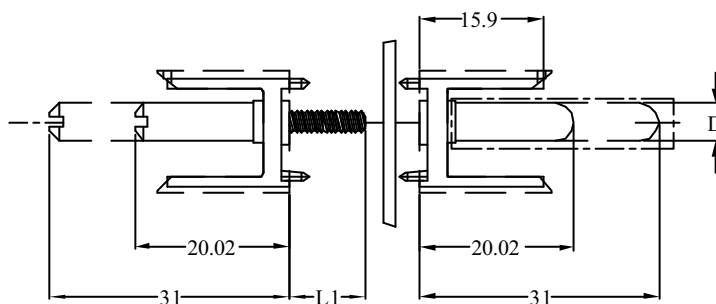


Guide Pin

PRODUCT



Single Guide Pin



Double Guide Pin

PCB pattern P9, see chapter PCB layouts

PARTNUMBERS

Narrow Body Header Housing

| Guide Pin Type | | guide pin length | Part number Guide Pin | Required Header Housing | Required Receptacle Housing |
|----------------|-------|------------------|-----------------------|-------------------------|-----------------------------|
| single sided | short | 20,0 mm | 70295-001LF | (1x) 70290-101LF | (1x) 70292-101LF |
| | long | 31,0 mm | 70295-002LF | (1x) 70290-101LF | (1x) 70292-101LF |
| double sided | short | 20,0 mm | 70295-003LF | (2x) 70290-101LF | (2x) 70292-101LF |
| | long | 31,0 mm | 70295-004LF | (2x) 70290-101LF | (2x) 70292-101LF |

Wide Body Header Housing

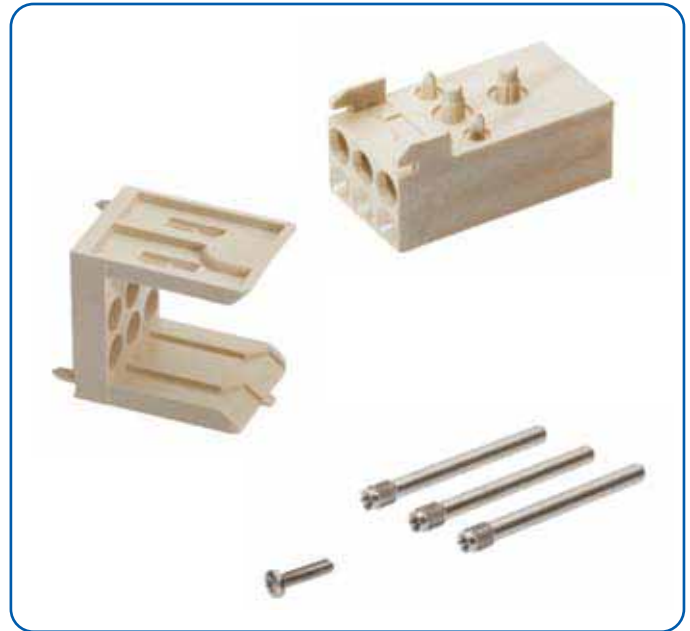
| Guide Pin Type | | guide pin length | Part number Guide Pin | Required Header Housing | Required Receptacle Housing |
|----------------|-------|------------------|-----------------------|-------------------------|-----------------------------|
| single sided | short | 20,0 mm | 70295-001LF | (1x) 88911-101LF | (1x) 70292-101LF |
| | long | 31,0 mm | 70295-002LF | (1x) 88911-101LF | (1x) 70292-101LF |
| double sided | short | 20,0 mm | 70295-003LF | (2x) 88911-101LF | (2x) 70292-101LF |
| | long | 31,0 mm | 70295-004LF | (2x) 88911-101LF | (2x) 70292-101LF |

Note: Housings not supplied with guide pins
For details on housings see section Hybrid Headers and receptacles

Board-to-Board Keying system

FEATURES

- ▀ Daughter card keying
- ▀ Provides 20 keying combinations
- ▀ Modular design guarantees flexibility
- ▀ Stackable end-to-end without loss of position
- ▀ Engagement before 8.25 mm pins
- ▀ Precedes card latch engagement
- ▀ Receptacle available as 20 unique molded parts



TECHNICAL DATA

PHYSICAL

- ▀ Keying pin material: stainless steel
- ▀ Housing material: Glass filled LCP,UL94V-0

ENVIRONMENTAL

- ▀ Operating temperature -55°C to +105°C
- ▀ RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- ▀ Receptacle housing: 50 housing/bag
- ▀ Keying pins with screws: 300 pins/bag

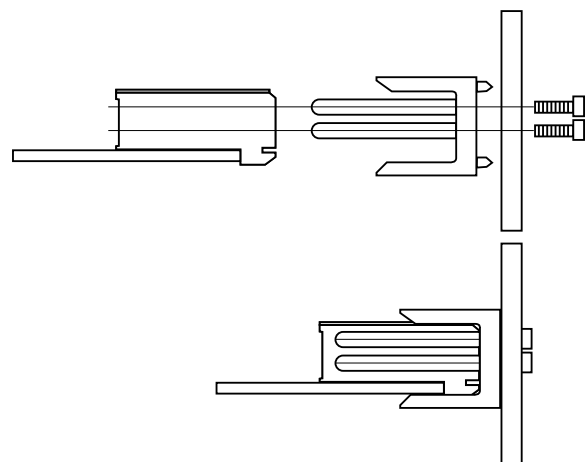
PROCESSING INFORMATION

- ▀ Wave, IR Vapor phase

MATING DATA

- ▀ Shroud, wide body 6 position, page 167
- ▀ part number 88913-101LF

TYPICAL APPLICATIONS

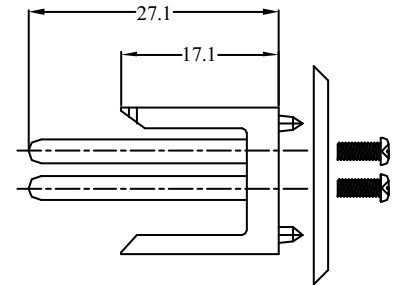
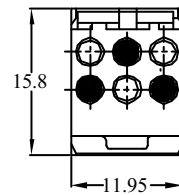
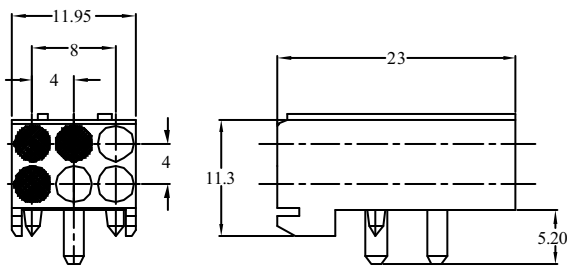


Board-to-Board Keying system

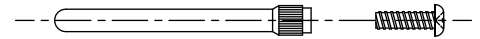
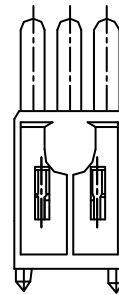
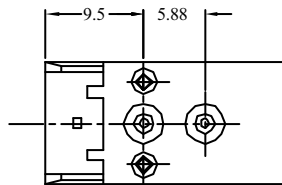
PRODUCT

Receptacle Keying module with press peg

Keying Pin



● = denotes plugged position



PARTNUMBERS

Base Part Number

Pin Configuration

LF

LF = lead free

88914 - 0yyLF

Keying Pin

| pin configuration | pcb thickness |
|-------------------|----------------|
| 011 | 2,31 - 3,10 mm |
| 012 | 3,10 - 3,89 mm |
| 013 | 3,89 - 4,67 mm |

88916 - 2yyLF

Receptacle Keying module with press peg

| pin configuration | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 |
|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 |

Ramping Module

FEATURES

- Provides initial vertical alignment on daughter card
- Symmetrical application; 2 required per slot
- Utilizes 6 mm of slot space
- Provides end-caps for backplane header slots
- Used independently of cabinet hardware design



TECHNICAL DATA

PHYSICAL

- ramping module material, glass-filled nylon, color natural , UL94 V-0.

MECHANICAL PERFORMANCE

- temperature: -55C to +105 C

ENVIRONMENTAL

- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

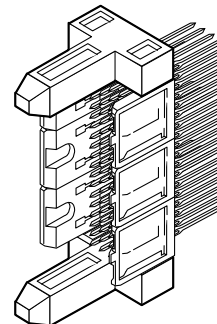
- Bag of 500 pieces

MATING DATA

Used in combination with Header

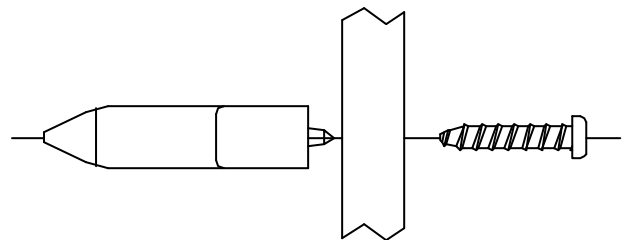
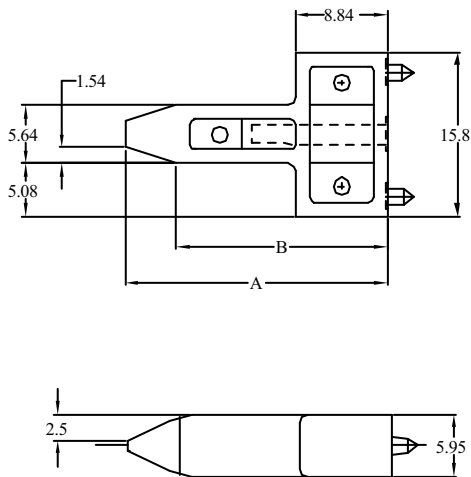
- 4 row Header straight, solder-to-board, page 25
 - 1 mod, part number 88951-101LF
 - 2 mod, part number 88952-101LF
 - 4 mod, part number 88953-101LF
 - 8 mod, part number 88954-101LF
- 4 row Header straight, press-fit, page 27
 - 1 mod, part number 70232-116LF
 - 2 mod, part number 70233-116LF
 - 4 mod, part number 70234-116LF
 - 8 mod, part number 70235-116LF

TYPICAL APPLICATIONS



Ramping Module

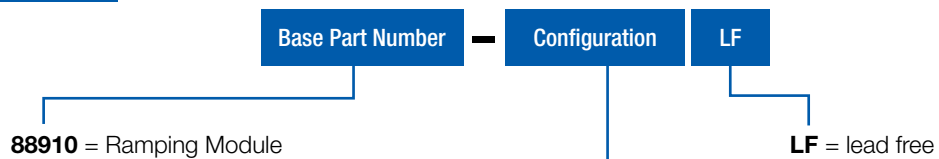
PRODUCT



PCB pattern P19, see chapter PCB layouts

PARTNUMBERS

88910 - yyyLF



| yyy | ramp height (dim. A) | ramp height (dim. B) |
|-----|----------------------|----------------------|
| 011 | 25,30 | 20,36 |
| 012 | 33,15 | 28,06 |

Shorting Clip header, 4 row, signal, straight, press-fit, wide body

FEATURES

- ▶ shorts any adjacent pin pair in row A of the Header signal pins mate before shorting clips break
- ▶ In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- ▶ Eye of the needle press-fit contact

TECHNICAL DATA

PHYSICAL

- ▶ spacing: 2,00 mm x 2,00 mm
- ▶ housing: glass-filled LCP, colour natural
- ▶ flammability rating: UL 94 V-0
- ▶ pin material: phosphor bronze
- ▶ performance level: Telcordia CO

ELECTRICAL

- ▶ current rating: 1 A
- ▶ insulation resistance: 5x10³ MΩ initially, 1x10³ MΩ after tests
- ▶ withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- ▶ insertion force: 0,45 N max. per individual signal contact (mating)
- ▶ withdrawal force: 0,15 N max. per individual signal contact (unmating)
- ▶ press-fit contact insertion: 65 N max. per pin
- ▶ press-fit pin withdrawal: 15 N min. per pin
- ▶ recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- ▶ Operating temperature range: -55°C to +125°C
- ▶ RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- ▶ standard: tubes

PROCESSING INFORMATION

- ▶ Applicable process: press-fit

REFERENCE DATA

- ▶ file no. GS-12-180
- ▶ application specification: BUS-20-073

APPLICATION EQUIPMENT

- ▶ for application equipment, check out the application equipment table on page 217-223



MATING DATA

▶ Receptacle, right angle, press-fit, page 35

- ▶ 1 mod – part number 88945-102LF
- ▶ 2 mod – part number 88946-102LF
- ▶ 4 mod – part number 88947-102LF
- ▶ 8 mod – part number 88948-102LF

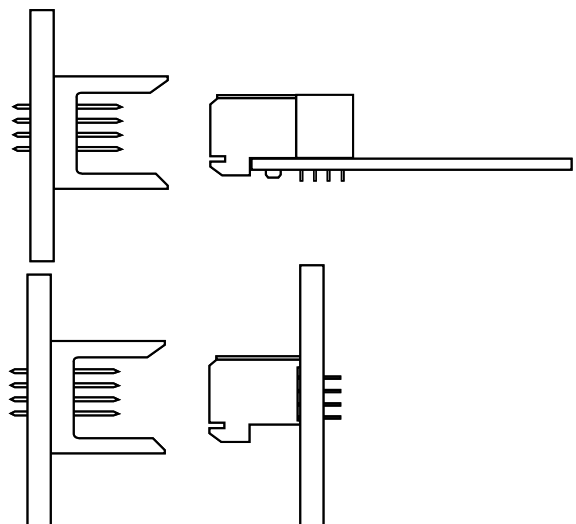
▶ Receptacle, right angle, solder-to-board, page 33

- ▶ 1 mod – part numbers 89035-101LF
- ▶ 2 mod – part numbers 89036-101LF
- ▶ 4 mod – part numbers 89037-101LF
- ▶ 8 mod - part numbers 89038-101LF

▶ Receptacle, right angle, Pin-in-Paste, page 37

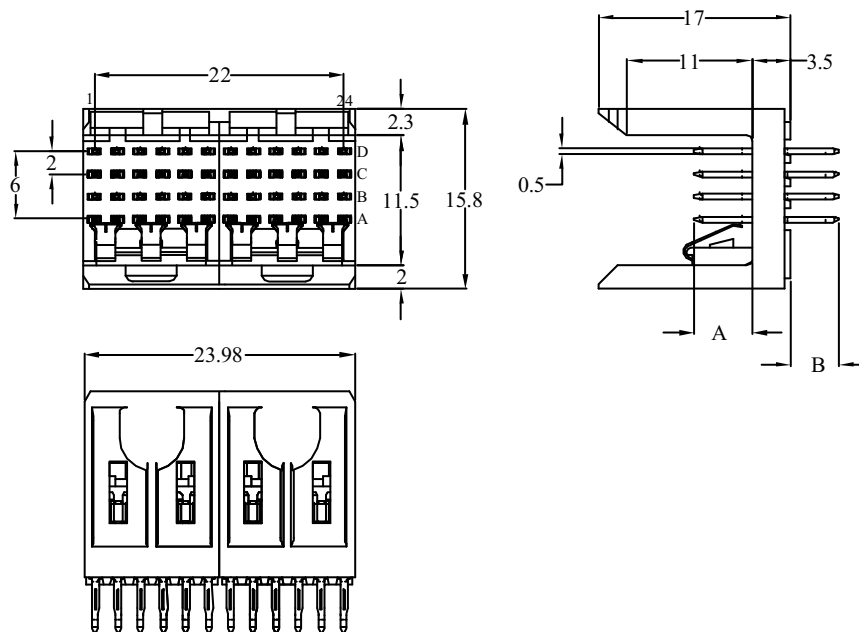
- ▶ 1 mod – part numbers 52048-101LF

TYPICAL APPLICATIONS



Shorting Clip header, 4 row, signal, straight, press-fit, wide body

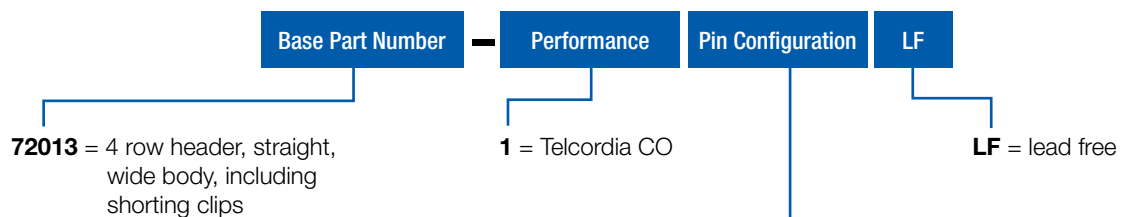
PRODUCT



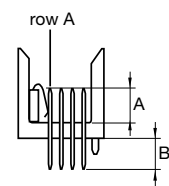
PCB pattern P6, see chapter PCB layouts

PARTNUMBERS

72013 - 1yyyLF



| yyy | modules | no. of positions | mating length A | tail length B | shorting clip at |
|-----------------|---------|------------------|-----------------|---------------|------------------|
| on request only | 1 | 4 x 6 | 5,75 mm | 4,30 mm | all row A pins |
| 003 | 2 | 4 x 12 | 5,75 mm | 4,30 mm | all row A pins |
| 004 | 3 | 4 x 24 | 5,75 mm | 4,30 mm | all row A pins |
| 005 | 4 | 4 x 48 | 5,75 mm | 4,30 mm | all row A pins |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Shorting Clip header, 5 row, signal, straight, press-fit, wide body

FEATURES

- shorts any adjacent pin pair in row A of the Header signal pins mate before shorting clips break
- In accordance with IEC 60917 and IEC 61076-4-104 (Futurebus+)
- Eye of the needle press-fit contact

TECHNICAL DATA

PHYSICAL

- spacing: 2,00 mm x 2,00 mm
- housing: glass-filled LCP, colour natural
- flammability rating: UL 94 V-0
- pin material: phosphor bronze
- performance level: Telcordia CO

ELECTRICAL

- current rating: 1 A
- insulation resistance: $5 \times 10^3 \text{ M}\Omega$ initially, $1 \times 10^3 \text{ M}\Omega$ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- insertion force: 0,45 N max. per individual signal contact (mating)
- withdrawal force: 0,15 N max. per individual signal contact (unmating)
- press-fit contact insertion: 65 N max. per pin
- press-fit pin withdrawal: 15 N min. per pin
- recommended hole diameter: 0,65-0,80 mm

ENVIRONMENTAL

- Operating temperature range: -55°C to $+125^\circ\text{C}$
- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PACKAGING

- standard: tubes

PROCESSING INFORMATION

- press fit

REFERENCE DATA

- file no. GS-12-180
- application specification: BUS-20-073

APPLICATION EQUIPMENT

- for application equipment, check out the application equipment table on page 217-223



MATING DATA

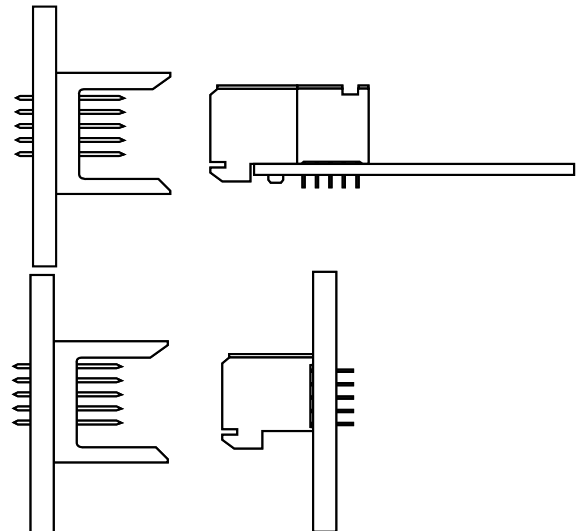
Receptacle, right angle, press-fit, pag 45

- 1 mod – part number 89047
- 2 mod – part number 89093
- 4 mod – part number 89094
- 8 mod – part number 89095

Receptacle, right angle, solder-to-board, page 43

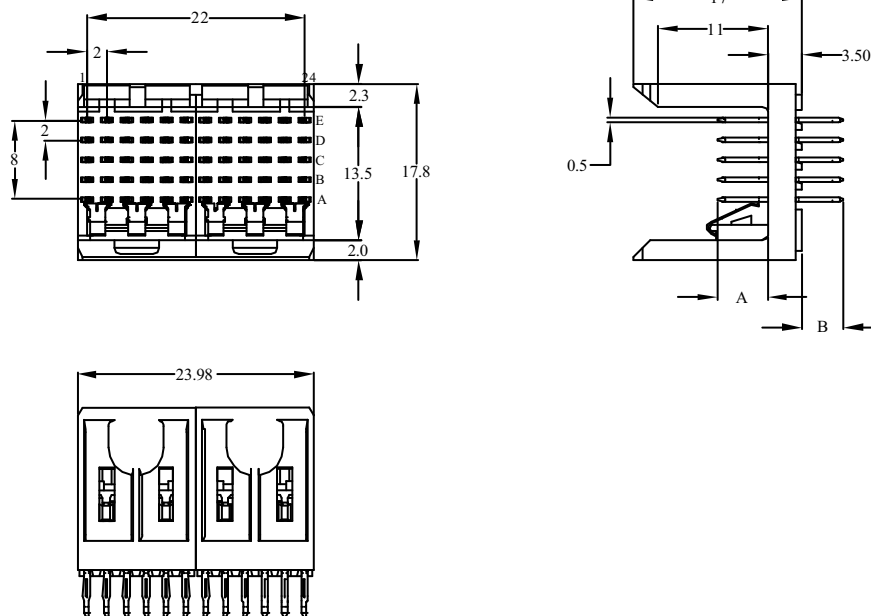
- 1 mod – part numbers 85863
- 2 mod – part numbers 85864
- 4 mod – part numbers 85865
- 8 mod - part numbers 85866

TYPICAL APPLICATIONS



Shorting Clip header, 5 row, signal, straight, press-fit, wide body

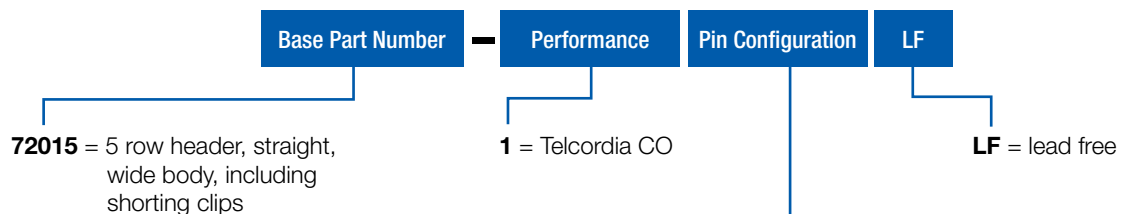
PRODUCT



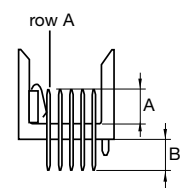
PCB pattern P7, see chapter PCB layouts

PARTNUMBERS

72015 - 1yyyLF



| yyy | modules | no. of positions | mating length A | tail length B | shorting clip at |
|-----------------|---------|------------------|-----------------|---------------|------------------|
| 003 | 1 | 5 x 6 | 5,75 mm | 4,30 mm | all row A pins |
| on request only | 2 | 5 x 12 | 5,75 mm | 4,30 mm | all row A pins |
| on request only | 3 | 5 x 24 | 5,75 mm | 4,30 mm | all row A pins |
| on request only | 4 | 5 x 48 | 5,75 mm | 4,30 mm | all row A pins |



Note: for other special patterns or loadings, please check drawings, all other configurations on request only

End wall

FEATURES

- ▶ End wall can be used on either side of the Header
- ▶ Latch feature to prevent mismatch
- ▶ Protection feature
- ▶ Match with 4 row and 5 row shroud

TECHNICAL DATA

PHYSICAL

- ▶ housing: 30% glass-filled flame retardant accessory, color natural, flammability rating: UL 94 V-0
- ▶ The housing withstand exposure to 260°C peak temperature for 15 seconds in a wave solder application with 1.5mm minimum PCB.

ENVIRONMENTAL

- ▶ RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

REFERENCE DATA

- ▶ Product specification GS-12-199



MATING DATA

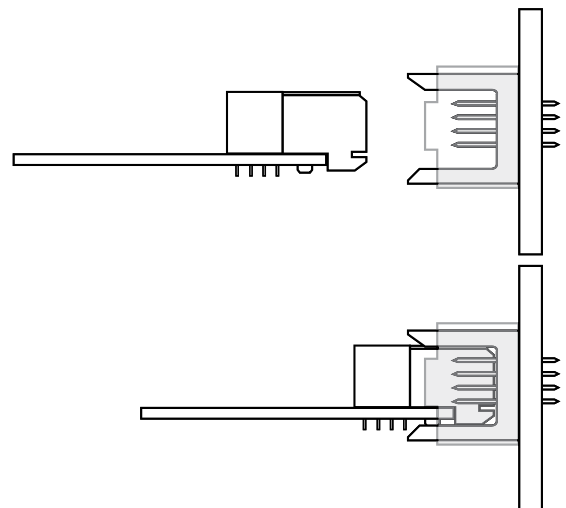
4 row

- ▶ Shroud, part number 70203-xxxLF, page 83
- ▶ Hybrid header housing, part number 88911-xxxLF, page 155
- ▶ part number 88913-xxxLF, page 159

5 row

- ▶ Shroud, part number 89055-xxxLF, page 85
- ▶ Header, part number 89006-116LF (1 mod), 89007-116LF (2 mod), 89008-116LF (4 mod) and 89009-116LF (8 mod), page 41

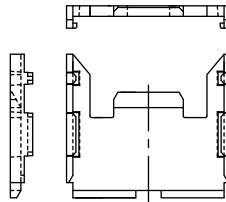
TYPICAL APPLICATIONS



End wall

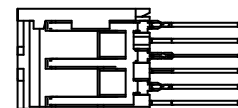
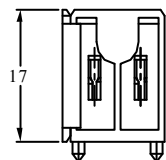
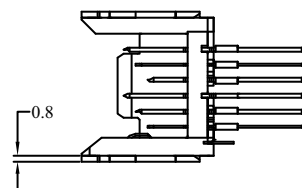
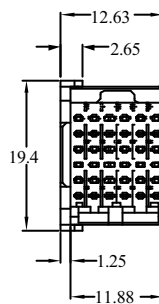
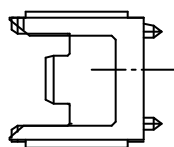
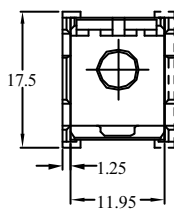
PRODUCT

End Wall



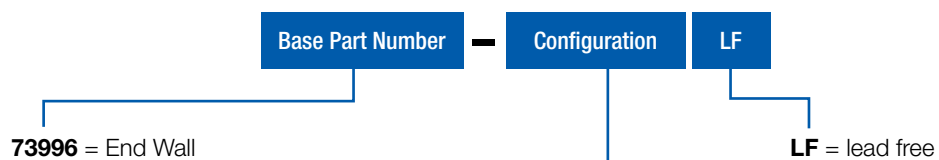
73996-002
(4 row application)

73996-011
(5 row application)



PARTNUMBERS

73996 - yyyLF



| yyy | description |
|-----|-------------------------------|
| 002 | 4 row Shroud & Hybrid housing |
| 011 | 5 row Shroud & Header |

Hybrid housing

FEATURES

- create stand off of 3,5 mm
- can be used for DIN standard power, coax and guide pin



TECHNICAL DATA

PHYSICAL

- housing: glass-filled LCP, color natural
- flammability rating: UL 94 V-0
- temperature withstanding till 260C for 60 seconds

ENVIRONMENTAL

- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

PROCESSING INFORMATION

- Infra-red or vapor phase reflow oven

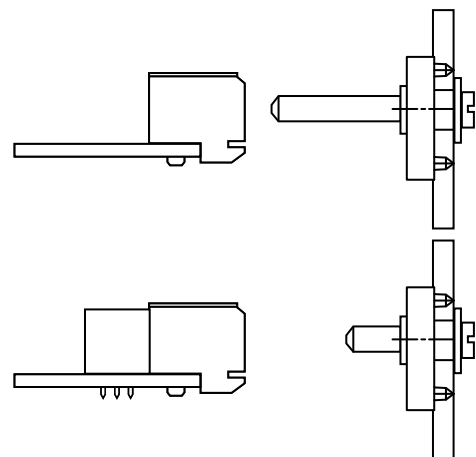
RECOMMENDED HOLE DIAMETER

| 4 row Hybrid header housing in combination with | Hole diameter (unplated) |
|--|-----------------------------|
| guide pin | 3,25 mm +/-0,10 mm |
| screw to board high power insert | 3,25 mm +/-0,10 mm |
| plug / plug high power coupler | 6,00 mm +0,10 mm |
| receptacle / receptacle coax coupler | 6,00 mm +0,10 mm |

MATING DATA

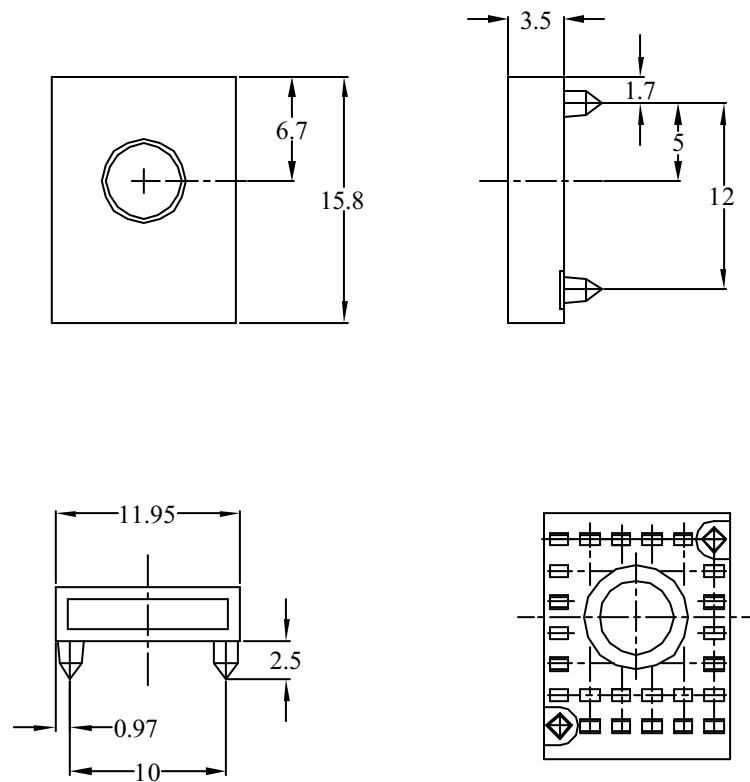
- Guide Pin, page 185
 - part number 70295-00XLF
- Screw to board high power insert, page 155
 - part number 91570-001LF
- Plug / plug high power coupler, page 155
 - part number 70201-001LF
- Receptacle / receptacle coax coupler, page 163
 - part number 70200-001LF

TYPICAL APPLICATIONS



Hybrid housing

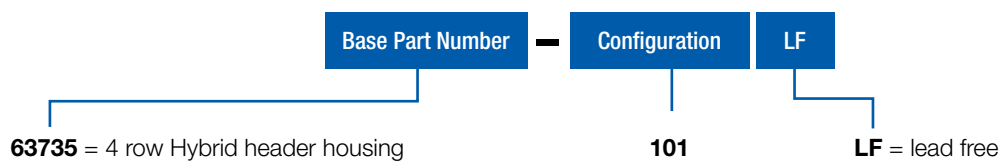
PRODUCT



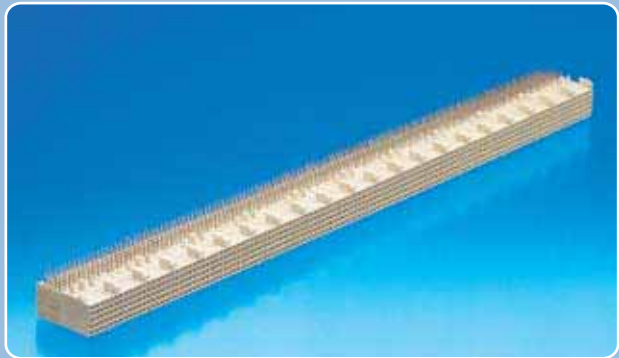
PCB pattern P25, see chapter PCB layouts

PARTNUMBERS



63735 - 101LF





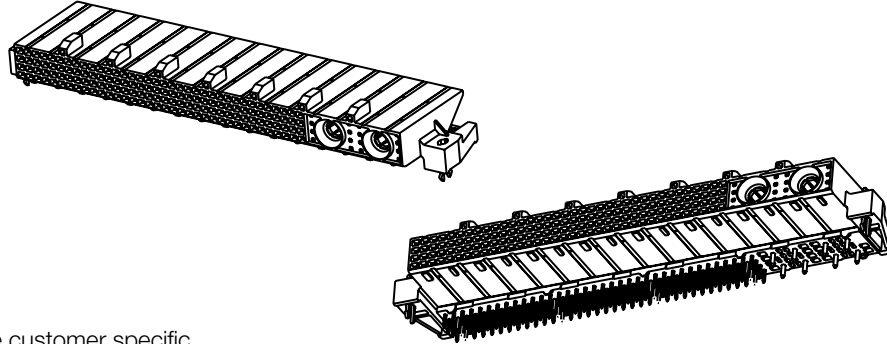


METRAL® APPLICATION SPECIFIC

-  Mono blocks
-  Customized designs

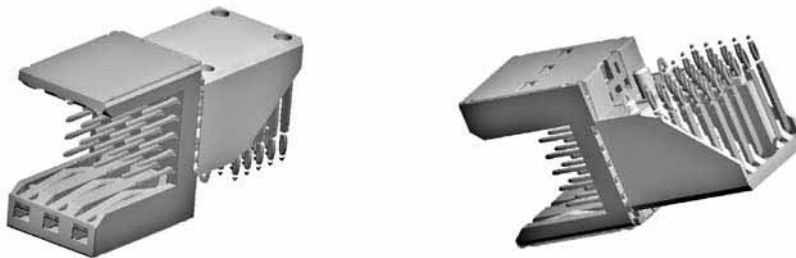
The products shown give an impression of the capabilities within the METRAL® core family

8 module Signal & 2 module Power contact assembly with fixed modules



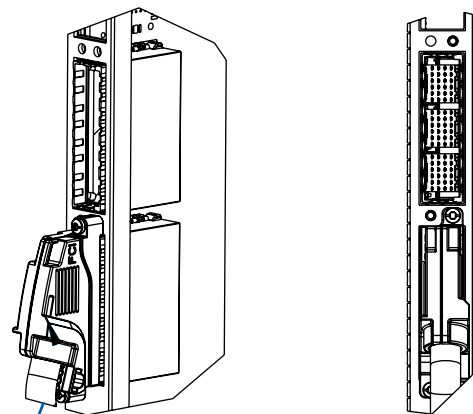
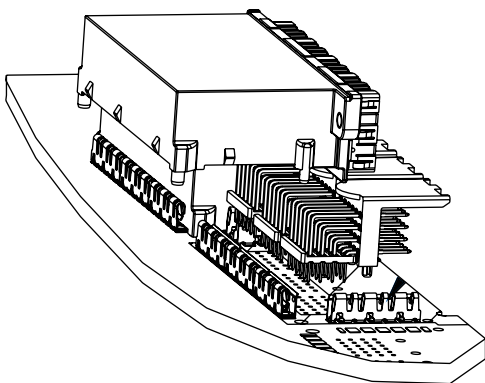
Note: all configurations are customer specific,
new configurations on request only,
please contact your local sales representative.

Signal Header right angle including Latch and Guiding



PARTNUMBER HM1B61LDP258H6PLF

Shielded Header 72 position (3 x 24 pos.) solder-to-board

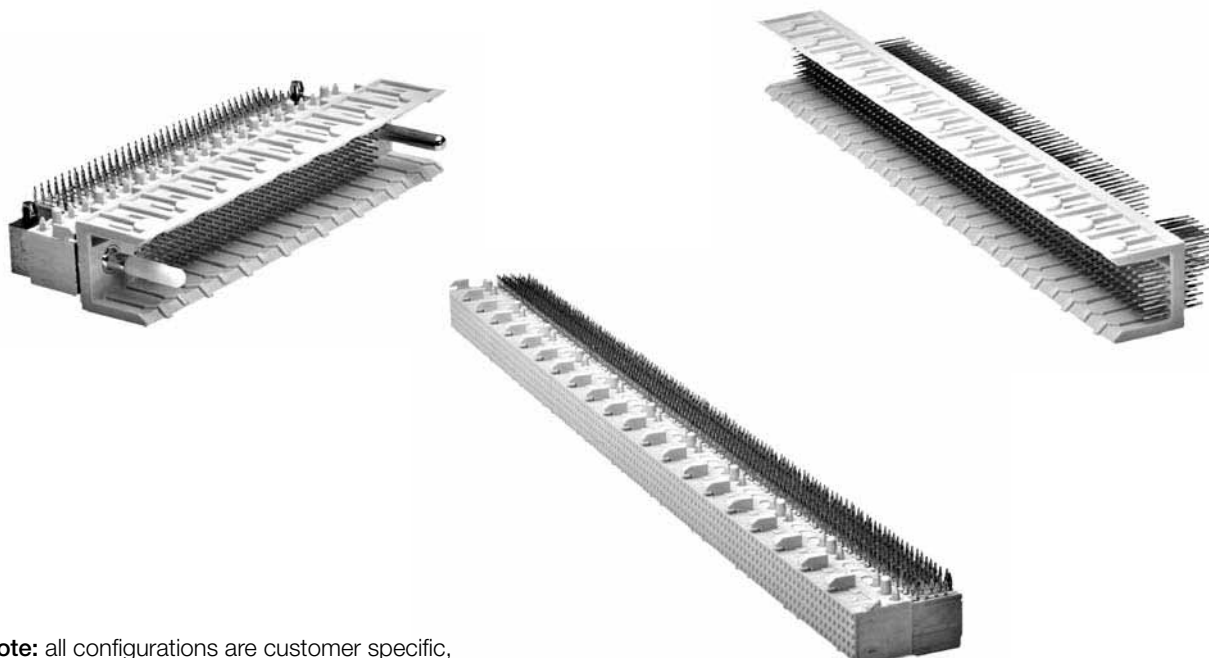


mating part,
cable connector Shielded
part number 10013381-231LF, page 177

PARTNUMBER 10022805-101LF

The products shown give an impression of the capabilities within the METRAL® core family

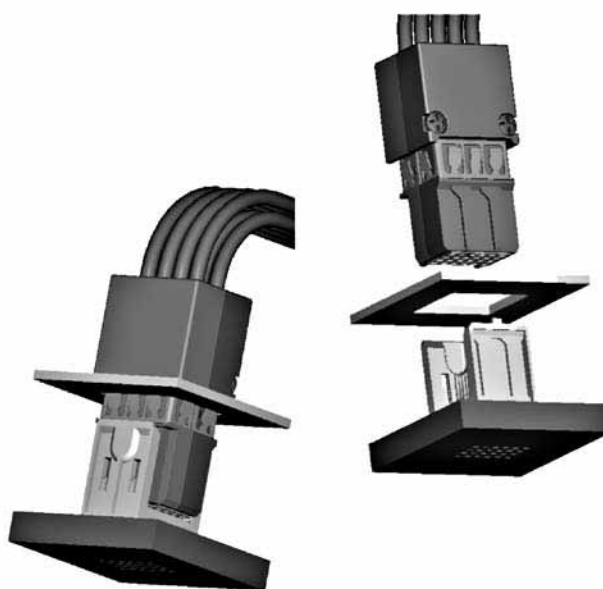
Monoblocks, various Headers and Receptacles



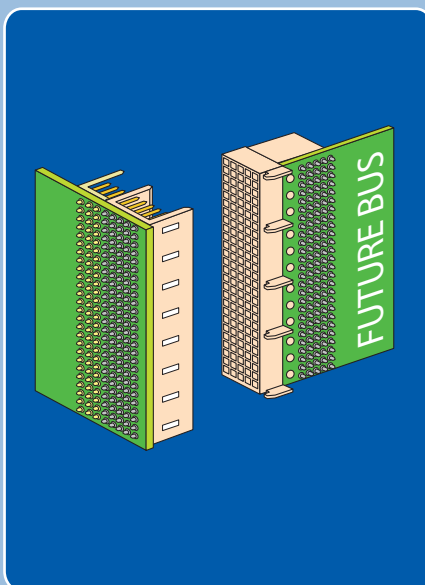
Note: all configurations are customer specific,
new configurations on request only,
please contact your local sales representative.

E1-T1 Connectors, 2Mb Field I/O connector system






- 2 Mb - FieldIO - coax: Part number: 10001783-001LF
- 2 Mb - FieldIO - STP: Part number: 10007370-001LF
- Field Application tooling: BPY 506
- Product specification: GS-12-219
- Application specification: GS-20-032







METRAL® TECHNICAL SPECIFICATION

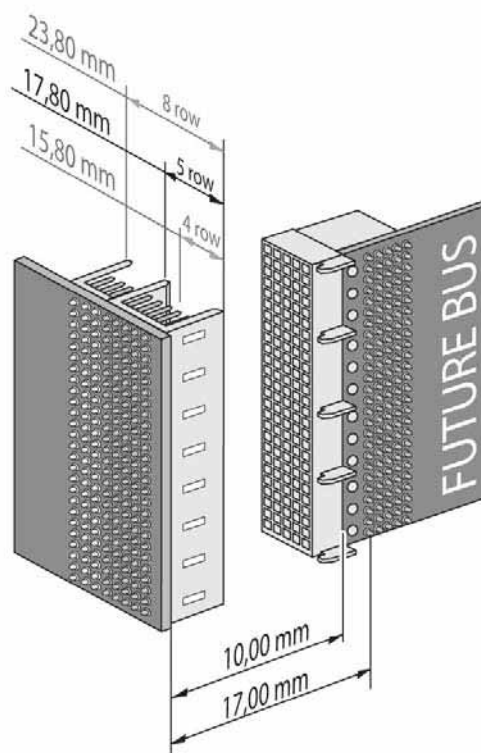
-  Future Bus
-  IPCI Bus
-  Performance Specifications
-  Electrical Specifications
-  Process Specifications

METRAL® FUTUREBUS versus HARD METRIC

TECHNICAL SPECIFICATION

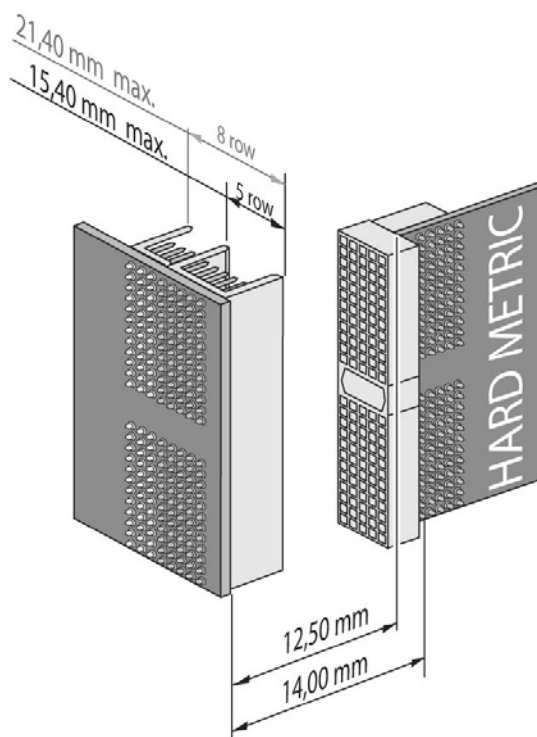
FUTUREBUS

- ▶ METRAL® Core
- ▶ METRAL® High Speed



HARD METRIC

- ▶ Millipacs
- ▶ Airmax



METRAL® IPCI Bus

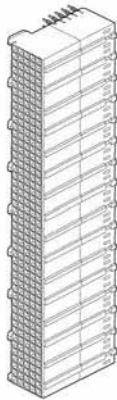
FCI Electronics

METRAL® connector system was chosen as the interconnection system for the IPCI (Industrial peripheral computer Interface)

The following are typical 3SU and 6SU board configurations

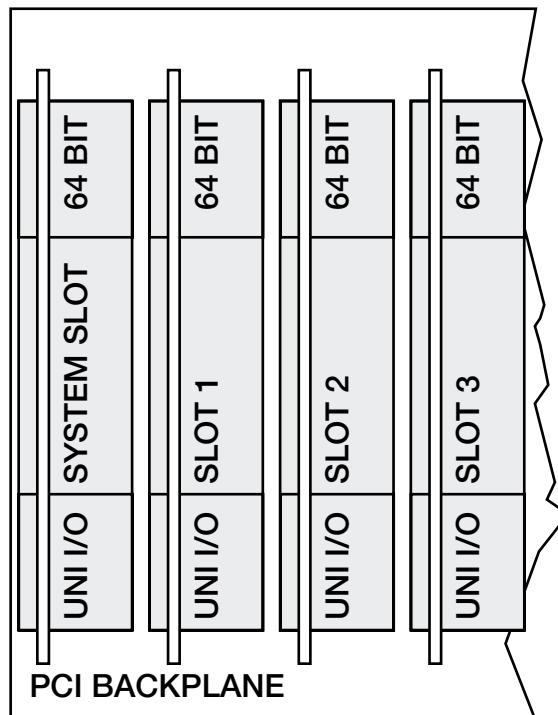
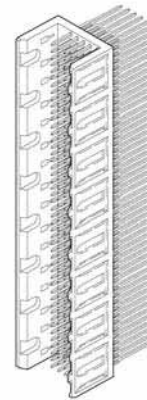
Daughter Board Receptacle Right-Angle

- Solder-to-Board
5 x 48 positions
85866-xxxLF
- Press-Fit
5 x 48 positions
89055-xxxLF



Backpanel Header Straight

- Press-Fit
5 x 48 positions
89009-xxxLF



ELECTRICAL CHARACTERISTICS

GENERAL

- Although some of these parameters can be obtained from tabulated measured data, they are typically obtained from finite element or boundary element modeling type programs which model portions of the connector as separate transmission line sections. The resulting R, L, and C matrices are converted to SPICE parameters for each transmission line section. These parameters basically define lumped element approximations to each transmission line section. The METRAL® connector can be represented by three such transmission line sections; one for the leaded section, one for the internal block section, and one for the header section.
- The METRAL™ connector has been modeled by FCI Electronics, Ind. using Quantic Laboratories' two dimensional boundary element modeling program called Greenfield®.
- FCI Electronics has a number of SPICE models available.
- METRAL® 4 row 7 : 1 and 2 : 1 signal/ground ratio
- METRAL® 5 row 2 : 1 and 4 : 1 signal/ground ratio
- METRAL® 5 row row C grounded

Of course if needed, a specific SPICE model can be generated (ask for details)

Summary METRAL™ electrical data Standard

- All data :** With 2 : 1 signal to ground ratio
Measurement system 50 Ohm impedance
- Capacitance**
(1 mHz)
(mated connector) 1 - 1,25 pF max.
(location dependent)
- Inductance**
500 ps risetime 12 - 18 nH
1000 ps risetime 15 - 24 nH
(location dependent)
- Propagation delay** 143 - 214 ps
(24 ps. row to skew)
- Crosstalk** (single line driven)
500 ps risetime 6,0 % max. near end
1000 ps risetime 3,5 % max. near end
- Impedance**
1000 ps risetime 56 - 71 Ohm
(location dependent)
- Contact resistance**
signal 25 - 45 m Ohm
power 8 m Ohm
- Insulation resistance** > 5000 M Ohm

ELECTRICAL CHARACTERISTICS

GENERAL

Current Carrying Capacity.

The current carrying capacity of a connector is that current which elevates the contact temperature to a specified value. It is a function of many variables including interconnection wiring (open wires and/or printed wiring), gauge and/or cross sections of wiring, board thicknesses, current in adjacent contacts, ambient temperature, and air flow.

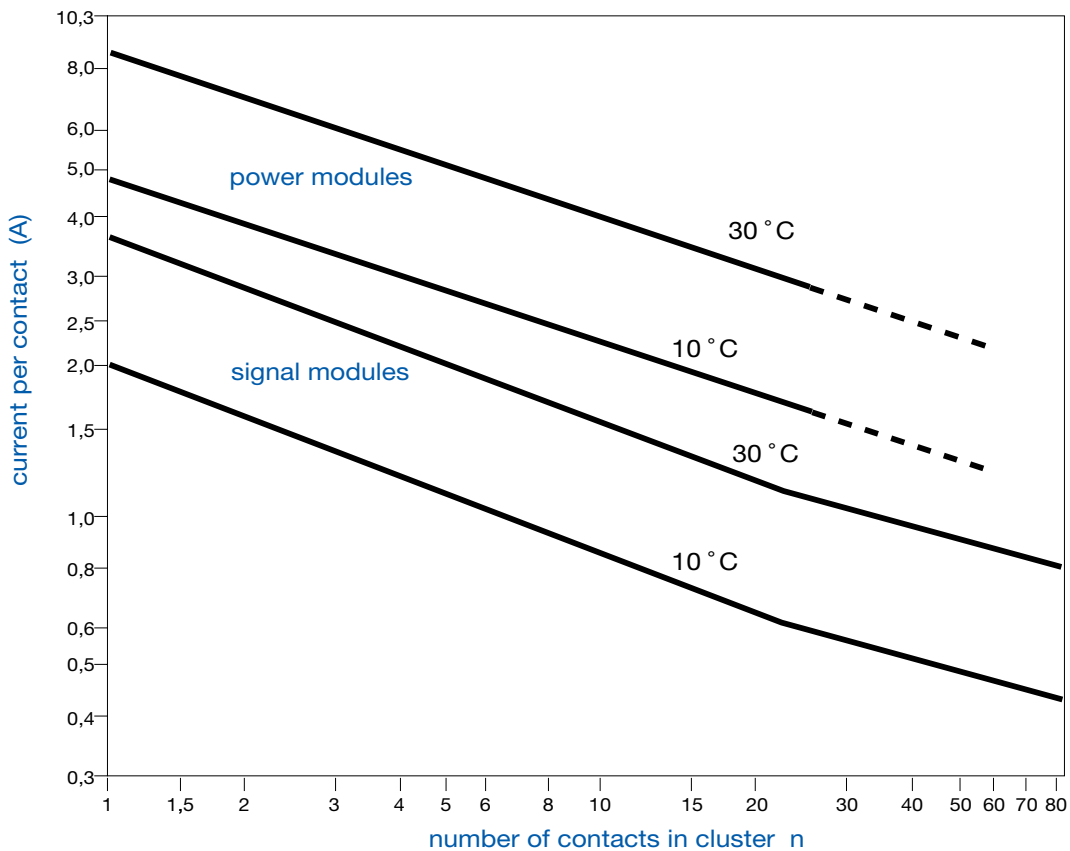
Since actual application details may differ from these experimental conditions, the following results are provided only as an approximate guide for the current carrying capacity of the METRAL® Modular System. Current carrying capacity was measured for 10°C and 30°C rise above ambient.

The results are shown in Fig. 1.

The curves show cluster number (number of current carrying contacts surrounding the measured contact, including the measured contact) versus contact current.

The curves will asymptotically approach constant current at large clusters, but are approximately linear on the log-log scale over a cluster range of 1 to 25 in all cases.

Fig. 1 Current carrying capacity per contact for 10 °C and 30 °C temperature rise



SPICE Parameters.

Some users might prefer to use SPICE parameter representations of the connector to do their own network simulation response studies. These are R,L, and C parameters placed in SPICE parameter formats to be used by a SPICE program.

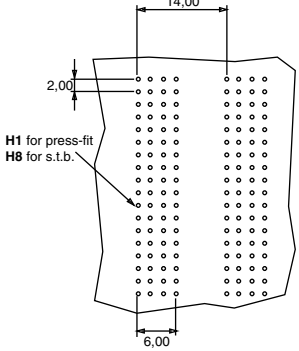
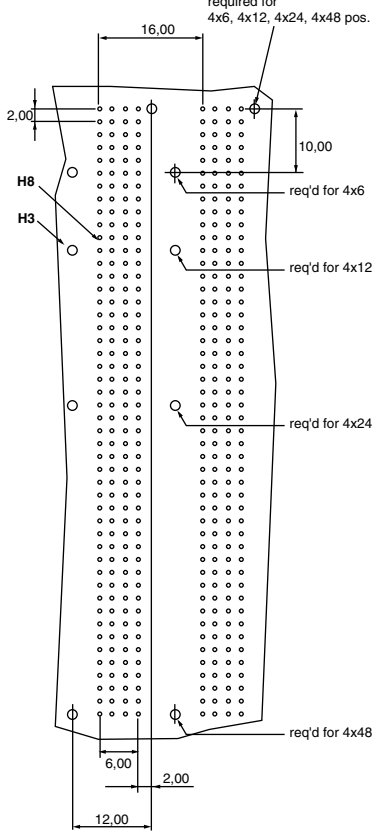
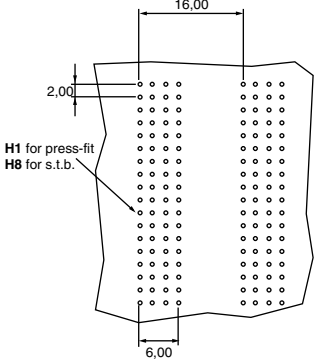
Hole Specifications

| | |
|--|---|
| ▶ Hole H1 <ul style="list-style-type: none"> • Drill size • Drilled hole tolerance • Copper plating • Tin-lead plating • Finished hole size • Recommended land size | 0,85 mm 0,81 to 0,86 mm 0,025 mm min 0,005 to 0,015 mm 0,65 to 0,80 mm 1,17 mm |
| ▶ Hole H2 <ul style="list-style-type: none"> • Unplated • Plated (for EE receptacle only) <ul style="list-style-type: none"> Drill size Copper plating Tin-lead plating Finished hole size | 2,05 +0,05/-0,00 mm 2,10 mm 0,025 to 0,050 mm 0,005 to 0,015 mm 1,05 to 2,05 mm |
| ▶ Hole H3 <ul style="list-style-type: none"> • Unplated | 1,50 +0,10/-0,00 mm |
| ▶ Hole H4 <ul style="list-style-type: none"> • Unplated-when used with guide pin • Plated - when used with straight screw-to-board high-power plug insert; use pad 5,00 mm min. in dia • Plated - for press-fit power insert <ul style="list-style-type: none"> Drill size Copper plating Tin-lead plating Finished hole size | 3,25 ±0,10 mm 3,25 ±0,10 mm 3,15 ±0,25 mm 0,04 mm min. 0,005 to 0,015 mm 3,00 +0,04/-0,06 mm |
| ▶ Hole H5 <ul style="list-style-type: none"> • Unplated | 6,00 +0,10/-0,00 mm |
| ▶ Hole H6 <ul style="list-style-type: none"> • Plated • When used with right-angle solder-to-board pass-through high-power receptacle insert, use common pad to tie all six holes together • When used with right-angle solder-to-board coax plug insert, surround each hole with pad 1,50 mm in dia. | 1,00 ±0,10 mm 1,00 ±0,10 mm |
| ▶ Hole H7 <ul style="list-style-type: none"> • Unplated | 2,80 +0,10/-0,00 mm |
| ▶ Hole H8 <ul style="list-style-type: none"> • Plated • Recommended land size | 0,70 +0,10/-0,05 mm 1,10 mm max |
| ▶ Hole H9 <ul style="list-style-type: none"> • Unplated | 1,85 ± 0,05 mm |

PCB Patterns

| PCB Pattern | Family | Applicable to connector type | PCB recommended layout |
|-------------|---------------------------|--|------------------------|
| P1 | Signal & Power | receptacle / header wide body / narrow body 4 row RIGHT ANGLE press-fit / solder-to-board / Pin-in-Paste (check P13 for Pin-in-Paste plating lay-out) | |
| P2 | Signal & Power | receptacle / header wide body / narrow body 5 row RIGHT ANGLE press-fit / solder-to-board / Pin-in-Paste (check P14 for Pin-in-Paste plating lay-out) | |
| P3 | Signal & Power | receptacle / header narrow body 4 row STRAIGHT solder-to-board | |

PCB Patterns

| PCB Pattern | Family | Applicable to connector type | PCB recommended layout |
|-------------|---------------------------|--|---|
| P4 | Signal & Power | receptacle / header narrow body 4 row STRAIGHT press fit |  |
| P5 | Signal & Power | receptacle / header wide body 4 row STRAIGHT solder to board |  |
| P6 | Signal & Power | receptacle / header wide body 4 row STRAIGHT press fit |  |

PCB LAYOUTS

PCB Patterns

| PCB Pattern | Family | Applicable to connector type | PCB recommended layout |
|-------------|---------------------------------|---|--|
| P7 | Signal & Power | receptacle / header wide body 5 row STRAIGHT press fit | <p>H1 for press-fit H8 for s.t.b.</p> |
| P8 | Hybrid | DIN high power receptacle | <p>14,00 for narrow body</p> |
| P9 | Hybrid & Accessories | DIN high power header DIN standard Coax header Guide pin | <p>14,00 for narrow body 16,00 for wide body</p> <p>H4 guide pin H4 power press-fit H4 power screw-to-board H5 coax/power coupler</p> <p>needed for centerplane application only</p> |
| P10 | Hybrid | DIN high power STRAIGHT receptacle DIN Standard RIGHT ANGLE receptacle | <p>for DIN power no central hole H6 for s.t.b.</p> |

PCB LAYOUTS

PCB Patterns

| PCB Pattern | Family | Applicable to connector type | PCB recommended layout |
|-------------|---------------|---|------------------------|
| P11 | Hybrid | MINI Coax receptacle | |
| P12 | Hybrid | MINI power header MINI Coax header | |
| P13 | Signal | plating lay-out receptacle 4 row Right Angle Pin-in-Paste | |
| P14 | Signal | plating lay-out receptacle 5 row Right Angle Pin-in-Paste | |

PCB LAYOUTS

PCB Patterns

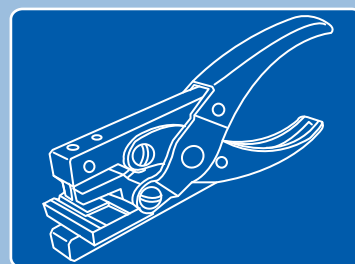
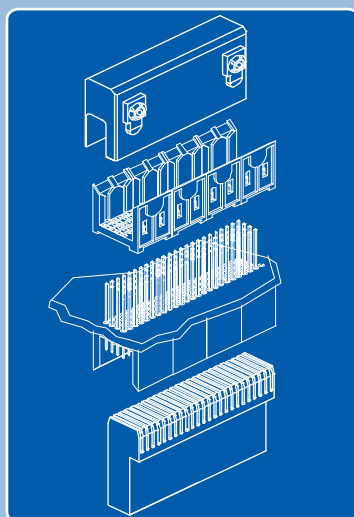
| PCB Pattern | Family | Applicable to connector type | PCB recommended layout |
|-------------------|----------------------------------|--|---|
| <p>P15</p> | <p>Signal & Power</p> | <p>receptacle / header wide body 5 row STRAIGHT press-fit Shielded</p> | <p>these holes when using an EE Shroud on opposite side</p> |
| <p>P16</p> | | <p>receptacle / header wide body 5 row STRAIGHT press-fit</p> | |
| <p>P17</p> | <p>Accessories</p> | <p>board-to-board keying receptacle</p> | <p>this row for EE Female Connector only</p> |

PCB Patterns


| PCB Pattern | Family | Applicable to connector type | PCB recommended layout |
|-------------|--------------------|---|------------------------|
| P18 | Accessories | board-to-board keying pin | |
| P19 | Accessories | ramping module | |
| P20 | Hybrid | MINI power receptacle | |
| P21 | | header wide body 8 row STRAIGHT press-fit | |

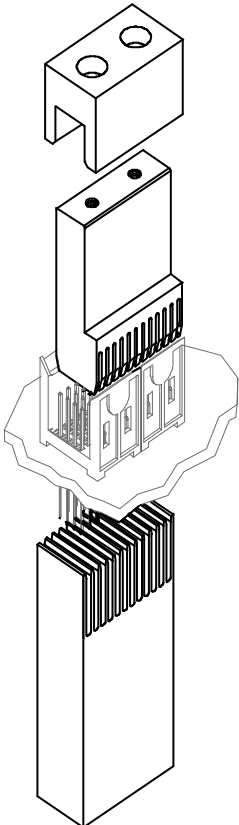
PCB LAYOUTS



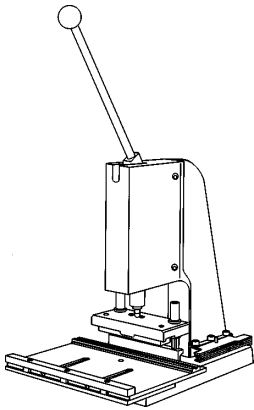
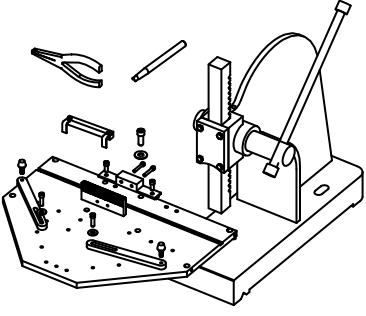
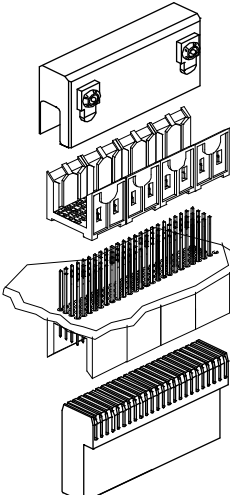
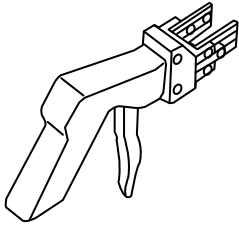


METRAL® APPLICATION EQUIPMENT

 application tooling for the diverse connector types

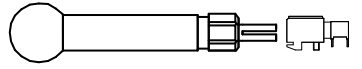
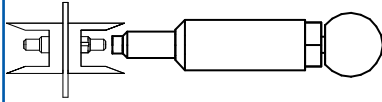
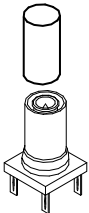
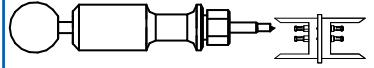
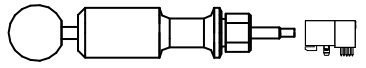
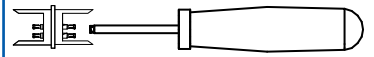
| Family | Connector Type | Tooling Description | Tooling Part number | Tooling Application |
|---|-------------------------------|---|---|--|
| <p>Signal, Power & Electrical Enhanced</p> | <p>Header Straight</p> | <p>insertion tooling</p> | |  |
| | | <p>press block holder - 4 and 5 row - 1 mod press block holder - 4 and 5 row - 2 mod press block holder - 4 and 5 row - 4 mod press block holder - 4 and 5 row - 8 mod</p> | <p>415446-001 415446-002 415446-003 415446-004</p> | |
| | | <p>board support - 4 and 5 row board support - 4 and 5 row board support - 4 and 5 row board support - 4 and 5 row</p> | <p>415609-001 415609-002 415609-003 415609-004</p> | |
| | | <p>signal press block - 4 row - 1 mod signal press block - 4 row - 2 mod signal press block - 4 row - 4 mod signal press block - 4 row - 8 mod</p> | <p>166934-001 166934-002 166934-003 166934-004</p> | |
| | | <p>signal press block - 5 row - 1 mod signal press block - 5 row - 2 mod signal press block - 5 row - 4 mod signal press block - 5 row - 8 mod</p> | <p>166935-001 166935-002 166935-003 166935-004</p> | |
| | | <p>power press block - 4 row - 1 mod power press block - 4 row - 2 mod power press block - 4 row - 4 mod power press block - 4 row - 8 mod</p> | <p>416393-001 416393-002 416393-003 416393-004</p> | |
| | | <p>power press block - 5 row - 1 mod power press block - 5 row - 2 mod power press block - 5 row - 4 mod power press block - 5 row - 8 mod</p> | <p>416394-001 416394-002 416394-003 416394-004</p> | |

| Family | Connector Type | Tooling Description | Tooling Part number | Tooling Application |
|-------------------------------------|-----------------|--|--|---------------------|
| Signal, Power & Electrical Enhanced | Header Straight | removal tool pin out of backside | MT-330 194208-001 | |
| | | removal tool pin out of matingside | MT-340 194204-001 | |
| | | self-repair KIT | MT-0370-01 | |
| | | multiple pin removal tool - 4 x 6 pos. multiple pin removal tool - 5 x 6 pos. | HT-0531 415878-001 HT-0532 415878-002 | |

| Family | Connector Type | Tooling Description | Tooling Part number | Tooling Application |
|-------------------------------------|------------------------|---|---|---|
| Signal, Power & Electrical Enhanced | Receptacle Right angle | insertion tool - 4 and 5 row top tool press bar - 8 mod top tool press bar - 1 mod top tool press bar - 2 mod top tool press bar - 4 mod board support bottom tool - 146.2mm | MT-0510 162452-001 162325-001 162325-004 162325-005 162325-007 162383-001 |  |
| | | removal tool - 4 and 5 row module blade - 1 mod module blade - 2 mod module blade - 4 mod module blade - 8 mod module press bar module press bar module press bar module press bar | HT-0518 415774-001 413773-001 413776-001 413774-001 413775-001 415783-001 415783-002 415783-004 415783-008 |  |
| Signal, Power | Shroud | insertion tool 4 row press block 2 mod - 4 row press block 4 mod - 4 row press block 8 mod - 4 row | 166934 166623-003 166623-002 166623-001 |  |
| | | insertion tool 5 row press block 2 mod - 5 row press block 4 mod - 5 row press block 8 mod - 5 row | 166935 166624-003 166624-002 166624-001 | |
| Electrical Enhanced | Shroud | removal tool die-cast housing | HT-0516 166816-001 |  |

| Family | Connector Type | Tooling Description | Tooling Part number | Tooling Application | |
|---------------------|-----------------------|--------------------------------------|--|--|--|
| Shielded Connectors | Round Cable Connector | insertion termination tool 4 row | HT-0524 | | |
| | | insertion termination tool 5 row | HT-0525 | | |
| | | removal termination tool 4 and 5 row | HT-0522 | | |
| | | removal termination tool contacts | HT-0523 | | |
| | | cover assembly tool 4 and 5 row | HT-0520 415810-001 | | |
| | | shielded cover assembly press | HT-0535 415860-001 | | |
| | | | latch removal | HT-0517 | |
| | | Shielded Header & Shroud | insertion press block - 1 mod - 5 row insertion press block - 2 mod - 5 row insertion press block - 4 mod - 5 row insertion press block - 8 mod - 5 row press block holder - 1 mod press block holder - 2 mod press block holder - 4 mod press block holder - 8 mod | 416398-001 416398-002 416398-003 416398-004 415446-001 415446-002 415446-003 415446-004 | |

APPLICATION EQUIPMENT

| Family | Connector Type | Tooling Description | Tooling Part number | Tooling Application |
|------------------|---------------------------------|------------------------------------|--------------------------------|---|
| Hybrid Connector | DIN Standard Coax | extraction tool receptacle housing | HT-0333 |  |
| | | extraction tool receptacle header | 194870 |  |
| | Hybrid Connector | insertion header coax contact | HT-0359 |  |
| | | removal header coax contact | HT-0400 |  |
| | | Mini Coax | insertion tool coax receptacle | 415591-001 |
| | extraction tool coax receptacle | | HT-0410 |  |
| | removal tool housing | | HT-358 |  |

| Family | Connector Type | Tooling Description | Tooling Part number | Tooling Application |
|-----------------|---|--|--|---------------------|
| Accessories | Guide Pin | guide pin insertion and removal tool | 415995-001 | |
| | Shorting Clip | insertion tooling - 4 row | 409298-001 | |
| | | insertion tooling - 5 row | 409298-002 | |
| Signal 8 row | Header Straight 8 row and Shroud 8 row | insertion tooling 2 mod (8 x 12pos.) press block holder press block board support press block | 415921-002 430073-001 416070-001 430073-002 | |
| | Receptacle 8 row | insertion tooling 2 mod (8 x 12pos.) Top tool press bar board support bottom tool | 416247-002 415970-002 | |

APPLICATION EQUIPMENT

| PART NUMBER | DESCRIPTION | | PAGE |
|-------------|--|----------------------|-----------------|
| 52048 | 4 row signal Receptacle right angle pin-in-paste | 1 module | 37 |
| 52049 | 5 row signal Receptacle right angle pin-in-paste | 1 module | 47 |
| 58361 | 4 row signal Header right angle pin-in-paste narrow body | 1 module | 65 |
| 58363 | 4 row signal Header right angle press-fit narrow body | 1 module | 63 |
| 63346 | 5 row power header straight solder-to-board wide body | 1 module | 105 |
| 63735 | hybrid housing 4 row hybrid housing | | 197 |
| 63793 | 5 row power receptacle right angle pin-in-paste | 1 module | 113 |
| 70200 | DIN coax receptacle coax insert | | 163 |
| 70201 | DIN high power header power insert | | 155 |
| 70203 | 4 row shroud | 1, 2, 4 and 8 module | 83 |
| 70212 | DIN coax receptacle coax insert | | 163 |
| 70232 | 4 row signal Header straight press-fit wide body | 1 module | 27 |
| 70233 | 4 row signal Header straight press-fit wide body | 2 module | 27 |
| 70234 | 4 row signal Header straight press-fit wide body | 4 module | 27 |
| 70235 | 4 row signal Header straight press-fit wide body | 8 module | 27 |
| 70236 | 4 row power header straight press-fit wide body | 1 module | 93 |
| 70239 | MINI coax receptacle coax insert right angle | | 169 |
| 70243 | MINI power header straight housing narrow body | | 159 / 167 |
| 70244 | MINI power receptacle right angle housing | | 161 / 163 / 169 |
| 70264 | 4 row signal Header straight solder-to-board narrow body | 1 module | 29 |
| 70278 | 4 row power header straight solder-to-board narrow body | 1 module | 95 |
| 70290 | DIN high power header housing narrow body | | 155 |
| 70292 | guide pin receptacle housing | | 155 / 185 |
| 70295 | guide pin guide pin | | 185 |
| 70424 | DIN high power receptacle power insert / feed through | | 157 |
| 70437 | 5 row Electrical Enhanced header straight press-fit wide body shielded | 1 module | 135 |
| 70438 | 5 row Electrical Enhanced shroud wide body shielded | 1 module | 137 |
| 72013 | 4 row shorting clip | | 191 |
| 72015 | 5 row shorting clip | | 193 |
| 72031 | 5 row Shielded header straight press-fit | 1 module | 143 |
| 72096 | DIN coax header coax insert straight | | 165 |
| 72388 | cable connector coding key | | 183 |
| 72476 | 4 row Cable connector | 4x6 pos | 173 |
| 72477 | 4 row Cable connector | 4x12 pos | 173 |
| 72478 | 5 row Cable connector | 5x6 pos | 175 |
| 72479 | 5 row Cable connector | 5x12 pos | 175 |
| 72651 | 4 row power receptacle right angle pin-in-paste | 1 module | 103 |
| 73996 | end wall end wall | | 195 |
| 74741 | 5 row signal Header straight solder-to-board wide body | 1 module | 39 |
| 74770 | 8 row signal Receptacle right angle press-fit | 2 module | 51 |
| 74771 | 8 row signal Header straight press-fit wide body | 2 module | 49 |
| 85706 | 5 row Shielded round cable connector | | 145 |
| 85757 | 4 row signal Receptacle straight press-fit | 1 module | 69 |
| 85758 | 4 row signal Receptacle straight press-fit | 2 module | 69 |
| 85759 | 4 row signal Receptacle straight press-fit | 4 module | 69 |
| 85760 | 4 row signal Receptacle straight press-fit | 8 module | 69 |
| 85761 | 5 row signal receptacle straight press-fit | 1 module | 79 |
| 85763 | 5 row signal receptacle straight press-fit | 4 module | 79 |
| 85811 | coding key coding key header | | 181 |
| 85812 | coding key coding key receptacle | | 181 |
| 85813 | coding key coding key header | | 181 |
| 85814 | coding key coding key receptacle | | 181 |
| 85822 | 4 row signal Header right angle solder-to-board narrow body | 1 module | 61 |
| 85826 | 4 row signal Header straight press-fit narrow body | 1 module | 31 |
| 85830 | 4 row power header straight press-fit narrow body | 1 module | 97 |
| 85847 | 5 row Electrical Enhanced receptacle right angle press-fit shielded | 1 module | 139 |
| 85863 | 5 row signal Receptacle right angle solder-to-board | 1 module | 43 |



| PART NUMBER | DESCRIPTION | | PAGE |
|-------------|--|----------------------|-----------|
| 85864 | 5 row signal Receptacle right angle solder-to-board | 2 module | 43 |
| 85865 | 5 row signal Receptacle right angle solder-to-board | 4 module | 43 |
| 85866 | 5 row signal Receptacle right angle solder-to-board | 8 module | 43 |
| 85876 | 5 row power receptacle right angle solder-to-board | 1 module | 109 |
| 85968 | 4 row power receptacle straight solder-to-board | 1 module | 123 |
| 85972 | MINI power header mini power plug / coupler | | 159 |
| 85973 | MINI power header straight mini power insert press-fit | | 159 |
| 85975 | MINI power header right angle mini power insert | | 159 |
| 85976 | MINI power receptacle right angle mini power insert | | 161 |
| 85995 | DIN high power receptacle power insert | | 157 |
| 88910 | ramping ramping module | | 189 |
| 88911 | DIN high power header housing wide body | | 155 / 163 |
| 88913 | MINI power header straight housing wide body | | 159 / 167 |
| 88914 | board-to-board keying pin | | 187 |
| 88916 | board-to-board keying receptacle module press-peg | | 187 |
| 88945 | 4 row signal Receptacle right angle press-fit | 1 module | 35 |
| 88946 | 4 row signal Receptacle right angle press-fit | 2 module | 35 |
| 88947 | 4 row signal Receptacle right angle press-fit | 4 module | 35 |
| 88948 | 4 row signal Receptacle right angle press-fit | 8 module | 35 |
| 88949 | 4 row power receptacle right angle press-fit | 1 module | 101 |
| 88951 | 4 row signal Header straight solder-to-board wide body | 1 module | 25 |
| 88952 | 4 row signal Header straight solder-to-board wide body | 2 module | 25 |
| 88953 | 4 row signal Header straight solder-to-board wide body | 4 module | 25 |
| 88954 | 4 row signal Header straight solder-to-board wide body | 8 module | 25 |
| 88960 | 4 row power header straight solder-to-board wide body | 1 module | 91 |
| 88971 | MINI coax header straight coax plug/plug coupler | | 167 |
| 88977 | DIN high power header power insert | | 155 |
| 88978 | MINI coax header straight coax insert press-fit | | 167 |
| 88980 | MINI coax header straight coax insert solder-to-board | | 167 |
| 88982 | MINI power header right angle housing | | 159 / 167 |
| 88983 | MINI coax header right angle coax insert solder-to-board | | 167 |
| 89006 | 5 row signal Header straight press-fit wide body | 1 module | 41 |
| 89007 | 5 row signal Header straight press-fit wide body | 2 module | 41 |
| 89008 | 5 row signal Header straight press-fit wide body | 4 module | 41 |
| 89009 | 5 row signal Header straight press-fit wide body | 8 module | 41 |
| 89035 | 4 row signal Receptacle right angle solder-to-board | 1 module | 33 |
| 89036 | 4 row signal Receptacle right angle solder-to-board | 2 module | 33 |
| 89037 | 4 row signal Receptacle right angle solder-to-board | 4 module | 33 |
| 89038 | 4 row signal Receptacle right angle solder-to-board | 8 module | 33 |
| 89039 | 4 row power receptacle right angle solder-to-board | 1 module | 99 |
| 89047 | 5 row signal Receptacle right angle press-fit | 1 module | 45 |
| 89055 | 5 row shroud | 1, 2, 4 and 8 module | 85 |
| 89092 | DIN high power receptacle housing | | 157 / 165 |
| 89093 | 5 row signal Receptacle right angle press-fit | 2 module | 45 |
| 89094 | 5 row signal Receptacle right angle press-fit | 4 module | 45 |
| 89095 | 5 row signal Receptacle right angle press-fit | 8 module | 45 |
| 89096 | 5 row power receptacle right angle press-fit | 1 module | 111 |
| 89099 | 5 row power header straight press-fit wide body | 1 module | 107 |
| 90837 | coding key coding key header | | 181 |
| 91210 | coding key coding key receptacle | | 181 |
| 91289 | coding key coding key header | | 181 |
| 91290 | coding key coding key receptacle | | 181 |
| 91570 | DIN high power header screw-to-board power insert | | 155 |
| 93903 | DIN coax header coax insert straight | | 165 |
| 93904 | DIN coax header coax insert straight | | 165 |
| 94561 | 5 row power receptacle straight solder-to-board | 1 module | 131 |
| 98173 | 8 row shroud | 2 module | 87 |

| PART NUMBER | DESCRIPTION | | PAGE |
|-------------------|---|----------|------|
| 10009536 | high power receptacle | 2x1 pos | 151 |
| 10009542 | high power header | 2x2 pos | 149 |
| 10009556 | high power header | 2x1 pos | 149 |
| 10013881 | 72 position shielded IDC cable connector | 72 pos | 177 |
| 10025058 | high power receptacle | 2x2 pos | 151 |
| HM1K41DAP000H6PLF | 4 row power header right angle solder-to-board wide body | 1 module | 117 |
| HM1K41DDP000H6PLF | 4 row power header right angle press-fit wide body | 1 module | 119 |
| HM1K41DFP000H6PLF | 4 row power header right angle pin-in-paste wide body | 1 module | 121 |
| HM1K51DAP000H6PLF | 5 row power header right angle solder-to-board wide body | 1 module | 125 |
| HM1K51DDP000H6PLF | 5 row power header right angle press-fit wide body | 1 module | 127 |
| HM1K51DFP000H6PLF | 5 row power header right angle pin-in-paste wide body | 1 module | 129 |
| HM1L41LAP000H6PLF | 4 row signal Header right angle solder-to-board wide body | 1 module | 55 |
| HM1L41LDP000H6PLF | 4 row signal Header right angle press-fit wide body | 1 module | 57 |
| HM1L41LFP000H6PLF | 4 row signal Header right angle pin-in-paste wide body | 1 module | 59 |
| HM1L42LAP000H6PLF | 4 row signal Header right angle solder-to-board wide body | 2 module | 55 |
| HM1L42LDP000H6PLF | 4 row signal Header right angle press-fit wide body | 2 module | 57 |
| HM1L43LAP000H6PLF | 4 row signal Header right angle solder-to-board wide body | 4 module | 55 |
| HM1L43LDP000H6PLF | 4 row signal Header right angle press-fit wide body | 4 module | 57 |
| HM1L44LAP000H6PLF | 4 row signal Header right angle solder-to-board wide body | 8 module | 55 |
| HM1L44LDP000H6PLF | 4 row signal Header right angle press-fit wide body | 8 module | 57 |
| HM1S51FRR000H6PLF | 5 row signal receptacle straight solder-to-board | 1 module | 77 |
| HM1L51LAP000H6PLF | 5 row signal header right angle solder-to-board wide body | 1 module | 71 |
| HM1L51LDP000H6PLF | 5 row signal header right angle press-fit wide body | 1 module | 73 |
| HM1L51LFP000H6PLF | 5 row signal header right angle pin-in-paste wide body | 1 module | 75 |
| HM1S52FRR000H6PLF | 5 row signal receptacle straight solder-to-board | 2 module | 77 |
| HM1L52LAP000H6PLF | 5 row signal header right angle solder-to-board wide body | 2 module | 71 |
| HM1L52LDP000H6PLF | 5 row signal header right angle press-fit wide body | 2 module | 73 |
| HM1S53FRR000H6PLF | 5 row signal receptacle straight solder-to-board | 4 module | 77 |
| HM1L53LAP000H6PLF | 5 row signal header right angle solder-to-board wide body | 4 module | 71 |
| HM1L53LDP000H6PLF | 5 row signal header right angle press-fit wide body | 4 module | 73 |
| HM1S54FRR000H6PLF | 5 row signal receptacle straight solder-to-board | 8 module | 77 |
| HM1L54LAP000H6PLF | 5 row signal header right angle solder-to-board wide body | 8 module | 71 |
| HM1L54LDP000H6PLF | 5 row signal header right angle press-fit wide body | 8 module | 73 |
| HM1S41FRR000H6PLF | 4 row signal Receptacle straight solder-to-board | 1 module | 67 |
| HM1S42FRR000H6PLF | 4 row signal Receptacle straight solder-to-board | 2 module | 67 |
| HM1S43FRR000H6PLF | 4 row signal Receptacle straight solder-to-board | 4 module | 67 |
| HM1S44FRR000H6PLF | 4 row signal Receptacle straight solder-to-board | 8 module | 67 |

Lined area for notes, consisting of a large rectangular box with rounded corners and horizontal lines.

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