

ELECTRONICS

METRAL®

2 mm Modular Interconnect System

TABLE OF CONTENTS

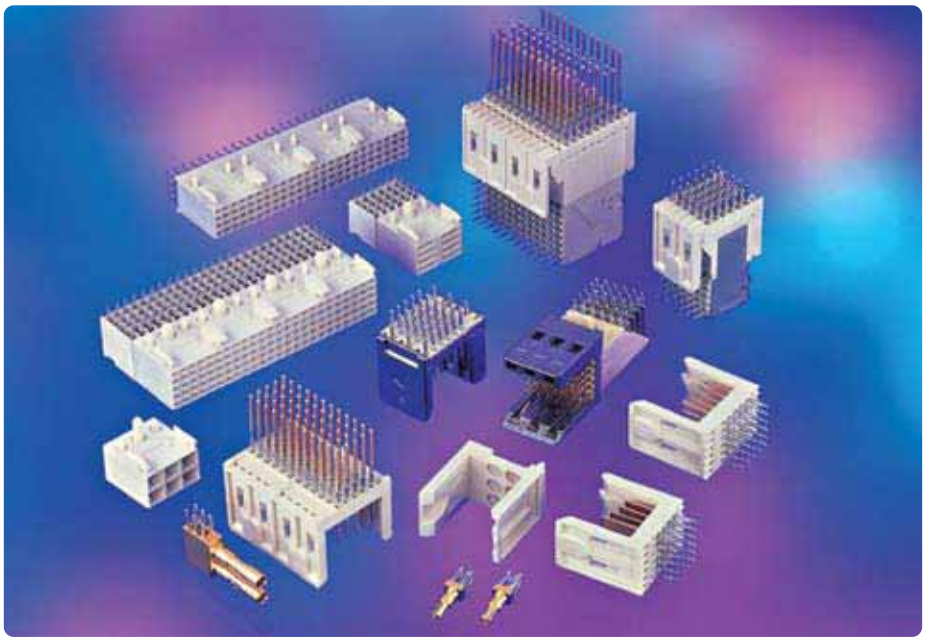
General information				3
Catalog Main set up				4
METRAL® core product selector	most popular METRAL® connector selector			5
Product finder	all products			9
Application selector	various applications examples			18
Signal connectors standard	header	straight	4 row - wide body	24
	header	straight	4 row - narrow body	28
	receptacle	right angle	4 row	32
	header	straight	5 row - wide body	40
	receptacle	right angle	5 row	42
	header	straight	8 row - wide body	48
	receptacle	right angle	8 row	50
Signal connectors reversed	header	right angle	4 row - wide body	54
	header	right angle	4 row - narrow body	60
	receptacle	straight	4 row	66
	header	right angle	5 row - wide body	70
	receptacle	straight	5 row	76
Shrouds	4 row - wide body			82
	5 row - wide body			84
	8 row - wide body			86
Power connectors standard	header	straight	4 row - wide body	90
	header	straight	4 row - narrow body	94
	receptacle	right angle	4 row	98
	header	straight	5 row - wide body	104
	receptacle	right angle	5 row	108
Power connectors reversed	header	right angle	4 row - wide body	110
	receptacle	straight	4 row	122
	header	right angle	5 row - wide body	124
	receptacle	straight	5 row	130
Electrical enhanced	header	straight	5 row	134
	shroud		5 row (5+2 row)	136
	receptacle	right angle	5 row	138
Shielded connectors	header	straight	5 row	142
	round cable connector		5 row	144
High power connector	high power header			148
	high power receptacle			150
Hybrid connectors	DIN standard high power			154
	Mini power			158
	DIN standard coax			162
	Mini coax			166
Cable connectors	signal			172
	shielded			176
Accessories	coding keys			180
	cable connector coding keys			182
	guide pin			184
	board-to-board keying system			186
	ramping module			188
	shorting clip			190
	end wall			194
	hybrid housing			196
Application specific	monoblocks			200
	customized designs			200
Technical specification	Futurebus			204
	IPCI Bus			205
	electrical specs			206
PCB- lay out	pcb lay out recommendations			208
Application equipment				217
Part number index				224

FCI: SETTING THE STANDARD FOR CONNECTORS

With operations in 30 countries,FCI is a leading manufacturer of connectors. Our 13,500 employees are commited 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)



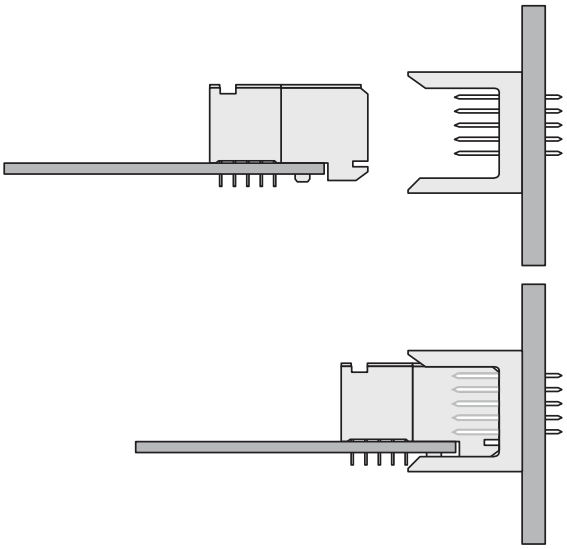
LIABILITY

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

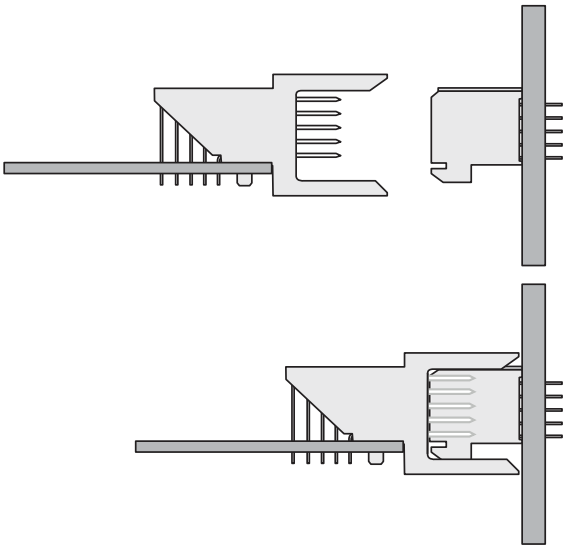
STANDARD CONNECTION

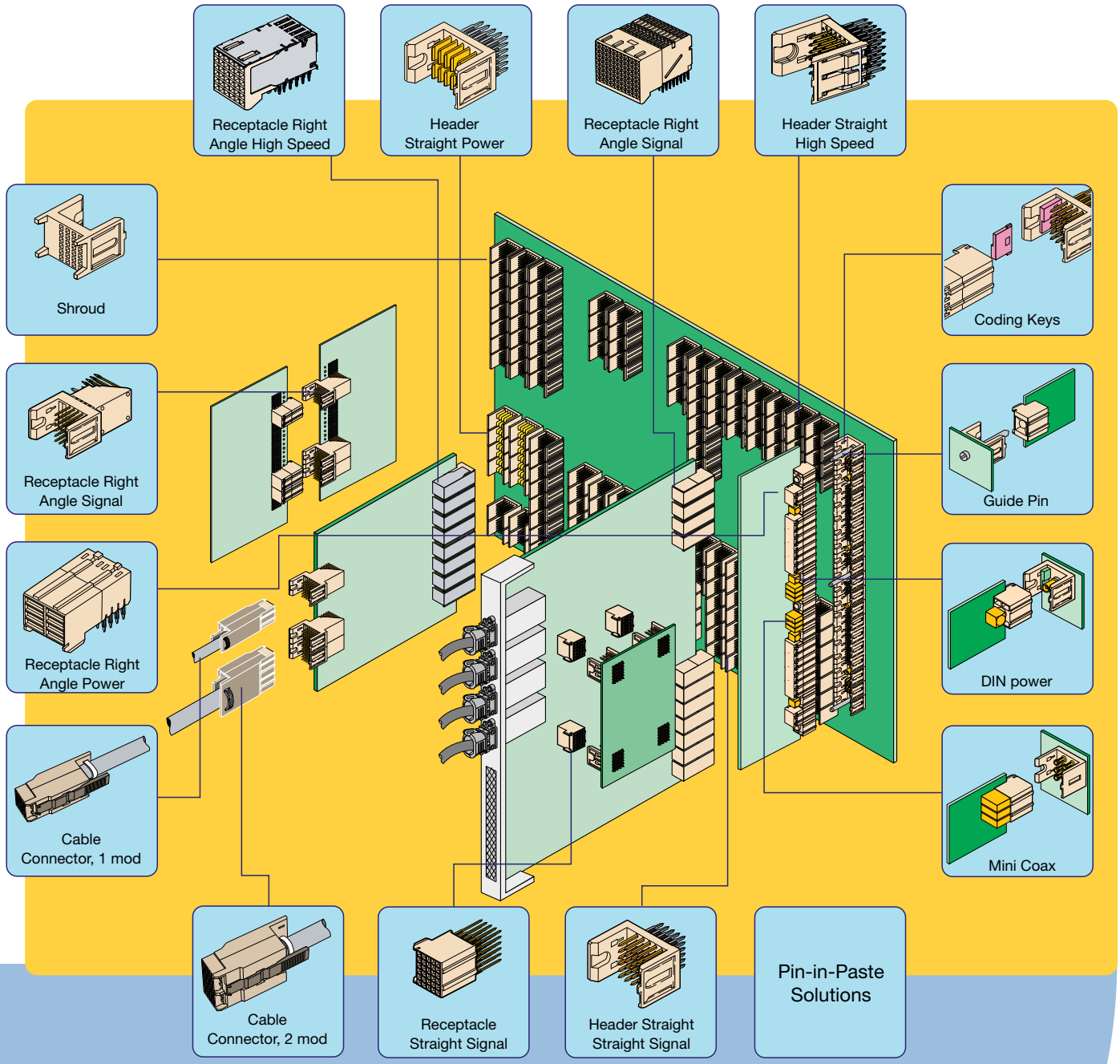
- Straight Header on backplane / motherboard
- Right Angle Receptacle on the daughter card
- Additional choices, 4 or 5 row and signal or power



REVERSED CONNECTION

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



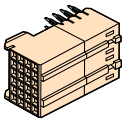


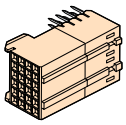
METRAL® Core Product Selector

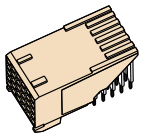
- Selection of the most popular connectors out of the METRAL® family

Signal Standard

Receptacle, Right angle, Signal

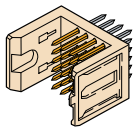

press-fit


solder to board


pin in paste

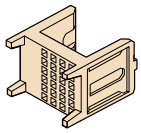
Press Fit			
Module	4 row	5 row	8 row
1	88945-102LF	89047-102LF	-
2	88946-102LF	89093-102LF	74770-102LF
4	88947-102LF	89094-102LF	-
8	88948-102LF	89095-102LF	-
Solder to Board			
1	89035-102LF	85863-102LF	
2	89036-102LF	85864-102LF	
4	89037-102LF	85865-102LF	
8	89038-102LF	85866-102LF	
Pin in Paste	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

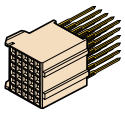
Shroud

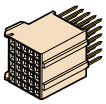


Wide body			
Module	4 row	5 row	8 row
1	70203-111LF	89055-111LF	-
2	70203-112LF	89055-112LF	98173-102LF
4	70203-113LF	89055-113LF	-
8	70203-114LF	89055-114LF	-

Signal Reversed

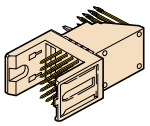
Receptacle, Straight, Signal


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

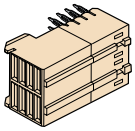
Header, Right angle, Signal

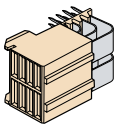


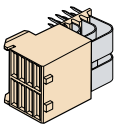
Press Fit Wide Body		
Module	4 row	5 row
1	HM1L41LDP000H6PLF	HM1L51LDP000H6PLF
2	HM1L42LDP000H6PLF	HM1L52LDP000H6PLF
4	HM1L43LDP000H6PLF	HM1L53LDP000H6PLF
8	HM1L44LDP000H6PLF	HM1L54LDP000H6PLF
Solder to Board Wide Body		
1	HM1L41LAP000H6PLF	HM1L51LAP000H6PLF
2	HM1L42LAP000H6PLF	HM1L52LAP000H6PLF
4	HM1L43LAP000H6PLF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

Power Standard

Receptacle, Right angle, Power

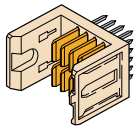

press-fit


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

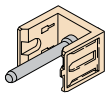
Header, Straight, Power

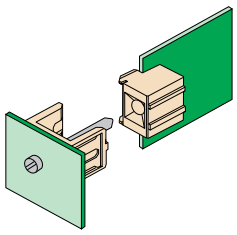


Press Fit, Wide Body		
Module	4 row	5 row
1	70236-101LF	89099-111LF

Accessories

Guide Pin

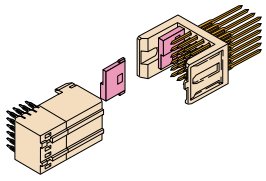




Guide Pin	
short, single-sided	70295-001LF
long , single-sided	70295-002LF

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

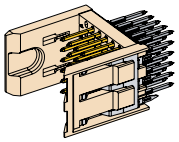
Extended Coding Keys



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

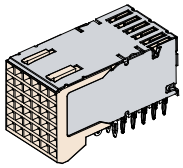
High Speed

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

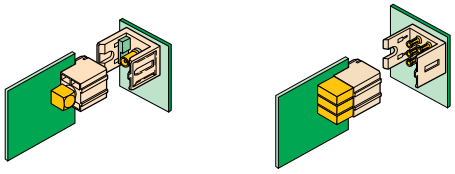
Receptacle, Right Angle, High Speed



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

Hybrid connectors



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

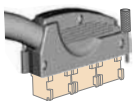
Cable Connectors

Cable Connector, Signal



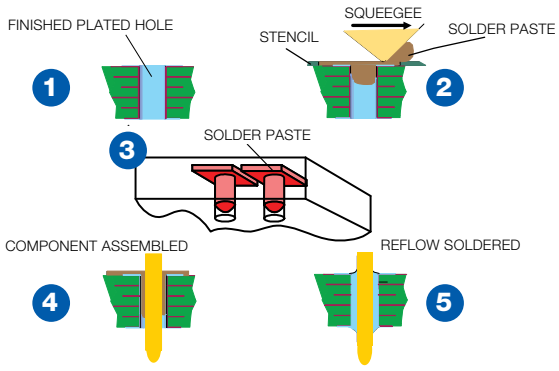
Module	4 row	5 row
1	72476-1111LF	72478-1111LF
2	72477-1111LF	72479-1111LF

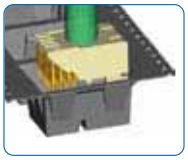
Cable Connector, Shielded



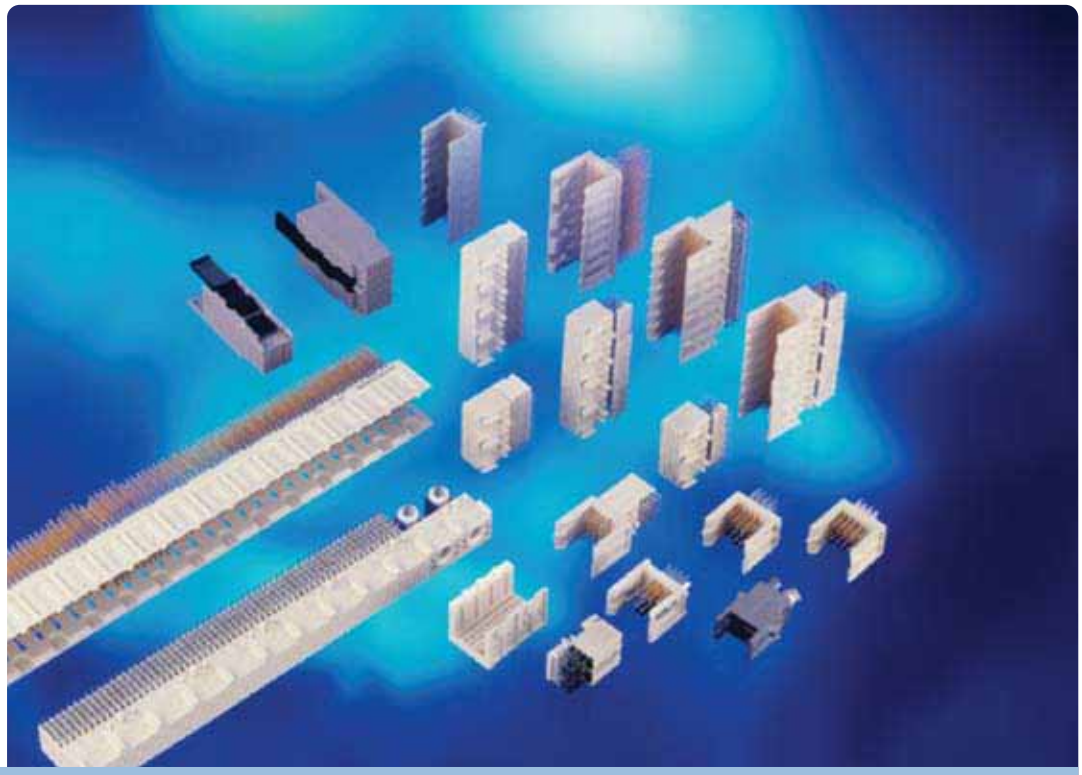
positions	4 row
72	10013881-231LF

Pin in Paste





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 acces to select product
- Diversity on application examples

METRAL® SIGNAL CONNECTORS STANDARD

product	description					housing size (number of lines) 12 mm	24 mm	48 mm	96 mm	page
	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 12 mm 24 mm 48 mm 96 mm number of lines				page
	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 12 mm 24 mm 48 mm 96 mm number of lines				page
	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 12 mm / 24 mm / 48 mm / 96 mm number of lines				page
	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 12 mm / 24 mm / 48 mm / 96 mm number of lines				page
	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 12 mm / 24 mm / 48 mm / 96 mm number of lines				page
	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 12 mm / 24 mm / 48 mm / 96 mm number of lines				page
	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 12 mm / 24 mm / 48 mm / 96 mm number of lines				page
	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 12 mm / 24 mm / 48 mm / 96 mm number of lines				page
	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 12 mm 24 mm 48 mm 96 mm number of lines				page
	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

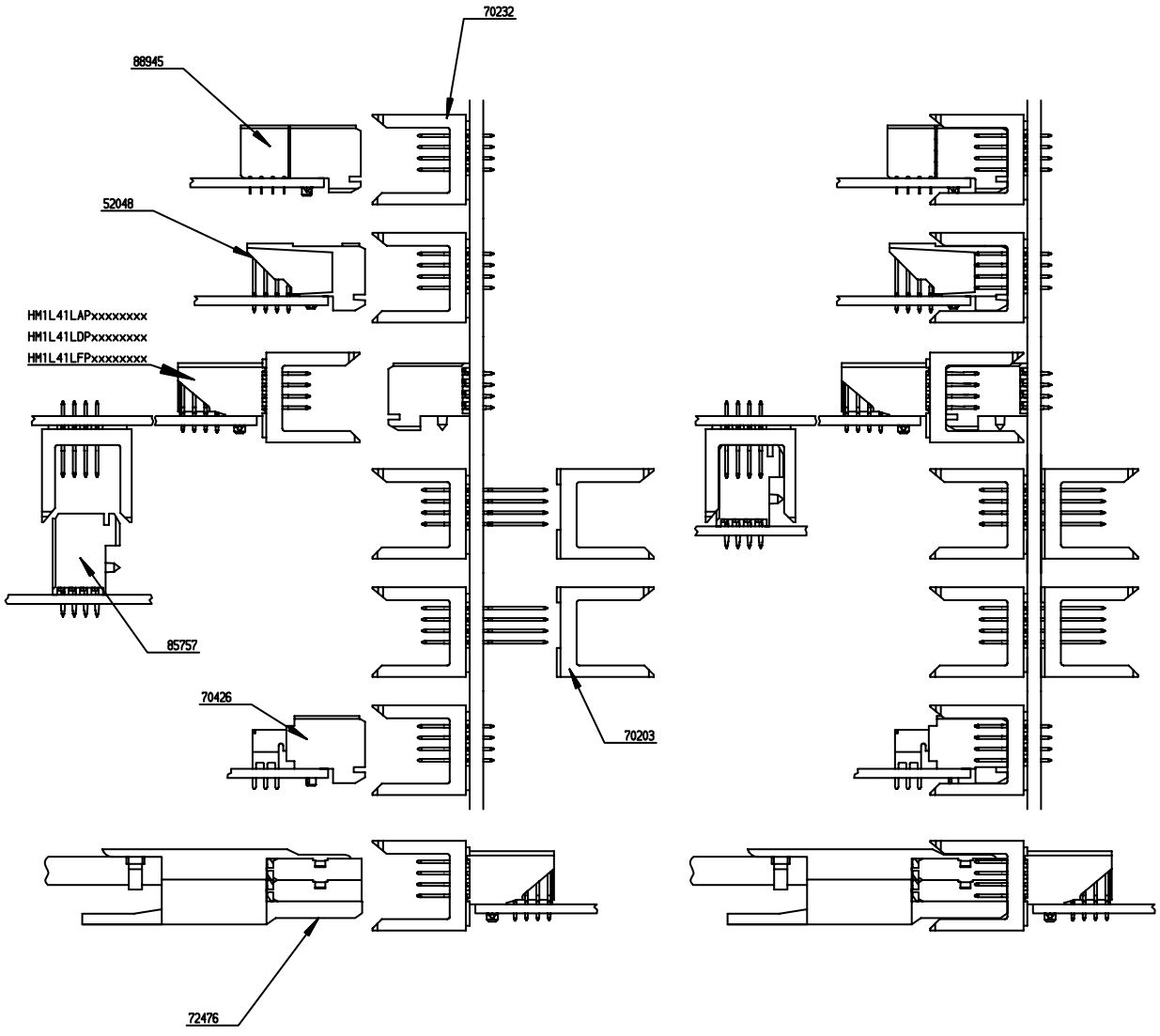
product	description					housing size 12 mm 24 mm 48 mm 96 mm number of lines				page
	Coding Keys Header Cable conn.	-	-	-	-	-	-	-	-	180 182
	Guide Pin	-	-	-	-	1				184
	Board to Board Keying system	-	-	-	-	6				186
	Ramping module	-	-	-	-	1				188
	Shorting Clip Header	Straight	PF	Signal	wide body	-	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

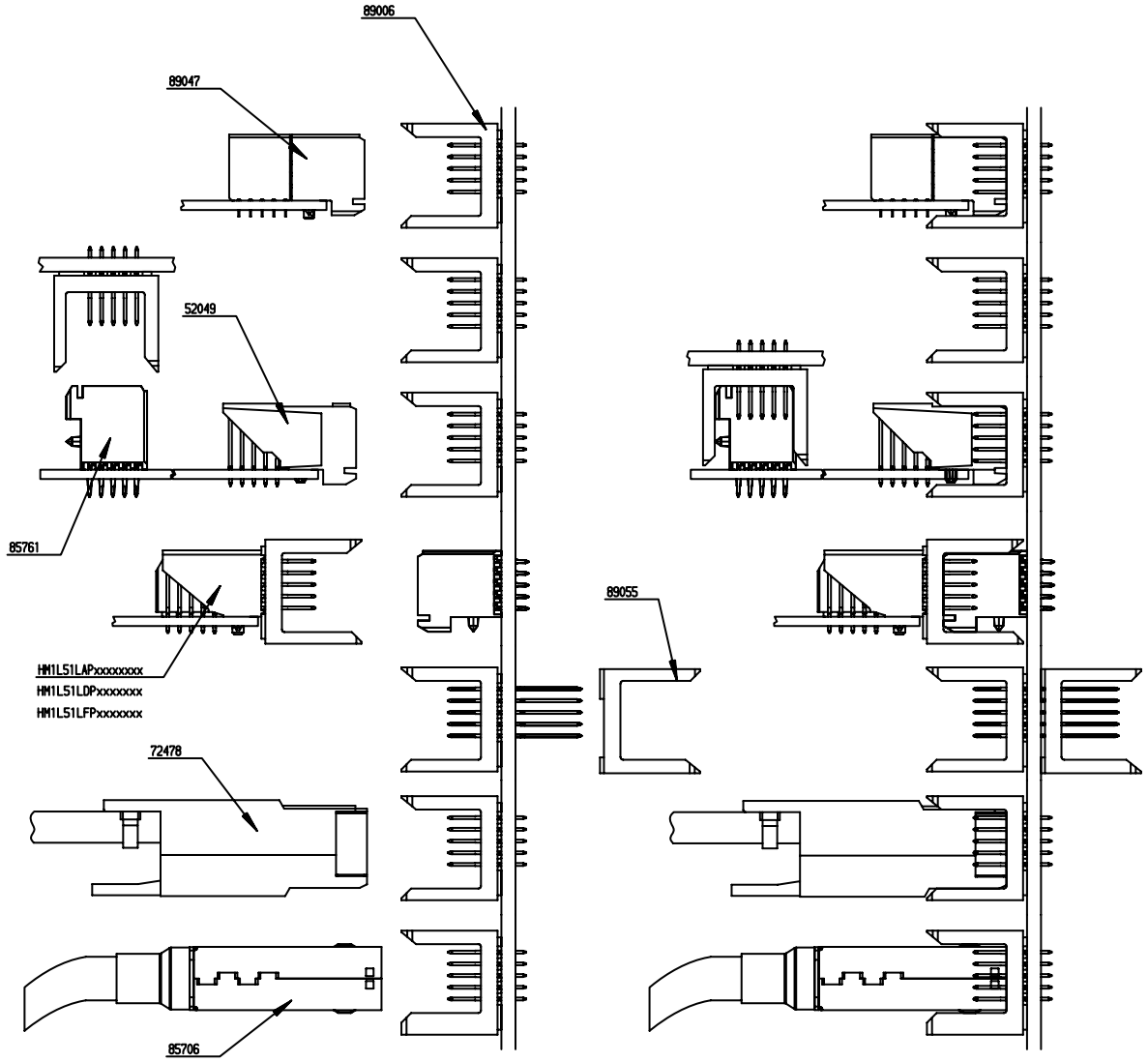
MATED



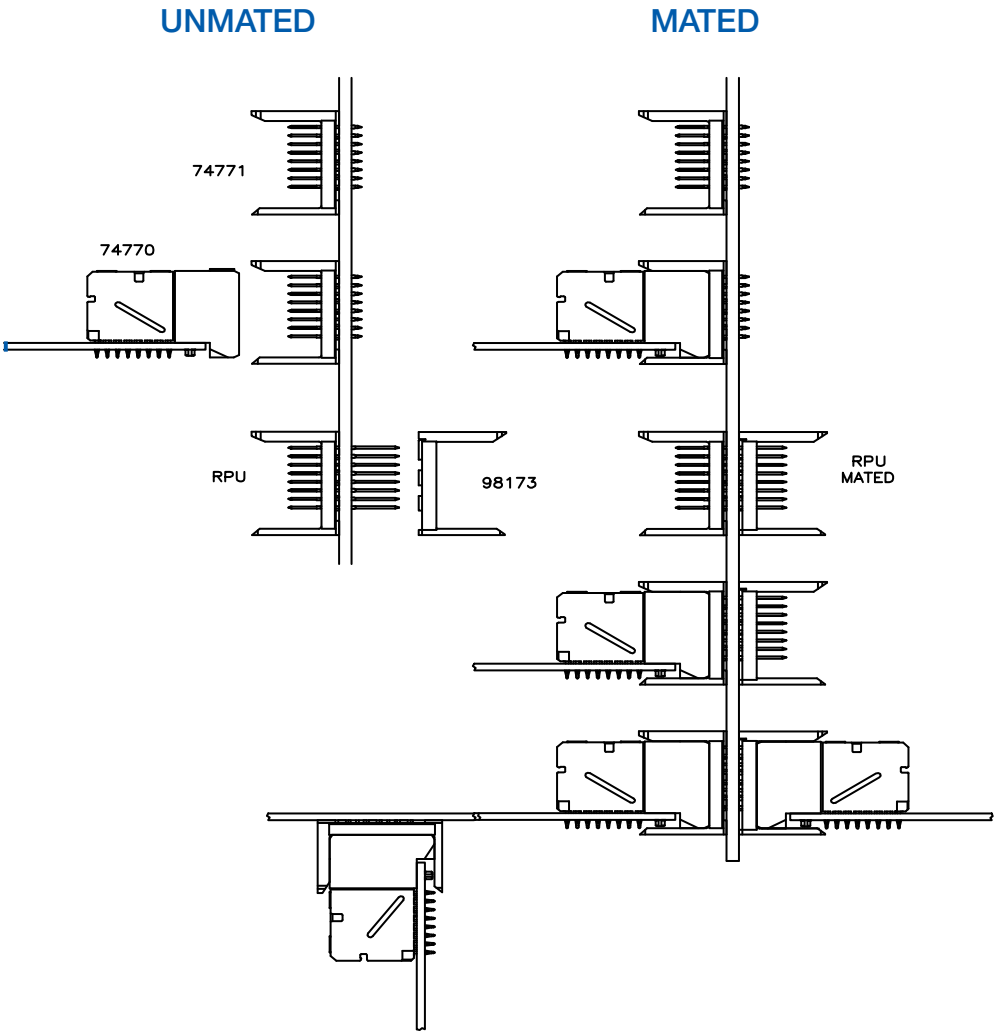
METRAL® 5 row assemblies

UNMATED

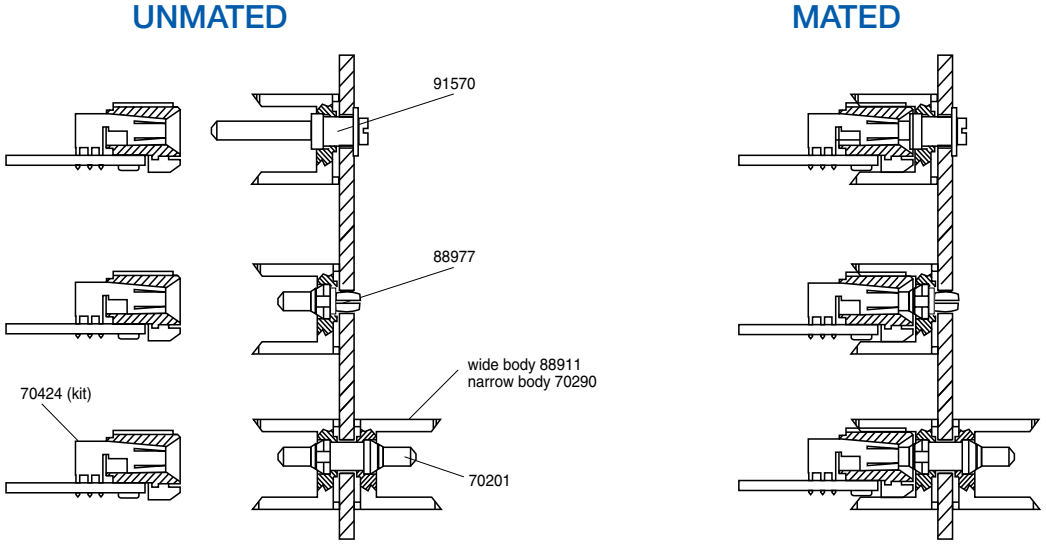
MATED



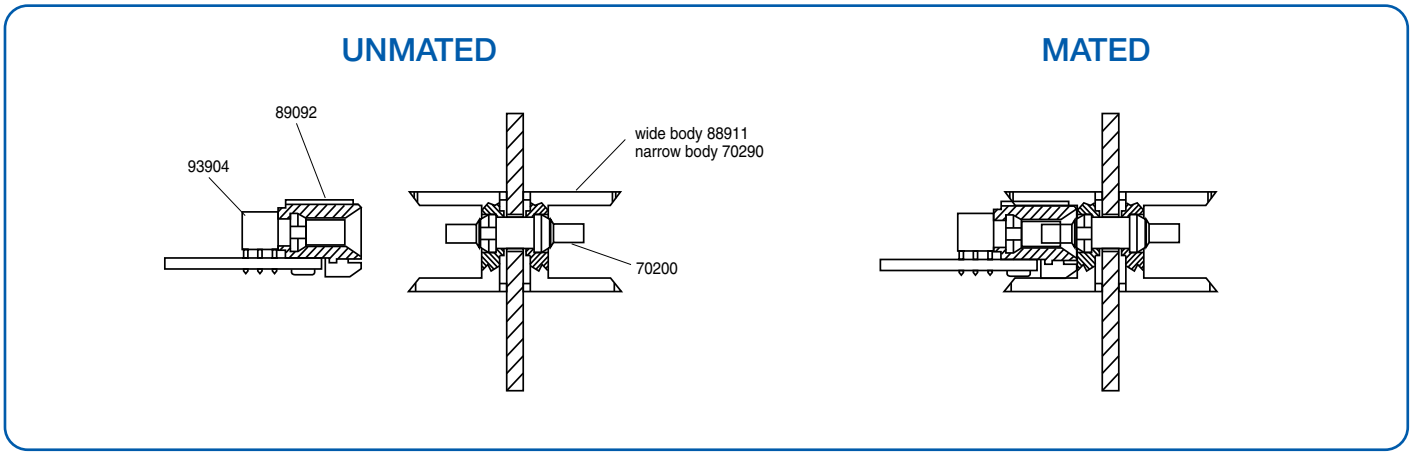
METRAL® 8 row assemblies



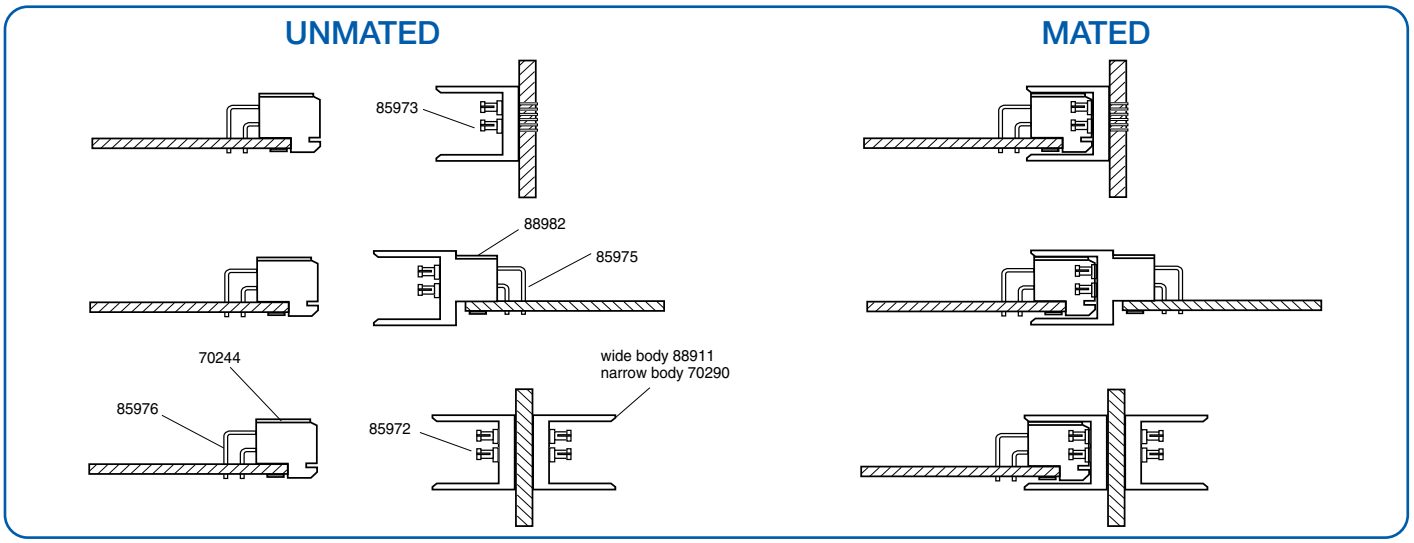
METRAL® DIN High Power assemblies



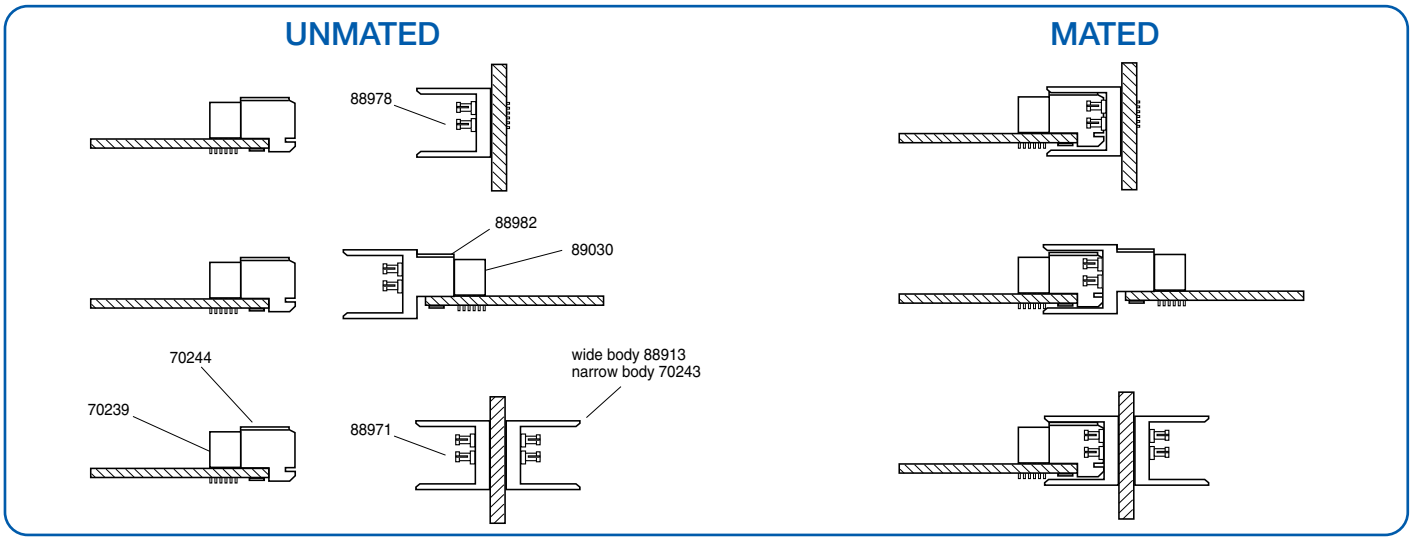
METRAL® DIN standard Coax assemblies



METRAL® Mini Power assemblies

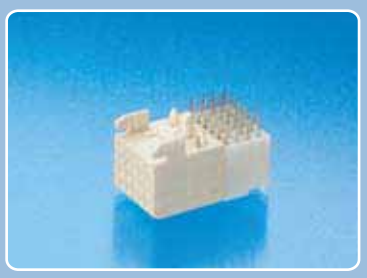


METRAL® Mini Coax assemblies









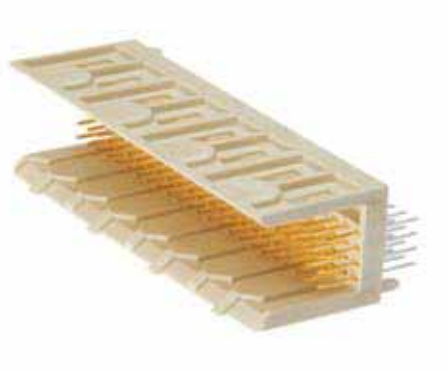
METRAL® SIGNAL CONNECTORS STANDARD

- 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: $5x10^3$ MΩ initially, $1x10^3$ 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

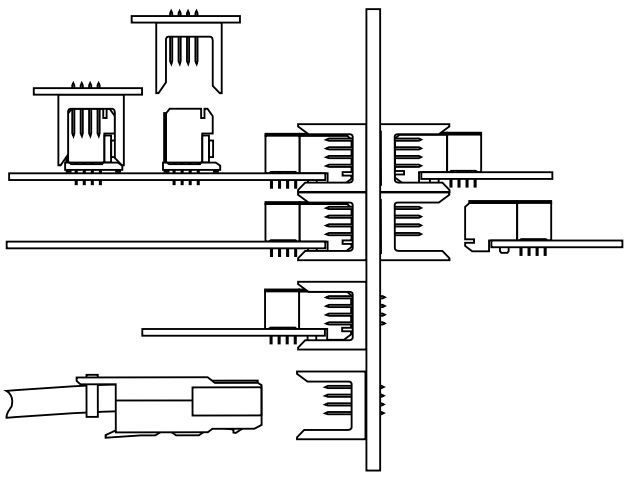
Receptacle, right angle, solder-to-board, page 32

- 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

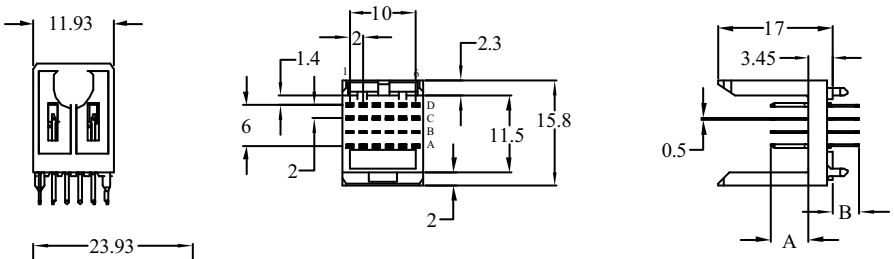
TYPICAL APPLICATIONS



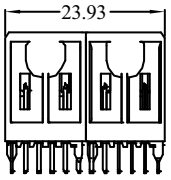
Header, 4 row, signal, straight, solder to board, wide body

PRODUCT

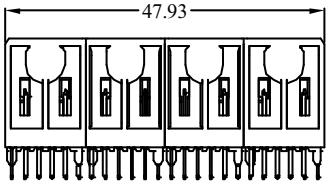
1 Module
88951-1yyLF



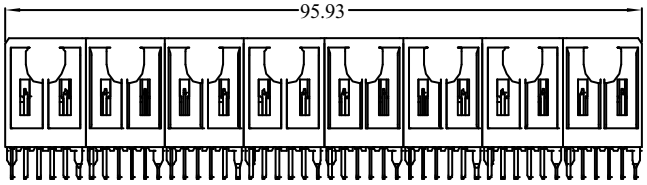
2 Module
88952-1yyLF



4 Module
88953-1yyLF



8 Module
88954-1yyLF



PCB pattern P5, see chapter PCB layouts

PARTNUMBERS

8895x - 1yyLF

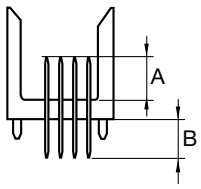
Base Part Number – Performance – Pin Configuration – LF

88951 = 1 module (4 x 6 pos.)
88952 = 2 module (4 x 12 pos.)
88953 = 4 module (4 x 24 pos.)
88954 = 8 module (4 x 48 pos.)

1 = Telcordia CO

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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

- 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

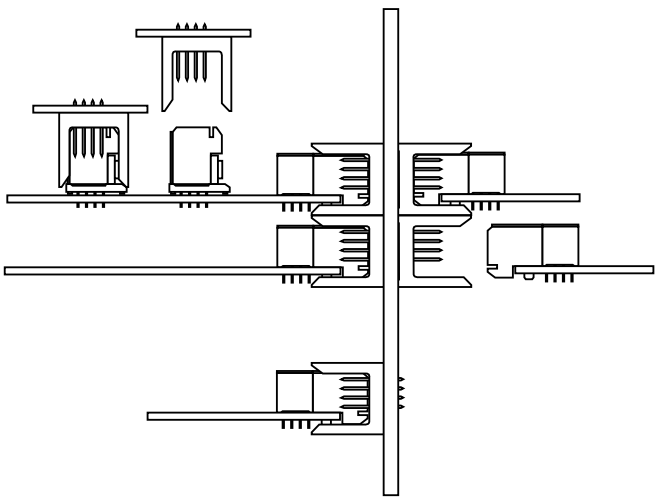
Receptacle, right angle, solder-to-board, page 32

- 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

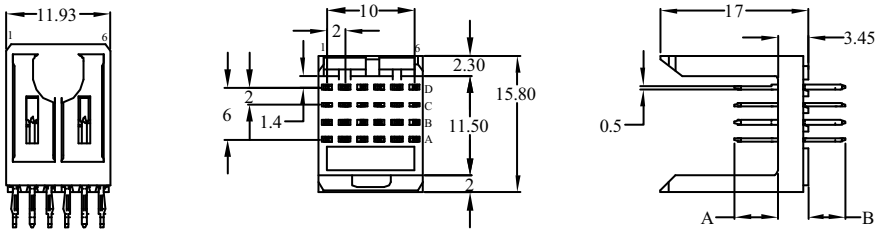
TYPICAL APPLICATIONS



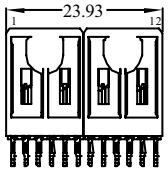
Header, 4 row, signal, straight, press-fit, wide body

PRODUCT

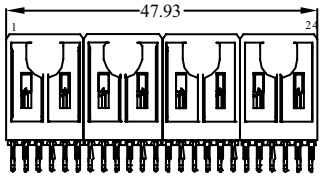
1 Module
70232-1yyLF



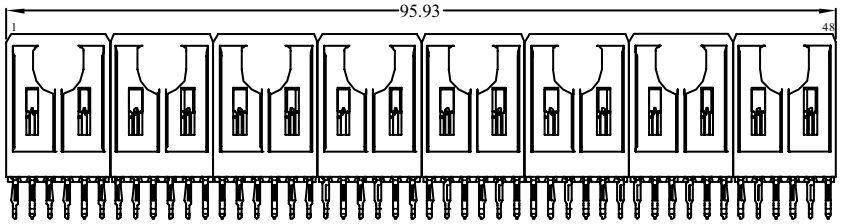
2 Module
70233-1yyLF



4 Module
70234-1yyLF



8 Module
70235-1yyLF



PCB pattern P6, see chapter PCB layouts

PARTNUMBERS

7023x - 1yyLF

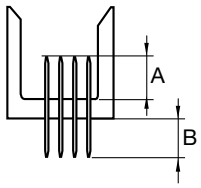
Base Part Number	–	Performance	Pin Configuration	LF

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: $5x10^3$ MΩ initially, $1x10^3$ 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

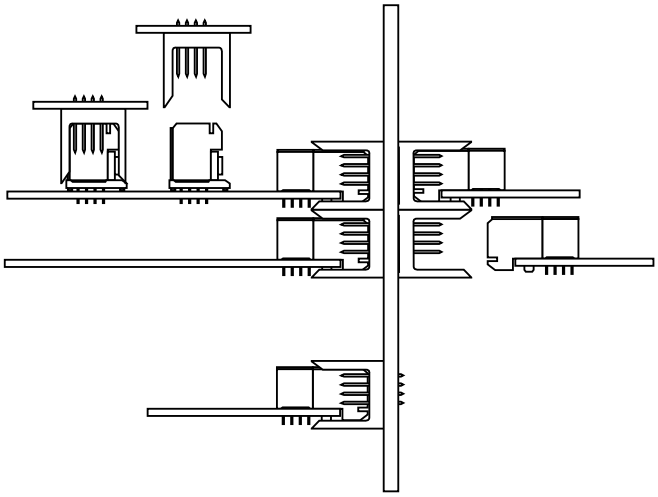
Receptacle, straight

- 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

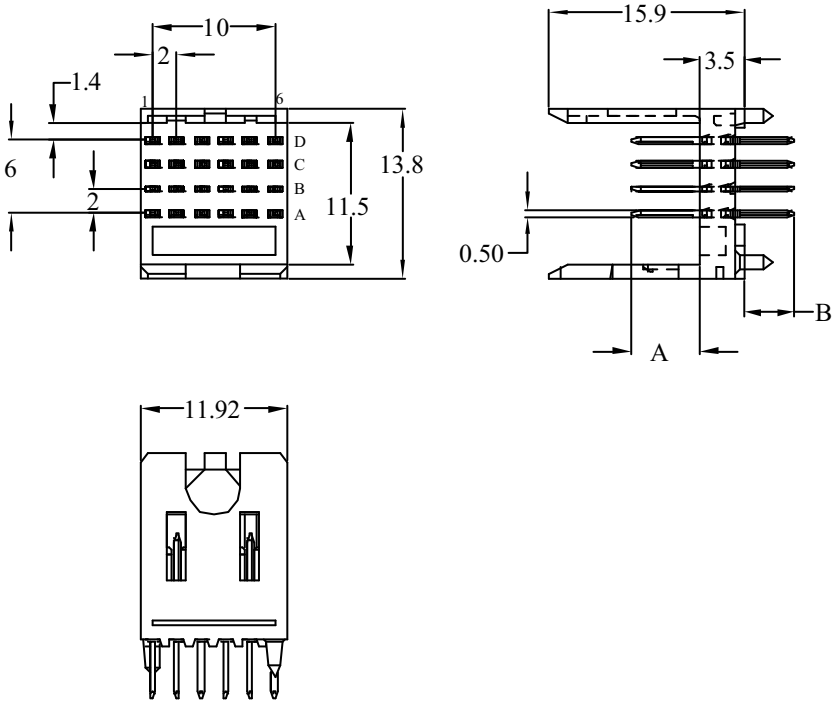
TYPICAL APPLICATIONS



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

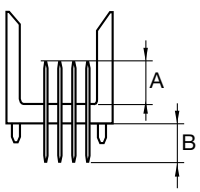
Base Part Number	–	Performance	Pin Configuration	LF

70264 = 1 module (4 x 6 pos.)

1 = Telcordia CO

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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
- press fit

REFERENCE DATA
- product specification.: GS-12-180

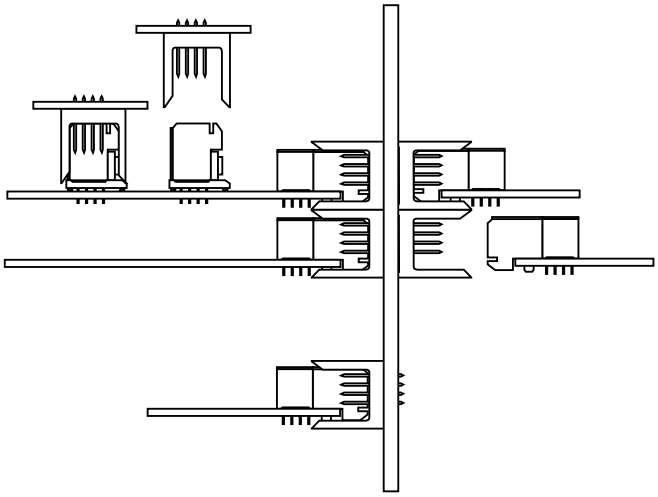
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

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

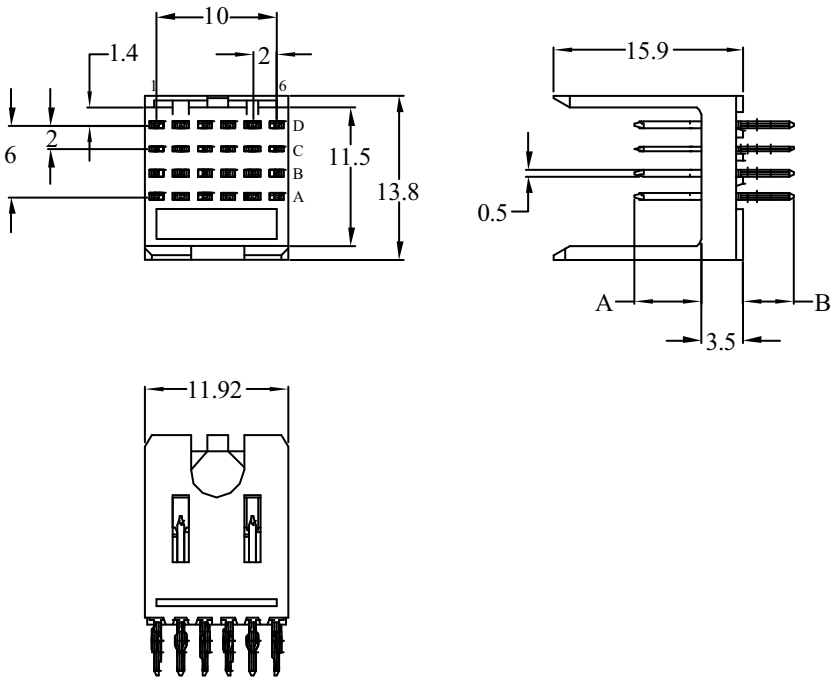
TYPICAL APPLICATIONS



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

PRODUCT

1 Module
85826-1yyLF



PCB pattern P4, see chapter PCB layouts

PARTNUMBERS

85826 - 1yyLF

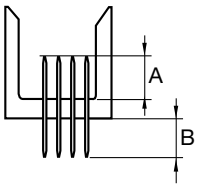
Base Part Number – Performance – Pin Configuration – LF

85826 = 1 module (4 x 6 pos.)

1 = Telcordia CO

LF = lead free

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

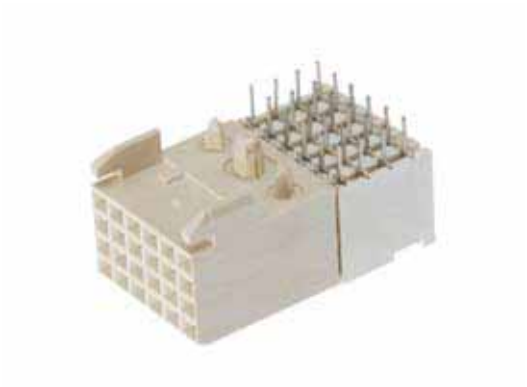


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

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: $5x10^3$ MΩ initially, $1x10^3$ 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

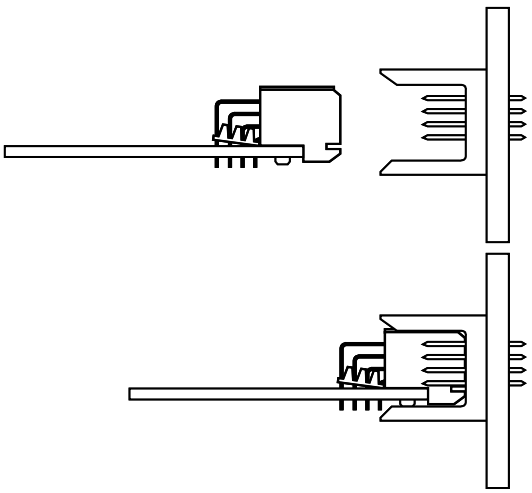
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

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

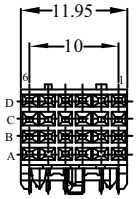
TYPICAL APPLICATIONS

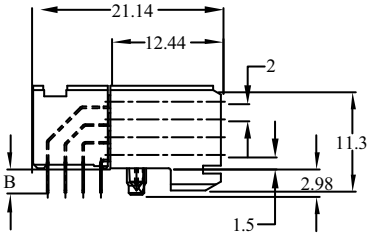


Receptacle, 4 row, signal, right angle, solder to board

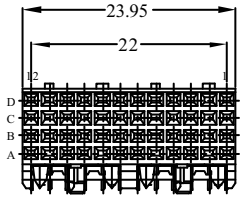
PRODUCT

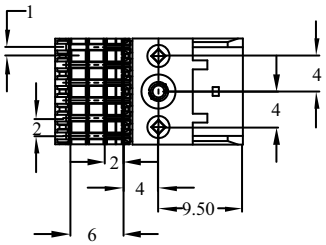
1 Module
89035-1yyLF



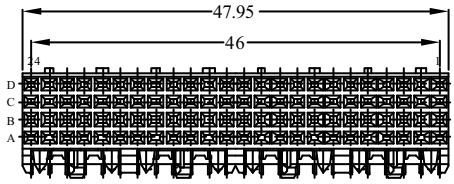


2 Module
89036-1yyLF

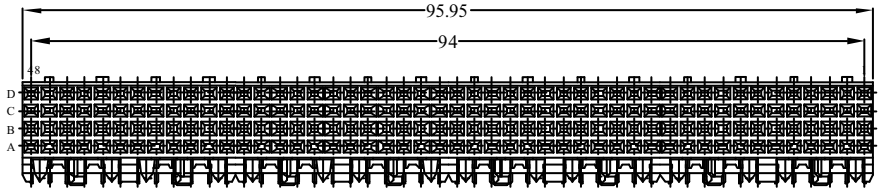




4 Module
89037-1yyLF



8 Module
89038-1yyLF



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

8903x - 1yyLF

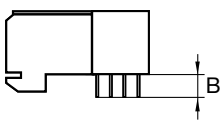
Base Part Number – Performance | Pin Configuration | LF

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: $5x10^3$ MΩ initially, $1x10^3$ 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

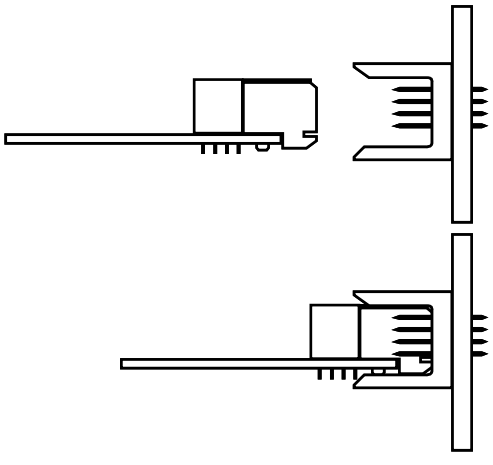
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

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

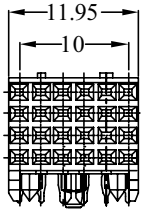
TYPICAL APPLICATIONS

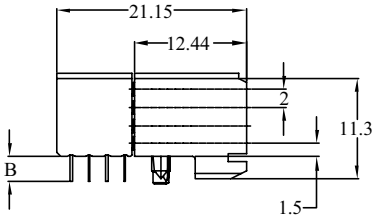


Receptacle, 4 row, signal, right angle, press fit

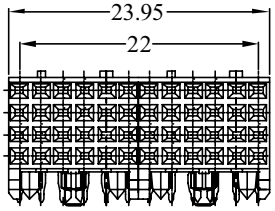
PRODUCT

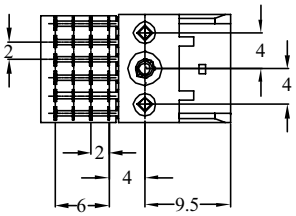
1 Module
88945-1yyLF



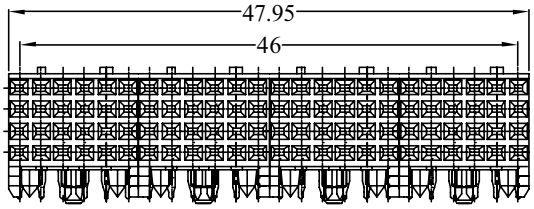


2 Module
88946-1yyLF

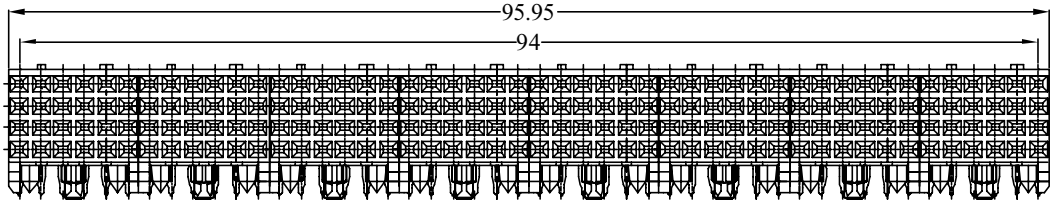




4 Module
88947-1yyLF



8 Module
88948-1yyLF



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

8894x - 1yyLF

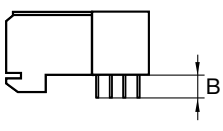
Base Part Number	–	Performance	Pin Configuration	LF

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: $5x10^3$ MΩ initially, $1x10^3$ 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

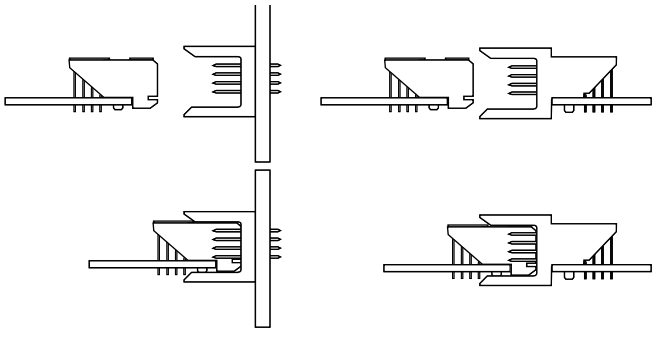
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Header, straight, press-fit, page 27
- 1 module – part number 70232-116LF

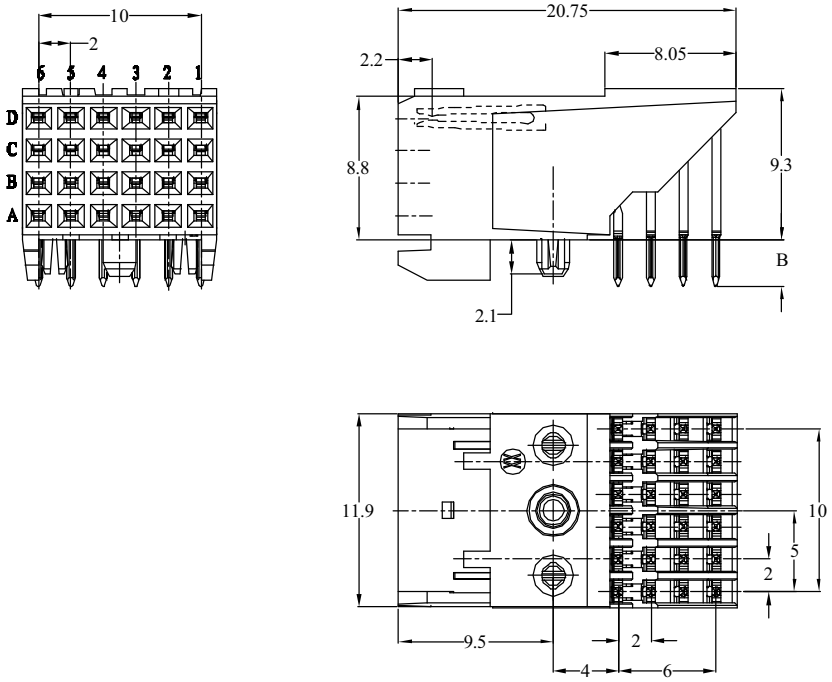
Header, straight, solder-to-board, page 25
- 1 module – part number 88951-101LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

52048 - 1yyLF

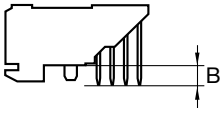
Base Part Number	–	Performance	Pin Configuration	LF

52048 = 1 module (4 x 6 pos.)

1 = Telcordia CO

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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

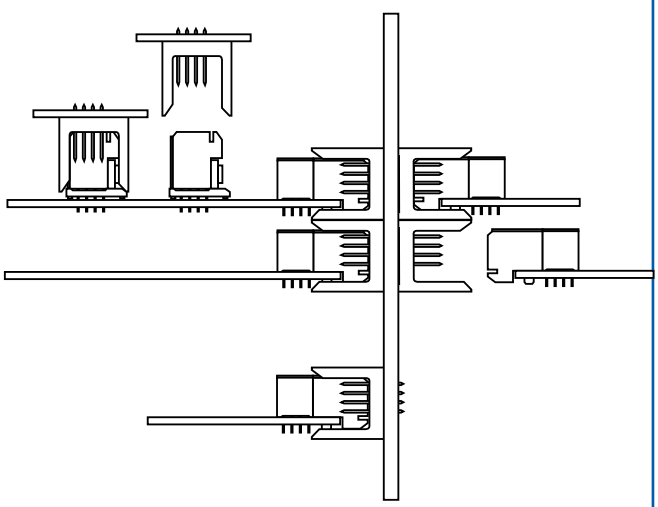
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Receptacle, right angle, press-fit, page 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

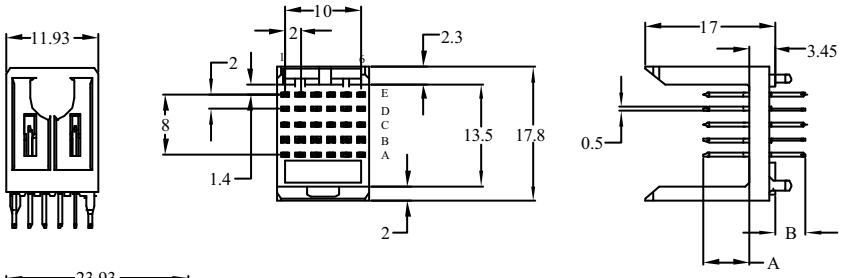
TYPICAL APPLICATIONS



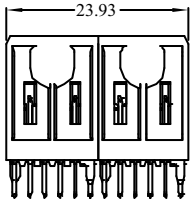
Header, 5 row, signal, straight, solder to board, wide body

PRODUCT

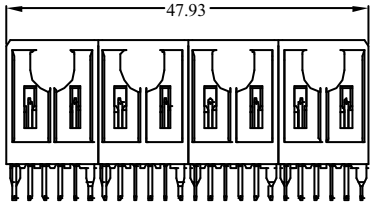
1 Module
74741-1yyLF



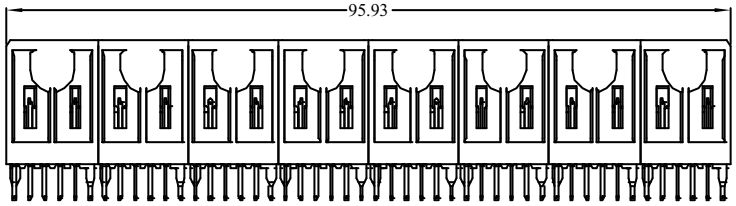
2 Module
7474x-1yyLF
on request only



4 Module
7474x-1yyLF
on request only



8 Module
7474x-1yyLF
on request only



PCB pattern P16, see chapter PCB layouts

PARTNUMBERS

74741 - 1yyLF

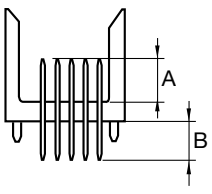
Base Part Number	–	Performance	Pin Configuration	LF

74741 = 1 module (5 x 6 pos.)
on request only = 2 module (5 x 12 pos.)
on request only = 4 module (5 x 24 pos.)
on request only = 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: $5x10^3$ MΩ initially, $1x10^3$ 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
- press fit

REFERENCE DATA
- product specification.: GS-12-180

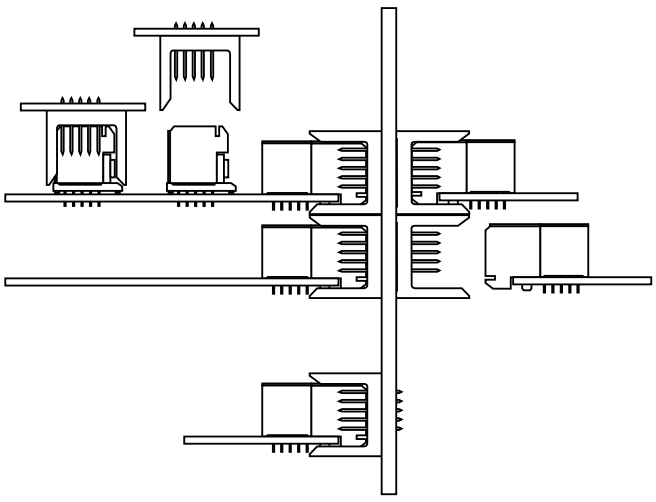
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

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

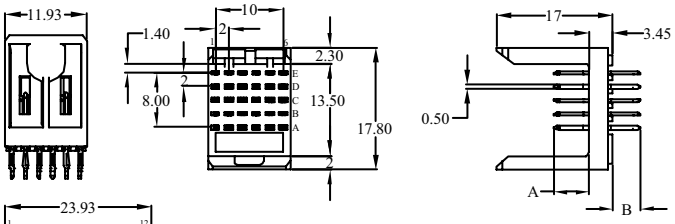
TYPICAL APPLICATIONS



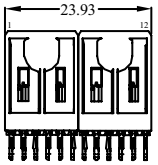
Header, 5 row, signal, straight, press-fit, wide body

PRODUCT

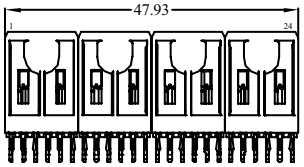
1 Module
89006-1yyLF



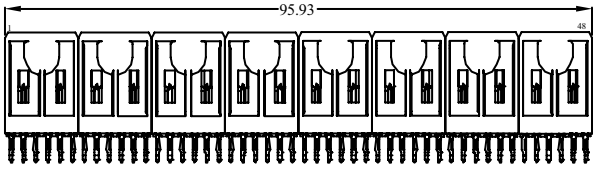
2 Module
89007-1yyLF



4 Module
89008-1yyLF



8 Module
89009-1yyLF



PCB pattern P7, see chapter PCB layouts

PARTNUMBERS

8900x - 1yyLF

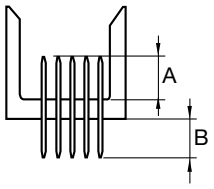
Base Part Number	–	Performance	Pin Configuration	LF

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

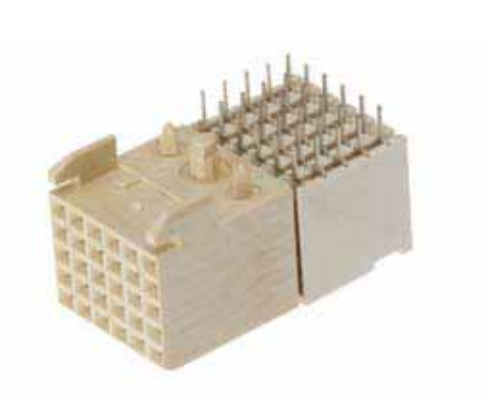


Note: blue marked in **pin configuration** is the preferred recommended standard
for other special patterns or loadings, please check drawings, all other configurations on request only

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: $5x10^3$ MΩ initially, $1x10^3$ 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

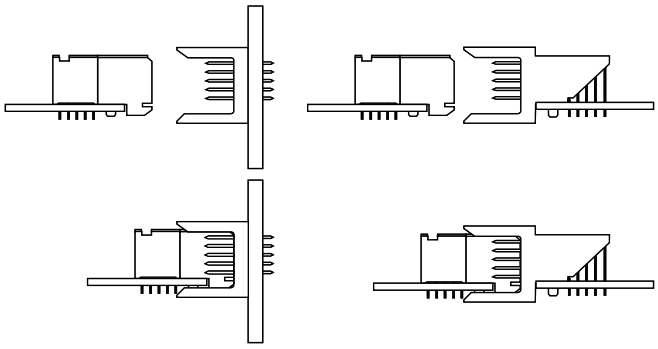
Header straight, press-fit, page 41

- 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*

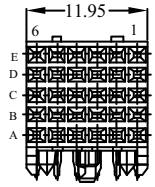
TYPICAL APPLICATIONS

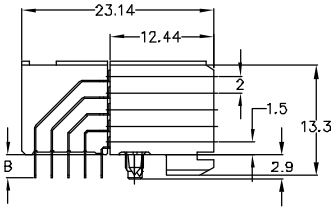


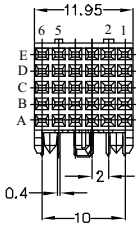
Receptacle, 5 row, signal, right angle, solder to board

PRODUCT

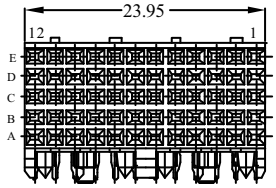
1 Module
85863-1yyLF

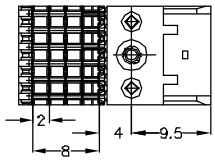




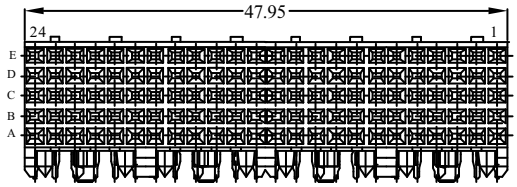


2 Module
85864-1yyLF

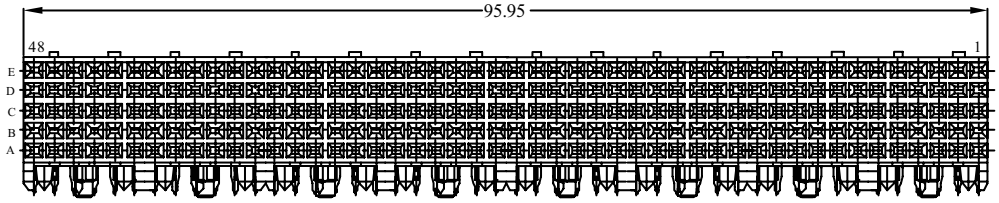




4 Module
85865-1yyLF



8 Module
85866-1yyLF



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

8586x - 1yyLF

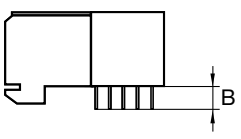
Base Part Number	–	Performance	Pin Configuration	LF

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: $5x10^3$ MΩ initially, $1x10^3$ 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

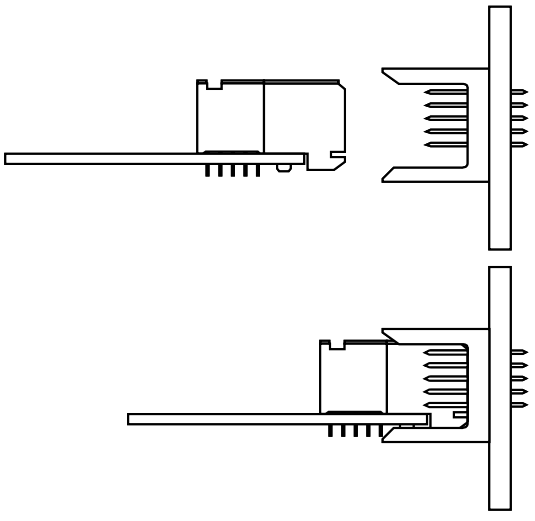
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223.

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*

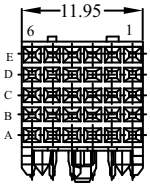
TYPICAL APPLICATIONS

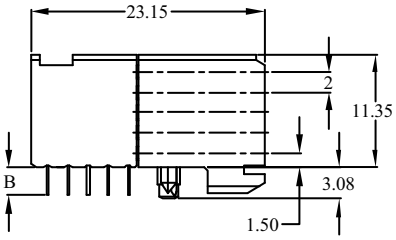


Receptacle, 5 row, signal, right angle, press fit

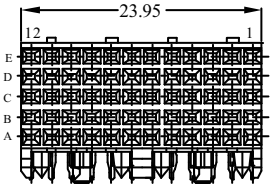
PRODUCT

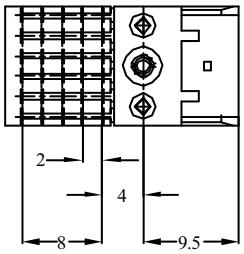
1 Module
89047-1yyLF



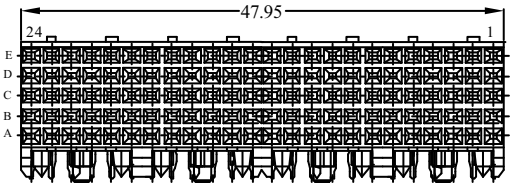


2 Module
89093-1yyLF

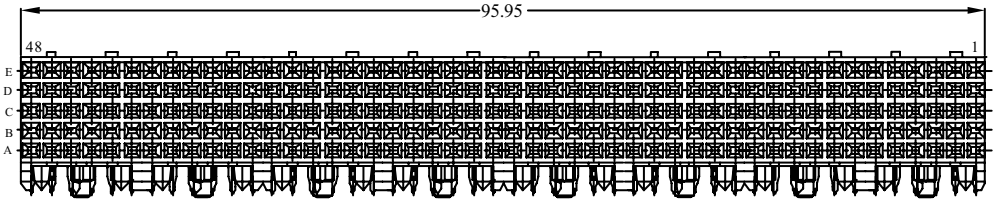




4 Module
89094-1yyLF



8 Module
89095-1yyLF



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

8904x - 1yyLF

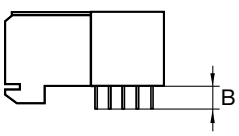
Base Part Number	–	Performance	Pin Configuration	LF

89047 = 1 module (5 x 6 pos.)
89093 = 2 module (5 x 12 pos.)
89094 = 4 module (5 x 24 pos.)
89095 = 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



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: $5x10^3$ MΩ initially, $1x10^3$ 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

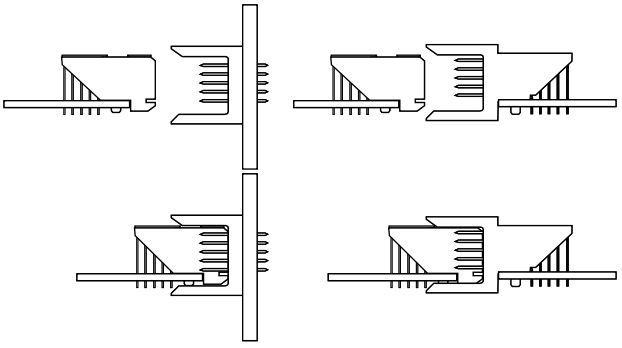
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Header, straight, press-fit, page 41
- 1 module – part number 89006-116LF

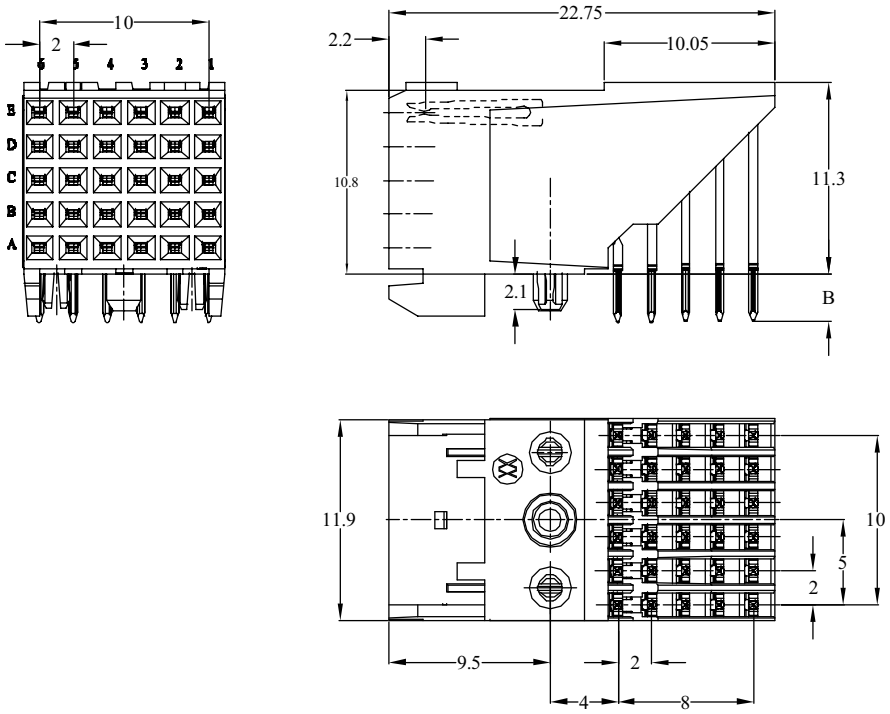
Header, straight, solder-to-board, page 39
- 1 module – part number 74741-101LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

52049 - 101LF

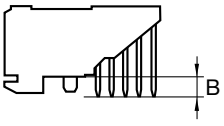
Base Part Number	–	Performance	Pin Configuration	LF

52049 = 1 module (5 x 6 pos.)

1 = Telcordia CO

LF = lead free

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, 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: $5x10^3$ MΩ initially, $1x10^3$ 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
- press fit

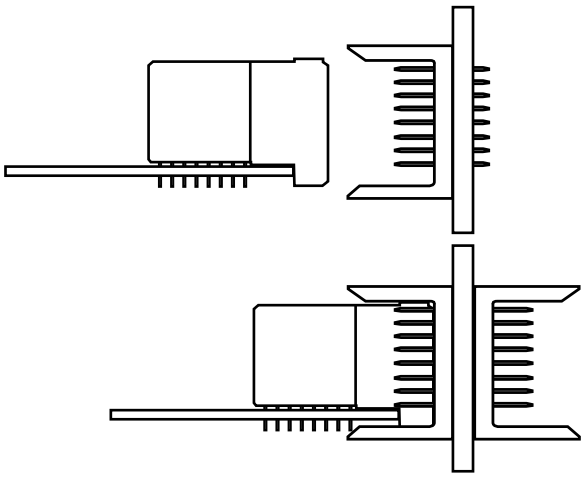
REFERENCE DATA
- product specification.: GS-12-134
- application specification: GS-20-010

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

MATING DATA

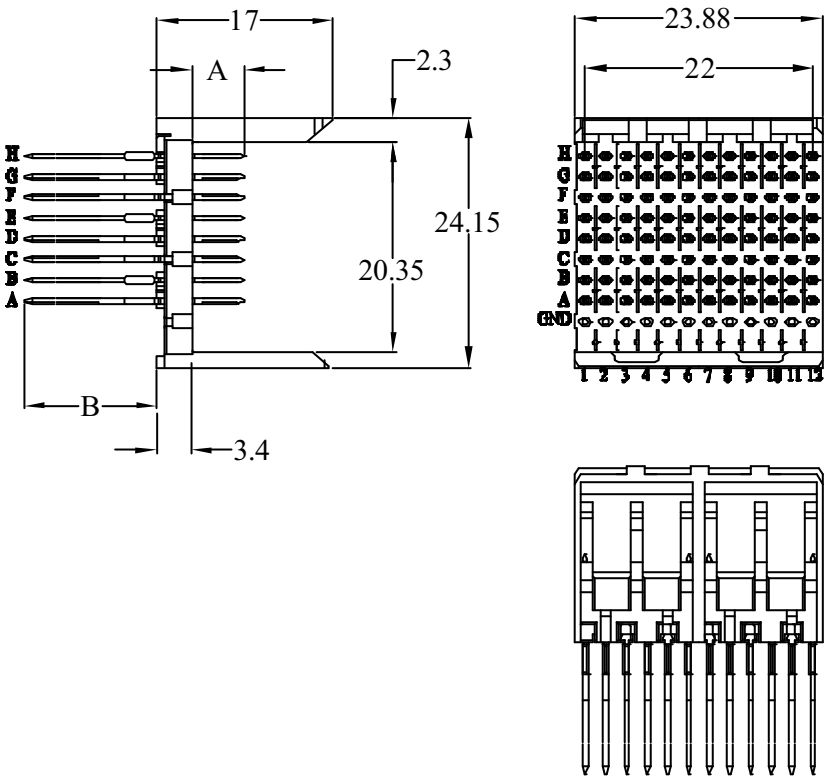
- Receptacle, right angle, press-fit, page 51
  - part number 74770-102LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P21, see chapter PCB layouts

PARTNUMBERS

74771 - 102011LF

Base Part Number	–	Performance	Pin Configuration	Pin Configuration	LF

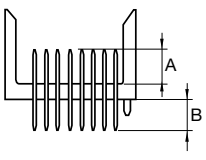
74771 = 8 row straight header

1 = Telcordia CO

02 = 2 modules, 8x12 pos.

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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

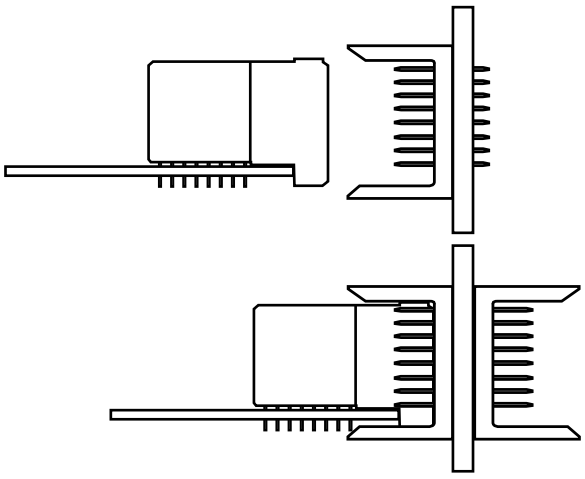
REFERENCE DATA
- product spec.: GS-12-134
- application specification: GS-20-010

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

MATING DATA

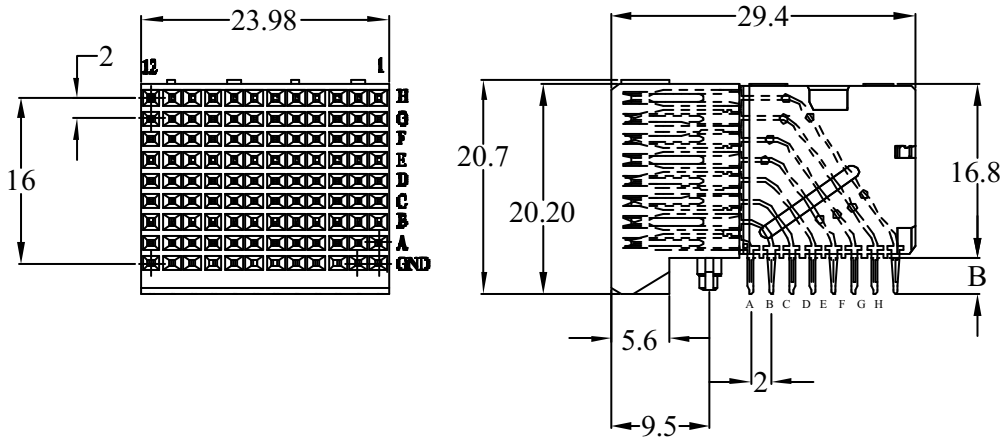
- Receptacle, right angle, press-fit, page 49
  - part number 74771-102011LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P22, see chapter PCB layouts

PARTNUMBERS

74770 - 102LF

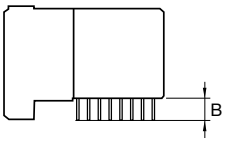
Base Part Number	–	Performance	Pin Configuration	LF

74770 = 2 module (8 x 12 pos.)

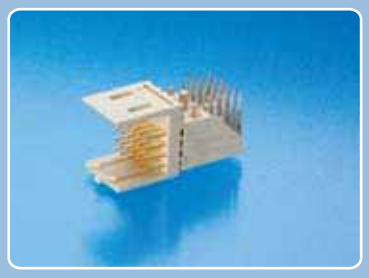
1 = Telcordia CO

LF = lead free

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





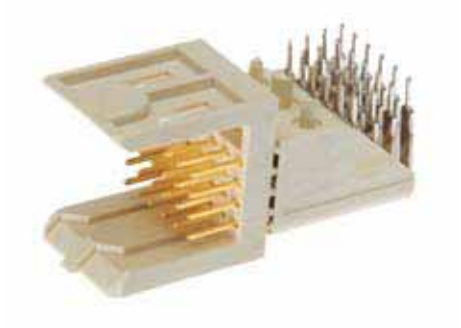
METRAL® SIGNAL CONNECTORS REVERSED

- 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: $5x10^3$ MΩ initially, $1x10^3$ 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 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

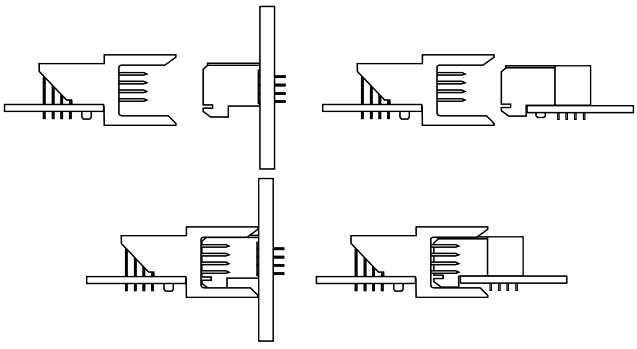
Receptacle, straight, press-fit, page 69

- 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

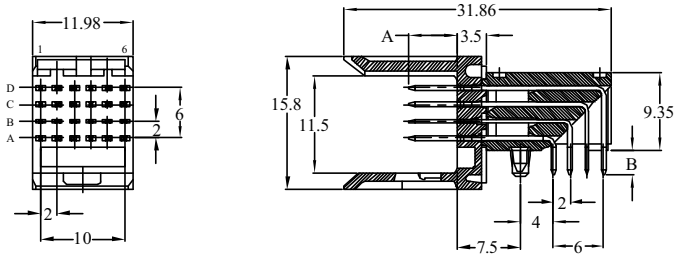
TYPICAL APPLICATIONS



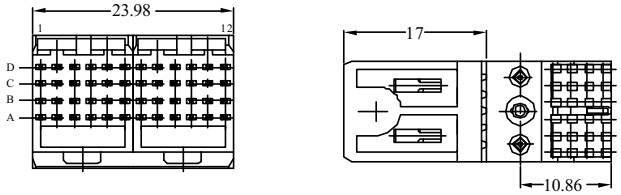
Header, 4 row, signal, right angle, solder to board, wide body

PRODUCT

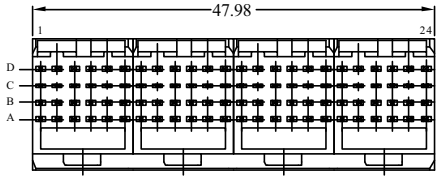
1 Module



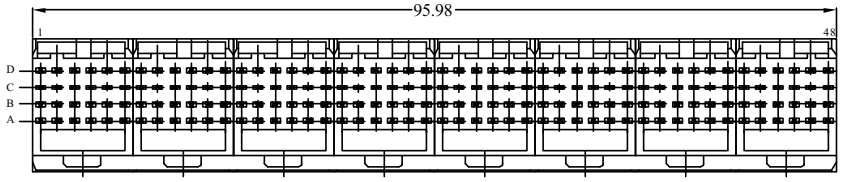
2 Module



4 Module



8 Module



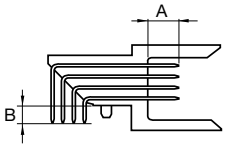
PCB pattern P1, see chapter PCB layouts

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	**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.)	**LAP** = solder to board		**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	

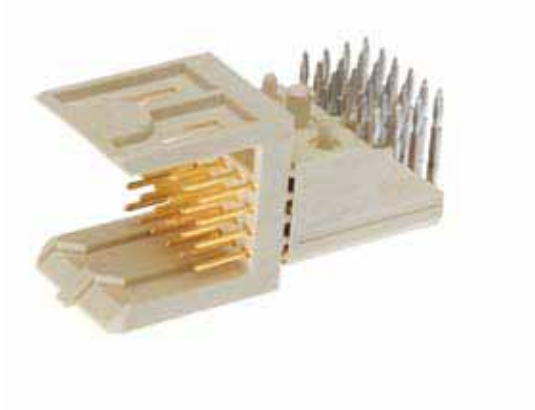


Note: For other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, signal, right angle, 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: $5x10^3$ MΩ initially, $1x10^3$ 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

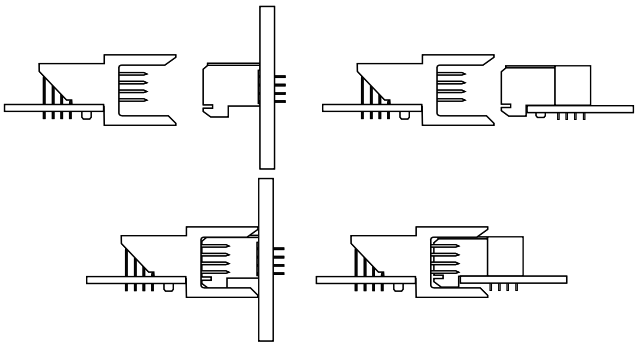
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

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

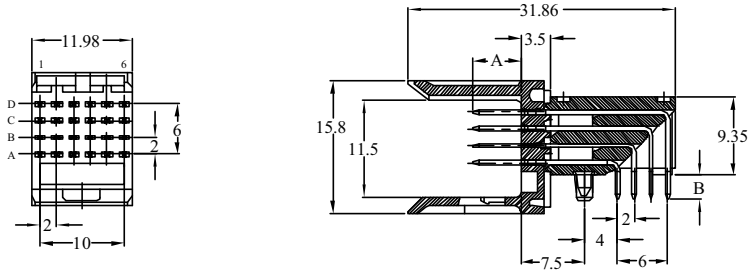
TYPICAL APPLICATIONS



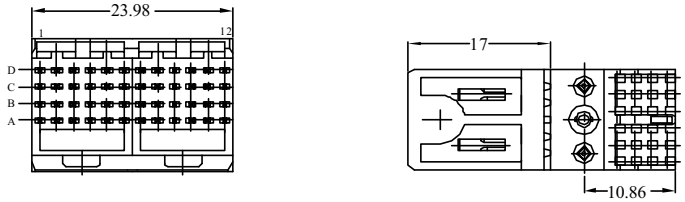
Header, 4 row, signal, right angle, press fit, wide body

PRODUCT

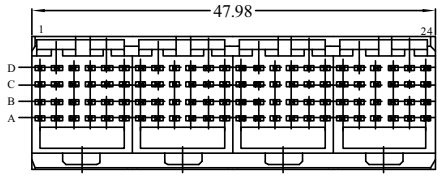
1 Module



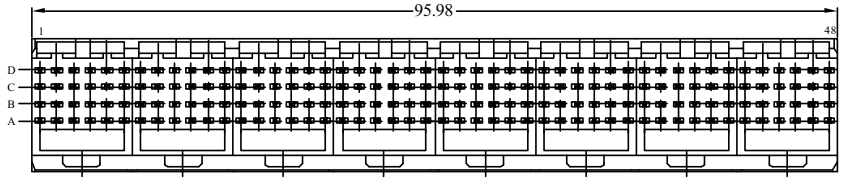
2 Module



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

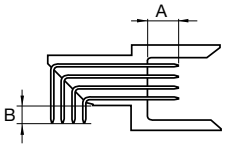
HM1

L = Signal header right angle, wide body

4 = 4 row

LDP = Press fit

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

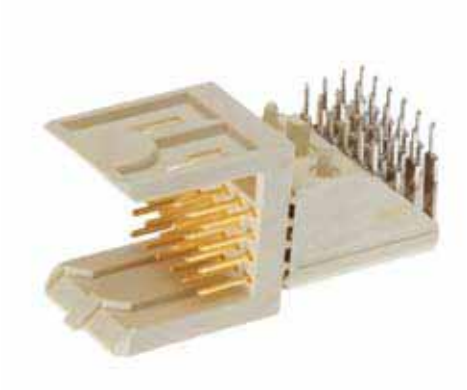
1 = 1 module (4 x 6 pos.)
2 = 2 module (4 x 12 pos.)
3 = 4 module (4 x 24 pos.)
4 = 8 module (4 x 48 pos.)

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: $5x10^3$ MΩ initially, $1x10^3$ 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

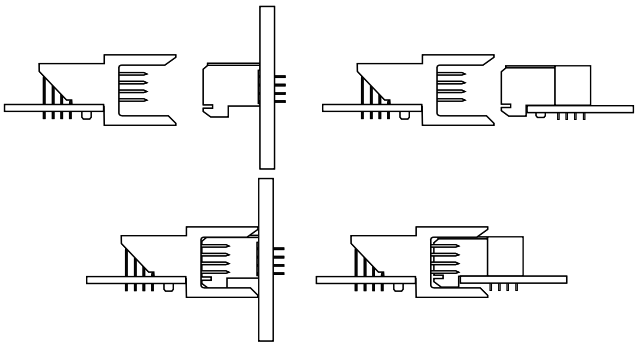
Receptacle, straight, press-fit, page 69

- 1 mod – part number 85757-101LF

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

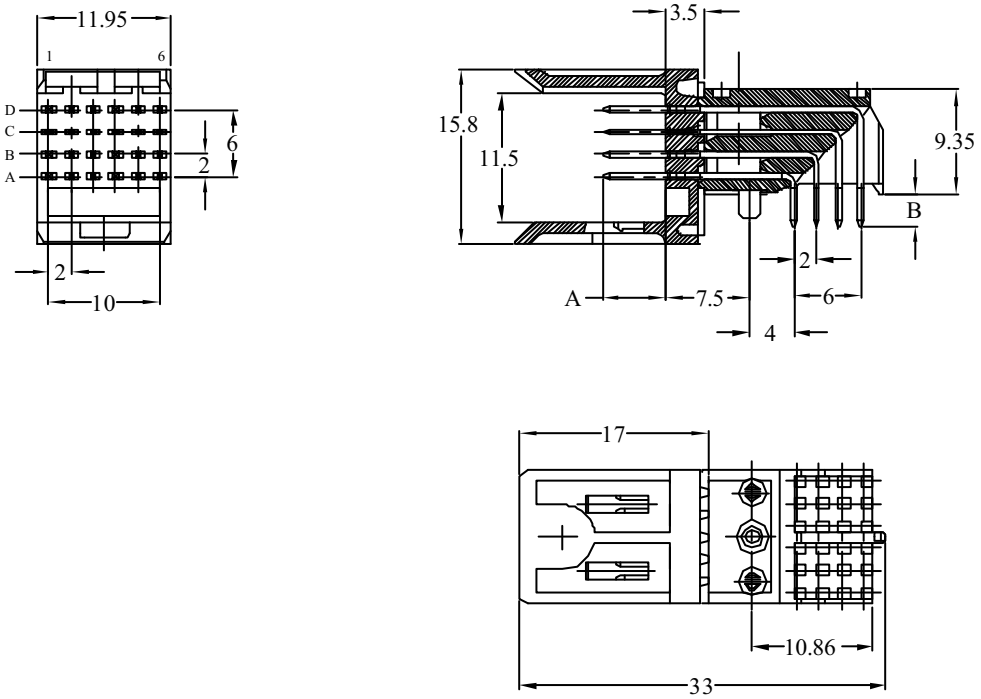
- 1 mod – part numbers HM1S41FRR000H6PLF

TYPICAL APPLICATIONS



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

PRODUCT



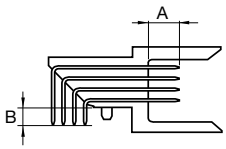
PCB pattern P1, see chapter PCB layouts

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		**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	

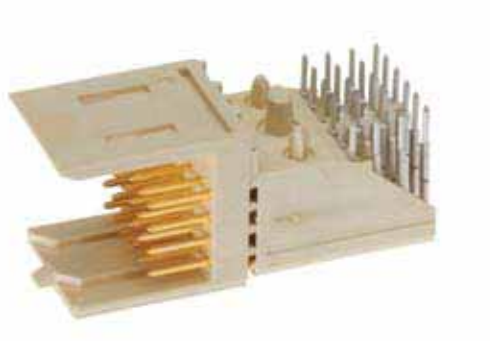


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

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: $5x10^3$ MΩ initially, $1x10^3$ 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-12-446

APPLICATION EQUIPMENT

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

MATING DATA

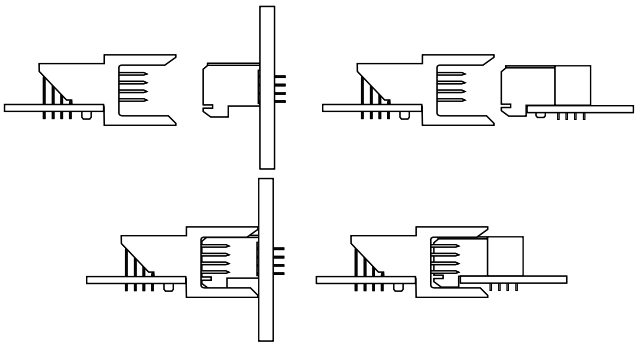
Receptacle, straight, press-fit, page 69

- 1 mod – part number 85757-1101LF

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

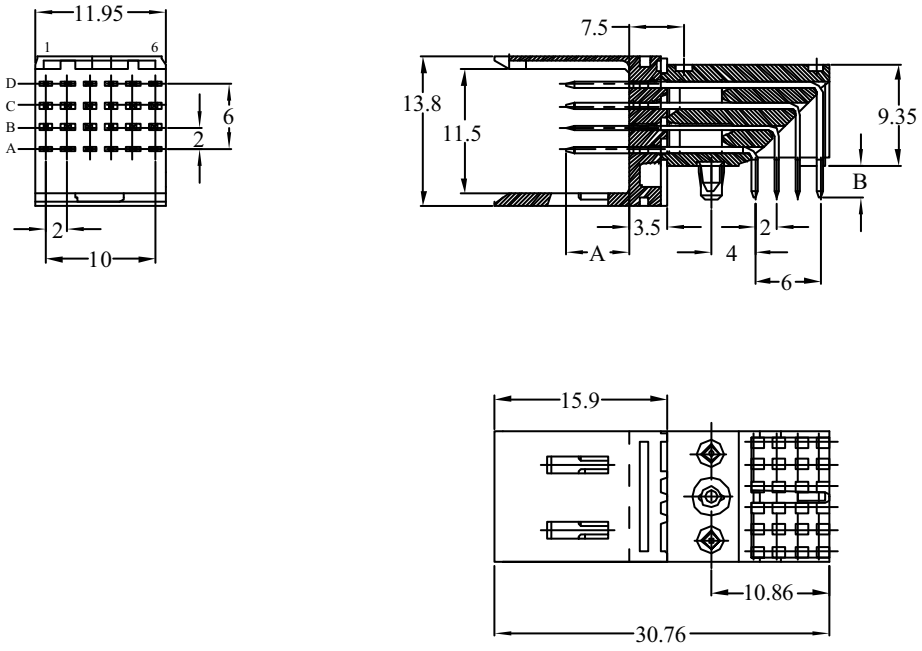
- 1 mod – part numbers HM1S41FRR000H6PLF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

85822 - 1yyLF

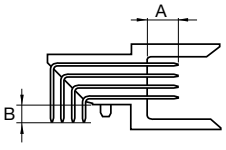
Base Part Number	–	Performance	Pin Configuration	LF

85822 = 1 module, 4 x 6 pos.

1 = Telcordia CO

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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
- Product specification: GS-12-445

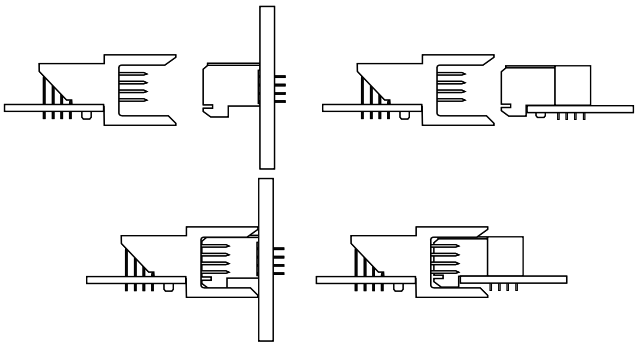
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Receptacle, straight, press-fit, page 69
- 1 mod – part number 85757-1101LF

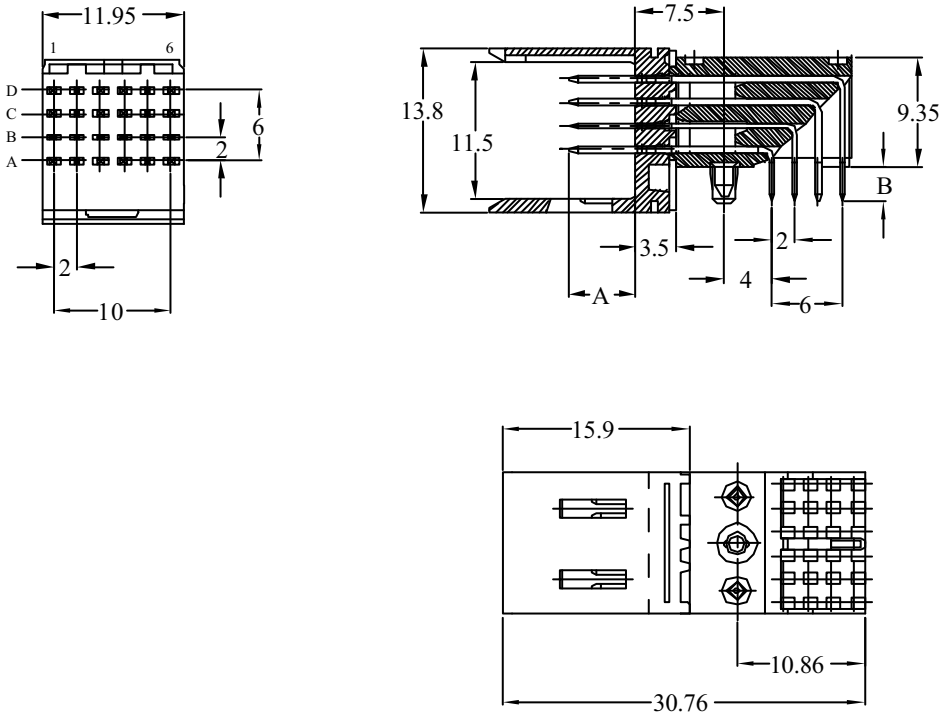
Receptacle, straight, solder-to-board, page 67
- 1 mod – part numbers HM1S41FRR000H6PLF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

58363 - 1yyLF

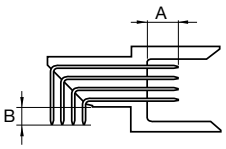
Base Part Number	–	Performance	Pin Configuration	LF

58363 = 1 module, 4 x 6 pos.

1 = Telcordia CO

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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

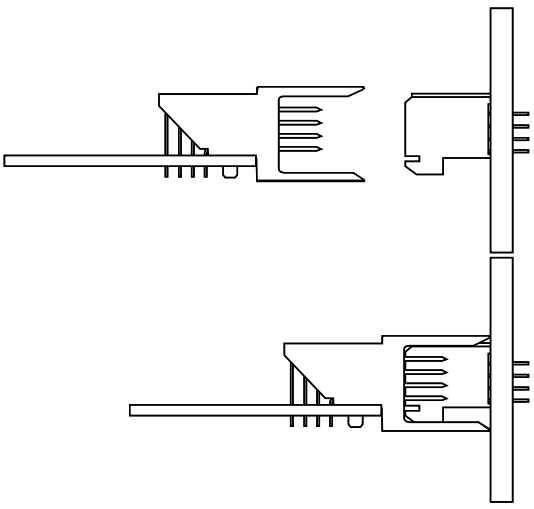
Receptacle, straight, press-fit, page 69

- 1 mod – part number 85757-1101LF

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

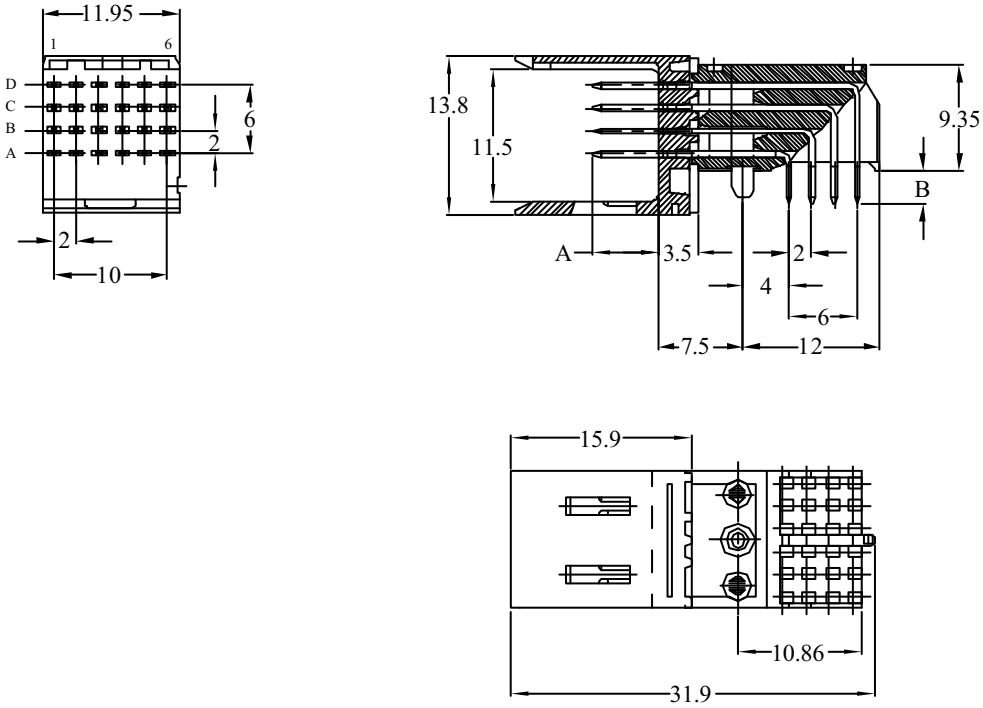
- 1 mod – part numbers HM1S41FRR000H6PLF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

58361 - 101LF

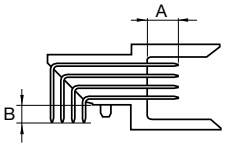
Base Part Number	–	Performance	Pin Configuration	LF

58361 = 1 module, 4 x 6 pos.

1 = Telcordia CO

LF = lead free

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

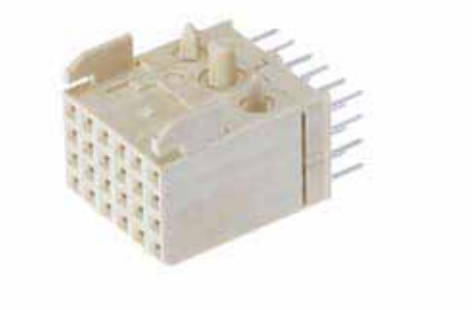


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

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: $5x10^3$ MΩ initially, $1x10^3$ 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

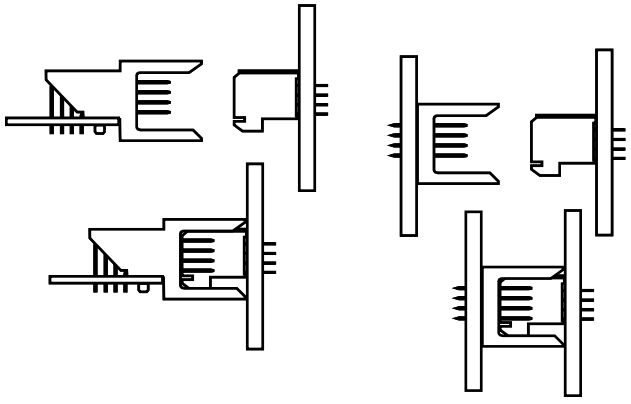
Header, right angle, solder-to-board, page 55

- 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

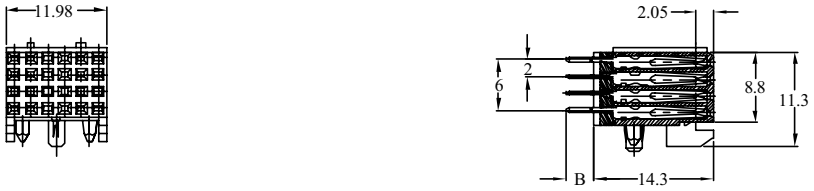
TYPICAL APPLICATIONS



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

PRODUCT

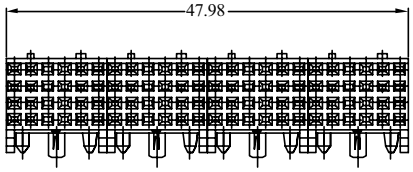
1 Module



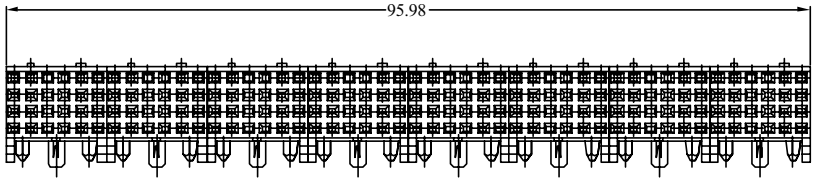
2 Module



4 Module



8 Module



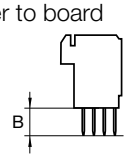
PCB pattern P5, see chapter PCB layouts

PARTNUMBERS

HM1S4 x FRR000H6PLF

Base Part Number	Type	no. of rows	no. of pos.	Configuration	000	Performance	Packaging	LF
HM1	**S** = signal receptacle straight	**4** = 4 row	**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.)	**FRR** = solder to board		**H6** = Telcordia CO	**P** = trays	**LF** = lead free

tail length (B)
3,30 mm



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

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 pressed on PCB with flat press block



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

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: $5x10^3$ MΩ initially, $1x10^3$ 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

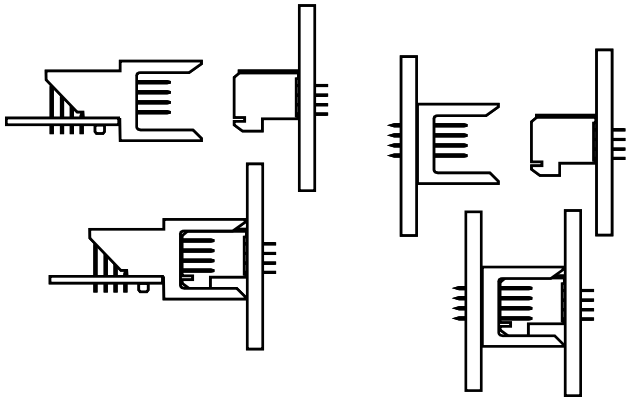
PACKAGING
- standard: tubes

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

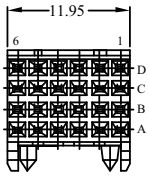
TYPICAL APPLICATIONS

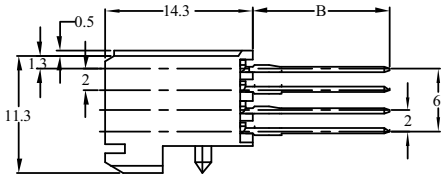


Receptacle, 4 row, signal, straight, press fit

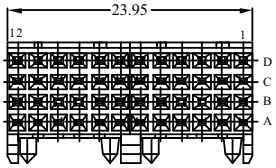
PRODUCT

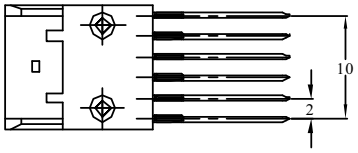
1 Module



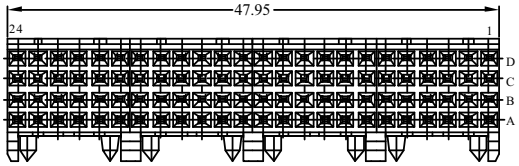


2 Module

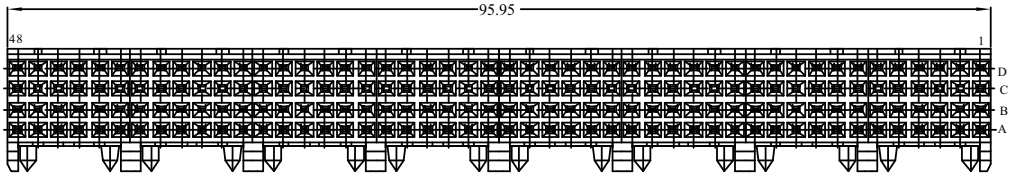




4 Module



8 Module



PCB pattern P6, see chapter PCB layouts

PARTNUMBERS

8575x - 1y01LF

Base Part Number	–	Performance	Tail length	Pin Configuration	LF

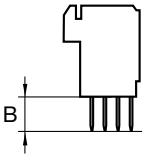
85757 = 1 module (4 x 6 pos.)
85758 = 2 module (4 x 12 pos.)
85759 = 4 module (4 x 24 pos.)
85760 = 8 module (4 x 48 pos.)

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: $5x10^3$ MΩ initially, $1x10^3$ 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 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

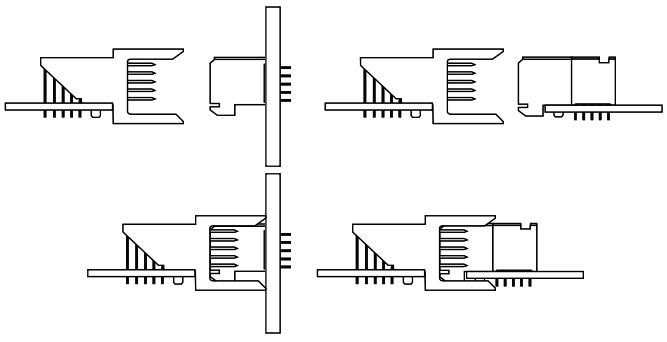
Receptacle, straight, press-fit, page 79

- 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

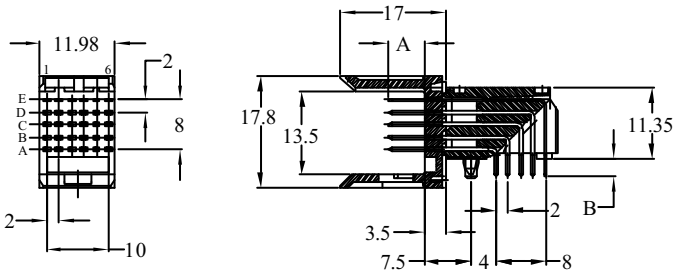
TYPICAL APPLICATIONS



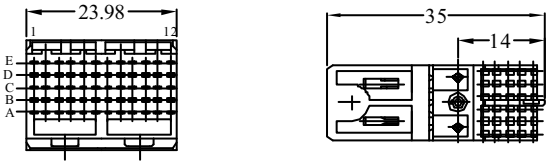
Header, 5 row, signal, right angle, solder to board, wide body

PRODUCT

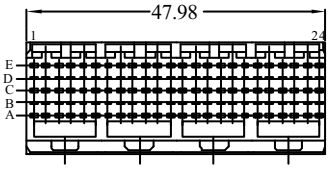
1 Module



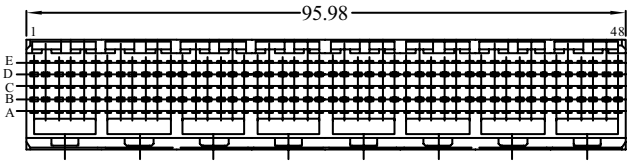
2 Module



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

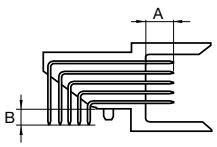
L = Signal header right angle, wide body

5 = 5 row

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.)

LAP = solder to board

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

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: $5x10^3$ MΩ initially, $1x10^3$ 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

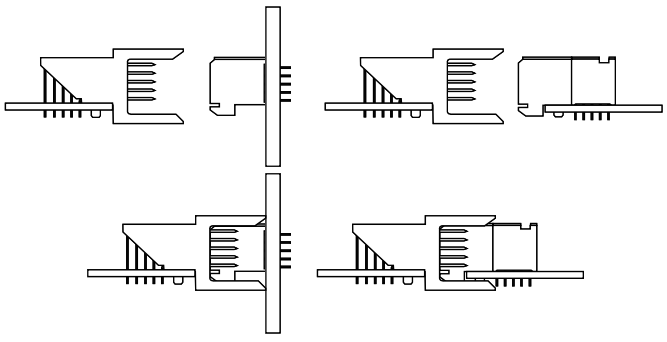
Receptacle, straight, press-fit, page 79

- 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

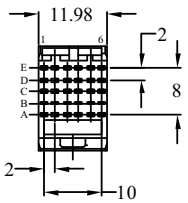
TYPICAL APPLICATIONS

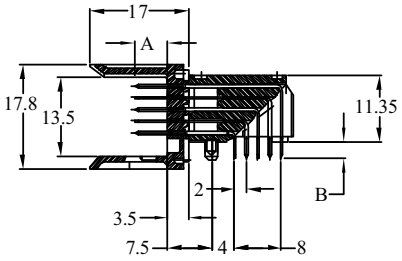


Header, 5 row, signal, right angle, press fit, wide body

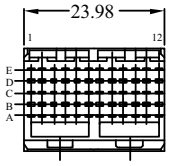
PRODUCT

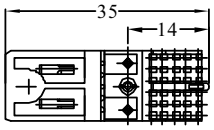
1 Module



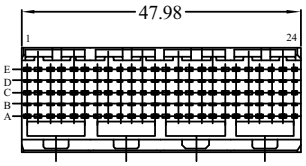


2 Module

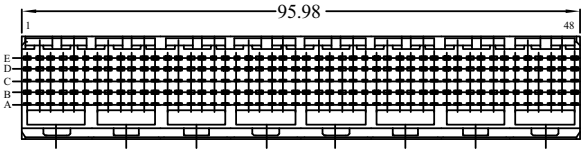




4 Module



8 Module



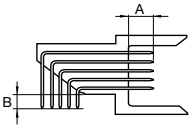
PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

HM1L5 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	**5** = 5 row	**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.)	**LDP** = press fit		**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, 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: $5x10^3$ MΩ initially, $1x10^3$ 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

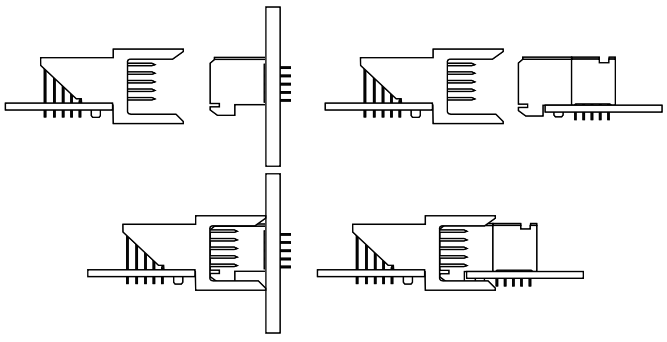
Receptacle, straight, press-fit, page 79

- 1 mod – part number 85761-1101LF

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

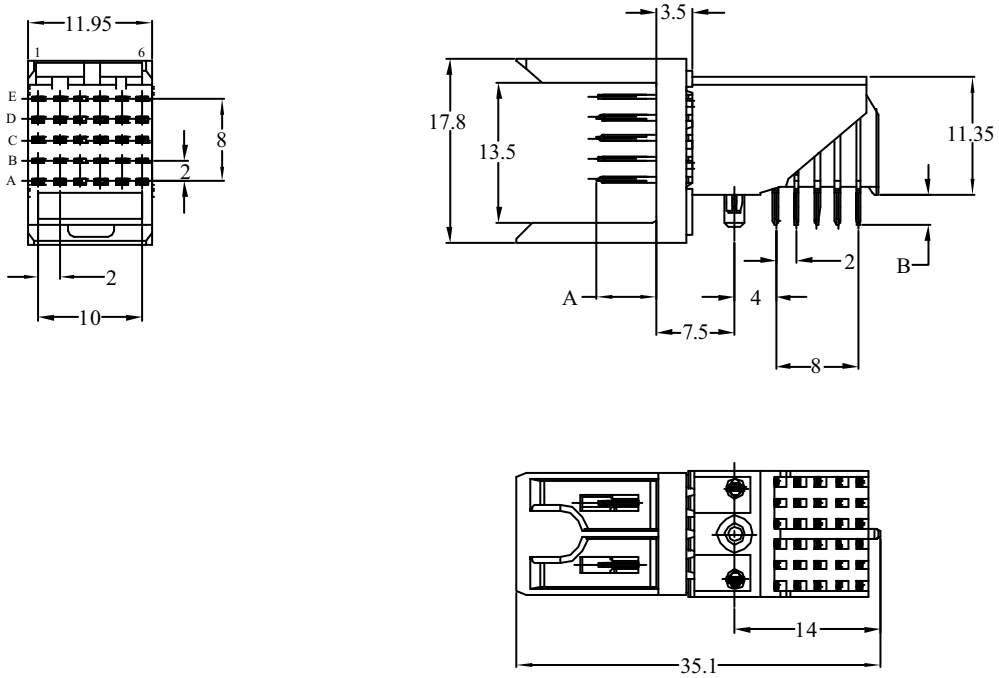
- 1 mod – part numbers HM1S51FRR000H6PLF

TYPICAL APPLICATIONS



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

PRODUCT



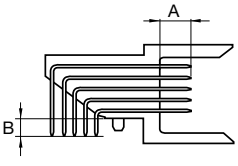
PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

HM1L5 x LFP000H6PLF

Base Part Number	Type	no. of rows	no. of pos.	Configuration	000	Performance	Packaging	LF
HM1	**L** = Signal header rright 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

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: $5x10^3$ MΩ initially, $1x10^3$ 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 73

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

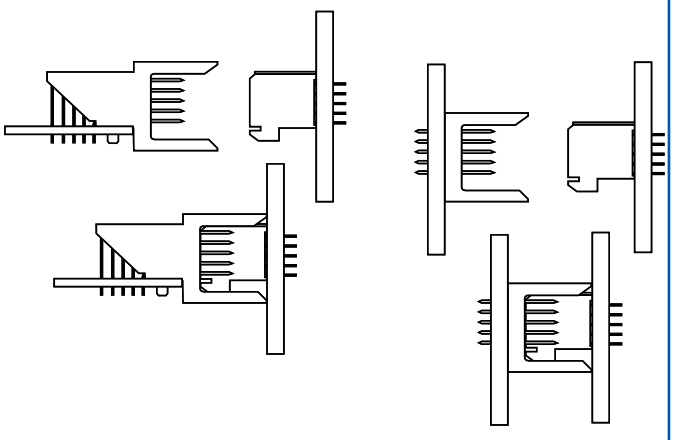
Header, right angle, solder-to-board, page 71

- 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

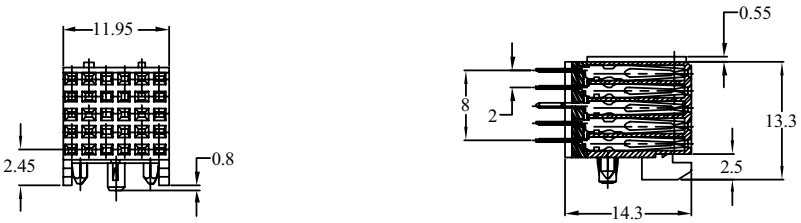
TYPICAL APPLICATIONS



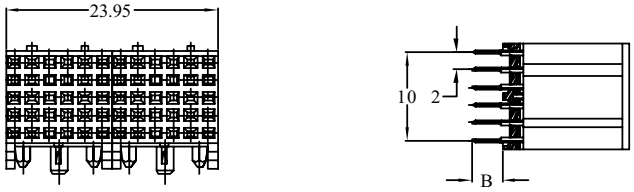
Receptacle, 5 row, signal, straight, solder to board

PRODUCT

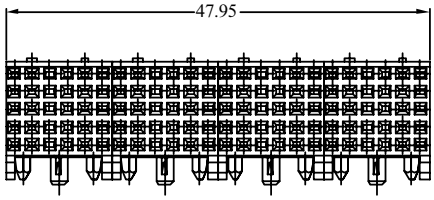
1 Module



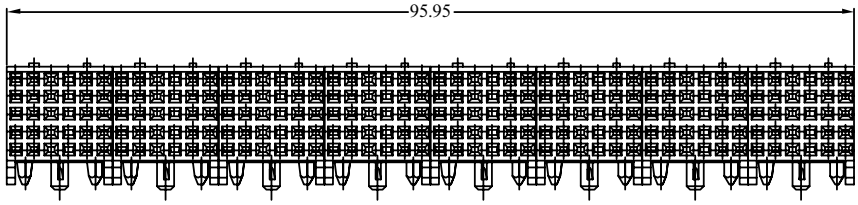
2 Module



4 Module



8 Module



PCB pattern P7, see chapter PCB layouts

PARTNUMBERS

HM1S5 x FRR000H6PLF

Base Part Number	Type	no. of rows	no. of pos.	Configuration	000	Performance	Packaging	LF
HM1	**S** = signal receptacle straight	**5** = 5 row	**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.)	**FRR** = solder to board tail length (B): 3,30 mm		**H6** = Telcordia CO	**P** = trays	**LF** = lead free

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

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 pressed on PCB with flat press block



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

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: $5x10^3$ MΩ initially, $1x10^3$ 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

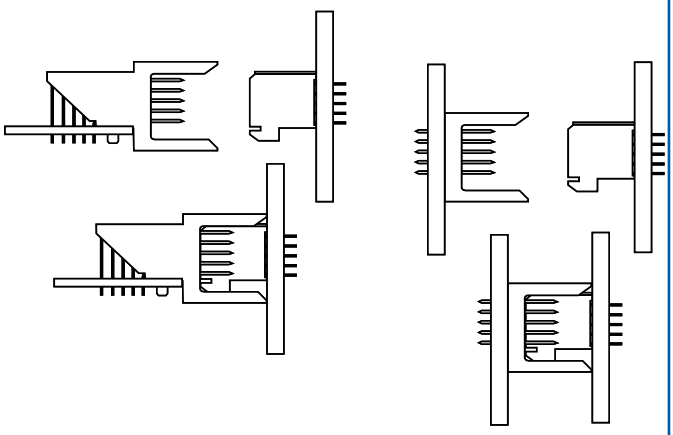
PACKAGING
- standard: tubes

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

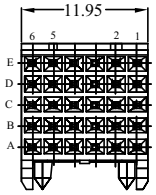
TYPICAL APPLICATIONS

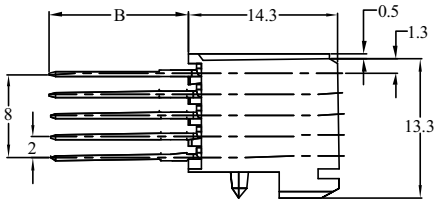


Receptacle, 5 row, signal, straight, press fitt

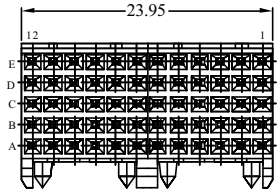
PRODUCT

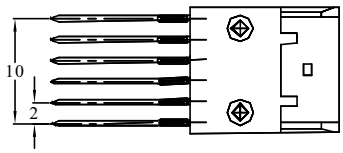
1 Module



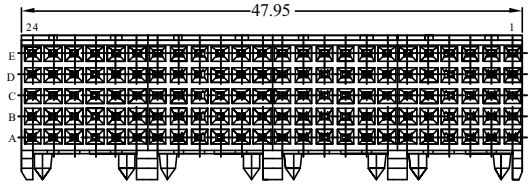


2 Module

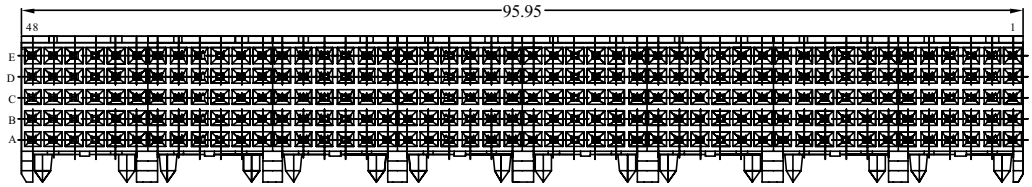




4 Module



8 Module



PCB pattern P7, see chapter PCB layouts

PARTNUMBERS

8576x - 1y01LF

Base Part Number	–	Performance	Tail length	Pin Configuration	LF

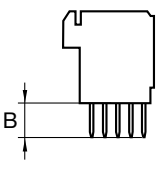
85761 = 1 module (5 x 6 pos.)
on request only = 2 module (5 x 12 pos.)
85763 = 4 module (5 x 24 pos.)
on request only = 8 module (5 x 48 pos.)

1 = Telcordia CO

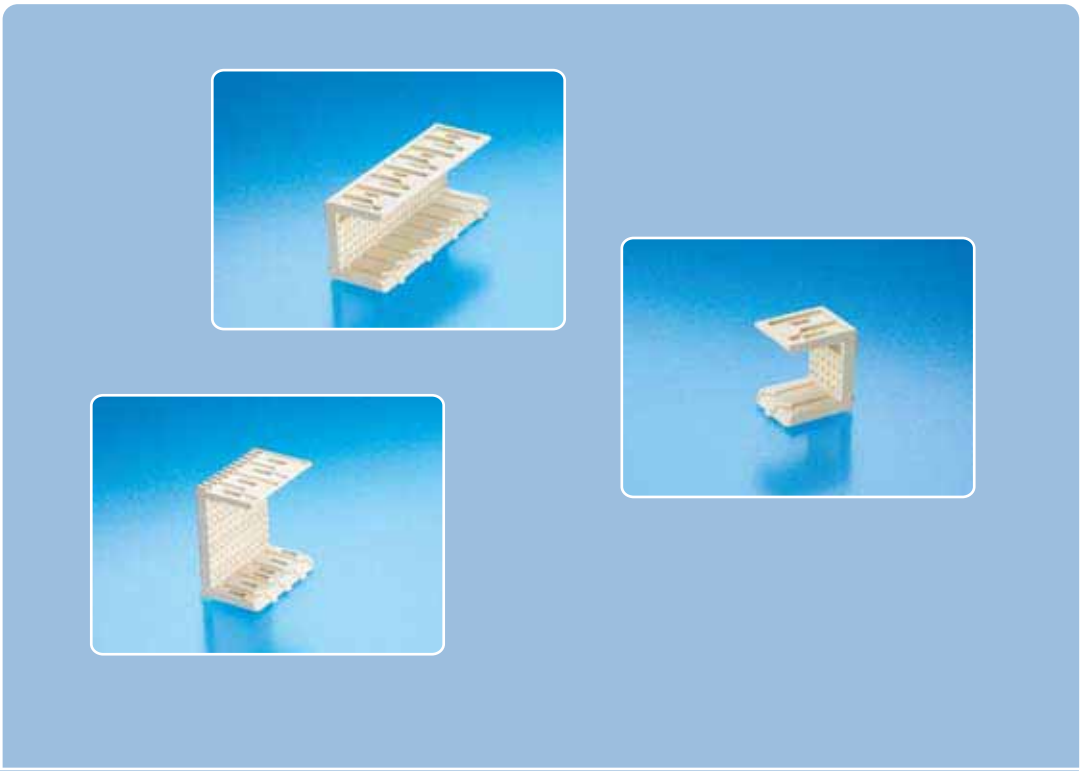
01 = fully loaded

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

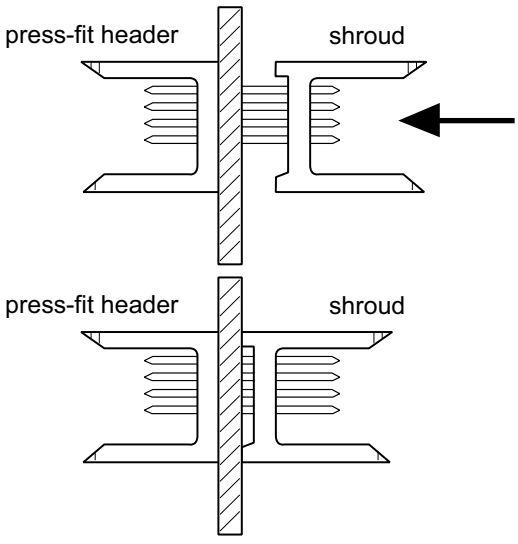
- for application equipment, check out the application equipment table on page 217-223.

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

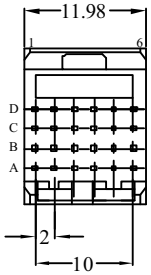
TYPICAL APPLICATIONS

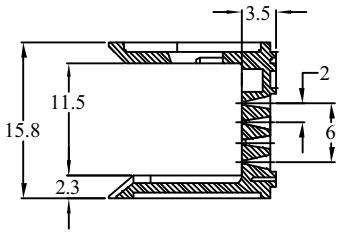


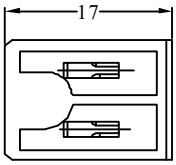
Shroud, 4 row, wide body

PRODUCT

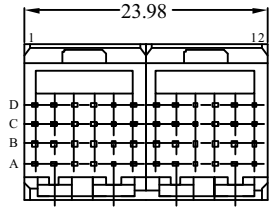
1 Module
70203-111LF

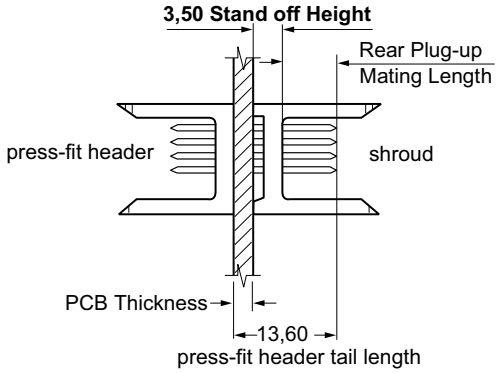




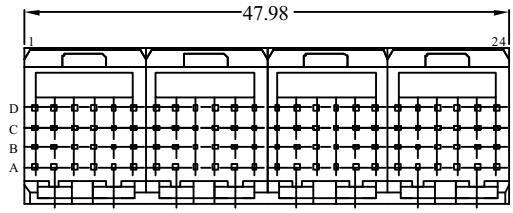


2 Module
70203-112LF

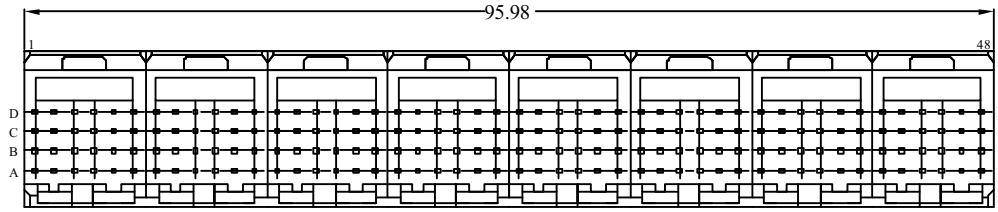




4 Module
70203-113LF



8 Module
70203-114LF



PARTNUMBERS

70203 - yyyLF

Base Part Number – no.of positions – LF

70203 = 4 row shroud, wide body

yyy	no. of positions
111	4 x 6
112	4 x 12
113	4 x 24
114	4 x 48

LF = lead free

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

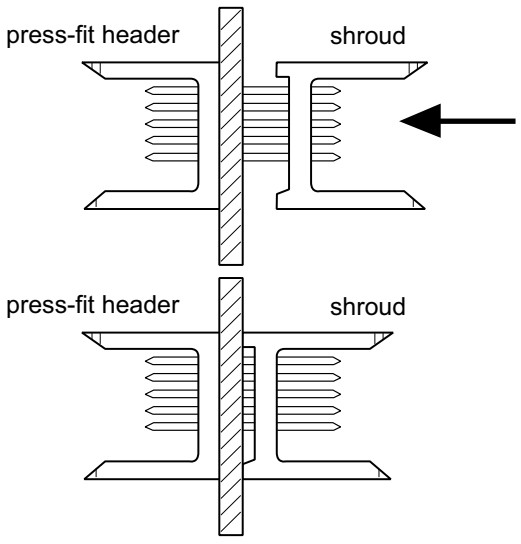
- for application equipment, check out the application equipment table on page 217-223

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

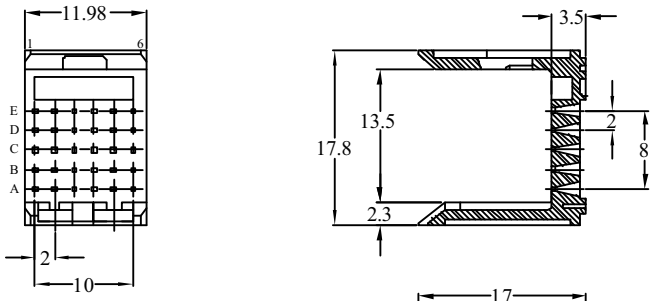
TYPICAL APPLICATIONS



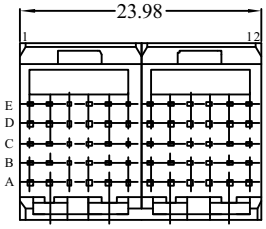
Shroud, 5 row, wide body

PRODUCT

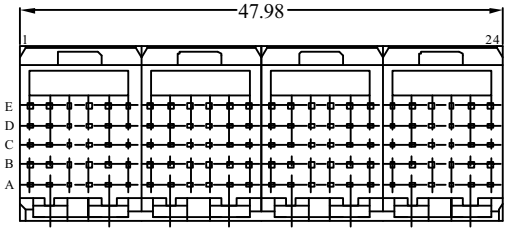
1 Module
89055-111LF

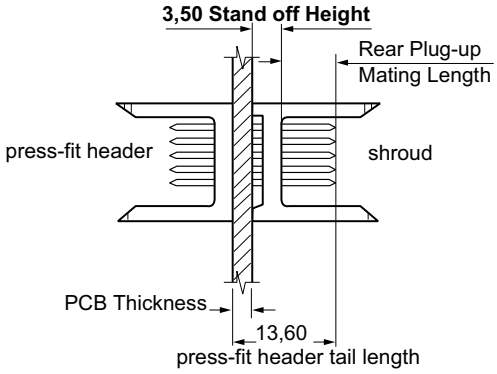


2 Module
89055-112LF

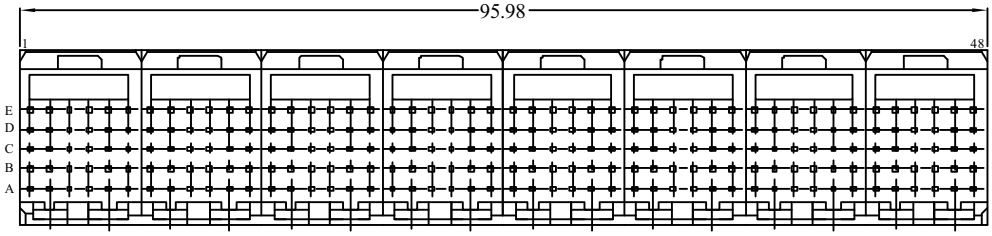


4 Module
89055-113LF





8 Module
89055-114LF



PARTNUMBERS

89055 - yyyLF

Base Part Number – no.of positions – LF

89055 = 5 row shroud, wide body

yyy	no. of positions
111	5 x 6
112	5 x 12
113	5 x 24
114	5 x 48

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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)

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

- 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

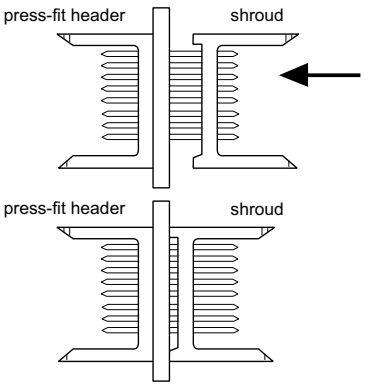
Header, straight, press-fit, page 49

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

Receptacle, straight, press-fit, page 51

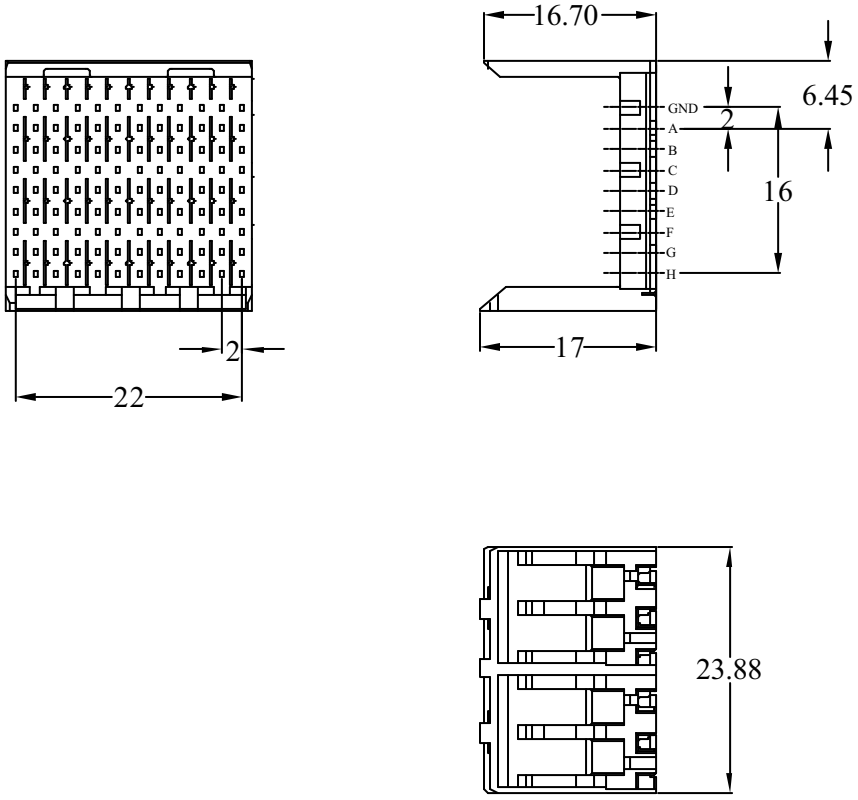
- part number 74770-102LF

TYPICAL APPLICATIONS



Shroud, 8 row, wide body

PRODUCT



PARTNUMBERS

98173 - 102LF

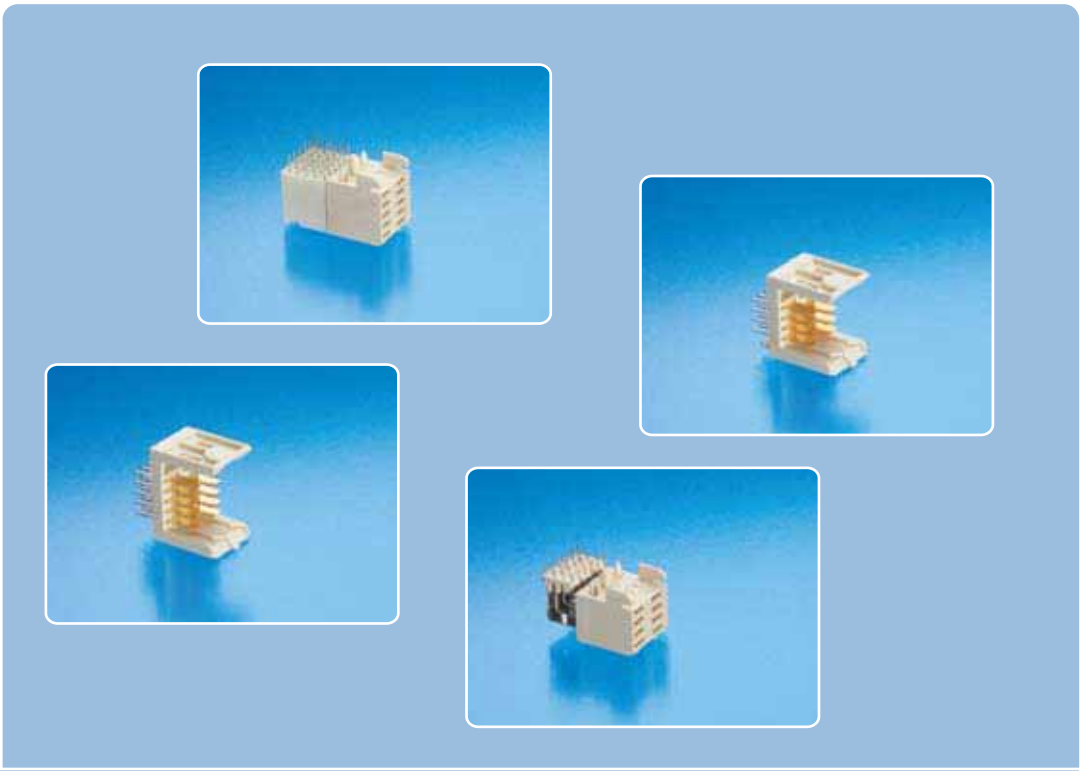
Base Part Number – **no.of positions** **LF**

98173 = 8 row shroud, wide body

yyy	no. of positions
102	8 x 12

LF = lead free

Note: Box packaging



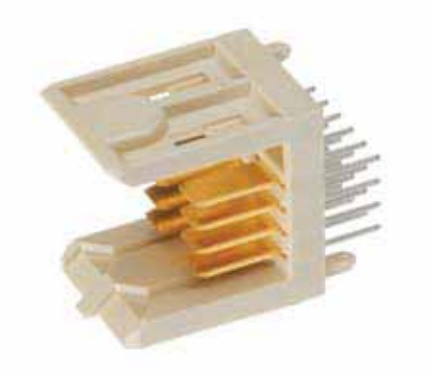
METRAL® POWER CONNECTORS STANDARD

- 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: $5x10^3$ MΩ initially, $1x10^3$ 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

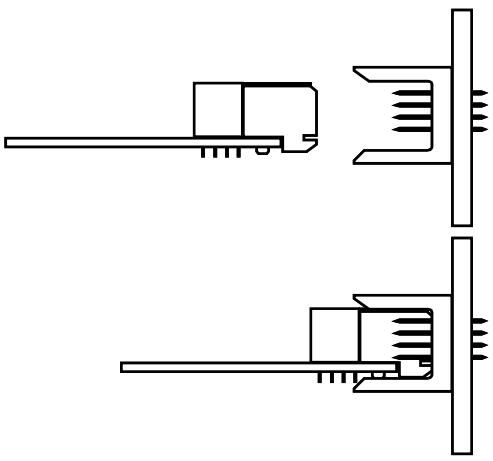
APPLICATION EQUIPMENT

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

MATING DATA

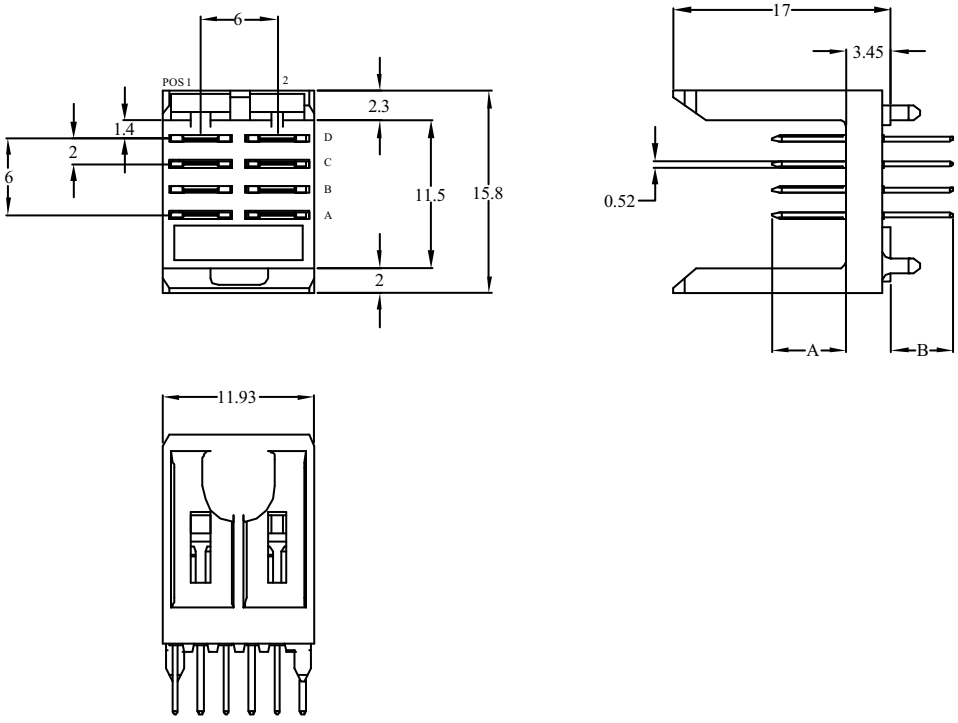
- Receptacle, right angle, press-fit, page 101
  - part number 88949-102LF
- Receptacle, right angle, solder-to-board, page 99
  - part number 89039-101LF
- Receptacle, right angle, Pin-in-Paste, page 103
  - part number 72651-101LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P5, see chapter PCB layouts

PARTNUMBERS

88960 - 101LF

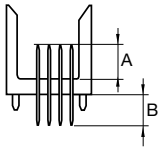
Base Part Number	–	Performance	Pin Configuration	LF

88960 = 1 module, 4 x 6 pos.

1 = Telcordia CO

LF = lead free

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

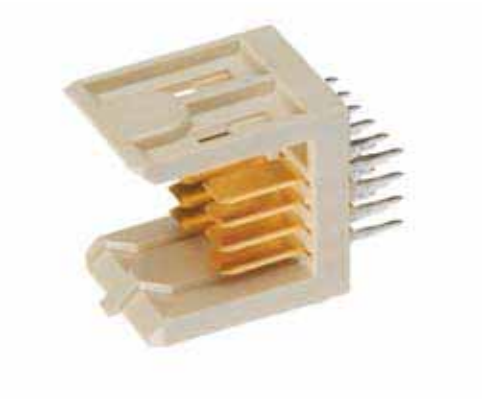


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

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: $5x10^3$ MΩ initially, $1x10^3$ 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)
- 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

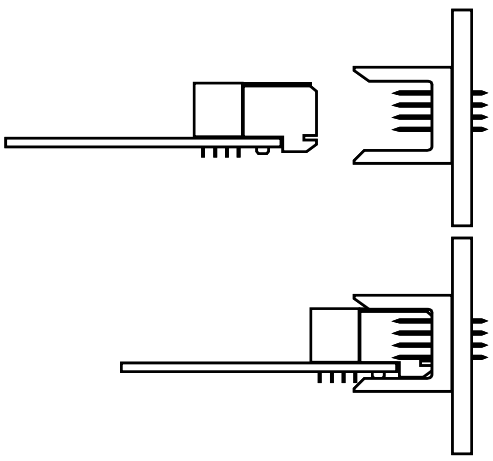
APPLICATION EQUIPMENT

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

MATING DATA

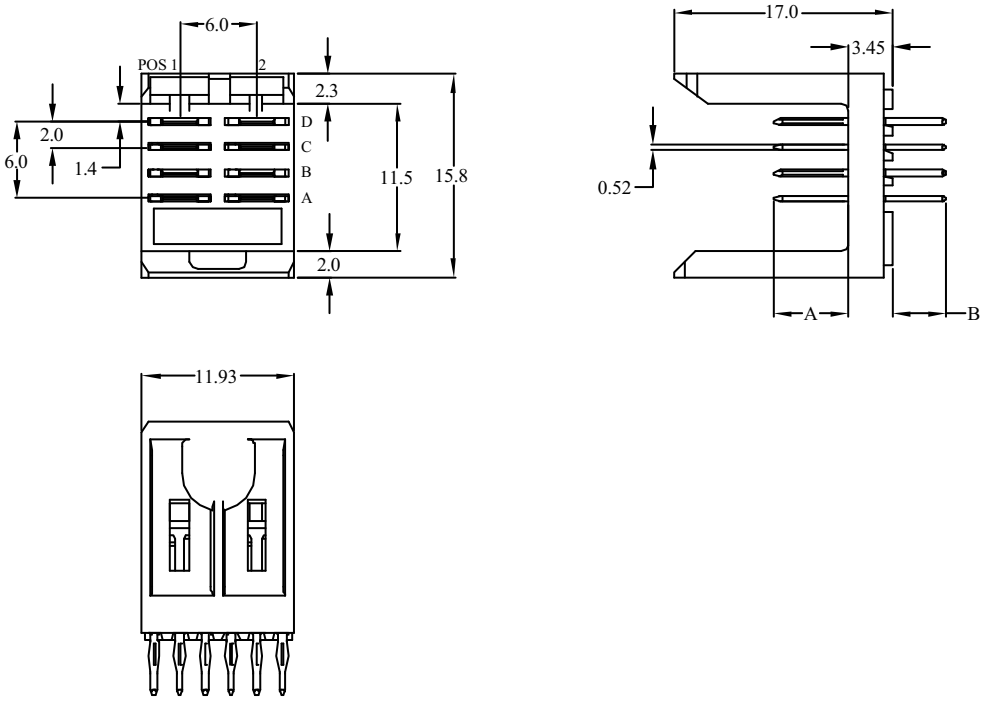
- Receptacle, right angle, press-fit, page 101
  - part number 88949-102LF
- Receptacle, right angle, solder-to-board, page 99
  - part number 89039-101LF
- Receptacle, right angle, Pin-in-Paste, page 103
  - part number 72651-101LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P6, see chapter PCB layouts

PARTNUMBERS

70236 - 101LF

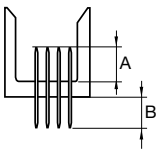
Base Part Number	–	Performance	Pin Configuration	LF

70236 = 1 module, 4 x 6 pos.

1 = Telcordia CO

LF = lead free

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, 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: $5x10^3$ MΩ initially, $1x10^3$ 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

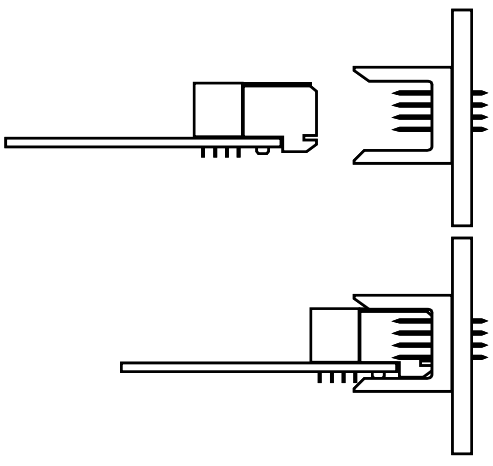
APPLICATION EQUIPMENT

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

MATING DATA

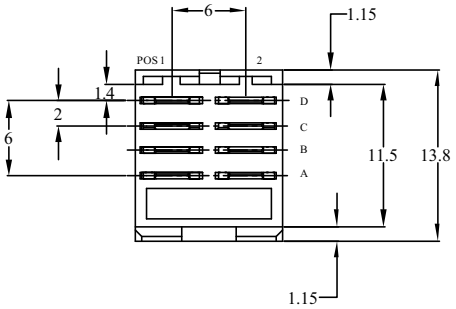
- Receptacle, right angle, press-fit, page 101
  - part number 88949-102LF
- Receptacle, right angle, solder-to-board, page 99
  - part number 89039-101LF
- Receptacle, right angle, Pin-in-Paste, page 103
  - part number 72651-101LF

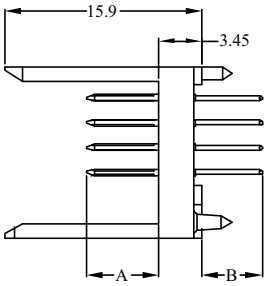
TYPICAL APPLICATIONS

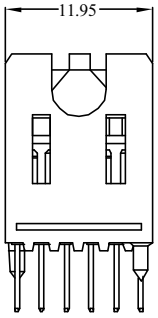


Header, 4 row, power, straight, solder to board, narrow body

PRODUCT







PCB pattern P3, see chapter PCB layouts

PARTNUMBERS

70278 - 101LF

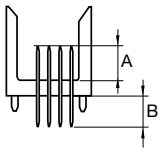
Base Part Number	–	Performance	Pin Configuration	LF

70278 = 1 module, 4 x 6 pos.

1 = Telcordia CO

LF = lead free

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

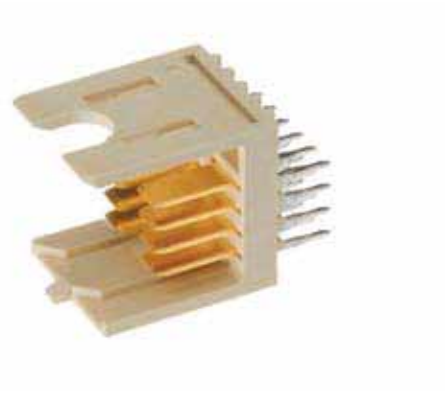


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 4 row, power, straight, press-fit, 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 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: 5x10^3 MΩ initially, 1x10^3 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)
- 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

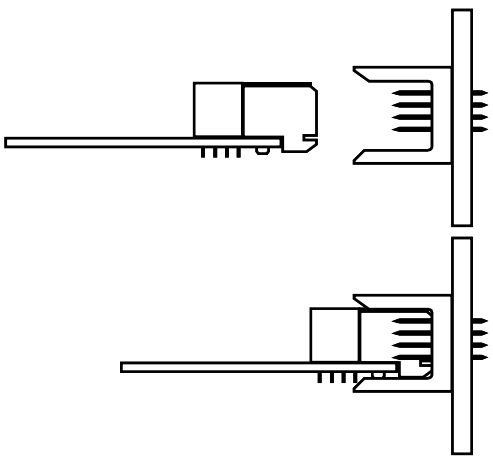
APPLICATION EQUIPMENT

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

MATING DATA

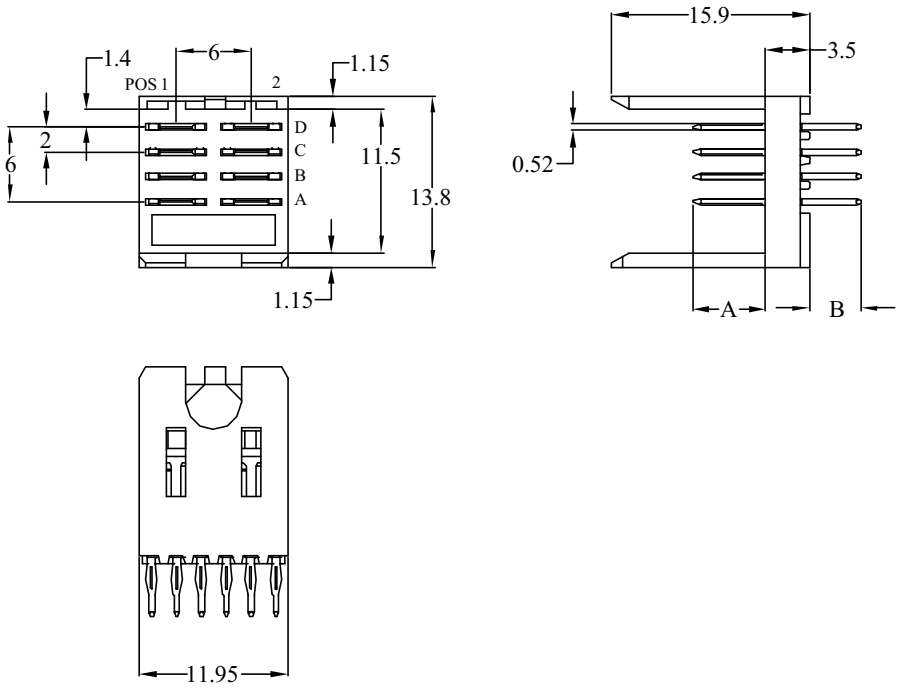
- Receptacle, right angle, press-fit, page 101
  - part number 88949-102LF
- Receptacle, right angle, solder-to-board, page 99
  - part number 89039-101LF
- Receptacle, right angle, Pin-in-Paste, page 103
  - part number 72651-101LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P4, see chapter PCB layouts

PARTNUMBERS

85830 - 101LF

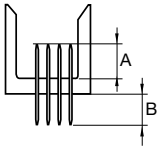
Base Part Number	–	Performance	Pin Configuration	LF

85830 = 1 module, 4 x 6 pos.

1 = Telcordia CO

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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

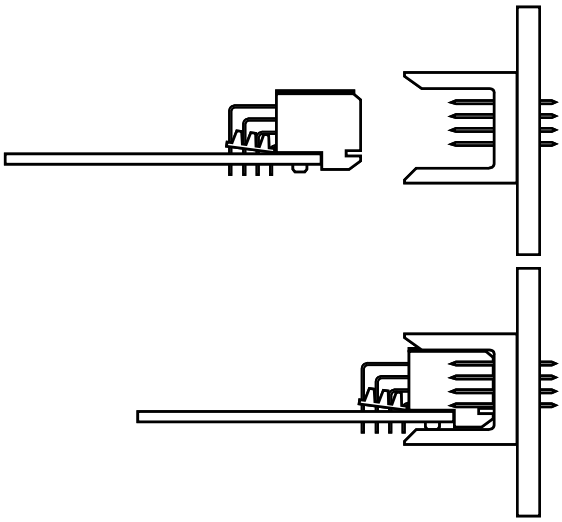
Header, straight, press-fit, page 93

- 1 module – part number 70236-101LF

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

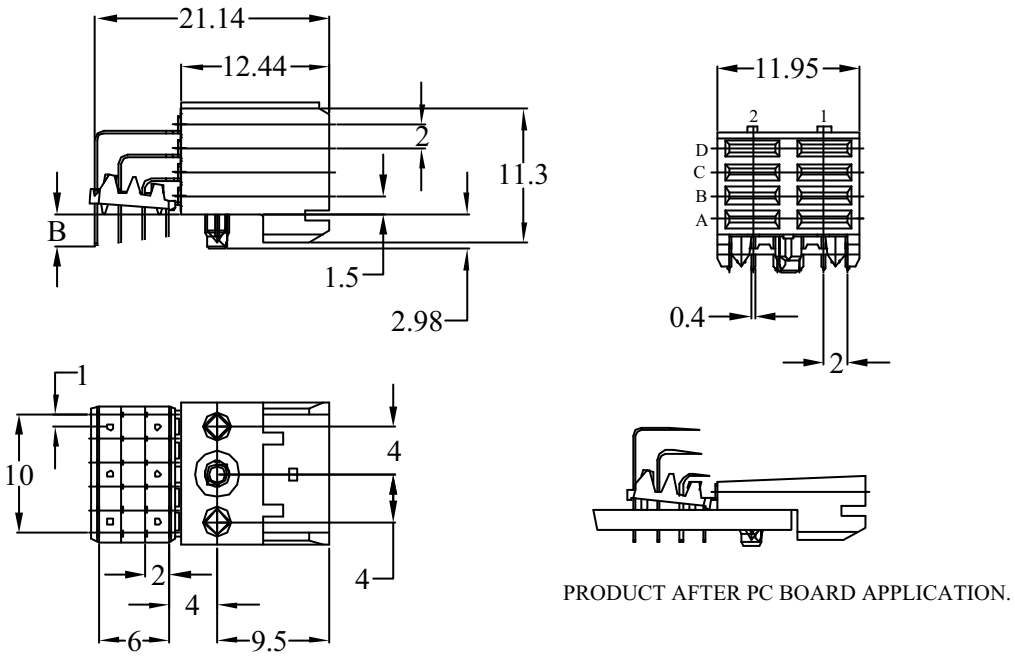
- 1 module – part number 88960-101LF

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

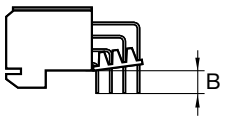
Base Part Number	–	Performance	Pin Configuration	LF

89039 = 1 module, 4 x 2 pos.

1 = Telcordia CO

LF = lead free

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

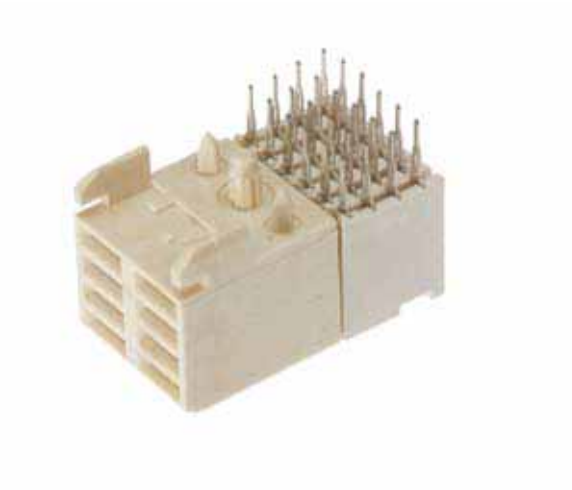


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

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 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: $5x10^3$ MΩ initially, $1x10^3$ 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)
- 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

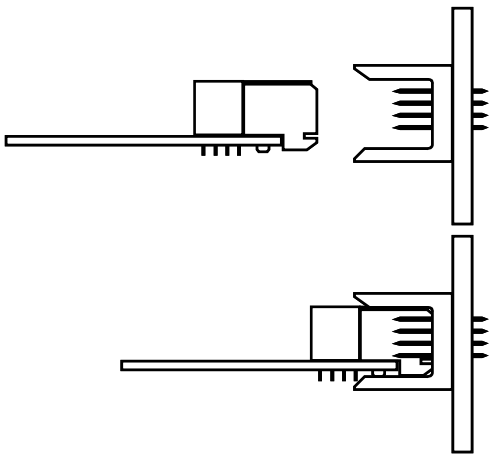
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Header, straight, press-fit, page 93
- 1 module – part number 70236-101LF

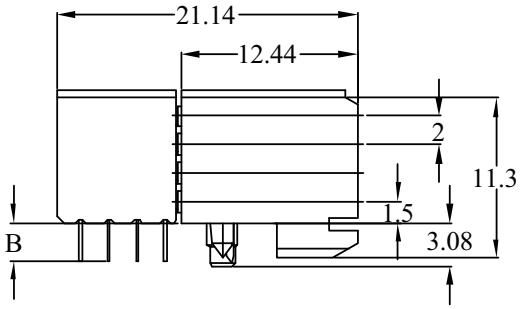
Header, straight, solder-to-board, page 91
- 1 module – part number 88960-101LF

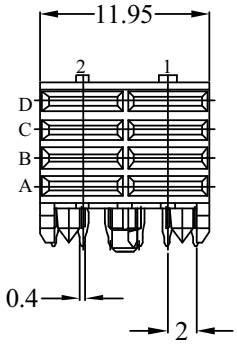
TYPICAL APPLICATIONS

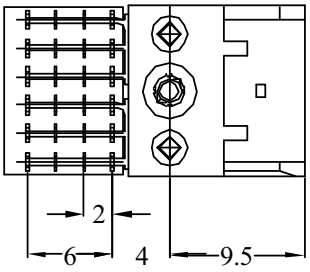


Receptacle, 4 row, power, right angle, press-fit

PRODUCT







PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

88949 - 1yyLF

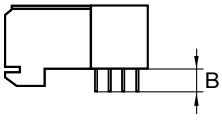
Base Part Number	–	Performance	Pin Configuration	LF

88949 = 1 module, 4 x 2 pos.

1 = Telcordia CO

LF = lead free

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

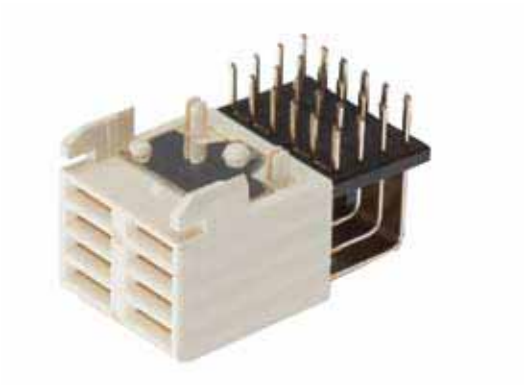


Note: blue marked in **tail length** is the preferred recommended standard
for other special patterns or loadings, please check drawings, all other configurations on request only

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: $5x10^3$ MΩ initially, $1x10^3$ 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

- 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

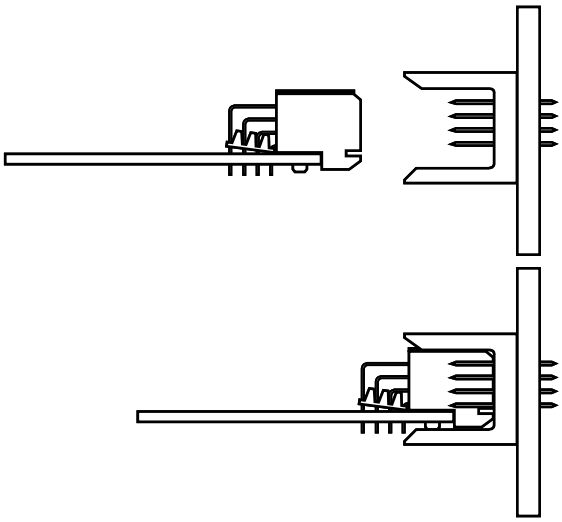
Header, straight, press-fit, page 93

- 1 module – part number 70236-101LF

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

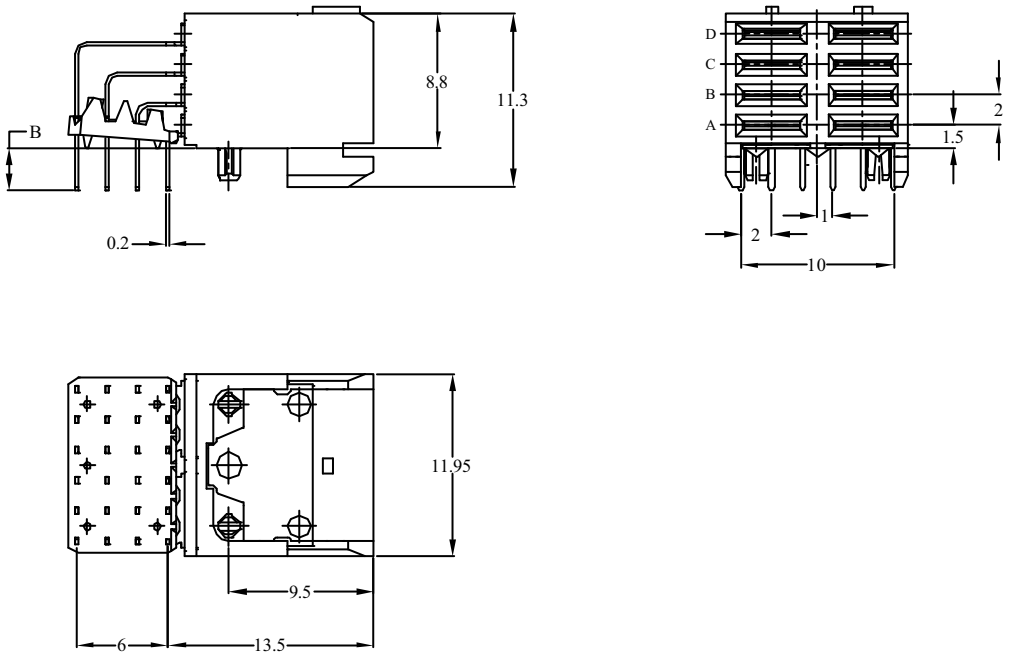
- 1 module – part number 88960-101LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

72651 - 1yyLF

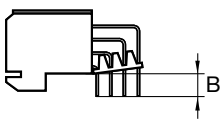
Base Part Number	–	Performance	Pin Configuration	LF

72651 = 1 module, 4 x 2 pos.

1 = Telcordia CO

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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

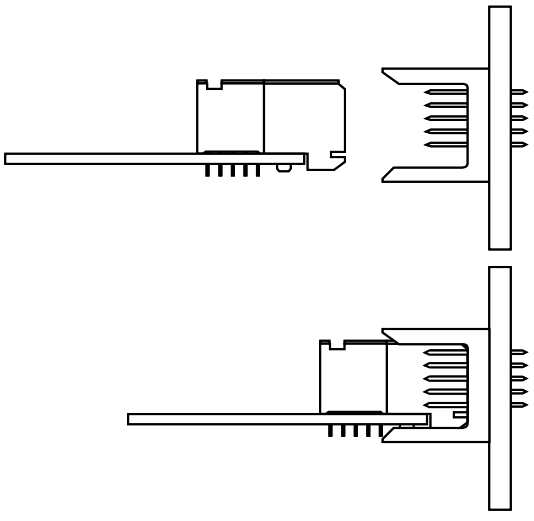
APPLICATION EQUIPMENT

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

MATING DATA

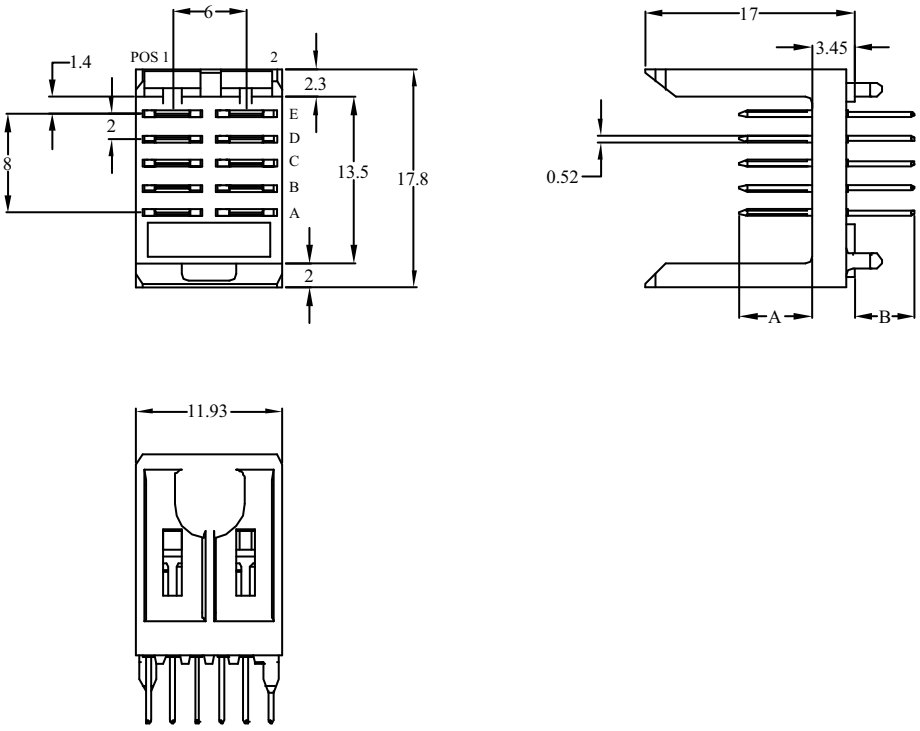
- Receptacle, right angle, press-fit, page 109
  - part number 85876-1yyLF
- Receptacle, right angle, solder-to-board, page 111
  - part number 89096-1yyLF
- Receptacle, right angle, Pin-in-Paste, page 113
  - part number 63793-101LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P16, see chapter PCB layouts

PARTNUMBERS

63346 - 104LF

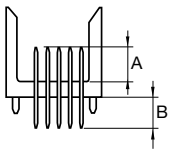
Base Part Number	–	Performance	Pin Configuration	LF

63346 = 1 module, 5 x 2 pos.

1 = Telcordia CO

LF = lead free

yy	mating length (A)	tail length (B)
04	6,50 mm	4,25 mm



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: $5x10^3$ MΩ initially, $1x10^3$ 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)
- 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

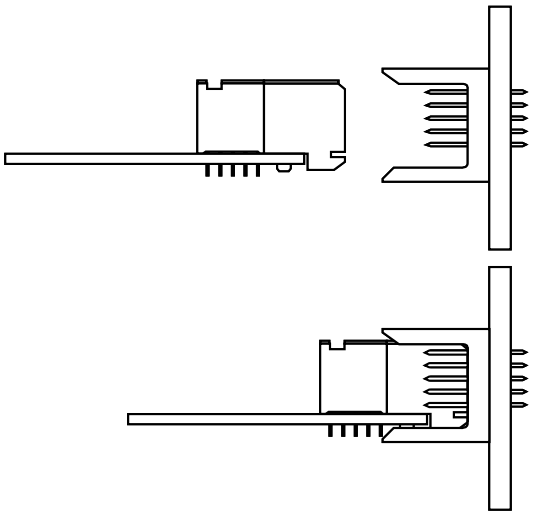
APPLICATION EQUIPMENT

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

MATING DATA

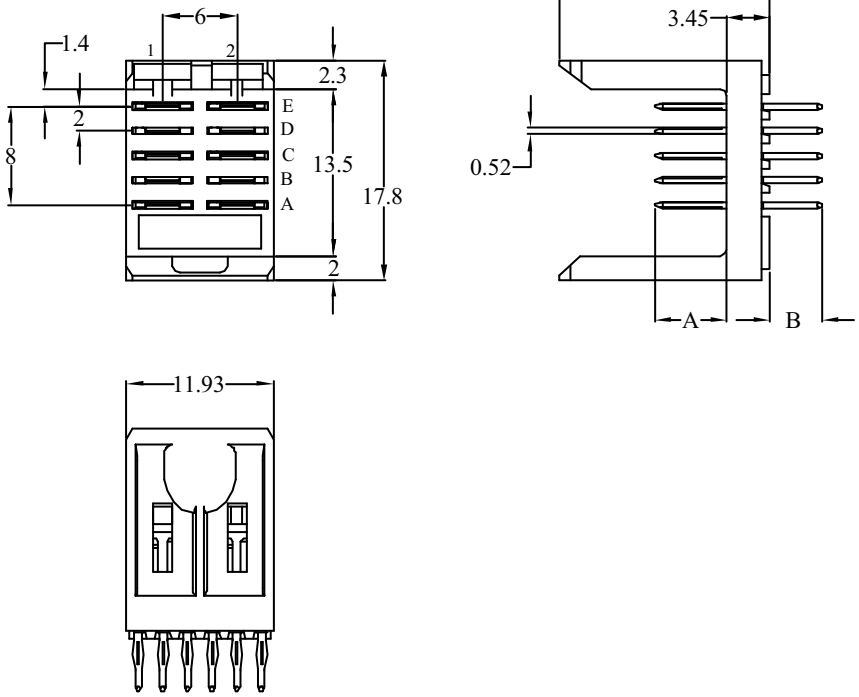
- Receptacle, right angle, press-fit, page 109
  - part number 85876-1yyLF
- Receptacle, right angle, solder-to-board, page 111
  - part number 89096-1yyLF
- Receptacle, right angle, Pin-in-Paste, page 113
  - part number 63793-101LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P7, see chapter PCB layouts

PARTNUMBERS

89099 - 111LF

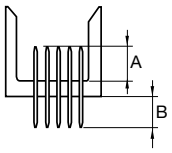
Base Part Number – Performance – Pin Configuration – LF

89099 = 1 module, 5 x 6 pos.

1 = Telcordia CO

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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)
- 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

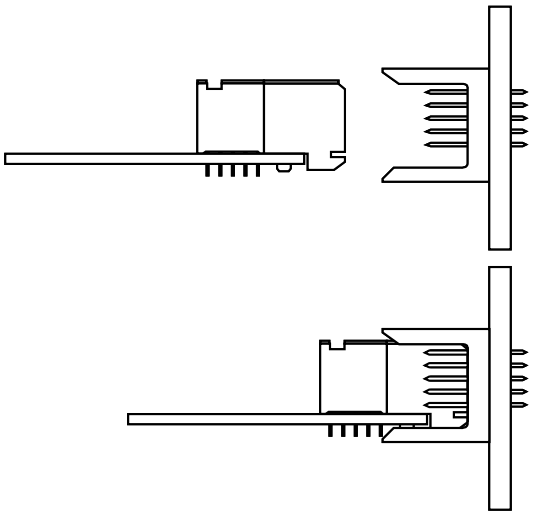
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Header, straight, press-fit, page 107
- 1 module – part number 89099-111LF

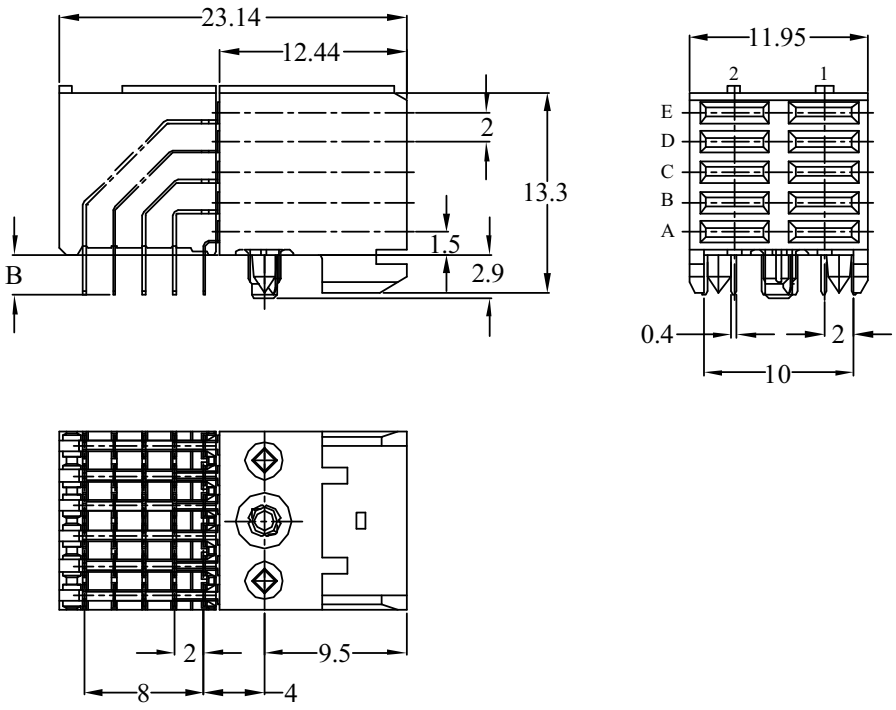
Header, straight, solder-to-board, page 105
- 1 module – part number 63346-104LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

85876 - 1yyLF

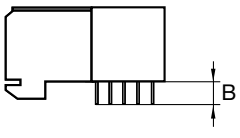
Base Part Number	–	Performance	Pin Configuration	LF

85876 = 1 module, 5 x 2 pos.

1 = Telcordia CO

LF = lead free

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 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: $5x10^3$ MΩ initially, $1x10^3$ 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)
- 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

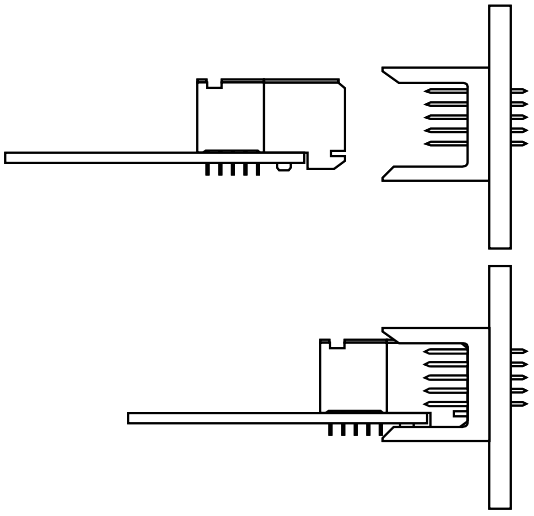
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Header, straight, press-fit, page 107
- 1 module – part number 89099-111LF

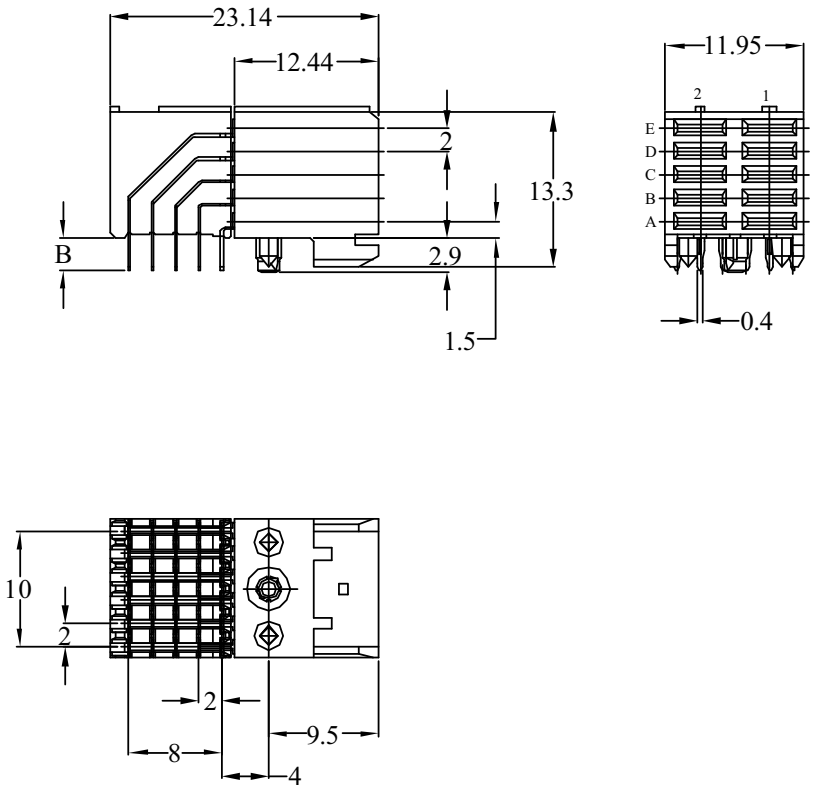
Header, straight, solder-to-board, page 105
- 1 module – part number 63346-104LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

89096 - 1yyLF

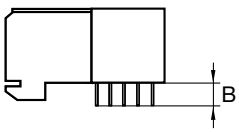
Base Part Number	–	Performance	Pin Configuration	LF

89096 = 1 module, 5 x 2 pos.

1 = Telcordia CO

LF = lead free

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

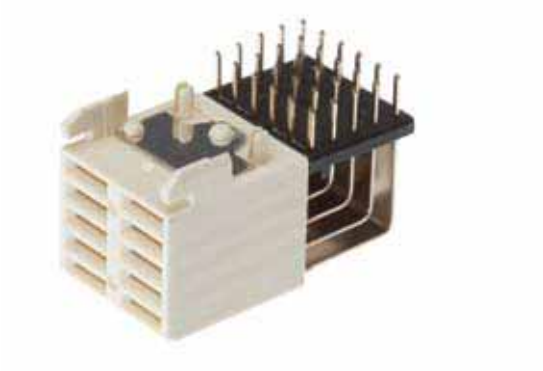


Note: blue marked in **tail length** is the preferred recommended standard
for other special patterns or loadings, please check drawings, all other configurations on request only

Receptacle, 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: $5x10^3$ MΩ initially, $1x10^3$ 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

- 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

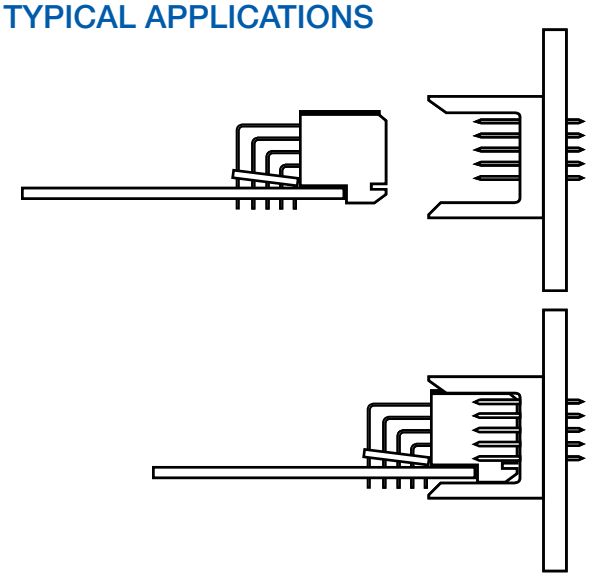
Header, straight, press-fit, page 107

- 1 module – part number 89099-111LF

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

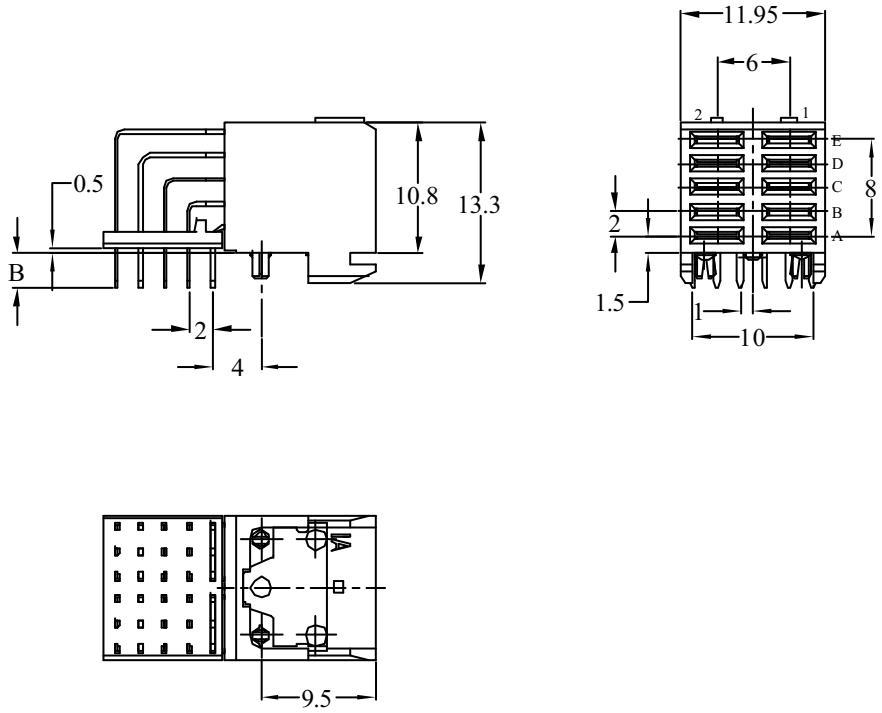
- 1 module – part number 63346-104LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

63793 - 101LF

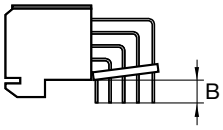
Base Part Number	–	Performance	Pin Configuration	LF

63793 = 1 module, 5 x 2 pos.

1 = Telcordia CO

LF = lead free

yy	Tail length (B)
01	2,80 mm



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: $5x10^3$ MΩ initially, $1x10^3$ 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-12-446
- Application Specification BUS-20-075

APPLICATION EQUIPMENT

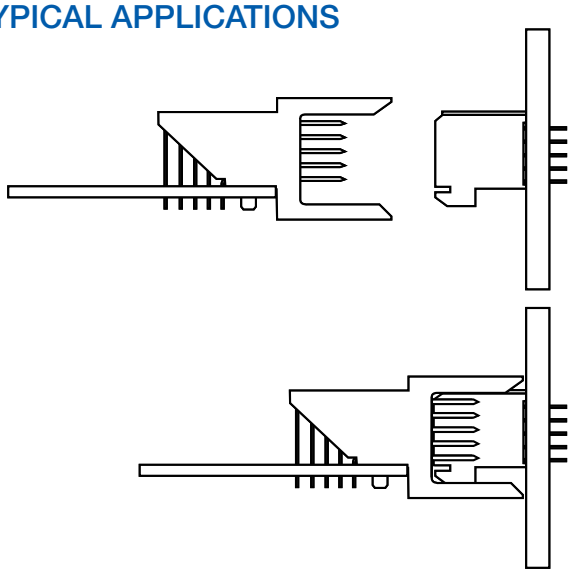
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Receptacle, straight, solder-to-board, page 123

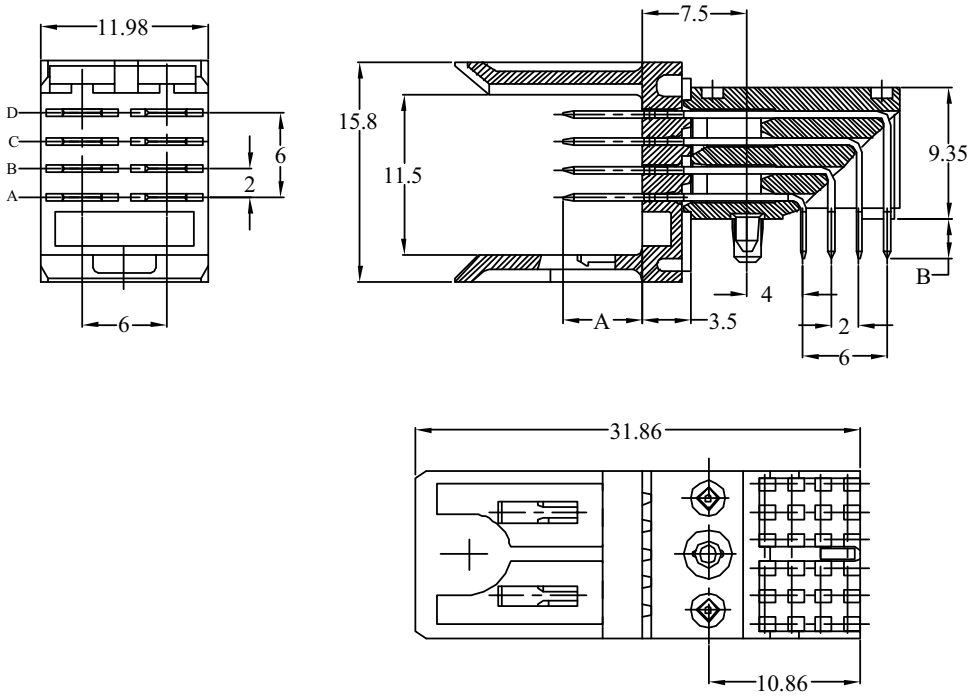
- part number 85968-101LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P1, see chapter PCB layouts

PARTNUMBERS

HM1K4 1 DAP000H6PLF

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

HM1

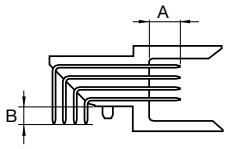
K = power header right angle

4 = 4 row

1 = 1 module (4 x 2 pos.)

DAP = solder to board

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

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: $5x10^3$ MΩ initially, $1x10^3$ 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)
- 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

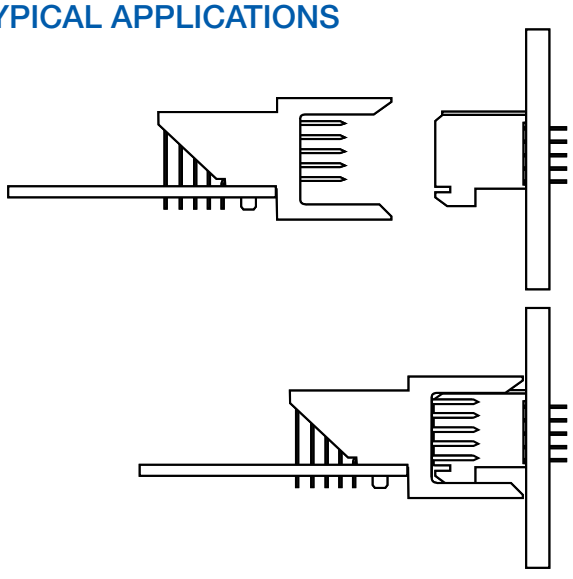
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Receptacle, straight, solder-to-board, page 123

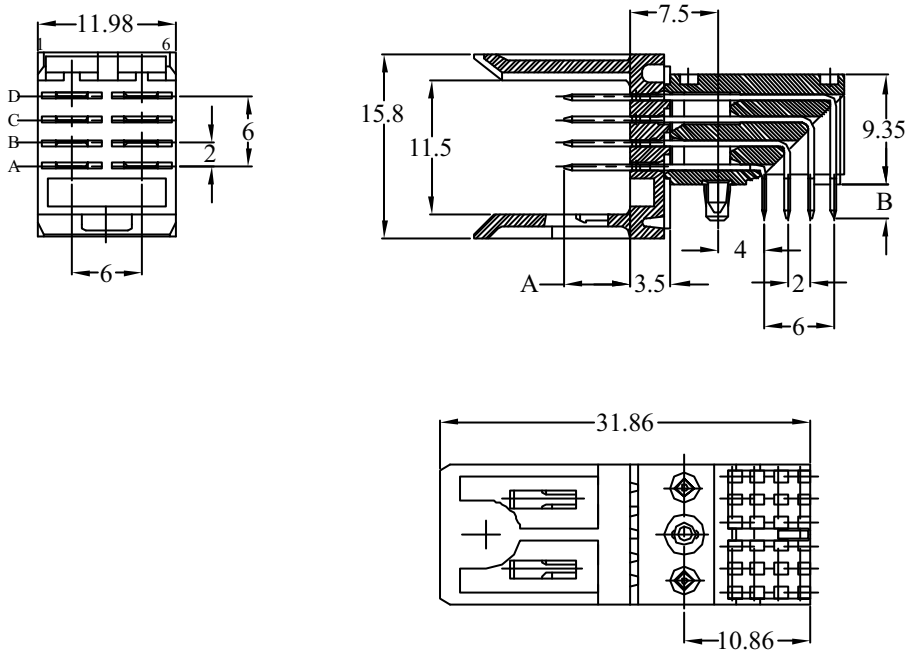
- part number 85968-101LF

TYPICAL APPLICATIONS



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

PRODUCT



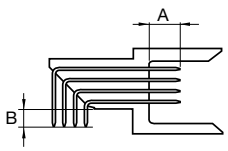
PCB pattern P1, see chapter PCB layouts

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: $5x10^3$ MΩ initially, $1x10^3$ 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

- 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

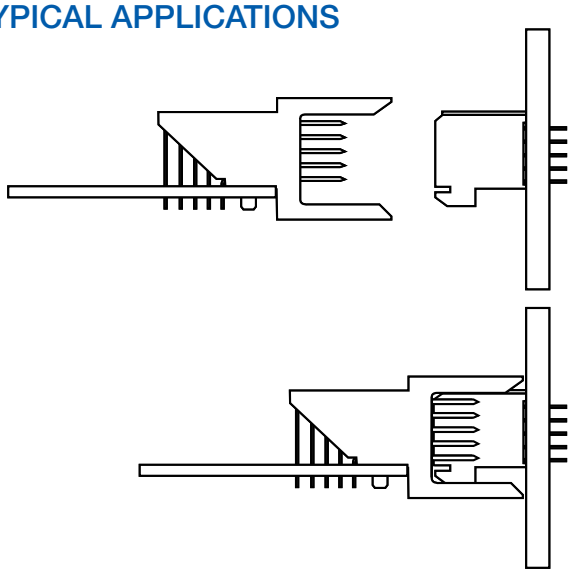
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Receptacle, straight, solder-to-board, page 123

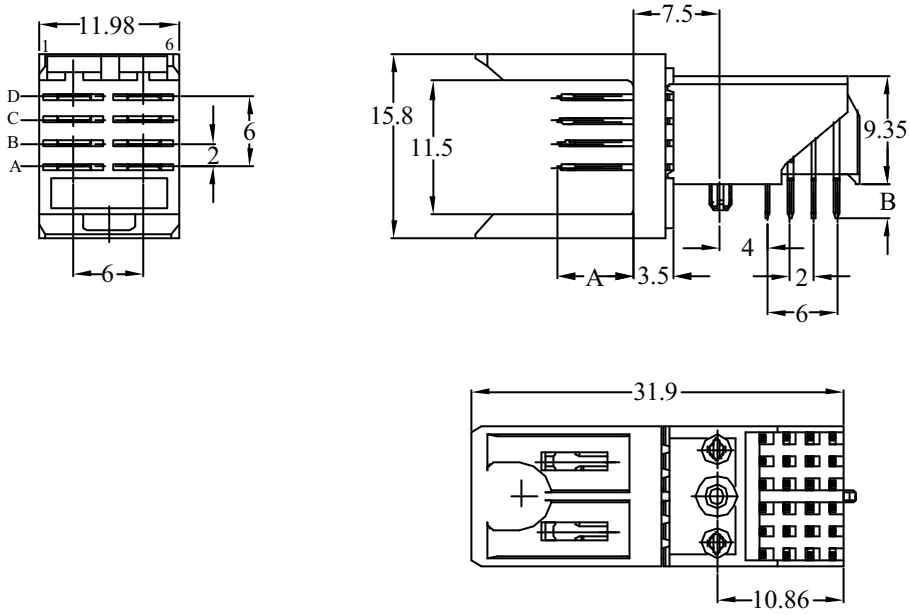
- part number 85968-101LF

TYPICAL APPLICATIONS



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

PRODUCT



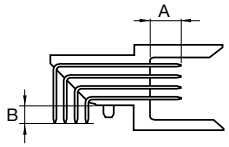
PCB pattern P1, see chapter PCB layouts

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

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: $5x10^3$ MΩ initially, $1x10^3$ 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-12-453

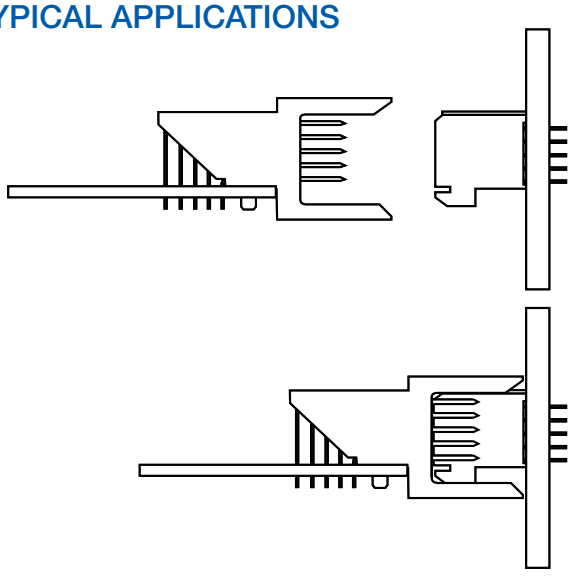
APPLICATION EQUIPMENT

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

MATING DATA

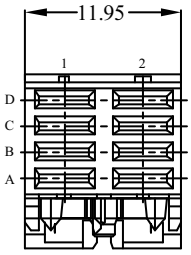
- Header, right angle, press-fit, page 119
  - part number HM1K41DDP000H6PLF
- Header, right angle, solder-to-board, page 117
  - part number HM1K41DAP000H6PLF
- Header, right angle, Pin-in-Paste, page 121
  - part number HM1K41DFP000H6PLF

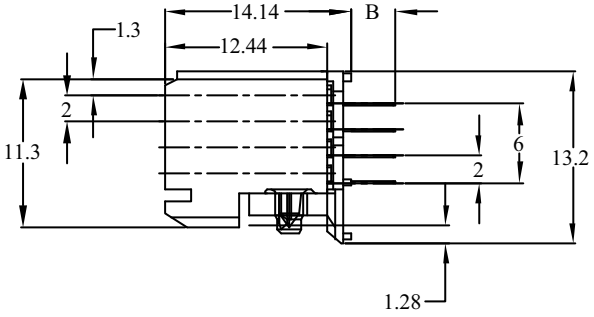
TYPICAL APPLICATIONS

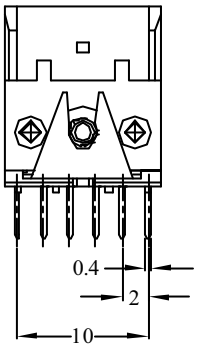


Receptacle, 4 row, power, straight, solder to board

PRODUCT







PCB pattern P5, see chapter PCB layouts

PARTNUMBERS

85968 - 101LF

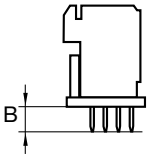
Base Part Number	–	Performance	Pin Configuration	LF

85968 = 1 module, 4 x 2 pos.

1 = Telcordia CO

LF = lead free

yy	Tail length (B)	PCB Thickness
01	3,50 mm	1,60 mm



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: $5x10^3$ MΩ initially, $1x10^3$ 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

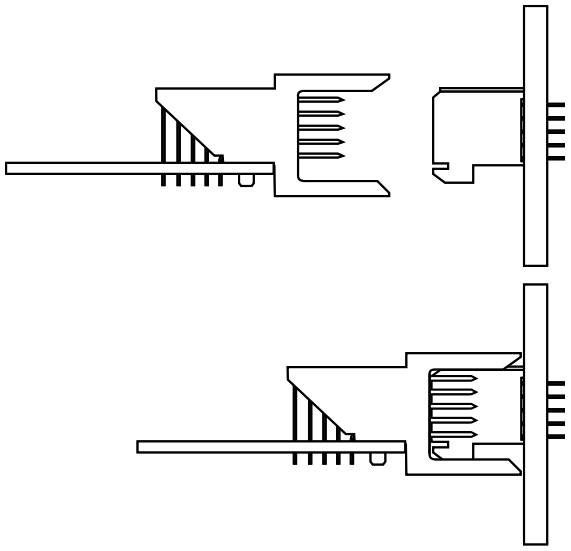
APPLICATION EQUIPMENT

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

MATING DATA

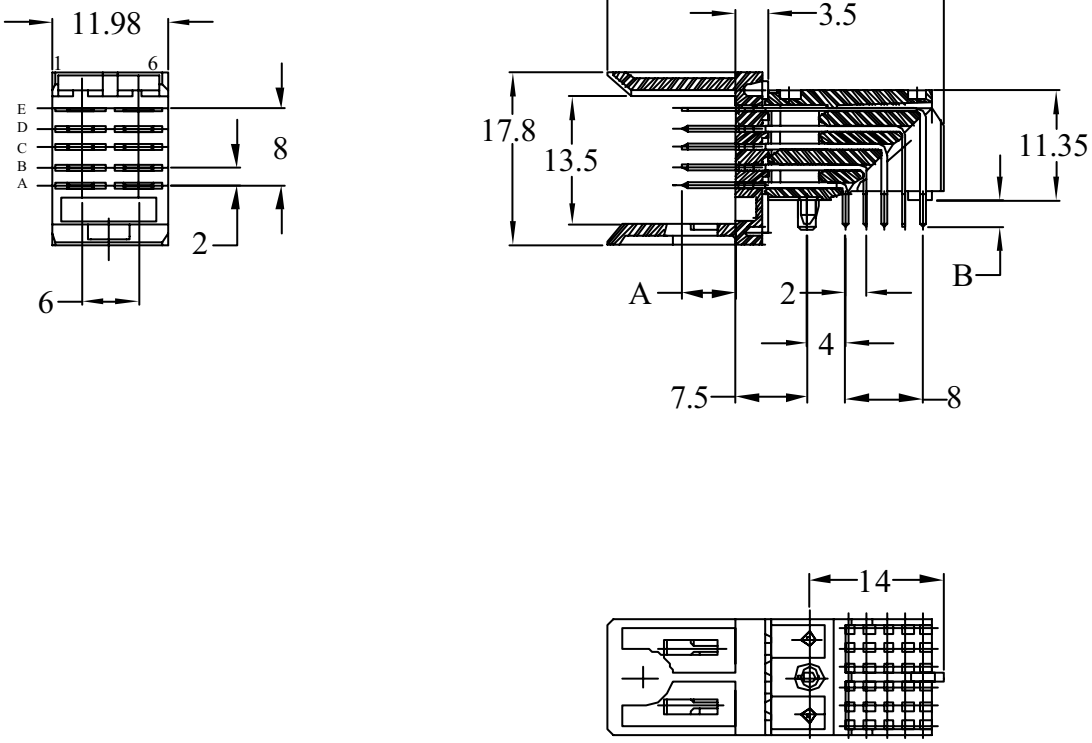
- Receptacle, straight, solder-to-board, page 131
  - part number 94561-112LF

TYPICAL APPLICATIONS



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

PRODUCT



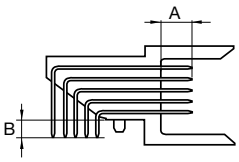
PCB pattern P2, see chapter PCB layouts

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		**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	

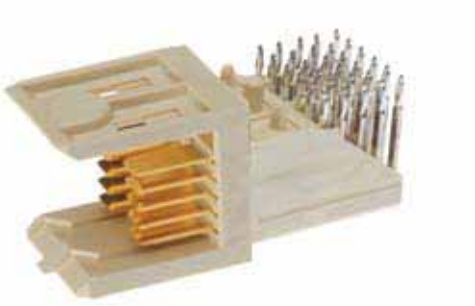


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

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: $5x10^3$ MΩ initially, $1x10^3$ 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)
- 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

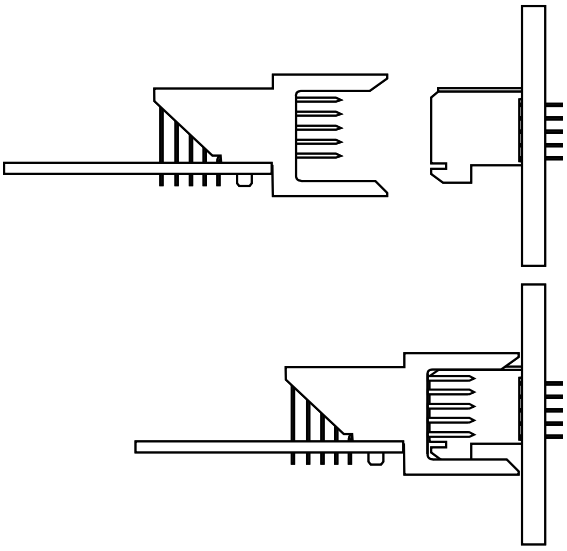
APPLICATION EQUIPMENT

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

MATING DATA

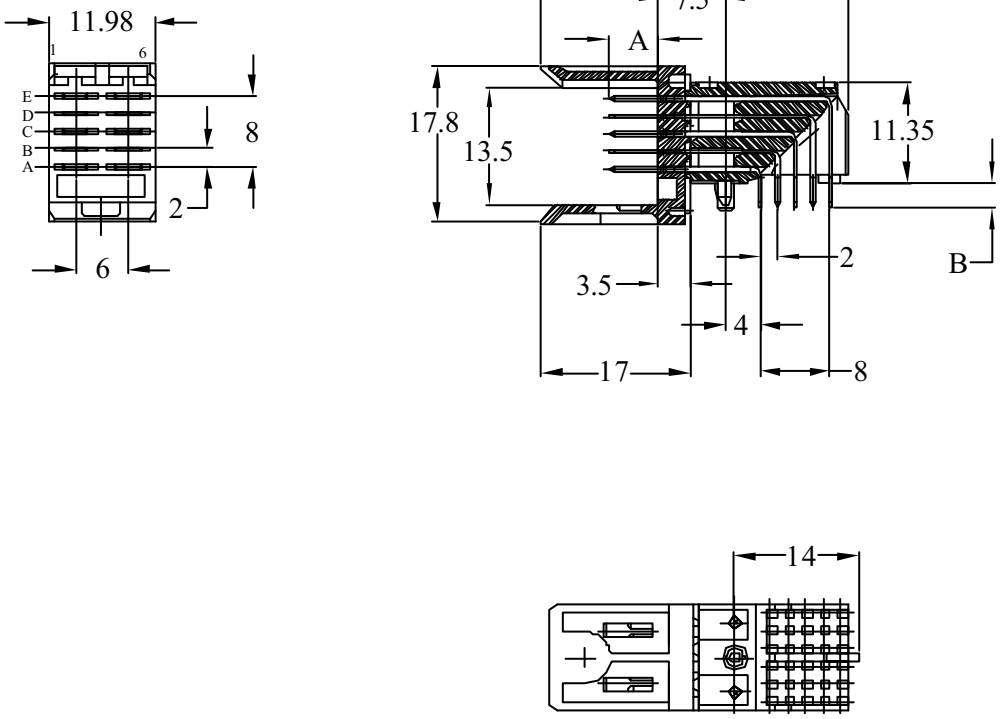
- Receptacle, straight, solder-to-board, page 131
  - part number 94561-112LF

TYPICAL APPLICATIONS



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

PRODUCT



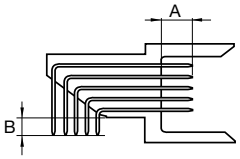
PCB pattern P2, see chapter PCB layouts

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	**1** = 1 module (5 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	

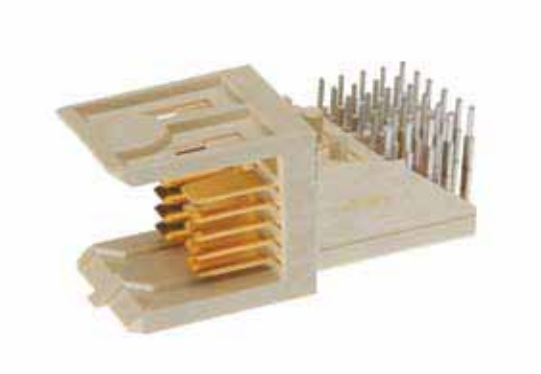


Note: for other special patterns or loadings, please check drawings, all other configurations on request only

Header, 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: $5x10^3$ MΩ initially, $1x10^3$ 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

- 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

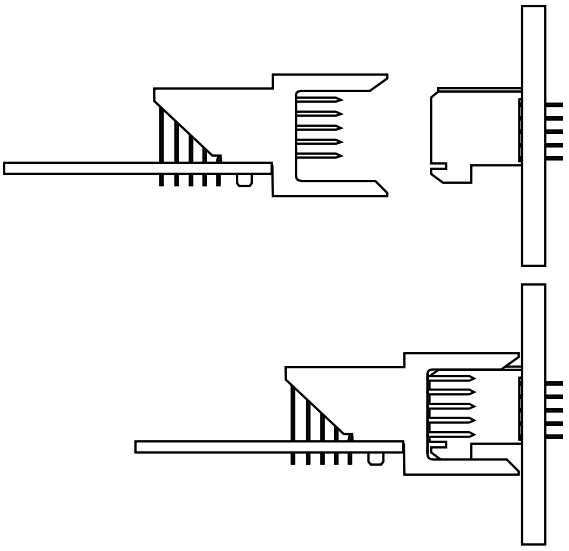
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Receptacle, straight, solder-to-board, page 131

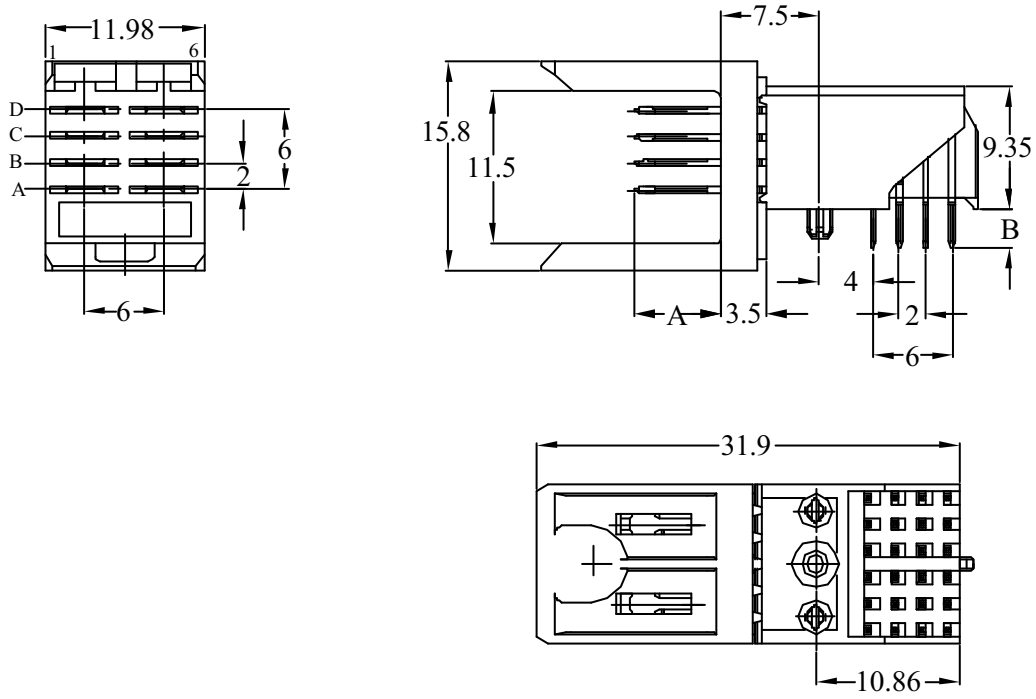
- part number 94561-112LF

TYPICAL APPLICATIONS



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

PRODUCT



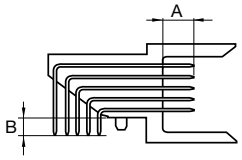
PCB pattern P2, see chapter PCB layouts

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		**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: $5x10^3$ MΩ initially, $1x10^3$ 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

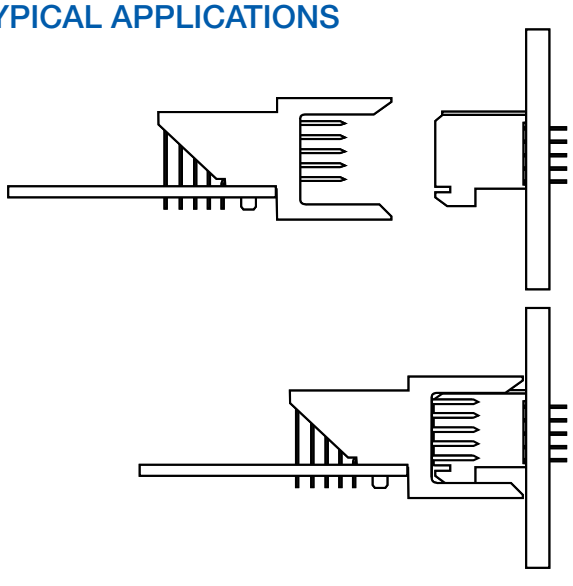
APPLICATION EQUIPMENT

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

MATING DATA

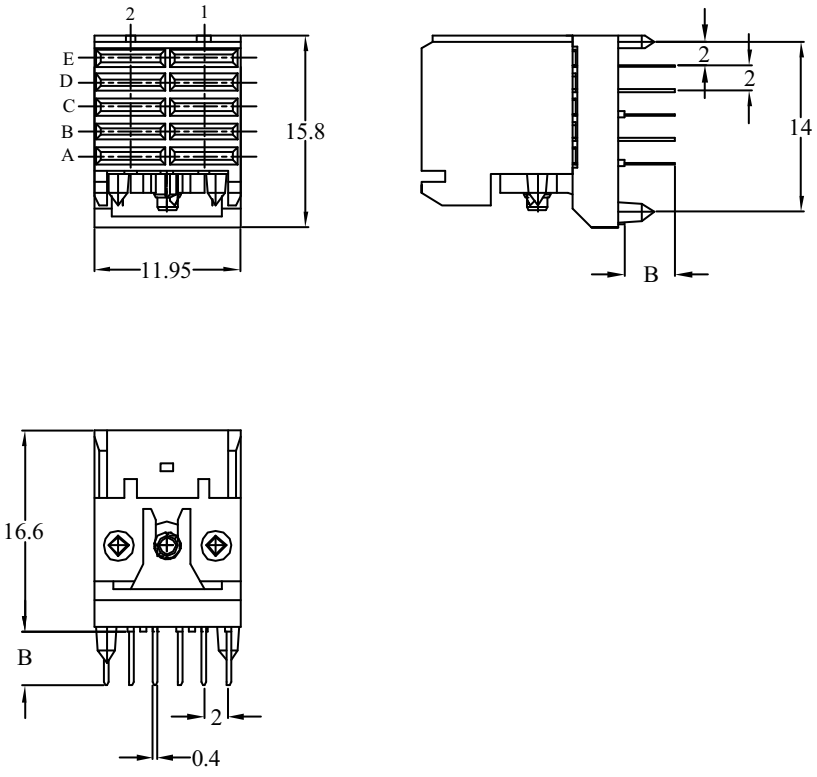
- Header, right angle, press-fit, page 127
  - part number HM1K451DDP000H6PLF
- Header, right angle, solder-to-board, page 125
  - part number HM1K51DAP000H6PLF
- Header, right angle, Pin-in-Paste, page 129
  - part number HM1K51DFP000H6PLF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P16, see chapter PCB layouts

PARTNUMBERS

94561 - 1yyLF

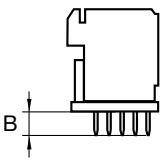
Base Part Number	–	Performance	Pin Configuration	LF

94561 = 1 module, 5 x 2 pos.

1 = Telcordia CO

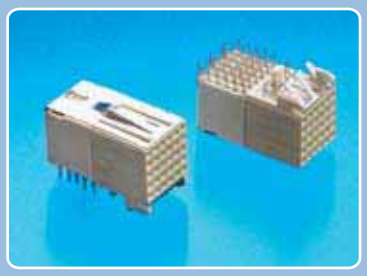
LF = lead free

yy	Tail length (B)	PCB Thickness
11	2,65 mm	1,60 mm
12	3,45 mm	2,40 mm



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

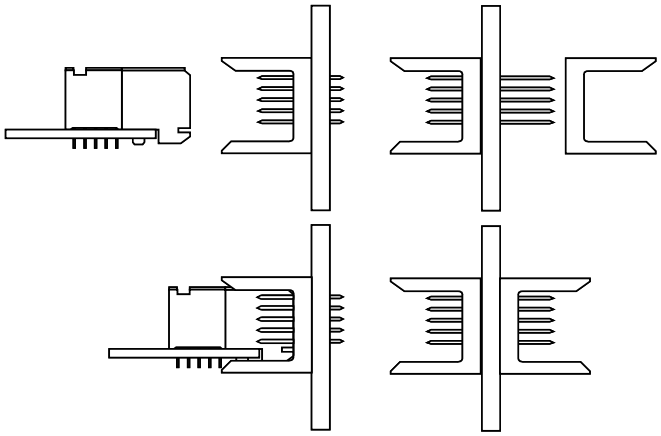
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Electrical Enhanced Receptacle, Signal, right angle
- part number 85847-102LF, page 139

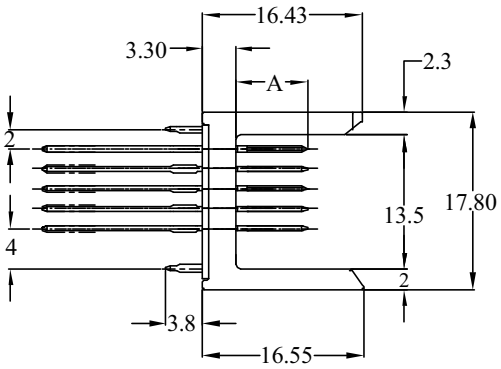
Electrical Enhanced Shroud, wide body
- part numbers 70438-111LF, page 137

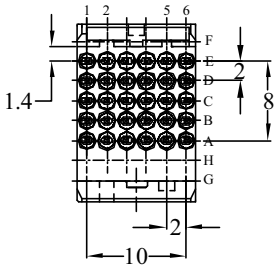
TYPICAL APPLICATIONS

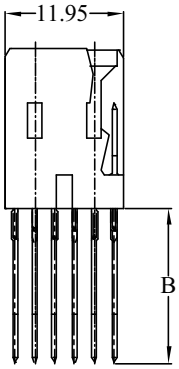


Header, 5+2 row, signal, straight, press-fit, wide body

PRODUCT







PCB pattern P15, see chapter PCB layouts

PARTNUMBERS

70437 - 1yyLF

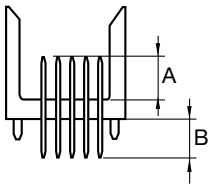
Base Part Number	–	Performance	Pin Configuration	LF

70437 = Electrical Enhanced header, straight, signal, press-fit

1 = Telcordia CO

LF = lead free

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

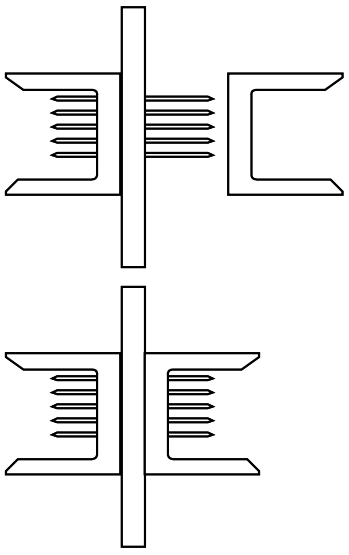
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Rear plug up- Header, Signal, straight, press-fit, page 135

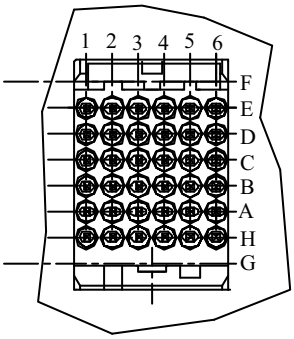
- partnumber 70437-121LF
- partnumber 70437-126LF
- partnumber 70437-128LF

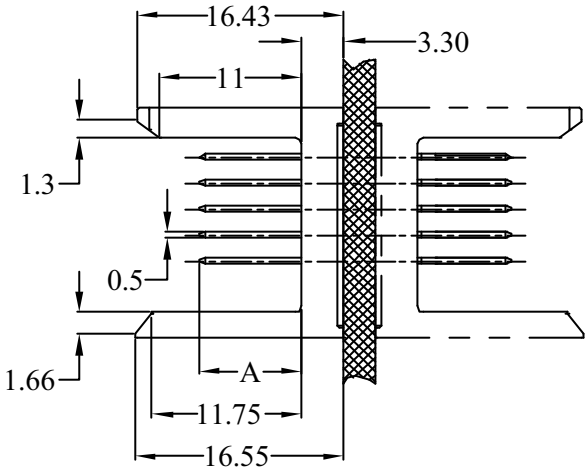
TYPICAL APPLICATIONS

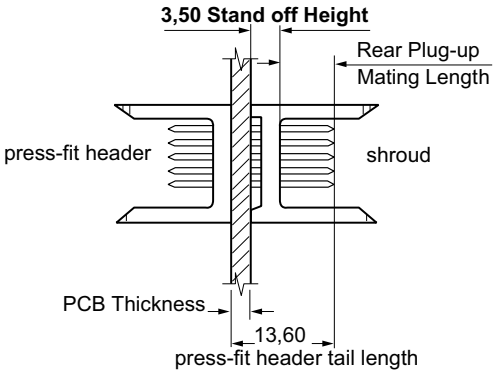


Shroud, 5+2 row, wide body

PRODUCT







PARTNUMBERS

70438 - 111LF

Base Part Number	–	no.of positions	LF

70438 = Electrical Enhanced Shroud, wide body

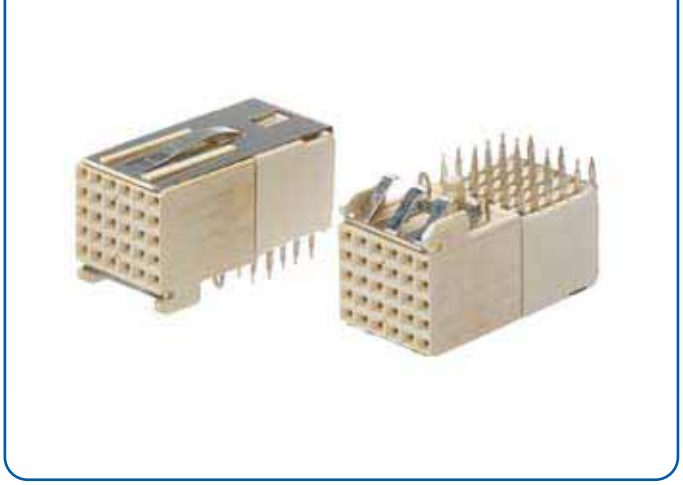
111 = 1 module, 5 x 6 positions

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

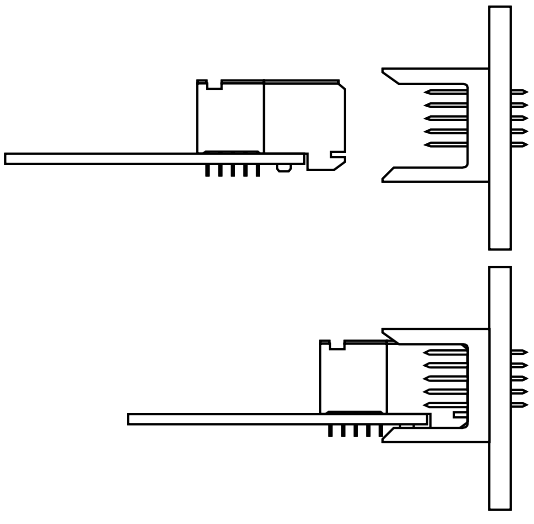
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Electrical Enhanced Header, Signal, straight, page 135

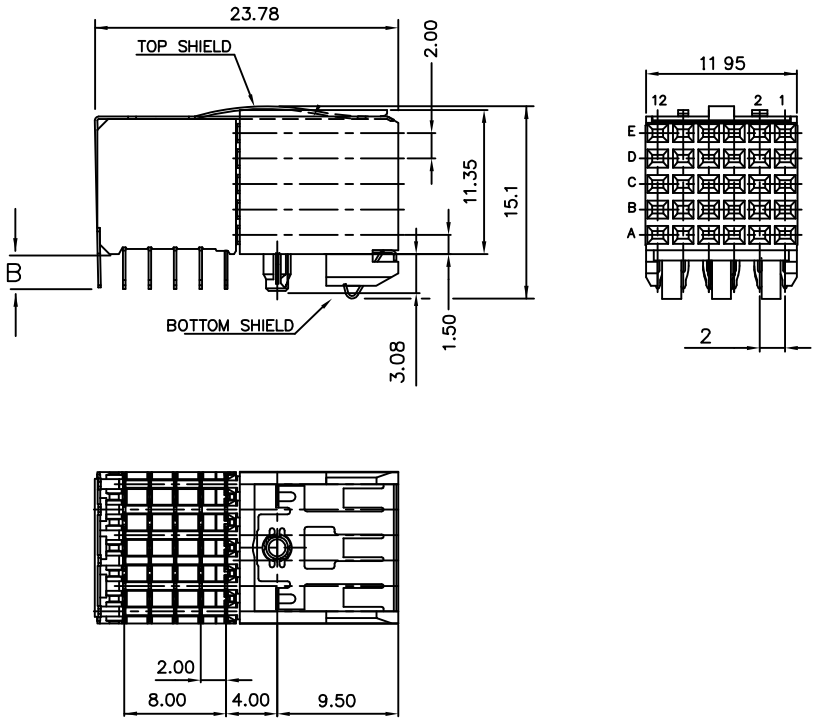
- part number 70437-111LF
- part number 70437-116LF
- part number 70437-118LF

TYPICAL APPLICATIONS



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

PRODUCT



PCB pattern P2, see chapter PCB layouts

PARTNUMBERS

85847 - 102LF

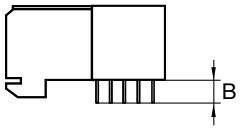
Base Part Number	–	Performance	Pin Configuration	LF

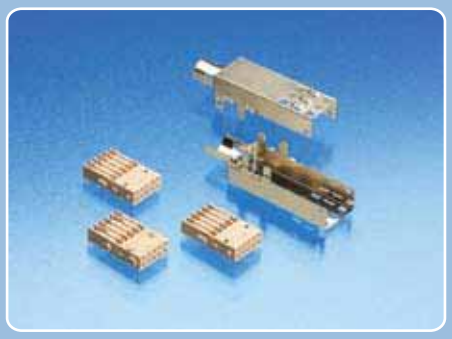
85847 = Electrical enhanced Receptacle, signal

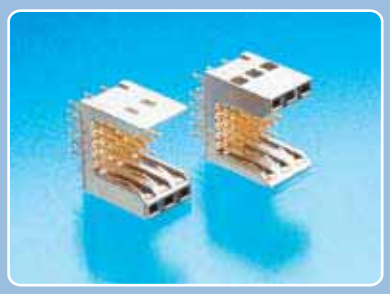
1 = Telcordia CO

LF = lead free

02 = 1 module, 5 x 6 positions
Dim B = 2,90 mm for 1,6 pcb







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

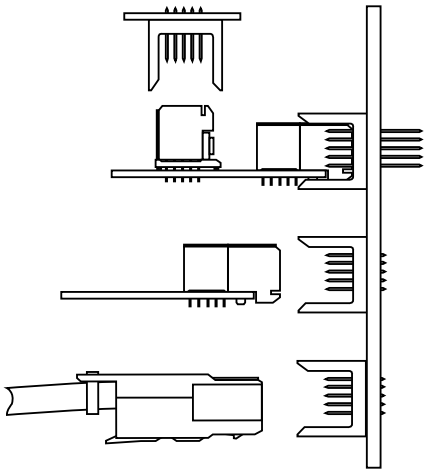
MATING DATA

Round Cable connector, Shielded
- 5 x 6 pos. part number 85706-xxxxLF, page 145

Cable Connector
- 5 row, part number 72478-1111LF, page 175

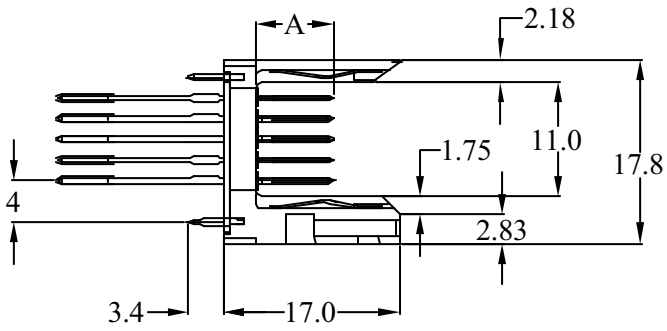
Receptacle, 5 row
- Right angle, press-fit, part number 89047-102LF, page 45
- Straight, press-fit, part number 85761-1101LF, page 79

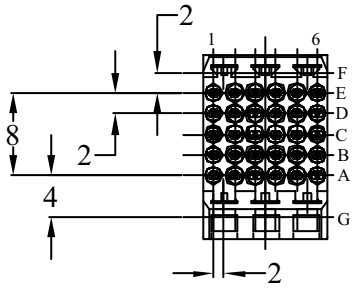
TYPICAL APPLICATIONS

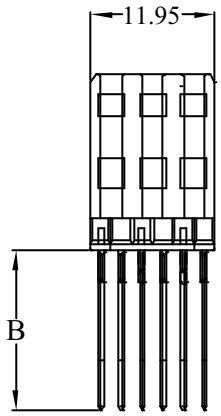


Header, 5 row, signal, straight, press-fit

PRODUCT







PCB pattern P15, see chapter PCB layouts

PARTNUMBERS

72031 - 1yyLF

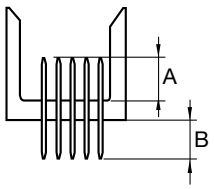
Base Part Number	–	Performance	Pin Configuration	LF

72031 = 1 module (5 x 6 pos.)

1 = Telcordia CO

LF = lead free

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

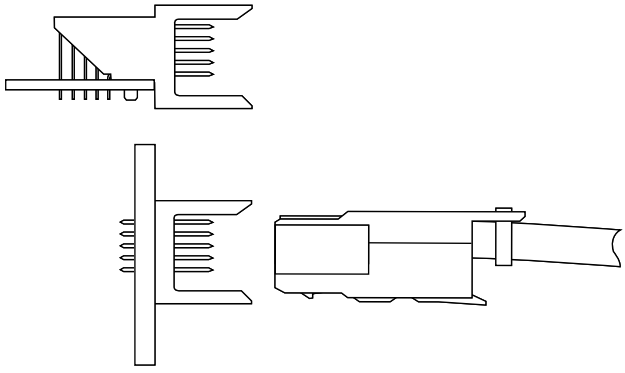
REFERENCE DATA
- application specification GES-20-003

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

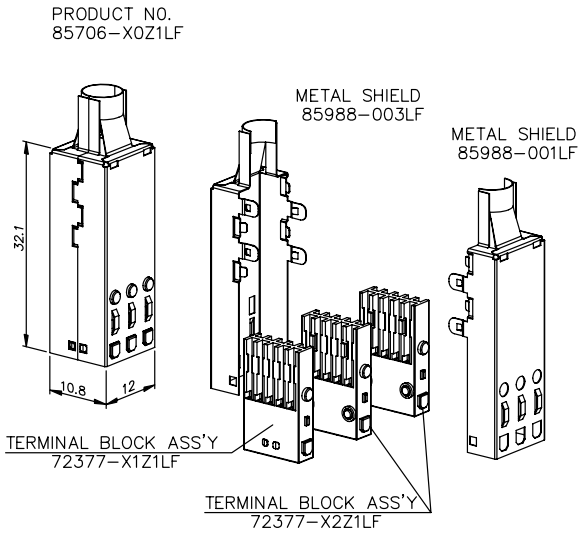
TYPICAL APPLICATIONS



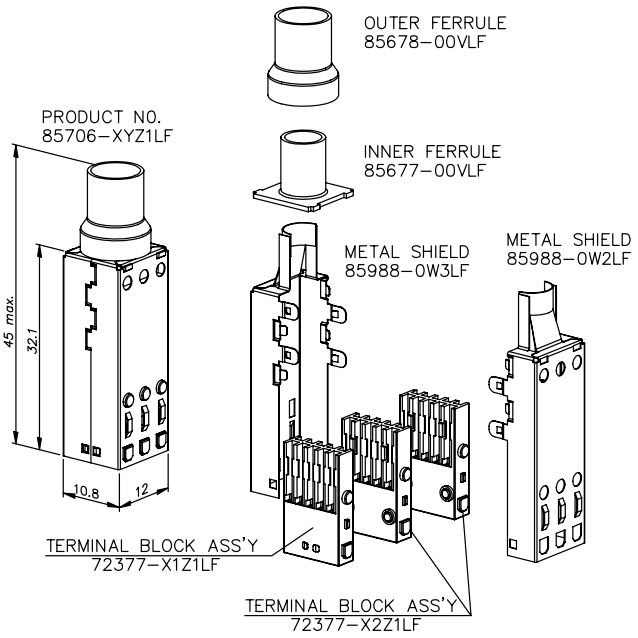
Shielded Cable Connector, 5 row, signal

PRODUCT

Heat shrink version



Crimped version



PARTNUMBERS

85706 - 1yz1LF

Base Part Number	–	Performance	Pin Configuration	LF

85706 = 1 module (5 x 6 pos.)

1 = Telcordia CO

LF = lead free

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



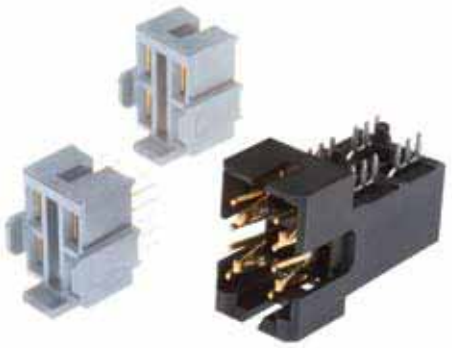
METRAL® HIGH POWER CONNECTORS

- 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

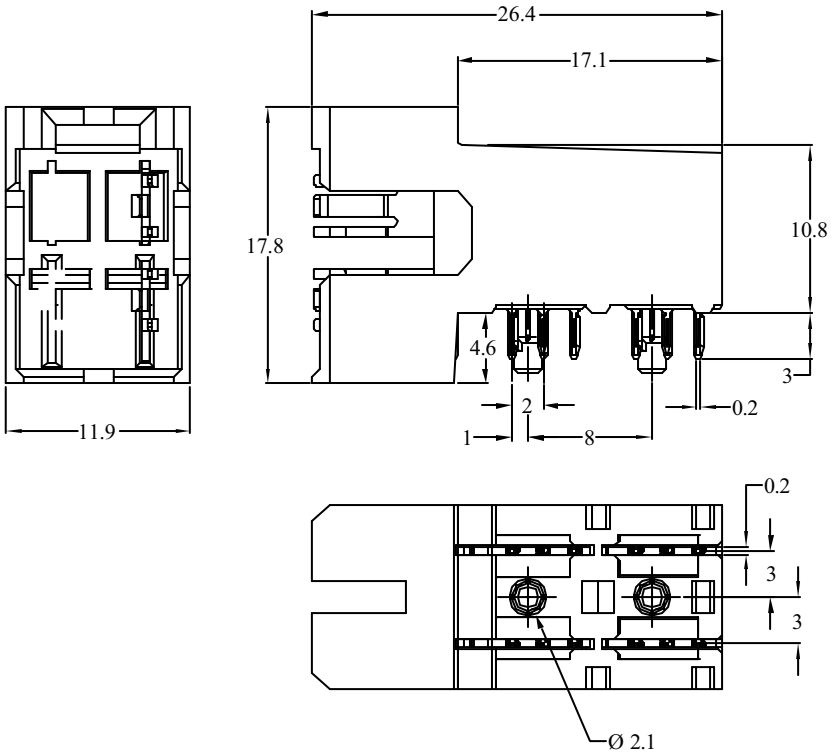
- Vertical receptacle, 8,0 mm mating length, 10009536-001
- Vertical receptacle, 6,5 mm mating length, 10009536-002
- Vertical receptacle, fmlb, 10025058-XXXX

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

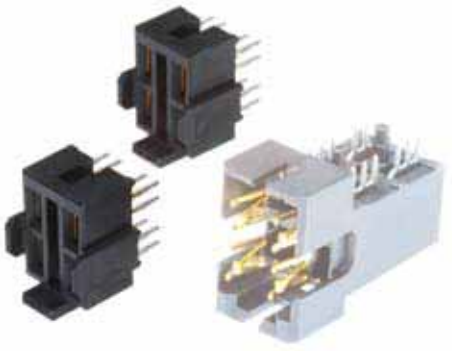
LF = lead free

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

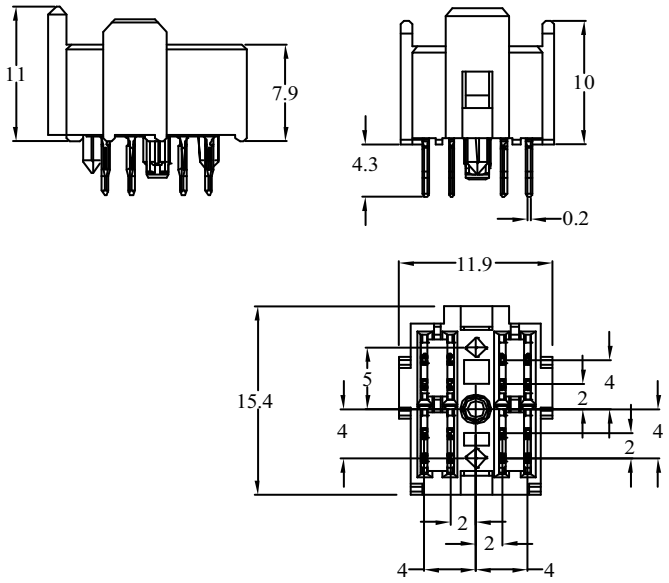
- right angle header, 2 x 2 contacts, partnumber, 10009452-001
- right angle header, 1 x 2 contacts, partnumber, 10009556-001

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

Base Part Number – Pin Configuration LF

LF = lead free

10009536-yyyLF

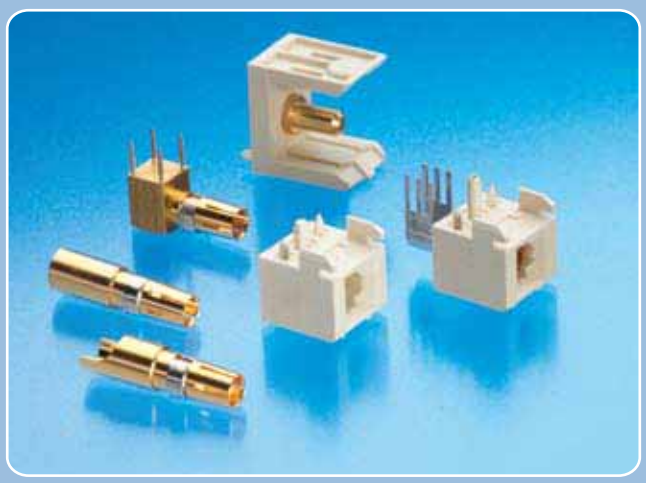
receptacle, straight

	yyy	position number	mating length
receptacle straight	001	-	8,00 mm
	002	-	6,00 mm

10025058-yyyyLF

receptacle, straight, FMLB

	yyyy	position number	mating length
receptacle straight FMLB	1222	pos. 1	1,10 mm
		pos. 2	2,60 mm
		pos. 3	2,60 mm
		pos. 4	2,60 mm
	1122	pos. 1	1,10 mm
		pos. 2	1,10 mm
		pos. 3	2,60 mm
		pos. 4	2,60 mm
	2122	pos. 1	1,10 mm
		pos. 2	1,10 mm
		pos. 3	2,60 mm
		pos. 4	2,60 mm
	2111	pos. 1	2,60 mm
		pos. 2	1,10 mm
		pos. 3	2,60 mm
		pos. 4	2,60 mm
	2112	pos. 1	2,60 mm
		pos. 2	1,10 mm
		pos. 3	1,10 mm
		pos. 4	2,60 mm



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: $5x10^3$ MΩ initially, $1x10^3$ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- Recommended hole diameter: 1,00 ± 0,1 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 boxes/bags

PROCESSING INFORMATION

- Applicable process: assemble to board

APPLICATION EQUIPMENT

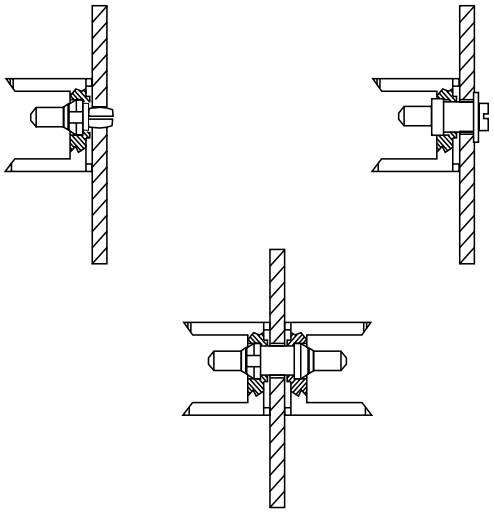
- for application equipment, check out the application equipment table on page 217-223

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

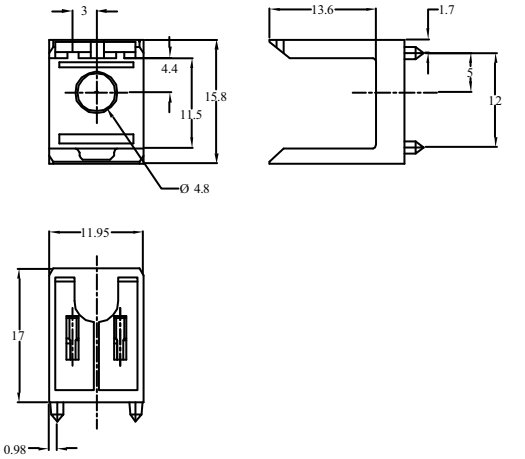
TYPICAL APPLICATIONS



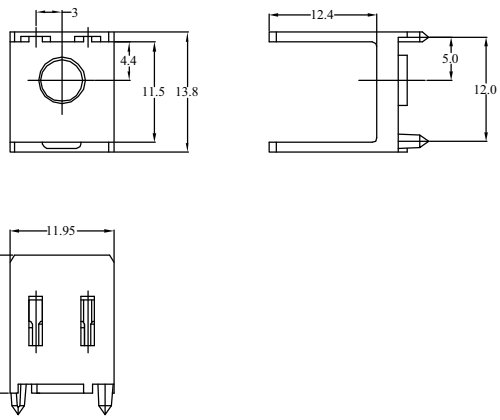
Header, straight, DIN standard, High Power

PRODUCT

Wide Body Housing

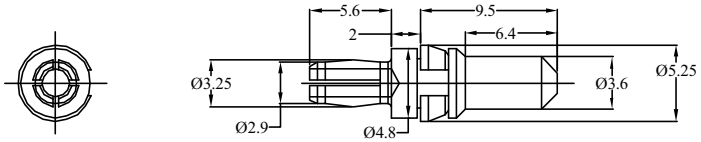


Narrow Body Housing

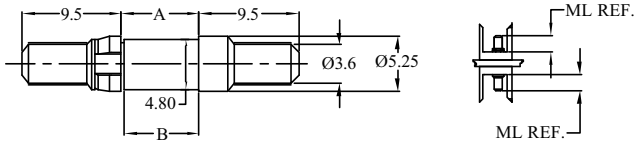


PCB pattern P9, see chapter PCB layouts

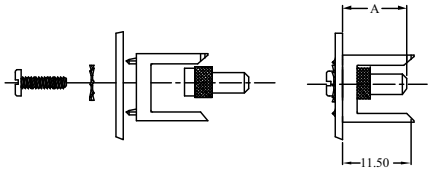
Power insert, straight, press fit



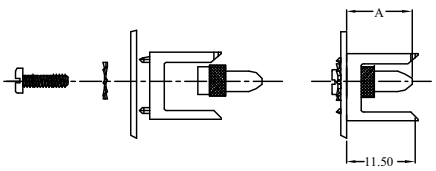
Power coupler



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: $5x10^3$ MΩ initially, $1x10^3$ MΩ after tests
- withstanding voltage: 1000 V rms (sea level)

MECHANICAL PERFORMANCE

- Recommended hole diameter: 1,00 ± 0,1 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 boxes/bags

PROCESSING INFORMATION

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

APPLICATION EQUIPMENT

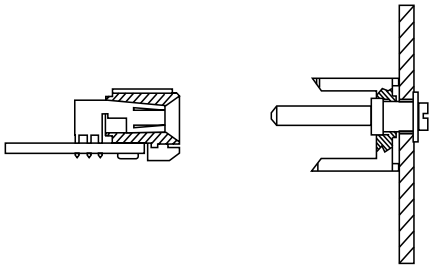
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

High power plug insert, page 155

- partnumber, 91570-001LF

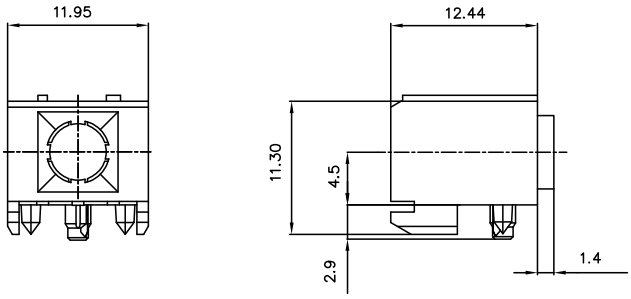
TYPICAL APPLICATIONS

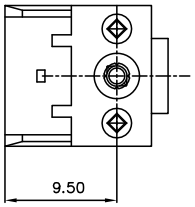


Receptacle, Right angle, DIN standard, High Power

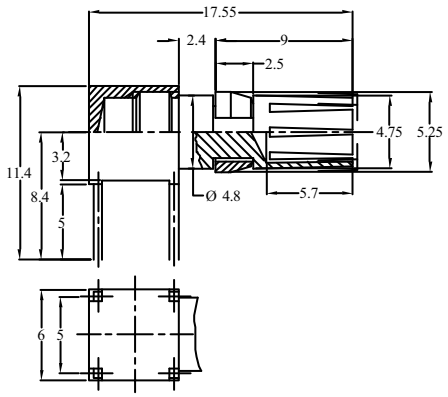
PRODUCT

Housings

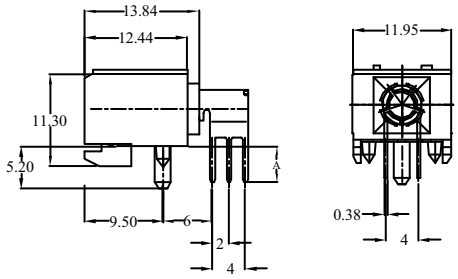




Power inserts



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	-

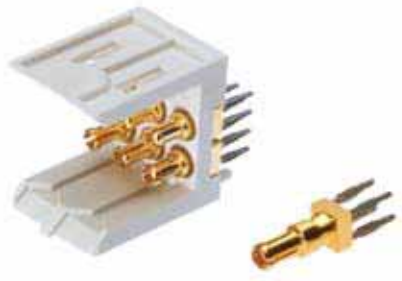
KIT, pre-assembled housings & inserts

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

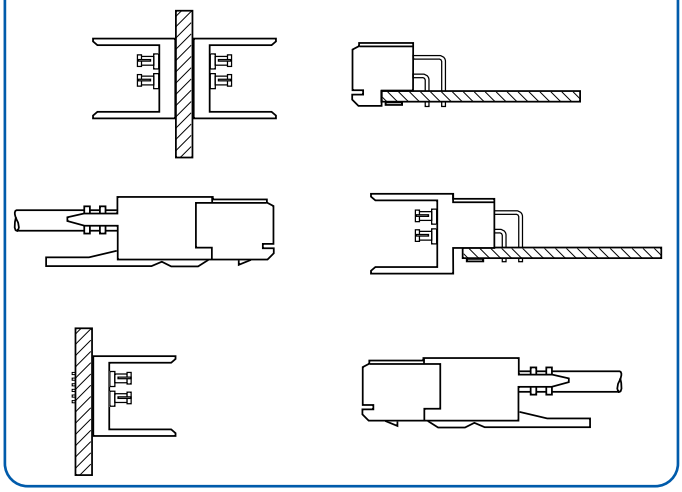
Housing, page 161

- partnumber 70244-102

Insert, page 161

- partnumber 85976-001LF
- partnumber 85976-002 LF

TYPICAL APPLICATIONS



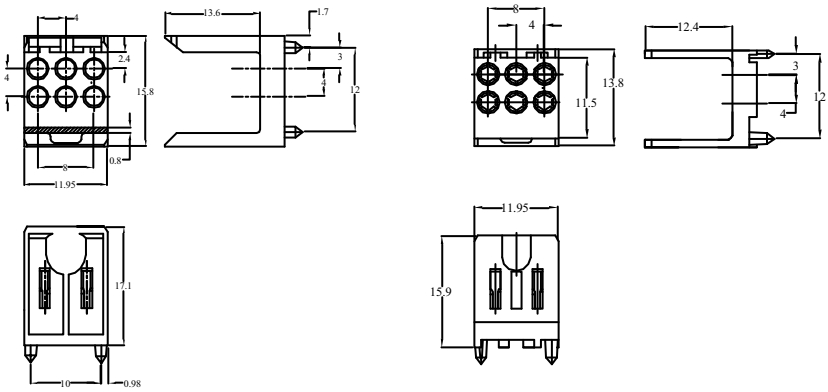
ELECTRICAL

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

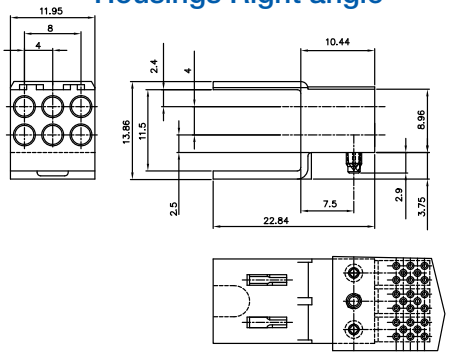
Header, Mini power

PRODUCT

Housings Straight

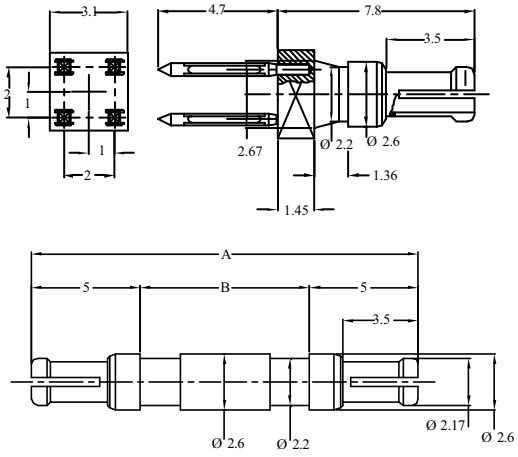


Housings Right angle

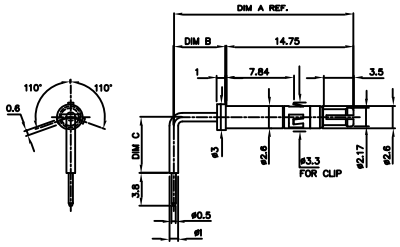


PCB pattern P12, see chapter PCB layouts

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

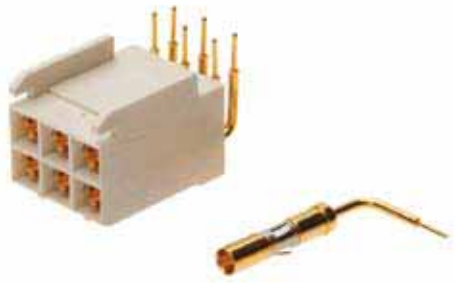
Partnumber	Description	Tail length	PCB thickness
85975-001LF	Mini power RA insert, row A	3,8 mm	2,4 mm
85975-002LF	Mini power RA insert, row B	3,8 mm	2,4 mm

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

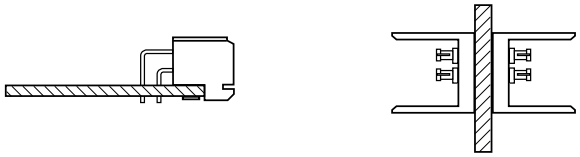
Straight, page 159

- 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



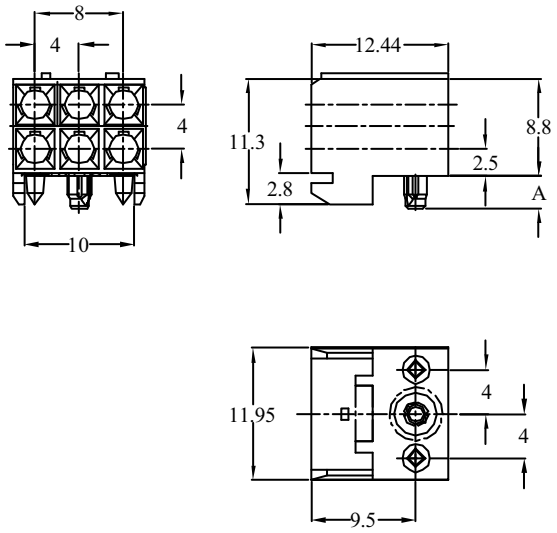
ELECTRICAL

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

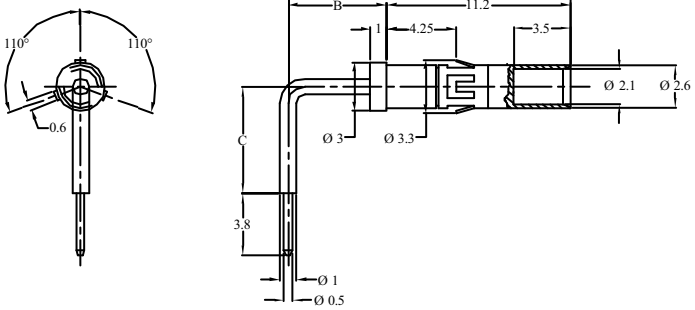
Receptacle, Mini Power

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

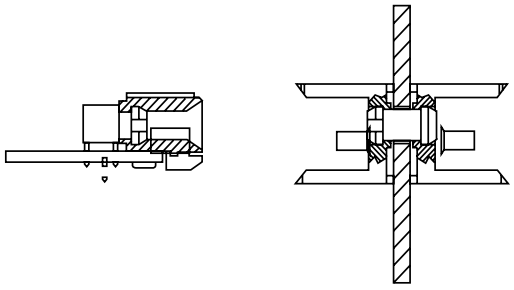
Right angle, solder to board, page 165

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

Right angle, press-fit, page 165

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

TYPICAL APPLICATIONS



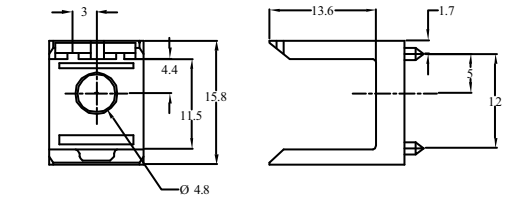
ELECTRICAL

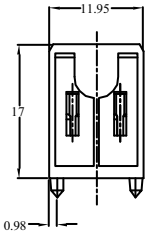
Electrical characteristic impedance	50 Ω	75 Ω
Working frequency	0 - 10 GHz	0 - 1,5 GHz
Reflection coefficient	max.0,05 up to 1 GHz; max. 0,01 up to 10 Ghz	max.0,01 up to 1,5 GHz
Peak voltage	750 V eff.	750 V eff.
Operating voltage	250 V eff.	250 V eff.
Insulation resistance	1 x 10^3 MΩ initially,	1 x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

Header, straight, DIN standard, Coax

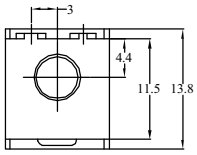
PRODUCT

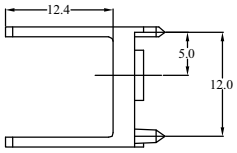
Wide Body Housing

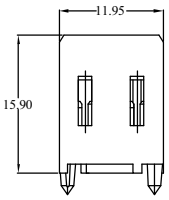




Narrow Body Housing

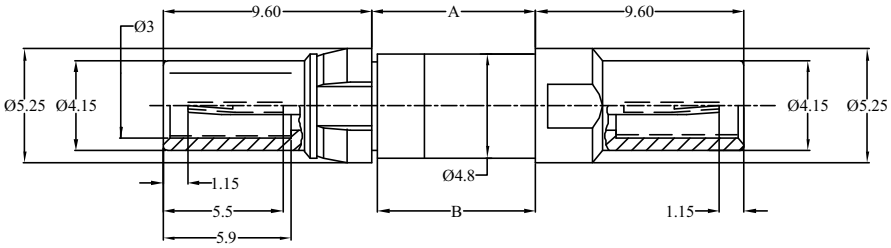






PCB pattern P9, see chapter PCB layouts

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

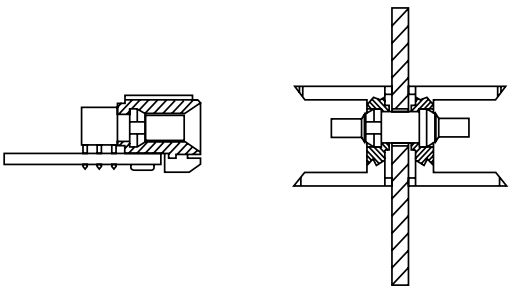
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Hybrid DIN standard receptacle, coax, page 163

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

TYPICAL APPLICATIONS



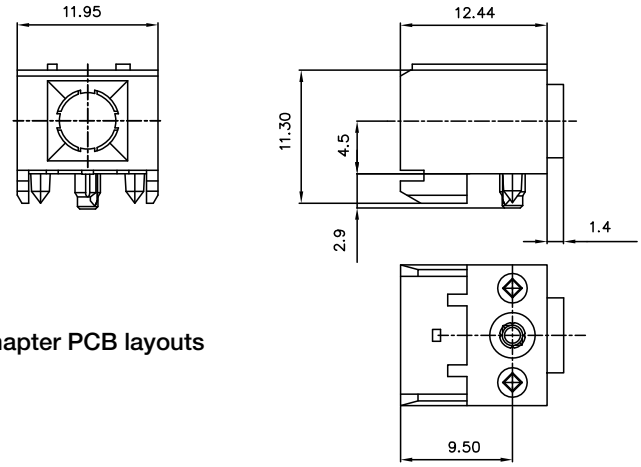
ELECTRICAL

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

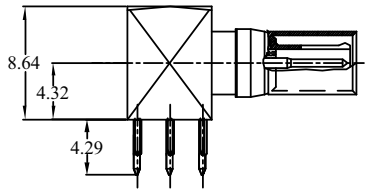
PRODUCT

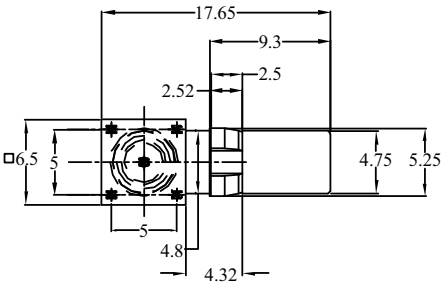
Housings

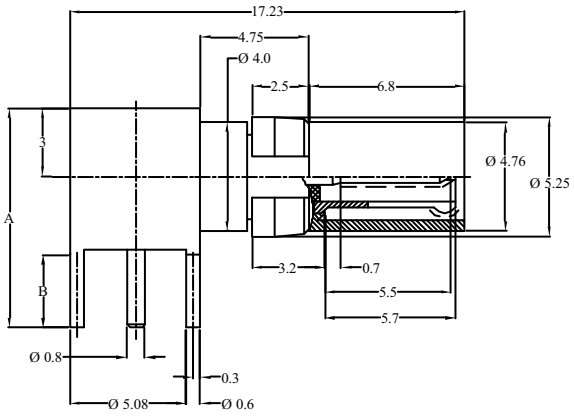


PCB pattern P10, see chapter PCB layouts

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

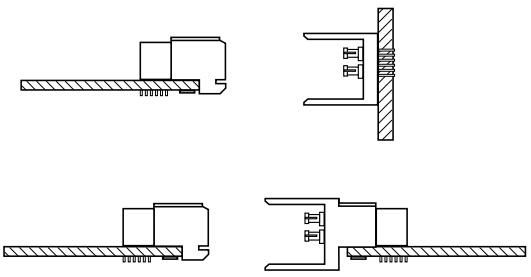
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

Right angle, page 169

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

TYPICAL APPLICATIONS



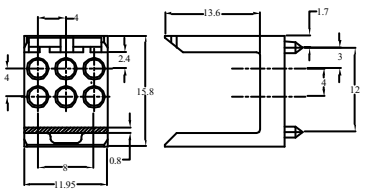
ELECTRICAL

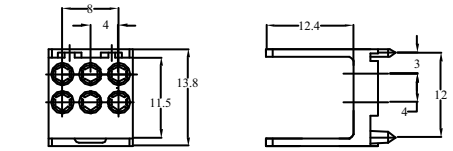
Electrical characteristic impedance	50 Ω	75 Ω
Working frequency	0 - 10 GHz	0 - 1,5 GHz
Reflection coefficient	max.0,05 up to 1 GHz; max. 0,01 up to 10 Ghz	max.0,01 up to 1,5 GHz
Peak voltage	750 V eff.	750 V eff.
Operating voltage	250 V eff.	250 V eff.
Insulation resistance	1 x 10^3 MΩ initially,	1 x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

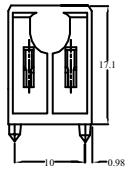
Header, Mini Coax

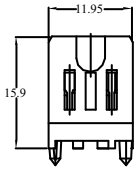
PRODUCT

Housings Straight

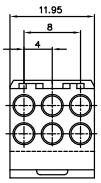


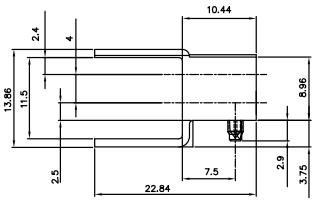


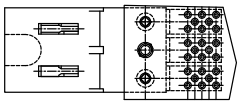




Housings Right angle

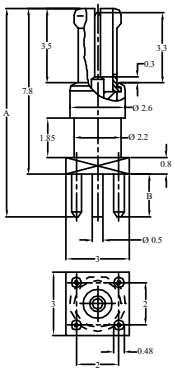


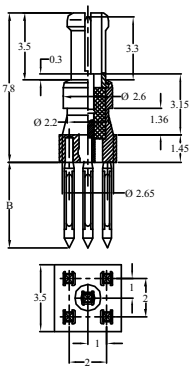


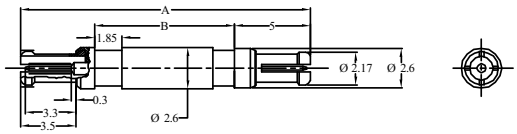


PCB pattern P12, see chapter PCB layouts

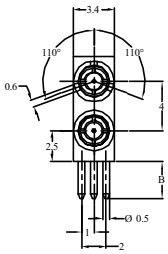
Inserts Straight

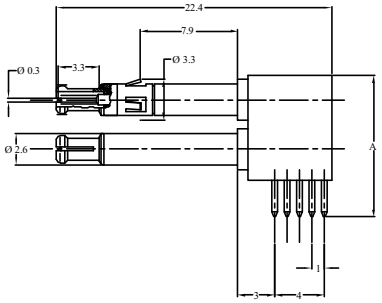






Inserts Right angle





PARTNUMBERS

Housings Straight

Partnumber	Description
88913-101LF	6 position STR header-wide body-STB
88913-111LF	6 position STR header-wide body-PF
70243-101LF	6 position STR header-narrow body-STB
70243-111LF	6 position STR header-narrow body-PF

Inserts Straight

Partnumber	Description	length	PCB thickness
88980-002LF	Mini Coax STR insert- STB	-	1,6 mm
88978-001LF	Mini Coax STR insert- PF	-	-
88971-003LF	Mini Coax STR plug/plug coupler	17,40 mm	1,6 mm

Housings Right angle

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

Inserts Right angle

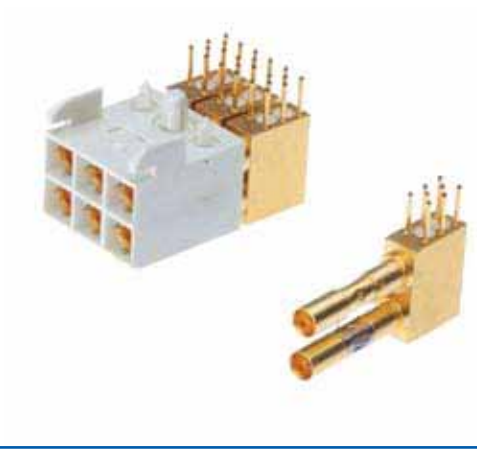
Partnumber	Description	Tail length	PCB thickness
88983-001LF	Mini Coax RA insert- STB	2,80 mm	1,6 mm

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

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: BeryliumCopper
- 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

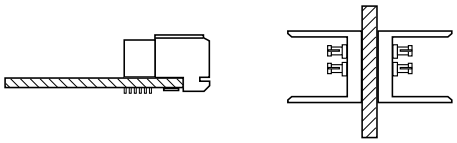
Straight, page 167

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

Right angle, page 167

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

TYPICAL APPLICATIONS



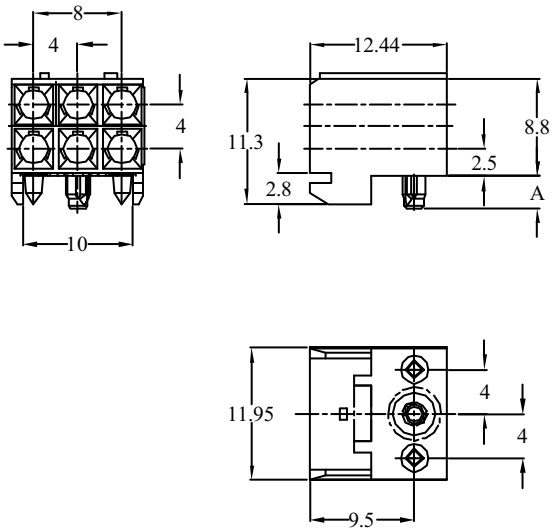
ELECTRICAL

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

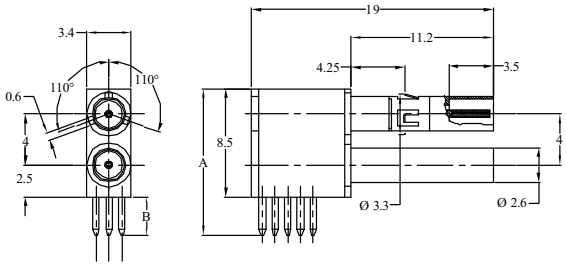
PRODUCT

Housings



PCB pattern P12, see chapter PCB layouts

Inserts



PARTNUMBERS

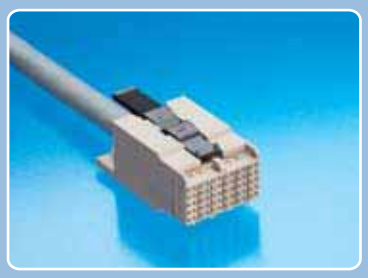
Housings

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)

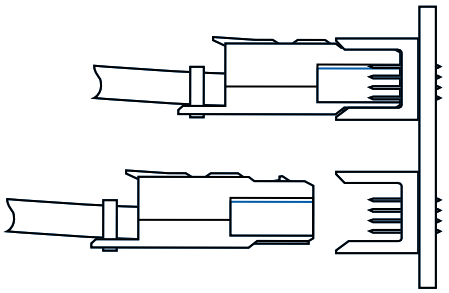
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

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

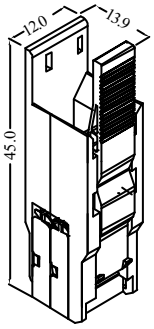
TYPICAL APPLICATIONS



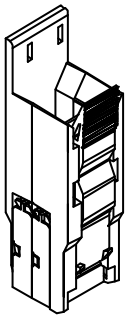
Cable Connectors, 4 row, signal

PRODUCT

1 Module
72476-1yx1LF

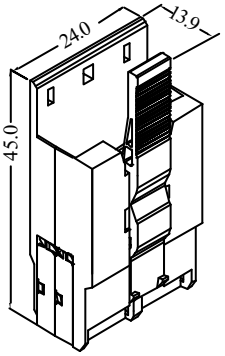


STANDARD LATCH FINGER
FOR CABLE TIE BELOW
LATCH FINGER AND EASIEST
ACCESS TO LATCH FINGER

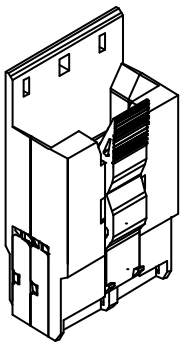


SHORT LATCH FINGER
FOR CABLE TIE ABOVE
LATCH FINGER AND LARGER
CABLE SIZE CAPACITY

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

Base Part Number	–	Performance	Latch style (y)	Wire/conductor style (x)	1	LF

1 = Telcordia CO

LF = lead free

72476 = 1 module, 4 x 6 pos.
72477 = 2 module, 4 x 12 pos.

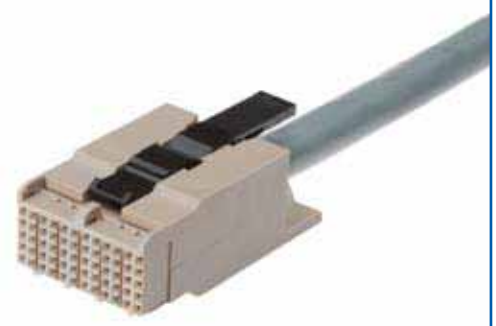
1 = standard finger latch
for easiest actuation
2 = short finger latch
for extra large cable

1 = 26 to 24 AWG size
2 = 30 to 28 AWG size

Cable Connectors, 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)

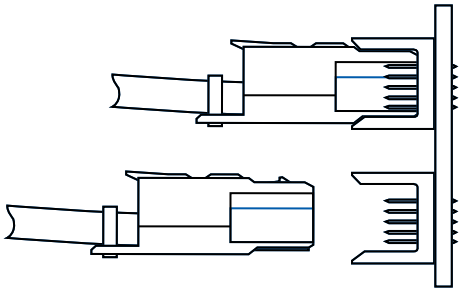
APPLICATION EQUIPMENT
- for application equipment, check out the application equipment table on page 217-223

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

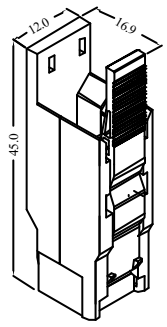
TYPICAL APPLICATIONS



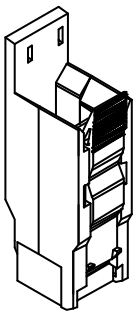
Cable Connectors, 5 row, signal

PRODUCT

1 Module
72478-1yx1LF

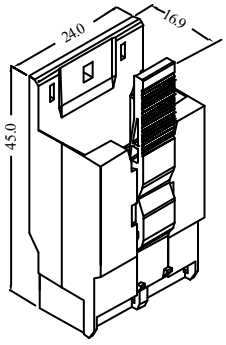


STANDARD LATCH FINGER
FOR CABLE TIE BELOW
LATCH FINGER AND EASIEST
ACCESS TO LATCH FINGER

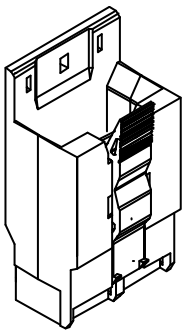


SHORT LATCH FINGER
FOR CABLE TIE ABOVE
LATCH FINGER AND LARGER
CABLE SIZE CAPACITY

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

Base Part Number	–	Performance	Latch style (y)	Wire/conductor style (x)	1	LF

1 = Telcordia CO

LF = lead free

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

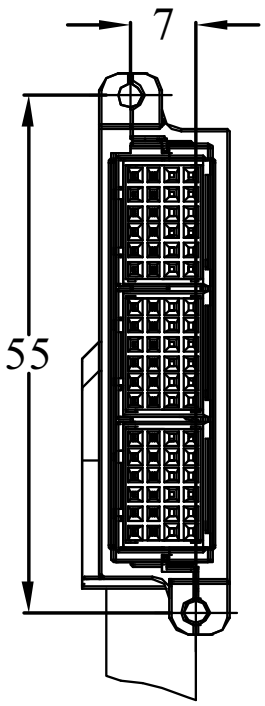
MATING DATA

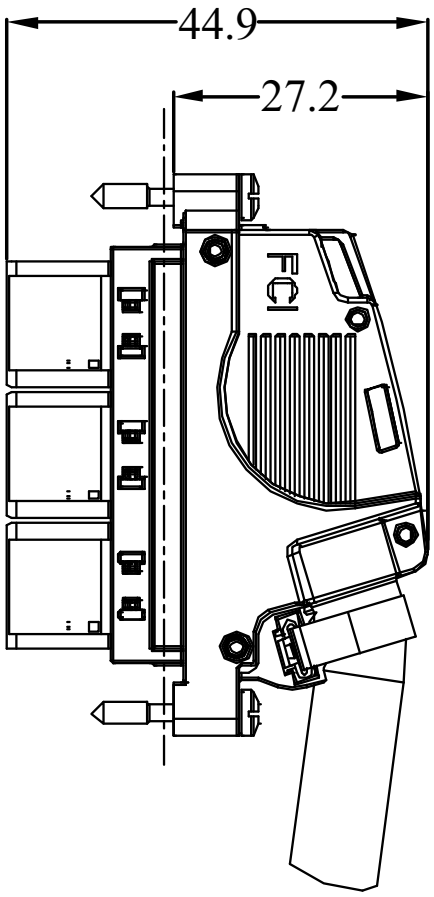
mating part, page 200

- 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 ^{0}C to +125 ^{0}C

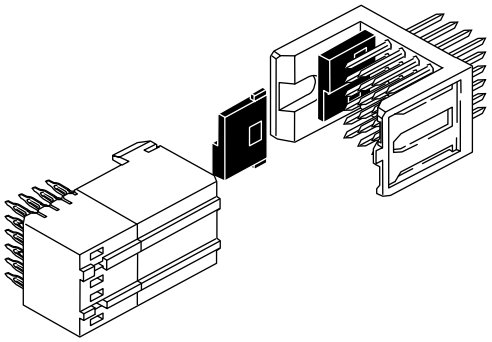
ENVIRONMENTAL

- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

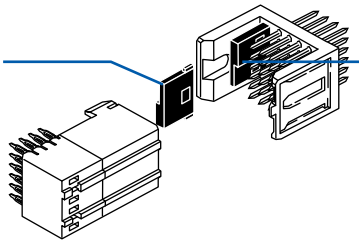
PACKAGING

- 100 parts, min. order quantity 100 parts

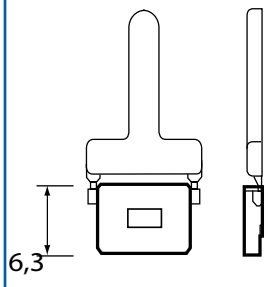
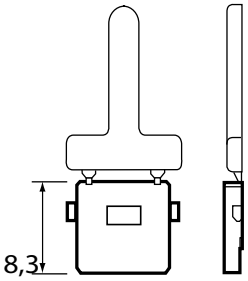
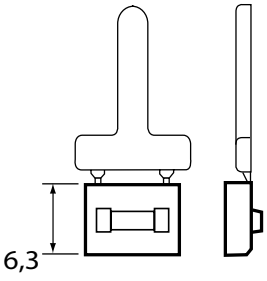
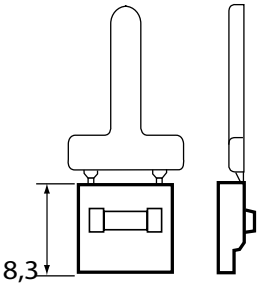
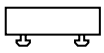
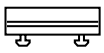
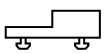
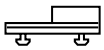
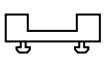
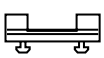
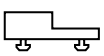
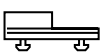
TYPICAL APPLICATIONS



Coding Keys



PARTNUMBERS

	Receptacle Coding		Header Coding	
mating pair	IEC standardized	Extended	IEC standardized	Extended
	 up to 6,5 mm pin length	 up to 8,0 mm pin length	 up to 6,5 mm pin length	 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 ^{0}C to +125 ^{0}C

ENVIRONMENTAL

- RoHs information, this product is compatible according to the European Union Directive 2002/95/IEC

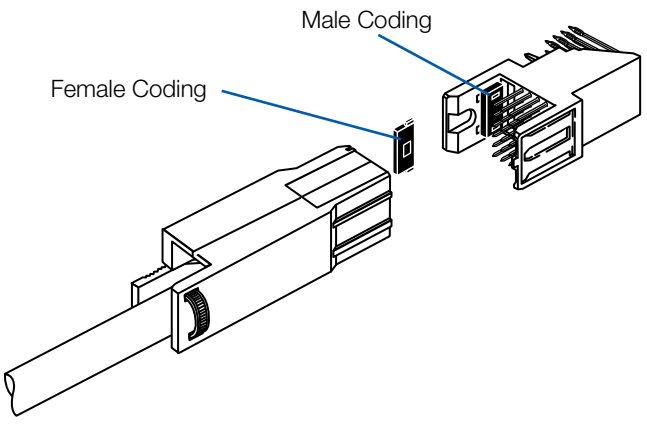
PACKAGING

- 100 parts, packed by bags

REFERENCE DATA

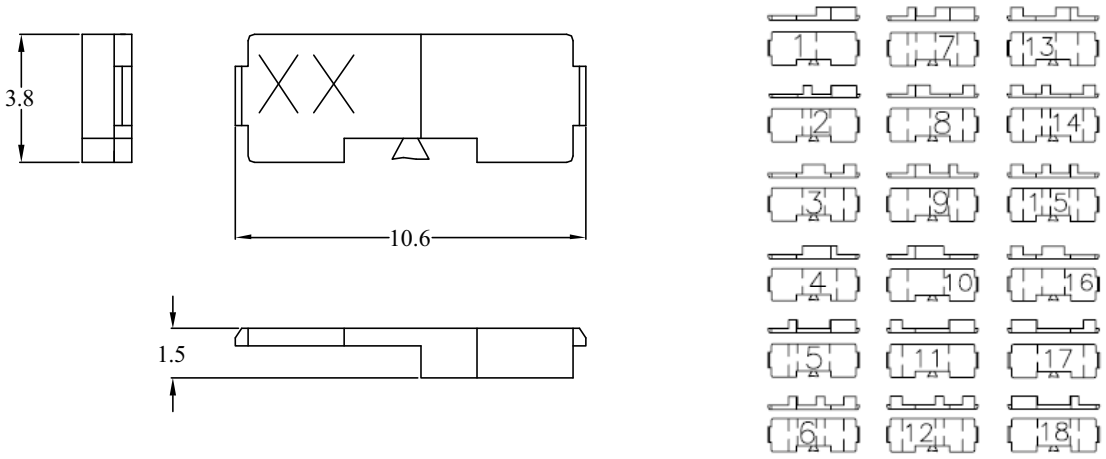
- Application Specifications: GS-20-002 (4 Row)
  GS-20-003 (5 Row)

TYPICAL APPLICATIONS



Cable Connector Coding Keys

PRODUCT



PARTNUMBERS

72388 - yyyyLF

Base Part Number – **Configuration** **LF**

72388 = Coding Key Cable connector

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

LF = lead free

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

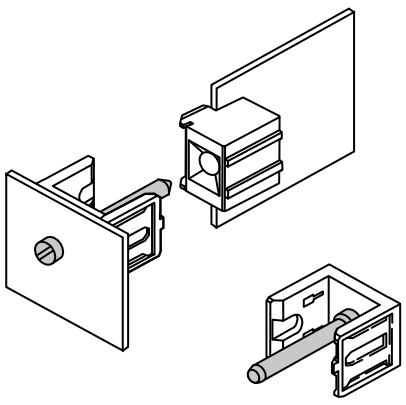
- for application equipment, check out the application equipment table on page 217-223

MATING DATA

mating part, page .....

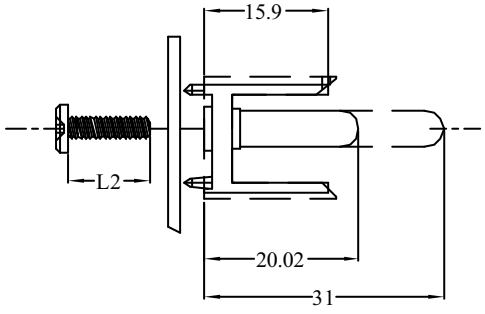
- Receptacle housing: part no 70292-101LF, page 157
- Header housing,
  narrow body: part no 70290-101LF, page 155
  wide body: part no 88911-101LF, page 155

TYPICAL APPLICATIONS

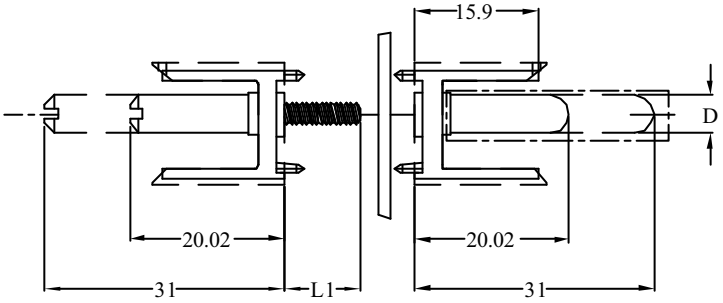


Guide Pin

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 detais 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 +105C˚
- 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

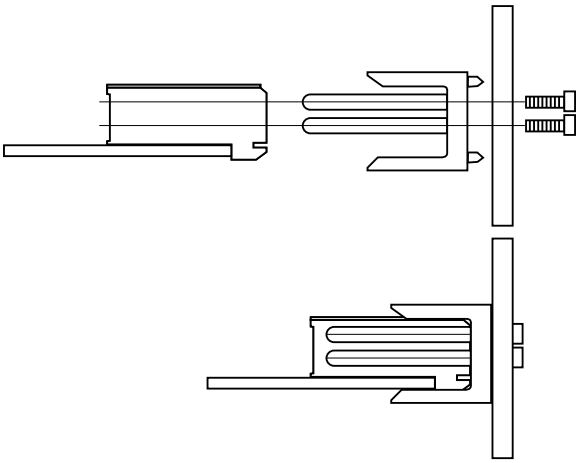
- Wave, IR Vapor phase

MATING DATA

Shroud, wide body 6 position, page 167

- part number 88913-101LF

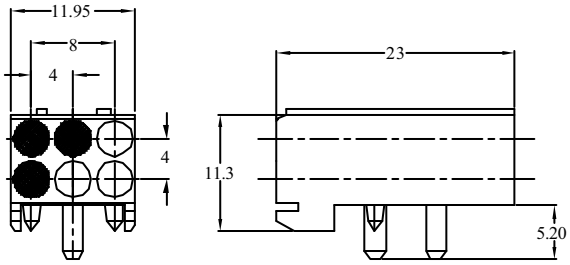
TYPICAL APPLICATIONS



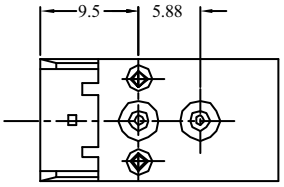
Board-to-Board Keying system

PRODUCT

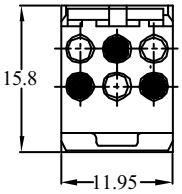
Receptacle Keying module with press peg

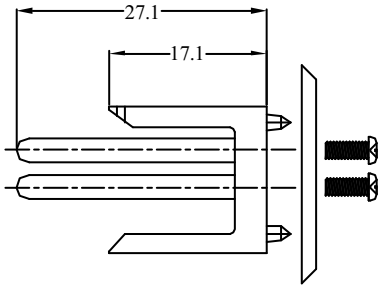


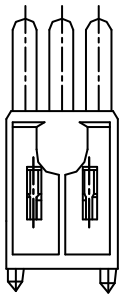
● = denotes plugged position

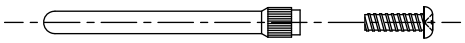


Keying Pin









PARTNUMBERS

Base Part Number – Pin Configuration – LF

LF = lead free

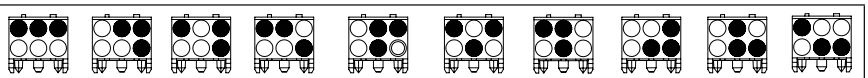
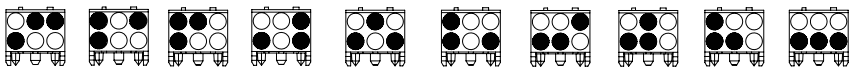
88914 - 0yyLF

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**	**220**

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

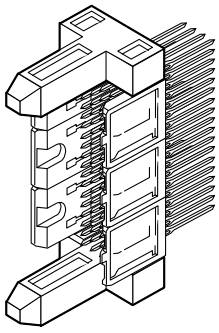
MATING DATA

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

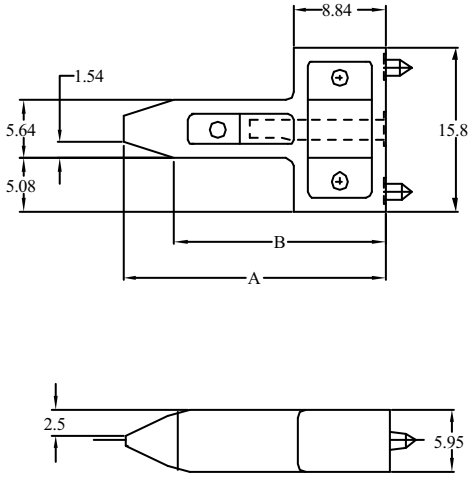
- 4 row Header straight, press-fit, page 27
  1 mod, part number 70232-116LF
  2 mod, part number 70233-116LF
  4 mod, part number 70234-116LF
  8 mod, part number 70235-116LF

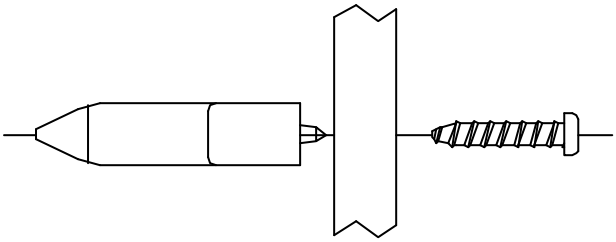
TYPICAL APPLICATIONS



Ramping Module

PRODUCT





PCB pattern P19, see chapter PCB layouts

PARTNUMBERS

88910 - yyyLF

Base Part Number	–	Configuration	LF

88910 = Ramping Module

LF = lead free

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: $5x10^3$ MΩ initially, $1x10^3$ 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

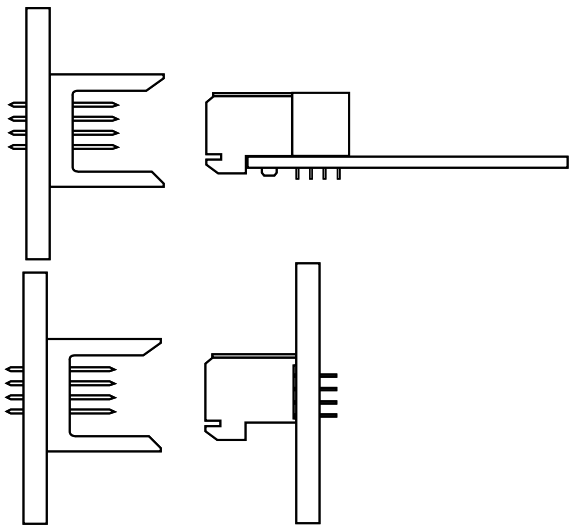
Receptacle, right angle, solder-to-board, page 33

- 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

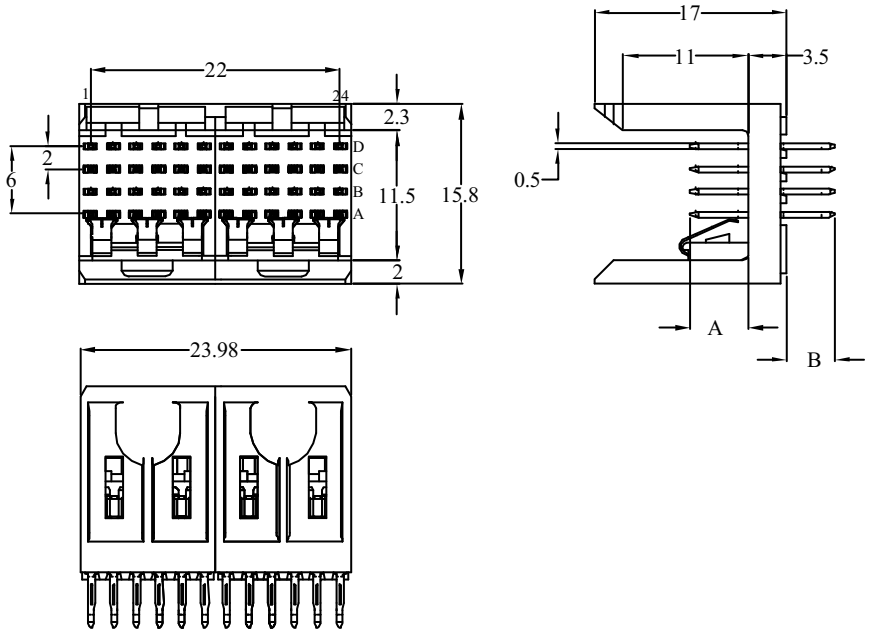
- 1 mod – part numbers 52048-101LF

TYPICAL APPLICATIONS



Shorting Clip header, 4 row, signal, straight, press-fit, wide body

PRODUCT



PCB pattern P6, see chapter PCB layouts

PARTNUMBERS

72013 - 1yyyLF

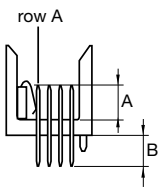
Base Part Number	–	Performance	Pin Configuration	LF

72013 = 4 row header, straight, wide body, including shorting clips

1 = Telcordia CO

LF = lead free

yyy	modules	no. of positions	mating length A	tail lengthB	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: $5x10^3$ MΩ initially, $1x10^3$ 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

- 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

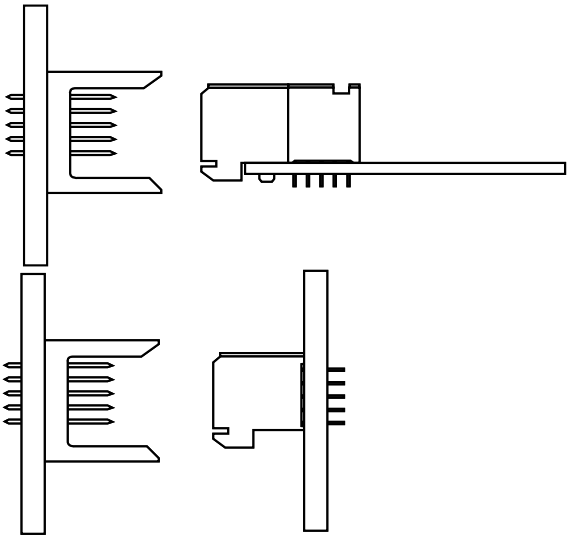
Receptacle, right angle, press-fit, pag 45

- 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

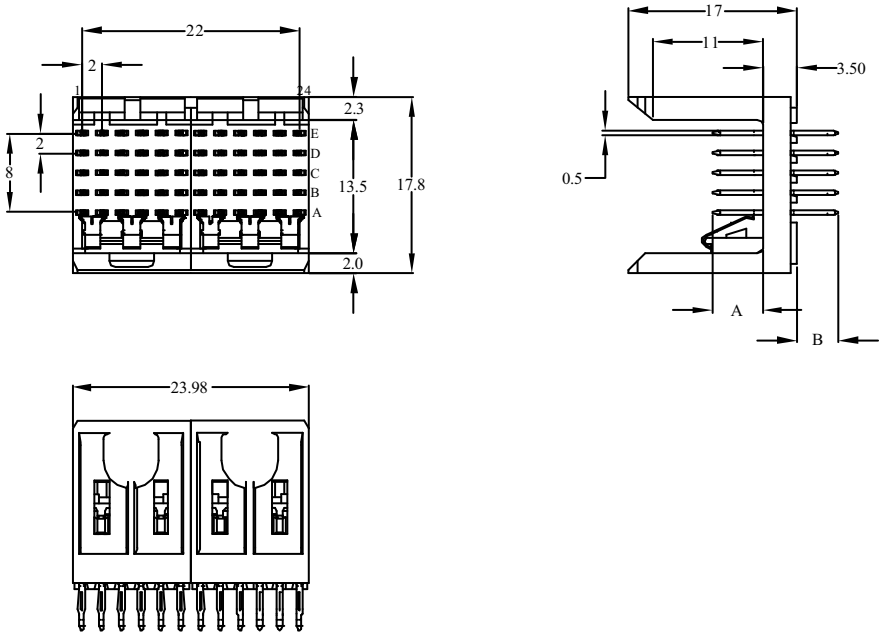
- 1 mod – part numbers 85863
- 2 mod – part numbers 85864
- 4 mod – part numbers 85865
- 8 mod - part numbers 85866

TYPICAL APPLICATIONS



Shorting Clip header, 5 row, signal, straight, press-fit, wide body

PRODUCT



PCB pattern P7, see chapter PCB layouts

PARTNUMBERS

72015 - 1yyyLF

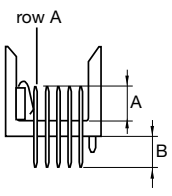
Base Part Number	–	Performance	Pin Configuration	LF

72015 = 5 row header, straight, wide body, including shorting clips

1 = Telcordia CO

LF = lead free

yyy	modules	no. of positions	mating length A	tail lengthB	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

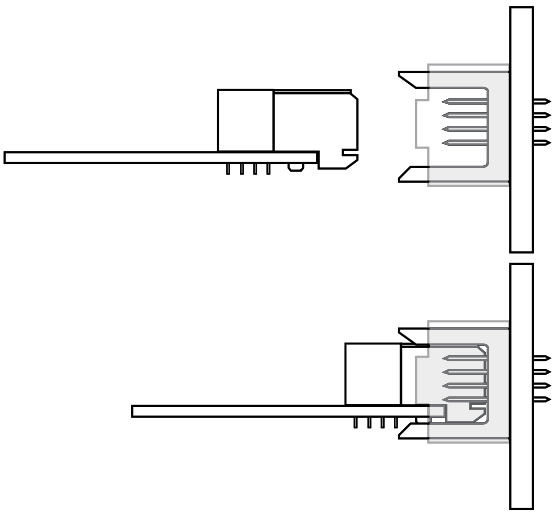
4 row

- 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

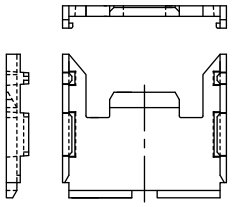
TYPICAL APPLICATIONS



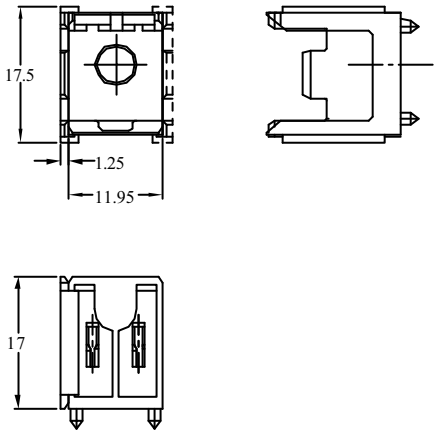
End wall

PRODUCT

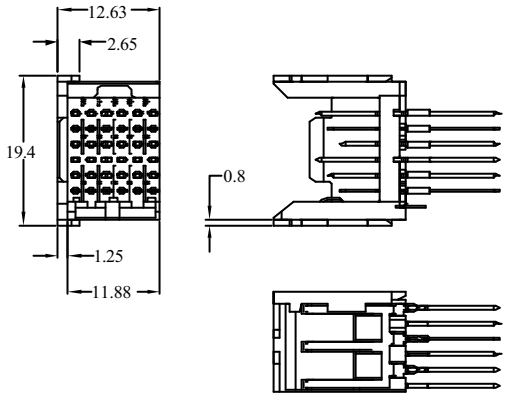
End Wall



73996-002
(4 row application)



73996-011
(5 row application)



PARTNUMBERS

73996 - yyyLF

Base Part Number – **Configuration** **LF**

73996 = End Wall

LF = lead free

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

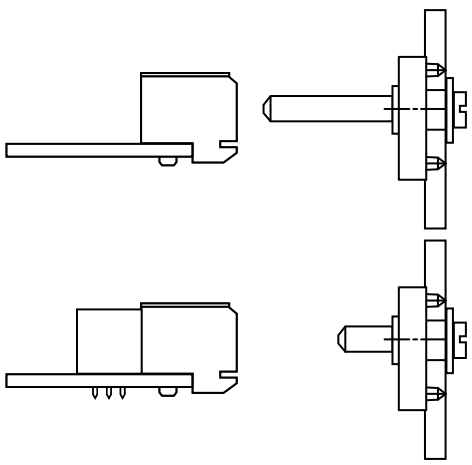
RECOMMENDED HOLE DIAMETER

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

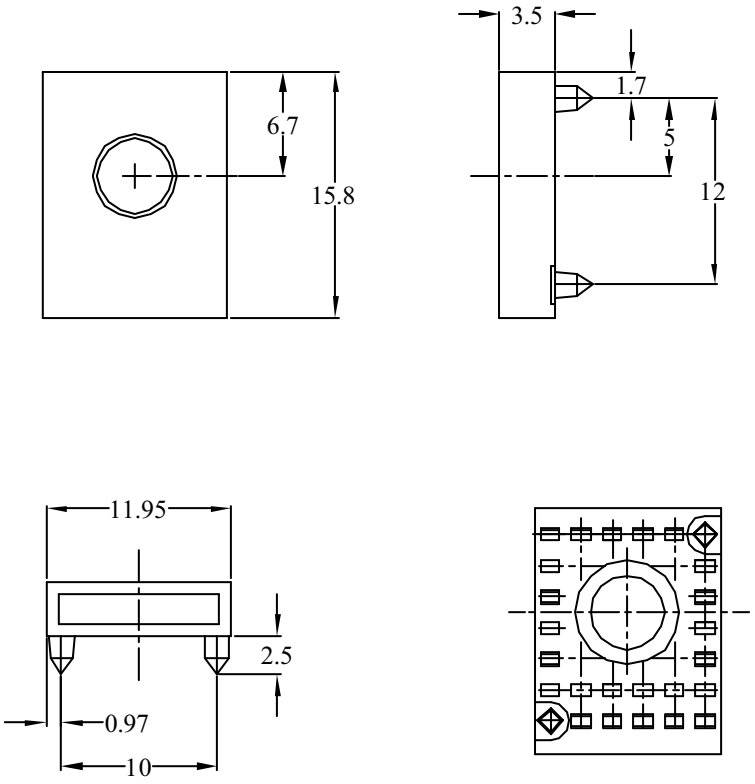
- Guide Pin, page 185
  - part number 70295-00XLF
- Screw to board high power insert, page 155
  - part number 91570-001LF
- Plug / plug high power coupler, page 155
  - part number 70201-001LF
- Receptacle / receptacle coax coupler, page 163
  - part number 70200-001LF

TYPICAL APPLICATIONS



Hybrid housing

PRODUCT



PCB pattern P25, see chapter PCB layouts

PARTNUMBERS

63735 - 101LF

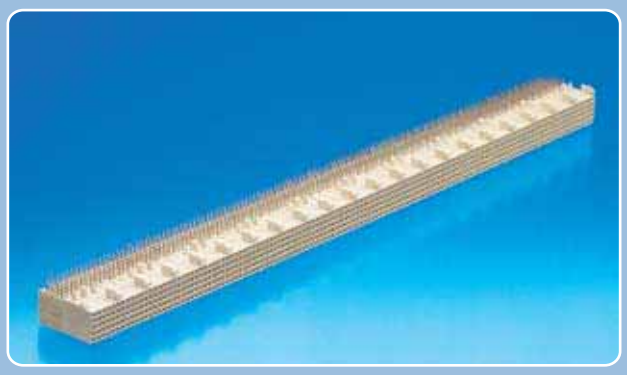
Base Part Number	–	Configuration	LF

63735 = 4 row Hybrid header housing

101

LF = lead free



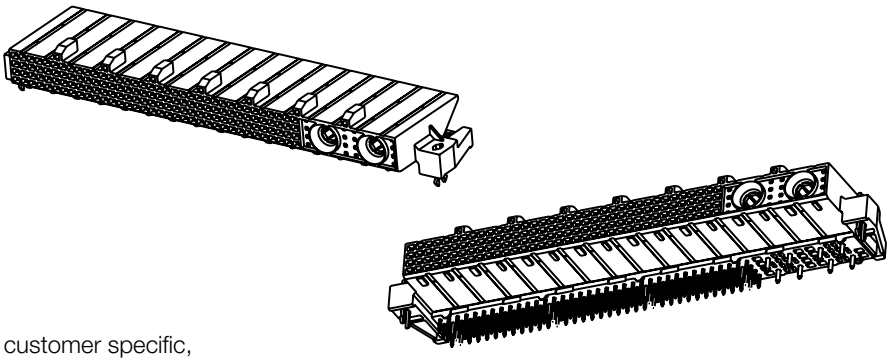


METRAL® APPLICATION SPECIFIC

- Mono blocks
- Customized designs

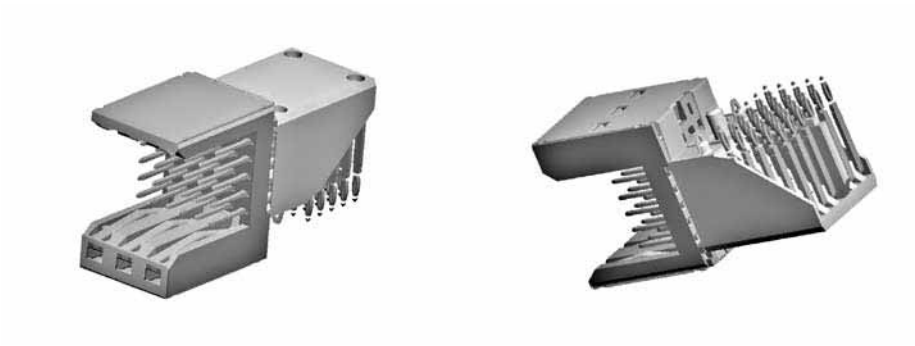
The products shown give an impression of the capabilities within the METRAL® core family

8 module Signal & 2 module Power contact assembly with fixed modules



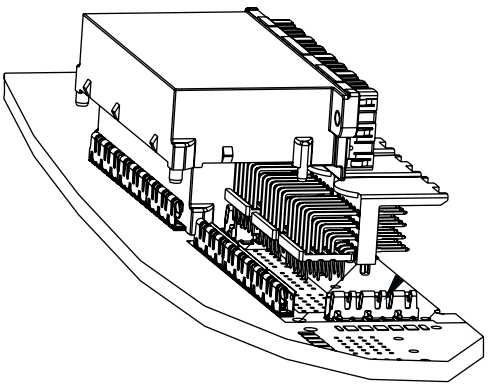
Note: all configurations are customer specific,
new configurations on request only,
please contact your local sales representative.

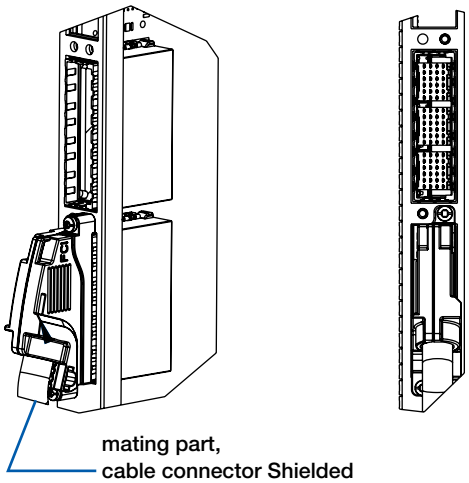
Signal Header right angle including Latch and Guiding



PARTNUMBER **HM1B61LDP258H6PLF**

Shielded Header 72 position (3 x 24 pos.) solder-to-board



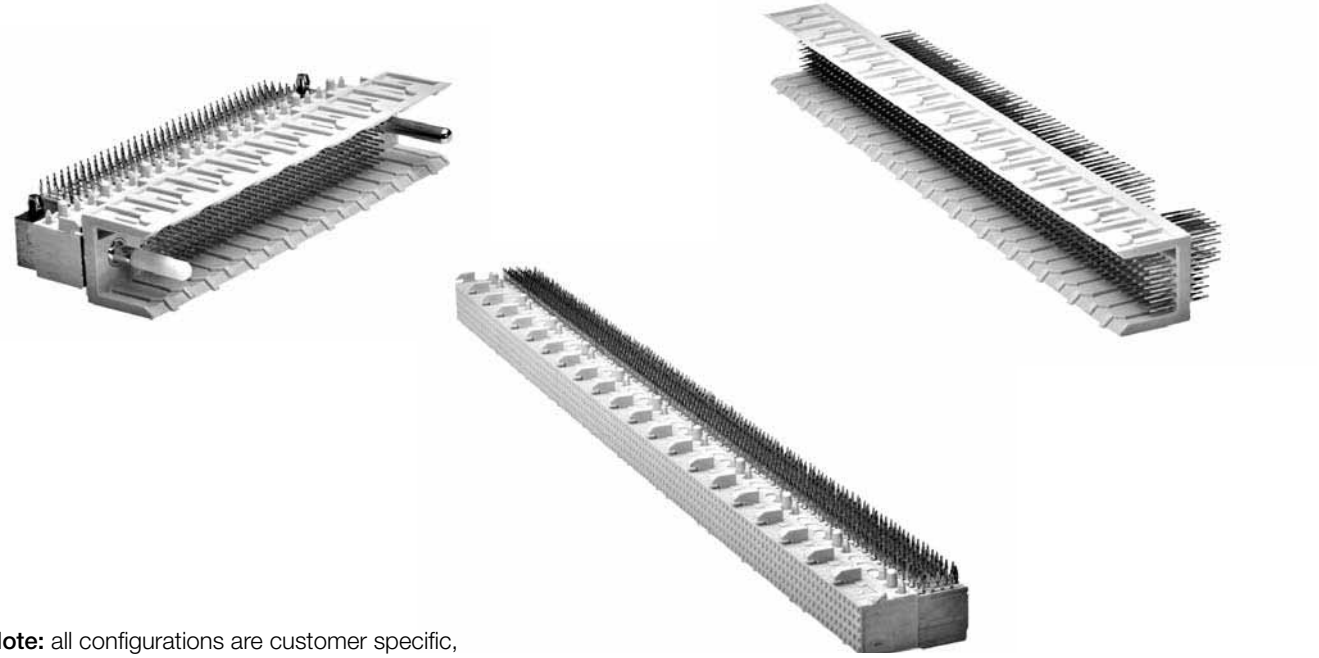


mating part,
cable connector Shielded
part number 10013381-231LF, page 177

PARTNUMBER **10022805-101LF**

The products shown give an impression of the capabilities within the METRAL® core family

Monoblocks, various Headers and Receptacles



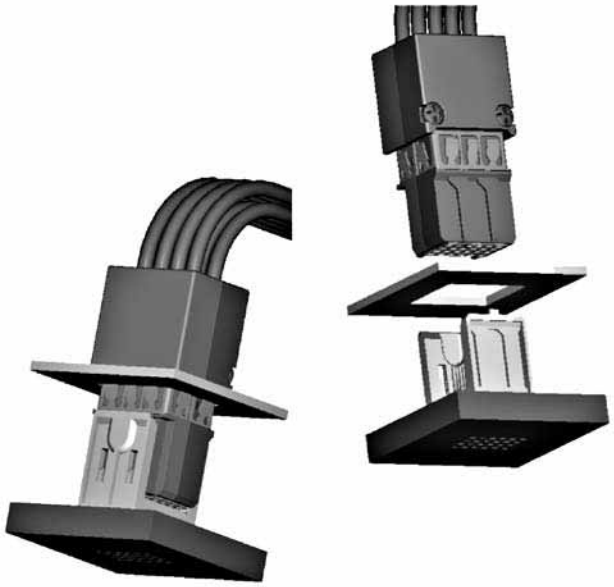
Note: all configurations are customer specific,
new configurations on request only,
please contact your local sales representative.

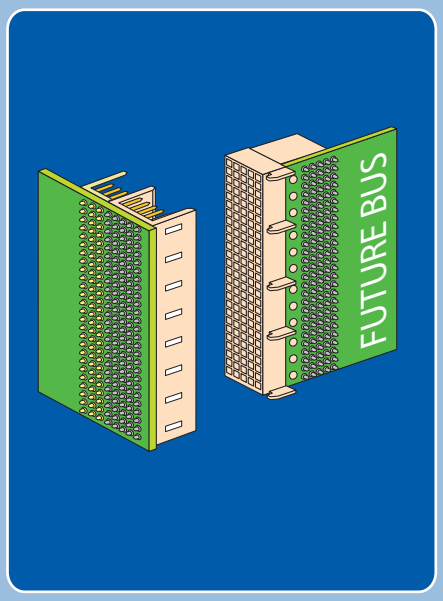
E1-T1 Connectors, 2Mb Field I/O connector system

- 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





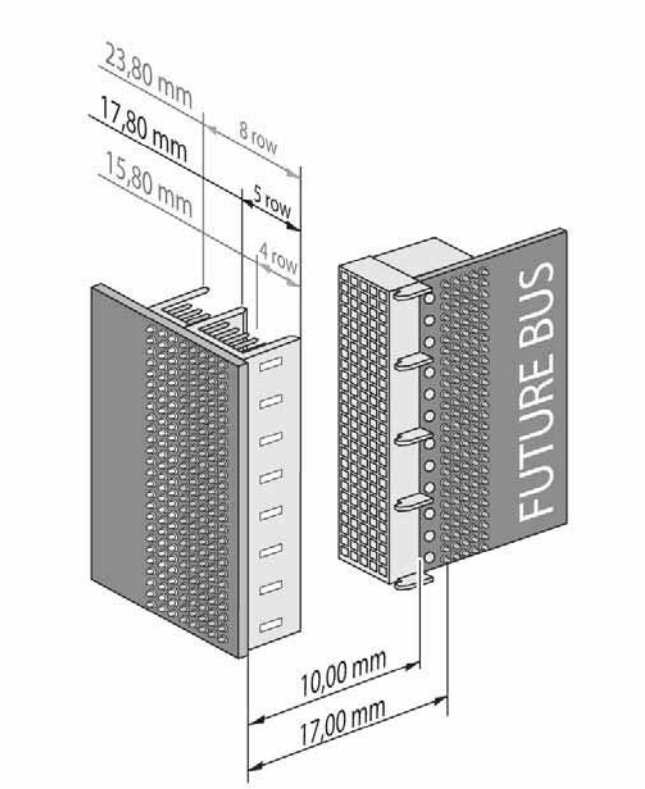
METRAL® TECHNICAL SPECIFICATION

- Future Bus
- IPCI Bus
- Performance Specifications
- Electrical Specifications
- Process Specifications

METRAL® FUTUREBUS versus HARD METRIC

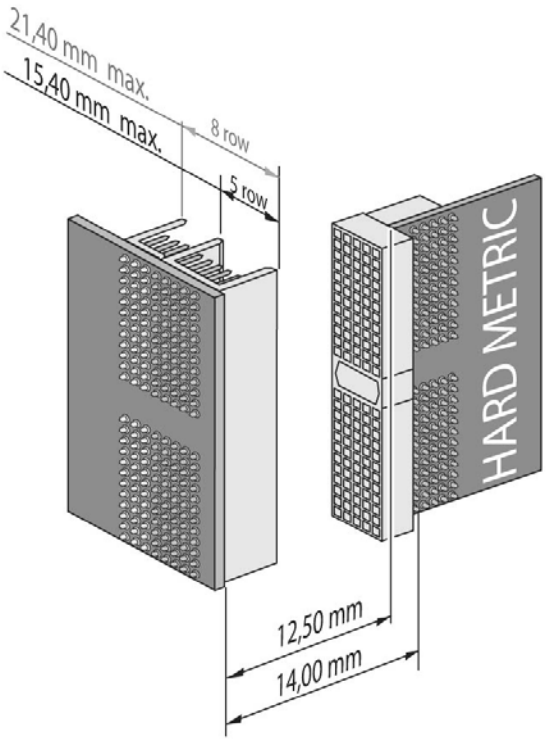
FUTUREBUS

- METRAL® Core
- METRAL® High Speed



HARD METRIC

- Millipacs
- Airmax



METRAL® IPCI Bus

FCI Electronics

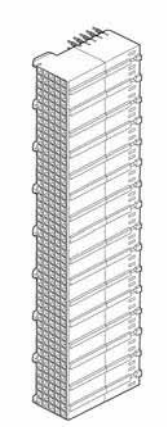
METRAL® connector system was chosen as the interconnection system for the IPCI (Industrial peripheral computer Interface)

The following are typical 3SU and 6SU board configurations

Daughter Board

Receptacle Right-Angle

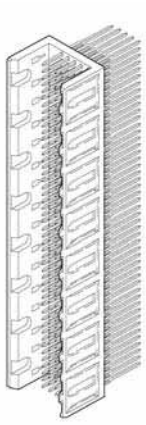
- Solder-to-Board
  5 x 48 positions
  85866-xxxLF
- Press-Fit
  5 x 48 positions
  89055-xxxLF

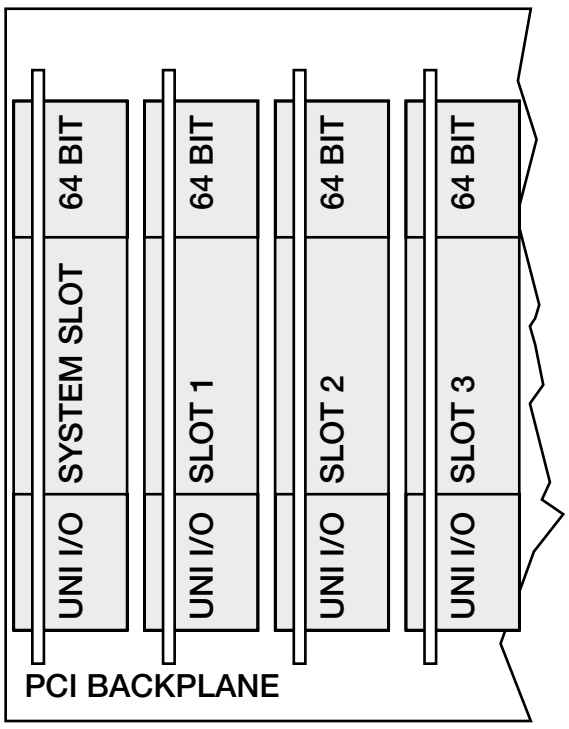


Backpanel

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 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 1000 ps risetime	 12 - 18 nH 15 - 24 nH (location dependent)
Propagation delay	143 - 214 ps (24 ps. row to skew)
Crosstalk 500 ps risetime 1000 ps risetime	(single line driven) 6,0 % max. near end 3,5 % max. near end
Impedance 1000 ps risetime	 56 - 71 Ohm (location dependent)
Contact resistance signal power	 25 - 45 m Ohm 8 m Ohm
Insulation resistance	> 5000 M Ohm

ELECTRICAL CHARACTERISTICS

GENERAL

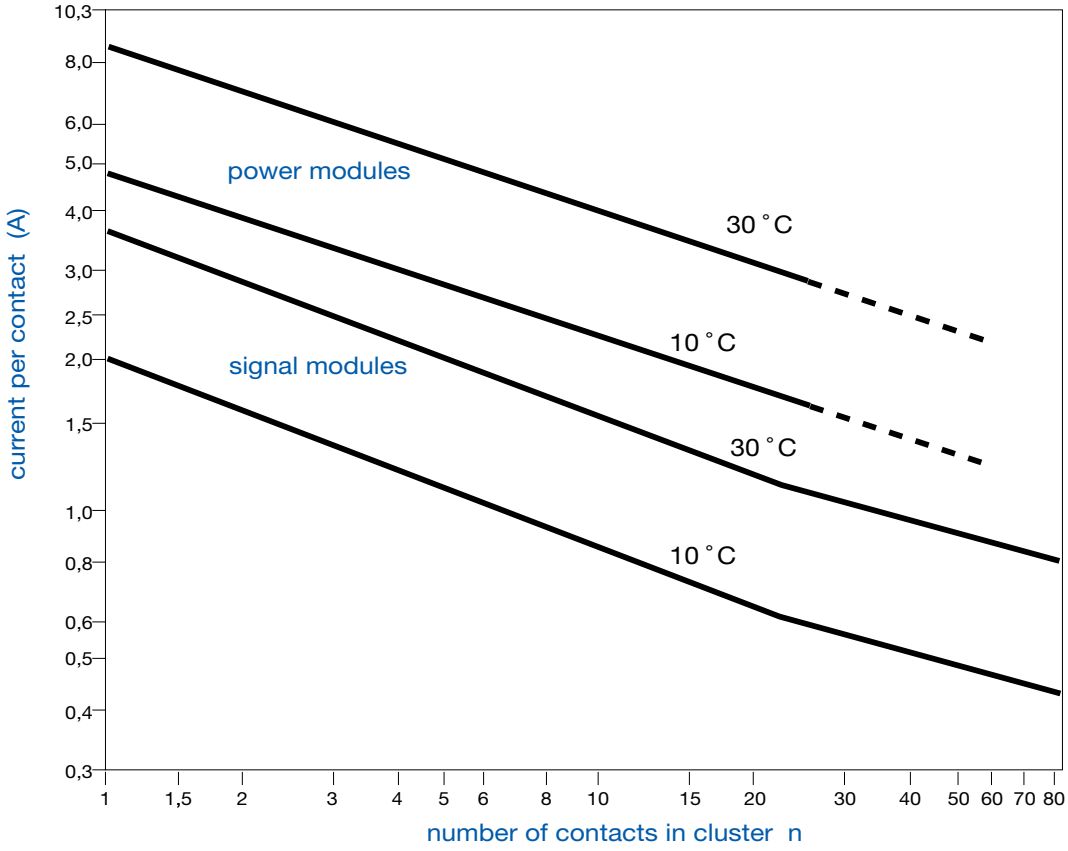
Current Carrying Capacity.

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



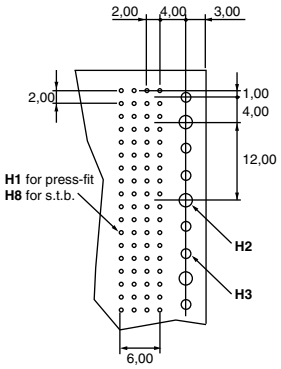
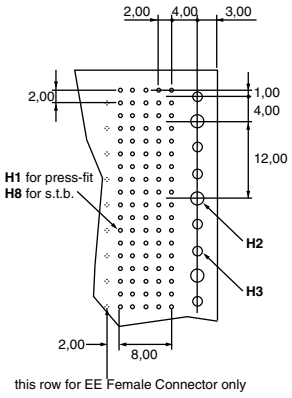
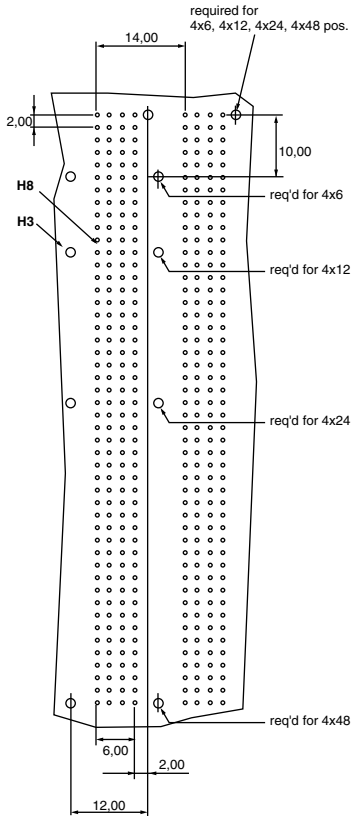
SPICE Parameters.

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.

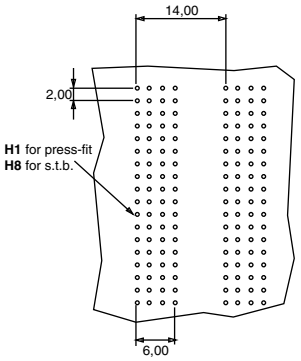
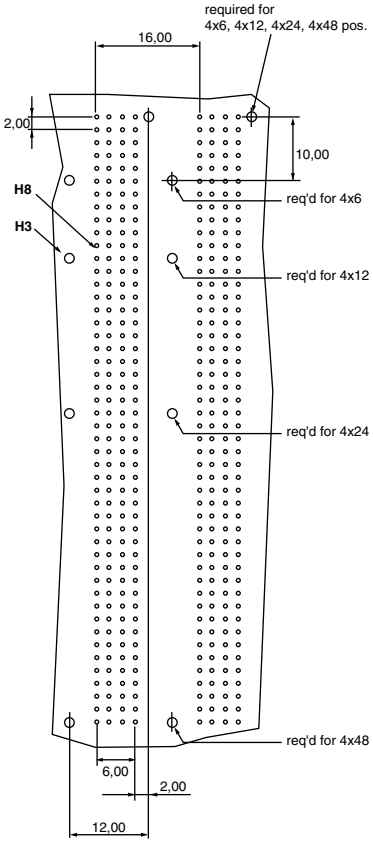
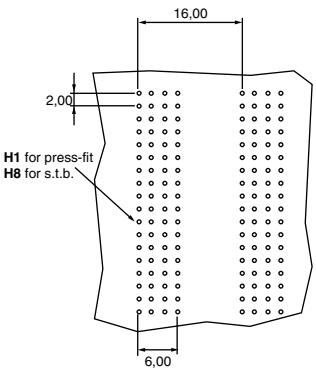
Hole Specifications

Hole H1	• Drill size	0,85 mm
	• Drilled hole tolerance	0,81 to 0,86 mm
	• Copper plating	0,025 mm min
	• Tin-lead plating	0,005 to 0,015 mm
	• Finished hole size	0,65 to 0,80 mm
	• Recommended land size	1,17 mm
Hole H2	• Unplated	2,05 +0,05/-0,00 mm
	• Plated (for EE receptacle only)	
	Drill size	2,10 mm
	Copper plating	0,025 to 0,050 mm
	Tin-lead plating	0,005 to 0,015 mm
	Finished hole size	1,05 to 2,05 mm
Hole H3	• Unplated	1,50 +0,10/-0,00 mm
Hole H4	• Unplated-when used with guide pin	3,25 ±0,10 mm
	• Plated - when used with straight screw-to-board high-power plug insert; use pad 5,00 mm min. in dia	3,25 ±0,10 mm
	• Plated - for press-fit power insert	
	Drill size	3,15 ±0,25 mm
	Copper plating	0,04 mm min.
	Tin-lead plating	0,005 to 0,015 mm
	Finished hole size	3,00 +0,04/-0,06 mm
Hole H5	• Unplated	6,00 +0,10/-0,00 mm
Hole H6	• Plated	
	• When used with right-angle solder-to-board pass-through high-power receptacle insert, use common pad to tie all six holes together	1,00 ±0,10 mm
	• 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
Hole H7	• Unplated	2,80 +0,10/-0,00 mm
Hole H8	• Plated	0,70 +0,10/-0,05 mm
	• Recommended land size	1,10 mm max
Hole H9	• Unplated	1,85 ± 0,05 mm

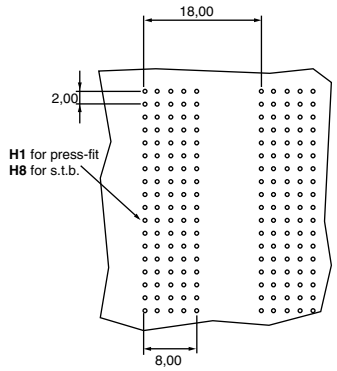
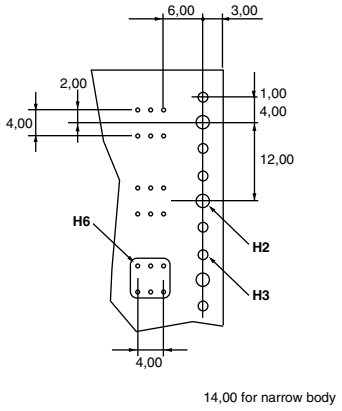
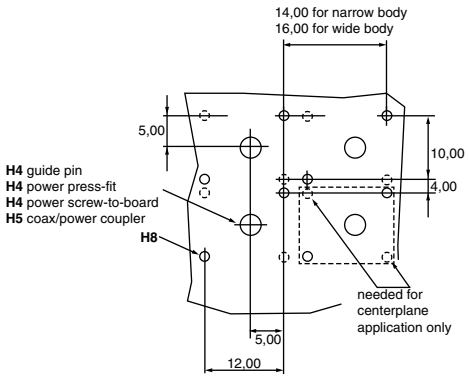
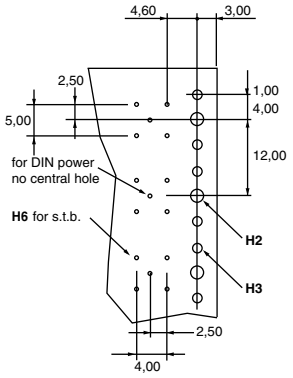
PCB Patterns

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	

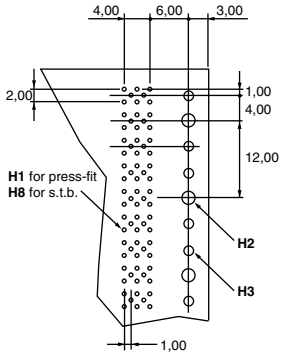
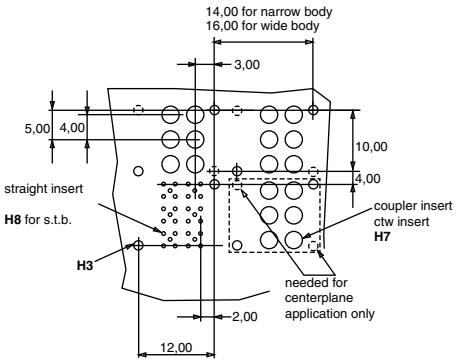
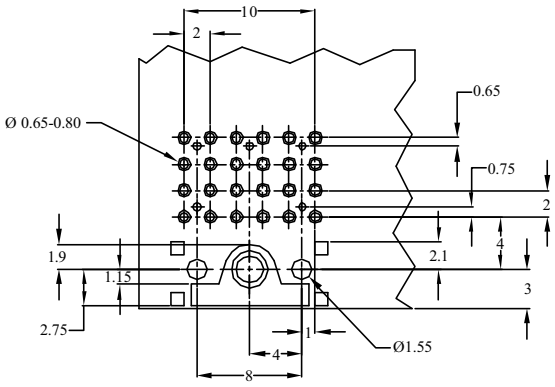
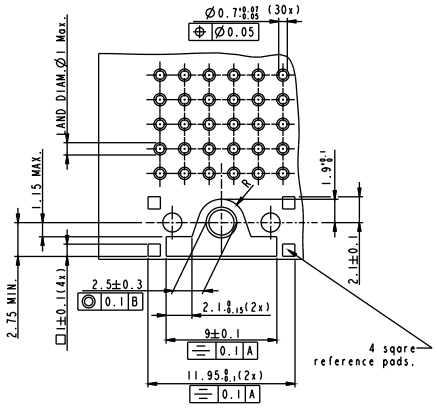
PCB Patterns

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	

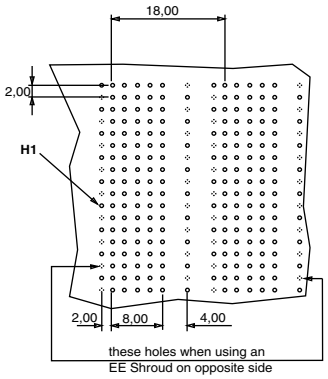
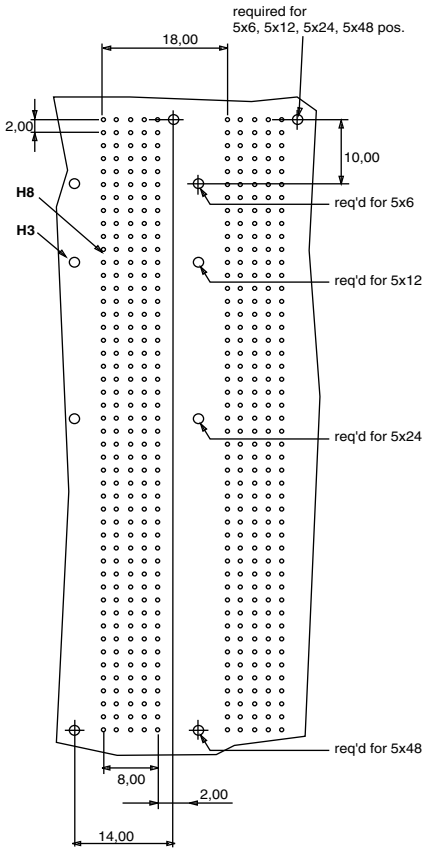
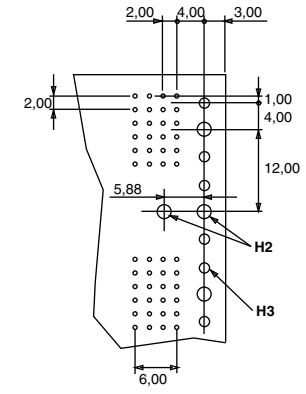
PCB Patterns

PCB Pattern	Family	Applicable to connector type	PCB recommended layout
P7	**Signal & Power**	receptacle / header wide body 5 row STRAIGHT press fit	
P8	**Hybrid**	DIN high power receptacle	
P9	**Hybrid & Accessories**	DIN high power header DIN standard Coax header Guide pin	
P10	**Hybrid**	DIN high power STRAIGHT receptacle DIN Standard RIGHT ANGLE receptacle	

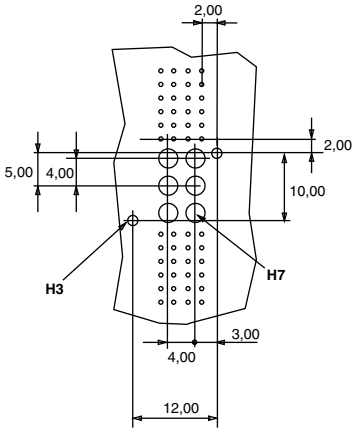
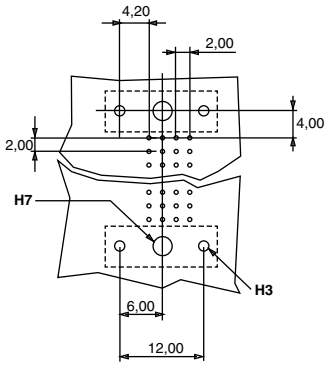
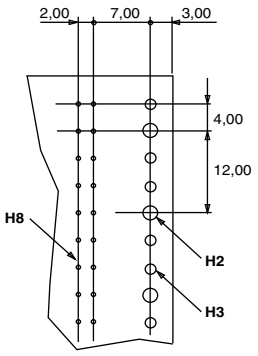
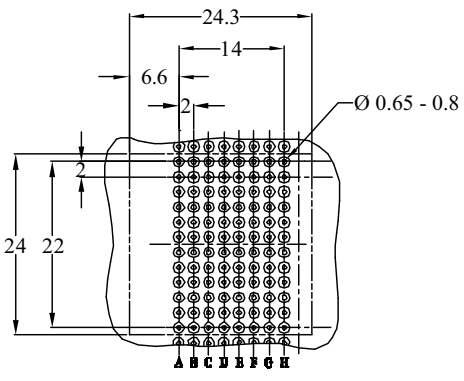
PCB Patterns

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	

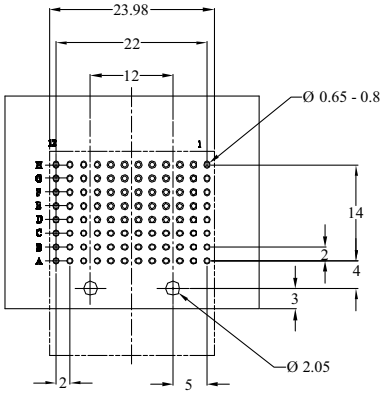
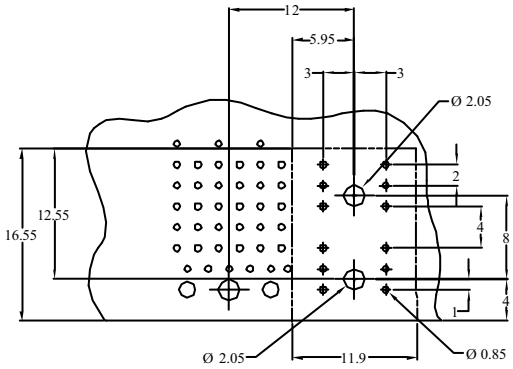
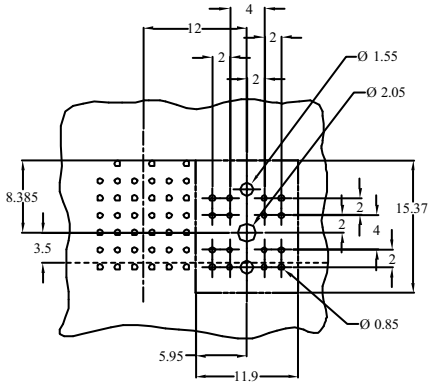
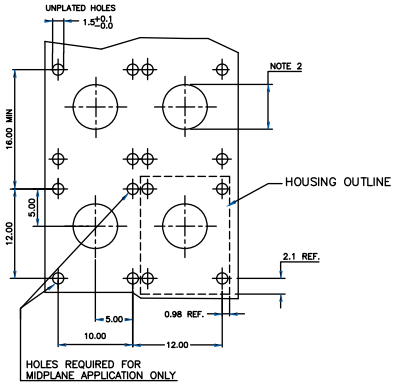
PCB Patterns

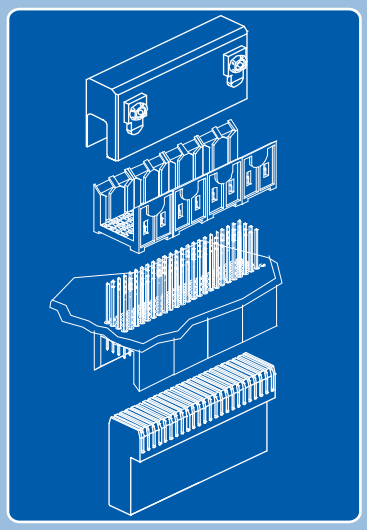
PCB Pattern	Family	Applicable to connector type	PCB recommended layout
P15	**Signal & Power**	receptacle / header wide body 5 row STRAIGHT press-fit Shielded	
P16		receptacle / header wide body 5 row STRAIGHT press-fit	
P17	**Accessories**	board-to-board keying receptacle	

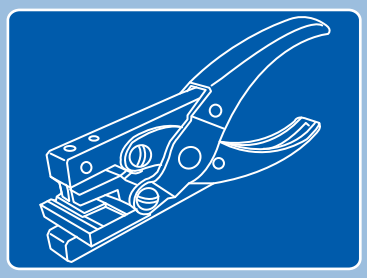
PCB Patterns

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 Patterns

PCB Pattern	Family	Applicable to connector type	PCB recommended layout
P22	**Signal**	receptacle wide body 8 row RIGHT ANGLE press-fit	
P23	**High Power**	High power header	
P24	**High Power**	High power receptacle	
P25	**Accessories**	Hybrid housing	

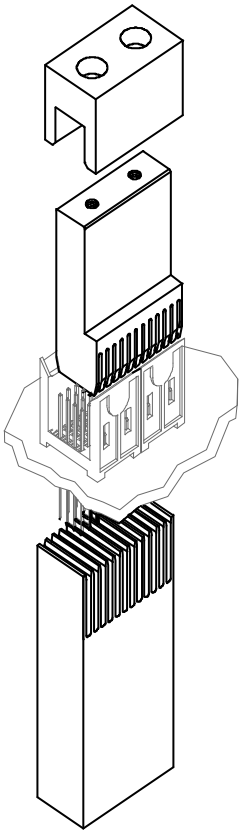


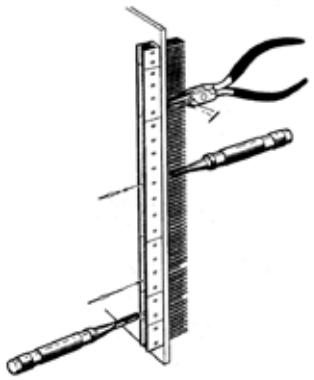
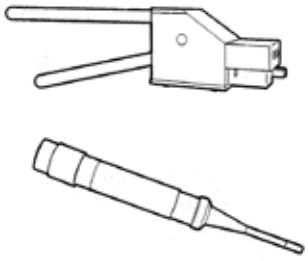
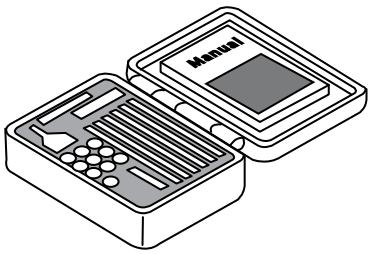
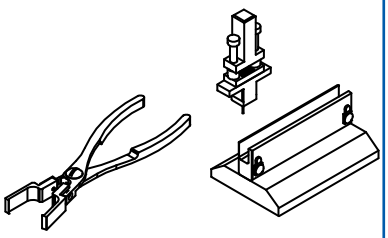


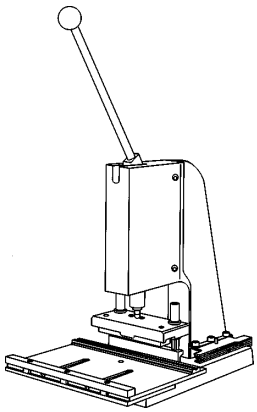
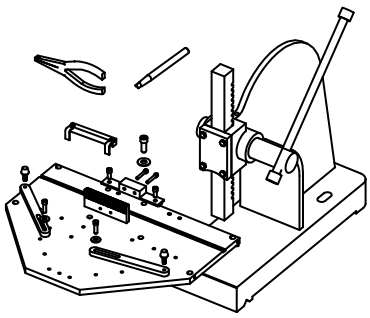
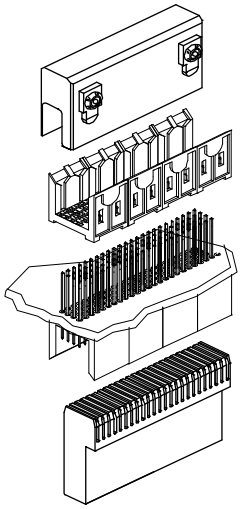
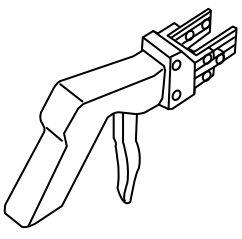
METRAL® APPLICATION EQUIPMENT

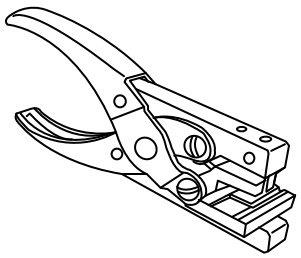
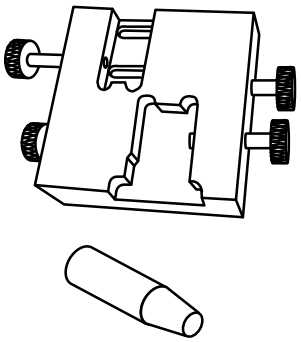
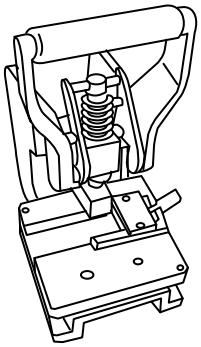
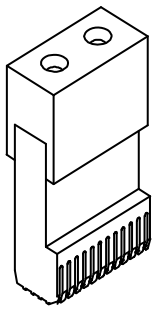
application tooling for the diverse connector types

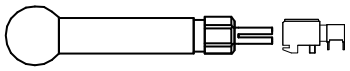
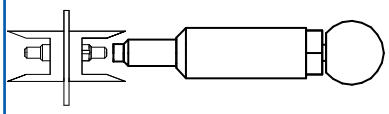
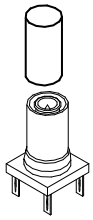
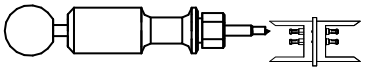
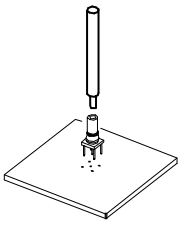
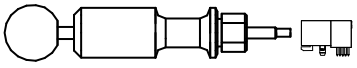
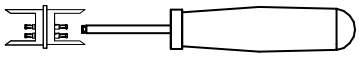
Family	Connector Type	Tooling Description	Tooling Part number	Tooling Application
		insertion tooling		
		press block holder - 4 and 5 row - 1 mod	415446-001	
		press block holder - 4 and 5 row - 2 mod	415446-002	
		press block holder - 4 and 5 row - 4 mod	415446-003	
		press block holder - 4 and 5 row - 8 mod	415446-004	
		board support - 4 and 5 row	415609-001	
		board support - 4 and 5 row	415609-002	
		board support - 4 and 5 row	415609-003	
		board support - 4 and 5 row	415609-004	
Signal, Power & Electrical Enhanced	**Header Straight**	signal press block - 4 row - 1 mod	166934-001	
		signal press block - 4 row - 2 mod	166934-002	
		signal press block - 4 row - 4 mod	166934-003	
		signal press block - 4 row - 8 mod	166934-004	
		signal press block - 5 row - 1 mod	166935-001	
		signal press block - 5 row - 2 mod	166935-002	
		signal press block - 5 row - 4 mod	166935-003	
		signal press block - 5 row - 8 mod	166935-004	
		power press block - 4 row - 1 mod	416393-001	
		power press block - 4 row - 2 mod	416393-002	
		power press block - 4 row - 4 mod	416393-003	
		power press block - 4 row - 8 mod	416393-004	
		power press block - 5 row - 1 mod	416394-001	
		power press block - 5 row - 2 mod	416394-002	
		power press block - 5 row - 4 mod	416394-003	
		power press block - 5 row - 8 mod	416394-004	

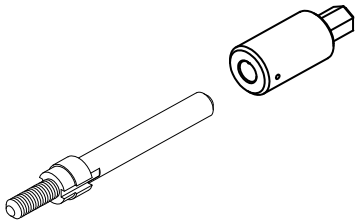
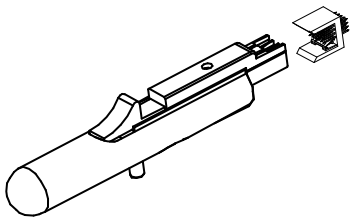
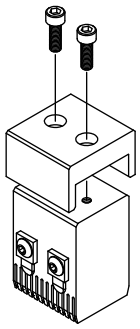
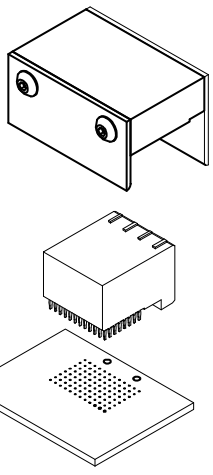
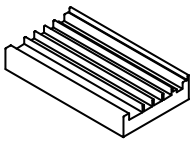


Family	Connector Type	Tooling Description	Tooling Part number	Tooling Application
Signal, Power & Electrical Enhanced	**Header Straight**	**removal tool pin out of backside**	**MT-330** 194208-001	
		removal tool pin out of matingside	**MT-340** 194204-001	
		self-repair KIT	**MT-0370-01**	
		multiple 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**	**MT-0510** 162452-001	
		top tool press bar - 8 mod	162325-001	
		top tool press bar - 1 mod	162325-004	
		top tool press bar - 2 mod	162325-005	
		top tool press bar - 4 mod	162325-007	
		board support bottom tool - 146.2mm	162383-001	
		removal tool - 4 and 5 row	**HT-0518** 415774-001	
		module blade - 1 mod	413773-001	
		module blade - 2 mod	413776-001	
		module blade - 4 mod	413774-001	
		module blade - 8 mod	413775-001	
		module press bar	415783-001	
		module press bar	415783-002	
		module press bar	415783-004	
		module press bar	415783-008	
Signal, Power	**Shroud**	**insertion tool 4 row**	166934	
			166623-003	
		press block 2 mod - 4 row	166623-002	
		press block 4 mod - 4 row	166623-001	
		press block 8 mod - 4 row		
			166935	
		insertion tool 5 row	166624-003	
		press block 2 mod - 5 row	166624-002	
		press block 4 mod - 5 row	166624-001	
		press block 8 mod - 5 row		
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** **insertion termination tool 5 row**	**HT-0524** **HT-0525**	
		removal termination tool 4 and 5 row **removal termination tool contacts**	**HT-0522** **HT-0523**	
		cover assembly tool 4 and 5 row **shielded cover assembly press**	**HT-0520** 415810-001 **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	

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	
	Mini Coax	**insertion header coax contact**	**HT-0359**	
		removal header coax contact	**HT-0400**	
		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** **insertion tooling - 5 row**	409298-001 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	 

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-tp-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 shileded 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

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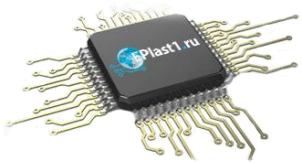
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